सत्यमेव जयते

Ministry of Petroleum and Natural Gas

Government of India

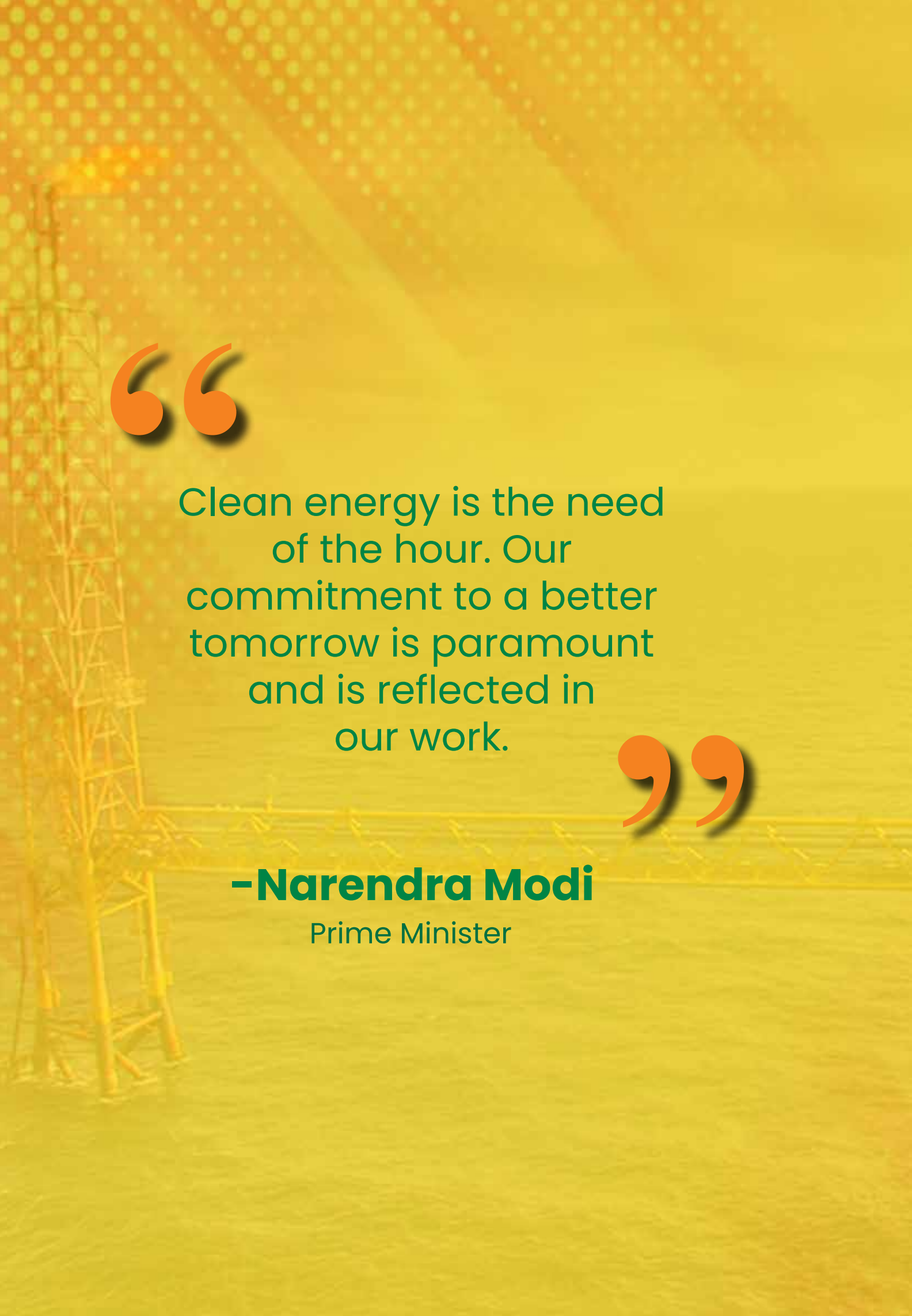
DRIVING INDIA'S ENERGY SHIFT-

Cleaner, Greener, Smarter



NET ZERO

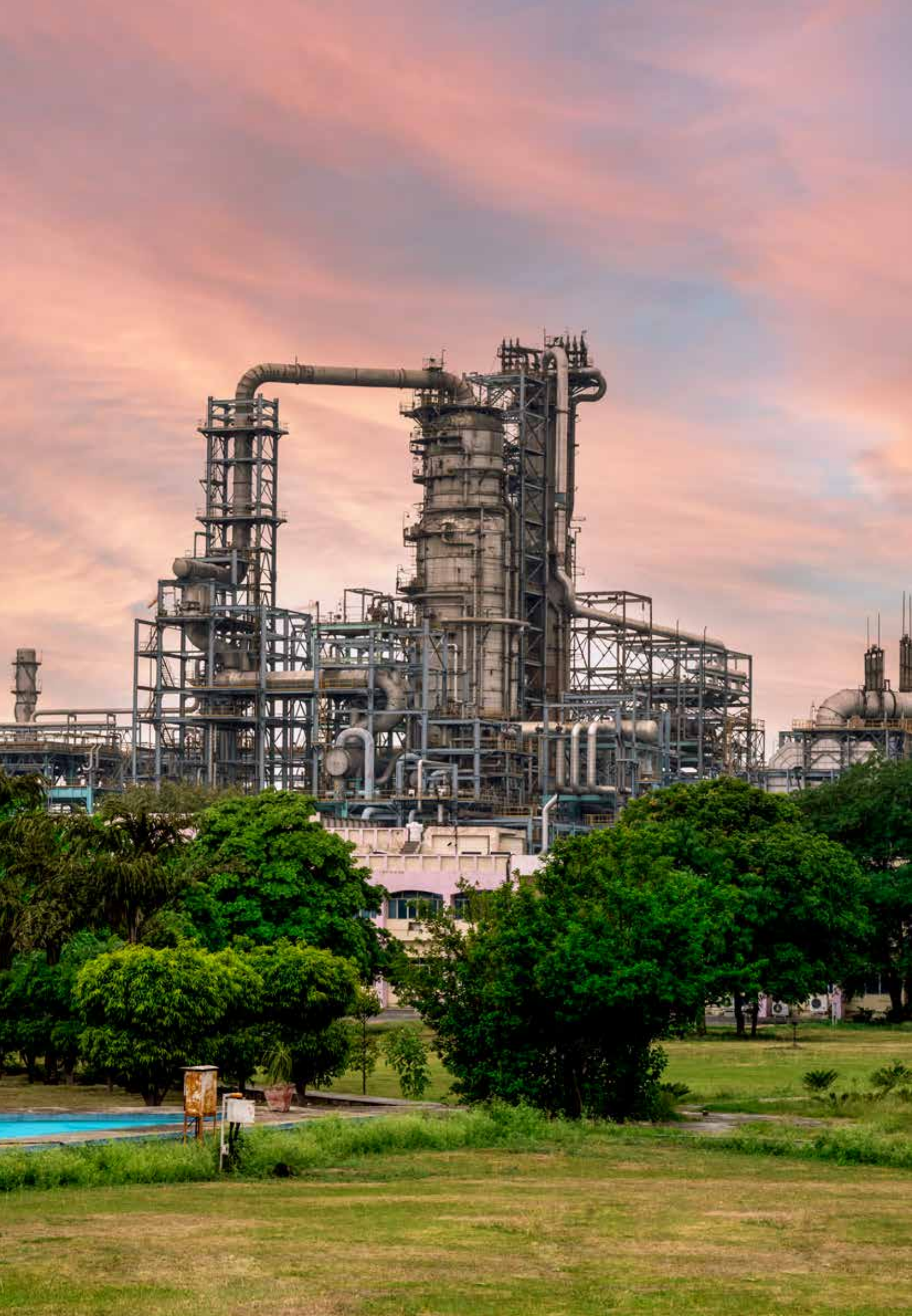
ANNUAL REPORT 2024-25


Clean energy is the need of the hour. Our commitment to a better tomorrow is paramount and is reflected in our work.
-Narendra Modi
Prime Minister



India's Key Energy Drivers

- Accelerating efforts to move towards a gas-based economy
- Greater reliance on domestic sources to drive biofuels
- Cleaner use of fossil fuels particularly petroleum and coal
- Increasing contribution of electricity to de-carbonize mobility
- Achieving renewables target of 450GW by 2030
- Digital innovation across all energy systems
- Moving into emerging fuels including hydrogen



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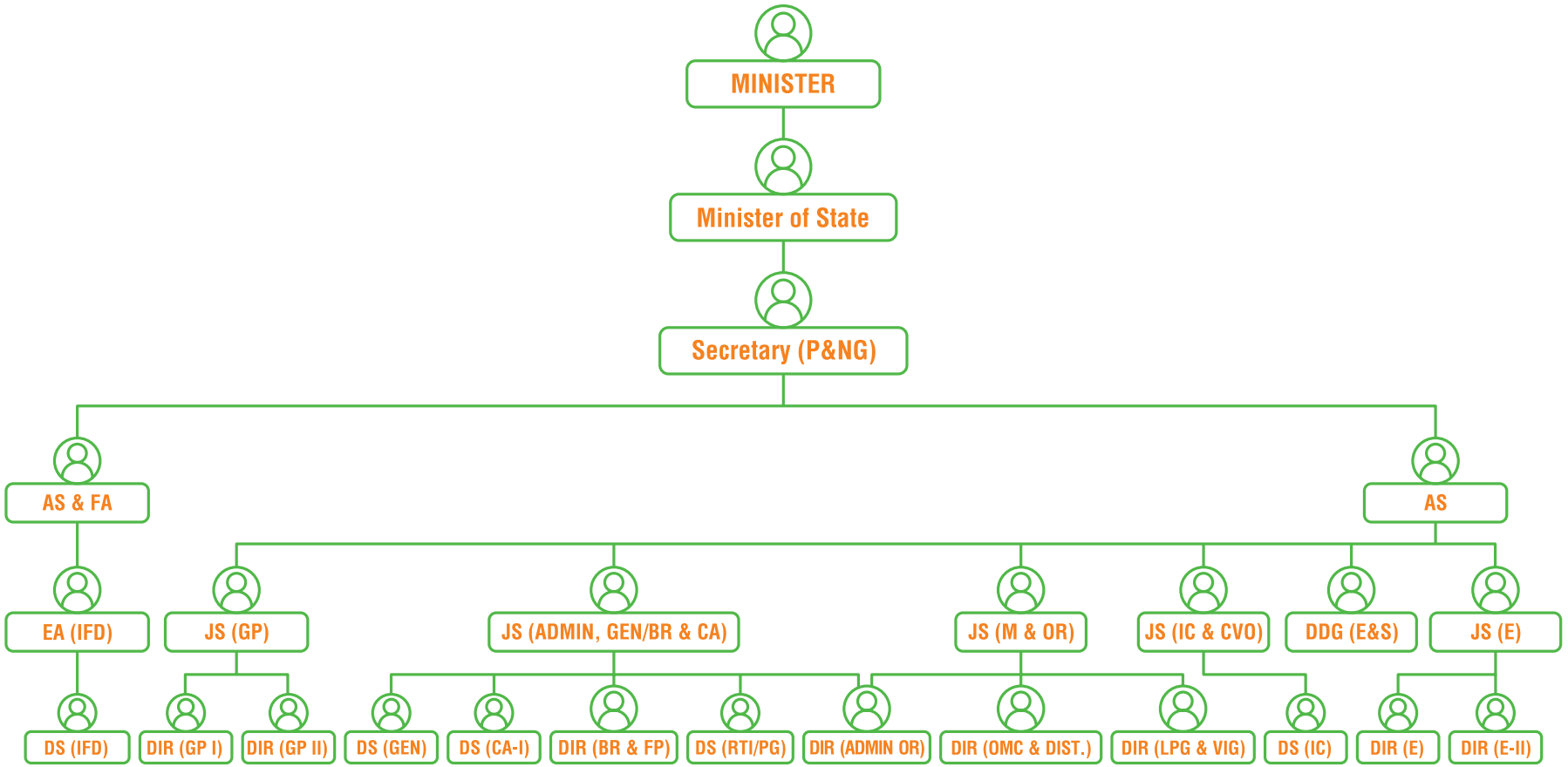
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Organization Structure Overview

- Shri Hardeep Singh Puri continues to hold the charge of Minister for Petroleum and Natural Gas with effect from 11th of June, 2024.
- Shri Suresh Gopi holds the charge of Minister of State for Petroleum and Natural Gas with effect from 11th of June, 2024.
- Shri Pankaj Jain, IAS (AM:1990), holds the charge of Secretary in the Ministry of Petroleum and Natural Gas with effect from 30th of December, 2021.
- Shri Praveen Mal Khanooja, IA & AS:1994, holds the charge of Additional Secretary in the Ministry of Petroleum and Natural Gas with effect from 12th of August, 2022.
- Ms Kamini Chauhan Ratan, IAS (UP:1997), holds the charge of Additional Secretary & Financial Adviser Secretary in the Ministry of Petroleum and Natural Gas with effect from 22nd of November, 2022.
- Ms Sujata Sharma, IAS (AP:2006), continues to hold the charge of Joint Secretary in the Ministry of Petroleum and Natural Gas with effect from 12th of December, 2022.
- Shri Asheesh Joshi, IAS (UD:2006), continues to holds the charge of Joint Secretary in the Ministry of Petroleum and Natural Gas with effect from 19th of July, 2023.
- Shri Vinod Seshan, IAS (AM:2008), holds the charge of Joint Secretary in the Ministry of Petroleum and Natural Gas with effect from 7th of August, 2024.
- Ms Esha Srivastava, IFS:2004, holds the charge of Joint Secretary in the Ministry of Petroleum and Natural Gas with effect from 8th of January, 2024.
- Shri Rohit Mathur, CSS, continues to hold the charge of Joint Secretary in the Ministry of Petroleum and Natural Gas with effect from 10th of January, 2020.
- Shri Dheeraj Kumar Ojha, ISS:1999, continues to hold the charge of Deputy Director General in the Ministry of Petroleum and Natural Gas with effect from 10th of December, 2021.
- Shri Rajinder Kumar, IES:2003, continues to hold the charge of Economic Adviser in the Ministry of Petroleum and Natural Gas with effect from 11th of March, 2022.
- In line with the guidelines laid down by Hon'ble Supreme Court in the Case of Vishakha & Ors. Vs. State of Rajasthan & Ors. and orders issued by Department of Personnel & Training/Ministry of Women & Child Development, an Internal Complaint Committee (Women Cell) has been re-constituted in the Ministry for prevention and redressal of complaints of sexual harassment of working women. Presently, Ms Sujata Sharma, Joint Secretary in the Ministry of Petroleum and Natural Gas, is the Chairperson of the Committee with four other members (including one member from NGO).



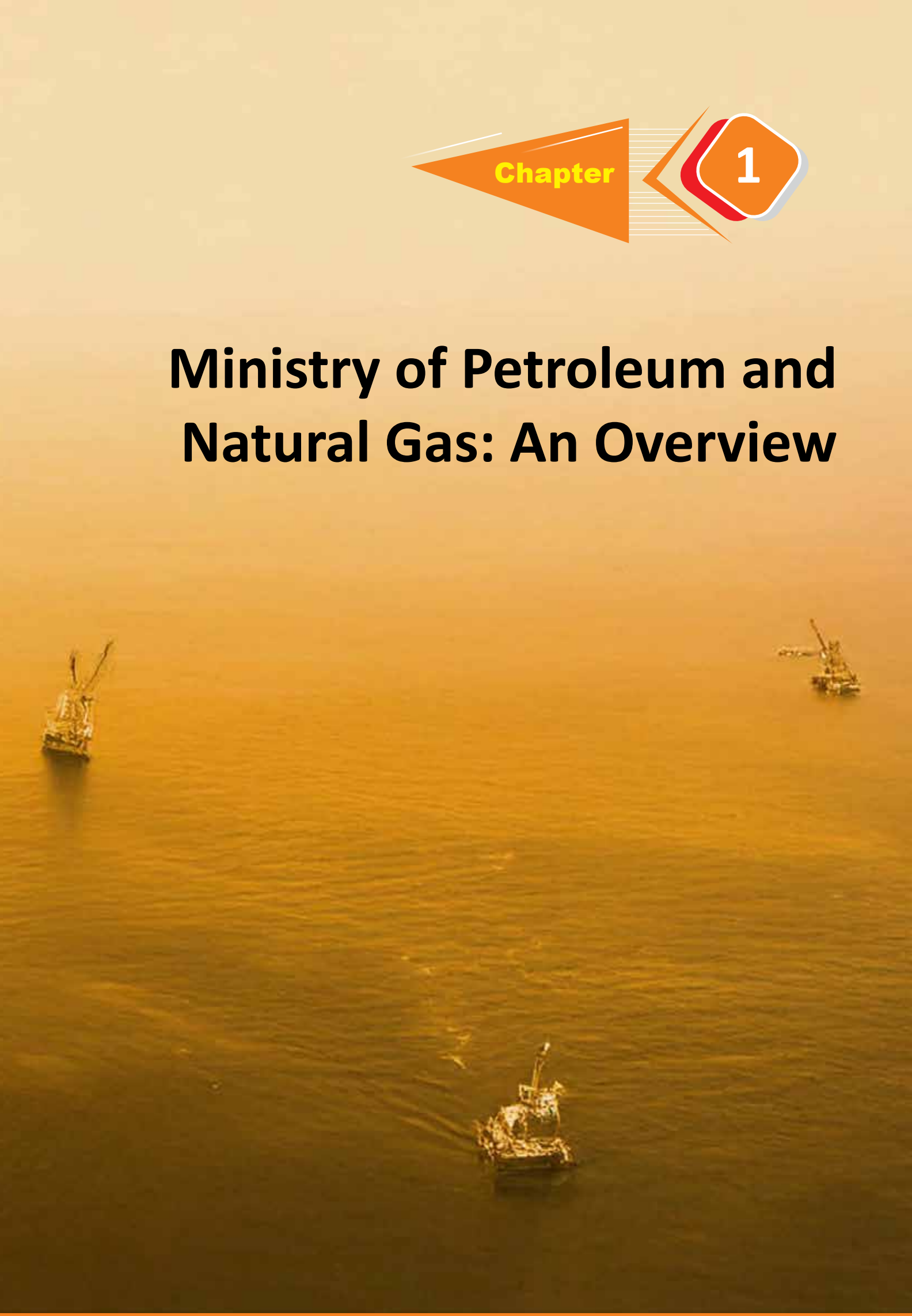
Organogram of M/o Petroleum & Natural Gas





Chapter 1

Ministry of Petroleum and Natural Gas: An Overview



1 Ministry of Petroleum and Natural Gas: An Overview

Performance of Petroleum & Natural Gas Sector - Some Key Macro-Economic Trends

1.1: Introduction:

India has achieved noteworthy economic milestones in recent years. India, the world's fourth-largest economy, has emerged as the fastest-growing major economy and is on track to become the world's third-largest economy with a projected GDP of $7.3 trillion by 2030.

India's petroleum industry is a comprehensive sector encompassing exploration, production, refining, distribution, and marketing of petroleum and its by-products. This includes upstream activities like extraction of crude oil and natural gas, midstream activities such as transportation and storage, and downstream processes including refining and distribution of fuels like petrol, diesel, LPG and kerosene. A critical contributor to India's energy basket, the petroleum industry ensures energy security and underpins various economic activities.

The petroleum sector in India is experiencing growth, driven by increasing energy demand and government initiatives focused on energy security and access. India is a major player in refining and exporting petroleum products and is poised to be a significant contributor to global oil demand growth. As governments worldwide focus on bolstering domestic security, with a particular emphasis on energy security, India's role as the current G20 presidency offers a unique opportunity to lead discussions on critical global issues, notably climate change. India has already achieved its commitments to reduce emissions intensity by 33-35% compared to 2005 levels, and to produce 40% of its electricity from non-fossil fuel-based energy sources. India took a further step forward in August 2022 when it enhanced its nationally determined contribution, in line with its goal to achieve net-zero emissions by 2070. However, like many developing countries, India also faces the challenge of balancing environmental sustainability and ensuring energy security as well as energy equity for its people.

India is striving towards ensuring energy justice through accessibility and affordability which will be the key driver towards increasing per-capita energy demand in near future. The Hon'ble PM has envisaged four pillars of India's energy future – energy access, energy efficiency, energy sustainability and energy security. These four pillars are crucial for India as it marches ahead in its ambition to become an economic powerhouse in the world.

The demand for energy is met mostly by fossil fuels, which accounts for 88.2% of India's primary energy requirement. As per the Energy Institute's 74th edition Statistical Review of World Energy-2025, Coal accounts for 59.3% of the energy mix, Oil and Gas account for 28.1% and 6.5% respectively.

India's Energy Mix in 2024		
Coal	:	**59.3%**
Crude Oil	:	**28.1%**
Renewables	:	**3.1%**
Natural Gas	:	**6.5%**
Hydroelectricity	:	**1.4%**
Nuclear Energy	:	**1.5%**

The global energy landscape is witnessing rapid changes in view of the climate

commitments and geopolitical situations. This has driven the need for a discussion and proactive steps towards low-carbon pathways and decarbonization throughout the energy value chains. With a record annual capacity addition of 29.52 GW, the total installed renewable energy (RE) capacity in the country has reached 220.10 GW as of 31st March 2025, up from 198.75 GW in the previous fiscal. This performance reflects India's steady advancement towards the target of achieving 500 GW of non-fossil fuel-based capacity by 2030, as part of its commitments under the 'Panchamrit' goals set by Prime Minister Shri Narendra Modi. Hon'ble Prime Minister's has outlined his vision on Energy Transition in COP-26 at Glasgow in 2021, known as "PANCHAMRIT".

PANCHAMRIT

- To increase its non-fossil energy capacity to 500 GW by 2030 including 450 GW Renewable Energy (RE) capacity addition and 43% RE purchase obligation by 2030.
- To meet 50 % of India's power demand via renewable energy sources.
- To reduce the carbon intensity of the Indian economy by 45%.
- To reduce India's total projected carbon emissions by one billion tonnes from 2021 to 2030.
- To achieve a target net zero (for carbon emissions) by 2070.

This emphasizes the shift toward non-fossil fuel energy infrastructure and aims to achieve carbon neutrality by 2070, thereby reducing emissions to net-zero. Simultaneously, India is expected to double its energy demand by 2050 wherein the energy mix will be crucial in deciding the energy transition and fuels of the future. The focus towards emerging fuels and alternate energy will act as key driver and lever in designing the futuristic energy systems and formulating an effective national energy policy. The issue of energy transition, diversification of energy basket, energy independence and energy security shall be affecting the energy mix of India in the years ahead.

Meeting the rising demand for energy resources in an economically viable, environmentally sustainable manner poses a formidable national challenge. Increasing oil and gas production in near future will require a targeted effort to boost production from both producing fields and fields under development to arrest the decline. However, domestic production of crude oil has been static or declining over the years. Production enhancement from existing fields alone, which are mostly mature or maturing, is possible to a limited extent only.

A multi-pronged approach is required for achieving production targets such as enhancing production from already producing fields (old & new), speedy execution of FDPs (Field Development Plans) in existing and new fields, monetization of un-monetized fields and discoveries, augmenting inventory of flowing wells, effective implementation of Production Enhancement Contracts (PEC), Production linked incentives in existing acreages, scouting technology partners to develop difficult plays like Tight oil / gas and HP-HT reservoirs, exploration of unconventional resources like CBM, Shale Oil / Gas in existing and new acreages etc.

New and substantial discoveries of hydrocarbon accumulations are critical to increase domestic production of natural gas and crude oil. Aggressive drilling of exploratory wells in unexplored areas as well as play-based explorations in less explored areas is the need of the hour, with the participation of global oil majors. A two-pronged approach to increase domestic production is needed: (a) exploration in mining lease areas targeting unproven plays and missed/by-passed oil and (b) aggressive award of large

exploration acreages, especially in deep-water and ultra-deep-water areas, aiming at substantial discoveries for monetization.

It is necessary to accelerate exploration, especially in frontier offshore areas, and attract foreign capital through exploration-led, data driven strategies and effective outreach. The focus of exploratory efforts should be on 'Yet to Find' hydrocarbon resources. Simultaneously, emphasis on enhancing production from existing fields, which are mostly mature or maturing, is critical to sustain and enhance the current levels of domestic production of oil and gas. The primary goal is to boost recovery rates and production from our reserves by leveraging cutting-edge technology, innovative processes, and strategic partnerships.

The strategy for enhancing domestic production and reducing dependence on import needs to be tailored to the current global scenario and investment climate. In view of increasing domestic energy needs and growing climate concerns, shrinking investment in greenfield E&P projects and increasingly stiff competition from other countries to attract foreign capital in E&P Sector, it is imperative to adopt fresh and comprehensive measures to attract private investors in the Indian E&P sector.

In order to locate 'Yet to Find' hydrocarbon resources, the active area of sedimentary basins needs to go up significantly to translate into greater resource accretion through award of larger exploration acreages under the forthcoming OALP bidding rounds. To achieve this objective, key strategic priorities are acreage accretion, with thrust on play-based exploration, time bound completion of exploratory work programme, complete seismic survey up to EEZ boundary, exploration of the petroliferous Andaman basin, special bid rounds for offshore areas and North-East, upgradation of NDR and new data acquisition/ dissemination policy and National Geo-scientific data acquisition & drilling programme etc.

Government of India is driving its efforts in evolving a comprehensive energy security mechanism. To become "AatmaNirbhar", India must reduce its import dependency, which means that it should fully exploit its existing hydrocarbon resources through accelerated E&P (Exploration & Production) activities.

Government has adopted a five-pronged strategy comprising increasing domestic production of oil and gas, promoting energy efficiency and conservation measures, giving thrust on demand substitution, promoting biofuels and other alternate fuels/ renewables, EV charging facilities and refinery process improvements for reducing the country's oil dependence on imported crude oil.

1.2: Production of Oil, Gas and Petroleum Products:

The crude oil production during the year 2024-25 was 28.70 MMT against production of 29.36 MMT in 2023-24. In indigenous maximum production of crude oil from the western offshore of ONGC around 43.32% of total crude oil production. Natural Gas production during FY 2024-25 was 36.11 Billion Cubic Meters (BCM) against production of FY 2023-24 (36.44 BCM). The maximum production of natural gas was from western offshore of ONGC which is around 40.06% of the total production of natural gas.

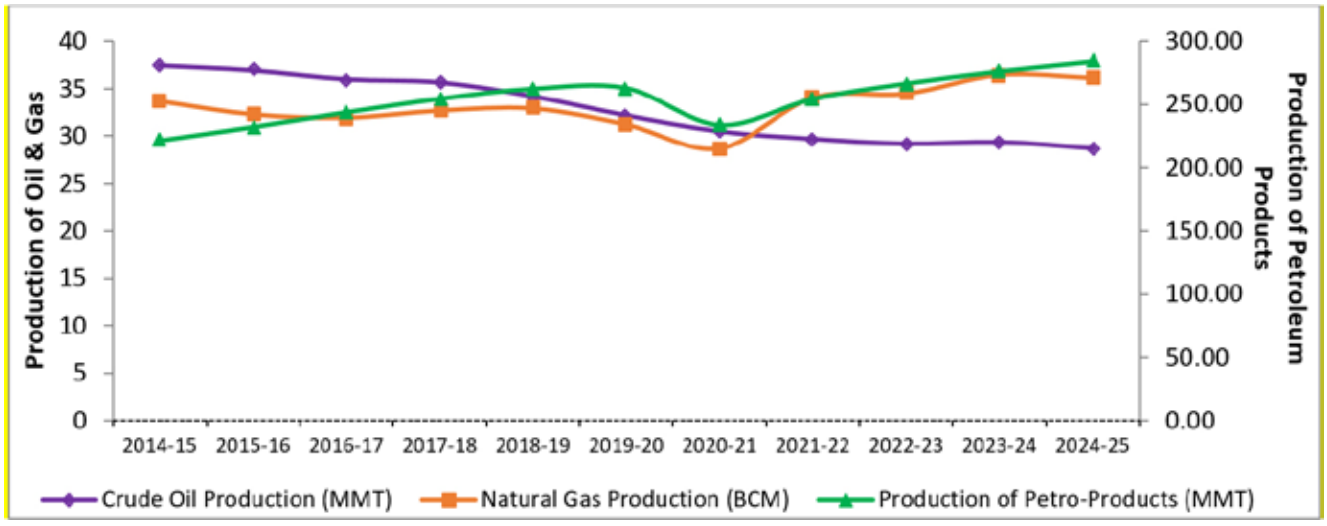
Production of Petroleum Products during the 2024-25 was 283.77 MMT, which is 2.79% higher than the production of FY 2023-24 (276.06 MMT). The trends in the production of crude oil, natural gas and petroleum products are given below: -

Table-1: Trends of Production in Crude Oil, Natural Gas and Petroleum Products

Year	Crude Oil Production (MMT)	% Growth in Crude Oil Production	Natural Gas Production (BCM)	% Growth in Natural Gas Production	Production of Petro-Products (MMT)	% Growth in Production of Petro-Products
2014-15	37.46	-0.87	33.66	-4.94	221.14	0.17
2015-16	36.94	-1.39	32.25	-4.18	231.92	4.88
2016-17	36.01	-2.53	31.90	-1.09	243.55	5.01
2017-18	35.68	-0.90	32.65	2.36	254.40	4.46
2018-19	34.20	-4.15	32.87	0.69	262.36	3.13
2019-20	32.17	-5.95	31.18	-5.14	262.94	0.22
2020-21	30.49	-5.21	28.67	-8.05	233.51	-11.19
2021-22	29.69	-2.63	34.02	18.66	254.31	8.90
2022-23	29.18	-1.72	34.45	1.25	266.54	4.81
2023-24	29.36	-1.13	36.44	7.10	276.06	8.55
2024-25 (P)	**28.70**	**-2.23**	**36.11**	**-0.91**	**283.77**	**2.79**

P: Provisional

Graph-1: Trends of Production in Crude Oil, Natural Gas and Petroleum Products



1.3: Refining Capacity & Refinery Crude Throughput:

Indian refining industry has done well in establishing itself as a major player globally. India, which is the fourth largest refiner in the world and second largest refiner in Asia after China, has emerged as a refining hub with refining capacity exceeding demand.

As of 1st April 2025, India's oil refining capacity stood at 256.82 million metric tonnes per annum (MMTPA).

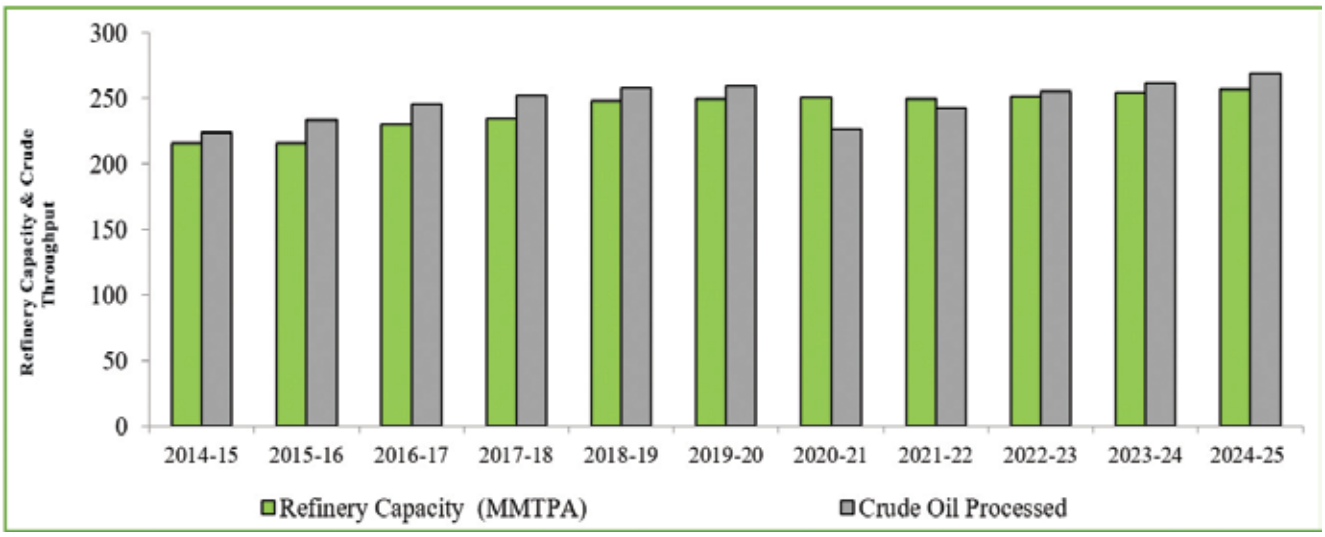
Crude oil processed during FY 2024-25 was 267.70 MMT and refinery capacity utilization during FY 2024-25 was 104.24% (provisional). The trend in Refining Capacity & Crude throughput is depicted below:

Table-2: Trend in Refining Capacity & Crude Oil Processed

Year	Refining Capacity (MMTPA) @	% Growth in Refining Capacity	Crude Oil Processed (MMT)	% Growth in Crude Oil Processed	Annual Refining Capacity Utilization
2014-15	215.07	0.00	223.24	0.33	103.80
2015-16	215.07	0.00	232.86	4.31	108.28
2016-17	230.07	6.97	245.36	5.37	106.65
2017-18	233.97	1.70	251.93	2.68	107.68
2018-19	247.57	5.81	257.20	2.09	103.89
2019-20	249.37	0.73	258.71	0.59	103.75
2020-21	249.87	0.20	225.66	-12.78	90.31
2021-22	249.22	-0.26	241.70	7.11	96.99
2022-23	251.22	0.80	255.23	5.60	101.60
2023-24	253.92	1.07	261.55	2.47	103.00
2024-25 (P)	**256.82**	**1.14**	**267.70**	**2.35**	**104.24**

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

Graph-2: Trend in Refining Capacity & Crude Oil Processed



1.4: Consumption of Petroleum Products & Natural Gas:

The country has experienced sustained economic growth over the past few years resulting in increased industrialization, urbanization and infrastructure development along with the rise in total sales of vehicles. These are the major factors which have contributed to overall higher demand for transportation, energy, and fuel, consequently driving up fuel consumption. Oil consumption and imports have grown rapidly on account of rising vehicle ownership and road transport use. The Pradhan Mantri Ujjwala Yojana (PMUY) scheme provides LPG connections to households living below the poverty line. Alongside the increasing use of LPG in rural areas, there has also been growth in the use of Pipeline Natural Gas (PNG) in urban areas. The transportation sector has experienced remarkable growth in recent years, emerging as the fastest-growing end-use segment. India is led for a significant expansion of its transportation infrastructure – from highways, railways and metro lines to airports and ports.

The consumption of petroleum products during FY 2024-25 with a volume of about

239.17 MMT reported a growth of 2.10% compared to the volume of about 234.26 MMT during FY 2023-24. Total consumption of natural gas during the FY 2024-25 was 71.31 BCM which was 5.63% higher than the consumption (67.51 BCM) of FY 2023-24. Around 49.52% of our natural gas demand was fulfilled through the indigenous source and 50.48% through import during 2024-25.

Table-3: Consumption of Petroleum Products and Natural Gas

Year	Consumption of Petro-Products (MMT)	% Growth in Consumption of Petro-Products	Consumption of Natural Gas (BCM)	% Growth in Consumption of Natural Gas
2014-15	165.52	4.49	50.30	-2.94
2015-16	184.67	11.57	50.18	-0.24
2016-17	194.60	5.37	54.41	8.43
2017-18	206.17	5.95	58.47	7.45
2018-19	213.22	3.42	60.60	3.66
2019-20	214.13	0.43	62.61	3.31
2020-21	194.30	-9.26	60.98	-2.60
2021-22	204.23	5.11	64.16	5.21
2022-23	223.02	9.20	59.97	-6.53
2023-24	234.26	5.04	67.51	12.58
2024-25 (P)	**239.17**	**2.10**	**71.31**	**5.63**

P: Provisional

1.5: Pricing Policy on Sensitive Petroleum Products & Crude Oil:

The pricing of petroleum products was brought under the Administered Price Mechanism (APM) effective July 1975 when the pricing of petroleum products was shifted from import parity principles to cost plus principles. Under APM (1975 to 2002) various oil pool accounts were maintained with the objective to i) ensure stability in selling price; ii) insulate consumers against international price fluctuations; and iii) subsidization of consumer price of certain products like kerosene for public distribution and domestic LPG by cross subsidization from other products like petrol, Aviation Turbine Fuel (ATF) etc. Effective 01.04.2002, the APM was dismantled and the Government decided to provide subsidy on sale of PDS kerosene and domestic LPG at specified flat rates. To administer these budgetary subsidies, the Government formulated a 'PDS Kerosene and Domestic LPG Subsidy Scheme, 2002'.

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. Import of crude oil takes place at international prices.

1.6: Import of Crude Oil and Natural Gas (LNG):

Import of crude oil during 2024-25 was 243.22 MMT (Provisional) valued at ₹11,60,618 crore (Provisional) as against import of 234.26 MMT valued at ₹11,05,176 crore in 2023-24 which is higher by 3.42% in quantity terms and higher by 5.02% in value terms vis-a-vis 2023-24. Import of natural gas (LNG) during

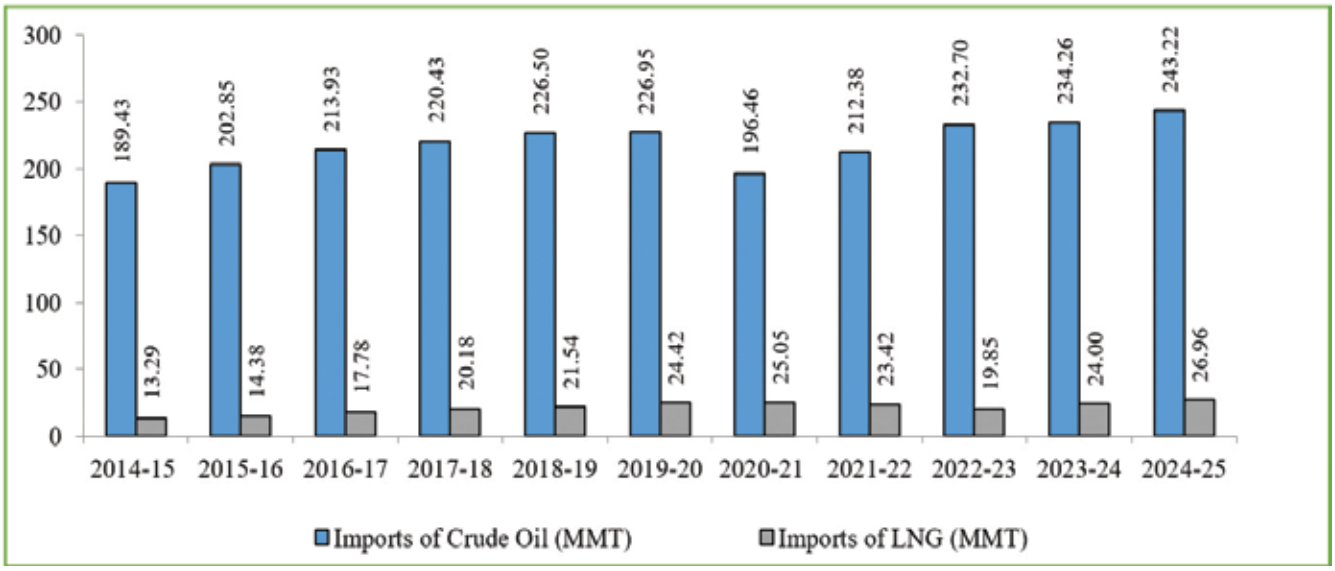
the FY 2024-25 was 26.96 MMT (Provisional) valued at ₹1,25,953 crore (Provisional) as against import of 24.0 MMT valued at ₹1,10,994 crore in 2023-24 which is higher by 22.80% in quantity terms and higher by 13.48% in value terms. The trend in growth of crude oil & natural gas (LNG) shown in Table-4 & Graph-4.

Table-4: Trends of Imports of Crude Oil & LNG

Year	Imports of Crude Oil (MMT)	% Growth in Imports of Crude Oil	Imports of LNG (MMT)	% Growth in Imports of LNG
2014-15	189.43	0.10	13.29	2.06
2015-16	202.85	7.08	14.38	8.19
2016-17	213.93	5.46	17.78	23.69
2017-18	220.43	3.04	20.18	13.46
2018-19	226.50	2.75	21.54	6.78
2019-20	226.95	0.20	24.42	13.33
2020-21	196.46	-13.44	25.05	2.61
2021-22	212.38	8.10	23.42	-6.54
2022-23	232.70	9.57	19.85	-15.22
2023-24	234.26	0.67	24.00	20.87
2024-25 (P)	**243.22**	**3.42**	**26.96**	**22.80**

P: Provisional

Graph-4: Import of Crude Oil and Natural Gas (LNG)



1.7: Import & Export of Petroleum Products:

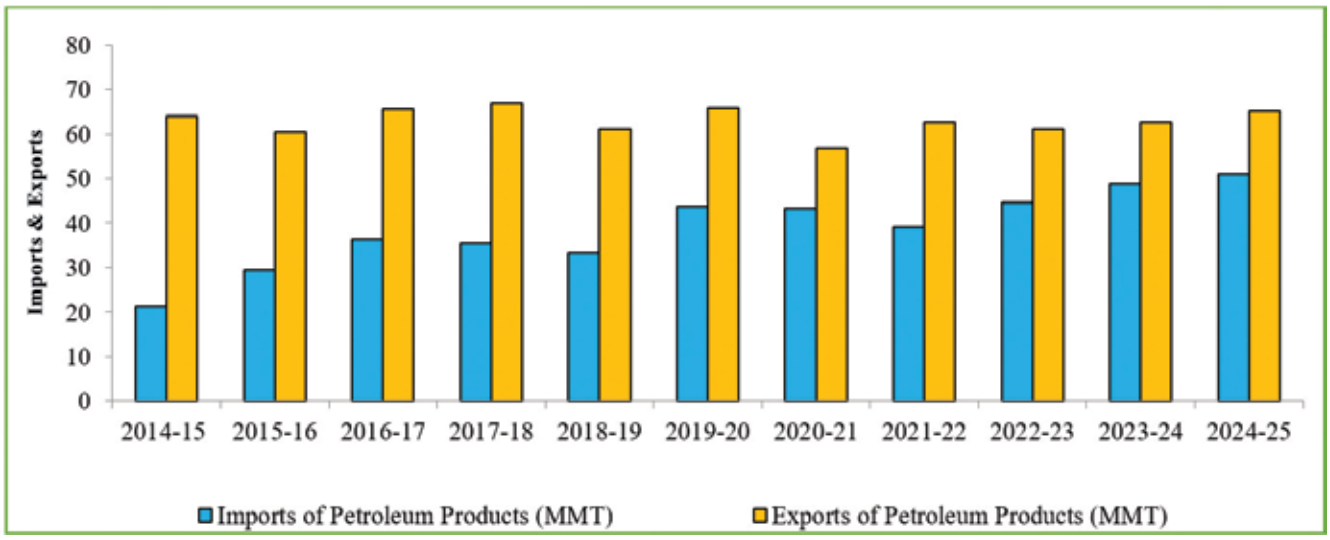
Import of Petroleum Products in FY 2024-25 was 50.90 MMT (Provisional) valued at ₹2,00,183 crore (Provisional) against the import of 48.69 MMT valued at ₹1,90,069 crore in 2023-24 which is higher by 7.60% in quantity terms and higher by 5.32% in value terms vis-a-vis 2023-24. Further, while the exports of petroleum products during 2024-25 was 65.08 MMT (Provisional) valued at ₹3,75,769 crore (Provisional) showing an increase of 2.33% in quantity terms and decrease of 4.80% in value terms against the export of 62.59 MMT valued at ₹3,94,723 crore during 2023-24. The trend of import and export of petroleum products in quantity-term is depicted below:

Table-5: Import & Export 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
2014-15	21.30	27.57	63.93	-5.79
2015-16	29.46	38.28	60.54	-5.31
2016-17	36.29	23.19	65.51	8.22
2017-18	35.46	-2.28	66.83	2.01
2018-19	33.35	-5.96	61.10	-8.58
2019-20	43.79	31.30	65.69	7.51
2020-21	43.25	-1.23	56.77	-13.57
2021-22	39.02	-9.78	62.75	10.54
2022-23	44.60	14.30	61.01	-2.77
2023-24	48.69	9.18	62.59	2.59
2024-25 (P)	**50.90**	**7.60**	**65.08**	**2.33**

P: Provisional

Graph-5: Trends of Import and Export of petroleum products



1.8: Diversification of supplies and Investment in overseas E&P assets:

India is importing over 88% of crude oil and 50% of natural gas to meet its growing energy demand. Recognising the vulnerabilities in global crude oil supply chains, the Government has prioritised diversifying the import basket for oil and gas.

Over the past few years, new crude oil suppliers such as the USA, Russia, Colombia, Ghana, Equatorial Guinea and new crude oil grades from Angola and Argentina have been added, expanding India's crude oil sourcing from upto 40 countries. To further enhance energy security and reduce dependence on spot purchases, Indian Oil Marketing Companies (OMCs) have made long-term crude oil agreements with Petrobras, Brazil, as well as with Ecopetrol, Colombia. Notably, dependency on traditional suppliers from the Gulf Cooperation Council (GCC) and OPEC countries has significantly declined in the last five years, reflecting India's strategic efforts to mitigate supply risks. Similarly, LNG

imports have also diversified from Qatar to new sources, namely Australia, the USA and the UAE, among others.

Since India is a net importer of Oil & Gas, investment in overseas Oil & Gas assets is essential for ensuring energy security. India is continuously exploring opportunities for investment abroad in oil and gas assets. Till 31st March 2025, Indian Oil and Gas PSUs have 45 assets in 21 countries. Out of the 45 assets, 21 are producing, 14 are under exploration, 3 are pipeline projects, and 7 are under various phases of development. During FY 2024-25, overseas production of oil and gas was approximately 20.2 MMTOE, which represents a substantial amount of India's domestic production.

1.9: Reforms in Exploration and Licensing Policy:

Government has taken various Policy initiatives with the objective to intensify exploration activities, attract foreign and domestic investment and enhance domestic production. The major policy initiatives taken by the Government to enhance domestic production of oil and gas and to reduce import dependency are as under:

1.9.1 Long Term Initiatives:

(i) Policy for Relaxations, Extensions, and Clarifications under Production Sharing Contract (PSC) regime for early monetization of hydrocarbon discoveries, 2014.

(ii) Discovered Small Field Policy, 2015.

(iii) Hydrocarbon Exploration and Licensing Policy, 2016.

(iv) Open Acreage Licensing Policy (OALP): Modalities for operationalization of Hydrocarbon Exploration & Licensing Policy (HELP), 2017.

(v) Policy for Extension of Production Sharing Contracts, 2016 and 2017.

(vi) Policy for early monetization of Coal Bed Methane, 2017.

(vii) Setting up of National Data Repository, 2017.

(viii) Appraisal of Unappraised areas in Sedimentary Basins, 2017.

(ix) Re-assessment of Hydrocarbon Resources, 2017.

(x) Site Restoration and abandonment guidelines for Petroleum Operations, 2017.

(xi) Policy Framework to streamline the working of Production Sharing Contracts in Pre-NELP and NELP Blocks, 2018.

(xii) Amendment in the Definition of 'Petroleum' under clause (k) of Rule-3 of the Petroleum & Natural Gas Rules 2018.

(xiii) Policy to Promote and Incentivize Enhanced Recovery Methods for Oil and Gas, 2018.

(xiv) Policy framework for exploration and exploitation of Unconventional Hydrocarbons under existing Production Sharing Contracts, Coal Bed Methane contracts, and Nomination fields, 2018.

(xv) Policy framework for Exploration and exploitation of Coal Bed Methane (CBM) from areas under Coal Mining Lease allotted to Coal India Limited (CIL) and its subsidiaries, 2018.

(xvi) Policy Framework for Streamlining working of Production Sharing Contracts in respect of Pre-NELP and NELP Blocks, 2018

(xvii) Reforms in Hydrocarbon Exploration and Licensing Policy for enhancing domestic exploration and production of oil and gas, 2019.

(xviii) Dispute Resolution Committee, 2019.

(xix) Natural Gas Marketing Reforms, 2020.

(xx) Discovery of Market Price for

Domestically Produced Natural Gas through e-bidding, 2020.

(xxi) Deregulation of sale of domestically produced crude oil, 2022.

(xxii) Discovery of Market Price and Sale and Resale of Gas produced from Discoveries in Deepwater, Ultra Deepwater and High Pressure-High Temperature areas with marketing and pricing freedom, 13th January, 2023.

(xxiii) Under Special Arrangements with Indian Navy, around 99% of No Go Area has been opened up for Exploration and Production activities.

(xxiv) The Government of India has brought the Oilfield (Regulation and Development) Amendment Act, 2025 to amend the Oilfield (Regulation and Development) Act, 1948 to meet the current needs and market conditions and to make the sector more attractive to investors so that exploration and production of oil and gas could be increased further.

1.9.2 Short-Term Initiatives:

(i) Early Monetization of Existing Discoveries

(ii) Enhancement of Recovery Factor through the implementation of IOR/ EOR techniques and redevelopment of existing mature fields.

(iii) Drilling of infill oil/ gas wells.

(iv) Monetization of small and marginal discoveries onshore through service contracts and outsourcing.

(v) Redevelopment of existing matured fields and development of new fields/ marginal fields.

(vi) Induction of suitable technologies in selective fields.

(vii) Implementation of Production Enhancement Contracts.

(viii) Implementation of IOR/ EOR techniques.

1.10: Initiatives for facilitating clearances/ approvals and enhanced coordination:

(i) Empowered Coordination Committee (ECC): This committee has been constituted under the chairmanship of Cabinet Secretary to discuss the defense, environment, license etc. related issues pertaining to the Hydrocarbon sector.

(ii) Joint Working Group (JWG): Ministry of Petroleum and Natural Gas (MoPNG) constituted the Joint Working Group (JWG) to assess and address issues affecting the EoDB (Ease of Doing Business) in upstream oil and gas sector. The working group comprises representatives from key E&P operators and government. JWG has submitted its interim report in April, 2025.

(iii) Creation of 'Hydrocarbon Clearance Cell' (HCC): A dedicated 'Hydrocarbon Clearance Cell' has been institutionalized within DGH. The cell liaises with Central/State Government authorities for expeditious grant of clearances/ approvals.

(iv) Creation of North-East Coordination Committee (NECC): ECC under HCC of DGH created in September 2021 and 18 Coordinators are placed with various Departments of State Govts of Assam, Arunachal Pradesh and Tripura for ease of processing Clearance and Approval proposals under various environmental regulations as well as expediting the other issues related to Oil & Gas E&P activities requires administrative/ regulatory supports from the State Govt.

(v) Urja Pragati Portal (Upstream Response by Joint Action for proactive Governance and Timely Implementation): To facilitate E&P operators and monitor the approvals/clearances, URJA PRAGATI web-based interactive portal has been launched recently by DGH to prioritize and flag the long pending issues

concerning the upstream hydrocarbon sector involving various stakeholders such as Operators, Central Ministries and State Governments. The issues to be dealt through this portal covers clearances related to PEL (Petroleum Exploration License), PML (Petroleum Mining Lease), FC (Forest Clearance), WLC (Wildlife Clearance), CTE (Consent To Establish)/ CTO (Consent To Operate), ESZ (Eco Sensitive Zone) and CRZ (Coastal Regulation Zone).

(vi) **Upstream India Portal:** The 'Upstream India' portal was launched to provide support to E&P operators. It offers services such as sharing of facilities and infrastructure available at DGH, creation of a Knowledge Sharing Platform, and organization of regular workshops, seminars, conferences, training sessions, and discussions on the latest government policies, technologies, and usage of inventories.

(vii) **Urja Suraksha Samanvay:** GIS based monitoring and decision support system for swift information exchange.

1.11: Natural Gas Marketing Reforms:

(i) Taking another significant step to move towards gas-based economy, Government approved 'New Domestic Natural Gas Pricing Guidelines' in October 2014, based on the prices prevailing in major international hubs like Henry Hub (USA), Alberta (Canada), NBP (UK), Russia etc. to strike a balance between the requirements of both producing and consuming sectors. The prices of natural gas were revised after every six months and notified by Petroleum Planning and Analysis Cell (PPAC) under MoPNG. These Guidelines were applicable to natural gas produced from Nomination Fields and NELP, Pre-NELP Blocks/Fields, where pricing is to be approved by Government under per Production Sharing Contract (PSC).

(ii) Subsequently, from 2015 onwards, Government provided marketing and pricing freedom for gas under DSF, OALP, CBM regimes and for gas produced from North-Eastern Region (NER) and new gas discoveries after 28.02.2019 under all regimes.

(iii) To incentivize gas production from difficult areas such as High Pressure-High Temperature (HP-HT) reservoirs and Deepwater and Ultra-deepwater areas, Government, on 23rd March, 2016, granted marketing including pricing freedom on natural gas production with a price ceiling announced on half yearly basis by Petroleum Planning and Analysis Cell (PPAC).

(iv) Further, vide Notification dated 15.10.2020, a standard procedure was formulated to discover market price of gas through a transparent and competitive process and allowing affiliates to participate in bidding. Taking another significant step to move towards gas based economy, 'Natural Gas Marketing Reforms' were announced vide Notification dated 15.10.2020, to prescribe standard procedure to discover market price of gas to be sold in the market by gas producers, through a transparent and competitive process; permit Affiliates to participate in bidding process for sale of gas and allow marketing freedom to certain Field Development Plans (FDPs) where Production Sharing Contracts already provide pricing freedom. Subsequently, detailed guidelines for Discovery of Market Price for Domestically Produced Natural Gas through e-bidding were issued vide Notification dated 03.12.2020. Agencies, empanelled by DGH for carrying out e-bidding also been notified.

(v) Furthermore, gas producers having pricing and marketing freedom have been permitted for selling small quantity of gas through gas exchanges authorized by PNGRB vide OM dated 19.08.2021.

(vi) As a further momentum to gas reforms and saving the environment, Government issued detailed guidelines for monetization of Ad-hoc/Test Gas produced during the Testing of oil and gas wells vide OM dated 22.11.2021.

(vii) Vide Notification dated 13th January, 2023, Government provided clarifications on discovery of market price and sale and resale of gas produced from discoveries in Deepwater, Ultra Deepwater and High Pressure/ High Temperature areas with marketing and pricing freedom.

(viii) Revised guidelines regarding pricing of gas produced from nomination fields of ONGC/OIL, New Exploration Licensing Policy (NELP) blocks and pre-NELP blocks, where Production Sharing Contract (PSC) provides for Government's approval of prices were issued in April, 2023. As per the guidelines, the price of such natural gas shall be 10% of the monthly average of Indian Crude Basket and shall be notified on a monthly basis and shall have a floor and a ceiling. This has resulted in reduction of APM /NAPM gas prices from the nominated fields from USD 8.57 per MMBTU to USD 6.5 per MMBTU.

1.12: Sustainable Alternative Towards Affordable Transportation (SATAT):

Government has launched "Sustainable Alternative Towards Affordable Transportation (SATAT)" initiative on 1st October 2018, with the aim of establishing an ecosystem for production of Compressed Bio Gas (CBG) from various waste/ biomass sources and for promoting its use along with Natural Gas. Under this initiative, Oil and Gas Marketing Companies (OGMCs) invites Expression of Interest (EOI) to procure CBG from potential entrepreneurs.

This initiative synergises with GOBARdhan Scheme, Swachh Bharat Mission/ AtmaNirbhar Bharat/ target of Net Zero emission. For development of biogas/ CBG sector 'Whole of Government' approach is being adopted. Some of the enablers provided by different Ministries and Departments are Central Financial Assistance to all kind of CBG/ Biogas plants under Umbrella Scheme of National Bio-Energy Programme of Ministry of New and Renewable Energy (MNRE); additional Central Assistance on MSW based CBG plants to States and Union Territories for solid waste management by Ministry of Housing and Urban Affairs under the Scheme of Swachh Bharat Mission Urban 2.0; Market Development Assistance @ ₹1500/MT on Fermented Organic Manure produced from CBG projects under Policy on Promotion of Organic Fertilizer by Department of Fertilizers; incentive on biomass aggregation machinery by Department of Agriculture and Farmers Welfare under Sub Mission on Agricultural Mechanization and Crop Residue Management scheme; categorization of CBG projects under priority sector lending by RBI ; categorization of CBG projects under 'White category' by CPCB on case-to-case basis; excise duty exemption on amount of GST-paid on compressed bio gas contained in the blended CNG.

Government has issued policy guidelines for synchronization of CBG with City Gas Distribution (CGD) network under CBG-CGD synchronization Scheme.

Further, Government has approved Scheme for providing financial assistance to CBG producers for procurement of biomass aggregation machinery to support collection of biomass for a period of 04 years from FY 2023-24 to FY 2026-27. Scheme guidelines has been issued on 02.02.2024. Portal for receiving application has been activated from 01.04.2024.

In order to promote the production and consumption of CBG in the country, National Biofuels Coordination Committee (NBCC) on 24.11.2023 approved, the introduction of phase wise mandatory selling of CBG in CNG (Transport) & PNG (Domestic) segments of CGD sector. CBG Blending Obligation (CBO) will be voluntary

till FY 2024-2025 and mandatory obligation would start from FY 2025-26. CBO shall be kept as 1%, 3% and 4% of total CNG/ PNG consumption for FY 2025-26, 2026-27 and 2027-28 respectively. From 2028-29 onwards, CBO will be 5%.

Government has approved a scheme for Development of Pipeline Infrastructure (DPI) for injection of CBG in City Gas Distribution (CGD) network on 15.03.2024.

As on 31st March, 2025, 100 CBG/ Biogas plants with a total production capacity of around 700 MT per day have been commissioned. Sale of CBG has been initiated from around 315 Retail Outlets. CBG is also being supplied to industrial customers. Under CBG-CGD synchronization scheme, CBG sale has been started in 54 Geographical Areas of CGD Network.

1.13: National Policy on Biofuels-2018:

The National Policy on Biofuels 2018 envisages an indicative target of 20% blending of ethanol in petrol by Ethanol Supply Year (ESY) 2025-26 and 5% biodiesel in diesel by 2030. This goal is to be achieved by:

a. Reinforcing ongoing ethanol/biodiesel supplies through increasing domestic production.
b. Setting up Second Generation (2G) Bio Refineries.
c. Development of new feedstock for biofuels.
d. Development of new technologies for conversion to biofuels.
e. Creating suitable environment for biofuels and its integration with the main fuels.

1.14: NON CONVENTIONAL ENERGY:

1.14.1 EBP Programme: Government has been implementing Ethanol Blended Petrol (EBP) Programme wherein Oil Marketing Companies (OMCs) sell petrol blended with ethanol at varying percentages as per availability of ethanol. This Programme has been extended to whole of India to promote the use of alternative and environment friendly fuels. This intervention also seeks to reduce import dependence for energy requirements and give boost to agriculture sector.

To increase indigenous production of ethanol, the Government has taken multiple interventions including, re-introduction of administered price mechanism, opening of alternate route for ethanol production, reduction in Goods & Service Tax (GST) on ethanol meant for EBP Programme from 18% to 5%, notification of National Policy on Biofuels – 2018, scheme for financial assistance to sugar mills for enhancement and augmentation of the ethanol production capacity, allowed multiple feed-stocks viz. B heavy molasses, sugarcane juice, sugar, sugar syrup, damaged food grains, maize and surplus FCI rice to be used for ethanol production, differential ethanol price based on feed stock utilized for ethanol production, long term ethanol procurement policy, framework for setting up ethanol distillation capacities in ethanol deficit states to name the few.

These measures have significantly increased ethanol procurement by public sector OMCs from 38 crore liters during the Ethanol Supply Year (ESY) 2013–14 (December 2013 to November 2014) to 707.4 crore liters during ESY 2023-24 (November 2023 to October 2024). In line with the Roadmap for Ethanol Blending in India 2020–25, OMCs achieved an average ethanol blending rate of 10% during ESY 2021–22, 12% during ESY 2022–23 and 14.6% during ESY 2023-24. The roadmap estimates an ethanol requirement of approximately 1,016 crore liters to achieve 20% blending in petrol by ESY 2025–26. The Department of Food and Public Distribution (DFPD), the nodal agency for establishing ethanol distillation capacities, estimates the requirement of 1,700 crore liters per annum of capacity to meet EBP needs and other uses. To support this goal, an interest subvention scheme for enhancing ethanol production capacities has been notified. As a result, the distillation capacity has

increased from 685 crore liters per annum in 2018–19 to over 1788 crore liters per annum as of 31.03.2025.

OMCs have also signed Long Term Offtake Agreements (LTOAs) with 232 successful bidders to set up an estimated 1,106 crore liters per annum of dedicated ethanol capacity in ethanol-deficit states.

Out of these, 81 plants with an estimated annual capacity of 528 crore liters per annum have already been commissioned, most of which are grain-based. The introduction of various feedstocks to boost ethanol production has also diversified the feedstock mix used over the years. Further, OMCs have made E-20 & E-100 available at their retails outlets.

ESY wise procurement/blending performance are tabulated below:

ESY	Ethanol procurement / blending quantity in crore litres	Blending Percentage (%)
2014-15	67.4	2.33
2015-16	111.4	3.51
2016-17	66.5	2.07
2017-18	150.5	4.22
2018-19	188.6	5.00
2019-20	173.0	5.00
2020-21	302.3	8.10
2021-22	433.6	10.02
2022-23	508.5	12.06
2023-24	707.4	14.60
2024-25 (upto Mar'25)	391.0	18.36

The ex-mill prices of ethanol produced to be paid to the suppliers from different feedstock for ESY 2024-25 are as under:

Feed Stock	ESY 2024-25@
Sugarcane juice / sugar / sugar syrup$	65.61
B heavy molasses$	60.73
C heavy molasses$	57.97
Damaged Food Grains	**64.00**
Maize	**71.86 (incentive of 5.79)**
Surplus rice from FCI%	**58.50**

(@- ESY from 1st November to 31st October) $ Price fixed by Government % Price fixed by OMCs

Transportation and GST paid extra to the suppliers

1.14.2: 2G Ethanol Programme: To facilitate the production of ethanol, the Government notified the **Pradhan Mantri JI-VAN (Jaiv Indhan- Vatavaran Anukool Fasal Awashesh Nivaran) Yojana** in 2019, which was amended in 2024. The scheme provides financial support for integrated bioethanol projects to establish advanced biofuel facilities in the country using lignocellulosic biomass and other renewable feedstocks. The total financial outlay under the Yojana is ₹1,969.50 crore for the period 2018–19 to 2028–29. To keep pace with the latest developments in biofuels and attract greater investment, the Government amended the Pradhan Mantri JI-VAN Yojana. The amended scheme broadens the scope to include advanced biofuels produced from lignocellulosic feedstocks, such as agricultural and forestry residues, industrial waste, synthesis (syn) gas, and algae. "Bolt-on" plants and "brownfield projects" are now eligible under the scheme, leveraging their experience to improve viability. To encourage innovation, preference will be given to project proposals featuring new technologies and advancements in the sector.

1.14.3: Biodiesel Programme: During the period from April-2024 to January-2025, OMCs have procured 36.7 crore litres of Biodiesel for blending with Diesel.

1.14.4: Bio-Jet (ATF): The indicative blending targets of 1%, 2% and 5% for blending of SAF in ATF initially for interntional flights by 2027, 2028 and 2030 respectively.

1.15: Outlay for Ministry of Petroleum & Natural Gas:

The Government is committed to promote petroleum and gas sector throughout the country. Capital expenditure creates employment opportunities through the construction of infrastructure projects and supporting economic growth and promoting investment. Total budgeted Internal and Extra Budgetary Resources (IEBR) for CPSEs' under the Ministry of Petroleum and Natural Gas in FY 2024-25 was ₹1,18,499 crore (Budget Estimate) against which ₹1,62,537 crore is the actual expenditure during the April-March, 2024-25 which was 137.16% of the budget estimate.

1.16 Promotion of Digital Payments:

There has been a significant expansion of digital payment infrastructure at retail outlets. As on 31.03.2025, there are 87,610 (IOCL-40221, BPCL-23642, HPCL-23747) retail outlets across the country and all these ROs have been covered with digital infrastructure having 2,63,410 POS terminals and 1,03,224 e-wallet facility. Further, all 87,610 retail outlets are enabled with BHIM UPI. All the LPG Distributors are enabled with BHIM UPI.

1.17 Electric Vehicle Charging Station:

In order to increase the electric vehicle charging infrastructure in the country, Oil Marketing Companies are putting up Electric Vehicle Charging Stations (EVCS) at their Retail outlets (ROs) in different parts of the country in phased manner based on techno commercial feasibility and compliance of PESO norms. As on 31.03.2025, OMCs have put up 25,243 EV charging stations and 976 Battery Swapping stations at their ROs.

1.18 Market Authorization:

Ministry of Petroleum and Natural Gas vide resolution dated 08.11.2019 revised the guidelines for authorization to market transportation fuels i.e. MS & HSD. As on 31.03.2025, there are 14 entities which are authorized to market transportation fuels in accordance with the provisions of the said resolution.

1.19 Clean fuel access (LPG + PNG):

LPG and PNG put together provide clean fuel for domestic household needs.

LPG: LPG is a globally recognised clean fuel for cooking and will play a vital role in achieving SDG-7 targets. LPG directly

contributes to SDG 3, 5, 8, 9, 11, 13 and indirectly contributes to remaining 10 SDGs. Since 2014, Government of India has been on a mission to promote the use of LPG as a clean cooking fuel so as to replace/reduce the usage of traditional fuels such as biomass, wood and kerosene etc. LPG consumption is consequently increasing both in urban and rural areas due to its inherent benefits over traditional cooking fuels. There were 14.51 crore active domestic LPG consumers as on 01.04.2014, which have increased to 32.97 crore as on 01.04.2025.

PNG: As part of the initiative to cut India's carbon footprint, government is envisaging a gas-based economy by increasing the share of natural gas in India's primary energy mix from 6.3% to 15% by the year 2030. The push for natural gas has seen the number of households with PNG connections reached to 1.5 crore as on 31st March 2025. Total PNG connections are expected to rise as more cities get city gas service. Piped Natural Gas is safer, cheaper, and more convenient than comparable fossil fuels such as LPG. Uninterrupted availability round-the-clock and inability to get pilfered are the added advantages that have attracted customers to switch to PNG.

1.20: Startup India:

Under the Startup India initiative of Oil and Gas Sector, proposals/ applications are invited through open advertisements by the individual PSUs for funding and mentoring. The themes for the proposals include leveraging Internet of Things (IoT) in Upstream/ Midstream/ Downstream operations of Oil PSUs, Digitization of Business Processes, Green Fuels, Alternative Energy, Improved Technologies for Hydrocarbon Industry besides topics of societal relevance.

The PSUs under the Ministry of Petroleum and Natural Gas have created Startup funds aggregating to ₹967.35 Crore as of 31.03.2025. Till 31.03.2025, a total no. of 344 Startups has been funded by Oil and Gas PSUs with disbursed fund value of ₹299.38 Crores. Some Startups supported by Oil and Gas PSUs have already matured.

1.21: Skill Development:

Under Skill India initiative, Hydrocarbon Sector Skill Council (HSSC) was set up under Societies Registration Act, 1860 on 26-04-2016. Several high priority trades were identified in consultation with the Industry members for National Occupational Standard (NOS)/ Qualification Pack (QP) development. Till 31.03.2025, 57 QPs have been approved by National Skill Qualification Committee (NSQC). Skill Development Institutes (SDIs) for hydrocarbon sector have been set up at six cities viz Bhubaneswar, Vizag, Kochi, Ahmedabad, Guwahati and Raebareli. Till March'2025, more than 43,985 trainees have been trained in these SDIs.

The permanent campus of Skill Development Institute (SDI), Bhubaneswar, which envisages providing world class industry-based skill training using state of the art infrastructure and technology to create an industry ready talent pool was dedicated to the nation on 20th August, 2021.

1.22: PM GatiShakti in MoPNG:

MoPNG has achieved significant progress in adopting PM GatiShakti initiative. MoPNG Portal of PM GatiShakti has been developed as a first instance which has integration with the Main NMP Platform. In MoPNG PM GatiShakti Portal, total 9 layers and 23 sub-layers are finalised in consultation with MoPNG GatiShakti Cell and Core Team. Standard Data Base Structure i.e. Definition of layers, sub-layers, attributes and Metadata has been created. For maintaining data quality on NMP, a three-tier validation mechanism (Maker, Checker and Approver) is in place. Standard Operating Procedure (SOP) for Quality Improvement Programme (QIP) has been finalized shared with stakeholders. PMGS NMP Portal User Manual has been prepared

and uploaded on NMP dashboard. More than 1 lakh assets and 1 lakh km of pipelines pertaining to PNG sector have been meticulously mapped on the NMP which corresponds to nine layers and 23 sub-layers.

1.23 APNA GHAR:

The PSU OMCs will be setting up Truckers' Wayside Amenities (WSA) named 'APNA GHAR' at 1000 Retail Outlets along National/State Highways in 3 years during 2024-25 to 2026-27 with a total cost of ₹2171 crores (excluding land cost) with the objective to ensure safe and convenient long-distance travel, reducing probability of accidents, providing fillip to rural economy, generating employment in rural areas and boosting Tourism and Banking.

APNA GHAR is having facilities such as Dhabha, Dormitory, Toilet, Self cooking area etc. They have been designed to ensure safe and convenient long-distance travel with a focus on reducing the likelihood of fatigue related accidents and promoting over-all safety. APNA GHAR mobile app has been designed to make truckers' life easier by enabling dormitory booking from anywhere at any times. As on 15.02.2025, APNA GHAR have been set up at 212 Retail Outlets across the country with 2766 beds besides other facilities.

1.24 Energy Stations:

Energy stations serve as comprehensive fuel retail hubs offering diverse energy options for seamless mobility, encompassing both traditional fuels (MS & HSD) and alternative energy sources like CNG/LNG, Electric Vehicle Charging Stations & Biofuels. Energy Stations aim to accelerate the adoption of environmentally friendly fuel choices, supporting the Government of India's decarbonization and Net Zero objectives. They ensure widespread availability of all energy types across the country, with strategic placement along major highways, including the Golden Quadrilateral and North-South, East-West corridors. PSU OMCs to set up 4,000 Energy Stations in five years starting 2024-25 with an approximate investment of ₹6,000 crores. As on 31.03.2025, OMCs have put up 25,243 EV charging stations and 976 Battery Swapping stations at their ROs.

1.25 Progressive Use of Hindi in Official Work:

In pursuance of the directions of the Department of Official Language, Hindi Fortnight was organized in the Ministry from 14th September, 2024 to 28th September, 2024. During this occasion, an appeal from the Hon'ble Minister was issued to all our offices including all the PSUs. Various activities including different Hindi Competitions were conducted during this fortnight.

There is a provision of Hindi Advisory Committee in the Ministry under the Chairmanship of Hon'ble Minister for Petroleum and Natural Gas. The function of the committee is to render advice to the Ministry for promotion of official language in official work. Hindi Advisory Committee of the Ministry is to be reconstituted after the general elections of the 18th Lok Sabha and the process of its reconstitution is underway.

Similarly, an Official Language Implementation Committee is also functioning in the Ministry under the Chairmanship of Joint Secretary (Gen. & Admn.). 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 around 31 offices of our PSUs which includes offices of OIL, ONGC, IOCL, BPCL, HPCL, and GAIL etc.

and reviewed the progress of official language in these offices. During the year under review, the Ministry notified 11 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 2024-25 issued by the Department of Official Language, Deputy Director (OL) of the Ministry inspected more than 23 offices of our PSUs and reviewed the progress of Hindi in these offices. Likewise, OL section of Ministry also inspected 10 Sections of the Ministry. On the spot suggestions were given to the officers concerned for removing the deficiencies.

1.26 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. Information under Section 4(2) of RTI Act 2005 i.e. to provide information suo motu to the public at regular interval is being regularly updated on the Ministry's website. An on-line system called RTIMIS has been introduced by DoP&T. With the aid of this online system, applications and appeals received from public are being speedily disposed of within the stipulated time frame. To provide information to people in timely and trouble free manner and to promote transparency, all Oil & Gas PSUs and other organisations under the administrative control of this Ministry are now on DoP&T's online RTIMIS portal.

During April-March, 2024-25, 1449 applications/receipts and 1551 applications/receipts and 81 appeals have been received under RTI Act, 2005 in the Ministry.

1.27 Public Grievances:

In accordance with guidelines of the Cabinet Secretariat, Government of India, the Public Grievance Cell has been functioning in the Ministry of Petroleum & Natural Gas. The Cell has been attending to the grievances of members of the public against the Public Sector Oil & Gas Companies and other organizations under the administrative control of this Ministry. An online system called "Centralized Public Grievance Redressal and Monitoring System (CPGRAMS) has been introduced in the month of June, 2008. In addition, a systematic mechanism in MoPNG has also been evolved so as to ensure speedy and expeditious redressal of the public grievances. The review of pendency of PGs in the MoPNG and Oil & Gas PSUs is undertaken regularly by Senior Officers.

During FY 2024-25, total number of 22,651 PGs (including 2308 application brought forwarded) have been received and out of which 20,864 PGs stands disposed of as on 31st March, 2025.

1.28 Cyber Security Guidelines:

Oil & Gas sector has been identified as one of the critical sectors by National Critical Information Infrastructure Protection Centre (NCIIPC). Oil Sector is increasingly using Information and Communication Technologies (ICT) and Operational Technology for their operations and governance to enhance productivity, improve efficiency in working. The adoption of increasing ICT has increased the risk of cyber security threats and attacks. This Ministry understands the need of cyber security within the Ministry and its associated PSUs to ensure that their system is secure and resilient.

This Ministry and its associated PSUs has appointed CISO/Dy. CISO in their respective organization. To ensure a structured mechanism, in accordance with best information security system

practices, a "Cyber Crisis Management committee for Petroleum" has been constituted with Secretary, MoPNG as its chairman and CISOs of Ministry and its associated PSUs as its members. The Committee reviews the state of CCMP/ cyber security systems of oil PSUs and identifies gaps.

In order to ensure that cyber security is considered as a management issue and not merely a technical issue, a presentation by CISO to the Board of Directors of the PSU, once in a quarter, has been made mandatory. Quarterly meetings of CISO, MOPNG with CISOs/ IT heads of all Oil PSUs/Attached Offices and representatives of NCIIPC/I4C/CERT-In/NIC are now being held to discuss the status of preparedness for cyber security, constraint being faced by PSU in cyber security implementation.

This Ministry has constituted a Committee of technical experts to develop a comprehensive reference framework for cyber security which would be followed by all the Oil Sector organisations including their subsidiaries and joint ventures under the administrative control of this Ministry. This framework will address the growing need for robust cyber security measures to protect critical infrastructure from evolving threats.

The guidelines issued by MeitY and MHA for departments and employees on creating a working environment which is not prone to cyber-attacks and security in respect of networks and applications, have been compiled and circulated in the Ministry for compliance.

Hardware inventory of all desktop machines in the Ministry is prepared. EDR (Endpoint Detection Response) solution (to safeguard the network from malware attacks) as well as Unified Endpoint Management (UEM) tool (both provided by NIC) is now implemented in desktops of the Ministry.

All the guideline by CERT-IN for Server security is being taken care of, which include deployment of firewall, EDR client recommendations, maintaining of server log, provisioning of VPN access, restriction of server access, disabling of default user, implementation of SSL etc. All the PSU under this Ministry has been instructed to implement all the guideline and adhere to the advisory issued by the CERT-IN and other Government agency.

Training and awareness program for officials and staff of this ministry as part of Cyber Jagrookta Diwas to minimize the risk of cyber security is being organized from time to time.

1.29 Energy Diplomacy:

The Government of India has been actively engaged in shaping its global engagement and securing its energy needs in an increasingly interconnected world. India's energy diplomacy is not only limited to cultivating, sustaining and enhancing energy partnerships with hydrocarbon-rich countries and prominent international organisations dealing with energy matters but also fostering collaboration on hydrocarbons and clean technologies with countries of the Global South.

India has been raising voices for all oil-consuming countries of the global south for responsible pricing and stabilising the global oil market. This makes India a *sui generis* case and has driven our energy strategy, now acknowledged the world over as being pragmatic and balanced.

To bolster India's energy security, the Government is actively strengthening bilateral relationships with both established oil and gas producers, including GCC and OPEC member states, as well as new entrants like Guyana. These partnerships are reinforced through sustained bilateral engagements, signing of MoUs, engagement with international organisations such as the OPEC, IEA and IEF. This comprehensive approach underscores India's commitment to

ensuring energy security while navigating the global energy transition.

India's quest for energy security works under the framework of four 'A's: availability, accessibility, affordability and acceptability, which is to make energy accessible to all the sections and sectors at an affordable price. India acknowledges that oil and gas will continue to play a significant role in India's primary energy mix in the coming decade, however, India is also fostering all forms of energy including Solar, Wind, Bio-fuel and Hydrogen to ensure energy security and availability to its citizens at an affordable price in a sustainable manner. Notably, India is spearheading the Global Biofuels Alliance, underscoring India's commitment to steering the energy transition towards a sustainable future.

Ministry of Petroleum and Natural Gas has been working very closely with the Ministry of External Affairs and our Embassies abroad, to strengthen energy security and safeguard India's investment. The following salient features of Energy Diplomacy merit mentioning:

- Supporting Indian refiners for securing an uninterrupted and timely supply of crude oil.
- Geographical diversification and widening of oil & gas sourcing including the acquisition of E&P assets.
- Launching initiatives to promote 'Neighbourhood first policy' in the oil and gas sector by building energy corridors and energy bridges.
- Negotiating long-term Oil and LNG deals.
- Leveraging India's relationship with International organisations such as OPEC, IEF & IEA, where India's voice can make a difference towards balancing the needs of producer and consumer nations.
- Spearheading "Global Biofuels Alliance" to promote global collaboration for the adoption of sustainable biofuels.
- Convening India Energy Week, reinforcing India's role in leading global energy dialogues among policymakers, industry players and other stakeholders.



Energising India's Progress



Award of 28 blocks under Open Acreage Licensing Policy Bid Round IX.



Hon'ble Minister of MoPNG taking Review Meeting with Senior Officers of MoPNG



Hon'ble Hardeep S Puri chairs Consultative Committee Meeting on Petroleum & Natural Gas



BPCL & Adnoc Trading sign long term LNG supply agreement



World Economic Forum (WEF) event, involving key figures from various sectors



ONGC western offshore



Ennore LNG Terminal, Tamil Nadu



IndianOil Compress Bio Gas (CBG) Plant at Gorakhpur, Uttar Pradesh



IOCL's 3G Ethanol Unit Panipat, Haryana



Delivery workers transport LPG cylinders by boat to reach remote households



HPCL's Rajahmundry Terminal



Electric vehicle (EV) Charging Station



"APNA GHAR" a facility designed to provide amenities for truck and taxi drivers on highways



India's largest underground LPG storage facility



Mobility battery swapping station



Chapter 2

Exploration and Production



2 Exploration and Production

2.1 Context/Background:

The Directorate General of Hydrocarbons (DGH) was established in 1993 under the administrative control of Ministry of Petroleum and Natural Gas (MoPNG) by a Government of India Resolution. The objective of setting up of DGH was to promote sound management of the Indian oil and natural gas resources having a balanced regard for environment, safety, technological and economic aspects of petroleum activity. In addition, DGH has been strengthened with certain responsibilities concerning the Production Sharing Contracts (PSCs) for Discovered fields/Exploration blocks, promotion of investment through implementation of policies including Discovered Small Field Policy, Hydrocarbon Exploration & Licensing Policy (HELP) and monitoring of E&P activities.

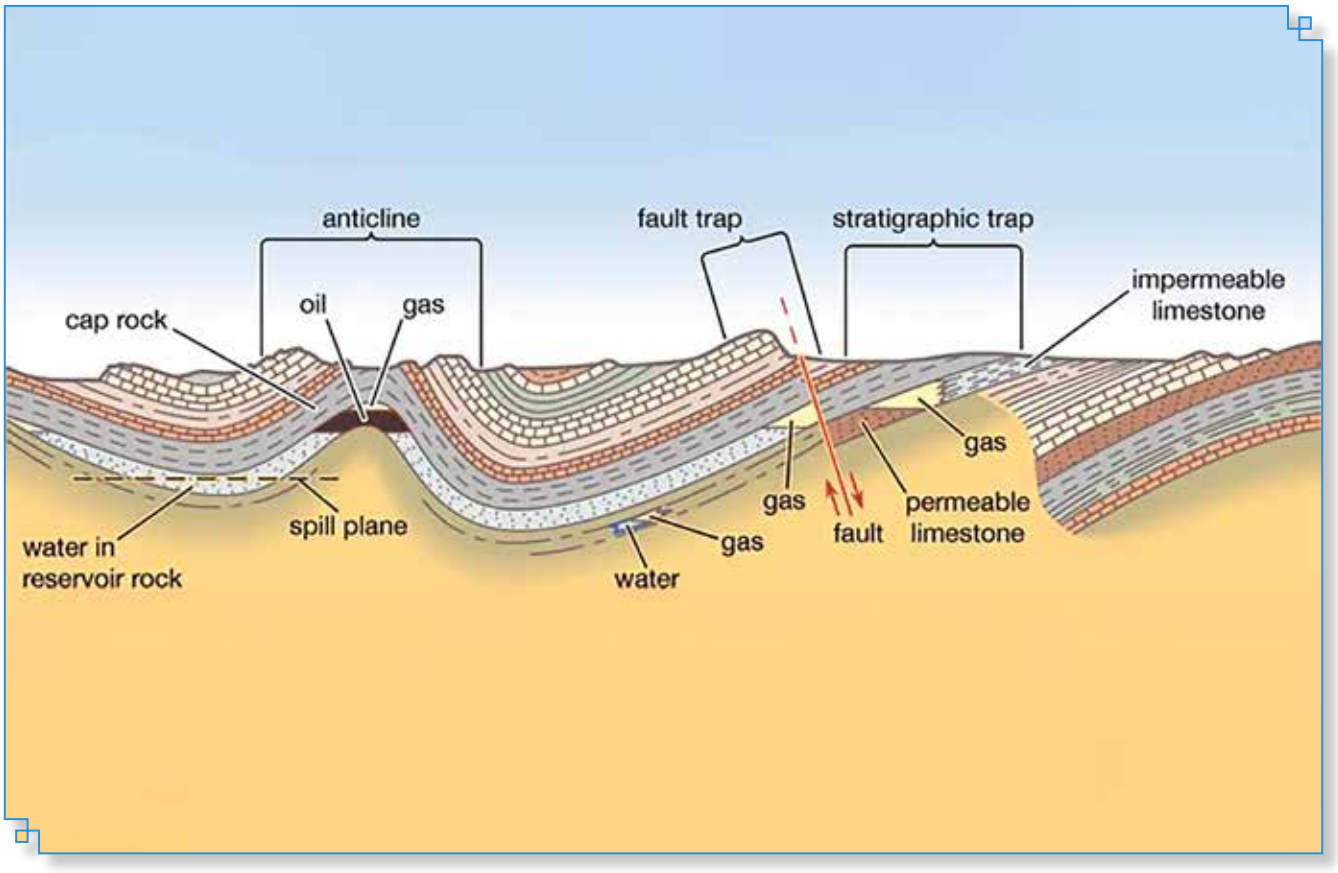
2.2 Sedimentary Basins in India:

India has 26 sedimentary basins covering an area of 3.36 million square kilometres. The onland sedimentary basins of India have an acreage of about 1.63 million square kilometres; offshore sedimentary basins, up to the 400 meters isobath have an aerial extent of about 0.41 million square kilometres and in the deepwater beyond 400 meters isobath, the sedimentary area has been estimated to be about 1.32 million square kilometres. The Indian sedimentary basins have been broadly divided into three categories based on their degree of prospectivity as presently known, which is as under:

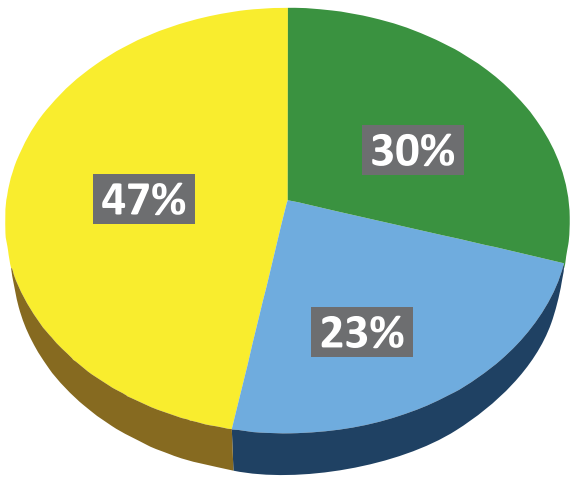
Table 2.1: Categories of Indian Sedimentary Basins

Type of Basins	Area (sq. km.)	Hydrocarbons Prospectivity	Basins/ Region
Category I (7 Basins)	9,98,325	Established commercial production	Cambay, Assam Shelf, Mumbai Offshore, Krishna Godavari, Cauvery, Assam Arakan Fold Belt and Rajasthan
Category II (5 Basins)	7,80,974	Discovered accumulation of hydrocarbons but no commercial production as yet	Kutch, Mahanadi-NEC, Andaman, Vindhyan, Saurashtra
Category III (14 Basins)	15,86,150	No known accumulation of hydrocarbon yet. Prospective by analogy	Himalayan Foreland, Ganga-Punjab, Kerala-Konkan, Bengal-Purnea, Karewa, Spiti-Zanskar, Satpura-South-Rewa Damodar, Narmada, Deccan Syneclise, Bhima-Kaladgi, Cuddapah, Pranhita-Godavari, Bastar, Chhattisgarh
Total	**33,65,449**		

Types of Geological Traps for Petroleum Accumulation



Crude oil and Natural Gas production in the country is mainly confined to Category-I sedimentary basins. In addition, significant quantity of petroleum resources has been established in five category -II basins, however production is yet to commence from these basins. The distribution of total Indian sedimentary area of 3.36 million square kilometer under different categories is presented as under:

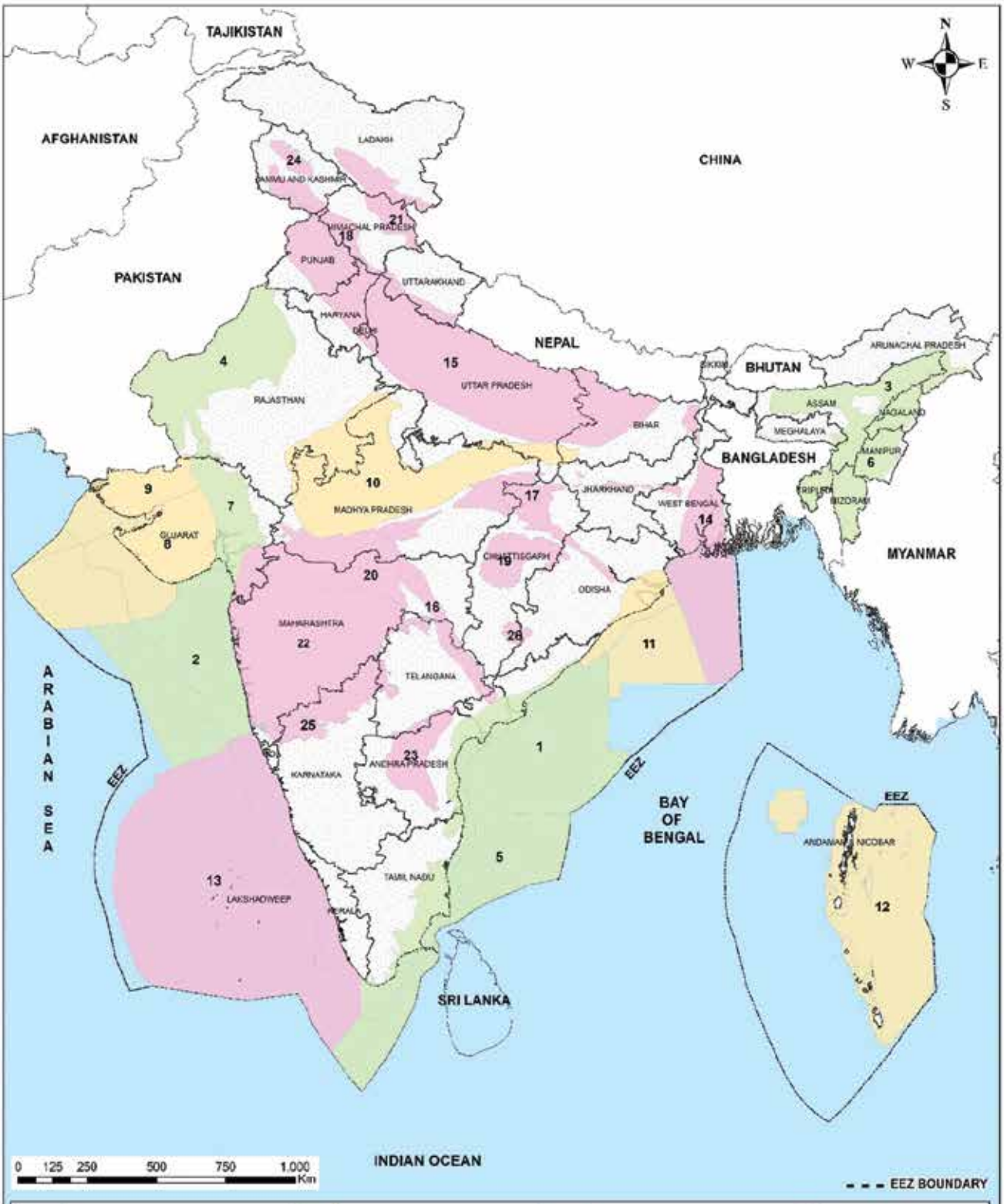


Category-I (Established Commercial Production)

Category-II (Discovered but no Commercial Production)

Category-III (Yet to be Discovered)

INDIAN SEDIMENTARY BASINS



CATEGORY-I		CATEGORY-II		CATEGORY-III			
1	KRISHNA GODAVARI (KG)	8	SAURASHTRA	13	KERALA KONKAN	20	NARMADA
2	MUMBAI OFFSHORE	9	KUTCH	14	BENGAL-PURNEA	21	SPITI ZANSKAR
3	ASSAM SHELF	10	VINDHYAN	15	GANGA-PUNJAB	22	DECCAN SYNECLIES
4	RAJASTHAN BASIN	11	MAHANADI	16	PRANHITA GODAVARI (PG)	23	CUDDAPAH
5	CAUVERY	12	ANDAMAN	17	SATPURA-SOUTH REWA-DAMODAR	24	KAREWA
6	ASSAM ARAKAN FOLD BELT			18	HIMALAYAN FORELAND	25	BHIMA-KALADGI
7	CAMBAY			19	CHHATTISGARH	26	BASTAR

2.3 Estimated Resources of Crude Oil and Natural Gas Conventional Hydrocarbon Resources:

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

Table 2.2: Estimated Hydrocarbon Resources in India (Source: DGH)

Basin Category	No.	Basin Name	Prognosticated Resource (MMTOE) Estimate (2017)	Total Area, sq. km.	Active Area (PEL/PML), sq. km.
Category I (Basins with reserves being produced and exploited)	1	Assam Arakan Fold Belt	1,632.80	80,825.00	12,785.66
	2	Assam Shelf	6,001.20	56,000.00	30,369.48
	3	Cambay	2,585.60	53,500.00	20,646.49
	4	Cauvery	1,964.40	2,40,000.00	20,904.8
	5	Krishna Godavari	9,554.50	2,30,000.00	20,940.07
	6	Mumbai Offshore	9,646.00	2,12,000.00	56,548.69
	7	Rajasthan	4,126.00	1,26,000.00	24,220.88
Category I Total			**35,510.50**	**9,98,325.00**	**1,86,416.07**
Category II (Basins with contingent resources to be developed and monetized)	8	Andaman	371.40	2,25,918.00	23,262
	9	Kutch	898.40	58,554.00	13,359.3
	10	Mahanadi	650.60	99,500.00	28,609.73
	11	Saurashtra	1,325.20	1,94,114.00	10,883
	12	Vindhyan	632.50	2,02,888.00	13,722
Category II Total			**3,878.10**	**7,80,974.00**	**89,836.03**
Category III (Basins with only prospective resources to be explored and discovered)	13	Bastar	1.30	5,360.00	
	14	Bengal-Purnea	828.30	1,21,914.00	17,428.40
	15	Bhima-Kaladgi	3.20	14,100.00	
	16	Chhattisgarh	25.00	32,000.00	
	17	Cuddapah	5.10	40,100.00	3,306
	18	Deccan-Syneclise	11.00	2,37,500.00	
	19	Ganga-Punjab	128.40	3,04,000.00	2,428
	20	Himalayan Foreland	44.40	30,110.00	666
	21	Karewa	4.00	6,671.00	
	22	Kerala Konakan	1,244.60	5,80,000.00	11,350
	23	Narmada	18.00	95,215.00	2,999
	24	Pranhita Godavari	95.40	30,000.00	
	25	Satpura-S.Rewa-Damodar	63.00	57,180.00	906
	26	Spiti-Zanskar	11.10	32,000.00	
Category III Total			**2,482.80**	**15,86,150.00**	**39,083.40**
Total (MMTOE)			**41,871.40**	**33,65,449.00**	**3,15,335.50**

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

2.3.1 Country's Reserves (2P) and Resources (2C) as on 01.04.2025: E&P operating regimes in the country, namely Nomination, Production Sharing Contract (PSC), Open Acreage Licensing Policy (OALP), Discovered Small Fields (DSF), and Coal Bed Methane (CBM) for conventional and unconventional hydrocarbon reserves. As on 01.04.2025, the Operators have reported recoverable (2P+2C) reserves and resources of about 672 MMT of crude oil 1,074 BCM of natural gas at the country level. The reserves and contingent resources status of the country across regimes is provided at **Table 2.3.**

The reported contingent resources (2C) at the country level are significantly high and need to be prioritized by new or re-development projects within a defined timeframe.

Table 2.3: Hydrocarbon Reserves Status, as of 01.04.2025

Regime	2P In-Place		2P EUR		Accretion during 2024-2025		Reserves (2P)		Contingent Resources(2C)	
	Oil+Cond. (MMT)	Gas (BCM)	Oil+Cond. (MMT)	Gas (BCM)	Oil+Cond. (MMT)	Gas (BCM)	Oil+Cond. (MMT)	Gas (BCM)	Oil+Cond. (MMT)	Gas (BCM)
Nomination (ONGC & OIL)	6268.7	2793.8	1709.3	1433.3	11.7	17.7	353.5	365.3	111.4	295.1
PSC	963.6	792.8	233.3	319.8	4.2	-32.7	64.2	146.8	130.6	113.9
DSF	63.8	91.0	5.4	24.6	0.0	0.1	5.3	24.2	5.0	18.7
OALP	10.7	66.5	0.1	0.3	0.0	0.0	0.0	0.1	2.0	36.2
CBM	0.0	342.7	0.0	66.3	0.0	1.1	0.0	59.1	0.0	14.7
Grand Total	**7306.7**	**4086.8**	**1948.1**	**1844.3**	**15.94**	**-13.8**	**423.1**	**595.4**	**249.0**	**478.6**

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

Table 2.4: State/Region-wise Distribution of Coal Bed Methane Resources in India

No.	State	Estimated CBM resources (IN BCM)	Estimated CBM resources (IN TCF)	GIIP (in TCF)
1	Jharkhand	722.08	25.50	1.92
2	Rajasthan	359.62	12.70	0
3	Gujarat	351.13	12.40	0
4	Odisha	243.52	8.60	0
5	Chhattisgarh	240.69	8.50	0
6	Madhya Pradesh	218.04	7.70	3.65
7	West Bengal	218.04	7.70	4.85
8	Tamil Nadu	104.77	3.70	0
9	Telangana & Andhra Pradesh	99.11	3.50	0
10	Maharashtra	33.98	1.20	0
11	North east	8.50	0.30	0
	Total CBM Resource	**2599.48**	**91.80**	**10.42**

***Conversion factor: 1 cubic metre = 35.3147 cubic feet**

2.3.3 Shale Gas/Oil Resource: Shale gas/oil is a form of natural gas/oil that remain unexpelled, unmigrated, and entrapped within the pore space and fractures of a source rock (commonly, shale). They are categorized as an unconventional resource due to their nature of occurrence and method of extraction.

It is estimated that a number of sedimentary basins (Gangetic plain, Gujarat, Rajasthan, Andhra Pradesh and other coastal areas) in India, including the hydrocarbon bearing ones (Cambay, Assam-Arakan and Damodar) are prospective from shale oil and gas point of view. Since 2011, various agencies such as United States Geological Survey (USGS), Central Mine Planning and Design Institute (CMPDI) and ONGC have carried out studies for shale gas reserve estimation in the country. In order to understand the prospectivity and untap the Shale Gas and Oil resource potential in India, GoI announced a Shale gas and Oil exploration policy on 14th October 2013 for the National Oil Companies (NOCs), ONGC, and OIL. Under the Shale Gas Policy - 2013, ONGC identified 50 blocks in 4 basins while OIL identified 6 blocks in 2 basins A total of 34 Shale wells were drilled (30 by ONGC & 4 by OIL) in their nomination areas, however, the prospectivity of Shale Gas/oil could not be established.

2.3.4 Re-assessment of Hydrocarbon Resources: For updated estimation of hydrocarbon resource potential in the country, re-assessment of hydrocarbon resources for all 26 sedimentary basins in the country was completed in 2017 after almost two decades of the earlier estimation. This resulted in prognosticated conventional hydrocarbon resources of the order of 41.87 billion tonnes (oil and oil equivalent of gas), which is about 49% increase as compared to the earlier estimate of 28.08 billion tonnes.

2.4 Crude oil and Natural Gas Production

2.4.1 Crude oil production: Crude oil production in FY 2024-25 is about 28.70 MMT. About 76.3% of crude oil is by ONGC and OIL under nomination regime and remaining 23.7% of crude oil production is from contract regime. The share of offshore crude oil production is about 52.6%. The remaining onland crude oil production was from mainly Andhra Pradesh, Arunachal Pradesh, Assam, Gujarat, Rajasthan, Tamil Nadu, West Bengal etc. The details of crude oil production in FY 2024-25 and last 5 years are as under:

Table 2.5: State-wise Crude Oil Production Trends (MMT)

Location Type	State/Location	2020-21	2021-22	2022-23	2023-24	2024-25
Offshore	Eastern Offshore	0.74	0.63	0.55	1.46	2.44
	Gujarat Offshore	0.41	0.34	0.38	0.33	0.18
	Western Offshore	14.24	13.60	13.55	13.24	12.47
Offshore Total		**15.39**	**14.57**	**14.48**	**15.03**	**15.09**
Share of PSUs		**14.24**	**13.62**	**13.54**	**13.21**	**12.44**

Share of Private/JVs		**1.15**	**0.95**	**0.94**	**1.82**	**2.64**
Onland	Andhra Pradesh	0.19	0.20	0.24	0.25	0.28
	Arunachal Pradesh	0.05	0.05	0.05	0.05	0.05
	Assam	3.90	3.99	4.16	4.36	4.45
	Gujarat	4.65	4.63	4.85	4.95	5.13
	Rajasthan	5.89	5.89	5.07	4.42	3.43
	Tamil Nadu	0.41	0.37	0.32	0.29	0.26
	Tripura	0.003	0.003	0.003	0.002	0.002
	West Bengal	0.00010	0.00010	0.000008	0.00	0.00
Onland Total		**15.100**	**15.133**	**14.699**	**14.329**	**13.61**
Share of PSUs		**8.87**	**8.82**	**9.11**	**9.35**	**9.47**
Share of Private/JVs		**6.23**	**6.30**	**5.59**	**4.98**	**4.15**
Grand Total		**30.49**	**29.69**	**29.18**	**29.36**	**28.70**
Share of PSUs		**23.11**	**22.44**	**22.65**	**22.56**	**21.91**
Share of Private/JVs		**7.39**	**7.25**	**6.53**	**6.80**	**6.79**

2.4.2 Natural Gas production: Natural Gas production in 2024-25 is about 36.11 BCM. About 60.8% of natural gas production is by ONGC and OIL from nomination regime and remaining 39.2% of natural gas production is from Contract Regime (PSC regime, RSC and CBM regime).

The share of offshore natural gas production in FY 2024-25 is about 71.8%. The remaining natural gas production including CBM was from 10 States viz., Andhra Pradesh, Arunachal Pradesh, Assam, Gujarat, Rajasthan, Tamil Nadu, Tripura, Jharkhand, Madhya Pradesh and West Bengal. The details of Natural gas production in 2024-25 and last 5 years are as under:

Table 2.6: State-wise Natural Gas Production Trends (MMSCM)

Location Type	State/ Location	2020-21	2021-22	2022-23	2023-24	2024-25
Offshore	Eastern Offshore	1621.5	7024.8	7999.99	10823.6	11258.79
	Gujarat Offshore	147.6	163	231.93	214.375	152.08
	Western Offshore	16659.9	15681.1	15176.6	14833.12	14516.64
Offshore Total		**18429.1**	**22868.9**	**23408.6**	**25871.09**	**25927.52**
Share of PSUs		**17086.4**	**15942.9**	**15325.02**	**14978.61**	**15272.69**
Share of Private/JVs		**1342.6**	**6926**	**8083.6**	**10892.48**	**10654.83**

Location Type	State/ Location	2020-21	2021-22	2022-23	2023-24	2024-25
Onland	Andhra Pradesh	827.5	808.6	709.694	721.9115	755.98
	Arunachal Pradesh	55.4	57.7	53.314	39.634	41.59
	Assam	2995.4	3371.5	3557.47	3489.19	3551.40
	Gujarat	1138.4	1017.3	923.242	926.01	1053.16
	Rajasthan	2039.7	2618.8	2340.15	2198.923	1786.43
	Tamil Nadu	910.9	1066.5	1109.45	1015.771	1013.38
	Tripura	1633.8	1530.8	1674.94	1524.863	1224.13
Onland- CBM	Jharkhand	1.7	4	10.095	5.371	46.87
	Madhya Pradesh	333.7	290.1	263.93	234.16	293.96
	West Bengal	307	389.2	399.421	410.947	414.75
Onland Total		**10243.4**	**11154.6**	**11041.7**	**10566.78**	**10181.65**
Share of PSUs		**7265.3**	**7578.3**	**7685.2**	**7427.5**	**7264.86**
Share of Private/JVs		**2978.1**	**3576.3**	**3356.5**	**3139.28**	**2916.78**
Grand Total		**28672.4**	**34023.5**	**34450.3**	**36437.87**	**36109.17**
Share of PSUs		**24351.7**	**23521.2**	**23010.2**	**22406.11**	**22537.55**
Share of Private/JVs		**4320.7**	**10502.3**	**11440.1**	**14031.76**	**13571.61**

In FY 2024-25, India's coal bed methane (CBM) production reached 755.58 MMSCM. Commercial CBM production in India began in July 2007 in the Raniganj (South) block, West Bengal. As of March 2025, the total CBM production rate from six blocks nationwide is approximately 2.22 MMSCMD, encompassing test gas from one block and commercial production from five blocks. Specifically, the Raniganj (South) block's commercial CBM production is about 0.2 MMSCMD. Other commercially producing blocks include the Raniganj (East) block, operated by ESSAR, with a production rate of 0.93 MMSCMD, and the Jharia and Bokaro blocks, operated by ONGC, contributing 0.2 MMSCMD. Additionally, the Sohagpur (West) block, operated by RIL, yields approximately 0.89 MMSCMD of CBM.

2.5 Indian Sedimentary Area:

India's total sedimentary basin area is 3.36 million sq. km., of which, Onland area covers 1.63 Million sq. Km. (48.5%) and Offshore area covers 1.73 Million sq. Km (51.5%). As of 31st March, 2025, a total of 79.47% of the basinal areas have been appraised.

2.6 Blocks Awarded for Exploration and Production:

There have been different regimes according to which blocks/ acreages have been awarded/ granted to companies (PSUs and Private). A brief overview of different E&P regimes are given below:

a) **Nomination Basis:** Acreages for exploration and production were granted to National Oil Companies viz. Oil and Natural Gas Corporation Ltd (ONGC) and Oil India Ltd. (OIL) on nomination basis prior to implementation of NELP.

b) **Pre-NELP Discovered Field:** Government offered Contract Areas of small/medium sized discovered fields (proven reserves were discovered by ONGC and OIL) to the private sector in August 1992. Government of India has signed 28 contracts for 29 discovered fields under Pre-NELP Discovered (Small and Medium size fields) regime.

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

d) **New Exploration Licensing Policy (NELP)-1999 onwards:** Under NELP, exploration blocks were awarded to Indian Private and foreign companies through international competitive bidding process where National Oil Companies viz, ONGC and OIL also competed on equal footing. A total of 254 blocks were awarded under NELP regime.

e) **Discovered Small Field (DSF) Policy:** Under Discovered Small Field Policy, Government has awarded 85 Contract areas, DSF-I, DSF-II & DSF-III Bid Rounds, based on Revenue Sharing Model.

f) **Hydrocarbon Exploration & Licensing Policy:** Under Hydrocarbon Exploration & Licensing Policy (HELP), Government has awarded 144 Exploratory Blocks on Revenue Sharing basis, in Eight bidding rounds till 31st March, 2025.

Government of India has signed 310 Production Sharing Contracts (PSC) covering 29 discovered fields, 28 exploration blocks under pre-NELP Exploration Blocks and 254 blocks under NELP regime. Also 85 Revenue Sharing Contracts (RSCs) have been signed under three DSF (Discovered Small Field) Bidding Rounds involving 85 Contract Areas. Under HELP, in OALP, Bid Round I to VIII 144 RSCs have been signed. At present, out of 310 PSCs & 229 RSCs signed so far under various bidding rounds (Discovered Field, Pre-NELP, NELP, HELP and DSF), 59 PSCs and 184 RSCs (DSF+HELP) are currently operational.

2.7 Petroleum Exploration Licence (PEL) and Petroleum Mining Lease (PML):

Under Nomination regime, ONGC is operating in 3 PEL and in 325 PML blocks covering an area of about 48,473 sq. km. In addition, OIL is operating 25 PML fields under nomination regime covering an area of 4828.84 sq. km. The basin-wise details of PEL/PML operated by ONGC and OIL are as under:

Table 2.7: Basin-wise PEL & PML under Nomination Regime (ONGC) as on 31.03.2025

Basin	Nomination			
	PEL		PML	
	Acreages	Area (sq. km.)	Acreages	Area (sq. km.)
Assam-Arakan (Cachar+Mizoram)			6	794
Assam-Arakan (Tripura)			17	3027
Assam Shelf -Nagaland	3	1583	39	1560
Bengal				
Cambay			160	5625
Kutch Onland				
Saurashtra				
Cauvery (On)			26	3956
Ganga Valley				
Purnea				
Himalayan Foreland				
Krishna-Godavari (On)			36	4283

Basin	Nomination			
	PEL		PML	
	Acreages	Area (sq. km.)	Acreages	Area (sq. km.)
Palar				
Jharkhand				
Jaisalmer			4	838
Bikaner-Nagaur				
Vindhyan				
Satpura-South Reva-Damodar				
Narmada				
Total Onland	**3**	**1583**	**288**	**20083**
Mumbai Offshore (SW)			27	25794
Mumbai Offshore (DW)				
Mumbai Offshore (SW+DW)			27	25794
Kerala-Konkan (SW)				
Kerala-Konkan (DW)				
Kerala-Konkan (SW+DW)				
Kutch (SW)				
Kutch (DW)				
Kutch (SW+DW)				
Saurashtra (SW)			2	422
Saurashtra (DW)				
Saurashtra (SW+DW)			2	422
Gulf of Cambay (SW)				
Gulf of Cambay (DW)				
Gulf of Cambay (SW+DW)				
Total W. Offshore (SW)			**29**	**26216**
Total W. Offshore (DW)				
Total W. Offshore (SW+DW)			**29**	**26216**
Krishna-Godavari (SW)			5	357
Krishna-Godavari (DW)			2	224
Krishna-Godavari (SW+DW)			7	581
Cauvery (SW)			1	11
Cauvery (DW)				
Cauvery (SW+DW)			1	11
Bengal Offshore (SW)				
Bengal Offshore (DW)				
Bengal Offshore (SW+DW)				
Mahanadi (SW)				
Mahanadi (DW)				
Mahanadi (SW+DW)				
Andaman (SW)				
Andaman (DW)				
Andaman (SW+DW)				

Basin	Nomination			
	PEL		PML	
	Acreages	Area (sq. km.)	Acreages	Area (sq. km.)
Total E. Offshore (SW)			**6**	**368**
Total E. Offshore (DW)			**2**	**224**
Total E. Offshore (SW+DW)			**8**	**592**
Total Offshore (SW)			**35**	**26583**
Total Offshore (DW)			**2**	**224**
Total Offshore			**37**	**26807**
Total ONGC	**3**	**1583**	**325**	**46890**

Table 2.8: Basin-wise PEL & PML under Nomination Regime (OIL) as on 31.03.2025

Basin			PEL		PML		Total	
			No.	Area (Km^2)	No.	Area (Km^2)	No.	Area (Km^2)
OIL	Rajasthan	onland	-	-	2	446.71	2	446.71
	Assam-Arakan	onland	-	-	23	4382.13	23	4382.13
Total - OIL			-	-	**25**	**4828.84**	**25**	**4828.84**

Table 2.9: Basin-wise PEL & PML with PSU/Private & Joint Venture Companies under PSC regime as on 31.03.2025

Basin Name	No. of PEL	Total PEL Area (sq. km.)	No. of PML	Total PML Area (sq. km.)
Assam-Arakan Shelf	6	5968.55	4	263.43
Bengal-Purnea	1	2364.00	0	0.00
Cambay	3	131.59	42	1583.10
Cauvery	0	0.00	4	422.80
Krishna Godavari	2	2075.87	12	2387.97
Mahanadi	1	831.73	0	0.00
Mumbai	1	705.57	1	501.06
Rajasthan	0	0.00	3	3287.17
Saurashtra	0	0.00	1	552.00
Vindhyan	1	462.00	0	0.00
Grand Total	**15**	**12539.31**	**67**	**8997.53**

***For a total of 59 Operational Blocks**

Table 2.10: Basin-wise PML with Private /Joint Venture Companies under DSF as on 31.03.2025

Sl. No.	Basin Name	PML Granted	PML Area (sq. km.)
1	Mumbai Offshore	16	6285.06
2	Krishna Godavari	16	2147.23
4	Assam Shelf	6	162.51
5	Assam- Arakan fold belt	2	541.53
6	Cambay	10	1192.8
8	Rajasthan	3	167.0
9	Kutch	2	2092.3
10	Bengal-Purnea	1	541.4
	Total	**56**	**13129.80**

2.7.1 Status of grant of Petroleum Exploration Licence (PELs) as on 31.03.2025: A total of 177 PEL were to be granted in 144 blocks awarded in Eight OALP bid rounds. A total of 158 PELs for an area of 2,27,367 sq.km. have been granted till 31.03.2025. Summary of status of PELs is as under:

Table 2.11: Bid Round wise status of PEL under OALP as on 31.03.2025

OALP Bid Round	Total No of PELs	PEL Granted	PEL Pending	PEL Denied	PEL not applied	PEL Granted Area, sq. km.
OALP I	76	66	2	8**		55518
OALP II	18	17	1	0		28394
OALP III	21	15	2	4**		22678
OALP IV	7	7	0	0		18510
OALP V	13	13	0	0		19789
OALP VI	24	22	2	0		32347
OALP VII	8	8	0	0		15766
OALP VIII	10	10	0	0		34365
Total	**177**	**158**	**7**	**12**	**0**	**227367**

*Some of the awarded blocks falls under the jurisdiction of multiple states hence the number of PELs are more than the number of awarded blocks.
** Due to Non-grant of PEL in the State of Tamil Nadu, Puducherry & Andhra Pradesh, the Block/Part Area is surrendered by the Contractor.

Table 2.12: Basin wise status of PEL under OALP as on 31.03.2025

Basin	Total No of PELs	PEL Granted	PEL Pending	PEL Denied	PEL not applied	PEL Granted Area, sq. km.
Andaman-Nicobar	6	6	0	0		23262
Assam Arakan Fold Belt	17	16	1	0		4041
Assam Shelf	31	29	2	0		20832
Bengal-Purnea	6	5	1	0		14523
Cambay	26	25	1	0		12114
Cauvery	15	6	2	7**		16515
Cuddapah	1	1	0	0		3306
Ganga-Punjab	4	4	0	0		2428
Himalayan Foreland	1	1	0	0		666
Kerala Konkan	3	3	0	0		11350
Krishna Godavari	10	5	0	5*		9465
Kutch	9	9	0	0		11267
Mahanadi	10	10	0	0		27778
Mumbai Offshore	9	9	0	0		23263
Narmada	2	2	0	0		2999
Rajasthan	16	16	0	0		19482
Satpura-South Rewa-Damodar	1	1	0	0		906
Saurashtra	5	5	0	0		9909
Vindhyan	5	5	0	0		13260
Total	**177**	**158**	**8**	**12**	**0**	**227367**

Some of the Basins cover multiple jurisdiction such as Onshore/Offshore or multiple states
*5 PEL denied by Tamil Nadu/Puducherry, Operator Surrendered the area/Block.
** Due to Non grant of 7 PELs comprising the States Tamil Nadu, Andhra Pradesh and Puducherry, Operator Surrendered the Block.

Table 2.13: Exploratory Efforts by ONGC and OIL under Nomination Regime as on 31.03.2025

Sr. No.	Company	Cumulative exploration			During FY 2024-25		
		2D seismic (LKM)	3D seismic (sq. km.)	Exploratory Well (No)	2D seismic (LKM)	3D seismic (sq. km.)	Exploratory Well (No)
1	ONGC	8,83,690.72	1,40,547.72	6589	191.13	2091.44	71
2	OIL	28030	9816	449	70.94	482.25	15

2.8 Exploratory Efforts by Private / JV companies under PSC:

The basin-wise exploratory efforts made by Private/Joint venture companies in terms of 2D seismic, 3D seismic and exploratory wells under PSC and RSC Regimes as on 31.03.2025 are as under:

Table 2.14: Exploratory Inputs in PSC Regime (as on 31.03.2025)

Basin	2D LKM	3D SKM	Exploratory Wells*
Andaman-Nicobar	27070	16562	6
Assam-Arakan Fold Belt	1352	613	4
Assam-Arakan Shelf	5468	2211	44
Bengal-Purnea	5247	4909	16
Cambay	29994	9167	325
Cauvery	64727	44561	51
Deccan Syneclise	476	0	0
Ganga	3876	263	4
Ganga-Punjab	2542	1420	4
Himalayan-Foreland	810	0	1
Kerela Konkan	52290	14035	7
Krishna Godavari	76106	71311	210
Kutch	2985	8345	21
Mahanadi	59542	64659	53
Mumbai	21349	27285	51
Pranhita Godavari	195	0	1
Rajasthan	14157	16396	312
Satpura-South Rewa-Damodar	2050	304	2
Saurashtra	16037	15428	16
Vindhyan	3918	858	10
Grand Total	**3,90,191**	**2,98,326**	**1,138**

Note: * Including Exploratory and Appraisal Wells

Under RSC, as on 31st March, 2025, contractors of the blocks have acquired 32,131 LKM of 2D Seismic data and 41,321 sq. km. of 3D Seismic data and have drilled 100 exploratory wells. Basin-wise details are as follows:

Table 2.15: Exploratory Inputs in RSC Regime (OALP) (as on 31.03.2025)

Basin	2D Seismic (LKM)	3D Seismic (SKM)	Exploratory Wells (No.)
Andaman-Nicobar	8500.50	2840.80	1
Assam Arakan Fold Belt	1113.80	405.20	5
Assam Shelf	3272.30	648.90	7
Bengal-Purnea	903.70	3830.60	2
Cambay	1518.90	1865.10	21
Cauvery	0.00	8596.99	2
Cuddapah	316.97	331.68	0
Ganga-Punjab	0.00	597.15	0
Himalayan Foreland	0.00	0.00	0
Kerala Konkan	0.00	1027.78	0
Krishna Godavari	430.90	1513.90	1
Kutch	398.00	1357.93	0
Mahanadi	2305.28	4610.02	7
Mumbai Offshore	940.00	9248.14	26
Narmada	0.00	67.26	0
Rajasthan	10701.39	870.46	16
Satpura-South Rewa-Damodar	0.00	200.73	0
Saurashtra	488.64	1855.97	2
Vindhyan	1240.72	1452.65	10
Total	**32,131.10**	**41,321.26**	**100**

2.8.1 Hydrocarbon Discoveries in 2024-25: During FY 2024-25, a total of 10 Hydrocarbon discoveries has been made. Five discoveries have been made under contract regime while 5 discoveries in Nomination regime. Overall, out of 10 discoveries, 7 were made by ONGC, 2 by OIL and 1 by Vedanta Ltd. The details of discoveries are under:

Table 2.16: Summary of Hydrocarbon Discoveries in 2024-25

Sl No	Company	Total
1	ONGC Nomination Regime	3
2	OIL Nomination Regime	2
3	Contract Regime	5
Total		**10**

Table 2.17: Details of Hydrocarbon Discoveries in 2024-25

S. No.	Discovery Name	Hydrocarbon	Block	Basin	Location	Operator
Discoveries under Nomination Regime						
1	West Matar-2 (MRAX)	Oil & Gas	ML-Matar	Cambay	On Land	ONGC
2	Chandramani (B-56-2)	Gas	ML-C-Series Field	Mumbai SW	Mumbai SW	ONGC
3.	Yandapalli-1 (YPAA)	Oil & Gas	Malleswaram PML	Krishna Godavari	Krishna Godavari	ONGC
4	Mechaki-6	Oil	Mechaki PML	Assam Arakan	Assam Arakan	OIL
5	Mechaki-7	Gas	Mechaki PML	Assam Arakan	Assam Arakan	OIL
Discoveries under Contract Regime (PSC+RSC)						
6	Ranaghat	Gas	WB-ONN-2005/4	Bengal	On Land	ONGC
7	Purn-1	Oil	CB-ONHP-2019/1	Cambay	On Land	ONGC
8	Mbs191hda-1 (Neelmani)	Gas	MB-OSHP-2019/1	Mumbai Offshore	Shallow water	ONGC
9	Chola-1	Gas	CY-UDWHP-2019/1	Cauvery	Ultra Deep Water	ONGC
10	Rudra	Oil	AA-ONHP-2017/4	Assam Shelf	On Land	Vedanta

2.9 National Data Repository (NDR):

Under HELP, the Government has launched the Open Acreage Licensing (OALP) mechanism, which allows the investors to carve out blocks of their choice by assessing E&P data available in the National Data Repository (NDR). National Data Repository (NDR) is thus a pre-requisite and key component for making OALP operational.

National Data Repository (NDR) was set up at DGH and launched on 28th June, 2017 to make the entire Exploration and Production (E&P) data available to various stakeholders for commercial exploration, research & development and academic purposes. The Cumulative data loaded in NDR as on 31.03.2025 is as follows:

a. 2D Seismic Data : 4.011 Million LKM
b. 3D Seismic Data : 1.258 Million SKM
c. Well and Log Data : 24,434 No. of Wells
d. Well Reports : 52,941 Nos. of reports

2.9.1 Future-Ready National Data Repository 2.0 [NDR 2.0]: Since its operationalization in June 2017, NDR has been successfully meeting the demands of all its stakeholders such as investors, operators, service-providers, R&D institutes, academia, and government bodies. The increasing volumes of both pre and post stack data acquired and assimilated in the intervening years coupled with ageing hardware and software has necessitated its upgradation to next generation IT platform which is scalable to grow with time and equipped with enhanced storage, compute and network resources.

Accordingly, in order to bring efficiency in data management and better serve its global users with enhanced functionalities of anytime, anywhere access, DGH has decided to upgrade the present client-server platform to Next Generation cloud-based National Data Repository.

Next generation National Data Repository (NDR 2.0) aims to substantially improve the data accessibility (downloading), data reporting, submission (uploading), enhance storage (for all E&P data types including seismic field data) and create

a cloud-enabled database platform. The upgradation of the present NDR to a cloud-based system will allow global investors and stakeholders, anywhere-anytime access to data and a virtual data room.

2.10 Policy Initiatives taken by the Government for Enhancing Crude Oil and Gas Production:

In a major drive to give a boost to upstream hydrocarbon sector, the Government has unveiled a series of policy initiatives. The reforms in hydrocarbon sector are based on the guiding principles of enhancing domestic oil and gas production, increasing investment, generating sizable employment, enhancing transparency, and reducing regulatory burden. Some of the notable policy reforms are mentioned below.

2.10.1 Hydrocarbon Exploration and Licensing Policy / Open Acreage Licensing Programme (March 2016):

In March 2016, Government launched Hydrocarbon Exploration Licensing Policy (HELP). HELP is a paradigm shift from Cost Recovery to Revenue Sharing Mechanism wherein contractor shares revenue with the Government from the start of the production. The Government introduced the Open Acreage Licensing Program (OALP) as a part of the HELP on 30th March 2016 and formally it was put in operation w.e.f. 1st July 2017 which gives exploration companies the option to select the exploration blocks on their own, without having to wait for the formal bid round from the Government.

HELP comes with attractive and liberal terms like reduced royalty rates, no oil cess, marketing and pricing freedom, round the year bidding, freedom to investors for carving out blocks of their interest, a single license to cover both conventional and unconventional hydrocarbon resources, exploration permission during the entire contract period, and an easy, transparent and swift bidding and awarding process. HELP also encourages round the year submission of Expression of Interest (EOI) in 3 windows (April 1 to July 31, August 1 to November 30 and December 1 to March 31) by the interested bidders.

Salient features of HELP

- Opportunity to carve out blocks using National Data Repository (NDR)
- Unified Licence for both conventional and unconventional Hydrocarbons
- Simple and easy to administer Revenue Sharing model
- Low regulatory burden
- Easy entry and exit barriers
- Complete transparency and time bound process
- Level playing field for global private companies as well as National Oil Companies
- Market pricing and free market access
- Concessional royalty regime for Ultra-Deep water and Shallow Water areas
- Exploration rights for full contract life

Government further notified policy reforms in upstream sector on 28th February 2019 under HELP to increase exploration activities, attract domestic and foreign investment in unexplored/unallocated areas of sedimentary basins and promote ease of doing business by streamlining and expediting the approval processes. These reforms were made applicable from OALP Round IV onwards. Category specific Bid Evaluation Criteria with more weightage to exploratory work programme in Category-I basins (70% vis-à-vis 50% earlier), Category-II and III type blocks bided based on exploratory work programme only, shorter exploration period, concessional royalty rates to expedite oil and gas production, introduction of alternate dispute resolution mechanism and Empowered Coordination Committee (ECC) for expediting statutory clearances/ approvals.

Summary of Participation in OALP: In Eight rounds of bid under OALP, 149 blocks were on offer and 144 exploration blocks

covering an area of 2,42,056 sq. km. were awarded to successful bidders. Five (5) un-awarded blocks were offered under OALP-Round-III for CBM, however no bids were received for these CBM blocks. 252 bids were received for remaining 144 blocks that are spread over 19 Sedimentary Basins. Summary of participation in OALP rounds is as under:

Table 2.18: Details of OALP Bid Rounds

OALP Bid Round	Blocks on offer	Number of participants	No. of bids	Area on offer (sq.km.)	Area awarded (sq. km.)
OALP-I	55	9	110	59,282	59,282
OALP-II	14	8	33	29,233	29,233
OALP-III	18+5*	5	42	31,722	29,765
OALP-IV	7	2	8	18,510	18,510
OALP-V	11	3	12	19,789	19,789
OALP-VI	21	3	24	35,346	35,346
OALP-VII	8	4	10	15,766	15,766
OALP-VIII	10	6	13	34,365	34,365
Total	**149**	**40**	**252**	**2,44,014**	**2,42,056**

* No bid received for five CBM Blocks.

The committed investment till Round VIII is around 3.37 Billion USD. Out of the total committed Work Programme of 51,725 LKM 2D Seismic, 66,843 SKM 3D seismic and 499 Exploratory Wells 32131 LKM of 2D Seismic data, 41321 sq. km. of 3D Seismic data and drilling of 100 wells have completed till FY 31.03.2025. A total of 14 discoveries (8 oil + 6 gas) have been made so far.

OALP Bid Round-IX: The Government has launched the OALP Bid Round-IX, offering 28 blocks covering an area of 1,36,596 sq. km. for International Competitive Bidding on 3rd January 2024. A total of 9 (nine) Onland Blocks, 8 (eight) Shallow-Water Blocks and 11 (eleven) Ultra Deep-Water Blocks are on offer. The bidding was closed for OALP bid round IX on 21st September 2024 and 60 bids were submitted and received. A total of Seven (7) bidders including three (3) public and four (4) private parties participated in the Bid Round. Bid Evaluation has been completed and blocks are expected to be awarded soon.

OALP Bid Round-X: Hon'ble Minister MoP&NG, launched the OALP-X round at the India Energy Week Summit 2025 on 11th February 2025 in New Delhi. In this bid round, 25 blocks spread across 13 Sedimentary Basins covering an area of 1,91,986.21 sq. km are on offer for bidding to investors. This bid round is primarily an offshore focused round, with 19 offshore blocks covering 1,75,115 sq. km falling in offshore while, 6 blocks with an area of 16,871 sq. km. lies in Onland. Moreover, notably, 16 blocks, accounting for 97,919.6 sq. km. (51%) fall within areas previously designated as "No-Go" zones.

Additionally, for OALP Round X, a new e-bidding portal has been introduced to enhance transparency and security, along with features designed to improve ease of doing business for investors.

2.10.2 Discovered Small Field Policy (DSF): The Marginal Field Policy was approved by the Cabinet Committee on Economic Affairs (CCEA) on 2nd September, 2015 and notified vide Notification No. O-19018/22-95-ONG-III dated 14.10.2015 to bring un-monetized discoveries of National Oil Companies (NOCs) on production. This Policy was

later renamed as Discovered Small Field (DSF) Policy.

Salient Fiscal and Policy Features of DSF Rounds

- Single license for conventional and non-conventional hydrocarbons
- No restriction on exploration activity during Contract Period
- No upfront Signature Bonus
- Bids invited under International Competitive Bidding.
- Pricing and Sale-marketing Freedom
- Royalty, No Cess, Exemption from custom duty
- Eligibility: No Technical Experience Required, up to 100% participation by Foreign companies

The details of DSF rounds conducted so far are as under:

Table 2.19: Details of DSF Bid Rounds

DSF round	DSF-I	DSF-II	DSF-III	S DSF	Grand Total
Launched on	25.05.2016	09.08.2018	10.06.2021	15.04.2025	
Total Offered Blocks	46	25	32	2	105
Total Offered Discoveries	67	59	75	3	204
Total O+OEG (MMt)	86	190	232	To be awarded in April 2025	508
Total Offered Area (sq. km.)	1551	3042	13000		17593
Date of Signing of RSC	27.03.2017	07.03.2019	09.09.2022		
Total awarded Blocks	30	24	31		85
Total awarded Discoveries	43	58	74		175
Total awarded O+OEG (MMt)	45	189	230		464
Total awarded Area (sq. km.)	777	3004	12727		16508
E-bids received	134 bids for 34 contract areas	145 bids for 24 Contract Areas	107 bids for 32 contract areas		

The Status of DSF I, II & III Contract is as under (As on 31.03.2025):

Table 2.20: Status of DSF Bid Rounds as on 31.03.2025

Status	DSF-I	DSF-II	DSF-III	Total
Awarded Contract Area (CA)	30	24	31	85
Active Contract Areas (CA)	12	18	26	56
CAs where PML Pending	3	1	2	6
CA-Terminated/Relinquished	15	5	3	23

2.10.3 Bidding for CBM Blocks:

- The Government of India formulated Coal Bed Methane (CBM) policy in 1997. About 26,000 sq. km. was identified for CBM exploration in the country. India's CBM resources are estimated at around 2,600 billion cubic meters (BCM).
- Four CBM bidding rounds (2001, 2003, 2005 & 2008) were implemented by MoPNG, resulting in the award of 33 CBM blocks [including 2 blocks on Nomination and 1 block through the Foreign Investment Promotion Board (FIPB) route] covering 16,598 sq. km.
- GoI launched two Special CBM Bid Rounds (2021 & 2022), under the HELP through International Competitive Bidding. 7 Blocks (4 in SCBM-21 & 3 in

SCBM-22) of area 4,579 sq. km. were awarded in these Special CBM Rounds.

- At present in total, 15 CBM Blocks (7009 sq. km.) are active. Out of which, 04 blocks are in exploration phase, 03 are in the development phase and 05 blocks are in production phase. During FY 2024-25 the cumulative production of CBM up to March 2025 is around 556.83 MMSCM.

2.10.4 GoI's efforts to acquire geo-scientific data in India's sedimentary basins

i. National Seismic Programme (NSP): National Seismic programme (NSP) was launched on 12th October 2016 with an objective to appraise the unappraised onland basinal areas of the country. Under the programme, Government has approved the proposal for conducting 2D seismic survey for data Acquisition, Processing, and Interpretation (API) of 48,243 Line Kilo Metres (LKM).

Acquisition, Processing and Interpretation of 46,960 LKM (~97%) 2D seismic data could be acquired out of the total target of 48,243 LKM. Gujarat Energy Research and Management Institute (GERMI), Gandhinagar carried out a Third-Party evaluation study of NSP data and submitted a report to NDR.

To cover the inaccessible and hostile geographical areas (where seismic data could not be acquired due to inaccessible terrain and hostile environment) under NSP project, a volume of 40,000 flight LKM Airborne Geophysical Survey had also been planned with approximate cost of INR 80 crores. On behalf of Ministry, Oil India Ltd (OIL) carried out Airborne Gravity Gradiometry and Gravity Magnetic (AGG & GM) data survey and completed the API (Acquisition, Processing and Interpretation) of 42944 Flight LKM of AGG & GM Survey.

The sector wise/state-wise break-up of AGG & GM targets and achievements are tabulated below.

Area	Target	Achievement (in Flight LKM)
AS-AP	2064	2064.46
AS-AP-NL	8131	8131.15
AS-ML-MN-NL	11240	11227.83
MZ-TR	5606	5573.59
North-East India Total	27,041	26,997.03
Cauvery	11888	12295.14
Bastar	1764	1833.99
Karewa	1710	1816.93
Spiti*	7392	-
Rest of India Total	**22,754**	**15,946.06**
Project Total	**49,795**	**42,943.09**

*Test flight was conducted to analyses the risk involved over high altitudes in Spiti valley, however, due to the HSE concerns, data in Spiti valley was not acquired.

ii. Deep Andaman offshore Project: Andaman Basin is a potential petroleum proliferous basin located in the south-eastern part of the Bay of Bengal in the proximity of the most prolific petroleum provinces of Southeast Asia.

The 2D/3D seismic or well data acquired in the basin was scanty and the data coverage was moderate to sparse. The area surrounding the Andaman & Nicobar (A&N) islands has significant potential for oil and gas, but the exploratory activities could not be taken up there because most of the area was designated as a "No-Go" Zone (0.37 million sq. km. of the "No-Go" zone area falls in the Andaman Basin).

For comprehensive appraisal of Andaman offshore, DGH formulated a plan to acquire 22,500 LKM 2D Broadband seismic data acquisition, processing, and interpretation thereof covering basinal area of approx. 2,81,613 sq. Km. and accordingly, Deep Andaman offshore survey was launched by GoI.

The project was implemented through M/s Oil India Limited. A total of 22,500 LKM seismic data was acquired in deep Andaman offshore. Project was

completed in month of March, 2023 and the data has been uploaded on NDR portal.

iii. **Reduced No-Go Area:** The Government has been successful in reducing "No-GO" areas by 99% in April 2022, hitherto not available for E&P activities. This made more than 1 million sq. km. area of India's EEZ available for exploration.

iv. **Exclusive Economic Zones (EEZ) survey:** Approximately 1.13 Million sq. km. area of offshore Basinal Areas of Indian sedimentary basins up to EEZ was lying unapprised. In order to assess the entirety of the offshore basin area extending up to the Exclusive Economic Zone (EEZ) of the nation, efforts were undertaken to conduct a 2D broadband seismic survey covering an area of approximately 80,000 LKM. It was implemented by ONGC and a total of approximately 79,540 LKM of 2D seismic data acquisition processing and interpretation completed in June, 2024.

v. **Mission Anveshan (Ongoing):** To comprehensive appraisal of the Indian sedimentary basins, closed 2D seismic profiles have been planned in 07 onland sedimentary basins under ongoing Mission Anveshan. The objective of this project is to infer comprehensive appraisal of the basins and bring out the hydrocarbon prospectivity. The project is for closed grid 2D seismic API (Acquisition, Processing & Interpretation) 20275 LKM in 07 onland sedimentary basins with outlay of INR 792 crores has been formulated. Till 31st March 2025, a total of 2954 GLKM of seismic data has been acquired.

vi. **Extended Continental Shelf (Ongoing):** A good quality high resolution seismic data with close spacing in Continental shelf in Western and Eastern offshore beyond EEZ boundary will provide valuable inputs regarding the presence of sediments and help to ascertain hydrocarbons potential in the Continental Shelf area. All these inputs will be useful for formulating the long-term energy policy in offshore areas in the context of the blue economy. This work will help in supporting the claim of extended continental shelf boundary in East and West coast by MoES beyond the EEZ boundary. The proposed seismic reflection profiles with extended streamers and high-power seismic sources are expected to provide details of sub-basement reflections for determining the nature of the crust within the Laxmi Ridge. 2D seismic API is to be carried out for 30000 LKM in Eastern & Western Offshore of which 15,500 LKM in Western Sector will be carried out by ONGC and 14,500 LKM in Eastern Sector will be carried out by OIL. Till 31st March 2025, a total of 22876 LKM of seismic data has been acquired.

2.10.5 Natural Gas Marketing Reforms

a) Government approved 'New Domestic Natural Gas Pricing Guidelines' in October, 2014, based on the prices prevailing in major international hubs like Henry Hub (USA), Alberta (Canada), NBP (UK), Russia etc. to strike a balance between the requirements of both producing and consuming sectors. The prices of natural gas are revised after every six months and notified by Petroleum Planning and Analysis Cell (PPAC) under MoPNG. These Guidelines are applicable to natural gas produced from Nomination Fields and NELP, Pre-NELP Blocks/Fields, where pricing is to be approved by Government under per Production Sharing Contract (PSC).

b) Subsequently, from 2015 onwards, Government provided marketing and pricing freedom for gas under DSF, OALP, CBM regimes and for gas produced from North-Eastern Region (NER) and new gas discoveries after 28.02.2019 under all regimes.

c) To incentivize gas production from difficult areas such as High Pressure-High Temperature (HP-HT) reservoirs and deepwater and ultra-deepwater areas, Government, on 23rd March, 2016,

granted marketing including pricing freedom on natural gas production with a price ceiling announced on half yearly basis by Petroleum Planning and Analysis Cell (PPAC).

d) Further, 'Natural Gas Marketing Reforms' were announced vide Notification dated 15.10.2020, to prescribe standard procedure to discover market price of gas to be sold in the market by gas producers, through a transparent and competitive process through electronic bidding; permit affiliates to participate in bidding process for sale of gas and allow marketing freedom to certain Field Development Plans (FDPs) where Production Sharing Contracts already provide pricing freedom. Subsequently, detailed guidelines for Discovery of Market Price for Domestically Produced Natural Gas through e-bidding were issued vide Notification dated 03.12.2020. Agencies empanelled by DGH for carrying out e-bidding also been notified.

e) Furthermore, gas producers having pricing and marketing freedom have been permitted additional option for selling small quantity of gas (i.e. upto 500 MMSCM per annum) through gas exchanges authorized by PNGRB vide OM dated 19.08.2021.

f) As a further momentum to gas reforms and saving the environment, Government issued detailed guidelines for monetization of Ad-hoc/Test Gas produced during the Testing of oil and gas Well vide OM dated 22.11.2021.

g) Vide Notification dated 13th January, 2023, Government provided clarifications on discovery of market price and sale and resale of gas produced from discoveries in Deepwater, Ultra Deepwater and High Pressure/ High Temperature areas with marketing and pricing freedom.

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

a) The Government approved the Policy framework to promote and incentivize Enhanced Recovery (ER)/ Improved Recovery (IR)/Unconventional Hydrocarbon (UHC) production methods/ techniques through fiscal incentives in the form of partial waiver of royalty and cess and an enabling ecosystem to improve productivity of existing fields and enhance overall production of domestic hydrocarbons. Pursuant to the Policy, an Enhanced Recovery (ER) Committee has been constituted to oversee the implementation of the policy.

b) Under the present policy, Preliminary assessment of ER potential of more than 200 oil and gas fields had been carried out. ER Screening Reports of 19 projects (field-wise; ER method-wise) were approved for commencement of ER Pilot Phase. Out of which five pilot projects had been approved and operators were required to formulate/submit commercial implementation plan for the field(s) under the ER policy. Out of which, two fields were granted in-principal approval for the incentivization of commercial projects.

2.10.7 Policy on Crude Oil Deregulations (June, 2022):

The Cabinet Committee on Economic Affairs approved the 'Deregulation of Sale of Domestically Produced Crude Oil' policy. Under this decision, the government ceased allocating crude oil and condensate effective from October 1, 2022, granting marketing freedom to all exploration and production (E&P) operators. The condition in Production Sharing Contracts (PSCs) requiring operators to sell crude oil to the government, its nominee, or government companies is waived off, allowing all E&P operators to sell crude oil from their fields in the domestic market. However, as earlier, the export of crude oil remains prohibited. Government revenues, including royalty, cess, and contractual payments, will be calculated based on the

higher of the sales price or the price of the Indian Basket of Crude Oil, as determined by a government-nominated agency.

2.10.8 Policy Framework for Exploration & Exploitation of Unconventional Hydrocarbons (August, 2018):

The policy has been introduced to encourage the existing Contractors to unlock the potential of unconventional hydrocarbons including shale oil and gas and CBM in the existing acreages under PSCs and CBM contracts subject to conditions stipulated in policy document. This was not permitted earlier. Due to this policy, an area of 72,027 sq. km. held under PSCs and 5,269 sq. km. area under CBM contracts has been opened for simultaneous exploration and exploitation of conventional or unconventional hydrocarbons.

2.10.9 Enhanced Prospectively Perception through Data Generation

a) Upgradation of National Data Repository (NDR): NDR acts as a repository of geo-scientific database of the country and plays a key role in facilitating prospective bidders to carve out their choice of blocks for bidding under OALP. In order to cope with the ever-increasing demands of E&P data, NDR is being upgraded to cloud-enabled hyper-converged infrastructure to facilitate easy access of data to the industry for meaningful usage.

b) **Re-assessment of Hydrocarbon Resources:** For updated estimation of hydrocarbon resource potential in the country, re-assessment of hydrocarbon resources for all 26 sedimentary basins in the country was completed in 2017 almost after two decades of earlier estimation. This resulted in prognosticated conventional hydrocarbon resources of the order of 41.87 billion tonnes (oil and oil equivalent of gas), which is about 49% increase as compared to earlier estimate of 28.08 billion tonnes.

c) **Policy Reforms in Exploration and Licensing Policy for enhancing domestic exploration and production of oil and gas (28th February, 2019):** The Government notified 'Reforms in Exploration and Licensing Policy for enhancing domestic exploration and production of oil and gas' on 28th February 2019 with the objective to intensify exploration activities, attract foreign and domestic investment and enhance domestic production.

2.10.10 Guidelines for Early Monetization of Hydrocarbon Discoveries, June 2020: As a step towards energy security of the country, the guidelines was issued on 23.06.2020 for monetization of discovery under Production Sharing Contract/ Revenue Sharing Contract at an early stage within prescribed contractual timeline i.e. before completion of other activities such as Appraisal, Declaration of Commerciality (DoC) and submission of Field Development Plan (FDP).

2.11 Major Reforms taken for enhancing Ease of Doing Business (EODB) in E&P

- **Reducing Compliance Burden-Simplification of Procedures and Processes for submission of Documents on Self Certification basis:** With a view to make the system transparent and faster, under Ease of doing business, guidelines for simplification of procedures and processes for submission of documents on self-certification were issued on 28.02.2020 wherein government rationalized 37 processes in 3 categories under PSC contract.
- **Notification regarding Dispute Resolution Committee (2019):** External Committee of eminent persons/experts has been set up vide Notification dated 16.12.2019 and modalities and structure of Dispute Resolution Mechanism has been finalized.
- **Delegation of powers to DGH (2018-2020):** To streamline the operations

under PSC and removing the extra layers of approvals, all powers except for few, have been delegated to DGH for Contract Management.

- A variety of applications and systems such as Production Sharing Contract Management System, Petroleum Exploration Lease/Petroleum Mining Lease Data Management System, Production Database Management System, E-bidding portal etc. have also been launched.
- **Digitalization E&P Roadmap document:** With the intent to identify and facilitate opportunities for digitalization across the entire upstream value chain through collaboration with the entire India E&P ecosystem, the 'Digitization Roadmap for E&P Industry' was released by Secretary, PNG on 10th June, 2021.
- **Performance Monitoring Dashboard:** A comprehensive Digital Monitoring Dashboard was created in 2019 for monitoring various key E&P performance indicators. It has been integrated with the MoPNG portal in 2021.

2.12 ORD Act Amendment:

Oilfield (Regulation and Development) Amendment Act, 2025 "landmark reform" modernizes India's upstream regulatory framework and aligns it with international best practices. The Government of India has brought the Oilfield (Regulation and Development) Amendment Act, 2025 to amend the Oilfield (Regulation and Development) Act, 1948 to:

(i) allows exploitation of all types of hydrocarbons including shale oil, shale gas, tight oil, tight gas and not just crude and natural gas and all stages of operations under a single permit i.e. the Petroleum Lease;

(ii) provide stability of terms and tenure of lease;

(iii) correct legacy issue by removing terminology related to mining;

(iv) facilitate timely, fair and cost-effective dispute resolution through alternate methods;

(v) increase penalties to ₹25 lakh and upto ₹10 lakh per day for continuing infraction and creates an adjudication authority and appellate mechanism for expeditious levy of penalties;

(vi) aid small operator by allowing sharing of production and processing facilities and infrastructure;

(vii) promote safety at oilfield;

(viii) enable development of comprehensive energy projects for harnessing wind and solar energy and hydrogen along with mineral oils at oilfields; and

(ix) promote use of new technologies such as carbon capture utilization and storage and coal gasification.



ONGC DDW Platform, Eastern Offshore



Mangala Processing Terminal at Rajasthan



ONGC's Onland Rig



ONGC's B-193 Platform, Mumbai Offshore



Floating Production Storage and Offloading (FPSO), Vessel



OIL's Offshore Rig in Andaman







Chapter 3

Pipelines and Natural Gas

3 Pipelines and Natural Gas

India is not only 3rd largest energy consumer in the world after China and USA, but also one of the fastest growing energy consumers. In year 2023, primary energy consumption in the country was about 930 Million Tonnes of Oil equivalent (Mtoe) which has increased to 975 Mtoe during FY 2024-25. The share of Natural Gas in the energy mix is about 6.5% which is slated to increase further. In order to move forward, thrust has been put to enhance domestic gas production; encourage the import of Liquefied Natural Gas (LNG) and augment LNG import capacity; complete the establishment of National Gas Grid; and enhance the spread of City Gas Distribution (CGD) network across the country.

Table: Sectoral consumption of Natural Gas is given below:

NG Consumption during the FY 2024-25 (in MMSCM)			
Sector	**Domestic**	**RLNG***	**Total**
Energy Sector			
Power	6117	2775	8892
CGD	10045	5007	15051
Refinery	1501	4362	5864
I/C for P/L System	1967	2	1968
Agriculture(Tea Plantation)	153	0	153
Industrial	354	766	1120
Manufacturing	492	1191	1682
Other/Misc	9164	1212	10376
Non Energy Sectors			
Fertilizer	2876	17607	20483
Petrochemical	1183	2173	3355
LPG Shrinkage	919	0	919
Sponge Iron/Steel	485	847	1332
Total	**35254**	**35942**	**71196**
Source: Oil and Gas companies			

*Imported Regasified Liquefied Natural Gas

3.1 Gas Grid:

With the aim to create a National Gas Grid (One Nation, One Gas Grid) and increase the availability of natural gas across the country, Petroleum and Natural Gas Regulatory Board (PNGRB) has authorised approximately 33,475 km natural gas pipeline network across the country, As on March 2025 about 25,429 km long gas pipeline network is under operation in the country and around 10,459 km pipeline is under various stages of construction. These pipelines are constructed by the various project proponents from their own funds keeping in view the technical and commercial feasibility following the various regulatory approvals.

Gas Pipeline infrastructure is the most economically feasible and safe mode of transporting the natural gas by connecting gas sources to gas consuming markets. Gas pipeline practically determines the structure of the gas market and its development. Therefore, an inter connected National Gas Grid is under development to ensure the adequate availability and equitable distribution of natural gas in all parts of the country. Efforts are being made to complete the Gas Grid in a time bound manner.

In order to develop gas pipeline network in the Eastern part of the country, the Cabinet Committee on Economic Affairs (CCEA) approved partial capital grant at 40 percent

(₹5,176 crore) of the estimated capital cost of ₹12,940 crore to GAIL for the development of Jagdishpur @ Haldia and Bokaro-Dhamra Pipeline project. This project started in 2016 and connected Eastern part of the country with National 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 have supported the revival of 3 Fertilizer Plants namely Gorakhpur, Barauni and Sindri along the route of these pipeline projects. Connecting North-East part with NGG has become more viable after the advent of Pradhan Mantri Urja Ganga project. The pipeline has also been extended from Barauni to Guwahati (via Siliguri & Bongaigaon), as an integral part of Jagdishpur Haldia & Bokaro Dhamra Pipeline (JHBDPL) to connect North-East Region (NER) with the National Gas Grid.

726 km Barauni-Guwahati pipeline is passing through three states namely Bihar, West Bengal and Assam. Total 3306 km. pipeline i.e. Jagdishpur-Haldia & Bokaro-Dhamra including Barauni-Guwahati pipeline has been executed with the total investment of ₹17,233 crore (latest cost). Further, 253 km. of Dhamra-Haldia Pipeline section has also been authorised to GAIL as an expansion of JHBDPL Project. Pipeline has been connected and gas supply commenced to 4 Fertilizer Plants namely HURL Gorakhpur, Barauni, Sindri and Matix Fertilizer. Connectivity has also been provided to Varanasi, Patna, Ranchi, Jamshedpur City Gas distribution and other CGDs en-route the pipelines in the states of Uttar Pradesh, Bihar, Jharkhand and West Bengal. The entire sections of Integrated JHBDPL including BGPL & Dhamra-Haldia have been commissioned (3269 kms) except Kolkata-Haldia Pipeline (162 kms) and Dhamra-Haldia (103 Kms). The balance section is anticipated to be completed in the year 2025.

An MoU was signed among oil and gas CPSEs i.e. GAIL, IOCL, OIL, ONGC and NRL to form a joint venture company which will lay the pipeline connecting all north eastern State capital including Sikkim. Accordingly, "Indradhanush Gas Grid Ltd" (IGGL) a JVC has been incorporated on 10.08.2018. This JVC is developing trunk pipeline connectivity in all North Eastern States i.e. Assam, Sikkim, Mizoram, Manipur, Arunachal Pradesh, Tripura, Nagaland and Meghalaya in a phased manner. PNGRB issued Final authorization to IGGL on 17.11.2020 for the development of North-East Gas Pipeline Grid (NEGG). This project will also facilitate developing City Gas projects which will ensure the availability of clean cooking fuel to the households and environment friendly fuel to the industrial, commercial and transport sectors in major cities of North Eastern States. CCEA has approved Capital Grant (60% of project cost) of ₹5559 crore to improve viability of project. Further, out of 1,670 km of NEGG, about 992 km. of lowering has been completed as on 24.03.2025. 24"x 392 km. pipeline of Guwahati – Numaligarh section is ready for commissioning.

In the Southern region, Srikakulam Angul Pipeline (SAPL) with a total length of 744 km (619 in Odisha and 125 km. in Andhra Pradesh) and capacity of 6.65 MMSCMD is being established. 421 km. (Mainline) Pipeline section completed and balance 322 km. spurline is under implementation (as of March, 2025, lowering of 258 km. is achieved) which is to be completed in the year 2025. Further, Kochi-Kootanad-Bangalore-Mangalore (KKBMPL) Natural Gas pipeline is being constructed to facilitate processing of gas in the southern region. 579 km of the pipeline is commissioned and the work is under progress for construction of remaining 322 km. in the state of Tamil Nadu. Anticipated completion date is progressively by March, 2026.

IOCL has commissioned 1,080 km length of Ennore - Thiruvallur - Bengaluru - Puducherry - Nagapattinam - Madurai - Tuticorin Natural Gas Pipeline (ETBPNMTPL) for supply of natural gas to anchor customers and city gas distribution (CGD) customers in the states of Tamil Nadu, Andhra Pradesh, Karnataka and UT of Puducherry. The pipeline aims at establishing National Gas Grid in parts

of Southern India, in line with the GoI vision of creating a gas-based economy. The pipeline is presently supplying gas to 7 Geographical Areas (GAs) namely Chennai & Thiruvallur; Kanchipuram; Trichy & Namakkal; Chittoor, Kolar & Vellore; Tiruvannamalai, Villupuram & Kallakurchi; Madurai, Theni and Virudhnagar; and Kanyakumari, Thoothukudi and Tiruneveli Kattabo. Connectivity to 7 more GAs is under advanced stages and likely to be commissioned in near future. Further, two spur lines under ETBPNMTPL are envisaged to supply gas to Cauvery Basin Refinery (CBR). The CCEA clearance for CBR is awaited. Construction of these spurlines will further help in catalysing the industrial growth in the Region.

PNGRB has authorised GAIL India Limited for laying of Natural Gas pipeline from Gurdaspur to Jammu on 12.07.2023. To cater the demand of Srinagar region, PNGRB has invited bids for laying of 325 km long Natural Gas Pipeline from Jammu to Srinagar, emanating from GAIL's Gurdaspur Jammu Natural Gas Pipeline. GAIL is constructiong 160 km long Gurdaspur Jammu pipeline with authorized capacity of 3.1 MMSCMD. This pipeline is envisaged to connect UT of Jammu & Kashmir with National Gas Grid to supply cleaner natural gas. The scheduled completion date is July, 2026.

Additionally, PNGRB has also invited bids for laying of 875 km long Natural Gas Pipeline from Ennore, Tamil Nadu to Barshi, Maharashtra. This pipeline shall emanate from Ennore LNG Terminal and connect to East-West pipeline at Barshi which shall also enable onward transportation of natural gas to major interconnecting pipelines in the country.

3.2 Regasification infrastructure in the country:

Country commenced the first import of Liquefied Natural Gas (LNG) in year 2004 with the establishment of its first regasification LNG (RLNG) terminal located at Dahej (Gujarat). The import of LNG is being carried out as Open General License (OGL) item. The imported RLNG is being supplied at market determined prices as per contractual agreement between suppliers and buyers across the country. Establishment of LNG terminals is also permitted as an infrastructure project and eligible for 100% Foreign Direct Investment (FDI).

At present, the Country is having eight (8) operational LNG re-gasification terminals operational with capacity of about 52.7 MMTPA (~ 190 MMSCMD). The terminal-wise details are as under-

Location	Owner & Operator	Capacity (MMTPA)
Chhara (Gujarat)	HPLNG	5
Dahej (Gujarat)	PLL	17.5
Dhabol (Maharashtra)	GAIL(KLPL)	5
Dhamra (Odisha)	Adani LNG Pvt Ltd	5
Ennore (Tamil Nadu)	Indian Oil	5
Hazira (Gujarat)	SHELL	5.2
Kochi (Kerala)	PLL	5
Mundra (Gujarat)	GSPC LNG Ltd	5
Total Capacity (MMTPA)		**52.7**

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

Location	Owner & Operator	Capacity(MMTPA)
Dahej Expansion (Gujarat)	PLL	5
Gopalpur (Odisha)	PLL	4
Jafrabad (Gujarat)	SWAN ENERGY	5
Total Capacity (MMTPA)		**14**

3.3 City Gas Distribution (CGD):

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

CGD network ensures the supply of environment friendly cooking fuel at the door step of domestic households in the form of Piped Natural Gas (PNG) as well as clean fuel to transport sector in the form of Compressed Natural Gas (CNG). The usage of CNG in transport sector helps in curbing the vehicle emissions in urban area and it improves the air quality.

- Till May 2014, CGD networks was available in about 33 Geographical Areas (GAs) spread over 53 districts (part/full) in different part of the country.
- The Petroleum and Natural Gas Regulatory Board (PNGRB) under 12th and 12A CGD Bidding Round has finalized successful bidders covering 103 Districts, encompassing 6 North East States viz. Arunachal Pradesh, Meghalaya, Manipur, Nagaland, Sikkim & Mizoram and 2 Union Territories of Jammu & Kashmir and Ladakh. After completion of 12/12A CGD biding round, PNGRB has authorized entities for the development of CGD network in 307 Geographical Areas (Gas), covering entire mainland area (excluding islands) of the country.
- PNG supplies to domestic households has increased from a level of 25.4 lakh (May 2014) to 150.41 lakh (as on March, 2025). In total, 8,067 CNG stations (as on 31.03.2025) are making clean and economical transportation fuel available to about 55 lakh CNG vehicles across the country.

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

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

ii. Public Utility Status granted to CGD Projects by Ministry of Labour and Employment (MoLE).

iii. Ministry of Defence (MoD) has issued guidelines for use of PNG in its residential areas/unit lines.

iv. Dept. of Public Enterprises (DPE) has issued guidelines to Public Sector Enterprises (PSEs) to have the provisions of PNG in their respective Residential complexes.

v. Ministry of Housing & Urban Affairs (MOHUA) has issued advisory to State Governments on following aspects-

a. To standardize the Road Restoration/ permission charges along with time bound permission in accordance with the local conditions.

b. Earmarking of land plot for development of CNG Stations at the planning stage of town/city and same should be specified in the revised Master Plan.

c. Relevant modification in building by-laws for providing gas pipeline infrastructure in residential & commercial buildings at architectural design stage.

vi. Further, MOHUA has directed to CPWD & NBCC to have the provisions of PNG in all Government Residential complexes.

vii. Department for Promotion of Industry and Internal Trade (DPIIT) notified amended Rule 2018 to ease out process to set up CNG dispensing facilities at existing OMC ROs.


NATURAL GAS PIPELINE INFRASTRUCTURE OF INDIA - 2024
LADAKH
HIMACHAL PRADESH
PUNJAB
CHANDIGARH
UTTARAKHAND
HARYANA
RAJASTHAN
UTTAR PRADESH
MADHYA PRADESH
BIHAR
JHARKHAND
WEST BENGAL
SIKKIM
ARUNACHAL PRADESH
ASSAM
NAGALAND
MANIPUR
MIZORAM
TRIPURA
MEGHALAYA
ODISHA
CHHATTISGARH
GUJARAT
MAHARASHTRA
TELANGANA
ANDHRA PRADESH
KARNATAKA
TAMIL NADU
KERALA
PUDUCHERRY
LAKSHADWEEP
ANDAMAN & NICOBAR ISLANDS
MUNDRA
DAHEJ
HAZIRA
DABHOL
ENNORE
DHAMRA
Legend
Commissioned Natural Gas Pipeline
Under Construction Natural Gas Pipeline
LNG Terminal
GAIL Pipeline
GSPL Pipeline
PIL Pipeline
Other Pipeline
IOCL Pipeline
GGL Pipeline
IGGL Pipeline



IOCL's Pipelines Network



GAIL's Gas Processing Plant at Gandhar



Laying of Natural Gas Pipeline



Ennore LNG Terminal



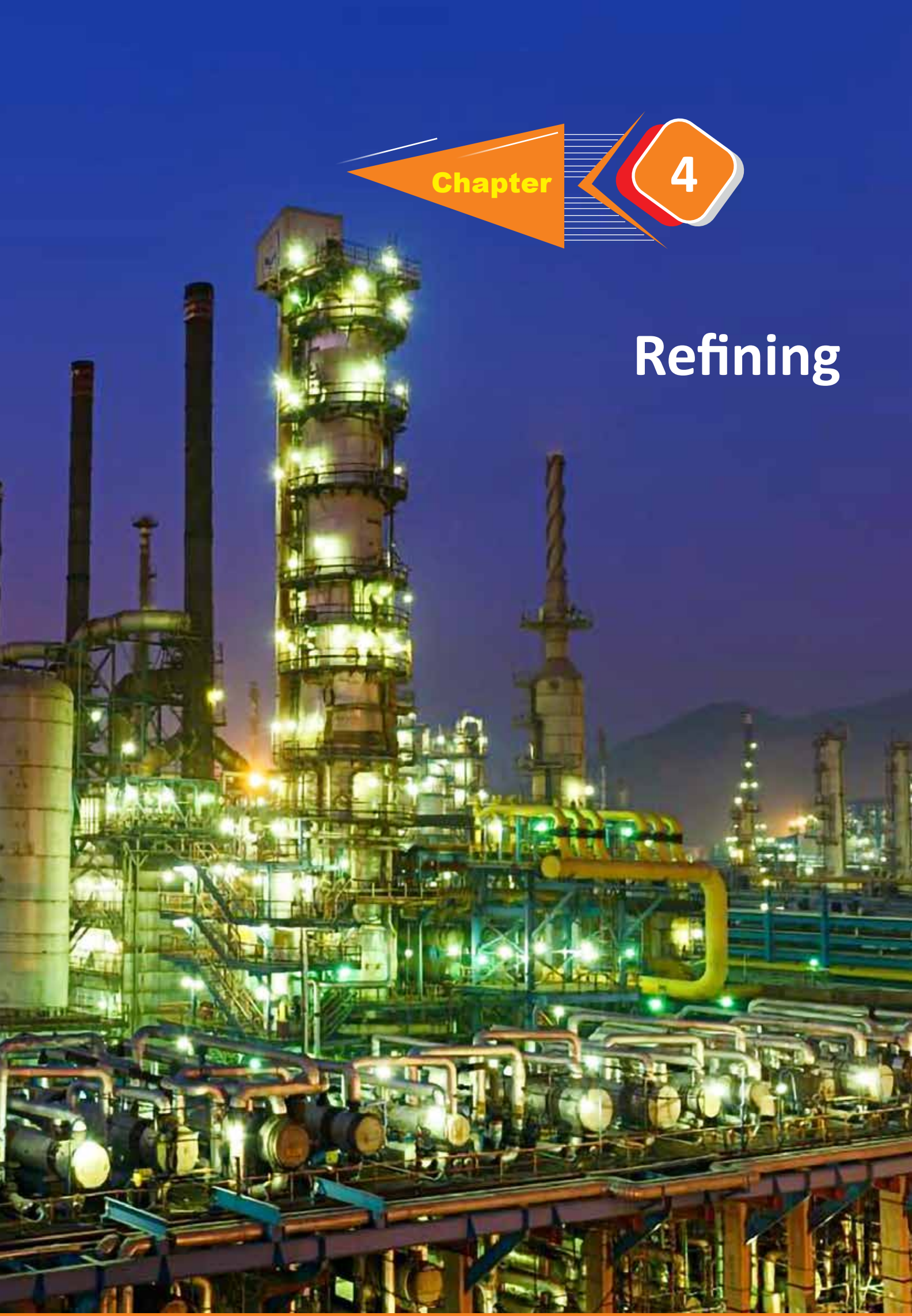
Natural Gas Pipelines against the Backdrop of Ship



BPCL Bina Panki Pipeline


LNG STATION
CRYOGENICS





Chapter 4

Refining

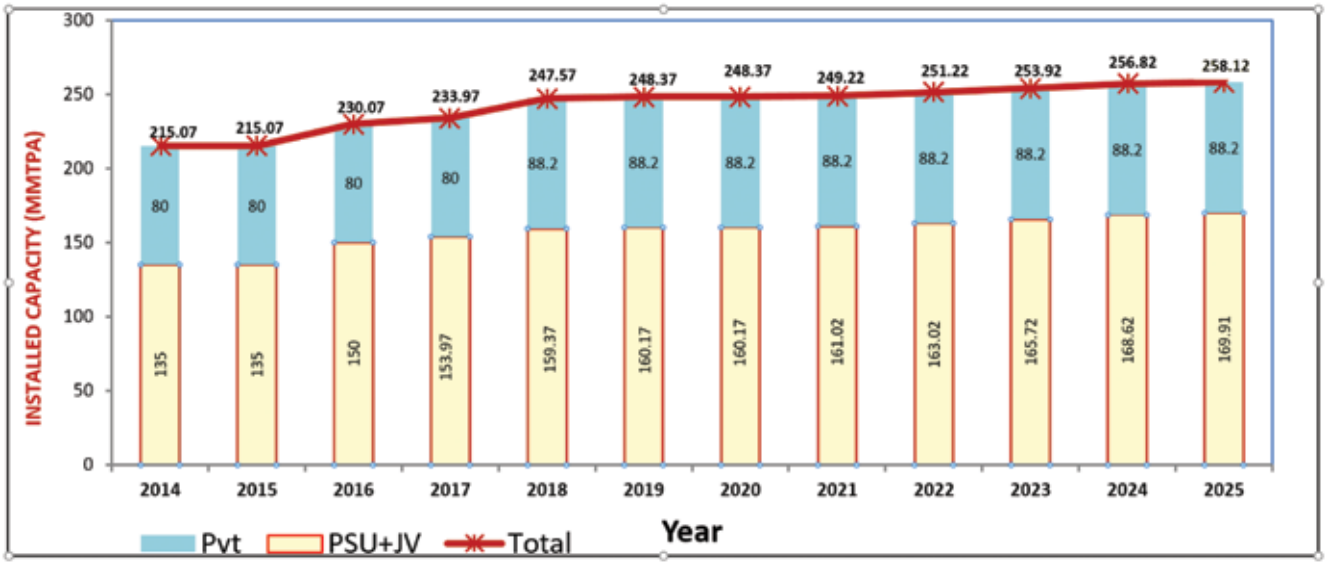
4 Refining

4.1 Introduction

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 name plate capacity has increased from 62.0 Million Metric Tonnes Per Annum (MMTPA) in 1998 to 258.12 MMTPA as on 31.03.2025, comprising of 22 operating refineries – 18 under Public Sector, 3 under Private Sector and 1 in Joint Venture (JV). The refining capacity is not only sufficient for domestic consumption but leaving a substantial surplus also for export of petroleum products. Since 2001-02, India is a net exporter of petroleum products. During FY 2024 – 2025, the country has exported 65.08 Million Metric Tonnes (MMT) (provisional) of Petroleum products worth 44.41 Billion US Dollars (provisional).

4.2 Refining Capacity Addition over the years:

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



The capacity wise details (as on 31.03.2025) of the refineries are given below:

S. No.	Refinery Location/ Year of commissioning	Name of the Company	Name Plate Capacity (MMTPA)
1.	Digboi - 1901	Indian Oil Corporation Ltd.	0.65
2.	Guwahati - 1962		1.20
3.	Barauni - 1964		6.00
4.	Koyali - 1965		13.70
5.	Bongaigaon - 1974		2.70
6.	Haldia - 1975		8.00
7.	Mathura - 1982		8.00
8.	Panipat - 1998		15.00
9.	Paradip - 2016		15.00

S. No.	Refinery Location/ Year of commissioning	Name of the Company	Name Plate Capacity (MMTPA)
10.	Manali - 1965	Chennai Petroleum Corporation Ltd.	10.50
	Total IOCL Group		**80.75**
11.	Mumbai - 1954	Hindustan Petroleum Corporation Ltd.	9.50
12.	Visakhapatnam -1957		15.0
	Total HPCL		**24.50**
13.	Mumbai - 1955	Bharat Petroleum Corporation Ltd.	12.00
14.	Kochi - 1963		15.50
15.	Bina - 2011		7.80
	Total BPCL		**35.30**
16.	Numaligarh - 2000	Numaligarh Refinery Ltd.	3.00
17.	Mangalore - 1996	Mangalore Refinery & Petrochemicals Ltd.	15.00
18.	Tatipaka - 2001	Oil & Natural Gas Corporation Ltd.	0.07
	Sub-total PSU		**158.62**
19.	Jamnagar, RILDTA,1999	Reliance Industries Ltd.	33.00
20.	Jamnagar, RIL SEZ, 2008	Reliance Industries Ltd.	35.20
21.	Vadinar, 2006	Nayara Energy	20.00
	Sub-total Private sector		**88.20**
22.	Bhatinda, HMEL, 2012	HPCL Mittal Energy Ltd.	11.30
	Sub-total Joint venture		**11.30**
Total			**258.12**

4.3 Green Field Refinery and Expansion of Existing Refineries

a. Expansion of existing Refineries

The capacity expansion plan of existing refineries under PSUs till 2028-29 is as under:

S. No.	Name of the Company	Location of the Refinery	Target year	Capacity MMTPA
1.	Bharat Petroleum Corporation Limited	Mumbai, Maharashtra	2028-29	4.0
2.	Bharat Petroleum Corporation Limited (BPCL)	Bina, Madhya Pradesh	2027-28	3.2
3.	Bharat Petroleum Corporation Limited	Kochi, Kerala	2026-27	2.5
4.	Indian Oil Corporation Limited (IOCL)	Digboi, Assam	2026-27	0.35
5.	Indian Oil Corporation Limited	Koyali, Gujarat	2026-27	4.3
6.	Indian Oil Corporation Limited	Barauni, Bihar	2026-27	3.0
7.	Indian Oil Corporation Limited	Panipat, Haryana	2026-27	10.0
8.	Numaligarh Refineries Limited (NRL)	Numaligarh, Assam	2025-26	6.0

b. Green Field Refinery

S. No.	Name of the Company	Location of the Refinery	Target year	Capacity MMTPA
1.	HPCL Rajasthan Refinery Limited (HRRL)	Barmer, Rajasthan	2025-26	9.0

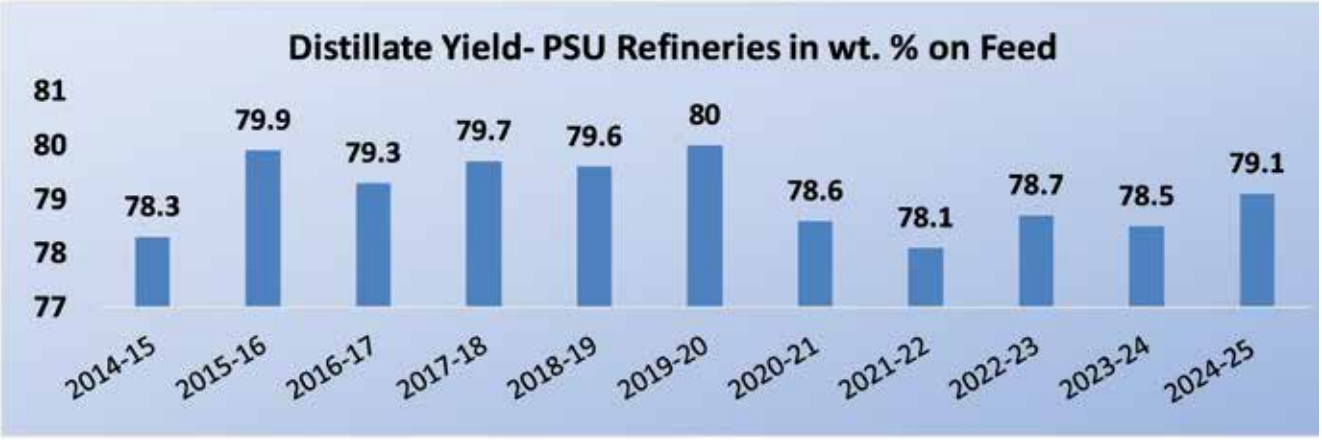
4.4 Refinery Performance Improvement:

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

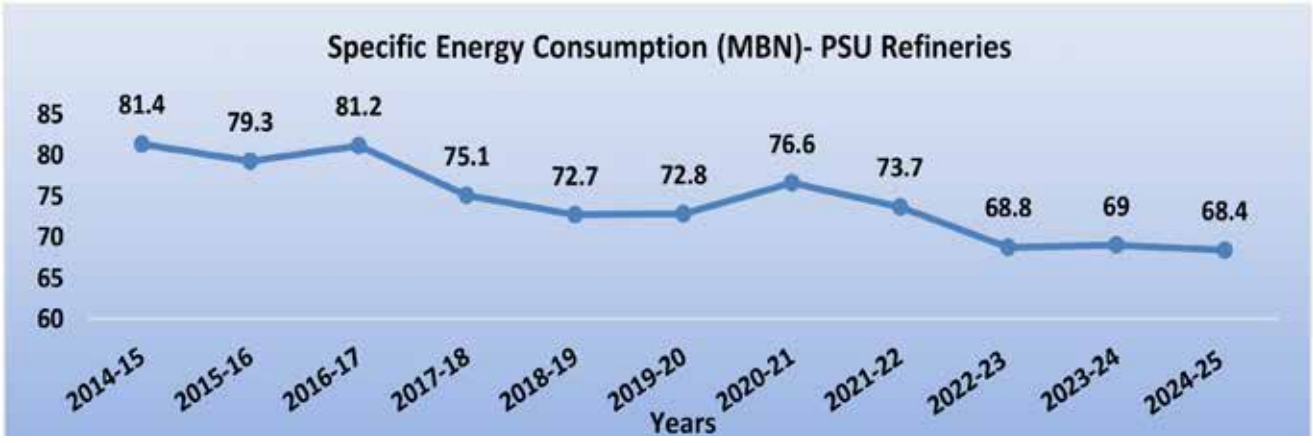
The Centre for High Technology (CHT) carried out a Performance Benchmarking Study of Public Sector Refineries through M/s Solomon Associates for consecutive cycles 2010, 2012, 2014, 2016, 2018, 2020 and 2022. The study cycle 2024 is in progress.

The distillate yield and quality of petrol/ diesel has been improved progressively by PSU refineries through adoption of modern technologies. For standardization of distillate yield, all Indian refineries have adopted a standard distillate yield methodology developed by CHT from 2020-21 onwards.

The PSU refineries' average distillate yield (wt.% on crude) has improved from 73.3% in FY 2005-06 to 79.1% in FY 2024-25. Similarly, energy conservation measures have helped the industry in reducing the Specific Energy Consumption (MBN), measured in terms of MBTU/Bbl/NRGF by about 30% during the period of 2005-06 to 2024-25.



From 2020-21 onwards, distillate methodology of CHT was adopted for standardization



***2022-23 MBN figures under validation by BEE Specific Energy Consumption is written as SEC or MBN.**

MBN =MBTU/Bbl/NRGF;

MBTU: Net energy & loss in Refinery (Million British Thermal Unit);

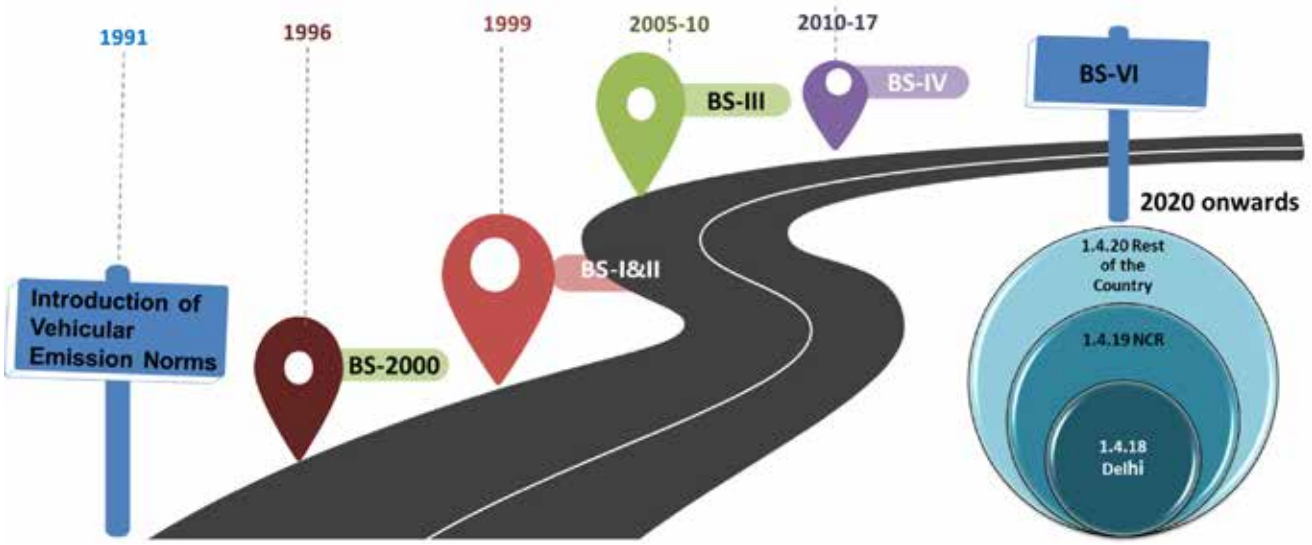
NRGF: Energy Factor;

Bbl: Barrel

From 2015-16 onwards, new MBN Methodology was adopted for standardization.

4.5 Auto Fuel Quality Up-gradation:

The supply of BS-IV quality fuel across the entire country was completed in phases by 01.04.2017. Government decided to leap frog directly from BS-IV to BS-VI emission norms in the country w.e.f. 01.04.2020. Ministry of Road transport & Highways, vide Notification No. GSR 889(E) dated 16.09.2016, notified emission standards for BS VI fuels. Considering rise in pollution level in Delhi, Government implemented BS-VI in NCT Delhi w.e.f. 01.04.2018, followed by major parts of NCR from 01.04.2019. The nationwide supply of BS-VI quality fuels commenced from 01.04.2020.



4.6 Brief Description of the Refineries

Public Sector Refineries

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

Digboi Refinery was commissioned in 1901 by Burmah Oil Company Ltd. (later Assam Oil Company Ltd.). Indian Oil Corporation Ltd. took over the Refinery and Marketing management of Assam Oil Company Ltd. with effect from 14.10.1981 and created a separate division. This division had both Refinery and Marketing operations. Digboi Refinery is the oldest operating refinery in the world and produces premium grade Paraffin wax and micro-crystalline wax. The present capacity of the Refinery is 0.65 MMTPA.

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

Guwahati Refinery was commissioned in January, 1962 with design capacity of 0.75 MMTPA. 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 (MS) and Diesel oil in 2003. The present capacity of the Refinery is 1.20 MMTPA.

4.6.3 Barauni Refinery (Bihar)-Indian Oil Corporation Limited (IOCL): Barauni Refinery was commissioned in July, 1964. The refinery, was originally designed for processing indigenous Assam crudes, which was subsequently revamped and expanded and is now capable of processing imported crudes. The present capacity of the Refinery is 6.00 MMTPA.

4.6.4 Koyali Refinery/ Jawahar Nagar Refinery (Gujarat)- Indian Oil Corporation Limited (IOCL):

Koyali Refinery was commissioned in October, 1965. Koyali Refinery commissioned the country's first Hydrocracker Unit for conversion of heavier ends of crude oil to high value superior quality Kerosene/Aviation Turbine Fuel (ATF) and Diesel. It also has the world's largest single train Linear

Alkyl Benzene (LAB) plant which marked IndianOil's entry into Petrochemicals. The present capacity of the Refinery is 13.70 MMTPA.

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

Bongaigaon Refinery & Petrochemicals Ltd. (BRPL) was incorporated on 20.02.1974, 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 25.03.2009. BRPL which was originally processing Assam crudes and is now capable of processing imported crudes. The present capacity of the Refinery is 2.70 MMTPA.

4.6.6 Haldia Refinery (West Bengal)-Indian Oil Corporation Limited (IOCL): Haldia Refinery was commissioned in January, 1975. It a coastal Refinery and is situated 136 km down-stream of Kolkata in the district of Purba Medinipur, West Bengal, near the confluence of rivers Hoogly and Haldi. It is also one of the two refineries of Indian Oil Group Companies producing Lube Oil Base Stocks (LOBS) apart from being the sole producer of Jute Batching Oil (JBO). Initially installed with a crude processing capacity of 2.5 MMTPA. The present capacity of the Refinery is 8.00 MMTPA.

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

Mathura Refinery was commissioned in January, 1982. The primary units of the refinery were designed by technology from USSR. It is the first Green Refinery of India equipped with elaborate environment monitoring system and ecological park. It also uses natural gas to control SO_2 emissions from the refinery. The present capacity of the Refinery is 8.00 MMTPA

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

Panipat Refinery was commissioned in 1998. Panipat Refinery is the first modern integrated refinery cum Petrochemical complex in public sector. The Purified Terephthalic Acid (PTA) plant is 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 IndianOil's entry into Plastics Industry. The present capacity of the Refinery is 15.00 MMTPA.

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

Paradip Refinery was commissioned in 2016 . It is located at Paradip, Odisha. This refinery serves as an economic stimulus for industrial development in the region by way of immediate potential growth of ancillary industries.

The refinery was designed to process 15.0 MMTPA crude with an overall Nelson complexity factor of 10.8, which makes it capable of processing 100% High Sulphur and Heavy Crude oil to produce various petroleum products like LPG, Motor Spirit (Petrol) & Diesel of BS-VI quality, Kerosene, Aviation Turbine Fuel, Propylene, Sulphur and Petroleum Coke. The refinery is also producing premium quality Motor Spirit and other green auto fuel variants for export to various countries. The products from the Refinery meets the energy demands of the domestic market and partly the South-East Asian export market. The present capacity of the refinery is 15.00 MMTPA.

HPCL Refineries

4.6.10 Mumbai Refinery (Maharashtra)-Hindustan Petroleum Corporation Limited (HPCL):

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

Stock (LOBS). On 15th July, 1974 the undertakings of ESSO and Lube India Ltd were nationalized and merged to form Hindustan Petroleum Corporation Limited (HPCL). HPCL-Mumbai Refinery is the only refinery of HPCL to produce Lube Oil Base Stocks. The refinery also produces special products like Food Grade Hexane, Rubber Processing (RPO), Diana Processing oil (Clear and transparent paraffin type of process oil, with excellent heat resistant and weather resistant properties) etc. The present capacity of the refinery is 9.50 MMTPA.

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

HPCL's Visakh Refinery was commissioned in 1957 by Caltex Oil Refining (India) Ltd. The Refinery was taken over by the Government of India in 1976 and was consequently amalgamated with HPCL in 1978. HPCL Visakh refinery was the first oil Refinery on the East Coast and was one of the first major industries of Visakhapatnam. With the commissioning of the Single Point Mooring (SPM) facility at Visakh in the year 2010, Very Large Crude Carriers (VLCC), which carry up to 2 million barrels of oil, can now be received at Visakh Refinery. The Indian Strategic Petroleum Reserves Ltd. (ISPRL) exists nearby the refinery. The present capacity of the Refinery is 15.00 MMTPA.

BPCL Refineries

4.6.12 Mumbai Refinery (Maharashtra) - Bharat Petroleum Corporation Limited (BPCL):

Mumbai Refinery was commissioned in January 1955 under the ownership of Burmah Shell refineries Ltd. Following the Government acquisition of the Burmah Shell, Bharat Petroleum Corporation Limited (BPCL) came into existence on 24th January 1976. BPCL-Mumbai refinery has processed 109 types of crude oil. The refinery also has Lube Base Oil Unit for production of environment friendly Group II/III base oil. The present capacity of the Refinery is 12.00 MMTPA.

4.6.13 Kochi Refinery (Kerala)–Bharat Petroleum Corporation Limited (BPCL):

Kochi Refinery was set up in pursuance of formation agreement dated 27th April, 1963 between Government of India, Philips Petroleum Co. of USA and Duncan Brothers of Calcutta. The refinery was amalgamated with Bharat Petroleum Corporation Ltd in 2006. The refinery is equipped to receive crude oil in Very Large Crude Carriers (VLCC). The product portfolio of the Kochi Refinery today includes petrochemical feedstocks and specialty products in addition to its range of quality fuels. The present capacity of the refinery is 15.50 MMTPA.

4.6.14 Bina Refinery (Madhya Pradesh)-Bharat Petroleum Corporation Limited (BPCL):

Bina Refinery was set up by Bharat Oman Refineries Limited (BORL), a joint venture of Bharat Petroleum Corporation Limited (BPCL) and OQ SAOC (formerly known as Oman Oil Company SAOC). It was commissioned in May 2011. Since March 2020, the Company become subsidiary of Bharat Petroleum Corporation Limited and in July 2021, entire shareholding of OQ SAOC was purchased by Bharat Petroleum Corporation Limited.

Bina Refinery is the first refinery in central part of India and augments the availability of petroleum products in Central and Northern India. Other facilities include Single Point Mooring facility (SPM), Crude Oil storage Terminal (COT) at Vadinar in Gujarat and 935 km long cross-country crude pipeline from Vadinar to Bina (VBPL). The present capacity of the refinery is 7.80 MMTPA.

CPCL Refinery

4.6.15 Manali Refinery (Tamil Nadu)-Chennai Petroleum Corporation Limited (CPCL):

Chennai Petroleum Corporation Limited (CPCL), formerly known as Madras Refineries Limited (MRL) was formed as a joint venture in 1965 between the Government of India (GOI), AMOCO and National Iranian Oil Company (NIOC). CPCL became a subsidiary of IOCL in 2001. CPCL-Manali refinery is one of the most complex refineries in India with Fuel, Lube, Wax and Petrochemical feedstocks production facilities. The 5.8 Million Gallon per Day (MGD) Sea Water Desalination Project to augment the water requirements of its refinery was first of its kind in the industry. The present capacity of the Refinery is 10.50 MMTPA.

NRL Refinery

4.6.16 Numaligarh Refinery (Assam)-Numaligarh Refinery Limited (NRL):

Numaligarh Refinery, also known as "Assam Accord Refinery" was commissioned in October, 2000. Current shareholding pattern of NRL with Oil India Limited (72.15%), Government of Assam (23.48%) and Engineers India Limited (4.37%). NRL is the largest refinery in the North- East equipped with modern units such as Hydrocracker and Delayed Coker for maximising distillate yield. The present capacity of the Refinery is 3.00 MMTPA.

MRPL Refinery

4.6.17 Mangalore Refinery (Karnataka)-Mangalore Refinery and Petrochemicals Limited (MRPL):

Mangalore Refinery and Petrochemicals Limited (MRPL) was commissioned in March, 1996. MRPL was originally set up as a Joint Venture refinery, promoted by Hindustan Petroleum Corporation Ltd. (HPCL) and Aditya Birla Group of Companies. In March, 2003 MRPL became a subsidiary of ONGC. The Refinery has high flexibility to process different crudes with API gravity of 24 to 46. MRPL is the only refinery in India to have 2 Hydrocrackers producing Premium Diesel with High Cetane Number. It is also the only refinery in India to have two Continuous Catalytic Regeneration (CCR) Platforming Unit producing Unleaded Petrol of High Octane Number. The present capacity of the Refinery is 15.00 MMTPA.

ONGC Refinery

4.6.18 Tatipaka Refinery (Andhra Pradesh) - Oil and Natural Gas Corporation Limited (ONGC):

The refinery, set up as mini refinery (Phase-I) of ONGC, was commissioned in September, 2001 at Tatipaka in East Godavari District of Andhra Pradesh. The present capacity of the Refinery is 0.07 MMTPA.

Joint Venture Refinery

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

Guru Gobind Singh Refinery (GGSR), owned by Hindustan Mittal Energy Limited (HMEL), a joint venture between HPCL and Mittal Energy Limited, was commissioned in April, 2012. The refinery is a testimony to a successful Public Private Partnership in the oil and gas sector given the strategic location of Bathinda, the refinery serves the fuel requirements of the northern States of India. The present capacity of the Refinery is 11.30 MMTPA.

4.6.20 Rajasthan Refinery (Barmer - Rajasthan) –HPCL Rajasthan Refinery Limited (HRRL):

HPCL Rajasthan Refinery Limited (HRRL) is a Joint Venture between Hindustan Petroleum Corporation Limited (HPCL) and Government of Rajasthan (GoR). The project involves setting up of a

Greenfield 9.00 MMTPA refinery cum Petro-chemical complex at Pachpadra in Balotra district of Rajasthan. Operations of HRRL will commence from 2025-26.

Private Sector Refineries

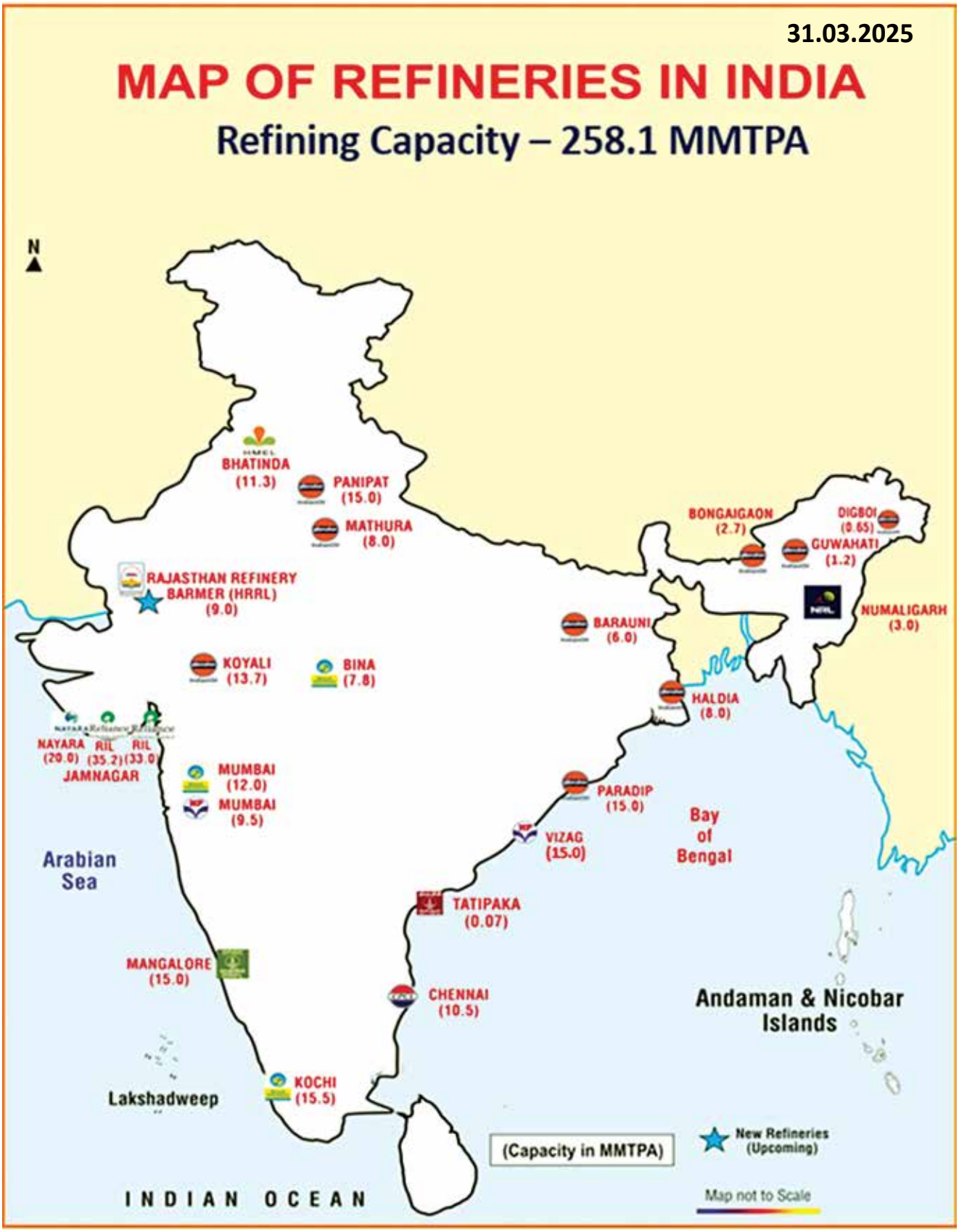
4.6.21 Reliance Industries Limited, Jamnagar (Gujarat) - Special Economic Zone (RIL - SEZ): The refinery was commissioned in December, 2008. An export based SEZ Refinery has a unique design and path breaking configuration with 'Clean Fuels' process plant. It is designed with high level of flexibility to change grades based on economy and to capture margins based on market dynamics. The new SEZ Refinery was the first refinery in India to produce Euro-IV grades of gasoline and diesel. The present capacity of the Refinery is 35.20 MMTPA.

4.6.22 Reliance Industries Limited, Jamnagar (Gujarat)-Domestic Tariff Area (RIL-DTA):

The refinery was commissioned in July 1999. RIL-DTA was the first private sector refinery in the country. RIL-DTA is having a petrochemical plant for the production of paraxylene, a polymer plant for the production of Polypropylene. The present capacity of the Refinery is 33.00 MMTPA.

4.6.23 Nayara Energy Limited, Vadinar Refinery, Vadinar (Gujarat)

The refinery was commissioned in November, 2006. Vadinar refinery is the single-location second largest Refinery in the country. The present capacity of the Refinery is 20.00 MMTPA.


31.03.2025
MAP OF REFINERIES IN INDIA
Refining Capacity – 258.1 MMTPA
N
BHATINDA
(11.3)
PANIPAT
(15.0)
MATHURA
(8.0)
RAJASTHAN REFINERY
BARMER (HRRL)
(9.0)
KOYALI
(13.7)
BINA
(7.8)
NAYARA
(20.0)
RIL
(35.2)
RIL
(33.0)
JAMNAGAR
MUMBAI
(12.0)
MUMBAI
(9.5)
Arabian
Sea
MANGALORE
(15.0)
KOCHI
(15.5)
Lakshadweep
CHENNAI
(10.5)
TATIPAKA
(0.07)
VIZAG
(15.0)
PARADIP
(15.0)
BARAUNI
(6.0)
HALDIA
(8.0)
BONGAIGAON
(2.7)
GUWAHATI
(1.2)
DIGBOI
(0.65)
NUMALIGARH
(3.0)
Bay
of
Bengal
Andaman & Nicobar
Islands
(Capacity in MMTPA)
New Refineries
(Upcoming)
Map not to Scale
INDIAN OCEAN





Hon'ble Minister of MoPNG and Hon'ble Chief Minister of Rajasthan visited HRRL's Barmer Refinery



HPCL Rajasthan Refinery Limited (HRRL)



BPCL's Mumbai Refinery



HPCL Visakh Refinery



IOCL's Paradip Refinery





Chapter 5

Marketing & Distribution



5 Marketing & Distribution

India's oil and gas marketing is driven by robust domestic demand and significant export capabilities, leveraging its large refining capacity and strategic location to serve global markets. The sector is characterized by a dual focus on meeting growing energy needs and boosting export revenue, supported by government initiatives, increased refining capacity, and advanced technologies. Key marketing strategies include expanding retail networks, incorporating digital payment and charging infrastructure at retail outlets, and promoting sustainable energy alternatives like bio-fuels.

India's petroleum industry is a comprehensive sector encompassing exploration, production, refining, distribution, and marketing of petroleum and its by-products. This includes upstream activities like extraction of crude oil and natural gas, midstream activities such as transportation and storage, and downstream processes including refining and distribution of fuels like petrol, diesel, LPG, and kerosene. A critical contributor to India's energy basket, the petroleum industry ensures energy security and underpins various economic activities.

Marketing Infrastructure: As on 31.03.2025 PSU OMCs viz IOCL, BPCL and HPCL have 287 POL Terminals/Depots, 260 Aviation Fuel Stations, 87610 Retail Outlets including 25391 rural outlets across the country. Pan-India level information (including the Private Sector) is depicted below:

Table 6.7 Industry Marketing Infrastucture as on 01.04.2025

Particulars	IOCL	BPCL	HPCL	RL/RBML/ RSIL*	NEL##	Shell	Others	Total
POL terminal/depots (Nos.)$	127	80	80	17	3		7	314
Aviation fuel stations (Nos.)@	130	73	57	32			10	302
Retail Outlets (total) (Nos.)^	40221	23642	23747	1906	6683	361	164	96724
Out of which, Rural ROs (Nos.)	13205	6200	1638					27756
SKO/LDO agencies (Nos.)	3830	927	6378					6395
1.PG distributors (total) (Nos.) (PSUs only)	1299	6269	6378					25566
LPG bottling plants (Nos.) (PSUs only)#	100	54	55				2	211
LPG bottling capacity (TMTPA) (PSUs only)&	11213	5220	6470				180	23083
LPG active domestic consumers (Nos. crore) (PSUs only)	15.5	8.5	9.0					33.0

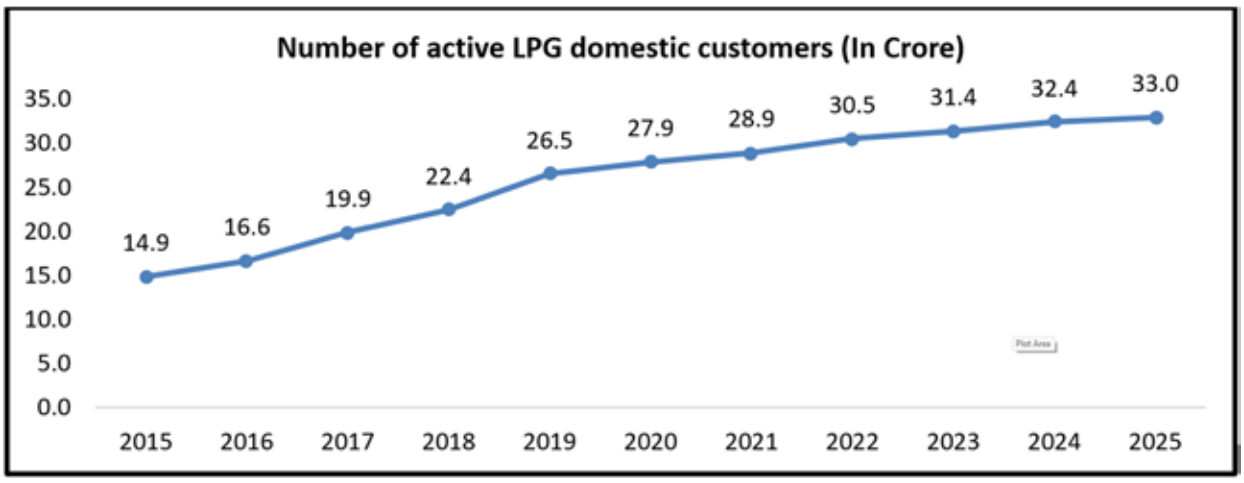
$(Others 5 MRPL & 2 NRL); @(Others ShellMRPL); ^(Others MRPL), #(Others NRL-1, CPCL-1); &(Others-NRL-60, CPCL-120);
##Nayara Energy Limited.
RBML-Reliance BP Mobility Limited; RSIL-RBML Solutions India Ltd.
Source: PPAC

Aviation Fuelling Station in the Country: An aviation fuel station, also known as an airplane fuel facility, is a facility that stores and supplies aviation fuel for aircraft. Aviation fuel stations are critical for airports to operate and are designed to be safe and efficient. Aviation fuels are petroleum based fuels or petroleum and synthetic fuel blends, used to power aircraft. They have more stringent requirements than fuels used for ground use such as heating

and road transport and contain additives to enhance or maintain properties important to fuel performance or handling. As on 31st March, 2025 there are 302 Nos. of Aviation Fueling Station in India.

5.1. Retail Marketing Infrastructure of LPG:

The retail marketing of LPG 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 Industries, Essar, Shell, etc. There are 211 LPG Bottling Plants having rated bottling capacity of 23,083 TMTPA, operated by Public Sector Oil Marketing Companies and 25,566 LPG Distributorships in the country as on 31.03.2025. Total active LPG consumers as on 31.03.2025 in the country were 32.97 crore. During FY 2024-25, total 85 new LPG distributorships and 2 new bottling plants have been commissioned. Also, a total of 43.6 lakh new LPG connections have been issued by OMCs during FY 2024-25, including 0.92 lakh connections under Ujjwala scheme.



Source: Petroleum Planning and Analysis Cell

5.2. Major Initiatives

5.2.1 PAHAL (DBTL Scheme): Government of India launched Direct Benefit Transfer for LPG consumer (DBTL) scheme namely, `PAHAL' (Pratyaksh Hanstantrit Labh), in 54 districts of the country on 15.11.2014. Later the scheme was extended to all over the country and as on 31.03.2025, a total of 30.58 crore LPG consumers have joined the scheme.

The scheme aims to rationalise subsidies and cut subsidy leakages. LPG consumers who join the PAHAL scheme, get their LPG refills 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 the LPG consumers in the country. PAHAL has further helped in identifying 'ghost' accounts, multiple accounts and inactive accounts. This resulted in curbing diversion of subsidised LPG to commercial purposes.

5.2.2 Give-It-Up: As a part of subsidy management, the Hon'ble Prime Minister of India appealed to all well-off LPG consumers to voluntarily surrender their LPG subsidy by launching 'Give-It-Up' campaign. Give-It-Up campaign evoked huge response from socially committed individuals and has resulted in more than 1.16 crore consumers giving up their LPG subsidy voluntarily as on 01.04.2025. Give-It-Up campaign of the government has received widespread acclaim from all over the world and is a leading and one of the earliest example of Nudge tool used in Public Policy inspired from the domain of Psychology and Behavioral Economics.

5.2.3 Pradhan Mantri Ujjwala Yojana (PMUY): In May 2016, Ministry of Petroleum and Natural Gas (MoPNG), introduced the 'Pradhan Mantri Ujjwala Yojana' (PMUY) as a flagship scheme with an objective to make clean cooking fuel such as LPG available to the rural and deprived households which were otherwise using traditional cooking fuels such as firewood, coal, cow-dung cakes etc. Usage of traditional cooking fuels had detrimental impacts on the health of rural women as well as on the environment.

Hon'ble Prime Minister of India formally launched the scheme on 01.05.2016.

Initially, PMUY envisaged a target of 5 crore connections over a period of 3 years starting from FY 2016-17. Later, the target of Pradhan Mantri Ujjwala Yojana (PMUY) was increased from five crore to eight crore by Government. Along with the increase in target Government also extended the benefit of PMUY to such poor families who had been left out on account of their names not appearing in either the SECC list or 7 identified categories to cover all poor families of the country. This extended list of beneficiaries included categories i.e. SC, ST, Pradhan Mantri Awas Yojana, Most Backward Classes, Antyodaya Anna Yojana, tea & ex-tea garden tribes, forest dwellers, island & river island people and poor household as per 14-point self-declaration by applicant.

Under this scheme, the Government provides deposit free LPG connection to the adult woman member of a BPL family. Government bears the cost of security deposit towards cylinder and Pressure Regulator, DGCC Card, Suraksha Hose and administrative/installation charges amounting ₹1600/- for each new connection.

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

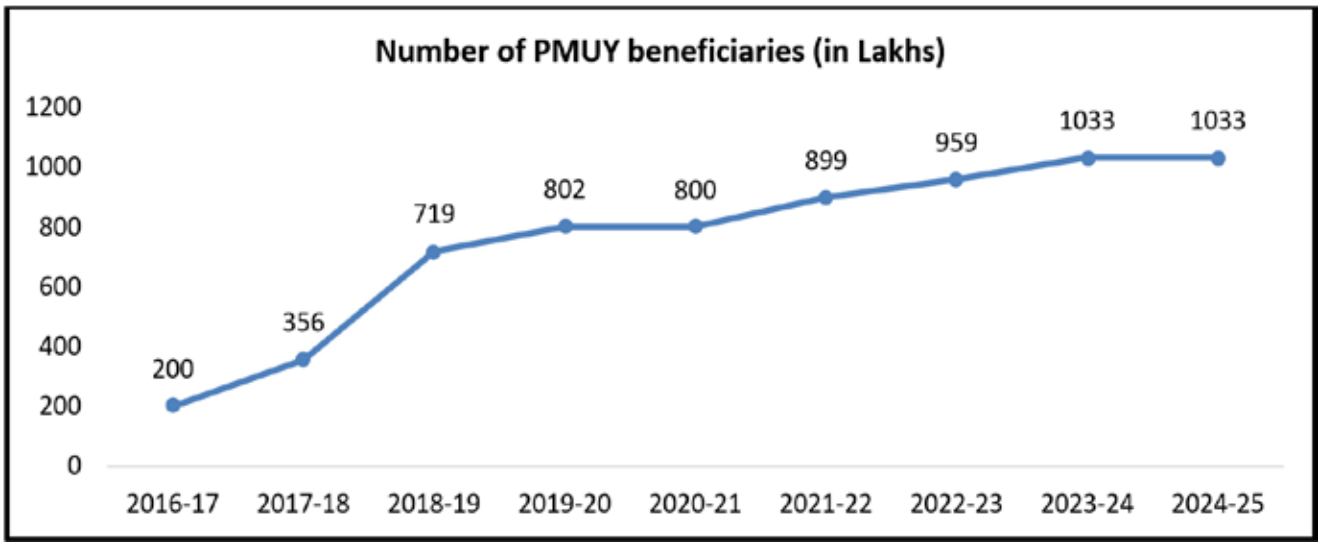
5.2.4 UJJWALA 2.0: Ujjwala 2.0 was launched by Hon'ble Prime Minister from Mahoba District of Uttar Pradesh on 10th August, 2021 on pan India basis to provide additional one crore LPG connections under PMUY.

Along with a deposit free LPG connection, Ujjwala 2.0 provides first refill and hotplate free of cost to all beneficiaries. Special provision has been made for migrant families to avail new connection. A self-declaration for both 'family declaration' and as a 'proof of address' would suffice for migrant applicant.

Online application option was also provided for the first time for applicants along with existing options like CSC centres, Helpdesk and OMC distributors etc. Applicants could apply online for an Ujjwala connection using scheme website www.pmuy.gov.in.

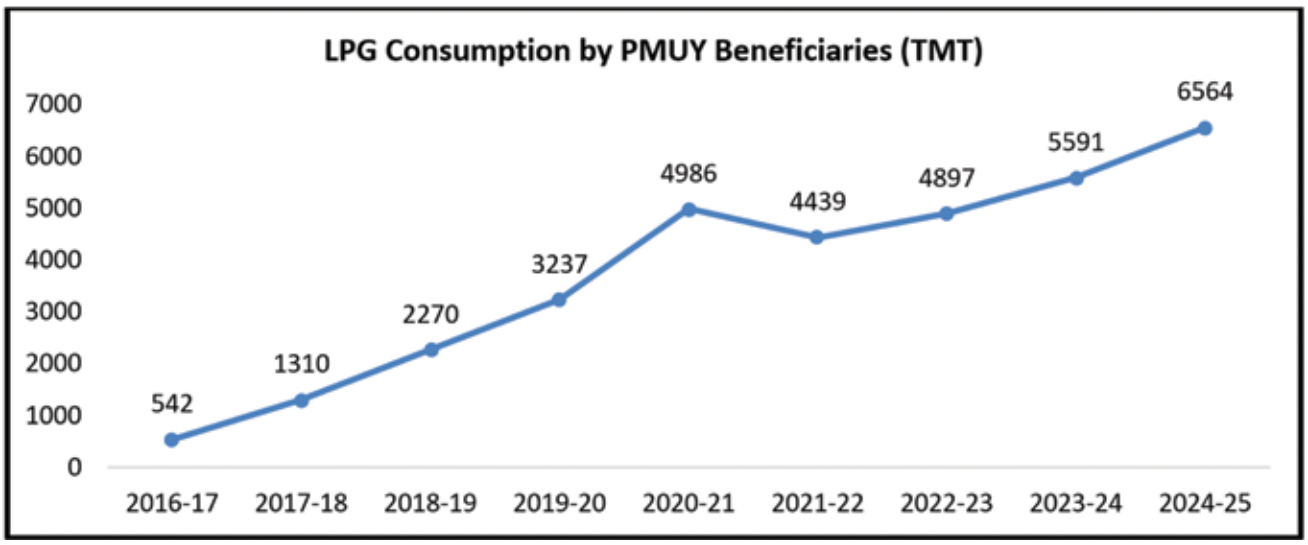
The target of releasing 1.0 crore LPG connections under Ujjwala 2.0 was achieved by January 2022. Further, to cover the left-out households, it was decided to release addition 60 lakh connection which was achieved by December 2022.

Government further approved expansion of Ujjwala Yojana in September 2023 for releasing 75 lakh additional LPG connections, which was achieved during July 2024. As on 31.03.2025, there are total 10.33 crore PMUY connections in the country.



Source: Petroleum Planning and Analysis Cell

Growth in PMUY consumption is 17.4% in FY 2024-25 as compared to FY 2023-24.



Source: Petroleum Planning and Analysis Cell

Per Capita Consumption of PMUY households has increased from 3.01 refills (in terms of 14.2 Kg domestic LPG cylinders) in 2019-20 to 3.95 in 2023-24 and 4.47 in 2024-25.

5.2.5 Targeted subsidy to PMUY Households: To make LPG more affordable to PMUY consumers and ensure sustained usage of LPG by them, Government started a targeted subsidy of ₹200/- per 14.2kg cylinder for up to 12 refills per year (and proportionately pro-rated for 5 Kg connections) to the PMUY consumers in May 2022. This subsidy was increased by ₹100 in October 2023 taking the total subsidy to ₹300. The subsidy is credited directly to the registered bank accounts of the eligible beneficiaries.

5.2.6 New LPG connections: LPG domestic connections are easily available on demand and are released to prospective customers once they approach the concerned distributorship and fulfil the KYC formalities. LPG distributors of the OMCs immediately register and act on a request for a new LPG connection. There is no waiting list for an ordinary LPG connections in the country.

F.Y.	New LPG connections issued (No. in Crore)
2021-22	1.58
2022-23	1.01
2023-24	1.12
2024-25	0.44

5.2.7 Portability for Domestic LPG customers

a. **Refill Portability:** Consumers are given an option to select a distributor other than their parent distributor while booking refills through the portal and mobile app. The list of all distributors serving in the pin code/market is displayed to the customer along with their star rating. A total of 15.8 lakh refill portability requests were processed in 2024-25.

b. **LPG connection portability for consumers:** The facility of Online Transfer of LPG connection to another distributor serving in the same area has been provided for the first time to LPG customers through respective OMCs' web portals and Mobile Apps. In 2024-25, Public Sector OMCs processed 6.4 lakh connection portability requests from LPG consumers.

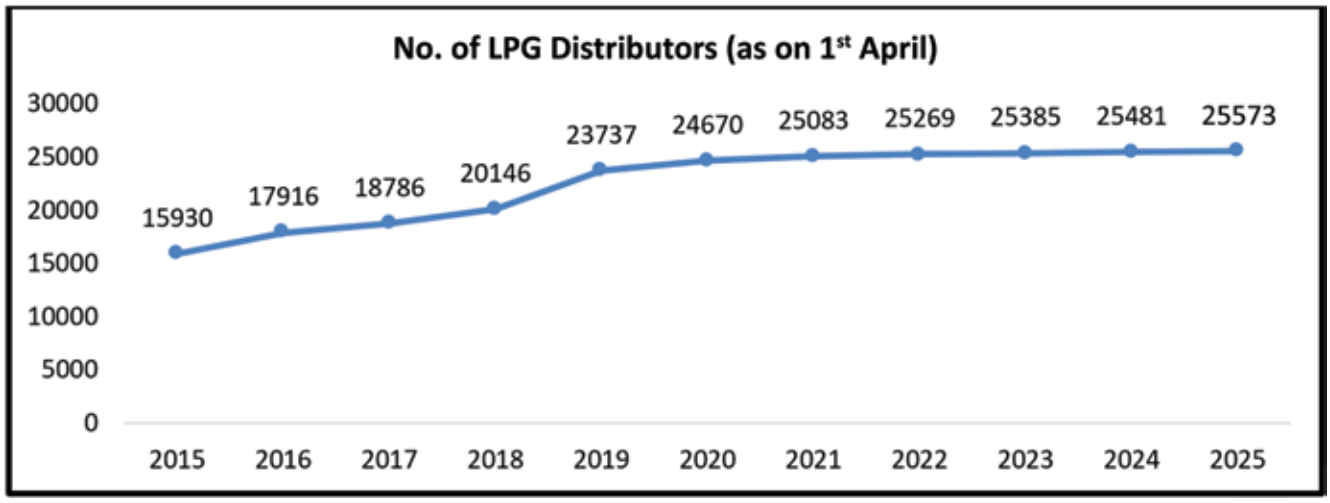
5.2.8 Commissioning of New Distributorships: Currently, the selection process for all types of distributorships is undertaken under Unified Guidelines for Selection of LPG distributorships. In FY 2021-22, 214 new LPG distributorships were commissioned. In FY 2023-24, a total of 96 new LPG distributorships were commissioned and in FY 2024-25, a total of 96 new LPG distributorships were commissioned across the country. As on 01.04.2025 there are total 25573 distributorships.

Figure in Numbers

State/UT	Sheheri Vitrak	Rurban Vitrak	Gramin Vitrak	Durgam Kshetriya Vitrak	Total
Chandigarh	26	0	0	0	26
Delhi	318	0	0	0	318
Haryana	282	103	233	9	627
Himachal Pradesh	69	14	91	37	211
Jammu & Kashmir	126	34	75	40	275
Ladakh	0	13	2	9	24
Punjab	334	258	250	21	863
Rajasthan	434	163	654	134	1385
Uttar Pradesh	1007	709	2308	122	4146
Uttarakhand	114	104	59	40	317
Sub Total North	**2710**	**1398**	**3672**	**412**	**8192**
Arunachal Pradesh	6	6	33	40	85
Assam	129	101	308	64	602
Manipur	15	13	36	39	103
Meghalaya	21	9	19	17	66
Mizoram	11	6	26	16	59
Nagaland	15	11	17	40	83
Sikkim	9	1	9	10	29
Tripura	18	8	47	14	87
Sub Total North-East	**224**	**155**	**495**	**240**	**1114**
Andaman & Nicobar Islands	0	4	5	1	10
Bihar	240	252	1502	38	2032
Jharkhand	163	52	356	20	591
Odisha	173	100	578	114	965
West Bengal	405	164	962	74	1605
Sub Total East	**981**	**572**	**3403**	**247**	**5203**
Chhattisgarh	105	75	172	182	534
Dadra & Nagar Haveli and Daman & Diu	5	1	1	0	7
Goa	44	4	5	2	55

State/UT	Sheheri Vitrak	Rurban Vitrak	Gramin Vitrak	Durgam Kshetriya Vitrak	Total
Gujarat	421	121	487	13	1042
Madhya Pradesh	472	210	485	385	1552
Maharashtra	1009	192	846	193	2240
Sub Total West	**2056**	**603**	**1996**	**775**	**5430**
Andhra Pradesh	324	299	430	107	1160
Karnataka	535	139	551	53	1278
Kerala	224	136	321	22	703
Lakshadweep	1	0	0	0	1
Puducherry	15	11	3	0	29
Tamil Nadu	566	364	613	109	1652
Telangana	291	105	335	80	811
Sub Total South	**1956**	**1054**	**2253**	**371**	**5634**
All India	**7927**	**3782**	**11819**	**2045**	**25573**

Source: IOCL on behalf of Public sector OMCs



Source: Petroleum Planning and Analysis Cell

5.3 Major Initiatives in Marketing Sector

5.3.1 Promotion of Digital Payments: There has been a significant expansion of digital payment infrastructure at retail outlets. As on 31.03.2025, there are 87,610 (IOCL-40221, BPCL-23642, HPCL-23747) Retail outlets across the country and all these ROs have been covered with digital infrastructure having 2,63,410 POS terminals and 1,03,224 e-wallet facility. Further, all 87,610 retail outlets are enabled with BHIM UPI. All the LPG Distributors are enabled with BHIM UPI.

5.3.2 Electric Vehicle Charging Station: In order to increase the electric vehicle charging infrastructure in the country, Oil Marketing Companies are putting up Electric Vehicle Charging Stations (EVCS) at their Retail outlets (ROs) in different parts of the country in phased manner based on techno commercial feasibility and compliance of PESO norms. As on 31.03.2025, OMCs have put up 25,243 EV charging stations and 976 Battery Swapping stations at their ROs.

5.3.3 Market Authorization: Ministry of Petroleum and Natural Gas vide Resolution dated 08.11.2019 revised the guidelines for authorization to market transportation fuels i.e. MS & HSD. As on 31.03.2025, there are 14 entities which are authorized to market transportation fuels in accordance with the provisions of the said Resolution.

5.3.4 Swachchh Bharat Mission: Under Swachchh Bharat Mission, toilet facilities are ensured at every retail outlet. As on 01.07.2025, 88352 ROs have toilet facility which includes 70,922 ROs having

separate toilet facility for male and female.

5.3.5 Door to Door Delivery: As on 01.07.2025 OMCs have commissioned total 3231 Door to Door Delivery (DDD) Bowsers through Dealers and Start-ups.

5.3.6 EV Charging Station: Ministry of Heavy Industries (MHI) has sanctioned ₹873.5 crore to Oil Marketing Companies under FAME II Subsidy Scheme for setting up 8932 Electric vehicle Charging Stations (EVCS). Electric Vehicle Charging Stations are being provided by OMCs at their ROs. As on 01.07.2025, 8558 number of EVCS has been installed by OMCs at their Retail Outlets (ROs) under FAME-II subsidy scheme out of which 1112 EVCS have been energized. In addition to this, OMCs have setup 18259 EVCS at their Retail outlet from their own funds.

5.3.7 APNA GHAR: The PSU OMCs will be setting up Truckers' Way side Amenities (WSA) named 'APNA GHAR' at 1000 Retail Outlets in 3 years during 2024-25 to 2026-27 with the objective to ensure safe and convenient long-distance travel, reducing probability of accidents, providing fillip to rural economy, generating employment in rural areas and boosting Tourism and Banking. As on 01.07.2025, APNA GHAR have been set up at 368 Retail Outlets across the country with 4611 beds besides other facilities. 438 More APNA GHARS are targeting for completion in 2025-26 and the balance 200 in 2026-27.

5.3.8 PDS SKO Allocation Policy: Effective 1st March, 2020 the retail selling price of PDS Kerosene is being maintained at Nil under-recovery level on pan India basis. At its peak during 2009-10, India used to consume 1.16 Cr Kilo Liter (KL) of Kerosene Oil (SKO) for domestic use. This has been progressively brought down by 96% to 3.82 lakh KL in 2024-25 with 21 States/UTs now becoming PDS SKO Free. For culminating phase of the initiative, PDS SKO Policy has been finalized in June, 2025 after consultation with States, wherein single price has been introduced eliminating separate categories of Subsidized and Non Subsidized allocation, empowering States to decide purpose of use and sub allocation and linking future allocation to actual upliftment. These reforms lay the ground work for a natural and smooth decline in allocation and use of SKO, a polluting fuel across the country.

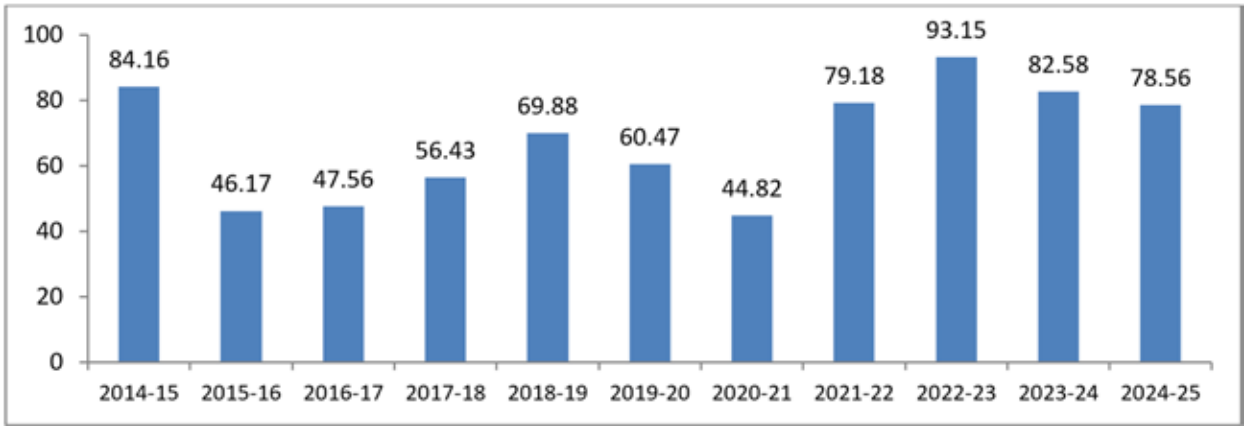
5.4 Pricing Policy on Sensitive Petroleum Products:

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

Effective 01.04.2002, the APM was dismantled and the Government decided to provide subsidy on sale of PDS kerosene and domestic LPG at specified flat rates. To administer these budgetary subsidies, the Government formulated a 'PDS Kerosene and Domestic LPG Subsidy Scheme, 2002'. Under this scheme, it was decided that these subsidies will be phased out in 3-5 years.

5.4.1 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. The trend of Indian basket of crude oil during 2014-15 to 2024-25 is given below:

Trend of Crude Oil: Indian Basket (in $/bbl)

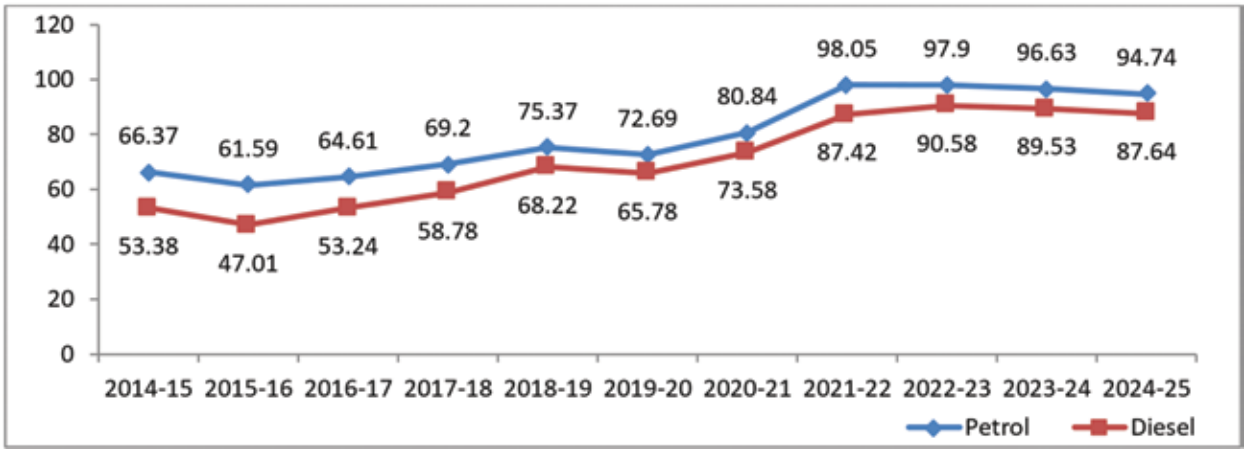


Source: Petroleum Planning and Analysis Cell

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.

5.4.2 Petrol and Diesel: The prices of petrol and diesel are market determined effective from 26th June, 2010 and 19th October, 2014 respectively and since then their prices are being decided by the Public Sector Oil Marketing Companies (OMCs) namely, Indian Oil Corporation Limited, Hindustan Petroleum Corporation Limited and Bharat Petroleum Corporation Limited, in line with the changes in the international market prices and other market conditions. The trend of yearly average retail selling prices of petrol and diesel at Delhi since 2014-15 is given below:

(₹/Litre)



Source: Petroleum Planning and Analysis Cell

5.5 **Subsidy:** The total subsidy/under-recovery on petroleum products and natural gas since 2019-20 is as under:

(₹ in crores)

Particulars	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25 (P)
Kerosene						
Total Under-recoveries on PDS Kerosene	1,833	-	-	-	-	-
LPG						
Direct Benefit Transfer for LPG (DBTL) subsidy (A)	22,726	3,658	242	855	1,227	366
Pradhan Mantri Ujjwala Yojana (PMUY) subsidy* (B)	1,446	76	1,569	6,110	10,217	13274
Pradhan Mantri Garib Kalyan Package (PMGKP) subsidy (C)	-	8,162	-	-	-	-
Compensation to OMCs for LPG under-recoveries (D)				22000	-	-
Total expenditure Subsidies/ Under-recoveries on Domestic LPG (A+B+C+D)	24,172	z11,896	1,811	28,965	11,444	13640

***: Includes targeted subsidy to PMUY households (P): Provisional**

Source: Petroleum Planning & Analysis Cell

The prices of non-subsidized Domestic LPG are determined by the OMCs themselves in line with changes in the international markets.



Under the Pradhan Mantri Ujjwala Yojana (PMUY), women were provided with free LPG cylinder connections





Delivery workers transport LPG cylinders by boat to reach remote households



LPG Cylinders delivery in remote area



Flex speed carousel at Cherlapally LPG Plant



HPCL Kanpur Terminal



IOCL's Depot at Leh


AL GHARRAFA
الغرافة
MAJURO

Chapter 6

International Cooperation and Engagement



6 International Cooperation & Engagement

India is amongst the world's leading energy consumers and is widely considered the emerging energy superpower as a demand driver of both conventional and clean energy resources. Currently, India is the 3rd largest energy consumer, the 3rd largest oil consumer, the 3rd largest LPG consumer, the 4th largest LNG importer, and the 4th largest refiner in the world.

Despite this, India's per capita energy consumption remains approximately 1/3rd of the world's average. As India continues on a high trajectory of economic growth, coupled with rapid urbanisation and industrialisation aligned with the vision of "Atmanirbhar Bharat", India's demand for energy is bound to grow exponentially.

According to the International Energy Agency (IEA), World Energy Outlook 2024, India's energy demand is expected to rise by more than 35% by 2035 from the current levels. The report forecasts that India will experience the largest energy and oil demand growth than any other country over the next decade. OPEC also resonates with this view in its World Oil Outlook (WOO) 2024 and forecasts that India is set to be the world's fastest-growing economy, adding approximately. 8 mb/d to its oil demand during 2023-2050, which is nearly 47% of the world's total incremental oil demand.

However, India's import dependency on crude oil (~88%) and natural gas (~50%) remains significant. With a view to safeguarding this rising demand and substantial reliance on imports, the Government of India has been taking a pragmatic approach towards ensuring affordable, reliable and sustainable energy access for the citizens. This can be summarised in India's four-plank strategy for energy security, namely diversification of energy supplies, increasing exploration and production footprint, using alternate energy sources, and meeting energy transition through the gas-based economy, green hydrogen and EVs.

6.1 Diversification of Crude Oil & LNG imports:

India's energy security remains vulnerable to geopolitical risks, given high dependence on imported crude oil & natural gas to meet the demand. The price volatility and threats to global supply chain disruptions, including conflicts in key producing regions, have underscored the need to diversify energy sources.

Over the past few years, new crude oil suppliers such as the USA, Russia, Colombia, Ghana, Equatorial Guinea and new crude oil grades from Angola and Argentina have been added, expanding India's crude oil sourcing from upto 40 countries.

Notably, dependency on traditional suppliers from the Gulf Cooperation Council (GCC) and OPEC countries has significantly declined in the last five years, reflecting India's strategic efforts to mitigate supply risks.

Simultaneously, the Government is actively strengthening bilateral relationships with both established oil and gas producers, including GCC and OPEC member states, as well as new entrants like Guyana. Similarly, LNG imports have also been diversified from the traditional suppliers to Australia, the USA and others.

These partnerships are reinforced through sustained bilateral engagements and engagement with international organisations such as the OPEC, IEA and IEF. This comprehensive approach underscores India's commitment to ensuring energy

security while navigating the global energy transition.

To further enhance energy security and reduce dependence on spot purchases, Indian Oil Marketing Companies (OMCs) have made long-term crude oil agreements with Petrobras, Brazil, as well as with Ecopetrol, Colombia.

6.2 Global Biofuels Alliance:

The Global Biofuels Alliance (GBA) is a multi-stakeholder alliance of governments, international organizations, and industries. It was launched as a chair's initiative during India's G20 Presidency in 2023. The alliance intends to expedite the global uptake of biofuels through facilitating capacity-building exercises across the value chain, technical support for national programs and promoting policy lessons-sharing, technology advancements, and intensifying the utilization of sustainable biofuels through the participation of a wide spectrum of stakeholders.

GBA has grown from strength to strength, increasing its membership to 29 countries and 14 international organisations with the addition of countries like Eswatini, Fiji, Madagascar, Hungary, and Cambodia. Furthermore, countries and IO members have seconded members to the GBA to support the GBA's initiatives and operations.

Interim Director General (IDG), GBA (Secretary, MoP&NG) represented GBA in the 2nd ETWG under Brazil's G20 Presidency held on 16th-17th April' 24, wherein he reaffirmed GBA's close ties with the G20. In his remarks on clean cooking, he emphasised the role of biofuels in accelerating clean cooking initiatives.

On the sidelines of the 2nd ETWG, the 3rd Temporary Executive Committee (TEC) meeting was held in hybrid mode on 17th April 2024, focused on advancing GBA's strategic direction for global biofuel development. During the meeting, the GBA logo was launched. Furthermore, GBA co-hosted the "GBA-G20 SAF: Future Fuels and Future Chemicals Forum" at Belo Horizonte, at the 3rd ETWG, Brazil.

Logo of Global Biofuels Alliance

IDG, GBA participated in the World Biogas Summit' 2024 hosted by the World Biogas Association from 10th to 11th July 2024. He delivered the opening keynote address, chaired a panel discussion, and conducted bilateral meetings with global stakeholders.

GBA has actively participated in COP29 in Baku, Azerbaijan, with the GBA Pavilion in the Green Zone, Baku Olympic Stadium from 11th November to 22nd November 2024. IDG, GBA chaired several initiatives of the GBA at COP29. The first was a roundtable on "Setting up a Common Definition of Sustainable Biofuels to Accelerate Biofuels Adoption". This was followed by the launch of GBA's first whitepaper, "Role of Bio-based Diesel in Supporting the Diesel Transition Journey" and the launch of GBA's official website.

IDG, GBA also chaired GBA's 4th TEC meeting (hybrid) in Paris. During the meeting, member countries applauded GBA's remarkable presence at COP29, highlighting its pivotal role in advancing sustainable biofuels globally and also discussed GBA's governance framework.

At India Energy Week'25, GBA engaged stakeholders at its dedicated Pavilion. GBA's participation also featured a roundtable chaired by IDG, GBA on "Defining Sustainable Biofuels to Accelerate Energy Transition". GBA also hosted a panel discussion featuring IDG, GBA and leadership from IOs featuring the launch of GBA's flagship whitepaper on "Role of Non-grain-based Biofuels in India's Energy Transition", and the formal adoption of the "Joint Statement on Sustainable Biofuels".

6.3. Enhanced Bilateral Energy Engagements with Key Partner Countries

6.3.1 Engagement with Brazil

- India and Brazil share a vibrant energy partnership that encompasses bilateral hydrocarbon trade, Indian investments in Brazil's upstream sector, and collaborative efforts in the bioenergy sector.
- Brazil remained the 12th largest supplier of crude oil to India in FY 2024-25. **To strengthen the bilateral trade, for the first time, BPCL and Petrobras signed an optional term contract for 6 million barrels of crude oil for April'25 to March'26.**
- Brazil is India's largest upstream investment destination in the Americas and the 3rd largest investment destination globally. Indian oil & gas PSUs (BPRL and OVL) have a participating interest in 4 projects in Brazil: BM-SEAL-11 & BM-C-30 (BPRL), BC-10 and BM-SEAL-4 (OVL).
- Hon'ble Minister visited Brazil in September 2024, wherein he held bilateral discussions with key leaders, including the President and CEO of Petrobras, the Minister of Mines and Energy of Brazil, the Minister of Foreign Affairs of Brazil, and the Advisor to the President of Brazil. The discussions centred on identifying and scaling up key areas of collaboration in oil trade, participation in the Indian E&P sector and collaboration in the biofuels sector. **A significant outcome of the visit was the release of a Joint Statement on Sustainable Aviation Fuel (SAF), affirming both nations' commitment to maintaining a coordinated position on SAF in international forums.**

6.3.2 Engagement with Japan

- India and Japan share a 'Special Strategic and Global Partnership', deeply rooted in spiritual affinity and strong cultural and civilisational ties. The energy sector is a key pillar of the bilateral partnership.
- Under the aegis of the India-Japan Energy Dialogue, Joint Secretary (IC), MoP&NG co-chaired the 2nd meeting of India–Japan Joint Working Group on Hydrocarbons on 03.03.2025. Both sides reviewed ongoing cooperation and investment opportunities in the hydrocarbon sector, including new avenues like establishing a flexible LNG market, advance biofuels, clean energy technologies and strategic oil & gas storages to strengthen the partnership.

6.3.3 Engagement with Kuwait

- Historically, India and Kuwait have been natural trading partners. In FY 2024-25, Kuwait was the 6th largest supplier of crude oil and the 4th largest supplier of LPG to India.
- The 7th meeting of the India-Kuwait Joint Working Group on Hydrocarbon was held in December 2024 in New Delhi, co-chaired by the Joint Secretary (IC), MoP&NG. Both sides reviewed bilateral cooperation across the entire value chain of oil & gas, petrochemicals, strategic reserves, and low-carbon solutions, including Green Hydrogen, Biofuels, and renewable energy.
- During the Kuwait delegation's visit to New Delhi, they also visited the Indian PSUs' facilities, as the sides intend to elevate this traditional buyer-seller relationship to a comprehensive strategic partnership through forming joint ventures in petrochemicals, exchanging advanced E&P technologies, and hosting regular B2B workshops to strengthen collaboration.

6.3.4 Engagement with Oman

- Oman is a strategic partner of India in the Gulf region, and both nations are among the top trading partners. India has been importing crude oil, petroleum products and LNG from Oman. During FY 2024-25, Oman was the 4th largest source of LNG and 6th largest source of LPG.
- In a bid to diversify India's energy basket, both sides are exploring the opportunities to enter into long-term crude oil as well as LNG sourcing contracts and reciprocal E&P opportunities.

- Further, the Indian strategic storage arm, ISPRL and Oman Tanking Terminal Company LLC (OTTCO) are working towards the participation of ISPRL in a crude storage facility being developed by OTTCO in Oman, a step towards energy security for both nations. Also, EIL has been providing its services in Oman for more than two decades.

6.3.5 Engagement with Qatar

- Qatar plays a crucial role in India's energy supply, being India's largest supplier of LNG and 2nd largest supplier of LPG in FY 2024-25.
- Hon'ble Minister regularly interacts with H.E. Saad bin Sherida Al Kaabi, Minister of State for Energy Affairs, Qatar and President & CEO of Qater Energy at International Forums. Both sides deliberated on bolstering the existing trade cooperation and explored reciprocal investment opportunities in the E&P sector.
- The Hon'ble Minister also attended the National Day of Qatar, hosted by H.E. Mohammed Hassan Jabir Al-Jabir, Ambassador of the State of Qatar in December 2024.
- The 5th India–Qatar Joint Task Force (JTF) on Energy was held on 17th February 2025, wherein the sides discussed the opportunities for cooperation in LNG trade & investment as well as in low-carbon solutions.

6.3.6 Engagement with Russia

- Russia has been a longstanding and time-tested partner for India. In the face of extreme volatility in international crude oil prices, Indian companies increased crude oil imports from Russia. Notably, Russia has emerged as a top supplier of crude oil. Indian PSUs have also invested in 5 oil and gas blocks in Russia, the largest destination of E&P investment.
- Hon'ble Minister met with his Russian counterpart, H.E. Mr. Sergei Tsivilev, Minister of Energy, Russian Federation in New Delhi in February 2025, wherein the sides discussed ways to increase bilateral energy trade and investments.
- Secretary MoP&NG had a bilateral meeting with Mr. Roman Marshavin, Deputy Minister of Energy, Russian Federation in November 2024. The two sides undertook a comprehensive review of Indian energy investments in Russia. Both sides also discussed ways to increase energy cooperation through trade and investments.
- Joint Secretary (IC), MoP&NG co-chaired the 25th Meeting of India–Russia Working Group on Cooperation in the field of Energy & Energy Efficiency. During the JWG, both sides reviewed ongoing engagements, discussed expanding cooperation across energy value chains, and explored new avenues for energy security, sustainable growth, and deeper strategic partnerships. The sides affirmed to take forward the bilateral energy trade as envisioned by the leaders of the two nations in the "Joint Statement on the development of strategic areas of India-Russia economic cooperation for the period up to 2030".

6.3.7 Engagement with Saudi Arabia

- As one of India's largest trade partners, Saudi Arabia continues to play a pivotal role as a major energy supplier. In FY 2024-25, Saudi Arabia ranked as the 3rd largest source of crude oil and the 3rd largest supplier of LPG to India.
- In addition to trade in hydrocarbons, Saudi Arabia is actively exploring investment opportunities in India's refining sector and Strategic Petroleum Reserve (SPR) program. These discussions are being facilitated through the India-Saudi Arabia High-Level Task Force on Investment, a dedicated body established to enhance bilateral investments. The formation of this Task Force follows the significant decision made during the State Visit of Crown Prince, H.R.H. Prince Mohammed bin Salman bin Abdulaziz Al Saud to India in September 2023. This collaborative framework is expected to further

strengthen energy security, promote investment, and deepen economic ties between the two nations.

- In this backdrop, Secretary MoP&NG visited Saudi Arabia in September 2024 and held discussions with Assistant Minister for oil & gas, H.E. Mohammed Albrahimin Riyadh. Both sides reviewed various relevant bilateral issues.

6.3.8 Engagement with UAE

- India and the UAE share a close and dynamic partnership, particularly in the areas of the hydrocarbon sector. The collaboration extends across the entire hydrocarbon value chain, encompassing crude oil, LNG, LPG, and petroleum products, as well as exploration and production (E&P) activities.
- India's relationship with the UAE has been elevated to a Strategic Partnership with a key focus on the hydrocarbon sector. In FY 2024-25, the UAE stood as the 4th largest source of crude oil, 3rd largest source of LNG, largest supplier of LPG and 2nd largest export destination for India's finished petroleum products.
- **India and the UAE further strengthened their bilateral trade partnership this year through key LNG import agreements:**
  - **a) IOCL signed an agreement with ADNOC for 1.2 MMTPA LNG over 14 years starting in 2026.**
  - **b) BPCL signed an agreement with ADNOC for 2.4 MMT of LNG spread over 5 years.**

  Notably, India has become the largest destination of the UAE's LNG, under term contract.
- India's investments in the UAE's upstream sector reflect this growing partnership. Notable investments include the Lower Zakum block and Abu Dhabi Onshore Block 1, a significant success story. The signing of the Production Concession Agreement (PCA) for the Onshore Block-1 in Ruwais field in September 2024 marks a historic milestone-the first-ever Indian company to operate in the UAE's upstream sector.
- In addition to investment milestones, diplomatic engagements have further cemented this partnership. The Hon'ble Minister met with H.E. Dr. Sultan Al Jaber, UAE Minister of Industry and Advanced Technology and Managing Director and Group CEO of ADNOC, in Abu Dhabi on the sidelines of ADIPEC 2024. Earlier in September 2024, the two leaders had also met in New Delhi during the visit of H.H. Crown Prince Khaled bin Mohammed bin Zayed Al Nahyan to India.
- During ADIPEC 2024, the Hon'ble Minister also held a bilateral meeting with H.E. Suhail Mohammed Al Mazrouei, UAE Minister of Energy and Infrastructure. Both sides discussed ways to further enhance the India-UAE energy partnership, recognizing ADNOC Group as a trusted and reliable partner in India's energy security strategy.

6.3.9 Engagement with the United States of America (USA)

- India and the USA have engagements in the entire spectrum of the Oil and Gas sector. India imports crude oil and LNG from the USA. Notably, USA is the 5th largest source of crude oil and the 2nd largest source of LNG for India. Indian PSUs have signed long-term contracts of 6.5 MMTPA (by GAIL & IOCL) for imports of LNG from the USA. Furthermore, Indian PSU companies have invested in the oil and gas sector in the USA.
- In September 2021, India-U.S. revamped Strategic Clean Energy Partnership (SCEP) was announced. Hon'ble Minister co-chaired the Ministerial meeting of the India-U.S.A SCEP with U.S. Energy Secretary H.E. Jennifer Granholm held on 16th September 2024 in Washinton D.C. Agencies from across the U.S. and Indian governments demonstrated several accomplishments across the six technical pillars of cooperation and reviewed the clean energy cooperation in biofuels, Green Hydrogen, renewable energy.

Recognising the pivotal role of India and the USA in the global energy landscape, in February 2025, the leaders of India and the USA recommitted to the USA-India Security Partnership in the oil, gas and civil nuclear energy.

- Hon'ble Minister met Mr. Wally Adeyemo, Deputy Secretary of Treasury, U.S.A on 16th September 2024 in Washington D.C., wherein the sides emphasized the growing bilateral hydrocarbon trade between the two countries.
- Hon'ble Minister also held one-on-one discussions with Mr. Geoffrey Pyatt, Assistant Secretary of State for Energy Resources, U.S. Department of State and Mr. Brad Crabtree, Assistant Secretary, Office of Fossil Energy and Carbon Management, US Department of Energy, while attending 52nd Edition of Gastech 2024 held in Houston, USA.

6.3.10 Endeavours to 'Neighbourhood':

'Neighbourhood First' is one of the key elements of India's foreign policy. India shares the conviction that better connectivity, including energy links/ corridors, with its neighbours will bring greater prosperity to all in an equitable and balanced manner.

6.3.10.1 Engagement with Bhutan

- India and Bhutan share a unique and time-tested relationship built on mutual trust, goodwill, and shared cultural ties. As close neighbors, India is Bhutan's largest trading partner.
- India and Bhutan have signed a G-2-G MoU on General Supply of Petroleum, Oil, Lubricants (POL) and Related Products. Under the MoU, the Government of India shall facilitate the uninterrupted flow of Petroleum products. Currently, India is meeting 100% of Bhutan's demand for petroleum products.

6.3.10.2 Engagement with Nepal

- India-Nepal cooperation in the petroleum sector is a perfect example of a collaborative synergetic partnership. India has been supplying 100% of Nepal's petroleum product requirements since 1974 through a General Supply Agreement.
- Subsequent to the commissioning of Motihari-Amlekhgunj Petroleum Product Pipeline (MAPL) in September 2019, a cornerstone of Nepal's supply security, the sides are working towards further enhancing petroleum infrastructure, which includes **Extension of Motihari-Amlekhgunj Pipeline (MAPL) from Amlekhgunj to Chitwan,** Construction of a **Greenfield Terminal at Chitwan,** Construction of **Siliguri - Jhapa Pipeline** and Construction of **Greenfield Terminal at Jhapa.** These projects will strengthen the petroleum infrastructure, reduce costs, and support supply security to the citizens & economy of Nepal.
- On the sidelines of India Energy Week 2025, the Hon'ble Minister met H.E. Dipak Khadka, Minister for Energy, Water Resources & Irrigation of Nepal wherein the sides discussed ways of further expanding future collaboration including LNG supply to Nepal, and reviewed existing infrastructure cooperation projects. First-ever LNG export agreement between India and Nepal was signed during IEW'25.
- In August 2024 & December 2024, the Hon'ble Minister met H.E. Damodar Bhandari, Minister of Industry, Commerce and Supplies of Nepal, wherein both sides reviewed the progress, particularly on ongoing and new infrastructure projects, including the signing of the B2B agreement between IOCL and NOC, Nepal, for new projects.

6.3.10.3 Engagement with Sri Lanka

- India and Sri Lanka have a vibrant energy partnership. India has traditionally been among Sri Lanka's largest trade partners, and Sri Lanka remains among the largest trade partners of India in the SAARC.
- India is also one of the largest contributors to Foreign Direct Investment (FDI) in Sri Lanka. A number of companies from India have invested and established their presence in Sri Lanka. During the time

of the energy crunch in Sri Lanka, India extended support by supplying petroleum products against the line of credit of a total US$4 billion.

- Indian companies are exploring new avenues of partnership, including the development of the Trincomalee region as an energy hub, the construction of a transnational pipeline from India to Srilanka and the supply of LNG to Sri Lanka.

6.4 Engagements with International Organisations

6.4.1 Engagement with the Organisation of the Petroleum Exporting Countries (OPEC)

- During FY 2024-25, India imported approximately 49% crude oil, 70% LPG, and 41% Petroleum products from OPEC countries. India has been regularly engaging with OPEC, which is a crucial element of India's Energy diplomacy for advocating responsible pricing of crude oil.
- Hon'ble Minister regularly interacted with H.E. Haitham Al-Ghais, Secretary General, OPEC, including during ADIPEC'2024 and IEW'25, where in both sides discussed the contours of the global energy markets, the impact of geopolitical developments around the world.

6.4.2 Engagement with the International Energy Agency (IEA):

India-IEA collaboration gained momentum from March 2017 onwards when India became an Associate country of IEA. Since then, India and IEA have been collaborating on various topics, including the sharing of data analysis, international best practices on the expansion of renewables, energy efficiency, gas security, oil stocks and emergency preparedness, investment, innovation, digitization etc. IEA has been a consistent, steadfast supporter of the GBA since its inception.

This year, India collaborated with the IEA on the "Summit on Clean Cooking in Africa" held in Paris. Ms Mary Burce Warlick, Deputy Executive Director, IEA, participated in India Energy Week 2025, wherein IEA, in collaboration with PPAC, launched the **"India Gas Report".**

6.4.3 Engagement with the International Energy Forum (IEF)

- India and IEF have a long-standing collaboration. India has been a Permanent Member of the Executive Board since its set-up in 2002. Joint Secretary (IC), MoP&NG is the executive board member of the IEF. IEF has been the consistent steadfast supporter of the GBA since its inception.
- The Hon'ble Minister engages with the IEF Secretary General at International Forums wherein the sides discussed oil and gas market trends, just & affordable energy transition among other key issues including on the sidelines of Gastech 2024 in USA.

6.5 International Events Organized/ Participated by Ministry of Petroleum & Natural Gas

6.5.1 India Energy Week 2025:

The third edition of the India Energy Week 2025 (IEW'25), the flagship energy event of India and the first major global energy event of the calendar, held from 11th to 14th February 2025 at the Yashobhoomi Convention Centre, New Delhi.

During the inaugural session, the Hon'ble Prime Minister delivered his remarks via video message, emphasising the growth and investment opportunities in India as well as the strides that India is making in the development of various types of energy, such as oil, gas, renewable energy, biofuels & nuclear for a sustainable future. His message set the tone for the transformative Energy Dialogue during IEW.

During the inaugural session, the Hon'ble Minister of Petroleum and Natural Gas underscored that IEW'25 came at a crucial juncture amid major geopolitical shifts that had reshaped the global energy order. The Hon'ble Minister stressed that the

conference offers a unique opportunity for policymakers, industry leaders, and stakeholders to engage in meaningful dialogue, exchange ideas, and chart a course for a balanced and inclusive energy transition. The Hon'ble Minister highlighted India's leadership in driving energy innovation and entrepreneurship.

Since its inception in 2023, IEW has, in two years, grown from strength to strength to become the second largest international energy conference in the world, underscoring the tremendous faith and hope that the global community has on India's economic growth story and conviction that India will be the major driver of both economic growth and socio-economic mobility.

IEW'25 witnessed the participation of over 80,000 visitors, 700 exhibitors in the course of 4 days across 120 countries, including Vice President of Venezuela, United Kingdom's Secretary of Energy Security & Net Zero, Deputy Prime Minister and Minister of Energy, Tanzania, Qatar Minister of State for Energy Affairs and CEO of Qatar Energy, Russian first Deputy Minister of Energy, Nepal Minister for Energy, Water Resources and Irrigation, Sudan Minister of Energy and Oil, Secretary General of OPEC, Governor of State of Goiás, Brazil, Governor of Taraba State of Nigeria. Deputy Executive Director, IEA. Global CEOs of Baker Hughes, Petrobras, Vitol, Lanzatech, as well assenior Executives of ADNOC, Exxon Mobil, Equinor, SLB, Linde, Honeywell, and TotalEnergies also attended the event.

With a whole of the government approach, IEW'25 was not limited to merely the active participation from oil & gas companies but also from across the entire energy landscape, including Power, Renewable, Coal, IT, Shipping, Mines & Minerals, NITI Aayog and other industry leaders.

A major milestone at IEW'25 was the launch of the 10th Open Acreage Licensing Policy bidding round, India's largest to date, offering 25 blocks for exploration.

IEW'25 also served as a premier platform for launching pivotal reports. During IEW'25, IEA in collaboration with PPAC released "India Gas Report" and PPAC released an annual journal. Global Biofuels Alliance also released a joint statement on sustainable biofuels, garnering endorsements from international organizations and launched a whitepaper on "Role of Non-grain-based Biofuels in India's Energy Transition".

Supporting the progressive vision of inviting the world to invest in the energy sector in India, IEW'25 served as a platform for highlighting the potential opportunities for collaboration, of which many were achieved. Some of these are:

- BPCL's crude term deal with Brazil's Petrobras, to import up to 6 million barrels of crude,
- LNG import agreements by IOCL with ADNOC, USD 7 billion contract to source 1.2 MMTPA LNG,
- LNG import agreements by BPCL with ADNOC, for 2.4 MMT spread over 5 years.
- First-ever LNG export agreement between India and Nepal,
- Agreement between BPCL and Equinor for the purchase of LPG,
- Technical partnership by EIL & ONGC with BP,
- Partnership MoU by ONGC Videsh & OIL with Petrobras for Cooperation in Upstream Sector,

IEW'25 gave impetus to India as an energy innovator by providing a platform for start-ups. The event brought together luminaries from various sectors, including VCs, incubators, accelerators, industry leaders and start-ups to propel innovation prowess. As a part of IEW'25, two Start-up competitions were held; one with a domestic focus (Avinya) and one with a focus on international E&P endeavours (Vasudha), with participation of over

500 entrepreneurs. A Hackathon with leading educational institutions in India was also a part of the event. IEW'25 posted a dedicated start-up zone in the exhibition, which featured more than 25 start-ups offering a platform to present their innovations to industry leaders.

The overwhelming response, the growth recorded by IEW, and the strategic direction and pragmatism on energy transition that IEW is showcasing to the global energy landscape are testimony to the recognition India commands in the global energy transition and the niche IEW is carving in global energy events.

6.5.2 ADIPEC 2024:

The Hon'ble Minister visited the UAE from 4th– 5th November 2024, to attend the Abu Dhabi International Petroleum Exhibition & Conference (ADIPEC-2024). The Hon'ble Minister inaugurated the India Pavilion organised by FIPI and the Confederation of Indian Industry's (CII) Pavilion at the ADIPEC 2024.

The Hon'ble Minister participated in the opening Ministerial Panel on "The New Global Leaders & the Energy Transition," along with H.E. Suhail Mohamed Al Mazrouei, Minister of Energy and Industry of the UAE, H.E. Eng. Karim Badawi, Minister of Petroleum and Mineral Resources of Egypt, and H.E. Ruth Nankabirwa Ssentamu, Minister of Energy and Mineral Development of Uganda. During the session, the Hon'ble Minister shared India's vision for a balanced and diversified energy transition. He highlighted that this journey is not a one-size-fits-all; it requires tailored, flexible strategies that account for each country's unique resources and needs.

During the visit, the Hon'ble Minister took part in bilateral discussions with his counterparts, including H.E. Dr. Sultan Ahmed Al Jaber, Minister of Industry and Advanced Technology, UAE Special Envoy for Climate, Group MD & CEO of ADNOC, and Chairman of Masdar; H.E. Suhail Mohamed Al Mazrouei, Minister of Energy and Industry of the UAE; and H.E. Haitham Al Ghais, Secretary General of OPEC. Additionally, the Hon'ble Minister had a bilateral meeting with Mr. Murray Auchincloss, global CEO of BP.

6.5.3 3rd Voice of Global South Summit:

The 3rd Voice of Global South Summit, with the overarching theme, "An Empowered Global South for a Sustainable Future," represented a continuity in the Global South's focus on strengthening collective efforts in addressing the challenges it faced in the current international environment.

Secretary, MoP&NG chaired the Energy Ministers' session under the 3rd Voice of Global South Summit, focusing on "Sustainable Energy Solutions for a Sustainable Future" held on 17th August 2024, with participation of over 15 Global South nations.

During the session, Secretary PNG touched upon the prevailing global energy markets, price volatility and challenges as well as the steps needed for accelerating the adoption of clean energy technology by developing countries.

Participants shared updates on advancements in new and alternate energy sources in their respective countries, including biofuels and identified the challenges related to ensuring energy security, accessibility and affordability. They noted that it is crucial to share best practices and ideas among partner countries of the Global South for achieving a just and orderly energy transition.

6.5.4 Gastech 2024:

The Hon'ble Minister led an Industry Delegation to participate in 52nd edition of Gastech 2024 which is one of the largest and dedicated event of the natural gas industry, held in Houston, U.S. in September 2024.

At Gastech'24, the Hon'ble Minister participated in 2 Ministerial discussions, i.e. Ministerial Roundtable during the

Inaugural Session and a roundtable with U.S.-India Business Council (USIBC) & the U.S.-India Strategic Partnership Forum (USISPF).

During the U.S.–India Roundtable, the Hon'ble Minister stressed India's intent to work jointly with USA-based companies to strengthen deployment and development of mature, low-carbon solutions with the potential to decarbonise hard-to-abate sectors.

The Hon'ble Minister also held bilateral meetings with energy ministers and officials from Egypt, Türkiye, and the United States and engaged in 15 business meetings with various CEOs and senior executives of leading global energy companies.

Gastech 2024 offered a good platform to showcase and advance India's diverse initiatives in the energy sector, particularly emphasising the burgeoning importance of a gas-based economy, substantial investments in natural gas infrastructure, and covering the entire nation with a CGD network. India is increasingly positioning itself as the centre for energy demand growth with the potential and capacity to significantly scale up both production and manufacturing capabilities, while finding global-scale solutions for energy transition.

During Gastech 2024, taking pivotal steps towards sustainable solutions and cutting-edge technological advancements, significant Memoranda of Understanding (MoUs) were exchanged between Indraprastha Gas Limited (IGL) and leading American energy companies, including with M/s. Heath Consultants Incorporated, Houston, M/s. John Crane (Smith Group), M/s Honeywell, M/s Knox Western, M/s Dresser Utility Solutions and M/s Nikkiso Clean energy. Also, IOCL and Shell entered into an MoU to strengthen collaboration in the gas sector and bolster India's gas-based economy.

6.6 Acquisition of Overseas Assets:

The Ministry of Petroleum and Natural Gas is facilitating Indian oil & gas PSUs to aggressively pursue opportunities for acquiring producing/near-producing oil and gas assets overseas in stable economies to strengthen the country's energy security.

Till 31st March 2025, Indian Oil and Gas PSUs have 45 assets in 21 countries. Out of the 45 assets, 21 are producing, 14 are under exploration, 3 are pipeline projects, and 7 are under various phases of development. From April 2024 to March 2025, the overseas production of oil and gas was approximately 20.2 MMTOE, which represents a substantial amount of India's domestic production. The list of assets is in Appendix XI.



Secretary, MoPNG and Interim Director General of GBA, Shri Pankaj Jain, chaired the 3rd TEC Meeting of the Global Biofuels Alliance, held on the sidelines of 2nd ETWG meeting under Brazil's G20 presidency



Hon'ble Minister of Petroleum and Natural Gas, Shri Hardeep Singh Puri meeting with H.E. Celso Amorim, Chief Advisor to the President of Brazil



Joint Secretary (IC), MoPNG, Ms. Esha Srivastava Co-Chaired the 7th Joint Working Group meeting with Kuwait



Hon'ble Minister of Petroleum and Natural Gas, Shri Hardeep Singh Puri attended National Day of Qatar



Secretary MoP&NG, Shri Pankaj Jain meeting with Assistant Minister for Oil & Gas, H.E. Mohammed Albrahimin Riyadh



Hon'ble Minister of Petroleum and Natural Gas, Shri Hardeep Singh Puri meeting with H.E. Dr Sultan Ahmed Al Jaber, UAE Minister of Industry and Advanced Technology



Hon'ble Minister of Petroleum and Natural Gas, Shri Hardeep Singh Puri meeting with H.E. Jennifer Granholm during SCEP meeting



Hon'ble Minister of Petroleum and Natural Gas, Shri Hardeep Singh Puri meeting with H.E. Haitham Al-Ghais, Secretary General, OPEC



Summit on Clean Cooking in Africa



Hon'ble Minister of Petroleum and Natural Gas, Shri Hardeep Singh Puri meeting with H.E. Sh. Damodar Bhandari, Minister of Industry, Commerce and Supplies of Nepal



Hon'ble Minister addressing at IEW, 2025



Secretary, MoPNG attend the 3rd Voice of Global South Summit

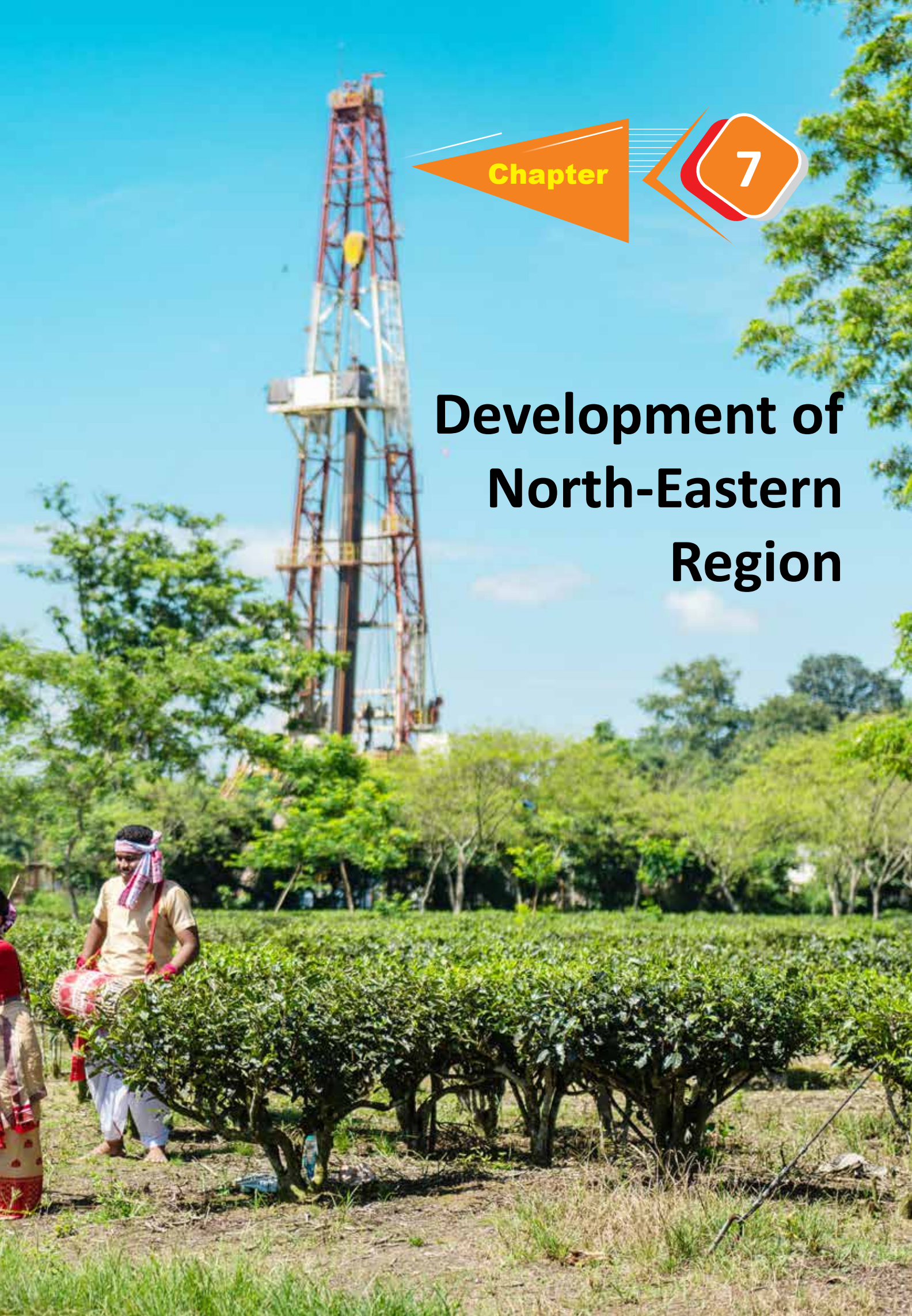


Hon'ble Minister Hardeep Singh Puri meets U.S. Energy Envoy Geoffrey Pyatt at Gastech 2025 in Houston



Hon'ble Minister attend the ADIPEC 2024 (Connecting Minds. Transforming Energy)





Chapter 7

Development of North-Eastern Region

7 Development of North-Eastern Region

7.1 Background:

Oil and gas exploration in North-East took place mainly during post-independence. These include the discoveries of the Naharkatiya 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, Tichna, Gojalia, Rokhia, Khobal, Hortoki have been discovered by OIL and ONGC in the North-Eastern states of Assam, Arunachal Pradesh, Nagaland, Tripura and Mizoram.

The area was opened for exploration to private/JV and foreign companies through pre-NELP, NELP, DSF and OALP rounds of biddings. OIL & ONGC have proven substantial amounts of producible hydrocarbons and have technical know-how of producing and managing complex reservoirs and contributing to (about 6.39 MMToE in 2024-25 by OIL & 2.612 MMToE by ONGC in NE) per annum of oil plus oil equivalent of gas (O+OEG) from their producing assets in North-East.

The North-East region is having around 18% (7634 MMT) of country's total prognosticated hydrocarbon resources. Inplace (2P) volume of about 2074 MMT (O+OEG) and ~348 MMT (O+OEG) Reserves & Contingent resources have been established so far by E&P companies, which means about 73% of hydrocarbon resources are under 'yet to discover' category.

The two national oil companies, namely, ONGC and OIL have been engaged in the North-East Region for exploration and exploitation of oil and gas for more than 60 years and generated a vast geo-scientific database and geological understanding of the basin.

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

OIL since its inception in February, 1959 has been actively pursuing exploration & development activities in the state of Assam.

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. As on 31.03.2025, OIL has acquired more than 16309.09 GLKM of 2D seismic data and nearly 11098.71 sq. km. of 3D seismic data in North-East and drilled 494 exploratory and 1451 development wells across all regimes. OIL is operating in 23 (twenty-three) PML's covering an area of 4382.13 sq. km. allotted under the nomination regime in the states of Assam (21 nos.), Arunachal Pradesh (2 nos.) and one (1) PEL in Assam with 24.61 sq. km.

As on 31st March 2025, OIL holds 1 NELP exploration block situated in the state of Assam and 17 blocks (7 Blocks in OALP Round I, 3 Blocks in OALP Round III and 2 Blocks each in OALP Rounds V, VI & VI and 1 Block in VIII) awarded under Open Acreage License Policy (OALP) as an operator in North-east across Assam,

Arunachal Pradesh, Nagaland & Tripura. One OALP Round V Block located in Assam have been relinquished. OIL has also been awarded 1 Block in South Tripura under DSF Round II. Exploration activities are ongoing in all the awarded OALP blocks except for Block AA-ONHP-2018/2 in the state of Nagaland (under OALP III) for which PEL is yet to be granted by the Govt. of Nagaland.

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

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. In the North-eastern Region, as on 31.03.2025, ONGC has drilled 834 exploratory wells in the state of Assam, 242 wells in Tripura, 3 in Meghalaya, 4 in Mizoram and 26 in the State of Nagaland.

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 Rudrasagar, Panidihing, Disangmukh, Lakwa, Lakhmani, Sonari, Geleki, Demulgaon, Amguri, Charali, Borholla, Khoraghat, Kasomarigaon and Nambar in Assam Shelf and Baramura, Agartala Dome, Sundulbari, Kunjaban, Rokhia, Bhubandar, Gojalia & Konaban etc. in Assam Arakan Fold Belt were discovered with this exploration philosophy.

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.

Currently, in North-Eastern Region, 2 PEL blocks (1 Pre-NELP & 1 OALP) in Assam, 1 NELP PEL block in Mizoram and 5 PEL blocks (1 NELP & 4 OALP) in the state of Tripura. It also holds 63 PML blocks (44 in Assam, 18 in Tripura, 1 in Nagaland) in North-East comprising both long term and short term PMLs. During FY 2024-25, ONGC acquired 241.72 GLK of 2D seismic data (89.82 GLK in Assam & 151.92 GLK in Tripura), 176.74 SKM of 3D seismic data (32.81 SKM in Assam & 143.93 in Tripura) and drilled 15 exploratory wells (8 in Assam & 7 in Tripura). Further, exploratory G&G efforts are in progress to acquire more acreage in North Eastern region.

7.3 Crude Oil and Natural Gas Production in North-East:

In Fiscal Year 2024-25, the North-Eastern States accounted for approximately 4.51 Million Metric Tonnes (MMT) of crude oil production, which constitutes 15.7% of the national total of 28.70 MMT. The state-wise and company-wise trends in crude oil production over the preceding five years are detailed below:

Table-7.1: State-wise and Company-wise trend in Crude Oil Production in North-East (in MMT)

State/ Region	Company	2020-21	2021-22	2022-23	2023-24	2024-25
Assam	OIL	2.90	2.90	3.11	3.29	3.38
	ONGC	0.96	0.99	1.01	1.05	1.05
	Pvt/JV	0.03	0.04	0.04	0.03	0.03
	Total	**3.90**	**3.94**	**4.17**	**4.36**	**4.46**
Arunachal Pradesh	OIL	0.02	0.02	0.02	0.03	0.03
	Pvt/JV	0.03	0.03	0.02	0.02	0.02
	Total	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**
Tripura	ONGC	**0.003**	**0.003**	**0.003**	**0.002**	**0.002**
North-East	Grand Total	**3.96**	**3.99**	**4.22**	**4.42**	**4.51**
of Which						
OIL Nomination Total		**2.93**	**2.93**	**3.14**	**3.32**	**3.41**
ONGC Nomination Total		**0.97**	**1.00**	**1.01**	**1.05**	**1.05**
PSC/RSC Total		**0.06**	**0.07**	**0.07**	**0.05**	**0.04**

It may be observed that in FY 2024-25 OIL has the share of ~ 76 % in crude oil production in North-East, followed by ONGC with a share of ~23 %. The share of Private/Joint Venture companies in crude oil production is about ~1 %.

In Fiscal Year 2024-25, Assam was the primary contributor to crude oil production among the North-Eastern States, accounting for approximately 98.9% of the region's output and 14.6% of India's total crude oil production. Arunachal Pradesh contributed around 1.08% of the North-Eastern states' total oil production, while Tripura's contribution was approximately 0.04%.

Production of Natural Gas: The North-Eastern States contributed approximately 4.82 Billion Metric Standard Cubic Metres (BCM) of natural gas in Fiscal Year 2024-25, representing 13.3% of the nation's total production of 36.11 BCM. The state-wise and company wise trend of natural gas production in last 5 years is given below:

Table-7.2: State-wise and Company-wise trend in Natural Gas Production in North-East (in BCM)

State/ Region	Source	2020-21	2021-22	2022-23	2023-24	2024-25
Assam	OIL	2.24	2.62	2.81	2.89	2.94
	ONGC	0.39	0.37	0.36	0.34	0.34
	Pvt/JV	0.37	0.38	0.39	0.27	0.28
	Total	**3.00**	**3.37**	**3.56**	**3.49**	**3.55**
Arunachal Pradesh	OIL	0.05	0.05	0.05	0.03	0.04
	Pvt/JV	0.005	0.005	0.005	0.005	0.005
	Total	**0.06**	**0.06**	**0.05**	**0.04**	**0.04**
Tripura	ONGC	**1.63**	**1.53**	**1.68**	**1.53**	**1.22**
North-East	Grand Total	**4.68**	**4.96**	**5.29**	**5.05**	**4.82**
of Which						
OIL Nomination Total		**2.29**	**2.67**	**2.85**	**2.92**	**2.98**
ONGC Nomination Total		**2.02**	**1.90**	**2.03**	**1.85**	**1.56**
PSC/RSC/CBM Total		**0.38**	**0.39**	**0.40**	**0.28**	**0.28**

During FY 2024-25, Oil India Limited (OIL) accounted for approximately 62% of the natural gas production in the North-East, while the Oil and Natural Gas Corporation (ONGC) contributed around 32%. Private and Joint Venture (JV) companies collectively held a share of approximately 6% in the region's natural gas production.

During Fiscal Year 2024-25, Assam accounted for approximately 74% of the total natural gas production from the North-Eastern States, representing 9.8% of India's overall natural gas production. Arunachal Pradesh contributed about 0.9% of the North-Eastern region's total gas production, while Tripura's share was approximately 25%.

7.4 Discovered Small Fields Policy:

The details blocks under DSF in the North Eastern Region are as under:

Table-7.3: DSF Contract Areas in North Easten Region

Status	Basin	DSF Bid Round	State / Location	Contract Area	Operator
PML Granted	Assam Shelf	DSF-I	Assam	AA/ONDSF/ DIPLING/2016	Ramayana Ispat Pvt. Ltd. & Mahendra Infratech Pvt. Ltd.
				AA/ONDSF/ DUARMARA/2016	Antelopus Energy Private Limited
		DSF-II	Assam	AA/ONDSF/ Disaijan/2018	Invenire Energy Private Limited
				AA/ONDSF/ Hazarigaon/2018	Vedanta Limited
				AA/ONDSF/ Umatara/2018	Indian Oil Corporation Ltd.
		DSF-III	Assam	AA/ONDSF/ TIPHUK/2021	Oilmax Energy Private Limited
	Assam-Arakan fold belt	DSF-II	Tripura	AA/ONDSF/ Tulamara/2018	Oil India Limited
		DSF-III	Assam	AA/ONDSF/ TUKBAI/2021	Vedanta Limited
Relinquished/ Terminated	Assam Shelf	DSF-I	Assam	AA/ONDSF/ JERAIPATHAR/2016	Indian Oil Corporation Limited
				AA/ONDSF/ BARSILLA/2016	Ramyana Ispat Pvt. Ltd. & Mahendra Infratech Pvt. Ltd.
				AA/ONDSF/ CHARAIDEO/2016	Oilmax Energy Private Limited
				AA/ONDSF/ LAXMIJAN/2016	Megha Engineering and Infrastructures Ltd.
			Arunanchal Pradesh	AA/ONDSF/ KHEREM/2016	HOEC Ltd., Prize Petroleum
		DSF-II	Assam	AA/ONDSF/ Madhakali/2018	ARSH CORPORATE SERVICES Pvt. Ltd (Duganta)
				AA/ONDSF/ Tiphuk/2018	Shanti G.D. Ispat and Power Pvt. Ltd.
	Assam-Arakan fold belt	DSF-I	Assam	AA/ONDSF/ HILARA/2016	Prize Petroleum Company Limited
				AA/ONDSF/ PATHARIA/2016	Vijayasri Bhaskar Industries Pvt. Ltd.
		DSF-III	Assam	AA/ONDSF/ PATHARIA/2021	Vedanta Limited

7.5 Alternate Hydrocarbon sources in North-East:

3 shale gas blocks operated by ONGC and 4 blocks operated by OIL are in the state of Assam. So far ONGC has drilled 2 wells (GKBO in Namti ML Block and LDG in Lakwa). OIL has acquired conventional cores from Dibrugarh, Dumduma and Chabua PML of Assam. The evaluation results show poor prospectively at these locations as the shales are entered into early oil generation window. In Arunachal Pradesh, OIL has identified two locations for acquiring the conventional cores viz., Jairampur Extn. PEL and Deomali PEL for acquiring extensive amount of conventional cores against the target shale of Upper Tikak Partbat and Disang shales respectively for establishment of Shale Gas/Oil potential.

7.6 North- East Vision 2030:

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

The objectives of the plan are to leverage the region's hydrocarbon potential, enhance access to clean fuels, improve availability of petroleum products, and 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.

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 neighboring 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 emphasis include production enhancement contracts, technology deployment and fast-track clearance, and development of service provider hubs.

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.

The vision aims at doubling Oil & Gas production by 2030, making clean fuels accessible, fast tracking projects, generating employment opportunities and promoting cooperation with neighboring countries.

To fulfill one of the major goal envisaged under Vision 2030, Government has allowed special dispensation of 2 year extension in exploration period and 1 year in Appraisal period for operational blocks in North–Eastern region. Government has also provided marketing and pricing freedom for natural gas produced in future in North-Eastern region. This is

likely to result in increased investment in development of oil & gas resources.

Under the Northeast Vision 2030, OIL exploration plan for seismic data acquisition and drilling of exploratory wells in Assam Self and Assam Arakan Fold basin areas in NE region from 2025-26 to 2027-28 are tabulated below:

Table-7.4: Exploration Plan of OIL under Northeast Vision 2030

North-East Region	Activity	2025-26	2026-27	2027-28	Total
Assam Shelf & Assam Arakan Fold Belt	2D Survey (LKM)	100	50	150	300
	3D Survey (sq. km.)	177	100	150	427
	Exploratory Drilling (No.)	20	26	30	76

Under the Northeast Vision 2030, ONGC exploration plan for seismic data acquisition and drilling of exploratory wells in Assam Self and Assam Arakan Fold basin areas in NE region from 2025-26 to 2027-28 are tabulated below:

Table-7.5: Exploration Plan of ONGC under Northeast Vision 2030

North-East Region	Activity	2025-26	2026-27	2027-28	Total
Assam Shelf & Assam Arakan Fold Belt	2D Survey (LKM)	376	150	150	676
	3D Survey (sq. km.)	308	350	350	1008
	Exploratory Drilling (No.)	27	25	27	79

7.7 Exploration blocks in North-Eastern Region under Hydrocarbon Exploration & Licensing Policy (HELP):

Oil E&P Companies are showing keen interest in the North-Eastern region. Till 31st March, 2025, a total of 35 blocks have been awarded to various companies. The details of exploration blocks awarded in the North-eastern region till 31st March, 2025 and the status is as under:

Table-7.6: Exploratory Blocks under OALP in North Eastern Region

S. No.	OALP Round	Block Name	Contractor/ Operator	Basin Name	Original Contract Area (sq. km)	Remarks
1	OALP-I	AA-ONHP-2017/1	Vedanta Limited	Assam Shelf	714.71	PEL of Nagaland Area is Awaited
2	OALP-I	AA-ONHP-2017/10	Oil India Limited	Assam Shelf	543.28	
3	OALP-I	AA-ONHP-2017/11	Vedanta Limited	Assam Shelf	784.55	
4	OALP-I	AA-ONHP-2017/12	Oil India Limited	Assam Shelf	309.9	
5	OALP-I	AA-ONHP-2017/13	Oil India Limited	Assam Shelf	840.69	
6	OALP-I	AA-ONHP-2017/14	Vedanta Limited	Assam Arakan Fold Belt	1719.17	

S. No.	OALP Round	Block Name	Contractor/ Operator	Basin Name	Original Contract Area (sq. km)	Remarks
7	OALP-I	AA-ONHP-2017/15	Vedanta Limited	Assam Shelf	1367.38	
8	OALP-I	AA-ONHP-2017/16	Oil India Limited	Assam Shelf	361.49	
9	OALP-I	AA-ONHP-2017/17	Oil India Limited	Assam Shelf	309.07	
10	OALP-I	AA-ONHP-2017/18	Oil India Limited	Assam Shelf	1711.1	
11	OALP-I	AA-ONHP-2017/19	HOEC	Assam Arakan Fold Belt	79.21	
12	OALP-I	AA-ONHP-2017/2	Vedanta Limited	Assam Arakan Fold Belt	73.19	
13	OALP-I	AA-ONHP-2017/20	Oil India Limited	Assam Arakan Fold Belt	36.31	
14	OALP-I	AA-ONHP-2017/3	Vedanta Limited	Assam Arakan Fold Belt	267.94	
15	OALP-I	AA-ONHP-2017/4	Vedanta Limited	Assam Shelf	839.33	PEL of Nagaland Area is Awaited
16	OALP-I	AA-ONHP-2017/5	Vedanta Limited	Assam Shelf	758.23	
17	OALP-I	AA-ONHP-2017/6	Vedanta Limited	Assam Arakan Fold Belt	278.79	
18	OALP-I	AA-ONHP-2017/8	Vedanta Limited	Assam Shelf	610.54	
19	OALP-I	AA-ONHP-2017/9	Vedanta Limited	Assam Shelf	18.32	
20	OALP-III	AA-ONHP-2018/1	Vedanta Limited	Assam Shelf	248.87	
21	OALP-III	AA-ONHP-2018/2	Oil India Limited	Assam Arakan Fold Belt	2526.74	PEL Awaited
22	OALP-III	AA-ONHP-2018/3	Oil India Limited	Assam Shelf	1234.42	
23	OALP-III	AA-ONHP-2018/4	ONGC Limited	Assam Arakan Fold Belt	44.01	
24	OALP-III	AA-ONHP-2018/5	Oil India Limited	Assam Arakan Fold Belt	207.74	
25	OALP-V	AA-ONHP-2019/1	Oil India Limited	Assam Shelf	1278.27	
26	OALP-V	AA-ONHP-2019/2	Oil India Limited	Assam Shelf	2405.12	Relinquished
27	OALP-VI	AA-ONHP-2020/1	Oil India Limited	Assam Arakan Fold Belt	557.33	
28	OALP-VI	AA-ONHP-2020/2	ONGC Limited	Assam Arakan Fold Belt	50.41	

S. No.	OALP Round	Block Name	Contractor/ Operator	Basin Name	Original Contract Area (sq. km)	Remarks
29	OALP-VI	AA-ONHP-2020/3	Oil India Limited	Assam Arakan Fold Belt	219.37	
30	OALP-VI	AA-ONHP-2021/1	ONGC Limited	Assam Arakan Fold Belt	37.68	
31	OALP-VI	AS-ONHP-2021/1	ONGC Limited	Assam Shelf	24.64	
32	OALP-VII	AA-ONHP-2021/2	ONGC Limited	Assam Arakan Fold Belt	382.05	
33	OALP-VII	AS-ONHP-2021/2	Oil India Limited	Assam Shelf	2445.3	
34	OALP-VII	AS-ONHP-2021/3	Oil India Limited	Assam Shelf	1840.87	
35	OALP-VIII	AS-ONHP-2022/1	Oil India Limited	Assam Shelf	2057.63	PEL Deed not executed

7.8 National Seismic Programme:

National Seismic Programme (NSP) was launched on 12th October 2016 as part of the Government initiative for conducting 2D seismic survey of entire unappraised onland areas of sedimentary basins. The objective was appraisal of Un-appraised sedimentary basins in India and it envisaged 48,243 Line Kilometers (LKM) 2D seismic data for appraisal of onland areas. NSP got completed in Year, 2022. The areas where seismic survey couldn't be carried out due to inaccessible terrain and hostile environment are currently being taken up for appraisal by undertaking Airborne Geophysical Survey. The Sector wise acquired data is under NSP is as below:

NSP Details State/Location wise in North East

State/Location	2D Seismic (LKM)
Arunachal Pradesh	185.58
Assam	3899.34
Manipur	4.74
Meghalaya	12.66
Mizoram	980.00
Nagaland	0
Total	**5082.32**

7.9 Airborne Gravity Gradiometry & Gravity Magnetic survey (AGG & GM):

To cover the inaccessible and hostile geographical areas under NSP project where seismic data could not be acquired due to inaccessible terrain and hostile environment (mostly in Assam Arakan Fold Belt, Assam Shelf and selected traverse in areas of Cauvery, Bastar, Karewa and Spiti basins), Airborne Gravity Gradiometry and Gravity Magnetic (AGG & GM) data survey was carried out by M/s OIL on behalf of Ministry. In North East a total of 26,997 Flight LKM data was acquired under AGG& GM survey. The survey was started in May, 2023 and was completed in May, 2024. Sector wise details in North East is as follows:

NORTH EAST			
State	**Block Name**	**Approx. Area (sq.km)**	**Line Spacing: 2x20km - LKM**
Arunachal Pradesh	AS_AP &As_Man_Naga	4,000	2,112
Assam	AS_AP&AS_Man_Naga	10,100	5,489
Nagaland	AS_Man_Naga	13,500	7,336
Manipur	AS_Man_Naga	10,030	5,451
Meghalaya	AS_Man_Naga	1,700	924
Mizoram	AS Miz_Tri	8,478	4,726
Tripura	AS Miz_Tri	1,722	960
Total			**26,997**

OIL has also initiated AGG&GM data acquisition campaign in the NER for the seamless coverage to understand regional geological setting & plays across the OIL's OALP blocks including areas which could not be covered in the last campaign in the OIL's PML and areas around Kaziranga and Mikir hills with a cumulative quantum of 34190 flight LKM. The acquisition campaign commenced on 04th February, 2025 and a total of 5,786.91 flight LKM has been acquired as of 31.03.2025.

7.10 Project Status of NER:

As of March 2025, there are 27 projects under implementation of the Oil & Gas CPSEs costing ₹5 crore & above with total anticipated cost of ₹54,723 crore. Total 5 projects has been completed in the current FY 2024-25 with anticipated cost of ₹423 crore. During the FY 2024-25, the total cumulative expenditure on the project in the NER is ₹10,325 crore. Details is as follows:

Sl. No.	Project Type/Sector	Total No. of Ongoing Projects	Cost (In ₹ Cr.)		Completed Projects During the current FY	
			Original	Ant.	Nos.	Ant. Cost (In ₹ Cr.)
I	Mega Project (>= ₹ 500 Cr.)	10	37,623	51,478	0	0
II	Small Project (< ₹ 500 Cr.)	17	3,294	3,244	5	423
Grand Total:		**27**	**40,918**	**54,723**	**5**	**423**

7.11 Assam Gas Crackers Project now Brahmaputra Cracker and Polymer Limited (BCPL):

The Assam Gas Cracker Project (AGCP) was proposed as a part of the implementation of Assam Accord signed by the Government of India on 15th August, 1985. The Project is an outcome of socio-economic concerns of the Government of India for equitable development across Indian states through industrialization of backward regions of the country. In pursuit of this objective for the State of Assam, the Government of India considered to establish a petrochemical Industry at village Lepetkata in the District of Dibrugarh for judicious utilization of the higher fractions of Natural Gas for value addition, creating avenues for downstream plastic processing and ancillary industries and other diversified opportunities with enormous scope for direct and indirect employment potential for the overall economic development of the State.

The project is the largest petrochemical complex in North-East India and there has been substantial increase in the consumption of polymer in NER due to BCPL. The plant has dominant position in terms of geographical proximity to countries like Bangladesh, Nepal, Myanmar etc. and has started export of polymers to Bangladesh

and Bhutan. The plant employs around 700 permanent employees. Additionally, around 2600 manpower under contract are working inside the petrochemical complex. Further, huge number of jobs are created in the region for the vendors, transporters, suppliers etc. Altogether, a robust ecosystem thrives around this sophisticated plant. Moreover, downstream plastic processing units will involve significant additional income generation in NER. BCPL has not only provided employment opportunities but also has contributed in skill development of the local populace who has been working inside the plant. BCPL is also setting up two plants viz. Butene-1 and HPG (2nd stage) inside the petrochemical complex at Lepetkata, Assam.

As a responsible corporate citizen, BCPL pursues CSR initiatives in and around the plant to foster the region's overall socio-economic development of North-East Region. The focus areas of BCPL's CSR initiative include Health & Nutrition, Swachhata & Sanitation, Rural Development, and Skill Development, among others. Some of the projects undertaken by BCPL in Assam are infrastructure development of public health centers, vocational training programs for unemployed youth, digital classroom at schools, development of sports Infrastructure, construction of community toilet etc.

7.12 North East Gas Grid:

The North East Gas Grid (NEGG) project is being implemented by Indradhanush Gas Grid Limited (IGGL), a Joint Venture Company of IOCL, ONGC, GAIL, OIL, and NRL, to supply Natural gas to all the eight North-Eastern states i.e., Assam, Arunachal Pradesh, Meghalaya, Tripura, Mizoram, Nagaland, Manipur & Sikkim, at an estimated cost of ₹9,265 crores.

The 1670 Km long natural gas pipeline grid having a capacity of 4.75 MMSCMD traverses through challenging terrains of North East India and connects Guwahati to the capital / major cities of the region like Itanagar, Dimapur, Kohima, Imphal, Aizawl, Agartala, Shillong, Silchar, Gangtok, and Numaligarh.

The pipeline grid connects to the National Gas Grid through the Baruani-Guwahati pipeline (BGPL) which is being implemented by GAIL India Ltd under the Pradhan Mantri Urja Ganga Project to connect Eastern India with the National Gas Grid.

As on date, the actual physical progress is 85.30% against scheduled physical progress of 90.03% and actual financial progress is 68.86% against the scheduled financial progress of 75.20%. A few remarkable strides achieved by IGGL in the recent times are as follows:

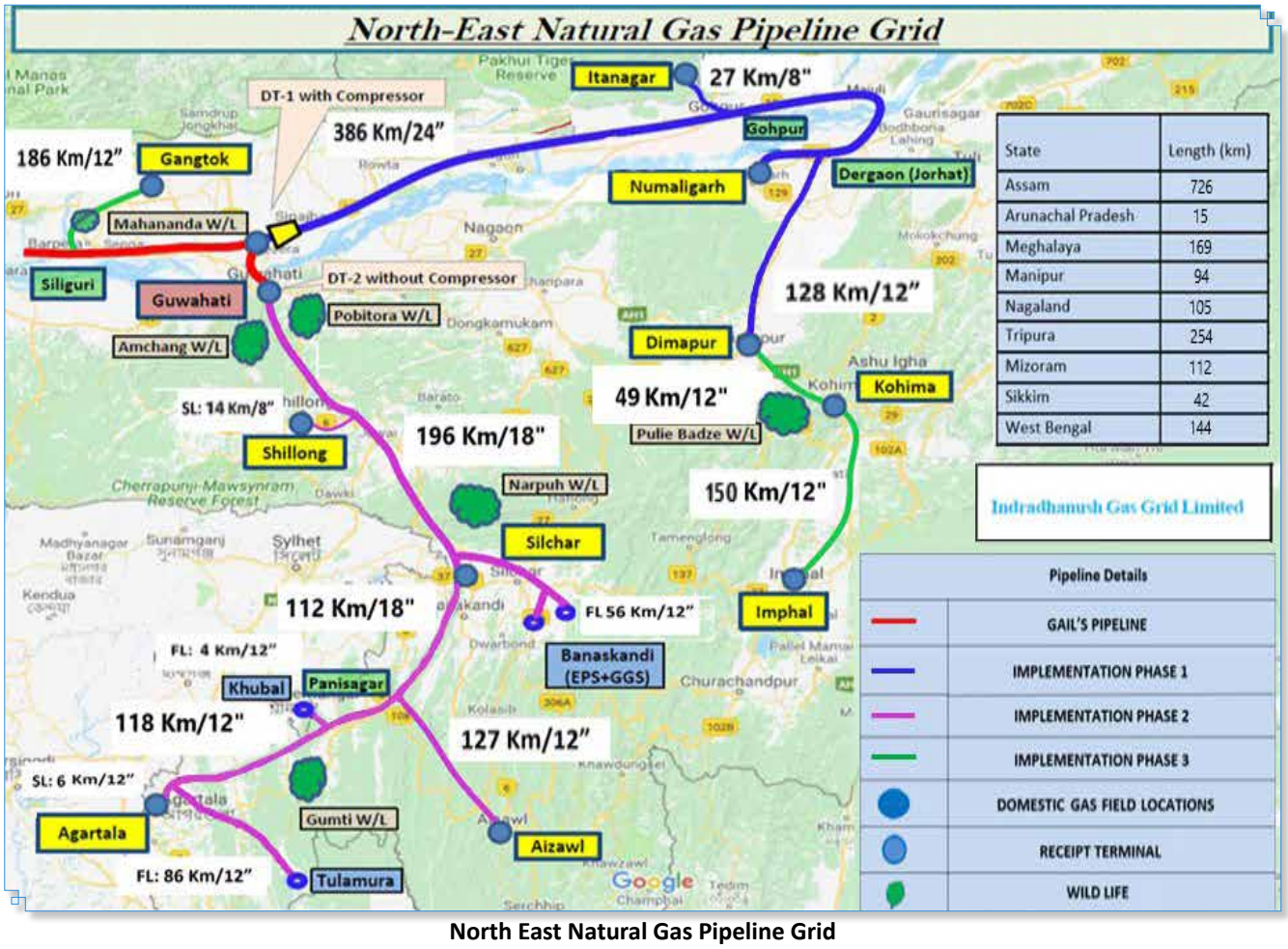
a) **Longest HDD river crossing hydrocarbon pipeline of 24" dia of 5.7 km length in Asia:** IGGL has successfully completed laying of 24" Diameter hydrocarbon pipeline beneath the Brahmaputra River by HDD method connecting Jorhat (West Bank) and Majuli, (North Bank) of river Brahmaputra. Total length of 5.7 Km, executed through intersection HDD method in three sections comprising of lengths-1.0 km, 4.0 km and 0.7 Km. The middle point of the pipeline is 30 m below river bed.

b) **Commissioning of 392 km of Guwahati Numaligarh Pipeline:** IGGL has successfully commissioned 392 km pipeline in Phase-I starting from Baihata (i.e. interconnection point with GAIL) to Numaligarh Refinery Limited (NRL) completed on 16.07.2025. As on date, the 392 km GNPL pipeline is maintained at a pressure of 35 Kg/cm^2 for supply of gas to NRL at any moment. Through this pipeline gas can be delivered to anchor customers like NRL and NEGDCL, CGD entity lying along the route of GNPL.

c) **Signing of GTA with anchor customers:** Gas Transmission Agreement (GTA) has been signed with NRL. NRL would be off taking an initial gas volume of 0.1 MMSCMD from the GNPL section by 1st September 2025. Work is also going on for delivering gas to North East Gas Distribution Company Limited (NEGDCL) from SV-05 of GNPL and likely gas flow should start as early as possible.

d) **Gas source connectivity with the grid:** On completion of Phase-I of NEGG, near about 2,07,000 SCM of gas shall start flowing to the grid from ONGC Jorhat asset, which as on date is disconnected from the grid. The anticipated date for flow of these much volume of gas is targeted on December 2025 through Dergaon Dimapur Pipeline of NEGG.

BENEFITS OF NEGG: The NEGG project is a project of strategic importance and on implementation of the project, it will ensure reliable and uninterrupted natural gas supplies to the consumers viz. industrial, City Gas Distribution networks in North East region which are expected to boost industrial as well as economic growth of the region while conserving the environment and supplementing efforts of the Government for development of a Gas based economy in the North East.



North East Natural Gas Pipeline Grid

7.13 NRL's Projects under Implementation

7.13.1 Numaligarh Refinery Expansion Project (NREP): The expansion project has two major components, namely, a) 6 MMTPA refinery at Numaligarh and b) Paradip-Numaligarh Crude pipeline along with crude oil import terminal. The approved cost of the project is ₹28,026 crore, out of which, an amount of ₹1,020 crore has been approved as capital subsidy for the project. Revised Cost Estimate of ₹33,901 crore is under approval and being reviewed at MoP&NG.

i. 6 MMTPA refinery at Numaligarh -: As on 31.03.2025, overall physical progress is 71.88% and financial progress is 68.42%.

ii. Paradip Numaligarh Crude Oil Pipeline (PNCPL) and Crude Oil Import Terminal (COIT) - The length of the pipeline in 1,635 kms. in length and 9 MMTPA in capacity. As on 31.03.2025, overall physical progress is 83.8% and financial progress is 80.76%.

Under NREP key unit coming under the expansion project are:

a. **Petrochemical Project:** The project involves

setting up of a 360 KTPA Poly Propylene Unit (PPU) and its associated facilities at Numaligarh. Post implementation of the project, Petrochemical Intensity Index (PII) of NRL will be 3.88%. Environment Clearance of the project has been obtained and EIL is onboarded as EPCM for the project. Project is targeted to be completed in FY 2027-28.

b. **DCU Revamp:** The project involves revamp of existing Delayed Coker Unit (DCU) by increasing the capacity from 306 KTPA to 560 KTPA for processing Un-converted Oil (UCO) from upcoming Residue Upgradation Facility including Coke Drum Structural Package. For DCU reliability and efficiency improvement additional facilities for ensuring sustainable operation of the unit such as Overhauling of Off Gas Compressor, Process equipment, New Substation building and DCS upgradation are coming up.

c. **Dabidubi LPG Facility:** NRL is setting up a 15 Kilometer underground LPG pipeline to connect to its LPG facilities being setup at Dabidubi in Golaghat district of Assam. The capacity of the new LPG facility post commissioning will be 700 KTPA.

d. **Power Recovery Turbine in PFCC unit:** A Power Recovery Turbine will be installed in the flue gas section at downstream of reactor-regenerator section of PFCCU as an energy saving initiative. This will generate power from regenerator flue gas to increase the energy efficiency of the unit and will result in reduction of CO_2 emissions from the complex.

7.13.2 2G Bio Refinery (JV project): NRL, in collaboration with two other foreign investors, have formed the Joint Venture Company - "Assam Bio-refinery Private Limited (ABRPL)" which is setting up a second-generation bio-refinery at Numaligarh, Assam to produce ethanol from non-food grade feed stock bamboo. The first trial run has been conducted successfully to establish conversion of bamboo to alcohol.

7.13.3 North East Gas Grid Project (JV project): NRL is a partner with 20% stake in the JV company- Indradhanush Gas Grid Limited (IGGL) which is executing the North East Gas Grid project to lay Natural Gas Pipeline of 4.75 Million Metric Standard Cubic Meter Per Day (MMSCMD) capacity.

7.13.4 Green Hydrogen Plant: In line with National Green Hydrogen Mission and to meet the GHCO (Green Hydrogen Consumption Obligation) in coming years, NRL is setting up a Green Hydrogen plant of capacity 300 Kg/hr. (2.4 KTPA) at Numaligarh on EPC basis. This will replace 5% of the present grey hydrogen being used by the refinery which will reduce approximately 24,000 Tons of CO_2 emission per annum.



First Well at Digboi, Assam



OIL Sucker Rod Pump at Assam



Oil and Gas land Drilling rig at North -East



BCPL's Ethylene Cracking Unit



NRL's PFCC Main Fractionators Column Erection



Siu-Ka-Pha (Siu-Ka-Pha) Multi-specialty Hospital in Sivasagar, Assam under ONGC's CSR





Chapter 8

R&D and New Technologies

8 R&D and New Technologies

Oil PSUs primarily focus their R&D efforts on various aspects of the oil and gas sector, including exploration and production technologies, refining processes, petrochemicals and energy efficiency. Some PSUs have also started exploring renewable energy sources and clean technologies as part of their R&D portfolio. Competitive R&D as part of business strategy is needed for innovations & exploration of different approaches/pathways.

a. **Downstream R&D:** R&D Centres of IOCL, HPCL, BPCL, EIL, GAIL and MRPL are working in areas of value addition to refinery petrochemical streams. Carbon capture, utilization, and sequestration are also being explored by the Centres. The other areas of research include gasification, biofuel, wastewater treatment, pipeline inspection, HCNG mixing, hydrogen production and storage, fuel cell and battery technology, etc.

b. **Upstream R&D:** R&D Centres of ONGC and OIL are working in areas such as enhanced oil recovery, carbon capture, utilization and sequestration, coal bed methane, hydrogen production and storage, batteries and energy storage systems, and fuel cell technologies, etc.

8.1 Oil and Natural Gas Corporation (ONGC):

ONGC through its R&D Institutes is pursuing adaptation customization and applied research. All the R&D institutes are certified by International Organization for Standardization (ISO) and recognized as in-house R&D Units by the Department of Scientific and Industrial Research (DSIR, Ministry of Science and Technology).

In the year 2024-25, ONGC carried out several R&D studies for conventional and non-conventional hydrocarbons at its different Institutes.

8.1.1 Industry-Academia Participation:

(i) **ONGC-PAN IIT Collaborative Research Program:** ONGC has entered into a Memorandum of Collaboration (MoC) with pan IIT in January 19, 2015 to work towards a collective R&D Programme for developing indigenous technologies to enhance exploration and exploitation of hydrocarbons and alternate sources of energy. Pan IIT is a consortium of seven premier Indian Institutes of Technology namely, IIT-Kharagpur, IIT-Kanpur, IIT-Madras, IIT-Bombay, IIT-Delhi, IIT-Guwahati and IIT-Roorkee. This is a long-term initiative for sustained research, development and capacity building. Under this program, ONGC Institute/R&D centers have taken up 40 R&D projects in 4 phases under memorandum of collaboration signed between ONGC and IIT Kharagpur (on behalf of seven IITs).

(ii) **CoE-OGE Projects:** The Centre of Excellence in Oil, Gas and Energy is an inter-disciplinary Centre of Excellence between Indian PSUs (IOCL, ONGC, HPCL, BPCL, GAIL, OIL & EIL) and IIT Bombay initiated by Ministry of Petroleum and Natural Gas (MoPNG). It has been founded to provide a competitive advantage to India's Oil and Gas sector PSUs and its energy sector in the emerging business ecosystem driven by climate challenges, stressed resources and disrupting technologies globally. Under this initiative, 14 projects are taken up and 8 projects are completed.

(iii) Collaborations and Memorandum of Understanding (MoU):

a) **KDMIPE's Strategic Collaborations in Geoscience Research:** A tripartite MoU among Keshava Deva Malaviya Institute of Petroleum Exploration (KDMIPE), ONGC, Telangana Renewable Energy Development Corporation Ltd. (TGREDCO) and Singareni Collieries Company Limited (SCCL), Telangana on "Exploration & Development of Manuguru Geothermal Field in Godavari Graben, Pranhita-Godavari (PG) Basin, Telangana, India" was signed on 02.08.2024. The MoU will focus in the areas of collaborative research, development and innovation, leading to joint projects and joint knowledge valorisation, on the basis of complementary efforts with special focus on Geothermal Energy exploration and exploitation along with field validation for a period of five (05) years.

b) **GEOPIC's collaboration with BHU for Joint Seismic and Potential Field Inversion for Sub-Basalt Imaging:** To enhance subsurface imaging, GEOPIC has collaborated with Banaras Hindu University (BHU) for a project agreement on Joint Seismic and Potential Field Inversion. Signed on 25th July, 2022, this agreement focuses on improving sub-basalt imaging in Block CB-ONHP-2018/2, west of the Boala area in the Cambay Basin through joint inversion techniques.

c) **Institute of Reservoir Studies (IRS), Ahmedabad – Research Collaborations:** The Institute of Reservoir Studies (IRS), Ahmedabad, has also strengthened its research capabilities through international collaborations. A partnership with the University of Texas at Austin is driving advancements in Chemical Enhanced Oil Recovery (CEOR) formulations, tailored specifically for Indian reservoirs to optimize oil recovery efficiency. Additionally, in collaboration with the University of Calgary, IRS is implementing the LoSAL (Low Salinity Water Flooding) technique in the Heera field to improve oil displacement efficiency through advanced water injection methods. The IRS is also working with The Energy and Resources Institute (TERI), Delhi, on a Resident Microbial Enhanced Production Pilot across ONGC fields in Gujarat, leveraging microbial technology for hydrocarbon recovery. Furthermore, in collaboration with the National Centre of Excellence in Carbon Capture, Utilization, and Storage (CCUS) at IIT Bombay, IRS is conducting a comprehensive assessment of CO_2 storage potential, risk evaluation, and life cycle analysis in selected ONGC fields, supporting India's transition toward sustainable carbon management practices.

d) **Institute of Biotechnology & Geosciences (INBIGS), Jorhat – Sustainability & Recovery Initiatives:** In association with CSIR-Northeast Institute of Science and Technology (NEIST), Jorhat, Assam, ONGC is developing a membrane-based process for waste water treatment from the Assam and Assam Arakan Basin, with a strong emphasis on water recycling at the Jorhat work centre. Additionally, ONGC's collaboration with Tezpur University is driving multiple research initiatives, including the development of a Phytoremediation Protocol for crude oil bioremediation, bioremediation of petroleum hydrocarbon contaminated soil and water using a micro-aerophilic/ anaerobic bacterial consortium, and the formulation of a Microbial Enhanced Oil Recovery (MEOR) slug for improving hydrocarbon recovery in the Upper Assam Basin.

e) **ONGC Advanced Training Institute (ATI), Goa–Offshore Safety & Environmental Monitoring:** The ONGC Advanced Training Institute (ATI), Goa, has partnered with premier research institutions to enhance environmental

monitoring and offshore safety. In collaboration with ISRO-NRSC, ATI has launched a project on satellite monitoring of oil spills in the Western Offshore Region, utilizing advanced remote sensing technologies to strengthen spill detection and response mechanisms. Additionally, working alongside CSIR-National Institute of Oceanography (NIO), ATI is conducting a study on the formation of a crater near the offshore WN2 platform (NLM & HRA Asset) to evaluate geological and environmental risks.

f) **Institute of Drilling Technology (IDT), Dehradun – Drilling Research & Global Outreach:** The Institute of Drilling Technology (IDT), Dehradun, is strengthening its research and global outreach through strategic collaborations. Under a MoU with IIT Kharagpur, IDT is developing thermally stable additives and high-performance drilling fluids capable of withstanding temperatures up to 230°C. Additionally, a MoU with RGIPT, Jais, Amethi, is fostering further advancements in drilling technology. Expanding its international engagement, IDT has signed a contract with ONGC Videsh Ltd., Colombia, on 18th December 2024, for well engineering services, including well designing and validation of the 4CP Casing Design for high-drift wells in the CPO-5 Block, Colombia.

g) **Centre for Excellence in Well Logging Technology, Vadodara – Subsurface Exploration:** The Centre for Excellence in Well Logging Technology, Vadodara, is advancing subsurface exploration through a collaborative project with Skoltech, Russia. This project focuses on understanding and exploring the relevance of Thermal Petro physics studies in Indian Basins, further contributing to ONGC's efforts in refining exploration techniques and enhancing hydrocarbon recovery strategies.

Institute of Production Engineering and Ocean Technology (IPEOT) have undertaken a collaborative project with IIT (ISM)-Dhanbad titled "Development of Nano Material Based Particle Gel System for Water & Gas Shut Off in Carbonate Reservoirs". A patent is filed on 21.03.2025.

8.1.2 R&D Initiatives by ONGC in the field of IOR/EOR activities: Improving recovery factor to 40% is one of the strategic goals of ONGC. Institute of Reservoir Studies (IRS), Ahmedabad, is spearheading Improved Oil Recovery (IOR) and Enhanced Oil Recovery (EOR) initiatives across its key assets, integrating pilot projects and commercial-scale implementations to optimize hydrocarbon recovery. The organization has made significant strides in deploying polymer flooding, surfactant-polymer (SP) and alkali-surfactant-polymer (ASP) injections, gas injection (GI), and thermal recovery methods in fields such as Mehsana, Ahmedabad, Assam, and Jorhat.

8.1.3 Key R&D advancements in 2024-25 include:

(i) **Cyclic Steam Stimulation (CSS) in Lanwa & Charada Fields:** ONGC successfully implemented its first CSS pilot in Lanwa field, leveraging laboratory studies and reservoir modeling. The initiative resulted in a 7-8 times productivity increase across seven wells, contributing approximately 75 TPD of production.

(ii) **Gas-Assisted Gravity Drainage (GAGD) at Kasomarigaon:** Mid-course corrections in the GAGD scheme have optimized operations by reducing gas flaring while boosting oil production by 120 m^3/day. Currently, the project is injecting 25,000-27,000 m^3/day of gas, aligning with ONGC's sustainability goals.

(iii) **Low-Salinity Water Flooding (LSWF) in Mumbai High:** A pilot in MHS L-III successfully stabilized water cut and

arrested oil decline, leading to additional oil gain. Encouraged by these results, ONGC has completed feasibility studies for expanding LSWF to Mumbai High North Field.

These pioneering IOR/EOR projects underscore ONGC's commitment to maximizing recovery from mature fields while adopting sustainable, technology-driven solutions to enhance production efficiency.

8.1.4 R&D Patents registered by ONGC: During FY 2024-25, ONGC secured eight patents and filed twelve patent applications. Additionally, six copyrights were registered, and nine copyright applications were filed.

8.1.5 New Technologies inducted in ONGC: Salient features of the technologies evaluated/ inducted during the year 2024-25 are given below.

(i) MoU for LNG Plant & Carbon Emission Reduction: ONGC has signed a MoU with IOCL to establish a small-scale Liquefied Natural Gas (LNG) plant near the Hatta gas field in the Vindhyan Basin. This initiative upgrades the basin from Category II to Category I and integrates advanced technologies to minimize carbon emissions. It marks India's first technology demonstration project of its kind.

(ii) Advanced Laboratory Facilities at KDMIPE: A state-of-the-art UV-Raman Spectro-meter has been procured for the Source Rock laboratory at KDMIPE, enhancing ONGC's ability to reconstruct geological history and determine hydrocarbon composition. Additionally, a Helium and Hydrogen Laboratory is being set up for cutting-edge research into alternative energy sources and hydrocarbon exploration.

(iii) Real-Time Drilling Operations Centre (RTDOC): The Real-Time Drilling Operations Centre (RTDOC) at the Institute of Drilling Technology (IDT), Dehradun, streamlines ONGC's drilling operations by monitoring both onshore and offshore rigs. This integrated command centre enhances decision-making, minimizes downtime, and improves operational efficiency.

(iv) Digital Advancements in Drilling Technology

- **Digital Well Program (DWP):** Launched in November 2024, this cloud-based application integrates automated workflows for streamlined well planning and execution.
- **Well Information System (WIS):** Introduced in December 2024, this platform facilitates real-time decision-making and data analytics for drilling operations.
- **Drilling Belief Analytics (DBA):** Implemented as a trial in three wells, this system optimizes drilling parameters through intelligent analysis.
- **Dog-Leg Reamer (DLR):** Tested in Rajahmundry wells, this tool improves wellbore stability, reducing drilling risks.

(v) AI-Enabled Well & Enhanced Oil Recovery (EOR) Innovations: The Institute of Reservoir Studies (IRS), Ahmedabad, has deployed India's first AI-enabled well in the Gandhar Field, marking a significant step toward AI-driven oil recovery optimization. Additional EOR techniques include:

- **Cyclic Steam Stimulation (CSS):** Deployed in new fields for ultra-heavy oil recovery.
- **Gas-Assisted Gravity Drainage (GAGD):** Implemented in the Kasomarigaon Field for improved gas injection efficiency.
- **Low-Salinity Water Flooding (LSWF):** Introduced in Mumbai High South (MHS) with plans for a full-scale rollout in Mumbai High North.
- IRS has also upgraded its Thermal Advanced EOR Lab with High-Pressure

Rich Gas Thermal Oxidation (HPRTO) and High-Pressure Air Injection (HPAI) systems, advancing research in thermal and hybrid recovery methods.

(vi) **Upgraded Reservoir Characterization Equipment:** At the Centre for Excellence in Well Logging Technology, Vadodara, new high-tech instruments have been introduced:

- **CAPRI Fully Automated Capillary System:** Enhances capillary pressure measurements for accurate petro physical studies.
- **Electronic Analytical Balance:** Ensures precise weight measurements for porosity-permeability analysis.
- **Chiller Unit:** Integrated with the Soxhlation unit, it improves temperature regulation and water conservation, supporting advanced reservoir characterization studies.

(vii) **Innovations in Oil & Gas Production at IPEOT:** The Institute of Production Engineering & Ocean Technology (IPEOT), Panvel, has introduced several advanced technologies to improve production efficiency:

- **Single Phase Retarded Acid System (SPRAS):** A superior alternative to conventional emulsified acids for limestone reservoir stimulation.
- **Acid Frac with PLA Diverter:** Enhances production from tight limestones using a self-degradable and cost-effective diverter.
- **Organic Clay Acid:** Designed for high-temperature sandstone reservoirs to improve production while preserving formations.
- **Rig less Water Shut-Off (RPM):** An efficient method to control excessive water production without requiring a rig.
- **Fiber Fracturing Technique:** Prevents proppant flowback in onshore fields, reducing workover costs.
- **Sand Agglomeration System:** Consolidates sand production while maintaining permeability.

These advancements reinforce ONGC's commitment to technological excellence, operational efficiency, and sustainable hydrocarbon exploration and production. During the last five years, ONGC has made alliances with industry leaders for latest technology transfer and undertaken various collaborative R&D:

Institute/ Organisation	Thrust Area
Exxon-Mobil	Joint technical studies and co-operation in frontier areas in offshore and other PEL blocks in east and west coast and open acreages for submission of EoI/ Bidding jointly.
Chevron New Ventures PTE Limited	Joint exploration evaluation of ONGC-operated and open offshore acreages.
Shell	CCUS studies, focusing on joint CO_2 storage study and EOR screening assessment for "key basins" in India, including depleted oil and gas fields and saline aquifers.
University of Calgary (UoC), Canada	Training, maintenance & service of High Pressure Air Injection Equipment.
University of Oklahoma, USA	GEOPIC, ONGC is a member of Attribute Assisted Seismic data Processing & Interpretation (AASPI) consortium at University of Oklahoma, USA. Consortium is doing research and developing innovative workflows and integrating in AASPI software package which is very rich in seismic attribute analysis and is supported by several MNCs. Experts are helping GEOPIC executives in technical queries regularly

Institute/ Organisation	Thrust Area
UT Administration of Ladakh and LAHDC, Leh & Iceland Geo Survey (ISOR)	For establishing India's maiden Geothermal Field Development Project in Ladakh. For providing expertise in establishing India's maiden Geothermal Field.
The Skolkovo Institute of Science and Technology (Skoltech), Moscow	Understanding & exploring the relevance of Thermal Petrophysics studies in Indian Basins. Gas Hydrate Research & Technology applicable to Indian Basins.

8.1.6 Benefits achieved through R&D studies: All the R&D projects undertaken by ONGC facilitated speedier and effective E&P activities of ONGC. R&D activities carried out by the Institutes have helped in enhancing the growth of the company by ensuring high success-ratio including enhancement of Reserves through finding new oil in existing petroleum provinces using state of the art technology available in the company. R&D activities have also facilitated in improving recovery factor, incremental oil gain, mitigating complex challenges of exploration in Frontier basins, deep-water blocks and to tap un-conventional energy resources. The R&D studies have significantly enhanced hydrocarbon exploration and resource assessment. Key benefits include the development of advanced geological models, structural and stratigraphic analysis, and petroleum system modelling, which optimize exploration strategies. The studies have also improved reservoir characterization and carbon sequestration potential assessment, and geothermal energy evaluation to support energy transition initiatives.

The R&D projects completed are applied in nature which provided domain specific challenges in seismic data processing, interpretation, complex reservoir characterization, reservoir modelling. Developed AI/ML based solutions are efficient leading to significant value addition and time saving.

ONGC's R&D efforts focus on both enhancing traditional hydrocarbon production and driving the transition to green energy. On the decarbonization front, ONGC is heavily investing in renewable energy projects, including solar, wind (offshore and onshore), and green hydrogen, as part of its strategy to achieve net-zero emissions by 2038. Additionally, the company is advancing research in biogas, energy efficiency, and reducing gas flaring to zero by 2030. On HSE front ONGC became the first Indian PSU to achieve NEBOSH Golden Learning Partner status.

8.1.7 R&D Expenditure

FY	R&D Expenditure (in ₹ Crore)
2021-22	531.58
2022-23	569.84
2023-24	686.68
2024-25	458.63
Total	**2246.73**

8.2 Oil India Limited (OIL):

Oil India Limited (OIL) has established two knowledge-based R&D Centers Research & Development Department (R&D) at its Field Headquarters in Duliajan, Assam, India and Centre of Excellence for Energy Studies (CoEES) in Guwahati, Assam, India. These R&D Centres provide specialized & innovative research based and cost-effective solutions to the challenges encountered in the energy industry, specifically catering to the needs of OIL. Both the Centres are recognized

by the Department of Scientific and Industrial Research (DSIR), Ministry of Science & Technology, Government of India. CoEES has also been recognized as a designated Institute for conducting screening and vetting of Enhanced Recovery projects as per ER Policy, 2018 vide The Gazette of India of MoP&NG dated 24th November 2020.

8.2.1 Activities pertaining to R&D Centre in Duliajan, Assam

8.2.1.1 Industry-Academia Collaboration:

i) OIL entered into a Memorandum of Understanding (MoU) with Pan CSIR laboratories in 2023 at New Delhi to initiate collaborative research on exploration and production operation of OIL as well as alternate energy. Under this MoU, three projects have been taken up on frontier areas of research with CSIR – IIP, Dehradun and CSIR – NGRI, Hyderabad :

a) Feasibility Studies on Synthetic Aviation Fuel (SAF) production from CO_2.

b) Studies on the development of the additive for Diesel-Methanol blend (Phase-I).

c) Chronostratigraphic and Provenance analysis from the sub-surface samples of Exploratory wells of Oil India Limited). Initiation of some other projects is in progress.

(ii) OIL is actively engaged with IIT Bombay on several projects on water management, Flow Assurance, adsorbed natural gas, energy storage, green hydrogen production etc. The projects include:

a) Drilling site waste water management – prototype development.

b) Produced water treatment coupled with resource recovery and zero liquid discharge (ZLD) strategies.

c) Modeling of wax deposition on transporting pipelines with and without chemical.

d) Advanced Battery Technologies.

e) Green Hydrogen production: Indigenization, cost reduction and performance enhancement of electrolyser technology.

f) Catalysis and Process Development for Sustainable Fuels & Chemicals.

(iii) OIL has also active research collaboration with IIT Guwahati. Study on "Development of Nano-materials for Oil and Gas Applications & Establishment of Nanotechnology laboratory in OIL" is ongoing.

(iv) OIL R&D is actively pursuing a collaborative project on "2D-3D hetero-structure based Green Catalyst for the Efficient Capture and Conversion of CO_2 into Green Fuels via Artificial Photosynthesis" with IIT Jodhpur.

8.2.1.2 In-house R&D projects undertaken by OIL

i) Surface Geo chemical Prospecting: Analysis carried out of all the required samples from Ningru PML blocks through analysis of adsorbed gas in soil samples.

ii) Reservoir Continuity Studies: Carried out in Balimara Oil Field of upper Assam region.

iii) Geochemical Characterization: Analyzed samples from Dima Hasao, Assam.

iv) Source Rock Evaluation: Samples analyzed from well Dima Hasao -1 (Loc. ODHA).

v) MEOR implementation: Field implementation of in-House developed Microbially Enhanced Oil Recovery (MEOR) technology in well NHK – 505 and HJN – 023.

vi) Microbial Geo-Prospecting for Oil and Gas (MPOG): Completed the analysis of all samples from Ningru PML blocks.

vii) Bio-Stimulation studies: Studies carried

out on in-situ Bio-stimulation of Methanogens for recovery of residual oil.

viii) Bio-Hydrogen studies: Process optimization to increase the efficiency and upscaling of bio-hydrogen production using microbes is being carried out.

ix) Bio-surfactant evaluation for EOR: Development of bio surfactants extracted from natural resources to synergistically fortify microbial consortia for enhanced oil recovery.

x) Well Stimulation: Designed Well Stimulation jobs using in-house expertise for improvement in injectivity. Development of an Emulsified Acid formulation is ongoing for Acidization of Producing and Water Disposal Wells.

xi) Pilot project: Pilot Polymer flooding project carried out in NHK 11D+18 block.

xii) Flow Assurance studies: Carried out extensive flow assurance studies for uninterrupted flow of crude oil from sub-surface to refineries.

xiii) Development of Low Temperature Oil Soluble Demulsifier (LT - OSD): OIL in collaboration with oil field chemicals manufacturers developed LT - OSD chemicals which are effective at 45˚C compared to conventional chemicals (effective at 60˚C only).

xiv) Crude oil characterization: Studies carried out to determine lighter hydrocarbon components in crude oil impacting flow assurance and wax deposition.

8.2.2 Patents registered by OIL:

OIL has been granted 18 patents in six (6) different countries - seven (7) in India, two (2) in Russia, three (3) in the USA, two (2) in China, three (3) in European Union and one (1) in Japan.

8.2.3 R&D Expenditure in last 3 years

FY	R&D Expenditure (₹ in Crore)
2021-22	100.96
2022-23	179.03
2023-24	149.22

8.2.4 Activities pertaining to CoEES Guwahati-, Assam

8.2.4.1 Geo-cellular Modelling & Reservoir Simulation for identification of bypassed oil:

Comprehensive reservoir rejuvenation studies are carried out as a continuous process through static and dynamic modelling studies with an objective of identifying undrained bypassed oil. Moreover, evaluation of most amenable EOR scheme for the reservoirs is also carried out.

8.2.4.2 Laboratory Studies:

a) Sediment logical study of Barail Formation of Lakwagaon Field, Assam Shelf is underway to conduct detailed facies analysis and decipher the depositional environment of Barail Formation based on conventional core analysis.

b) Under industry-academia collaboration projects with NE Universities (viz. Manipur, Dibrugarh University), organic geochemical analysis of the collected shale and coal samples from different field work areas in Assam Arakan Basin has been carried out on routine basis which is a valuable initiative that enhances our understanding of local geological resources.

c) CoEES has carried out laboratory investigation to find out the compatibility of CO_2 gas in the reservoir condition for miscibility with reservoir fluid and enhanced oil recovery.

d) Assessment of Suitability for CO_2 induced mineralization in Deccan Basalts, India has undertaken in collaboration with MoES-BGRL to understand the mechanisms of mineralization induced by CO_2 injection in Basaltic formations of Deccan Basalt using experimental studies and geochemical analysis.

e) Geochemical Characterization of Source Rock, Bitumen, Crude Oil and Drill cuttings samples under all Industry-Academia projects and samples from Rajasthan Fields and Mahanadi Basin projects are regularly carried out in Advanced Geochemical Laboratory to understand their origin, maturity and bio-degradation and also to correlate each oil samples and source rocks.

8.2.4.3 Net Zero Initiatives:

As a proactive measure, CoEES have initiated multiple studies as given below:

a) Feasibility study for Permanent storage of CO_2 in Jaisalmer Basin, Rajasthan.

b) Feasibility study for CO_2 EOR along with transportation and injection in Makum-North Hapjan Field.

8.2.4.4 Industry Academia Collaboration:

a) OIL is going to engage Texas A&M Engineering Experiment Station (TEES), the R&D wing of the Texas A&M University System, USA under a Memorandum of Understanding (MoU) with this University to carry out subsurface modeling Study in Kathaloni Sand reservoir for revitalization of the field along with identification of potential for amenable EOR schemes.

b) Under a MoU with IIT-Bombay, a mission mode project is presently in progress with Centre of Excellence in Oil and Gas Energy (CoEOGE), IITB that aims to estimate CO_2 storage potential and develop a risk-assessment and management framework by incorporating volumetric and geo-mechanical constraints in the identified reservoir.

c) Under MoU with the National Centre for Seismology (NCS), Government of India, an important and innovative project has been initiated to transform abandoned oil and gas wells into seismological observatories in seismically active regions such as Arunachal Pradesh and Assam.

d) Industry Academia Projects with universities of NE India has been taken up under MoU with Guwahati University, Dibrugarh University, Nagaland University, Manipur and Rajiv Gandhi University. The projects have been undertaken to study on the geological mapping, hydrocarbon potential of fold-thrust belt and Gondwana in Assam Arakan Basin.

e) Quantifying the trapping mechanisms for CO_2 geo-storage in saline aquifers of Assam and Rajasthan, India. The collaborative research project is undertaken with IIT-Kharagpur for investigation of comprehensive rock and brine characterization in OIL reservoirs, CO_2 wettability studies of shale and sandstone samples, quantification of porosity and permeability, CO_2 solubility studies, capillary trapping investigations, and a study of geochemical reactions and kinetics under reservoir conditions.

8.2.5 Induction of New Technology: Key advancements include:

(i) Electric Down hole Heating with Heat Tracing Cable.

(ii) Rig-Less Solution for leak repair in wellhead. valves, packers and Control Lines.

(iii) **Kronosflow:** The application provides 2D kinematic restoration modeling for assessing tectonically complex basins by understanding the vertical shear

back stripping method and step by step restoration for basin reconstruction.

(iv) **Low Frequency Passive Seismic:** This technique captures & interprets subtle seismic vibrations that can provide valuable insights into subsurface geological structures, fluid movements, and other geophysical phenomena.

(v) **Fishbones:** It boosts reservoir exposure, increasing production rates and enhancing recovery.

(vi) **Propellant Stimulation:** It involves use of solid rocket fuel as explosives to create a pressure pulse that fractures the surrounding rock formation and improves the flow of oil or gas. This technique is used in wells that have low productivity or have experienced a decline in production over time.

(vii) **Preparation of Digital Rock Atlas:** This technology carries out digital analysis of drill cutting samples and white light and UV light photography of conventional cores and digital archival of the output data in software through a systematic process so that the core/cuttings data may be incorporated during study on prospect generation, regional geological studies, geo-modeling etc.

(viii) **Well Portfolio Optimizer (WPO):** The technology Advisory System provides a standardized and automated approach to rapidly screen and rank wells, utilizing a multi criteria decision making process. It would also identify well problems, recommend intervention jobs and predict production gains.

8.3 Gas Authority of India Ltd. (GAIL):

GAIL has emphasized on the following collaborative research efforts under the thrust areas of hydrogen production, pipeline integrity, and CO_2 capture, are being selected for pursuit in this financial year in collaboration with institutions like BITS, IITs, and CSIR labs etc.

8.3.1 Sustainable High-purity Hydrogen production: GAIL (India) Limited, in collaboration with BITS Pilani, Goa, is advancing research on sustainable high-purity hydrogen production using Chemical Looping Combustion (CLC) in a packed reactor. This innovative process utilizes a metal oxide-based oxygen carrier to facilitate combustion without direct contact between fuel and air, effectively producing CO_2-free hydrogen. By integrating CLC technology, the project aims to enhance hydrogen yield, process efficiency, and carbon capture, making it a viable solution for clean hydrogen production in India's energy transition strategy.

8.3.2 Corrosion studies:

8.3.2.1 TEG corrosion study: GAIL in collaboration with IIT Patna is conducting a study on internal corrosion in natural gas pipelines caused by the carryover of tri-ethylene glycol (TEG).

8.3.2.2 Impact of LPG quality parameters on pipeline corrosion: At IIP Dehradun, both experimental investigations and CFD (Computational Fluid Dynamics) simulations are being utilized to assess how various LPG impurities, such as moisture, sulphur compounds, and other contaminants, contribute to corrosion in steel pipelines.

8.3.2.3 Correlation study of Pig Residue Composition and P/L corrosion: The study at CECRI Karaikudi aims to establish a correlation between pig residue composition and quantity with the internal corrosion rate in natural gas and LPG pipelines. By analysing the chemical and physical composition of pig residues such as iron oxides, sulphides, carbonates, and hydrocarbon deposits researchers can determine the dominant corrosion mechanisms and assess the effectiveness of corrosion inhibitors.

8.3.2.4 Development of Sulphur-free Odorants: GAIL is in collaboration with IIT Madras,

is working on the development of sulphur-free odorants for natural gas to enhance safety while addressing environmental concerns.

8.3.2.5 Impact of Hydrogen Enriched Natural Gas (HENG) on domestic burners: GAIL in collaboration with CSIR-Indian Institute of Petroleum (IIP), Dehradun, is conducting a study on the impact of Hydrogen Enriched Natural Gas (HENG) on the thermal performance of domestic cooking burners. These findings will help optimize burner designs for safe and efficient operation with HENG, ensuring minimal modifications to existing appliances.

8.3.2.6 Development of 10 KW Natural gas-based membrane reformer for on-site production of fuel cell grade hydrogen (Phase-II): This project aims to advance hydrogen production technology by leveraging membrane reforming for high-purity hydrogen generation. In Phase-II, the project emphasizes catalyst performance enhancement, durability testing, and system integration for real-world deployment.

8.3.2.7 CO2 Removal from Natural Gas Turbine Flue Gas Stream: GAIL in collaboration with BITS Pilani, Hyderabad Campus is focusing on developing a scalable and energy-efficient CO_2 removal technology that is also moisture-resistant, making it ideal for natural gas turbine flue gas streams. The goal is to enhance the sustainability of gas-based power plants by creating an advanced system that operates effectively under real-world conditions.

8.3.3 Centre of Excellence in Oil, Gas and Energy (CoE-OGE): GAIL is actively engaged in multiple mission-mode research projects at the Centre of Excellence in Oil, Gas, and Energy (CoE-OGE) at IIT Bombay, a collaborative initiative established by all central Oil & Gas PSUs to drive industry-relevant R&D. This year, GAIL is spearheading four mission-mode projects focused on: produced water treatment, the study of ammonia-blended fuels, geochemical studies of the Barmer and Jaisalmer basins, and quantifying and modeling the impact of hydrogen permeation through pipeline steel weldments in collaboration with other PSUs.

8.3.4 R&D center: GAIL is in the process of setting up of a state-of-the-art R&D centre on 30 acres of institutional land at Sector 22, Sohna. GAIL Board has recently approved the purchase of this land from HSIIDC, reflecting our commitment to advancing research and development.

8.3.5 Patents: GAIL holds a total of 37 active patents (34 Indian + 3 foreign), reflecting its commitment to innovation in products, processes, and technologies. In FY 2024-25, GAIL has applied the following 2 nos. of patents:

- An edge device for real-time current signature analysis of variable speed induction motor drives for monitoring and diagnosis of faults.
- A Novel catalyst Conversion of CO_2 to poly-carbonate diols.

Additionally, GAIL has been granted the following 2 nos. of patents:

- A sensitive and rapid sensor for inflammable fuel gases utilizing metal oxide thin film based low cost sensor.
- Homogeneous catalyst and its use in preparing linear polyethylene.

8.3.6 R&D/Innovation expenditure in the last 3 years:

FY	R&D/Innovation expenditure (₹ in cr.)
2022-23	180.71
2023-24	250.20
2024-25	352

8.4 Indian Oil Corporation Limited (IOCL):

R&D supported the marketing needs of fuel and lube business groups, with more than 169 formulations, across different segments. R&D Lube group has received 58 OEM approvals. The in-house development of indigenous component-based Gasoline and Diesel Multifunctional Additive (GMFA & DMFA) has enabled the marketing of Premium fuels. This year, using the Premium GMFA formulation for LAC dosing in gasoline at IOC refineries, initial batch is flagged off from Panipat Refinery. The premium racing fuel STORM-X for use in Round 3 of the Indian National Car Racing Championship at the Madras International Circuit has been launched.

IOC R&D has earned revenue of ₹27.49 Cr & ₹19.15 Cr in FY 2023-24 & FY 2024-25 respectively as direct earnings in royalties, license fees, and service charges from commercialized technologies and products.

8.4.1 Besides significant notional benefit has accrued through following activities.

(i) In-house testing of fuels and lubes using extensive facilities as Climatic Chamber, emission labs, engine testing and field-testing labs, analytical division facilities, to test the efficacy and suitability of new lube, grease and fuel formulation.

(ii) Licensing DRA technology to a third party is anticipated to save ₹ 50 Cr over five years, with additional recurring royalties from sales to other companies.

(iii) R&D Centre on an average tests 4000-6000 samples per years that are collected by field force and sent for detailed evaluation.

(iv) Applied Metallurgy and Corrosion research groups regularly works with sister divisions to help them for failure analysis, residual life analysis and provide solution to predict and improving the life and availability of existing assets which has a definite economic benefit.

a) A 300 kTA Grassroot indDSK unit was commissioned at Paradip Refinery and successfully completed PGTR achieving guaranteed parameters, thus developing in-house capability to meet the need of low sulphur SKO to support pipeline transfers from PDR.

b) R&D jointly with Virdis chemicals successfully developed, patented and completed the commissioning as well as PGTR for Bongaigaon Refinery ISOM catalyst achieving guaranteed parameters – RON and Isomerate yield. With an annual domestic demand of around 125 MTPA, this success has potential to yield 4-5 Cr in royalty in times to come.

c) R&D is working closely with RHQ for operation of Catalyst Manufacturing Unit (CMU) installed at Panipat Refinery to manufacture in-house developed catalyst formulations. The first batch of the FCC ZSM-5 additive based on R&D in-house formulation was flagged off recently. CMU is planned to supply hydro-treating catalysts and FCC Catalysts/Additives to IOCL Refineries.

d) During 2024-25, using the existing arrangement with **M/s Sud-Chemie (I) Ltd** (SCIL), about 3820 MT of in-house developed catalyst/additives was supplied to Indian Refineries.

e) R&D developed INDScan® iPIG tools facilitated more than 4500 km of pipeline inspection in 2024-25 in comparison to last year figure of 2711 km.

f) Two in-house developed Nano additive products viz. Propane Plus© – a green fuel for industrial use and XtraBoost© - an advanced version of Auto Gas were also launched this year thus expanding the current basket of already established products as Xtra-Tej and Indane Nanocut.

g) Developed and field-tested NanoKoat-I® for superior corrosion protection, effective in coastal environments and compatible with various fuels.

h) Premium ASA is specifically designed Anti-static agent to prevent static electricity build-up by incorporating polar molecules that disperse electrical charges within the fuel, thus reducing the risk of static discharge during fuel transfer operations.

i) To strengthen EV lubricants portfolio; Servo Futura EV grease (for EV electric motor bearing) and Servo Futura EV Trans 75W-90 transmission oils for aftermarket consumption were launched.

j) Besides catering to captive needs, in-house developed XtraFlo® DRA has now become sought-after-product being supplied to other pipeline operators including HPCL, BPCL, and HMEL etc.

k) As a part of bio-technology initiatives, R&D developed Agri-Elite technology for producing premium quality manure/ Bio-fertilizer production, from CBG plant. The technology was validated in in-house farm field trial, GB Pant Agriculture University, Pantnagar on rice and M/s Manas Agro Industries & Infrastructure Ltd. (MAIIL), Nagpur finding it superior to commercial products.

l) A microbial blend StubVorous®, for in-situ decomposition of crop residue was developed & field trials were undertaken at Gorakhpur, Uttar Pradesh. After successfully demonstrating the StubVorous technology at 10-acre scale of real fields located in both Haryana and Punjab the work is now underway on further wide scale trials before adopting full scale commercialization of the product into the market.

m) The mechanical completion of 10 TPD 2G Ethanol Demo plant at Panipat Refinery is over and the facility is under final stage of commissioning thus paving the way to prove the claims of in-house developed 2G Ethanol technology with in-situ enzyme production.

n) IndianOil R&D has developed eCo2Sorb, an indigenous patented enzymatic amine carbon capture technology with relatively lower energy footprint for CO_2 capture from refinery off gases and usage for conversion to value added chemicals or EOR. Validation of the in-house developed technology has been done in the pilot plant. During the year, further efforts are underway for demonstration of technology in one of the large-scale Fertilizer plants which is now in final stages and initial results are quite promising.

o) On the hydrogen front, all fifteen fuel cell buses have been received from Tata Motors and being mobilized for trials on specified routes in Delhi-NCR, with few buses handed over to Indian Armed Forces and planned for running in Vadodara City. IndianOil R&D is in the process of setting up ~ 1 ton per day capacity pilot plants based on various hydrogen production technologies such as Oxy-steam biomass gasification-based hydrogen generation, Solar powered electrolyser-based hydrogen generation, Natural gas and bio-CNG reforming based hydrogen generation.

p) Commercial roll out of Surya Nutan solar cookstoves is initiated through empanelled vendors. IndianOil has also signed MOU and licensing agreement with M/s EKI Energy Services Ltd for leveraging carbon financing for promotion of Surya Nutan.

q) IndianOil R&D spearheads the Start-up funding scheme. Till now 42 startups have been selected and incubated achieving 86 IPRs exemplifying the impact of IndianOil's startup ecosystem. Major areas of funding/ support are artificial intelligence, robotics, societal relevance, pipeline surveillance & maintenance etc. Building on the success of the previous startup rounds,

IndianOil also completed a special Startup Round with the theme "Green Resolve - Amrit Kaal Adhyay in April 2024.

r) R&D's New Energy Campus is under construction and is scheduled to commence operation of a few research blocks in 2025.

s) R&D received many accolades in 2024 including the CII IP Award; Clarivate South Asia Innovation Award 2024; CHT awards for IV-IZOMaxCAT® and XtraFlo™ DRA; FICCI Chemicals & Petrochemicals Awards 2024 for eCO2Sorb technology and XtraFlo™; FIPI Award 2023 for eCO2Sorb and many others.

8.4.2 R&D Expenditure (₹ in Cr) in last 3 years:

Financial Year	R&D Expenditure (₹ in Crore)
2022-23	698.21
2023-24	946.14
2024-25	726.95

8.5 Bharat Petroleum Corporation Limited (BPCL):

Bharat Petroleum's Corporate Research & Development Centre (CRDC) at Greater Noida, Uttar Pradesh and Product & Application Development Centre (P&AD) at Mumbai are the two research divisions who are proactively involved in adding value to the businesses through research activities. As part of "Atmanirbhar Bharat", CRDC has developed various novel and niche products / processes and is aggressively working towards their commercialization.

8.5.1 Details of Advances are given below:

(i) Hydrogen Recovery: The BharatH2Sep membrane technology for hydrogen recovery from refinery off-gas was successfully field-tested, achieving hydrogen purity of 98-99 mol% with 75-80% recovery.

(ii) Hydrogen Refueling Stations: CRDC is establishing a Hydrogen Refueling Station (HRS) at Cochin International Airport Ltd (CIAL), placing orders for electrolyzer and dispensers. CRDC also submitted joint proposals for hydrogen refueling stations with Maruti Suzuki and ANERT.

(iii) High-Efficiency PNG Stove: The Bharat Hi-Star PNG stove achieved 74% thermal efficiency, which is 15-20% higher than the commercial burners. Technology licensing agreements were signed with manufacturers for commercial production. The PNG burner was rolled out at BPCL housing complex in Noida.

(iv) Super Absorbent Polymer (SAP): For setting up a 20 KTPA commercial SAP plant at KR, finalized PFDs and reviewed P&IDs. Trials with Glacial acrylic acid as feed for SAP production led to superior grade of SAP production. BPCL received "CHT Innovation Award" for the indigenously developed SAP technology.

(v) FCC Catalyst Technology: An innovative FCC catalyst, "BHARAT-BCA", was developed to upgrade clarified oil (CLO) into gasoline and was scaled up. A commercial trial was conducted at MR which showed 2% reduction in HCO+CLO and a 1.75% increase in gasoline yield.

(vi) Hydrogen Blending in Natural Gas Pipelines: CRDC in collaboration with CoEOGE IIT-Bombay, IOCL and GAIL is quantifying impact of hydrogen permeation through pipeline steel weldments with computational phase field modeling for safe and reliable blended hydrogen gas transport.

(vii) Bio-plastic Production: CRDC has developed compostable bioplastics derived from biorefinery waste/ by-product, offering a sustainable alternative to single-use plastics. These bioplastics are designed to reduce environmental impact. The material has been certified by CIPET, ensuring its compost-ability.

(viii) **Green Silica Production from Boiler ash**: CRDC has developed a process to produce green silica from biomass ash. Pilot trials of 500 kg batch have been completed. The green silica production technology is now being scaled up to a demonstration level at BPCL Bargarh biorefinery.

(ix) **Production of Enriched Fermented organic manure from CBG plant:** To enhance the nutritional value of fermented organic manure (FOM) from CBG plants, CRDC has developed Enriched FOM (EFOM) with improved nitrogen, phosphorus, and potassium (NPK) content. This EFOM is designed for effective agricultural application and mitigating FOM storage or disposal challenges.

(x) **Pilferage-Proof Sleeves for LPG:** Innovative security sleeves with track-and-trace features were developed to prevent LPG pilferage. QR code scanning features were improved based on user feedback.

(xi) **BPMARRK® and K Model®:** Approvals were obtained to provide services using K Model® and BPMARRK® software products. A web platform for BPMARRK was developed, and K Model® software was upgraded with new features. K Model was successfully used to address desalter operation issues at KR.

(xii) **Special grade LPG:** A specialized hydrocarbon mixture of LPG was developed for high-altitude conditions, with successful field trials conducted in Sikkim.

(xiii) **Green Initiatives:** A hybrid (solar+wind) pilot project with battery storage was initiated to power a retail outlet using Green energy. The trials have been successful. Further development is underway.

(xiv) **Renewable power from Ocean wave:** An MOU was signed with M/s Eco Wave Power, Israel during India Energy Week 2025, in the august presence of Petroleum Minister, Shri Hardeep Singh Puri, C&MD, Shri G. Krishnakumar and Director (Marketing), Shri Sukhmal Jain, to install a 100–300 kW pilot project at BPCL's Mumbai Oil Terminal. A small-scale working model on technology was displayed at the event.

(xv) **Bioethanol from Sorghum:** BPCL signed a MoU with the National Sugar Institute, Kanpur, during India Energy Week 2025, in the august presence of Petroleum Minister, Shri Hardeep Singh Puri, C&MD, Shri G. Krishnakumar and Director (Marketing), Shri Sukhmal Jain, to optimize sweet sorghum as Bioethanol feedstock.

(xvi) **Integrated Carbon capture and conversion technology:** BPCL, in collaboration with M/s UrjanovaC, showcased an innovative CO_2 capture and utilization (CCU) technology which offers a dual solution for capturing CO_2 and converting it into calcium carbonate ($CaCO_3$) at ambient conditions. This aqua-based approach achieves 10-15% higher CO_2 capture efficiency than traditional amine solutions, eliminating the need for CO_2 storage and compression issues.

(xvii) **Patents and Publications:** CRDC filed six patents throughout the year, including methods for organic acid production, sugar production from biomass, pilferage-proof LPG sleeves, and solvent for carbon capture. A total of 16 patents have been granted.

(xviii) **Environmentally Acceptable Hydraulic oil:** Biodegradable Hydraulic oil developed for lubrication of hydraulic systems used in environmentally sensitive areas. This product is ideal for construction, mining, forestry, agriculture, and marine industries. Also meets the growing demand for environmentally acceptable hydraulic fluids, reducing risks of leakage or spillage while maintaining operational efficiency.

(xix) High-performance Neat cutting oil: Developed high-performance neat cutting oil with superior quality hydro treated base oils for Gear Hobbing application which ensures superior lubrication, extended tool life, excellent surface finish and low evaporation characteristics.

(xx) Engine oils for export market: Developed diesel engine oil for heavy duty commercial vehicles having potential for extended service life and engine oil for scooters with better fuel economy benefit. Both the products are API licensed as per mandatory requirement in that export market.

(xxi) Engine oil for new generation scooters: Developed synthetic engine oil for new generation BS VI scooters having potential to provide better fuel economy &enhanced catalyst protection. This oil has better flow ability at low temperatures and ensures quick engine start.

(xxii) Engine oil for OEM: Developed engine oil for export models of one leading two & three-wheeler manufacturer in India. This oil is extensively evaluated at OEM's R&D and field tested in three different countries.

(xxiii) Tractor Fluids: Developed Universal Tractor Transmission Oil (UTTO) for OEM factory fill applications, providing smooth power transmission, enhanced wear protection, and improved clutch performance.

(xxiv) Transmission and driveline lubricants: Developed high-performance, long-drain transmission and driveline lubricants for off-highway OEMs, passenger cars and commercial vehicles enhancing durability and efficiency under severe load and temperature conditions.

(xxv) High-Performance insulating oil: Developed high performance inhibited insulating oil for heavy duty transformers used in generation, transmission and railways transformers.

(xxvi) These advancements demonstrate BPCL's commitment to innovation, sustainability, and supporting various BPCL business units through cutting-edge technology and research.

8.5.2 R&D Expenditure by the BPCL:

FY	R&D Expenditure (INR crore)
2022-23	71.68
2023-24	95.87
2024-25	118.51

8.6 Hindustan Petroleum Corporation Limited (HPCL):

Hindustan Petroleum Green Research & Development Centre (HPGRDC) has been set up with a core purpose to make energy and chemicals accessible to everyone through innovation. The research centre is provided with state-of-the-art infrastructure facilities comprising energy efficient green buildings with built-up area of 5.6 lakh square feet. R&D centre has 20 laboratories established under Phase-I and Phase-II, which pertains to research areas viz. FCC, Hydro-processing, Catalysis, Bio-process, Crude Evaluation & Fuels Research, Standard Testing, Analytical & Chemical synthesis, Process Modelling & Simulation, Nano Technology, Petrochemicals & polymers, Centre of Excellence Lubes, Corrosion studies, Novel Separations, Resid Upgradation, Engine, Battery research & Digital lab. In order to provide advanced technical support and provide technological solutions to refineries, a dedicated cell was set-up viz. Global Technology Centre. Additionally, HPGRDC is setting up new labs viz. Hydrogen, Solar Energy, Bitumen & Pavement research, Water and Combustion.

HPGRDC continues to demonstrate its commitment to innovation, with a cumulative filing of 661 patents in India and abroad, and grant of 246 patents.

In the FY 2024-25, 114 new patents were filed, and 36 patents were granted, reinforcing HPGRDC's dedication to technological advancement.

HPGRDC received 3 prestigious awards for its innovations & research excellence viz. Innovation Award in the category of 'Best Innovation in R&D Institute' for "HP-AEME Technology: A First of its Kind Technology for Efficient Green Hydrogen Production", FIPI Award 2023-24 in the category of "Innovator of the Year-Team" for "HP-COSOL Process: Process for improving lube raffinate yield" and Rasayan Udyog Maharatna award during the 100 Years of Chemistry Celebrations by Indian Chemical Society held in Mumbai on 28thJan' 25.

HPGRDC's contributions to technology & process chemicals/catalysts development bolsters indigenization efforts towards 'Atmanirbhar Bharat' and reduces dependency on foreign licensors.

8.6.1 During FY 2024-25, HPGRDC's major achievements are:

(i) In-house developed HP-DAK technology (52 KTA) successfully commissioned at Mumbai Refinery of HPCL, producing low aromatic solvents having multiple applications. The products from this plant will replace the imported products making it an Atmanirbhar solution for Indian Industry.

(ii) Memorandum of Agreement (MoA) signed with EIL for commercialization of in-house developed HP-PSA technology. Under this partnership, HPCL will be the 'Technology Licensor' and EIL will be the exclusive 'Technology & Engineering Partner' for engineering, marketing and commercialization of the technology in India.

(iii) Commissioning of HP-VRU (Vapor Recovery Unit) technology at Hassan terminal. This unit is designed to efficiently capture and recover volatile hydrocarbons from exhaust gases of tankers and wagons, enhancing both operational efficiency and environmental sustainability.

(iv) Installation of HP-DG Clean (PM capture) unit at HPCL's Devanagonthi Terminal, Bangalore which removes Particulate Matter from the exhaust gases of Diesel Generators in line with the National Green Tribunal (NGT) guidelines.

(v) Collaboration with University of Birmingham for development of Hydrogen Dispensing System upto 700 bar.

(vi) HPCL has tied-up with Volvo for demonstration of Green Hydrogen for transportation sector in line with RFP call from MNRE. Letter of Intent has been received from ARAI, Pune.

(vii) Setting-up of two new scale-up facilities.

(viii) Catalyst, Additives and Adsorbents Scale-up (CAAS) facility.

(ix) Product scale up facility (PSU), for enabling R&D capabilities w.r.t scale-up of R&D developed catalysts /adsorbents/ additives/ chemicals and quicker demonstration/ commercialization.

(x) Successful demonstration of in-house developed HP-DUCER-NHT (chemical for reducing pressure drop) in other refineries like HMEL and MRPL, which helped in achieving significant reactor pressure reduction and sustaining unit operation at desired feed rate.

(xi) In-house designed Low pressure drop SprayMax FCC feed nozzles were commissioned in Mumbai Refinery.

(xii) India's first extensive in-house evaluation of E27 fuel in two-wheelers and passenger cars covering a cumulative mileage accumulation of over 1,30,000 km with intermittent performance evaluation were completed by HPGRDC.

(xiii) Collaborative research projects undertaken with various institutes of repute like IIP, ARCI, IISC, IITs in new energy areas like CO_2 conversion, biomass gasification etc.

(xiv) During the same period, HPGRDC has commercially demonstrated 20 new products/ Technologies (taking its tally of Technologies & Products demonstration to

83), the details of which are indicated below:

a) **HP-NanOKoool (Nano Additized Solar Reflectance Coating):** HP-NanOKoool is a nanocomposite solar reflectance coating. This innovative and cost-effective formulation combines nanoparticles with water-based acrylic paint, resulting in superior performance compared to commercial alternatives. The coating shows a solar reflectivity index (SRI) of 99%, significantly enhancing light reflection. Demonstrations of HP-NanOKoool have been conducted at HPGRDC and HRRL.

b) **HP-DRA (Drag Reducing Agent for White oil Multiproduct pipelines):** HP-DRA was successfully developed for petroleum finished products to maximize the reduction in drag by altering the flow dynamics such as shear stability and turbulence reduction within pipelines. HP-DRA formulation was scaled up and successfully demonstrated at HPCL's Visakha-Vijayawada-Secunderabad Pipeline.

c) **HP-13x31 (Zeolite based Adsorbent for Nitrogen Adsorption):** Zeolite-13X is used for adsorption process which has higher CO_2 adsorption capacity. This zeolite is useful for natural gas sweetening, oxygen gas plant, cryogenic nitrogen plant etc.

d) **HP-TIC (Thermal Insulation Coating):** HPGRDC has developed thermal insulation coating to mitigate corrosion under insulation. This substitutes the conventional insulation system up to line temperatures <120°C and has excellent adhesion strength. Novel product application requires minimal surface preparation.

e) **HP-3DPP (3D printable polypropylene):** It offers excellent interlayer adhesion, minimal warpage, and twice the mechanical strength of global alternatives. Supporting "Make-in-India" and Atmanirbhar Bharat, this Industry 4.0-supportive innovation enhances self-sufficiency in medical prosthetics, automotive parts, and packaging applications, reinforcing India's leadership in additive manufacturing and advanced polymer solutions.

f) **PCR HDPE:** Post Consumer Recycling of HDPE.

g) **Aqua Scale Out:** Descaling chemical formulation for removing existing calcium scales in cooling water systems.

h) **HP PFT:** Polymer Fuel Tanks.

i) **Nano ZSM-5:** Olefin maximising Additive in FCC unit.

j) **SEU Neutmax:** Neutralizing amine for Solvent extraction units.

k) **Antifoam:** Antifoam for Amine treating units.

l) **HP DLA FLO:** Cost effective novel version of DLA with better flow properties.

m) **HP CIC:** Cold Insulation Coating.

n) **HP BioP:** Bio-compostable polymer composite for food grade applications.

o) **HP Bio Film:** Bio Compostable Film.

p) **Fused 3D:** Polypropylene pellets for 3D printing.

q) **VisABit V2.0:** Viscosity improving additive "HP VisABit" to upgrade short residues/ VG10 to VG 30 bitumen and VG 30 to VG 40 / VG 40 Super Bitumen.

r) **HP COP:** CO combustion promoter additive for FCC Unit.

s) **HP Diacid:** Multipurpose additive for lubricants.

t) **HP Nanolite:** Nano Additized light coloured grease-TISONA N2.

8.6.2 Achievement during the FY 2024-25: Following has been achieved w.r.t catalyst and additives development for usage in refinery and petrochemical processes:

a) HP-CATREF (Catalyst for CCR) was successfully scaled-up and field trial initiated at HPCL Visakh refinery CCR unit.

b) HP-COP (CO combustion promoter additive for FCC Unit) was successfully scale-up for demonstration at HPCL FCC units.

c) HP-Nanopro (Nano ZSM-5) a First-of-kind material has been successfully scaled-up.

d) HP-PMA (ZSM-5 additive for higher propylene) was successfully scaled-up for taking field trial in HPCL FCC unit.

e) HP-DAK catalyst (catalyst for DAK Technology) was successfully scaled-up for use in in-house developed HP_DAK unit at Mumbai refinery.

f) HP-NHT (Naphtha Hydrotreating) catalyst successfully scaled-up.

g) HP-DHT (Diesel Hydrotreating) catalyst successfully scaled-up and pilot scale testing completed. Further, scale-up is in progress.

h) HP-AMT (Advanced Matrix Technology FCC Catalyst) - Indigenous efforts undertaken for manufacturing of in-house developed HP-AMT FCC Catalyst.

i) 15MT scale-up of in-house developed DHT Catalyst at CAAS Facility for SEU-II at MR completed.

- During the period, Centre of Excellence-Lubes Research lab has developed 21 novel Lube products as per market requirements namely-Die Casting Lubricant for OEM Honda, Premium Shock Absorber Oil-LV for OEM Tenneco, Premium Shock Absorber Oil-HDBT for OEM Tenneco, GMS- used as a lubricant in Defence teleprinters T-90 Tanks, Smerch Vehicles and similar equipment, Oil Mineral Hydraulic Buffer, Grease-Protective PX 6, Oil OX 13, RUSTOP HP 50, Premium Shock Absorber Oil for Gabriel- TLV A Ver 2.0, Premium Shock Absorber Oil for Gabriel-TLV B Ver 2.0, Copper Drawing Oil Ver 2.0, HP TISONA N2, Conductor Grease against OCG 750, HP NEOSYNTH FUTUR-X 0W16, HP RACER 10W30 for TVS Motors, HP RACER 20W50 for TVS Motors, Low Calcium Sulphonate Complex Grease-Limaplex HTX 3 N, HP Aluminum Hot Rolling Metal Working Fluid, HP Oil Performance Enhancer (OPEn), HP Conkote Super -Conveyor Chain Lubricant & HP Sugar Mill Grease for Heavy Loads with Calcium Sulphonate Chemistry.
- Establishing Global Technology Centre (GTC) at HPGRDC with high level of technical & trouble shooting expertise with long term objective of technological advancement in refinery and petrochemical sector.
- Following technologies have been developed by HPGRDC and engineering is in progress towards setting-up demonstration/commercial unit:

a) Distillate Hydro-treater Technology for HPCL Visakh Refinery.

b) HP-JeTreat Plant at HPCL Mumbai Refinery for production of Aviation Turbine Fuel (ATF) from straight run Kerosene.

c) CBG plant (Kannauj and Bareilly) for processing 80 TPD feed rice straw using in-house HP-RAMP technology.

d) HP-HCNG Technology a First-of-the-kind technology for simultaneous production of HCNG and value-added carbon product.

e) HP-TriJet Technology, which converts Used Cooking Oil into Sustainable Aviation Fuel (SAF) and green diesel.

f) Eluru Biorefinery which consists of 150 TPD rice straw feed based CBG Plant using HP RAMP Technology & rice straw based 3 KLPD of 2G Ethanol plant using HP ASAP Technology.

g) Residue hydro cracking (HP-Slurry+) technology for 120 KTPA capacity.

8.6.3 R&D Expenditure in last 3 years:

FY	R&D Expenditure (₹ in Crore)
2022-23	320
2023-24	352
2024-25	391

8.7 Mangalore Refinery and Petrochemicals Limited (MRPL):

MRPL's innovation centre spearheads the R&D activities, focusing on following areas:

(i) Artificial Intelligence (AI) & Machine

Learning (ML) for process efficiency and reliability improvement.

(ii) Valorization to refinery streams and molecules,

(iii) Net-Zero Technologies,

(iv) Process Integration and

(v) Topics of Strategic and/or Economic Merit.

R&Ds on said focal areas are carried out through in-house and/or collaborative projects with other institutions. MRPL has undertaken collaborative research projects with premier institutions like CSIR-NCL, CSIR-IICT, IIT Guwahati, NITK-Surathkal etc. As of March 2025, MRPL has filed a total of 29 patents, out of which 12 have been already granted and rest are under examination.

MRPL Innovation Centre received the "Special Innovation Award" from the Ministry of Petroleum and Natural Gas for the year 2024–25. In January 2025, Executive Committee (EC) of CHT has approved a ₹6.67 crore OIDB grant-in-aid for setting up a PET depolymerization pilot-cum-demonstration plant at MRPL. This funding will support the development and scale-up of MRPL's innovative PET depolymerization technology, facilitating efficient monomer recovery and advancing sustainable plastic recycling.

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8.7.1 Artificial Intelligence (AI) / Machine Learning (ML) Innovations:

(i) Real Time Optimization of Power and Steam Generation in Captive Power Plant: Power or steam demand in the refinery or petrochemical complex is dynamic and often STGs/GTGs respond to the load variations at different capacities to generate the said utilities. A novel algorithm which combines first principles with AI/ML models so as to develop a digital twin of each machine. These digital twins are leveraged by the optimizer to churn out the best combination of steam and power loading. Web and Mobile interface have been developed for real time advisory. The application computes the optimal loading pattern among the grid, STGs and PRDS for steam and power generation in a real time basis. This application has been deployed for MRPL Phase-1/2 Captive power plant in February 2021 and the estimated fuel oil savings is 4350 - 8760 tons per annum which translates to 0.22 to 0.44 MBN reduction. The monetary benefit to MRPL by using this application is between ₹35 and ₹55 crore depending on the marine fuel oil price.

(ii) Real Time Optimization of Polypropylene Unit: Real time predictor model developed is integrated in PPU's DCS and the whole system from the back-end AI/ML model till frond end integration to DCS has been developed and carried out in-house. The estimated financial benefits due to minimization of off-spec/non-prime PPU product formation along with lab sample reduction amounts to a sum of ₹10-15 crore per annum.

(iii) Real Time Optimization for Petro-Fluidized Catalytic Cracker (PFCC) Unit: MRPL Innovation Centre for process units' efficiency improvement has developed PFCC RTO in FY 2023-24 and has been in closed loop control since July 2024. It is arguably one of the first AI/ML based apps known to directly control a large commercial unit. R&D was carried out to build yield predictive models based on First-Principles and ML hybrid algorithms, leveraging which an RTO app was built to predict economic optimum yield pattern and corresponding operating parameters

set point for a given set of market prices of products.

(iv) Isobutyl Benzene (IBB) Process Technology: MRPL is setting up an IBB demo cum pilot plant. IBB has various applications in pharmaceuticals; one such application is to manufacture painkillers like ibuprofen. For developing the proof of concept (POC), MRPL collaborated with CSIR-NCL and developed an in-house process to manufacture IBB. MRPL's unique approach lies in utilizing the captive feedstocks, so that the API cost is low. The specialty of this process lies in high selectivity and conversion. The overall cost of manufacturing is expected to be lower than the existing technologies available. The demo plant is scheduled to be commissioned in Q3 2025.

(v) PET Depolymerisation Process Technology & Plastic Circularity: A collaborative research work with CSIR-NCL commenced on May 2023, focused on the depolymerization and upcycling of various plastic wastes. The proof-of-concept R&D for Polyethylene terephthalate (PET, a plastic used mainly in mineral water bottles) depolymeriz

(vi) A patent for PET depolymerization was filed. This innovative approach focuses on the recovery of constituent monomers from plastics, marking a significant advancement in the field. Two other patents for mixed plastic waste and mixed fabric waste depolymerization are being filed. PET pilot cum demo plant is scheduled to be commissioned in December 2025.

(vii) Deodoring Unit – Technology for Reducing Odor from Odorous Vent Gases: To address the odor from the off-gas stream, a proof-of-concept (POC) investigation was initiated in 2018. After successfully completing the POC, a mini pilot-scale study was carried out to gain a thorough understanding of the reaction kinetics. In the fiscal year 2022-23, a demonstration-level reactor was designed, achieving Technology Readiness Level 6 (TRL6), and a detailed study was conducted. On September 13, 2023, the patent was granted by the Indian Patent Office. Utilizing the in-house developed photo-catalytic odor reduction technology, a Deodorizing Unit (DeoU) was designed for deployment in the ETP WAO. The unit was successfully commissioned on October 31, 2023, and is currently operating efficiently, achieving an odor reduction efficiency of 85% to 90%.

(viii) Active Pharma Ingredients (API) process technologies: Under the refinery molecule valorization initiative, MRPL R&D has successfully developed POC R&D and filed about 4 patents for manufacturing few Active Pharmaceutical Ingredient (API) from captive refinery streams. This breakthrough will enhance MRPL's competitiveness and diversification into pharmaceutical sector. This initiative underscores MRPL's commitment to transforming refinery-derived molecules into high-value products, strengthening its position in specialty chemicals and pharmaceuticals.

8.7.2 Major Achievements:

(i) MRPL Innovation Center received recognition form Department of Scientific and Industrial Research (DSIR), Ministry of Science and technology in May 2022.

(ii) MRPL R&D efforts won awards under "Best Innovation Awards" category for consecutive three years in row from Ministry of Petroleum and Natural Gas, Govt. of India for FYs 2021-22, 2022-23 and 2023-24 as below:

a) FY-2021-22: Dynamic Optimization of Polypropylene Reactor through real time prediction of Melt Flow Index and Xylene Solubility in Polypropylene Reactors and ii. Real Time Optimization of Power and Steam Generation in Captive Power Plant.

b) FY-2022-23: Towards Net Zero: A Novel Energy-Efficient Crude Distillation Process with Reduced Environmental Impact.

c) **FY-2023-24:** First-Principles & Artificial Intelligence Hybrid Applications for Process Efficiency and Reliability Improvement.

d) In January 2025, Executive Committee (EC) of CHT has approved a ₹6.67 crore OIDB grant-in-aid for setting up a PET depolymerization pilot-cum-demonstration plant at MRPL.

e) MRPL Innovation center filed a total of 29 patents till date. Out of these 29 patents, 12 have already been successfully granted. The remaining patents are currently in various stages of the patent grant process.

8.7.3 Major on-going R&D activities

(i) Setting up of major demo/pilot plant for the following process:

- Isobutyl Benzene (IBB) demo plant
- Polyethylene Terephthalate (PET) depolymerisation pilot cum demo plant
- Gas phase polymerization pilot plant

(ii) Process technology synthesis for mixed layer plastics and mixed fabric waste depolymerization.

(iii) AI/ML-First Principle hybrid RTO applications for process efficiency improvement.

(iv) AI/ML-First Principle hybrid application for reliability improvement of rotary and static equipment.

8.7.4 R&D Expenditure:

Year	Expenditure (₹ Crore)
2022-23	0.57
2023-24	5.11
2024-25	35.95

8.8 Chennai Petroleum Corporation Limited (CPCL):

In line with CPCL's corporate objective to remain in the technological forefront in all aspects of the company's operation, CPCL R&D centre was established in July 1984. A modest beginning was made in the year 1988 by establishing facilities such as TBP distillation unit, FCC pilot plant and a petroleum testing laboratory. Subsequently, various pilot plants and sophisticated petroleum testing and analytical laboratories were set up for R&D Research activities.

8.8.1 Highlights of R&D Activities during the recent years:

(i) Signed MoU with Indian Institute of Technology Madras (IITM), Chennai and Rajiv Gandhi institute of Petroleum Technology (RGIPT) Amethi, UP to conduct collaborative research projects.

(ii) Created CPCL-ITM Research Cell (CIRC) to provide solutions to refinery problems via collaborative research projects.

(iii) Founding Member of ITM Energy Consortium and actively participating in their activities.

(iv) Engaged in a Collaborative project with IITM on "Green Hydrogen generation from Reverse Osmosis (RO) Reject through Alkaline Water Electrolysis".

(v) Engaged in a Collaborative project with RGIPT on "Development of Corrosion Inhibitor Formulation for mitigating Corrosion induced by Ethanol Bended Petrol (EBP).

(vi) Engaged in a Collaborative project with RGIPT on "Production of Nanocellulose from Rice Straw.

(vii) Developed a process for quality improvement of Group-I LOBS.

(viii) Carried out research work for production of ATF, MTO and JP5 from DHDT.

(ix) Carried out research work for the commercial production of:

a) Missile fuel for DRDO.

b) Rocket propellant for ISRO.

c) Mineral Turpentine Oil.

d) Microcrystalline wax.

e) Pharma Grade Hexane.

Studies carried out during the recent years:

(i) Crude Assay Generation for various crude processed in the Refinery

(ii) Evaluation and Selection of FCC catalyst/ additives.

(iii) Study on the determination of lube/wax potential for various crudes.

(iv) Study on utilization of HCGO (Heavy Coker Gas Oil) as additional feedstock in.

(v) FCCU Study on determining the suitability of FCCU GDS unit for Heavy Naphtha treating.

(vi) Study on hydrotreating of Deasphalted Oil (DAO) to improve the yield of BNHVI grade Lube Oil Base Stocks (LOBS).

(vii) Study on production of Group-II LOBS from UCO.

(viii) Extensive study on the production of different grades of Rubber Process Oil (RPO).

Intellectual Property:

(i) Eight patents have been granted to CPCL R&D.

(ii) One patents were filed in FY 2024-25.

8.8.2 R&D Expenditure:

Year	Total (in Lakh)
2021-22	715
2022-23	972
2023-24	1072
2024-25	1179

8.9 Numaligarh Refinery Limited (NRL):

NRL has been pursuing limited R&D activities through partnership with academia and research organizations to provide technological inputs to meet corporate objectives of technical excellence in all aspects of refinery operations develop new value-added products and upgrade the quality of the existing petroleum products. Few of such partnerships and collaborations are mentioned below:

8.9.1 NRL Centre of Excellence for developing Sustainable Material at IIT Guwahati

(i) Sustainable Material

a) Developing Eco packaging material: A project titled "Development of Biodegradable Plastics from Oil and Bio-Refinery Streams" has been undertaken to convert "Furfural" a bio-refinery by product to Polycaprolactone which can be moulded into various shapes for producing eco-packaging materials.

b) Circular Economy - Developing Green Activated Carbon: A project is taken up for Design and Development of a Demonstration Plant for production of Marketable Grade Green Activated Carbon from Bamboo Dust. This project aims to develop an industrial-scale demonstration plant for converting 5 MT/batch waste bamboo dust to green activated carbon.

(ii) Carbon Neutrality: An R&D project titled "H_2 Separation and CO_2 Capture from PSA Off Gas: Technology Development and Demonstration for NRL Refinery" has been taken up with the objective to develop integrated processes using Liquid Piston Compression Technology, Metal Hydrate Technology and Membrane technology. This project aims Hydrogen separation and CO_2 capture, contributing to India's clean energy roadmap and NRL's sustainability objectives.

(iii) Business Process Automation: A Project titled "AI Based Procurement RFx Automation for Numaligarh Refinery Limited" to be carried out in collaboration with Indian Institute of Technology Guwahati (IITG). This project aims to automate and optimize tendering and procurement processes, addressing critical business needs while ensuring compliance with Government of India procurement regulations.

8.9.2 NRL NEIST R&D Centre at Jorhat, Assam: Research projects undertaken at CSIR-NEIST:

(i) Development of Sustainable Nanocomposite Membrane for CO_2-capture from PSA off gas.

(ii) Development of Hybrid Nano-catalyst for green Hydrogen Production for water electrolysis.

(iii) Production of high-quality graphene like nanomaterials from petroleum waste of North Eastern Region and their fictionalization.

(iv) Development of lignocellulolytic multienzyme production process for bamboo based biorefinery.

8.9.3 Initiatives on Emission Reduction + Circularity: A collaboration agreement was executed on 29th December, 2022 between NRL and EIL to jointly commercialize EIL's patent on "Production of Aqueous Ammonia from Ammonia rich Sour Gases" and demonstrate at NRL site. Proposed demonstrating unit for Production of aqueous ammonia from ammonia-rich sour gases will be designed to produce 10 TPD of aqueous ammonia (max 16 TPD) and will be located near new SRB under NREP. Upon successful demonstration, this technology is expected to significantly reduce NOx emissions and meet the aqueous ammonia requirements of Assam Bio Ethanol Private Limited, thereby contributing to environmental sustainability and circular resource utilization.

8.9.4 Renewable Energy-Wind: NRL has entered into research collaboration with Assam Kaziranga University and the Institute of Frontier Science and Application to conduct a study titled "Assessment of Wind Energy Potential in Northeast India." The study involves multi-level and multi-site high-frequency observation and analysis of wind characteristics in riverine environments at turbine level. The primary objective is to generate bankable wind resource data to evaluate the feasibility of setting up wind energy projects in the region. As part of the initiative, two LIDAR machines have been deployed since January 2024 at various riverine locations in the Brahmaputra Valley to collect wind velocity and related environmental data.

8.9.5 Research Collaboration for waste to wealth: NRL has entered into framework collaboration with CSIR NEIST, Jorhat for carrying out process improvement, valorisation of its waste products etc. As part of this collaboration, a project titled "Removal of Phenol from sour & strip water, it's re-use and value addition" has been taken up and a pilot plant is being set up with the aim to reduce water footprint and to produce value added chemicals. Under this project, Lab scale experiments with 50 Litre batch size was conducted successfully by designing and developing hollow fibre membrane module. A pilot demonstration facility of 1 m^3/hr size is under development for installing at NRL site.

8.9.6 Research collaboration for Refinery Waste Management: NRL has engaged St. Edmund's College, Shillong for research study on Utilization of cyanobacteria in the bioremediation of crude oil, hydrocarbon storage tank bottom sludge, and ETP hydrocarbon sludge and its environmental biotechnology implications. A major accomplishment of the project is the reduction of Total Petroleum Hydrocarbon (TPH) content (ranging from C11 to C48) in treated culture samples containing crude oil, sludge, and ETP sludge to nearly zero after the completion of a 28-day cycle.

8.9.7 R&D Activities with Rajiv Gandhi Institute of Petroleum Technology (RGIPT), Amethi: NRL, in its effort to expand research activities, signed Memorandum of Agreement (MoA) on 13.11.2024 with Rajiv Gandhi Institute for Petroleum Technology, Amethi for carrying out following R&D Projects.

(i) Electrocatalytic conversion of H_2S and Ammonia in Sour Water to Sulphur, H_2 and Ammonium Sulphate.

(ii) Methanol-Diesel blending to achieve stable mixtures.

(iii) Lignin based Bio-adhesive development and its process optimization at pilot scale for demonstration.

(iv) Electrochemical Conversion of Ethanol-Water Mixture to Acetic Acid and Hydrogen.

(v) Development of Corrosion Inhibitor Formulations for Mitigating the Corrosion caused by Methanol Blended Diesel.

8.9.8 R&D Expenditures.

Year	Expenditure (₹ Crore)
2021-22	715
2022-23	2.09
2023-24	3.08
2024-25	26.71

8.10 Balmer Lawrie Research & Development:

Balmer Lawrie have two R&D centers known as Application Research Development (ARL) dedicated to New Product Developments of SBU: Greases & Lubricants and other one is Product development Centre (PDC) for SBU: Chemicals. Both these R&D centers are recognized by the Department of Scientific and Industrial Research (DSIR).

8.10.1 Applications Research Laboratory (ARL), Kolkata: The modernized R&D centre is well equipped with state-of-the-art test rigs / instruments and backed by highly qualified Scientists / Engineers. R&D efforts are being directed towards maintaining technological and cost leadership which leads to customer satisfaction through:

(i) Continuous Upgradation of the products & processes in tune with technological advancement to reduce cost of production and to deliver enhanced product performance.

(ii) Development of new high performance and speciality greases & lubricants with a thrust on lubricants for the automotive sector.

(iii) Emphasis on products specific to both industrial and Automotive OEMs.

(iv) Thrust on environmentally friendly & bio-degradable for future market requirements.

8.10.2 R&D Activities related to Greases & Lubricants in FY 2024-25

- Introduction of new types of greases like Greases for very high load applications like in dumpers, greases for low relaxation pre-stressed concrete applications (LRPC) with water resistance and corrosion prevention properties, Greases used in Overhead conductors, Automobile greases for long run, greases for neck roll bearing in cold roll steel mills, sulphonate grease for tractors in high water ingress applications, Replacement of high viscosity BS150 base oil with better SSI polymers and development of PU greases from preformed polymers.
- R&D projects were directed towards development of high performance grease for suspension bearings and synthetic gear case oil for Indian Railway for both diesel & electrical locomotives, High performance grease for overhead aluminium electrical conductors, Fire resistant grease for steel plants, long life multipurpose grease for automotive sectors, long life high temperature wheel bearing grease for Auto OEM, heavy duty diesel engine oil (CI4 Plus) & CK4 for auto OEM, 'Keep Clean' Hydraulic Oil for industrial OEM, high performance cutting oils, high performance oils for aluminium wire drawing and machining operations and rust preventive oils for Steel Tubes & Pipes, high performance cold rolling oils for mild and stainless steel, Bio-degradable engine oil and transmission oil for automotive sectors, development of infrastructure for in-house ester synthesis.

8.10.3 Product Development Centre: For Research and Development on chemicals related to Leather, Textiles, Agro and Paper chemicals, the Product Development Centre at Manali, Chennai has a team of qualified researchers who are constantly working on developing new age of chemicals in the above chosen areas. This centre has strong association with all leading technical institutes

like CLRI, Chennai, IICT, Hyderabad, IISC, Bengaluru, ICT Mumbai, IISER, Pune and IIT Chennai. A total of seven Indian patents for products have been filed from this centre. Balmer Lawrie obtained ZDHC MRSL Version 3.1 Level 3.0 certifications for 219 products. Also, GOTS certification Version 7.0 received for our textile chemicals.

Technologies developed over these years from PDC are

(i) Photo sulfo-chlorination.

(ii) Sulphitation of vegetable oils.

(iii) Sulfosuccination of fatty alcohol and fatty alcohol ethoxylates.

(iv) Mineral synthetic tanning agents.

(v) Hybrid sulphitation of vegetable oils and fatty alcohols.

(vi) Ranges of finishing chemicals.

(vii) Replacement syntan/Resin syntans/ Formaldehyde free syntans.

(viii) Development of paper binder by random emulsion copolymerization process for Paper/Packaging boards.

(ix) Development of Basic Chromium Sulphate process by utilizing vent off SO_2 from sulphochlorination reactions

BLC has introduced good number of high-performance fatliquors with indigenous technologies and these products are well accepted in the market adding volume to the business. They have done a lot of initiatives and got implemented in process improvements. One of the approaches in association with ICT, Mumbai for improving the % efficiency of SO_2 gas utilization in sulphochlorination reactions at plant level has been recognized and awarded by Indian Chemical Council. We are focusing on adding more products finishing range of leather chemicals.

8.10.4 Current activities

a. Development of high performance fatliquors.

b. Development of liquid synthetic agents.

c. Development of series of finishing chemicals.

d. Development of textile auxiliaries.

e. Development of topcoat acrylic binder for paper industry.

f. Collaborative study and development of speciality chemicals for textile market with M/s Indian Institute of Technology, Chennai.

g. Advisory consultancy with M/s Indian Institute of Science Education & Research, Pune on engineering developments for the SBU.

8.10.5 Expenditure on R&D activities

Financial Year	Revenue Expenditure (in ₹ Lakhs)	Capital Expenditure (in ₹ Lakhs)
2021-22	771.59	19.13
2022-23	729.57	54.76
2023-24	793.43	42.42
2024-25	867.94	33.28

8.11 Engineers India Limited (EIL):

The R&D Centre at Gurgaon has been a national facility for equipment-oriented research and to facilitate absorption and adaptation of technologies. In addition, to carry out collaborative research, to develop scale up methodology and to provide hardware testing & diagnostic services were the key intents. These efforts have resulted in development of more than 40 process technologies along with important hardware designs.

8.11.1 Technology Commercialization efforts: Continued efforts for Commercialization of various in-house developed technologies / technologies developed in collaboration are carried out. Some of these include:

(i) Supply of know-how/license, Basic Engineering Design Package (BEDP), proprietary items and other related services for LPGTU at BPCL Bina.

(ii) BEDP for Super Absorbent Polymer (SAP) production plant at Kochi Refinery.

(iii) Refurbishment/ Replacement of Proprietary Contactors for Coker LPG Treating Unit at MRPL.

(iv) Joint Development of scale-up know-how /process technology for 2600 TPD HiGee Deaeration plat at Kochi Refinery.

(v) Dynamic Simulation of Steam Network of Ammonia Unit (Train-I) Stanch Fertilizers.

(vi) Dynamic Simulation Study for Flare Load Estimation from Ethylene Cracker Unit BPCL, Bina Refinery.

(vii) CFD study of crude heater (11-B-01) at RR III for ADNOC refinery, Abu Dhabi.

(viii) CFD Analysis for Failure of Internals of Peak LP Flare Water Seal Drum (952-VV-102)-HMEL Bhatinda.

(ix) CFD analysis of the hot air duct distribution to BPCL Kochi refinery DHDS Burners.

(x) Emergency Sphere Vibration Study using CFD/FEM, ADNOC.

(xi) Flow distribution in Slug Catcher using CFD, KNPC.

(xii) CFD Modeling of Duct for Granulation unit, Stanch.

(xiii) Demonstration ROG PSA Unit at HPCL Mumbai Refinery for recovery of Hydrogen from off gases.

8.11.2 Initiatives taken for strengthening technology tie ups

(i) MoA inked with IIT Roorkee for Development of technology for "Direct CO_2 Conversion to Dimethyl Ether through Catalytic Hydrogenation".

(ii) MoA signed with HPCL for H_2 PSA Technology specially includes the applications of HGU_PSA, CCR-PSA and ROG-PSA/FG-PSA.

(iii) MOU signed between EIL & IIT Kanpur for joint research in the field of hydrocarbon, petrochemicals, energy technology and commercialize such jointly developed technologies.

(iv) Renewal of membership for FY 2024-25 for:

a) Process Science Technology Center (PSTC), an industry-academia collaborative research program initiated by University of Texas, USA.

b) Fractionation Research Incorporated (FRI), a non-profit cooperative research organization based at Oklahoma, USA.

c) Process Integration Research Consortium (PIRC), University of Manchester UK.

8.11.3 Technology development projects initiated: Some of the new projects initiated and ongoing projects are as below:

(i) Development of technology for direct conversion of CO_2 to Dimethyl Ether through Catalytic Hydrogenation.

(ii) Development of Scale up Methodology of HiGee Deaeration.

(iii) Technology upgradation of Ejector Design and Development of Optimization software for multistage ejector system.

(iv) Development of Novel baffles in Shell & Tube heat exchangers.

(v) Optimization of Amine Purification Process.

(vi) Development of AC-DC field based Desalting technology for handling heavy/blended crude oils.

(vii) Development of Liquid Jet Eductor system for Absorption of CO_2 from Biogas Using Amine Solvents.

(viii) Development of scale up methodology and Demo Package Preparation for H_2 PSA Technology.

(ix) Development of design methodology for coal slurry pipeline.

8.11.4 EIL has created IPR in both patents and trademarks form: As on Mar'

2025, 48 Live Patents and 61 applications pending grant are there. The highlight of patent portfolio is that almost 65% of filed patents have been commercialized. In addition, 28 granted trademarks along with 4 pending grants add to the IPR portfolio. 27 new patents have been filed during the year till Mar'25.

8.11.5 Startup Initiatives: EIL R&D also remains fully committed to GOI's Flagship program for nurturing the Start-up Eco System within India by steering EIL's start-up initiative "EngSUI". Under EngSUI, EIL is providing intellectual, infrastructural and financial support to the Startups. EIL funds the StartUp projects working in the field of Hydrocarbon, IT & IIOT, Renewable Energy & Storage, Nano-Materials, Waste to Energy, Bio Fuels, Net Zero Health Safety and Environment. 10 IITs and 4 NITs have registered with EIL's StartUp India Initiative. Totally 31 number of projects have been funded till date over 7 Rounds. EIL Board also approved equity investment through Start-Up fund of EIL in addition to ongoing Grant funding.



Hon'ble PM during his visit to INDMAX unit at Paradip Refinery



Hon'ble Minister launched MRPL's Toluene product



HPCL Bangalore R&D Centre



Successful commissioning of ISOM Catalyst at Bongaigaon Refinery



Surya Nutan solar cookstoves



Best Innovation in R&D Award for HP-AEME Technology: A first of its kind technology for efficient Green Hydrogen production



Innovator of the year-Team award for 'HP-COSOL Process: Process for improving lube raffinate yield'



MRPL wins Energy Technology Awards



MOU signing between M/s Eco Wave Power, Israel and BPCL



MRPL's IBB Demo Plant



BPCL R&D Centre, Greater Noida, UP



R&D Centre - "Applications Research Laboratory", Kolkata – Balmer Lawrie & Co. Ltd




600-112-DT-TF
HSD
400-114-TF-MFD
300-113-MFD-TF




Chapter
9
Bio-Fuels

9 Bio-Fuels

9.1 Non-Conventional Energy:

India, as one of the fastest-growing economies globally, pursues development objectives centered on economic growth, equity and human well-being. Energy serves as a critical enabler of socio-economic development, and the national energy strategy is geared towards enhancing efficiency, ensuring security, and facilitating environmentally sustainable access through an optimal mix of primary energy resources. While fossil fuels are expected to retain a significant role in India's energy landscape over the coming decades, they are finite, non-renewable, and environmentally taxing, necessitating their judicious use. In contrast, renewable energy sources are indigenous, non-polluting, and virtually inexhaustible. India is richly endowed with such renewable resources, making their widespread adoption imperative. Among these, biofuels-derived from renewable biomass-offer a strategic advantage by supporting sustainable development, augmenting conventional energy supplies, and addressing the growing demand for transportation fuels driven by economic expansion, while also meeting the energy needs of the country's vast rural population.

9.2 Ethanol Blended Petrol (EBP) Programme

9.2.1 Background: The Government through Oil Marketing Companies (OMCs), is implementing Ethanol Blended Petrol (EBP) Programme under which, OMCs sell ethanol blended petrol with percentage of ethanol up to 20%. As a green fuel, ethanol supports the environmental sustainability efforts of the Government, reduces import dependence on crude oil while saving foreign exchange and promotes domestic agriculture sector. After the pilot studies conducted during 2001, the Government of India, with effect from 01.01.2003 resolved to supply ethanol blended petrol in nine States and four Union Territories for sale of 5% Ethanol Blended Petrol.

Maneuvering through the formative and consolidation decade and with a view to giving a fillip to the EBP Programme, the Government, during December 2014, decided to procure ethanol produced from other non-food feedstocks besides molasses, like cellulosic and lignocellulosic materials including petrochemical route. It was also decided to administer the price of ethanol under EBP Programme.

Prior to Ethanol Supply Year (ESY) 2017-18, ethanol produced from C heavy molasses, a byproduct of sugar industry, was only allowed to be procured and blended under the EBP Programme. Government notified the new National Policy of Biofuels – 2018 which outlined the use of multiple sugar and grain-based feedstocks for ethanol production. Since 2018-19, B heavy molasses, damaged food grains, sugar and sugar syrup were allowed followed by surplus rice available with the Food Corporation of India (FCI) and maize during ESY 2020-21 to produce ethanol.

Other major interventions included amendment to the Industries (Development and Regulation) Act, 1951 to facilitate intrastate and interstate movement of ethanol under EBP Programme; lowering GST rate to 5% on ethanol meant for EBP programme; Ethanol Procurement Policy-2019 for procurement of ethanol on a long-term basis; Roadmap for ethanol blending in India for the period 2020-2025; multimodal transportation of ethanol and ethanol blended petrol using

road, railways and pipeline; augmentation of ethanol storage facility at distillery and OMCs; advancing the target for 20% ethanol blending in petrol to the Ethanol Supply Year (ESY) 2025-26 from 2030; guidelines for setting up Dedicated Ethanol Plants (DEPs) in ethanol deficit states, issued in August 2021 and signing of Long Term Offtake Agreements; ethanol Interest Subvention Schemes, from 2018 to 2022 for augmentation of ethanol production capacity; Pradhan Mantri JI-VAN (Jaiv Indhan- Vatavaran Anukool Fasal Awashesh Nivaran) Yojana to provide financial support for setting up Advanced Biofuels projects in the country using lignocellulosic biomass and other renewable feedstock. The aforesaid decisions, along with their effective implementation and monitoring, have resulted in a significant increase in ethanol availability.

9.2.2 Guidelines issued by the Central Government to promote ethanol blending: The Government have issued various guidelines on ethanol blending which, inter-alia, include:

i. Introduction of administered price mechanism in December, 2014 for ethanol produced under the Ethanol Blended Petrol (EBP) Programme.

ii. National Policy on Biofuels – 2018, and its amendment in 2022.

iii. Amending the Industries (Development and Regulation) Act, 1951 to facilitate intra-state and inter-state movement of ethanol under EBP Programme.

iv. Lowering GST rate to 5% on ethanol meant for EBP programme.

v. Ethanol procurement policy, 2019 for procurement of ethanol on a long-term basis.

vi. Roadmap for Ethanol blending in India for the period 2020-2025.

vii. Advancing the target for 20% ethanol blending in petrol to the Ethanol Supply Year (ESY) 2025-26 from 2030.

viii. Guidelines for setting up Dedicated Ethanol Plants (DEPs) in ethanol deficit states, issued in August 2021 and signing of Long Term Offtake Agreements.

ix. Ethanol Interest Subvention Schemes, from 2018 to 2022, by Department of Food and Public Distribution (DFPD) for augmentation of ethanol production capacity.

x. Pradhan Mantri JI-VAN (Jaiv Indhan-Vatavaran Anukool fasal awashesh Nivaran) Yojana 2019, amended in 2024, to provide financial support for setting up Advanced Biofuels projects in the country using lignocellulosic biomass and other renewable feedstock.

Due to the initiatives taken by the Central Government in the field of Biofuels including onboarding of stakeholders, several State Governments have come forward with their own Biofuel Policy extending additional incentives to the project proponents to attract investment thereby benefitting farmers and environment.

9.2.3 Ethanol Pricing: OMCs procure ethanol for blending with Petrol at different ex-mill prices depending on the feedstock used for its production. Till 2017-18, ethanol production for EBP Programme was permitted from C-heavy molasses (CHM) only. Since ESY 2018-19, multiple feed stocks have been utilised for ethanol production. Further, to incentivize this sector differential price of ethanol based on feed stock utilized for ethanol production was approved by the Government to optimize the logistics and procurement of ethanol. The ex-mill price of ethanol from sugarcane-based feedstock is decided by the Government, whereas the price of ethanol from grain-based feedstock is decided by Public Sector OMCs. Government's continued endeavour seeks to ensure that ethanol prices remain competitive vis-à-vis prices of fossil fuels.

Prices of ethanol have remained stable from 01.12.2022 through the ongoing ESY 2024-25 except for a 3% increase in price of C-Heavy Molasses. As there is no diversion of sugar during production of ethanol

from C-heavy molasses, this meets both the objectives of maintaining sufficient availability of sugar in the country and ethanol requirement for EBP Programme.

In addition, to optimize the availability of feedstock for ethanol production, incentives of ₹6.87 per litre on ethanol from C-Heavy Molasses (CHM), ₹15.51 per litre on maize ethanol and ₹8.46 per litre on ethanol from Damaged Food Grain (DFG) have been given during this period. As a result, the weighted average procurement price (including incentives) of ethanol on ex-mill basis (excluding GST) has increased from ₹61.89 per litre in ESY 2022-23 to ₹67.73 per litre in ESY 2024-25 (February, 2025).

The table below provides the variation in ex-mill ethanol prices from different feedstocks over the years:

Feedstock wise Price of Ethanol (in ₹/Ltr)

Ethanol Supply Year	Sugarcane Juice / Sugar / Syrup	B-Heavy Molasses	C-Heavy Molasses			Damaged Food Grains			Maize			FCI Rice		
			Regular Price	Incentive Amount	Total Ex-Mill Price	Regular Price	Incentive Amount	Total Ex-Mill Price	Regular Price	Incentive Amount	Total Ex-Mill Price	Regular Price	Incentive Amount	Total Ex-Mill Price
2016-17	Introduced from ESY 2018-19		39.00	-	39.00	Introduced from ESY 2018-19			Introduced from ESY 2020-21					
2017-18			40.85		40.85									
2018-19	59.19	52.43	43.46	-	43.46	47.13	-	47.13						
2019-20	59.48	54.27	43.75	-	43.75	50.36	-	50.36						
2020-21	62.65	57.61	45.69	-	45.69	51.55	-	51.55	51.55	-	51.55	56.87	-	56.87
2021-22	63.45	59.08	46.66	-	46.66	52.92	2.33	55.25	52.92	2.33	55.25	56.87	1.437	58.31
2022-23 (Dec-22 to Oct-23)	65.61	60.73	49.41	-	49.41	55.54	8.46	64.00	56.35	9.72	66.07	58.50	-	58.50
2023-24 (Nov-23 to Oct-24)	65.61	60.73	49.41	6.87	56.28	64.00	-	64.00	66.07	5.79	71.86	58.50	-	58.50
2024-25 (Nov-24 to Oct-25)	65.61	60.73	57.97	-	57.97	64.00	-	64.00	66.07	5.79	71.86	58.50	-	58.50

Details of Incentives / Relief Schemes (Over and above the Basic Price of Ethanol)

ESY 21-22 (Relief Scheme due to Ukraine War and DFG Rate Increase) for Q3 & Q4 i.e. 01.06.22 to 30.11.22

Feedstock	Relief (₹/Ltr)
SCJ	1.604
BHM	1.493
CHM	1.179
DFG	2.337
SFG	1.437

ESY 22-23 (Incentive on DFG and Maize due to stoppage of FCI Rice)

Feedstock	w.e.f 07.08.23	w.e.f 22.08.23	Total Incentive
DFG	4.75	3.71	8.46
Maize	6.01	3.71	9.72

ESY 23-24 (Incentive on CHM and Maize due to Sugar Diversion Restriction)

CHM : 6.87 ₹/Ltr (Applicable for entire ESY 23-24)
Maize : 5.79 ₹/Ltr (Applicable w.e.f. 05.01.24)

The table below provides the estimated weighted average ex-mill price of ethanol over the years:

Weighted Average Ethanol Ex-Mill Price in ₹/litre

ESY	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25
Ex-Mill Price (₹/ litre)	39.00	40.85	45.25	49.85	55.93	59.82	61.89	66.05	67.73

Additionally, GST as per actual and transportation rates as decided by OMCs are being paid to ethanol suppliers. For ESY 2024-25, the weighted average ex-mill price is considering ethanol allocation up to February 2025. ESY-wise procurement and blending performance is presented in the table below:

ESY	Ethanol procurement / blending quantity (crore litres)	Blending Percentage (%)
2015-16	111.40	3.51
2016-17	66.50	2.07
2017-18	150.50	4.22
2018-19	188.60	5.00
2019-20	173.00	5.00
2020-21	302.30	8.10
2021-22	433.60	10.02
2022-23	508.50	12.06
2023-24	707.40	14.60
2024-25 (upto Mar'25)	391.00	18.36

The table below provides the percentage of Supplied/Blended Quantity from different feedstocks during an ESY:

ESY	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25 (Allocation)*
Juice/Syrup	0%	0%	0%	0%	0%	8%	13%	20%	25%	10%	19%
BHM	0%	0%	0%	0%	17%	39%	61%	61%	46%	22%	13%
CHM	100%	100%	100%	100%	77%	41%	13%	2%	1%	9%	1%
DFG/Maize	0%	0%	0%	0%	5%	9%	13%	6%	6%	17%	11%
Blending FCI Rice	0%	0%	0%	0%	0%	0%	1%	11%	15%	0%	7%
Maize	0%	0%	0%	0%	0%	0%	0%	0%	6%	43%	49%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Blending %age	2.1%	3.5%	2.0%	4.2%	5.0%	5.0%	8.1%	10.0%	12.1%	14.6%	19.0%

***Allocation status for ESY 2024-25 is up to 31.03.2025 and the estimated blending %age if supplied in full is @19%**

Notably, Public Sector OMCs met the targets of 10% ethanol blending in petrol for ESY 2021-22 ahead of its schedule followed by 12% target achievement in ESY 2022-23. For ESY 2023-24, since May 2024, OMCs have been consistently blending more than 15% which enabled further improvement in average ethanol blending to 14.60%. For the ongoing ESY 2024-25, since January 2025, Public Sector OMCs are consistently blending more than 19.5% ethanol in petrol and are on track to achieve the target of 20% ethanol blending by ESY 2025-26.

Ethanol availability from different feedstocks is well poised, providing much needed balancing across feedstocks. OMCs have signed 232 Long Term Offtake Agreements for 792 crore litres per annum of dedicated ethanol capacity in the country. These Project proponents have plans to set up a design capacity of 1106 crore litres per annum. Out of these, 86 plants have been commissioned with a capacity of 535 crore litres per annum.

9.2.4 Accrued Benefits due to EBP Programme: Since ESY 2014-15 to ESY 2024-25 (upto March 2025), Public Sector Oil Marketing Companies (OMCs) have procured and blended 3100 crore litres of ethanol in petrol thereby displacing equivalent quantity of petrol. The foreign exchange impact due to the EBP Programme from ESY 2014-15 to ESY 2024-25 (upto March 2025) is estimated to be around ₹1,29,404 crore. This ethanol was produced from domestically grown sugarcane and grain-based feedstock which were sourced by the distilleries from local farmers thereby creating demand for their agricultural produce. OMCs are required to make expeditious payment to the distilleries towards their ethanol supplies thereby improving sugar mill / distillery's capital flow which in-turn benefitted the farmers.

It is estimated that from ESY 2014-15 to ESY 2024-25 (upto March 2025), OMCs have paid over ₹1,85,334/- crore to the distilleries towards ethanol procurement. Since feedstock sourced from local farmers forms a major portion of the total cost of ethanol a large sum of money has been paid by the distilleries to the local farmers for feedstock procurement.

On the environment benefits, it is estimated that the Net CO_2 reduction due to ethanol blending in petrol from ESY 2014-15 to ESY 2024-25 (upto March 2025) is around 659.7 LMT.

With 20% ethanol blending in the coming years, the accrued benefits to the farmers and environment will improve further apart from energy security and achieving Net Zero targets.

The savings achieved on account of ethanol blending in petrol from ESY 2014-15 to ESY 2024-25 (upto March, 2025) are tabulated below:

Saving achieved on account of blending of Ethanol in MS from ESY 2014-15 to ESY 2024-25*

Sr. No	Parameter	Mar'25	Nov'24–Mar'25	ESY 2014-15 to ESY 2023-24	Cumulative (ESY 2014–15 to ESY 2024–25*)
1	Ethanol Procured in Cr Ltrs	90.66	369.53	NA	NA
2	Ethanol Blended in Cr Ltrs	88.56	391.03	2,706.75	3,097.78
3	Ethanol Blending	19.78%	18.36%	NA	NA
4	Estimated Payments to distilleries (₹ Crores)	6,034.49	24,917.21	1,60,416.89	1,85,334.10
5	Saving in Foreign Exchange in INR (₹ Crores)	3,775.06	16,990.02	1,12,414.48	1,29,404.50
6	Saving in Foreign Exchange in USD (million)	435.72	1,978.81	14,311.82	16,290.60
7	Net CO_2 reduction in LMT	18.86	83.28	576.45	659.73
8	Crude Oil substitution in LMT	6.28	27.71	191.83	219.54
9	Estimated Payments to farmer (₹ Crores)	3,620.69	14,950.32	96,250.54	1,11,200.86

*** ESY 2024-25 figures are till Mar'25.**

9.3 Biodiesel Programme:

Government is adopting a multi-pronged approach to promote and encourage blending of biodiesel in diesel through Biodiesel Blending Programme, exploring multiple feedstocks including straight vegetable oil in stationery and other engines. Towards this, the Government, vide Gazette notification dated 30.04.2019, notified the "Guidelines for Sale of Biodiesel for Blending with High-Speed Diesel for Transportation Purposes-2019." To encourage further investment in biodiesel production, the GST rate on biodiesel supplied to Oil Marketing Companies (OMCs) for blending with diesel was reduced from 12% to 5% starting in October 2021. Under the National Policy on Biofuels-2018 an indicative target of 5% blending of biodiesel in diesel or direct sale of biodiesel has been proposed by 2030.

~94% of the Biodiesel in the country is produced using Palm Stearin Oil (PSO) as feedstock. As a result of aforesaid enablers, OMCs have significantly scaled up biodiesel procurement, increasing from 1.1 crore litres in FY 2015-16 to 36.7 crore litres in FY 2024-25 for blending with diesel.

9.4 Sustainable Aviation Fuel (SAF)/ Bio-Aviation Turbine Fuel (Bio-ATF):

Sustainable Aviation Fuel (SAF) remains a promising pathway for decarbonizing the aviation sector. A strategic emphasis

on SAF would not only contribute to the industry's environmental sustainability but also reinforce India's leadership in the global aviation sector as it transitions towards more sustainable practices.

The Government has set indicative blending targets of 1%, 2%, and 5% of SAF in Aviation Turbine Fuel (ATF) for international flights, effective from 2027, 2028, and 2030, respectively. Notably, India's first commercial flight using an indigenously produced SAF blended ATF was successfully operated between Pune and Delhi on 19th May, 2023.

OMCs are also engaged in setting up of various Pilot/ Commercial scale facilities based on HEFA/ Co-processing/ Alcohol-to-Jet Technology with a total planned capacity of 332 KTPA.

9.5 Second Generation Ethanol:

In December 2014, the Government, with an objective of harnessing energy from surplus biomass/agriculture waste and prioritizing environmental sustainability, decided to produce ethanol from non-food feedstocks besides molasses, like cellulosic and lignocellulosic materials including petrochemical route. OMCs were accordingly advised to study feasibility of setting up second generation ethanol plants using surplus biomass/agricultural waste as globally technology was in a nascent stage.

To encourage 2G ethanol capacity in the country and attract investment in this sector, "Pradhan Mantri JI-VAN (Jaiv Indhan- Vatavaran Anukool fasal awashesh Nivaran) Yojana" was notified in 2019, which was amended in 2024 for providing financial assistance to 2G Bio-ethanol projects wherein surplus biomass /agricultural waste which has cellulosic and lignocellulosic content, industrial waste etc. can be converted to ethanol using advanced biofuel technology.

The revised scheme, inter alia, includes extending its timeline by five years i.e., from 2023-24 to 2028-29, expanding eligibility to cover "bolt-on" plants and "brownfield projects", and replacing "2G ethanol" with advanced biofuels.

Under the revised scheme, financial assistance will be provided for about 12 commercial scale Advanced Biofuel Projects with a total financial outlay of ₹1969.50 crore, along with support for about 10 demonstration scale Advanced Biofuel Projects.

Further, financial assistance has been approved to both public and private sector companies for six commercial scale Second Generation (2G) bio-ethanol projects and four demonstration scale 2G ethanol projects.

The 2G ethanol plant of Indian Oil Corporation Limited (IOCL), with a capacity of 100 KLPD (approximately 3 crore liters), is based on indigenously developed technology utilizing paddy straw as feedstock. It was dedicated to the nation by the Hon'ble Prime Minister on World Biofuel Day in 2022 and is currently in its final stages of stabilization.

Numaligarh Refinery Limited is establishing a 2G ethanol plant in Numaligarh, Assam, to convert bamboo-a non-food-grade, non-wood lignocellulosic biomass-into ethanol.

This ethanol will be used for blending in petrol, aligning with the National Ethanol Blending Program. The plant is designed to produce 50 TMTPA (6.2 crore liters per annum) of ethanol from 300 TMTPA of dry bamboo. Additionally, it will generate other high-value green chemicals, including Furfural (18 TMTPA) and Acetic Acid (11 TMTPA). The facility envisaged to produce approximately 25 MW of green power, sufficient to meet its own energy requirements while allowing for the export of around 5 MW to the grid. The first trial run has been successfully conducted to validate the conversion of bamboo into alcohol. The plant is expected to be fully commissioned by Q2 of 2025-26.

BPCL is establishing a 2G ethanol plant at Bargarh, Odisha, with a capacity of 100 KLPD (approx 3 crore liters per annum) utilizing paddy straw as feedstock. An integrated 1G ethanol plant is planned in the second phase of the project. This 2G plant has already achieved mechanical completion and is in the advanced stage of commissioning.

HPCL is establishing a 2G ethanol plant at Bhatinda, Punjab, with a capacity of 100 KLPD (approx. 3 crore liters per annum), utilizing paddy straw as feedstock. This plant is anticipated to achieve mechanical completion in Q3 of 2025-26.

9.6 Research and Demonstration Focus in Biofuels:

The Centre for High Technology (CHT)-PSU OMC's research and development unit under the MoP&NG is working to support R&D pertaining to bioenergy in India through various schemes with major emphasis on advanced biofuels. The IOCL R&D center has developed indigenous technology for conversion of lignocellulosic biomass to 2G ethanol based on Simultaneous Saccharification and Co-Fermentation (SSCF) with onsite enzyme production. Demonstration scale plant is installed at Panipat and under commissioning. Multiple demonstration scale plant on new technologies to produce advance ethanol are supported under PM JI-VAN Yojana and under construction.

Studies are in advanced stages at the IOCL R&D center to install the world's first pilot plant with a capacity of 10 kg CO_2 per day using gas fermentation technology. Anaerobic gas fermentation technology will convert CO_2 into acetic acid, and aerobic fermentation technology will convert acetic acid into highly valuable omega - 3 fatty acids (docosahexaenoic acid, or DHA) and biodiesel. This value chain makes the overall process economically feasible.

IOCL commissioned a third generation (3G) ethanol production plant to produce around 128 KL per day of ethanol using gas fermentation technology from off gases at Panipat Refinery.

In a significant development for decarbonizing of the aviation sector, India's first commercial passenger flight using an indigenously produced SAF blend was successfully flown on May 19, 2023. In January 2024, Praj Industries Ltd.'s R&D unit established the first pilot project for producing aviation turbine fuel from alcohol near Pune in Pirangut, which was inaugurated by the Union Minister of India.

HPCL in collaboration with a renowned institute, completed the assembly of an electrolyser for producing green hydrogen at a 5 Nm3/h capacity based on indigenously developed technology (alkaline). HPCL is planning to setup CBG plants with HP-RAMP (rapid acidification for methane production) technology and utilize the CBG in a steam methane reformer to produce about 21 KTPA green hydrogen. Bharat Petroleum Corporation Ltd. (BPCL) R&D is also working on long-term solutions for hydrogen storage and indigenous fuel cell systems, along with various academic institutes. BPCL R&D is scaling up indigenous alkaline electrolyzer technology in collaboration with BARC. A study of the impact on the CGD network/NG pipeline resulting from various levels of hydrogen is in progress.

Current efforts are focused on the development of cost-effective and efficient enzymes for 2G bioethanol refineries; the development of value-added products by lignin valorization; commercial production of biojet fuel; compressed biogas from biomass, food-waste, and municipal solid waste; cost-effective biofuels from industrial waste gases; and green hydrogen.



IOCL's Energy Station



HPCL's CBG Plant Budaun Uttar Pradesh





NRL's 2G Ethanol Plant in Numaligarh, Assam





BPCL's 2G Ethanol Plant at Bargarh, Odisha

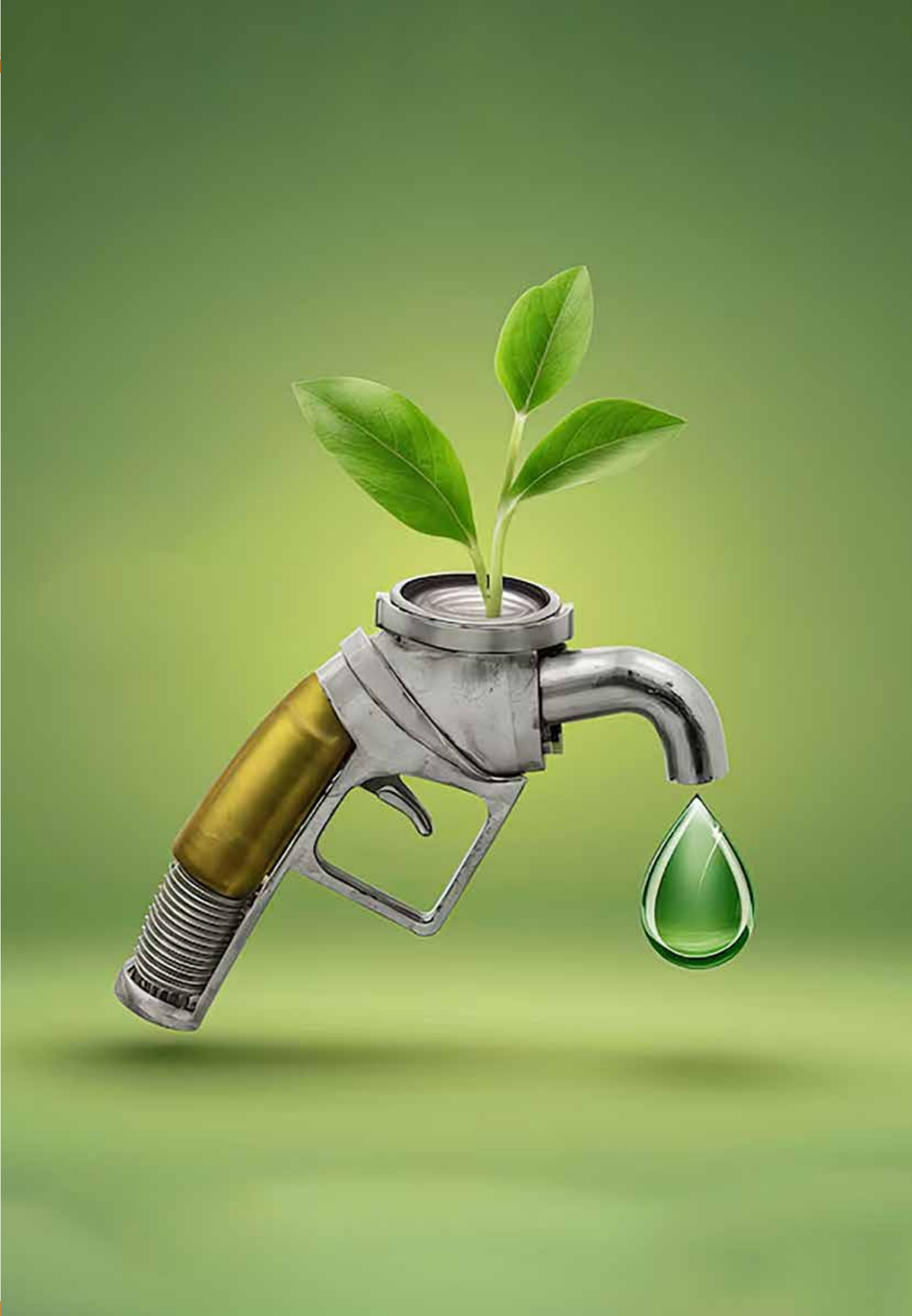


HPCL's 2G Ethanol Plant at Bhatinda, Punjab



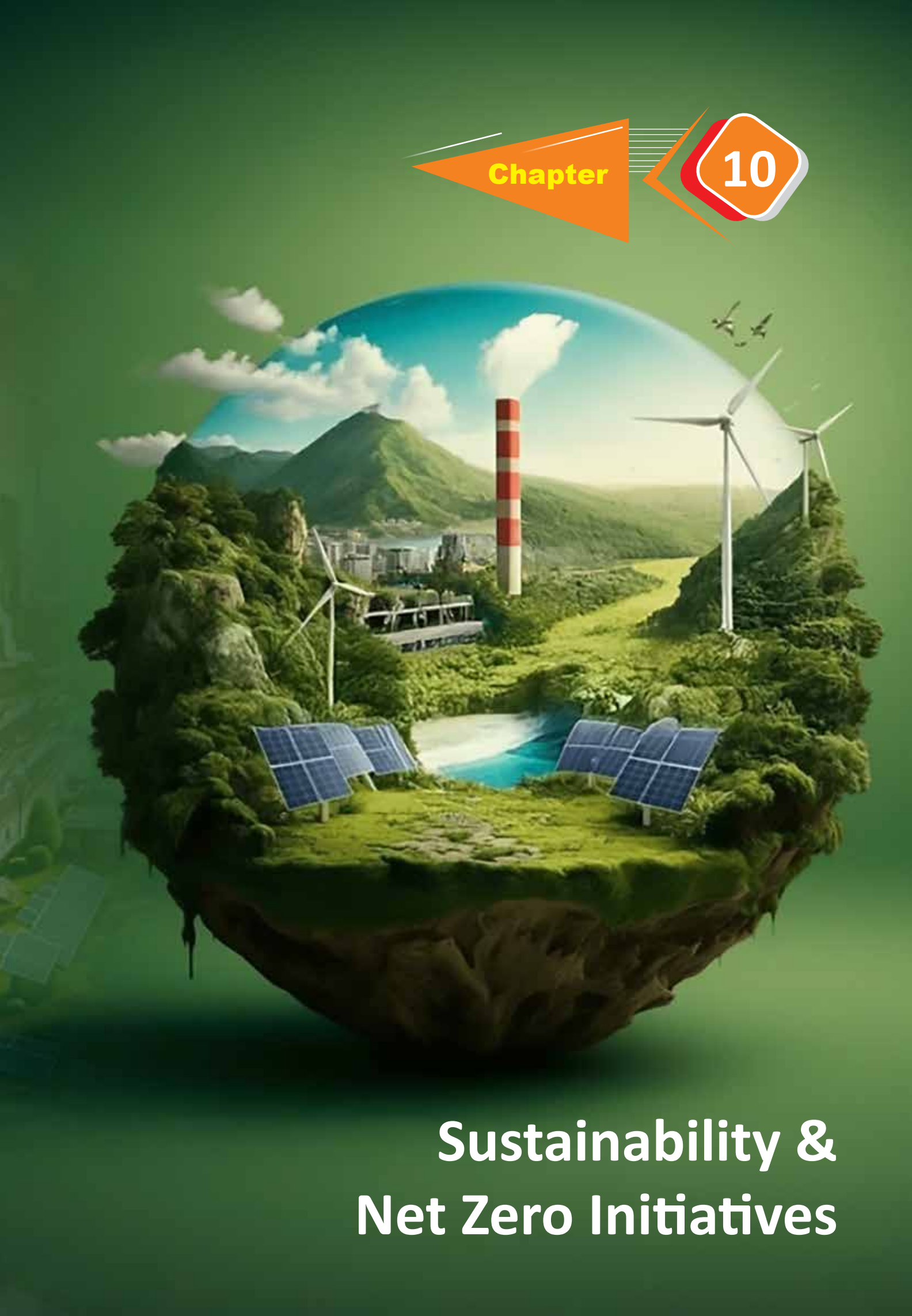


IOCL's 2G Ethanol Plant in Panipat, Haryana




CO2
NET
ZERO

Chapter 10



Sustainability & Net Zero Initiatives

10 Sustainability & Net Zero Initiatives

10.1 Net Zero Initiatives:

India is the 3rd largest consumer of primary energy in the world after US and China. The world is heading towards a major energy transition towards use of alternate clean energy sources like renewable energy, gas etc. delivered to users in the form of electricity, LNG, biofuels and green hydrogen. Hon'ble Prime Minister has given a vision to transform India into an 'Energy-Independent' nation by 2047 and further, at COP-26, India has also committed that they will achieve net zero carbon emissions by 2070.

As India strives to achieve developed status which is expected to double its primary energy demand, Oil and Gas CPSEs plans to boost its share in the energy sector by 2050 and contribute significantly to the vision of Viksit Bharat @2047. India has announced ambitious target to reduce the emission intensity of its GDP by 45% by 2030 over the base year 2005 and reach net zero emission by 2070. India has also announced that it will meet fifty percent of its electricity requirements from renewable energy sources by 2030, including installing 500 gigawatts of renewable energy capacity.

In line with the India's Energy transition goals, Oil and Gas CPSEs are adopting several methods to decarbonize its operations and value chain, such as advancing renewable hydrogen projects, renewable energy sources, enhancing energy efficiency, adopting cleaner technologies, and tapping low-carbon energy sources. Oil and Gas CPSEs are committed to achieving Net-Zero operational emissions (Scope 1 & 2) by 2046.

A multidisciplinary integrated approach towards taking sustainability into policies, structure, management, and operations is being developed in line with these net zero targets. CPSEs are exploring multiple alternate pathways and identified various levers towards achieving net zero roadmap, the primary focus is on mitigation efforts primarily on its refineries, implementing strategies centered on energy efficiency (improving furnace and boiler performance), transitioning from liquid fuels to natural gas, and investing in renewable energy, compressed biogas (CBG), and green hydrogen.

Energy Efficiency improvement like replacement of fossil fuel energy with electricity procured from grid and also Green Hydrogen is proposed as a replacement for existing steam reforming units (in Refineries). CPSEs are working on development of complete eco-system for electrolyser stack & BoP (Balance of Plant) manufacturing such as electrodes and electrolysis components with commercial manufacturers.

Bio-CNG is proposed as a replacement for Fuel Oil and Natural gas used across furnaces, boilers, gas turbines in refineries and diesel used in generators across marketing locations. CCUS (Carbon Capture, Utilization, and Storage) has been proposed to tackle hard-to-abate emissions from use of hydrocarbons generated as by-products within the refinery with limited market potential (E.g., Fuel Gas) or abate emissions from SMR (Blue Hydrogen).

In response to the government's mandate to increase ethanol blending in petrol

to 20% by 2025-26, Oil and Gas CPSEs are fully prepared, investing in advanced biofuels and initiating 2G and 3G ethanol projects using paddy straw and refinery off-gases. Collaborations with global technology leaders are underway to establish sustainable aviation fuel (SAF) plants in India. To support the goal of raising the share of natural gas in the energy mix from 6% to 15% by 2030, natural gas infrastructure is being built, including pipelines and enhancements for refinery use, as well as expanding city gas distribution networks. CPSEs are also setting up CBG plants through joint ventures and exploring CBG-based hydrogen production. EV charging stations and battery swapping stations are being built to enhance the development of electrified transport across the country.

In line with the country's Net zero target of 2070, CPSEs are also tapping opportunities through increasing research in emerging green technologies. This green transition can be fast tracked by investing significantly in green infrastructure, research and development, and subsidies for renewable energy projects. The strength of R&D is being leveraged to provide advanced technical support to various strategic business units and for the conceptualization, development and commercialization of products and technologies in emerging areas. In-house technologies are being developed related to net zero. Collaborations are being done with various academic institutes efforts in various fields including those related to Net-Zero. Further, as a part of Capability Building to meet Net-Zero challenges, CPSEs are providing training on the challenges and mitigation measures related to Net-Zero.

To balance environmental impact and economic growth, India has adopted a proactive approach by investing in Green Technologies, incentivizing for Renewable Energy, Collaborating on Technology Transfer and stricter emissions regulations to achieve sustainability.

Govt. has also taken several initiatives to bolster share of clean fuels such as such as bio fuels (blending of ethanol, compressed biogas, SAF) and has announced National Green Hydrogen Mission.

10.1.1 EBP (Ethanol Blended Petrol): The Government is promoting blending of ethanol in Petrol under the (EBP) programme. PM JI-VAN Yojana has been launched for production of 2G ethanol in the country. The scheme has been amended on 21.08.2024 to include Advanced Biofuel and Bolt on/Brown Field plants. The scheme is extended up to March 2028.

10.1.2 Promotion of CBG: Government has launched Sustainable Alternative Towards Affordable Transportation (SATAT) initiative on 1st October 2018, with the aim of establishing an ecosystem for production of Compressed Biogas (CBG) from various waste/ biomass sources and for promoting its use along with Natural Gas. Under this initiative, Oil and Gas Marketing Companies (OGMCs) invite Expression of Interest (EOI) to procure CBG from potential entrepreneurs.

10.1.3 Sustainable Aviation Fuel (SAF): Further to decarbonize aviation sector, Government also has set an indicative target of 1%, 2% and 5% blending of SAF in Aviation Turbine Fuel (ATF) initially for international flights with effect from 2027, 2028 and 2030 respectively.

10.1.4 Green Hydrogen Mission: Govt. has announced National Green Hydrogen Mission, which is aimed at promoting green hydrogen and demonstration/ development of associated infrastructure including its export with target to produce 5 MMTPA of green hydrogen by 2030. Under Strategic Intervention for Green Hydrogen Transition (SIGHT)-2B program refineries have been allocated 0.2 MTPA of green hydrogen procurement capacity on built-own-operate basis by 2030. The SIGHT program is allocated with an outlay of ₹17,490 Cr. The program consists of two distinct financial incentive mechanisms

to support domestic manufacturing of electrolysers and production of green hydrogen.

10.1.5 Increasing share of Natural gas: Natural gas as a transition fuel the government has set targets to increase the share of natural gas in India's energy mix from around 6% to 15% by 2030. PNGRB has authorized entities for the development of CGD network in 307 Geographical Areas (GAs), covering almost 100% of the mainland area (including the state of Odisha) for the development of CGD network across the country.

10.1.6 PAT (Perform, Achieve and Trade): In addition, for improvement of energy efficiency in energy-intensive sectors of the economy, PAT (Perform, Achieve and Trade) scheme has been operating in the country successfully. PAT is a market-based regulatory instrument to reduce specific energy consumption in the energy-intensive sectors of the economy through tradable energy saving certificates. Refinery sector was included in PAT in 2015 starting cycle-2 (2016-17 to 2018-19). During PAT-VI (Base Year: 2018-19; Assessment Year: 2022-23), 20 refineries are included with a targeted reduction of 1.17 MTOE (5.49% Sectoral target).

Oil and Gas is one of the hard-to-abate sectors of the economy, where decarbonization options are limited and difficult to achieve. However, various state-run oil companies have prepared plans to achieve goal of becoming net zero operational emission encompassing scope-1 and 2 emissions. PSUs under MoPNG have planned to achieve operational Net Zero (scope-1 and scope-2) between 2035 to 2046 while ensuring a secure, reliable, and affordable supply of energy.

10.2 SATAT:

Sustainable Alternative Towards Affordable Transportation (SATAT): Government has launched "Sustainable Alternative Towards Affordable Transportation (SATAT)" initiative on 1st October 2018, with the aim of establishing an ecosystem for production of Compressed Bio Gas (CBG) from various waste/ biomass sources and for promoting its use along with Natural Gas. Under this initiative, Oil and Gas Marketing Companies (OGMCs) invites Expression of Interest (EOI) to procure CBG from potential entrepreneurs.

This initiative synergises with GOBARdhan Scheme, Swachh Bharat Mission/ Atma Nirbhar Bharat/ target of Net Zero emission. For development of biogas/ CBG sector 'Whole of Government' approach is being adopted. Some of the enablers provided by different Ministries and Departments are: Central Financial Assistance to all kind of CBG/biogas plants under Umbrella Scheme of National Bio Energy Programme of Ministry of New and Renewable Energy (MNRE); additional Central Assistance on MSW based CBG plants to States and Union Territories for solid waste management by Ministry of Housing and Urban Affairs under the Scheme of Swachh Bharat Mission Urban 2.0; Market Development Assistance @ ₹1500/MT on Fermented Organic Manure produced from CBG projects under Policy on Promotion of Organic Fertilizer by Department of Fertilizers; incentive on biomass aggregation machinery by Department of Agriculture and Farmers Welfare under Sub Mission on Agricultural Mechanization and Crop Residue Management scheme; categorization of CBG projects under priority sector lending by RBI ; categorization of CBG projects under 'White category' by CPCB on case-to-case basis; excise duty exemption on amount of GST-paid on compressed bio gas contained in the blended CNG.

Government has issued policy guidelines for synchronization of CBG with City Gas Distribution (CGD) network under CBG-CGD synchronization Scheme.

Further, Government has introduced Scheme for providing financial assistance to CBG producers for procurement of biomass aggregation machinery to support

collection of biomass for a period of 04 years from FY 2023-24 to FY 2026-27.

In order to promote the production and consumption of CBG in the country, National Biofuels Coordination Committee (NBCC) on 24.11.2023 approved, the introduction of phase wise mandatory selling of CBG in CNG (Transport) & PNG (Domestic) segments of CGD sector. CBG Obligation (CBO) shall be kept as 1%, 3% and 4% of total CNG/PNG consumption for FY 2025-26, 2026-27 and 2027-28 respectively. From 2028-29 onwards, CBO will be 5%.

Government has also introduced a scheme for Development of Pipeline Infrastructure (DPI) for injection of CBG in City Gas Distribution (CGD) network on 15.03.2024 to facilitate the offtake of CBG.

As on 31st March, 2025, 100 CBG/biogas plants with a total production capacity of around 700 MT per day have been commissioned. Sale of CBG has been initiated from around 336 Retail Outlets. CBG is also being supplied to industrial customers.

10.3 Carbon Capture, Utilization, and Storage (CCUS):

The role of CCUS in climate change mitigation has been a topic of discussion for over two decades. The Intergovernmental Panel on Climate Change's (IPCC) Special Report on Global Warming of 1.5°C and the recent series of announcements made by nations on net-zero have enthused the proponents of this technology, given the potential the technology can play in reducing emissions. India too has made a commitment to become net zero by 2070. Addressing the 26th COP at Glasgow, the Hon'ble PM announced the Panchamrit to mitigate climate change including achieving net zero by 2070. Consequently, various steps including promoting renewable and alternate energy sources such as solar, wind, hydrogen, reducing emission from vehicles through adoption of CAFE norms, increasing green cover, promoting R&D, adoption of carbon neutral technologies like CCS/ CCUS have started gaining prominence. CCUS/CCS has emerged as one of the technologies to mitigate climate change. There have been a few limited efforts made historically to understand the potential of the CCUS technology and associated geological assessment. However, the high cost of capital has been a significant barrier to adopting CCUS technology despite the technology enjoying nearly five decades of global development, since USA's Carbon dioxide Enhanced Oil Recovery (CO_2-EOR) project. Apart from the technical aspects, politico-economic aspects also play a crucial role in carving the path for CCUS adoption in low carbon transition. India being a price sensitive market, the additional cost, to be borne due to CCUS, could be detrimental in a more extensive policy context. In view of future net zero objective and strong commitment towards environment, there is an essential requirement for India to examine options to reduce its carbon intensity further, for which CCS/CCUS could be a key option.

CPSEs under MoP&NG such as OIL, IOCL, BPCL HPCL, GAIL, ONGC, EIL signed an MoU on January 2, 2019, with IIT Bombay to set up a Centre of Excellence in oil Gas and Energy (CoE-OGE) at IIT Bombay. Under this MoU, a mission mode project is being undertaken that aims to estimate the CO_2 storage potential and develop a risk-assessment and management framework for CO_2 storage. Numerical and laboratory studies will be conducted on the selected field data to accurately simulate the reservoir response to CO_2 injection. This project (24-month duration) is currently underway and is anticipated to be completed by May 2025.

The initiatives undertaken by Oil & Gas PSUs are as under:

10.3.1 ONGC: The Company is also prioritizing CCUS as a major lever for decarbonization. By exploring partnerships and initiatives

related to CO_2 storage and enhanced oil production from mature fields, ONGC aligns its operations with sustainable practices and strengthens its competitive edge. The proposed CCUS project at Gandhar has the potential of 10% oil gain and cumulative sequestration capacity of 5 to 6 million ton of CO_2 by the year 2040.

Also, a Lab has been set-up in KDMIPE to undertake R&D work of CCUS. The Lab is also working on gas adsorption studies in coal, which can also act as an excellent trap for CO_2 as it permits higher storage than its pore volume capacity.

ONGC's overseas arm ONGC Videsh signed a non-binding memorandum of understanding ("MoU") with Petróleo Brasileiro S.A. on 12th February 2025 aimed at assessing opportunities in the areas of upstream, marketing, decarbonization, and low-carbon solutions, among others.

The agreement is aligned with ONGC's strategy to develop partnerships that allow for the sharing of risks and expertise, seeking to strengthen the company as an integrated energy enterprise and contributing to the success of a fair and responsible energy transition.

10.3.2 Oil India Ltd.: OIL has undertaken a feasibility study to identify suitable reservoirs/aquifers for CCS in the Bagitibba area of Jaisalmer basin, Rajasthan. Based on the findings, OIL is planning to set up a pilot demonstration plant to assess the feasibility of CCS. Additionally, OIL is conducting a feasibility study for CCUS in its matured Makum-North Hapjan Field in the Upper Assam Basin. To further strengthen its CCS/CCUS initiatives, OIL has recently completed in-house CO_2-EOR (Enhanced Oil Recovery) laboratory studies for the Makum–North Hapjan Field, Assam. Additionally, laboratory investigations are in progress to assess the CO_2 mineralization potential of basalt rocks from the Indian Deccan Traps under industry-academia collaboration project.

10.3.3 GAIL: GAIL has set-up a Pilot Plant at Pata in association with M/s CIMFR, Dhanbad to Capture 1 TPD of CO_2 through micro-algae. Various species of micro-algae are being analysed for their effectiveness in CO_2 capture and conversion for value-added products. GAIL has signed an MoU with M/s LanzaTech Inc, USA on 18.07.2023 to jointly explore, identify, evaluate, and implement the Projects for operational decarbonization at GAIL. Discussions are ongoing with M/s LanzaTech for setting up a Pilot/ Commercial Plant to produce bio-ethanol.

10.3.4 IOCL: IndianOil has set up World's first Refinery off gas to ethanol (3G ethanol) producing plant of 4.2 Crore litres per annum capacity (128 KLPD) at Panipat. IndianOil is the first Oil Refining Company in the world which has adopted this technology. This would lead to mitigation of ~ 1.8 Lakh tonnes of GHG emission per annum. IndianOil has also developed an advanced enzyme assisted solvent-based CO_2 capture technology (eCO_2Sorb) which is based on proprietary enzymes and solvents that synergistically enhance the efficiency of CO_2 capture while reducing the energy required for regeneration. It has also developed a low-energy bio-catalyzed CO_2 mineralization method to enhance mineralization efficiency while reducing the Hydraulic Retention Time (HRT) of the process of CCU based on CO_2 mineralization.

10.3.5 BPCL: BPCL has collaborated with M/s UrjaNovaC (a start-up incubated at IIT-Bombay) to scale up indigenously developed cost-effective CO_2 capture technology using an aqueous medium at near ambient pressure and its conversion to $CaCO_3$ and utilization. Furthermore, BPCL is actively working on development of cost-effective novel energy-efficient processes like adsorption based simulated moving bed and absorption based Hi-Gee Rotating Packed concept using novel solvents for capturing CO_2 from refinery flue gases. BPCL is also developing catalytic routes for captured CO_2 conversion to chemicals such as methanol, formic acid and diphenyl carbonate. BPCL is

also exploring bio catalytic route for CO_2 capture and conversion into value-added products which can be extended biogenic CO_2 deriving from CBG plants.

10.3.6 HPCL: HPCL has developed technology for capturing Carbon Dioxide from various streams using rotating packed bed system (HP-HiGAS Technology). Major advantage of this technology is size reduction of tall absorption columns by 10 times.

A demonstration plant at HPCL-Visakh Refinery with 24 KTPA CO_2 capture capacity is under construction.

10.3.7 MRPL: MRPL is in the process of development of Net Zero strategy and its implementation plan. CCUS is also being considered as one of the decarbonisation levers under Scope-1 emissions.

10.3.8 CPCL: A feasibility study to capture CO_2 (approx. 400 TPD) from existing Grey Hydrogen Generation Unit is in progress. The project is estimated to reduce CO_2 emissions to the tune of 1,20,000 tCOe.

10.3.9 NRL: It is planned to set -up a CO plant of capacity 400 MT/day using SMR gas from existing HGU. DFR for the same is under preparation. The CO_2 present in the SMR gas shall be captured from the SMR gas as part of the new CO plant. Approximately 260 TPD CO_2 shall be captured. The CO_2 captured will be utilized by Oil India Limited for EOR activity in their crude oil exploration site.

10.3.10 EIL: The discussion on energy transition for the Oil & Gas sector to net zero carbon emission cannot be bereft of avenues for CCUS in the existing hydrocarbon assets. CCUS technologies have a greater role to play in decarbonizing the energy sector particularly the power sector which still utilizes around 70% fossil fuel for electricity generation. Further, its application is critical in the hard to electrify and hard to abate sectors utilizing fossil fuels in the process itself.

It is important to note that the blue hydrogen (which utilizes carbon capture technology in the SMR pathway) versus green hydrogen debate has seemingly shifted to the implementation of green hydrogen facilities at large scale in the refineries to bring down the cost of green hydrogen production in the years to come.

10.4 Green Hydrogen:

Green Hydrogen can enable utilization of domestically abundant renewable energy resources across regions, seasons, and sectors feeding multiple usage streams, either as a fuel or as an industrial feedstock. It can directly replace fossil fuel derived feedstocks in hard to abate sectors viz. petroleum refining, fertilizer production, steel manufacturing, etc. Hydrogen fuelled long-haul automobiles and marine vessels can enable decarbonization of the mobility sector.

The initiatives undertaken by Oil & Gas PSUs are as under:

10.4.1 ONGC: ONGC has successfully started production of Green Hydrogen, based on microbial electrolysis of produced water which has been honored with the Gold Award at the ET Global Awards under the theme of Sustainable Innovation.

This breakthrough project, commissioned at ONGC's Mehsana Asset, is a pioneering Make-In-India effort led by ONGC JV & BD. It marks a significant step forward in ONGC's vision to lead India's energy transition by leveraging cutting-edge technology and circular economy principles.

Unlike conventional methods, the demonstration plant utilizes produced water (effluent from oil production) as a feedstock to generate Green Hydrogen, completely eliminating the need for freshwater. The plant operates on less than 1 kWh of energy per kg of hydrogen, powered entirely by solar energy, and produces hydrogen at an extremely cost-effective rate of ~2 USD per kg.

In addition to energy generation, it also treats the effluent water by significantly reducing Total Dissolved Solids (TDS), Chemical Oxygen Demand (COD), and

oil content, demonstrating the dual benefit of water remediation and clean energy production. Digitally integrated with ONGC's OB Hydracel platform, the system is modular, scalable, and capable of remote real-time monitoring.

It supports India's commitment to multiple UN Sustainable Development Goals, including clean energy, clean water, climate action, and responsible consumption. From research and development to field deployment in record time, this project showcases ONGC's capacity to deliver real-world impact and transform waste into valuable energy resources. It also positions ONGC as a frontrunner in the emerging Green Hydrogen economy, aligned with the Government of India's National Hydrogen Mission.

Tatipaka refinery green H_2 plant: ONGC exploring production of green H_2 through electrolyser route at Tatipaka refinery.

40 KTA Green H_2 Green fields projects: ONGC is engaged in discussions with MRPL regarding a green hydrogen offtake arrangement and the establishment of a Greenfield project in Mangaluru. A Joint Working Committee comprising members from both ONGC and MRPL has been formed to assess the feasibility of supplying 10% green hydrogen to MRPL.

10.4.2 Oil India Limited: OIL has received PNGRB approval to blend 2% by volume, green hydrogen into the CGD network in Jorhat, Assam. The PO Awarded for installation and commissioning of CLSS for blending of GH_2 into existing CGD network. Supply and installation awaited. In Baddi, Himachal Pradesh, OIL is developing a 1 MW Green Hydrogen Plant in collaboration with Himachal Pradesh Power Corporation Limited (HPPCL). The EPC work is underway, and construction is progressing on schedule for completion by September 2026. Additionally, OIL has signed an MoU with The Fertilisers and Chemicals Travancore Limited (FACT) to explore joint initiatives in the green hydrogen sector, with DPR preparation currently in progress.

OIL is working on developing Liquid Organic Hydrogen Carrier (LOHC) technology under the SNEH initiative to enable safe, sustainable, and cost-effective hydrogen transportation, and the project is currently in progress.

Collaboration for exploring possibilities in the green hydrogen value chain with PLL, NTPC, Linde, Govt of Himachal Pradesh is in progress.

10.4.3 GAIL: GAIL has commissioned India's maiden project of blending Hydrogen in City Gas Distribution grid in the Indore CGD network of GAIL's JV Company M/s Avantika Gas Limited The blending has been stopped since Aug 2024. GAIL has commissioned its first Green Hydrogen Plant having a production capacity of 1.4 KTPA (4.3 TPD) of at GAIL Vijaipur in Madhya Pradesh. Initially the hydrogen produced from this unit is being used as a fuel blended with Natural Gas for captive purpose in various equipment in the existing plant at Vijaipur. Further, this hydrogen is planned to be dispensed to retail customers in the nearby geographies, transported through high pressure cascades.

10.4.4 IOCL: Given the significant momentum hydrogen as a clean energy source has gained, IOCL is conducting extensive trial of 15 fuel cell buses (FCB) developed by Tata Motors running for three lakh kilometres involving various stakeholders. This involves fuel cell bus operations for passenger transit including Defence and Tourism public transit. Further, 4 fuel cell buses have been deployed in Vadodara, Gujarat, for trials and will be refueled at the Indian Oil Hydrogen Refueling Station (HRS) in Vadodara.

10.4.5 BPCL: Bharat Petroleum Corporation Limited (BPCL) is setting up projects for Green Hydrogen production through biomass route for captive use at both Kochi (500 TPA) and Bina Refinery (1500 TPA). Further, BPCL also intends to buy Green Hydrogen on build, own and operate basis for usage in its refineries and has floated

a tender for a quantity of 5 KPTA. In line with Government of India's vision to boost green hydrogen in the transport sector BPCL is also setting up Green Hydrogen Refueling station at Kochi in collaboration with Cochin International Airport Limited.

BPCL is setting up 5 MW of Electrolyser plant for Green Hydrogen production at Bina Refinery, BPCL R&D has inked MoA with BARC for scale-up and demonstration of indigenous Alkaline Electrolyser technology to MW scale. In this context, 0.5 MW electrolyser stack has been designed and fabricated. The same is being installed and commissioned in upcoming Hydrogen Refueling Station to foster green hydrogen-based mobility at Cochin International Airport Limited (CIAL) as per executed MoU between BPCL and CIAL. In line with this, BPCL has inked MoU with M/s BluJ Aero, a Hyderabad based start-up, CIAL, and The Agency for New and Renewable Energy Research and Technology (ANERT), Govt. of Kerala to develop Vertical Take-off and Landing (VTOL) based aircraft concept for short distance cargo delivery / air taxi concept. BPCL has also signed an MoU with KPIT Technologies to collaborate for hydrogen fuel cell electric buses, promoting sustainable and safe hydrogen-based mobility solutions.

Furthermore, BPCL has been supported under National Green Hydrogen Mission by MNRE to set up Hydrogen Refueling Station at Trivandrum. BPCL has also submitted joint proposal along with IIT-Roorkee and IIT-Delhi to set up Centre of Excellence to foster India centric development of Hydrogen value chain.

10.4.6 HPCL: HPCL R&D (HPGRDC) had initiated its foray into Green Hydrogen (GH_2) ecosystem way back in 2019-20 by installing a Proton Exchange Membrane (PEM) electrolyser powered by Solar power plant to meet the entire captive requirement of hydrogen for hydro processing for R&D. Further, HPGRDC has developed an advanced Alkaline (AEM type) Electrolyser Technology which uses in-house developed highly efficient bi-functional catalyst for its electrodes, eliminating the use of precious noble metal catalysts. In addition, the modified anion exchange membrane is placed between the two porous electrodes to form a "zero-gap" design, reduces the ohmic losses substantially, and enables it to produce high purity hydrogen. The developed 10 kW HP-AEME technology (2 Nm3/h H2 production capacity) combines the advantages such as cost effectiveness, low severity of operation and high efficiency and current density. Anion Exchange Membrane (AEM) electrolyser has been scaled up to 1 MW equivalent cell size and currently, testing and validation are in progress.

HPGRDC has commissioned India's first Solid Oxide Electrolyser Cell (SOEC) of 20 kW capacity in May 2024. This SOEC system has the potential to increase energy efficiency by 20% to 30% as compared to PEM and Alkaline electrolysers. HPCL in collaboration with International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI) and Central Glass & Ceramic Research Institute (CGCRI) has developed indigenous 1KWx10 Solid Oxide Fuel Cell (SOFC) stack.

HPCL Visakh Refinery commissioned the first ever Green Hydrogen Plant in any Indian Refinery in July 2024. The plant has a capacity to produce 370 TPA of Green Hydrogen (GH_2). HPCL has initiated steps for procuring 5 KTPA Green Hydrogen for 25 years for its Visakh Refinery and the plant for the same to be set up under BOO basis.

10.4.7 MRPL: MRPL is setting up a Green Hydrogen plant with a capacity of 500 TPA with the project targeted to be mechanically completed by Q3 of 2026-27. Under SIGHT-2B scheme, MRPL has tendered for 10 KTPA capacity.

10.4.8 CPCL: CPCL is setting up a 2 KTPA Green Hydrogen Unit on BOO basis which is likely to be commissioned by 2027-28. The green hydrogen generation capacity will be subsequently ramped up to 10

KTPA progressively by 2030 in line with the National Green Hydrogen mandate.

10.4.9 NRL: NRL is setting up a 2.4 KTPA green hydrogen plant on EPC basis, which is targeted to be commissioned by Dec. 2025. Also, NRL has floated a tender to set up a 10 KTPA Green hydrogen on BOO (Build, Own and Operate) basis and to supply Green Hydrogen for use in refinery, under SIGHT 2B scheme of MNRE. Total CO_2 emission reduction from above two green hydrogen projects shall be about 0.124 MMTPA.

10.4.10 EIL: EIL has been a frontrunner in implementing projects related to Green Hydrogen as well both for its production through electrolyzers and assessment of blending hydrogen in the existing natural gas pipelines. EIL provided its services for the execution of balance of plant (BoP) and associated facilities to install a 10 MW green hydrogen production facility in GAIL Vijaipur, Uttar Pradesh. This plant is designed to produce 4.3 tonnes per day (TPD) of green hydrogen using renewable energy from the grid and was commissioned recently. In addition, EIL is delivering services to various other clients for green hydrogen/ green ammonia production projects that are critical to decarbonizing the industrial sectors.

By leveraging new technologies, enhancing infrastructure, and integrating renewable energy, the oil and gas sector can continue to support India's economic development while transitioning to a more sustainable and resilient energy future.

10.5 Circular Economy Practices in Used Oil:

Concept of Circular Economy in Used Oil has gained momentum in past two decades wherein OMCs not only use the re-refined oil, obtained from used oil for manufacture of lubricants, but also conserve the precious petroleum reserves for safer and healthier tomorrow. Moreover, recycling has potential to reduce the rate of global climate change by reducing the extraction the manufacturing processes. This helps in lowering carbon footprints in the ecosystem. Re-refining of used lubricants could result in both environmental and economic benefits. Re-refining of used oil to manufacture base oil conserves more energy than reprocessing the used oil for use as fuel. The energy required to manufacture re-refined base oil from used oil is only one-third of produce virgin base oil. Therefore, re-refining is considered by many as a preferred option in terms of conserving resources as well as minimizing waste and reducing damage to the environment.

10.5.1 IOCL: IOCL has launched various lubricants so far with Re-refined base oils (RRBO) namely-Servo Raftar (for commercial vehicles), Servo Greenmile (for petrol vehicles), Servo 4T Green (four stroke bike engine oil) and Servo Tractor Green (Tractor Engine Oil) with up to 25% re-refined base oils. Further RRBO is being used in Industrial hydraulic and gear oils also. RRBO procured in 2024-25 was 2010 KL and approximately 13900 KL of RRBO blended lubricants were sold.

Additional efforts by OMCs to implement EPR legislation: OMCs have started engagements with all stakeholders and meetings have been organized with bulk generators for proper disposal of Used Oil, with aggregators-for collection of Used Oil and with recyclers for steady flow of RRBO & EPR certificates to OMCs. Work has been initiated to onboard aggregators-for collection of Used Oil from major bulk generators and supply to Re-refiners for RRBO production.

10.5.2 BPCL: As a part of BPCL's commitment to sustainability and circular economy principles, BPCL has undertaken multiple initiatives to promote the responsible management of used oil. BPCL's R&D (Lubricants) has successfully developed and commercialised a range of Automotive and Industrial lubricants formulated using Re-refined base oils (RRBO) and further

working to expand the RRBO based product portfolio, thereby facilitating the reuse of valuable resources. To support circularity, we are procuring Re-refined base oils from authorized Recyclers for use in Lubricant product formulations and working with Re-refiners for the improvement in quality of Re-refined base oils produced by them. BPCL is creating awareness through various training programs among key stakeholders including channel partners, customers, and Automotive OEMs-on the importance of Extended Producer Responsibility (EPR) in used oil management, and advocate the environmental benefits of RRBO, such as reduced carbon footprint compared to virgin base oils. Moreover, BPCL is actively engaged with regulatory and standard making bodies such as BIS, CPCB, and RECEIC to support development of EPR Used oil policy and establish a robust ecosystem for used oil management. These efforts are fully aligned with national environmental objectives for Used oil management.

10.5.3 HPCL: India's Used Oil ecosystem has long been marked by fragmentation and informal practices, leading to significant losses due to inefficient processes and improper disposal. Resource Efficiency and Circular Economy Industry Coalition (RECEIC) has launched a working group on the circularity in Used Oil during November 2024, wherein members from 18 industries representing entire value chain of Used Oil ecosystem came together to address various issues concerning EPR on Used Oil. During the first ever RECEIC Global Symposium held on March 24-25, 2025, this working group has released a knowledge paper titled 'Advancing India's Self Reliance: Enhancing Circularity in Used Oil Management'. HPCL became the first PSU to apply for registration as Producer on the CPCB Portal for used oil.

10.6 Sustainable Development:

Oil PSUs under Ministry of Petroleum & Natural Gas are integrating ESG factors into its future strategies and business operations with a view to enhance competitive advantage, attracting investors, building resilient business models and contributing to a more sustainable and inclusive global economy. Oil PSUs are committed to achieving its ESG objectives by implementing best practices in its operations and activities. The ESG performance is continuously benchmarked with national and international peers. An outline of activities/achievements in this regard is provided below:

10.6.1 ONGC: ONGC's Decarbonization Roadmap has been made publicly available, demonstrating its commitment to transparency and accountability. ONGC being a signatory to the Oil and Gas Decarbonization Charter (OGDC) during COP28, has committed itself to ambitious environmental goals. The company aims to achieve near zero upstream methane emissions by 2030 and to eliminate routine flaring by the same year. In 2024, ONGC received a B-rating in the Carbon Disclosure Project (CDP), reflecting its continuous efforts towards improving its environmental performance.

ONGC has so far registered 15 Clean Development Mechanism (CDM) projects with the United Nations Framework Convention on Climate Change (UNFCCC), with a combined CER generation capacity of 27,54,455 CERs, and application for issuance of 230,876 CERs for its 102 MW Wind Power project at Jaisalmer, Rajasthan has been filled with the UNFCCC. In FY 2024-25, ONGC conducted 322 energy audits across various rigs and installations through in-house energy auditors. Additionally, it has implemented an e-waste policy to ensure the responsible disposal of electronic equipment and accessories that have reached the end of their useful life. A Life Cycle Assessment (LCA) was also performed for six products, evaluating the environmental impact associated with their entire life cycle in terms of four impact categories: climate change, acidification, marine eutrophication, and fresh eutrophication.

10.6.1.1 Methane Leak Detection and abatement: ONGC has signed a Cooperation Agreement with TotalEnergies to carry out methane emissions detection and measurement campaigns using TotalEnergies' pioneer AUSEA (Airborne Ultralight Spectrometer for Environmental Applications) technology. We are planning to conduct Drone Surveys using Total Energies Patented technology AUSEA to detect particular area in an installation where methane emissions are occurring. Based on the hotspot identified through Remote Sensing and Arial surveys, ground surveys are conducted to detect specific leaks in pipeline and other instruments which are the source of fugitive methane emissions.

ONGC carries out regular gas leak detection survey at processing plants with handheld optical imaging IR camera. With the above efforts ONGC is able to detect approx. 52.16 MMSCM of methane in FY 2024-2025 alone which tantamount to 1.06 MMT CO_2e. It is important to note that ONGC is also conducting LDAR (Leak Detection and Repair Program) since 2008. Till date, ONGC has detected and arrested fugitive methane emissions of around 72.64 MMSCM which tantamount to 1.47 MMTCO2e.

10.6.1.2 Green initiatives undertaken: Demonstration plant / R&D plant: Equipment & machinery for green H_2 production plant has been received at Nandasan ETP, Mehsana, Gujarat, in July 2024. Erection & Commissioning work in under progress. This plant will produce green H_2 from produced water of HC well.

- Tatipaka refinery green H_2 plant: ONGC exploring production of green H_2 through electrolyser route at Tatipaka refinery.
- 40 KTA green H_2 Green fields projects: ONGC is engaged in discussions with MRPL regarding a green hydrogen offtake arrangement and the establishment of a greenfield project in Mangaluru. A Joint Working Committee comprising members from both ONGC and MRPL has been formed to assess the feasibility of supplying 10% green hydrogen to MRPL.
- Also, a Lab has been set-up in KDMIPE to undertake R&D work of CCUS. The Lab is also working on gas adsorption studies in coal, which can also act as an excellent trap for CO_2 as it permits higher storage than its pore volume capacity.

10.6.1.3 Double Materiality Assessment (DMA): As part of its unwavering commitment to sustainable development, ONGC has undertaken a comprehensive double materiality assessment exercise, aligning with global best practices in ESG reporting. This approach reflects ONGC's recognition of the dual lens of sustainability-evaluating not only how environmental and social factors impact the company's financial performance, but also how ONGC's operations affect the broader ecosystem and society. By integrating both perspectives, ONGC ensures that its strategic decisions are taken holistically by factoring in relevant risks and opportunities, reinforcing its role as a responsible energy leader in the transition to a low-carbon future.

10.6.1.4 ESG Ratings: Demonstrating its growing commitment to environmental transparency and sustainability, ONGC made a significant leap in its CDP Climate rating, achieving a B-score in its very first year of reporting, a remarkable improvement from a previous F rating. This upward trajectory reflects ONGC's proactive climate disclosure and risk management efforts. Additionally, ONGC's performance in the S&P Global Corporate Sustainability Assessment (CSA) also saw a notable rise, with

its ESG score improving from 13 to 28, underscoring the company's enhanced focus on ESG governance, environmental stewardship, and social responsibility. These achievements signal ONGC's strategic alignment with global sustainability benchmarks and its dedication to long-term value creation through responsible business practices.

10.6.1.5 ESG Reporting: ONGC publishes its Integrated Annual Report and BRSR, mandated by SEBI, on a year-on-year basis, providing detailed sustainability disclosures and ESG highlights. These reports are externally assured by third-party auditors under applicable assurance frameworks, ensuring the authenticity and reliability of the disclosed data. This consistent and verified reporting has significantly enhanced transparency, with ONGC now maintaining a comprehensive set of ESG metrics that are publicly available each year.

10.6.1.6 ESG Policies: In a strong demonstration of its commitment to sustainability and responsible business practices, ONGC has developed a suite of new policies including the Equal Opportunity Policy, Human Rights Policy, Anti-Bribery and Anti-Corruption Policy, Biodiversity Policy, Environment Policy, Health & Safety Policy, Public Advocacy Policy, Supplier Code of Conduct, and Sustainable Water Management Policy. These policies reflect ONGC's strategic approach to integrating ESG principles across its operations and fostering a culture of accountability, inclusivity, and environmental stewardship.

10.6.1.7 Key Sustainability Highlights:

A. Environment

a) Decarbonization Commitment: ONGC's Decarbonization Roadmap has been shared publicly, with a target to achieve Net Zero for Scope 1 and 2 emissions by 2038.

b) ONGC has become a signatory to the Oil and Gas Decarbonization Charter at COP28, pledging to achieve near-zero upstream methane emissions and eliminate routine flaring by 2030.

c) Methane Management: Methane emissions are monitored round-the-clock at 166 locations using TROPOMI satellite technology. Ground leak detection surveys with handheld GasFind IR cameras have identified 52.16 MMSCM of fugitive methane gas in FY 2024-25, preventing emissions equivalent to 1.06 MMTCO2e. Since 2007, a total of 72.64 MMSCM of methane emissions have been avoided, resulting in a reduction of 1.47 MMTCO2e.

d) Renewable Energy: In 2024-25, ONGC generated 212.05 million units of renewable energy. The company's total standalone installed renewable energy capacity stands at 194.5 MW (41.5 MW solar and 153 MW wind as of 31st March 2025).

e) LED Initiatives: 5,049 LED lights installed in FY 2023-24 delivered annual electricity savings of 75.9 million units. Overall, 3.6 lakh LED lights have been installed across ONGC facilities.

f) Emissions Reduction: Emissions control and energy efficiency programs have saved 2,23,734 MTCO2e, and all products include information about environmental and social impacts as well as responsible usage.

g) Strategic Investments: ONGC is investing ₹1 lakh crore by 2030 and ₹2 lakh crore by 2038 in energy efficiency initiatives. A tender was floated on 12th August 2024 for a 1,000 MW hybrid renewable energy project (500 MW wind + 500 MW solar) under the Group Captive Model.

h) Carbon Capture: A dedicated Carbon Capture Utilization and Storage (CCUS) laboratory was inaugurated at KDMIPE, alongside a three-year research partnership with IIT Bombay's NCOE-CCU.

i) Carbon Offsets: ONGC has registered 15 Clean Development Mechanism (CDM) projects with UNFCCC, with a total of 27,54,455 Certified Emission Reductions (CERs) issued to date.

j) Energy Audits: 322 energy audits were conducted at rigs and installations by in-house auditors.

k) E-Waste Management: An e-waste policy in-place, to ensures responsible disposal of end-of-life electronic equipment.

l) Life Cycle Assessment: Environmental impacts were assessed for six products, covering climate change, acidification, marine eutrophication, and freshwater eutrophication categories.

B. Social:

a) Employee Well-being: ONGC allocated 1.81% of its total revenue to measures supporting employee and worker welfare.

b) Health and Safety: Safety indicators for FY 2024-25: LTIFR – 0.29 (ONGC), 0.18 (Contractors); R-WRI – 0.42 (ONGC), 0.35 (Contractors).

c) All employees and workers have received training on human rights issues and policies.

d) Diversity and Inclusion: 59% of procurement inputs are sourced from MSMEs and small producers, including 3% from women-owned and 4% from SC/ST enterprises.

e) CSR Impact: ONGC's CSR initiatives benefited 1.46 crore people in FY 2024-25, primarily from vulnerable communities, with a total CSR expenditure of ₹911 crore.

f) Certifications: All operational sites are certified to ISO 9001 (Quality Management), ISO 14001 (Environment), ISO 37001 (Anti-Bribery), and ISO 45001 (Occupational Health and Safety) standards.

g) UN Global Compact: ONGC is a signatory to the United Nations Global Compact.

h) Information Security: There were zero reported data breaches in FY 2024-25.

C. Governance:

a) Stakeholder Engagement: Grievance redressal mechanisms are accessible to both internal and external stakeholders through public channels.

b) Ethical Sourcing: All vendors and suppliers provide written undertakings for compliance with statutory and human rights laws, including bans on child labour and forced labour. Projects exceeding ₹1 crore in value require an Integrity Pact to ensure fairness and transparency.

10.6.2 **OIL:** Oil India Limited (OIL) has unveiled a new vision to position itself as a leading, future-ready integrated energy company. Our Vision statement: "Be a leading and future ready integrated energy company committed to sustainable energy security of India through performance excellence". Sustainability is at the core of this vision, and the company is committed to embracing ESG principles to drive positive change for all stakeholders, safety, and the planet.

Key ESG Highlights undertook during FY 2024-25 are as follows:

A. Environment

a) OIL is leading the way in environmental sustainability,

setting an ambitious net-zero target by 2040.

b) OIL has incorporated OIL Green Energy Limited a wholly-owned subsidiary company, on 31st January 2025, for pursuing renewable and non-conventional energy business.

c) OIL is actively contributing to afforestation efforts, securing 419 hectares of reserved land for plantation under the MoEF&CC's Green Credit Program and planning further expansions.

d) OIL became the second Indian oil and gas company to join the OGDC, a global initiative launched at COP28 (2023).

e) OIL has collaborated with TotalEnergies to detect and measure methane emissions across its sites in India. Utilizing AUSEA technology, which employs drone mounted sensors, this partnership ensures comprehensive emissions monitoring and reduction, aligning with global best practices.

B. Social:

a) OIL promotes a culture of continuous learning and professional growth through structured training programs.

b) Recruitment policies ensure equal opportunities and a workplace that values diversity and inclusivity.

c) Achieved the lowest ever LTIFR (0.071), reflecting a strong commitment to employee safety.

d) A well-established Health, Safety, and Environment (HSE) system ensures adherence to best practices.

e) Regular audits, digital monitoring, and Project "KAVACH" further strengthen safety systems.

f) Upholds anti-bribery policies, Whistle Blower Policy, and collaborates with Transparency International India for ethical governance.

g) CSR programs are designed based on comprehensive needs assessments, ensuring targeted and measurable impact on communities.

C. Governance:

Oil India Limited (OIL) is committed to strong corporate governance by adhering to the Companies Act, 2013, SEBI (LODR) Regulations, 2015, DPE Guidelines, and global best practices. The company's governance framework ensures transparency, ethical business conduct, and accountability to shareholders and stakeholders.

a) Commitment to Transparency & Security

- Regular ESG & Sustainability Reports ensure stakeholder engagement and open disclosure of performance.
- Cyber security Excellence: OIL reported zero cyber security breaches, reinforcing its commitment to digital security.

b) Board Structure & Diversity

- Board Diversity Ratio: 1:7 (one woman director for every seven board members).
- Board-Level Oversight: 8 Board sub-committees oversee different business functions, ensuring effective governance.
- Board Diversity Policy: A structured approach to ensuring diverse representation and inclusive leadership was approved and published during FY 2025.

D. ESG Reporting:

Oil India Limited (OIL) is committed to transparent and comprehensive

ESG disclosures in alignment with regulatory frameworks and global best practices.

a) Business Responsibility and Sustainability Reporting (BRSR):

- Introduced by SEBI in 2021, BRSR mandates ESG performance disclosures for the top 1000 listed companies.
- OIL published its first voluntary BRSR report in FY 2021-22, followed by mandatory reports in FY 2022-23 and FY 2023-24, the latter assured by a third-party assurance provider.
- From FY 2024-25, OIL undertook reasonable assurance of its BRSR Core in compliance with SEBI's updated guidelines.
- Sustainability Reporting: OIL has been publishing Sustainability Reports (Darpan) since 2012, following the Global Reporting Initiative (GRI) framework to ensure transparency in ESG performance.

b) Carbon Disclosure Project (CDP) Performance:

- OIL improved its climate change score from "F" to "C" and achieved a "B-" rating in water security, reflecting its commitment to environmental responsibility.

10.6.3 GAIL: GAIL Sustainability Reports are in accordance with the latest version of the International Petroleum Industry Environmental Conservation Association (IPIECA) guidelines, which is a global Oil & Gas industry association that focuses on environmental and social issues. GAIL Sustainability reports are assured by an external assurance agency. The Sustainability Reports are assured as per Type 2 High-Level Engagement/Reasonable AA1000AS V3 standard. The assurance process includes physical visits at multiple sites, offices, corporate departments and virtual meetings at multiple locations to validate the data provided.

10.6.3.1 SEBI Mandated BRSR: GAIL has been publishing the Business Responsibility & Sustainability Report (BRSR) since FY 2012-13, as a part of the Annual Report, detailing the work being carried out in the area of Sustainability. GAIL's BRSR is also assured by an external assurance agency. The Assurance Auditor verifies the data received from various offices and also visits major GAIL sites to carry out Reasonable Assurance. The Assurance Certificate is provided by the Auditor after incorporation of applicable assurance points in BRSR. These reports may be accessed at GAIL's website: www.gailonline.com.

10.6.3.2 Adoption of CII GreenCo Ratings: The CII Green Company (GreenCo) Rating System endorses an approach that is based on sustainable performance. The rating system evaluates the ecological aspects of companies based on criteria such as Energy Efficiency, Renewable Energy, GHG mitigation, materiality conservation etc.

GAIL has implemented a CII GreenCo rating across its operational sites which provides leadership and guidance on how to make products, services and operations more sustainable. The Company's internal and external stakeholders are trained on the latest Green concepts so that they can implement better systems and global best practices in their operations.

The following GAIL sites have been accredited with CII GreenCo rating:

- Platinum Certification: JHBDPL-Ranchi, KKBMPL-Kochi and Dabhol-Bengaluru Pipeline
- Gold Certification: Pata Petrochemical Plant
- Silver Certification: Vijaipur Gas Processing Plant, Vaghodia Gas Processing Plant, Gandhar Gas Processing Plant, Jhabua

Compressor Station and Vizag-Secundrabad Pipeline

- Bronze: Chhainsa Compressor Station

10.6.3.3 ESG Ratings: In 2025, GAIL for the 8th consecutive time, has been included in the FTSE4Good Index Series as a part of the London Stock Exchange Group Sustainability Index, which demonstrates strong ESG practices in the Oil & Gas Sector. GAIL received the Prithvi Award-2024, Energy & Mining Category-2024 Award and India's Most Sustainable Companies 2023-24 Award. GAIL has also achieved a significant milestone by being upgraded two notches from "C" to "B" level in the 2023 CDP Global ESG Rating under Climate Change category.

In recognition of consistent effort and dedication toward Sustainability, GAIL was conferred with the 'GreenCo Champion Award' during the CII GreenCo Summit 2025 held in Hyderabad in June'25. Additionally, in acknowledgement of GAIL's proactive initiatives toward achieving an ambitious Net Zero emissions target, GAIL was honored with the prestigious "Sustainable Best Initiative of the Year 2025 Award-Achieve Net Zero" by UBS Forums in New Delhi on 11.06.2025.

10.6.3.4 ESG Performance Highlights of GAIL

A. Environment

a) GAIL operates a network of 16,421 km of NG pipeline & 2,040 km of LPG pipelines.

b) GAIL has an installed capacity 118 MW of Wind Power and 27 MW of Solar Power. GAIL has set a target to attain 3.5 GW of Renewable Energy by 2035.

c) Net Zero strategy aims to achieve 100% reduction in Scope-1 and Scope-2 emissions by the year 2035 and a 35% reduction in Scope-3 emissions by the year 2040.

b) Recycled 0.78 million m^3 of Wastewater. Zero Liquid Discharge (ZLD) project is under implementation at Pata (U.P) to reduce fresh water consumption.

c) GAIL has planted ~50,000 trees during FY 2024-25 under the initiative "Ek Ped Maa Ke Naam".

d) Hon'ble Prime Minister has inaugurated GAIL's first 05 TPD CBG Plant in Ranchi on 02.10.2024.

e) GAIL's First Green Hydrogen Plant (10MW) at Vijaipur inaugurated by Shri Pankaj Jain, Hon'ble Secretary, Ministry of Petroleum & Natural Gas, GOI on 24th May, 2024.

f) GAIL has converted 01 Natural Gas turbine driven Pipeline Compressor to Electrical drive (3.6 MW) at Vijaipur (M.P).

B. Social

a) In FY 2024-25, more than 15 lakh people benefited from GAIL's CSR projects.

b) 168 out of 180 students undergoing coaching for engineering entrance exams have cleared JEE Mains 2025 through GAIL's Utkarsh initiatives.

c) 60 Mobile Medical Units (MMUs) are operational across 30 districts in 13 states, and providing healthcare services in remote and rural areas as GAIL Arogya initiatives.

d) GAIL procured ₹1,760 Cr worth of goods & services from MSEs which is around 48% of the total eligible procurement.

e) Procurement of goods & services from MSEs owned by SC/ST entrepreneurs stood at ₹167 Cr which is 4.6% and from women entrepreneurs stood at ₹280 Cr which is 7.8% of the total eligible procurement.

f) GAIL's Customer Satisfaction Index is 92% for the FY 2024-25.

C. Governance

a) The Fitch & Moody's ratings have re-affirmed GAIL (India) Limited's Long-Term Foreign-Currency Issuer Default Rating (IDR) at 'BBB-' & 'Baa3' respectively, capped to India's Sovereign Rating with Outlook as 'Stable'. M/s India Ratings has reaffirmed the GAIL Rating (Domestic) as 'AAA'.

b) In FY 2024-25, GAIL received 250 complaints from internal and external Stakeholders through the CPGRAMS portal, and 100% of these were promptly resolved.

c) GAIL was conferred with the 'GreenCo Champion Award' during the CII GreenCo Summit 2025 held in Hyderabad in June'25

d) Inaugurated India's first Closed loop Meter Prover facility on 23rd August, 2024 at Dibiyapur Compressor Station.

e) GAIL pronounced as winner of "ICAI Sustainability Reporting Award" for FY 2023-24 for exemplary commitment to sustainability reporting and responsible business practices.

f) GAIL has completed Migration process from SAP ECC 6.0 System to latest SAP S4/HANA. The transition shall harness the capabilities of simplified & streamline processes, intelligent automation and real-time analytics.

g) Achieved HSE Score of 96.37% for FY 2024-25 against an internal target of 95.5%.

10.6.4 IOCL: IndianOil is integrating ESG factors into its future strategies and business operations with a view to enhance competitive advantage, attracting investors, building resilient business models and contributing to a more sustainable and inclusive global economy. IndianOil is committed to achieving its ESG objectives by implementing best practices in its operations and activities. The ESG performance is continuously benchmarked with national and international peers. An outline of activities/achievements in this regard is provided below:

A. Environment

a) IndianOil is positioned at the top in the Indian Oil and Gas Corporate -Bloomberg NEF Global Energy Transition Score

b) Secured the top rank among Indian Oil & Gas companies in the globally recognized Dow Jones Sustainability Indices (DJSI) 2025

c) Renewable Energy Capacity ~252 MW

d) 100 % Energy Efficient Lighting across IndianOil locations

e) 62 lakhs trees surviving till date

f) 1,20,000 MTCO2e

g) Carbon Sequestration Through Tree Plantation

h) Wastewater Recycled ~ 39.8 Billion Liters

i) ₹536.5 crores investment in renewable energy and greening efforts

j) 1.5 MMTCO2e+ Avoidance / Reduction / Mitigation in GHG Emissions

k) 3,30,174 MT of waste reused/ recycles/recovered

l) 228 zero liquid discharge locations

B. Social

a) CSR expenditure ₹ 583.04 crore during FY 2024-25 and more than 1.36 crores CSR Beneficiaries

b) 0.083 Lost Time Injury Frequency Rate (LTIFR) for permanent employees and 0.068 Lost Time Injury Frequency Rate (LTIFR) for permanent Workers

c) Internal Committees for POSH implementation at every Unit/ Region/Head Office level, headed by senior-level women employee

d) Health, Safety and Environment (H,S&E) Policy implemented across IndianOil to enhance safety culture

e) 42.17% Purchases from MSME/ MSEs

f) More than 93% Permanent employees covered various Union /Association

C. Governance

a) 99.98% Customer Complaints closed at the end of financial year 2024-25

b) 12 Board committees for good governance and 3 Female Directors including government nominee directors. More than 30 years average of experience of the whole-time Directors

c) 100% Operation Sites assessed for risk related to corruption

d) Zero cases Anti-competitive behavior recorded during FY 2024-25

- Indian Oil is committed to ESG through a multi-faceted approach that encompasses energy efficiency, renewable energy, waste management, biodiversity conservation, amongst others. The company has reduced its GHG emissions during FY 2024-25 by 1.55 MMTCO2e through avoidance/mitigation/ offset by implementing energy conservation projects, use of renewable energy, tree plantations, etc.
- IndianOil complies with the Securities and Exchange Board of India's (SEBI) non-financial reporting requirements through the Business Responsibility and Sustainability Report (BRSR) that transparently communicates non-financial data, plans, and performance to stakeholders. IndianOil's third party assured BRSR 2024-25 can be accessed from https://iocl.com/business-responsibility-report.
- IndianOil currently contributes to 11 United Nations SDGs through range of initiatives that span environmental, societal and governance dimensions.
- In the biodiversity space, large scale tree plantation has been carried out including mangrove plantation. As part of our efforts to contribute to a greener planet, IndianOil has planted more than 7 lakh trees during 2024-25 and around 62 Lakh trees are estimated to be surviving at the end of FY 2024-25 within and beyond our organizational boundaries, resulting in emission sequestration of ~0.124 MMTCO$_2$e. Among other conservation projects, IndianOil supported the transcontinental relocation of cheetahs.
- IndianOil has started participation in the Green Credits Programme (GCP) of GoI. Under the program, a total payment of ₹56.02 crore have been released for plantation covering 1077.01 hectares spread across four states i.e. Gujarat, Telangana, Rajasthan and Bihar.
- IndianOil also entered into partnerships with firms like EverEnviro, GPS Renewables to set up CBG plants for integrating advanced biogas technologies to convert organic waste into CBG.

Water Stewardship: IndianOil's water management initiatives include the use of treated wastewater, rainwater harvesting, and the establishment of sewage treatment plants, contributing to significant water reuse and conservation.

Waste Management & Circularity: Under the "Unbottled" campaign discarded PET bottles are converted into sustainable garments thereby promoting responsible recycling of plastic waste.

IndianOil introduced different grades of recycled polymers granules under its brand Cycloplast. These recycled granules are being used in blend with virgin polymers by processors. This marks a significant step by an Oil PSU towards providing solution for eco-friendly packaging.

10.6.5 **BPCL:** As a leading Maharatna PSU, BPCL's strategy focuses on India's commitment to transition to Net Zero. With myriad developmental challenges in India and increasingly volatile markets, we are cognizant of the need for a "just transition" that takes people along as we collectively move towards a new energy economy.

10.6.5.1 ESG Performance Highlights: The key ESG performance are as under:

a) Renewable installed capacity reached 154.86 MW and 171 MW are under development.

b) Achieved 4.76% renewable energy share in total electricity consumed.

c) GHG emission reduction of 1,31,396 MTCO2e through Refineries Energy Conservation (ENCON) initiatives.

d) 5 MW Green Hydrogen Plant Commissioned at Bina Refinery.

e) Established an integrated 2G and 1G Bio-Ethanol plant in Bargarh, Odisha, with a total production capacity of 200 Kilolitres per day. The project, with an approved cost of ₹1,557 crore, was in the pre-commissioning stage in March 2025 and production of Ethanol is slated to commence from September 2025.

f) Enhanced green cover through cumulative 12.18 lakh trees across India.

g) CSR initiatives covered 41,89,337 beneficiaries with ₹179.37 Crore expenditure and around 50% beneficiaries are from vulnerable and marginalized groups during FY 2024-25.

h) Total CSR Spend in the Last 11 years reached ₹1658.95 crore.

i) Achieved 125.55 Million Man-hours worked without lost time accidents (LTA) in Refineries.

j) Achieved 31.80% Procurement from MSMEs/MSEs, surpassing the mandated target of 25%.

k) Conducted 134 vigilance awareness sessions across the company.

l) 18.18% female directors on the board.

m) 100% board-level committees headed by independent directors.

10.6.5.2 Energy Management

Year	Specific Energy Consumption (in MBN)		
	Bina	Mumbai	Kochi
FY 2023-24	67.2	60.9	62.8
FY 2024-25	63.3	60.9	64.8
% change	5.8% decrease	No Change	3.18% increase

Energy efficiency is a key priority, driven by environmental goals and potential cost reductions in refineries. BPCL's strategic emphasis on energy

resource management and shift to sustainable energy sources plays a crucial role in our long-term value creation. By prioritizing efficient energy use, adopting renewables, and moving towards cleaner sources, we ensure environmental sustainability, drive cost savings, boost competitiveness, and position the company for future growth. Energy Conservation (ENCON) schemes are introduced in all three BPCL refineries that have significantly reduced the specific energy consumption.

10.6.5.3 Energy Transition: The RE business unit is advancing BPCL's cleaner energy goals, aiming to diversify the company's energy mix with greener options and to evolve into an integrated energy company.

10.6.5.4 Projects Sanctioned

- Ground Mounted Solar project at Prayagraj in UP
- Windfarm Projects each in the States of Madhya Pradesh and Maharashtra
- Integrated Green Hydrogen Plant and Hydrogen Re-fueling Station in Kochi, Kerala

10.6.5.5 Water Management: Water plays a vital role across BPCL's operations, supporting refining processes and cooling systems. Effective water management enhances BPCL's value creation by reducing environmental impact, lowering costs, increasing productivity, and managing risks related to water scarcity and regulations. This strategic approach optimizes production, enhances efficiency, and bolsters BPCL's financial performance. To bolster the efficient water management, we have continuously invested and worked towards increasing the Rainwater Harvesting (RWH) capacity and reduce the dependency on other sources of water.

- **More than 1041 TKL** (Thousand Kilo Liters) Rainwater Harvested
- **14.33 lakh sq m** Rainwater Harvesting Catchment Area

10.6.5.6 Waste Management: BPCL adheres to the 5R principles (Refuse, Reduce, Reuse, Repurpose, and Recycle) across all operations. We prioritize efficient waste management to minimize environmental impact, identifying, segregating, recycling, and ethically disposing of operational waste. We ensure the responsible disposal of hazardous waste like spent clay containing oil or residues containing oil, employing safe land filling methods facilitated by Treatment, Storage, and Disposal Facilities (TSDF). Hazardous and non-hazardous waste undergoes treatment and reuse in compliance with MoEF & CC, CPCB, and SPCB regulations. Achieved Zero waste to land fill certification for all operating locations under marketing and refinery. 5551 MT of plastic waste collected and reprocessed through BPCL's Lubes business unit under EPR as Brand owner.

10.6.5.7 Biodiversity Management: BPCL aims to minimize biodiversity impact by planting trees. In FY 2024-25, we planted over 1.78 Lakh trees using techniques such as Miyawaki afforestation, seed bombing, and conventional plantation methods. This expanded our cumulative green cover to 12,17,784 trees, contributing to the sequestration of approximately 25,571 metric tonnes of CO_2 equivalent (MTCO2e). To further reinforce our environmental stewardship, we partnered with the Madhya Pradesh State Forest Department to develop a 90-hectare green belt near the Bina Refinery, located in the Kanjia range of Khurai, Sagar district. This initiative was commissioned in July 2024 with an investment of ₹1.96 crore, which will be utilized to sustain the initiative over the next five years.

10.6.5.8 Social: Commitment to Inclusive Future: At BPCL, we prioritize an inclusive workplace that celebrates diversity and fosters a strong culture of belonging. Our initiatives are designed to ensure the welfare and safety of our employees while actively engaging with the communities we serve. By embracing principles of human rights and ethical labour practices, we are dedicated to initiatives that uplift society. We cultivate a workplace that not only values inclusivity and diversity but also promotes open dialogue and collaboration. Furthermore, our commitment extends to community-driven philanthropic endeavors, allowing us to consistently strive for a meaningful and positive impact on the broader community and contribute to sustainable development.

10.6.5.9 FY 2024 – 25 Highlights

a) 100% Employees and workers trained on health and safety measures and skill upgradation (including non-permanent workers)

b) 125.55 MMH Million Man-hours combined, without LTA in refineries

c) ₹179.37 crore CSR Spent

d) 2,553 man-hours trained 2361 participants on HSSE

e) 100% permanent employees and workers trained on human rights issues and policy

f) Zero Reportable Lost Time Injury Frequency Rate (RLTIFR) for employees

10.6.5.10 Employee Satisfaction Enhancement (ESE): At BPCL, we have several key initiatives aimed to support employee well-being. Roshni Plus offers confidential psychological counseling services for employees and their dependent family members. ESE hosts online ActivLife webinars and offline seminars on balance of work-life, mindfulness, and healthy habits, benefiting over 2500 participants. The unique initiative of SahkarmiMitra engages 63 nominated employees as emotional first-aid providers, promoting mental health awareness and offering support across various BPCL locations. Newly selected Sahkarmi Mitras receive specialized training to enhance their skills in supporting their peers.

10.6.5.11 Occupational Health and Safety: BPCL's motto, "Safety First, Safety Must," underscores our commitment to safety, health, security, and the environment, which remain central to our operations as a responsible company addressing evolving ESG aspects. Our goal is to achieve zero incidents, effective hydrocarbon mitigation, reduction of related dangers, and continuous improvement in operations. BPCL has established 3-tier Health, Safety, and Environment (HSE) committees at various operational levels (Operating location, Regional/ HQ and Corporate level). These committees regularly review safety protocols, investigate incidents, and recommend improvements to enhance safety measures.

a) Health, Safety, and Environment (HSE) Initiatives:

- **Training Programs:** BPCL conducts comprehensive safety training programs for employees and contractors as per OISD-STD-154, and Statutory/ Regulatory guidelines (MOU targets), covering topics like fire safety, first aid, emergency response, and safe handling of hazardous materials. These programs ensure that everyone is well-equipped to maintain safety standards.
- **Periodic Health Screenings:** BPCL organizes regular health check-up camps for employees, focusing on early detection and treatment of health issues.
- **Occupational Health Centres:** At major operational sites, BPCL has

established occupational health centres staffed with medical professionals to provide immediate healthcare services and monitor employee health.

b) Emergency Preparedness and Response

- **Mock Drills:** Regular mock drills are conducted as per PNGRB ERDMP Regulations 2010 to prepare employees for emergency situations such as fires, spills, and natural disasters.
- **Emergency Response Teams:** BPCL has trained emergency response teams equipped to handle various types of emergencies. These teams are regularly trained and updated on the latest response techniques.
- **Safety Audits and Inspections:** Regular internal/ external safety audits and inspections are conducted to identify potential hazards and ensure compliance with safety standards. These proactive measures help in implementing corrective actions promptly.
- **Risk Assessments:** Detailed risk assessments using various techniques like Hazop, HIRA, QRA etc are performed to identify and mitigate potential safety risks in BPCL's operations.

c) Awareness and Communication

- Safety Bulletins and Alerts
- Safety Campaigns
- Safety Awareness Week

10.6.6 HPCL: HPCL is integrating ESG factors into its strategies and business operations with a view to enhance competitive advantage, attract investors, build resilient business models and contribute to a more sustainable and inclusive global economy. HPCL is committed to achieving its ESG objectives by implementing best practices in its operations and activities. The ESG performance is continuously benchmarked with national and international peers.

10.6.6.1 ESG INITIATIVES:

a) ESG Integration & Strategy:

- ESG principles embedded in corporate strategies and daily operations.
- Aims to enhance competitive advantage, attract investors, build resilience, and support sustainable growth.

b) Strengthening ESG Performance:

- Participation in global ESG ratings including CDP, S&P, EcoVadis.
- CDP Climate Score improved to 'B' (Management) in 2024 from 'C' (2023) and 'D' (2022).
- Debut in CDP Water Security rating with 'B-' in 2024.

c) ESG Materiality Assessment:

- Conducted latest materiality assessment in 2024.
- Aligned with GRI-11, SASB, IPIECA standards.
- Benchmarked with peers and incorporated inputs from 30 government regulations and investor reports.

d) ESG Risk Management:

- ESG risks integrated into Enterprise Risk Management (ERM) framework.
- Aligned with COSO ERM 2017 and ISO 31000:2018.
- Covers operational, regulatory, financial, strategic, sustainability, cyber security, and business continuity risks.

e) Environmental Sustainability:

- Net Zero (Scope 1 & 2) target by 2040.
- Installed renewable capacity:

224.33 MW (Solar: 123.43 MW; Wind: 100.9 MW).

- 110 Marketing Locations (36 in LPG SBU and 74 in SOD SBU) use 100% Biodiesel in DG sets.
- 94% retail outlets solarized.
- 2,038 outlets with CNG facilities.
- EV charging facilities at 5,976 retail outlets.
- Commissioned pilot green hydrogen plant at Visakh Refinery.
- First PSU to opt for CII GreenCo Rating; 84 locations in FY25.
- Implemented ISO 9001, 14001, 45001 (Integrated Management System) across HSE; ISO-50001 for energy management.

f) Social Sustainability:

- Exceeded MoU targets for safety training.
- 1,472 officers completed NSC–HPCL Safety Aptitude Test (10 modules, 40+ safety standards).
- CSR spend of ₹87.35 crore in FY25, benefitting 40 lakh+ people.
- ₹19.08 crore CSR spend in 11 Aspirational Districts.
- 10.9% women workforce; 14.37% female hires in FY25.

g) Governance & Transparency:

- Human Rights Policy and Sustainable Procurement Policy (ISO 20400) in public domain.
- Robust grievance redressal mechanism; zero data breaches in FY25.
- BRSR published as per SEBI guidelines since 2022-23; 2023-24 report assured by 3rd party (ISAE 3000).
- GRI-based sustainability reporting since FY 2011-12; multiple awards for ESG disclosures.
- Released Integrated Annual Report for FY24 based on Integrated Reporting Framework.

10.6.7 **MRPL:** ESG Performance Highlights of MRPL:

A. Environment

a) Energy consumed from renewable: 2,04,225 GJ and Energy saving: 16,21,338 GJ.

b) Reduction in our overall GHG emission intensity (scope-1,2) per MT of crude processed by 5.9% from the last financial year. Carbon sequestration through plants: 5800 tCO_2 annually.

c) Plants planted: 5762 and Total 699 acres of green belt

d) Waste generated: 15,245 MT, Waste disposed/recycled: 11,978 MT and 41 MT of Vermi-compost harvested.

e) Water consumption: 2,21,27,450 m3 includes river, Desal and Treated Sewage.

f) Water intensity (per MT of crude processed) reduction of 15.2% from last financial year.

B. Social

a) Total CSR spent: INR 29.08 crores and No of beneficiaries: Approximately 3.8 Lakh.

b) Lost Time Injury Frequency Rate (LTIFR) (per one million-person hours worked): 0 for employees.

c) 54.82% of total procurement done from MSMEs, 21.78% procured directly within India. About 1% was sourced from MSEs owned by SC/ST entrepreneurs and 3.9% from MSEs owned by women entrepreneurs.

C. Governance:

Zero complaints with regard to conflict of interest, anti-competitive conduct and Zero bribery/ corruption charges.

10.6.7.1 Materiality analysis: To understand and prioritize stakeholder expectations, MRPL undertook a comprehensive materiality assessment in April 2024, identifying and evaluating the most significant Environmental, Social and Governance (ESG) topics for the Company and its stakeholders. High priority material topics identified includes emission management, water stewardship, waste management and circularity, climate change and adaptation, human capital management, corporate governance, business ethics, risk management, energy management and efficiency, occupational health and safety.

10.6.7.2 Environmental Stewardship: MRPL has implemented initiatives across critical areas such as energy management, greenhouse gas (GHG) emissions reduction, water conservation, waste management and biodiversity preservation.

- Energy management efforts focus on improving efficiency and integrating renewable energy sources, such as solar power, across our facilities, to reduce energy intensity and carbon emissions, supporting our Net-Zero emissions target by 2038.
- Water conservation remains a critical priority, with advanced recycling systems, desalination plant and optimized effluent management ensuring responsible water usage while protecting ecosystems. Our commitment to waste management follows circular economy principles; emphasizing recycling, reuse and responsible disposal through initiatives like slop oil recovery and vermi-composting.
- Our continuous efforts through greenbelt development, afforestation and habitat restoration initiatives have significantly enhanced local ecosystems and community well-being

10.6.7.3 Social Responsibility: MRPL fosters a positive and inclusive social impact through its operations and community engagements. MRPL recognizes its responsibility towards employees, stakeholders and the communities in which it operates. For employees, we prioritize health, safety, and career development through initiatives like the Leadership Development Program for Women Executives and partnerships with leading institutions for management training.

MRPL maintains a responsible value chain by promoting local sourcing, conducting capacity building sessions for suppliers and adhering to stringent ethical and sustainable practices. Engagement with stakeholders, including customers, is a cornerstone of our approach, ensuring robust grievance mechanisms, product safety and transparency in all interactions.

- MRPL organized four vendor meetings. MRPL also participated in MSME conclaves, which were organized in collaboration with FKCCI, CII and KASSIA respectively. Additionally, MRPL took part in CII MSME Leadership Summit and Business Network International (BNI) Meet during the year. Furthermore, MRPL participated in a Special Vendor Development Meet in collaboration with Chennai Petroleum Corporation Limited (CPCL). More than 550 vendors including MSME vendors are covered under these awareness programs.
- Procurements from MSME's: 54.82% of Procurement
- Procurement from SC/ST MSME's: 1% of Total Procurement
- Procurement from women MSME's: 3.9% of Total Procurement.

10.6.7.4 Governance and Ethical Leadership: Our governance structure emphasizes proactive risk management, responsible leadership and ethical operations. Policies such as the Whistleblower Policy, CSR & SD Policy and Integrated Management System provide clear directives that reinforce accountability and promote sustainability across all levels of the organization. Performance-linked evaluations and transparent reporting practices ensure stakeholder trust and drive continuous improvement. A comprehensive Enterprise-wide Risk Management (ERM) Policy addresses critical risks, ensuring effective mitigation. Our comprehensive governance framework, focussed to safeguard stakeholder interests, integrate sustainability into decision-making and foster ethical leadership to build a resilient and sustainable future.

10.6.7.5 BRSR reporting: Under SEBI guidelines, MRPL is reporting on BRSR from FY 2022-23 onwards.

10.6.8 CPCL: CPCL is committed to Environmental, Social and Governance (ESG) principles, which are used to assess the company's sustainability and ethical impact. The Business Responsibility and Sustainability Reporting (BRSR) framework, mandated by the Securities and Exchange Board of India (SEBI), guides Indian companies in disclosing their ESG performance.

ESG Performance Highlights of CPCL:

A. Environment

a) Star of the Industry Awards – Innovative Product of the year and Efficient Refiner of the year – Global Refining & Petrochemical Congress

b) 22 Windmills, 17.6 MW and 6 KWh Rooftop windmill installed at corporate office

c) 2.3 MW Ground mounted and roof top solar panels in buildings and refinery complex

d) Zero Dependency on Freshwater, 5 MGD Asia's first City Sewage Reclamation Plant,

e) Lowest Water Consumption from 6.6 MGD to 5.4 MGD in FY 2024-25

f) Around 20% increase in utilisation of cleaner fuels. 87.4 - Lowest ever Energy Intensity Index. Lowest ever Fuel & Loss of 8.51%

g) Around 15,000 trees planted during past 5 years and 176 acres established as green belt

B. Social:

a) National HR Excellence Award–2024 and Quality Leadership Award - 2024.

b) 65.58 Million Safe Man Hours

c) 2012 Accident-free days

d) CSR expenditure Rs. 49.6 Cr

e) 56.46% Procurement from MSME, 6.74% procurement from SC/ST owned enterprises and 3.5% procurement from women-owned enterprises

C. Governance:

a) Implementation of Public Interest Disclosure and Protection of Informer resolution (PIDPI)

b) Actively functioning Women Cell to handle grievances by women employees

c) Cyber Security Operation Centre launched to enhance digital security.

d) 100% compliance to Integrity pact as per CVC guidelines.

e) No Pending Investor's complaints & Public Grievance

CPCL also actively engages with stakeholders, including investors,

employees, customers, and communities, to understand and address their ESG concerns and expectations. We have outlined an ambitious vision to achieve net zero emissions by 2046, in line with our parent company IOCL's plan. Our comprehensive roadmap includes a variety of strategies such as increasing the use of renewable energy, maximizing usage of cleaner fuels like natural gas and various energy conservation measures. Additionally, CPCL aims to expand its green belt development to offset further emissions. By progressively increasing the share of green hydrogen and renewable energy in our operations, CPCL is committed to significantly reducing our carbon footprint and contributing to a sustainable future.

10.6.9 **NRL:** NRL is voluntarily preparing the Business Responsibility and Sustainability Report (BRSR) since 2023, providing information on the various initiatives taken with respect to environmental, social and governance (ESG) perspectives, in accordance with the SEBI and MCA recommendations based on the National Guidelines on Responsible Business Conduct (NGRBC). The BRSR is a significant step towards bringing sustainability reporting at par with the financial reporting.

Now companies must collect timely, accurate, complete, and auditable data to achieve "Investment Grade" ESG status. And SEBI formulated framework viz BRSR would help evaluate distinct facets of the sustainability of NRL's businesses and monitor specific aspects of an enterprise's resource utilization.

As a responsible corporate, NRL has proactively and voluntarily embraced BRSR reporting to lead by example to strong foundations for transparent reporting and responsible growth. This Business Responsibility and Sustainability Report (BRSR) present a snapshot of NRL's sustainability journey and performance for the financial year.

With the target of achieving Net Zero by 2038, NRL has deployed several technologies. On the environmental front, NRL has launched a Bamboo Sapling initiative, which contributes to carbon sequestration and sustainable forestry practices. The Company is also channelizing investments in renewable energy projects to reduce its carbon footprint. Our transition to paperless operations and a 24/7 water disposal contract ensures that waste is managed responsibly, safeguarding surrounding ecosystems. In digital front technologies to support the transformation journey, for example sensor-based monitoring, AI-based CCTV surveillance, smart truck parking, digital fire, safety command center etc to support the transformation journey. These initiatives reflect a robust commitment to sustainable and efficient operations, underscoring the importance of technology in driving environmental responsibility and operational excellence.

In the social realm, NRL places significant emphasis on the welfare of its workforce and their families. NRL has established creches for the children of contractors, offers scholarships for contract workers, and provides free annual health check-ups to ensure the well-being of its employees. These initiatives reflect the Company's commitment to fostering a supportive and inclusive work environment.

Our governance practices are built on principles of fairness and socio-economic equity. NRL is dedicated to a decent standard of living and supporting economic growth of the community by ensuring that the wages paid to our workers are higher than the minimum wages mandated by law.

In essence, innovation-focused sustainability is very much a part of our core corporate strategy and includes a holistic approach to environmental, social, and governance (ESG) practices.

10.6.10 Balmer Lawrie & Co. Ltd.: Balmer Lawrie's sustainability objectives are seamlessly integrated with its overall business goals and its sustainability roadmap is focused on protecting the interests of all stakeholders. The Company has been investing in reducing its carbon footprint in its processes and establishments and designing products and solutions for customers to enable them to lower their carbon footprint. It has taken several initiatives to enhance energy management, emission management, water management, waste management, employee health and safety, community development, and corporate governance. Balmer Lawrie began publishing the Business Sustainability and Responsibility Report (BRSR) in Annual Report from FY 2022-23, which is available in the Company's website.

ESG Performance Highlights of Balmer Lawrie & Co Ltd:

A. Environment

a) 4% Share of Renewable Energy Generation

b) 100% For all BL plants and units Energy Efficient Lighting

c) 30% Percent of the input material sourced sustainably

d) 1367.9 MT Plastic Disposal Under Extended Producer Responsibility (EPR)

e) GHG Emissions: Scope 1: 8609.37 MTCO2e and Scope2: 11798.86 MTCO2e

B. Social:

₹ 4.28 crore CSR Spent and 19730 Number of CSR Beneficiaries

C. Governance:

a) 82 Vigilance Awareness Sessions

b) 100% Customer Complain closed (Provisional)

c) 100% Operation Sites assessed for risk related to corruption

d) All board level committees are constituted as per the applicable provisions of Companies Act 2013. SEBI regulations and DPE Guidelines

e) Public Interest Disclosure & protection of informer resolution (PIDPI) is implemented across Balmer Lawrie & Co Ltd.

To reduce carbon footprint, its strategies include replacing conventional energy sources with renewable energy sources, adopting energy-efficient manufacturing processes, VFDs (variable frequency drive), motors, lights and buildings and investing in carbon offset manufacturing processes. In line with the Sustainability Policy, the Company has installed 1,346 KWp Solar Power Plant till date. This helps in reducing the dependency on fossil fuel based energy and offsets our energy requirement using renewable sources of energy. The 4 plants of SBU-Industrial Packaging across India has replaced use of LDO with PNG/LPG.

Major steps taken to reduce water usage and minimize waste are use of low flow fixtures, water free urinals, recycling wastewater, treatment via effluent plants and implementing rainwater harvesting systems etc. Treatment and disposal of effluents confirm to the statutory requirements. Balmer Lawrie strictly adheres to the Air emissions norms laid down in the Environment Protection Act, 1986.

Disposal of hazardous waste is done strictly as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016. All plants and major establishments of the Company are certified to environment standards ISO 14001. It is constantly focusing on minimising single-use plastics within our organisation. It regularly engages with stakeholders to reduce plastic usage for products and explore sustainable alternatives. Besides publishing the BRSR, the Company has an ESG

Committee with Senior Executives as Members of the Steering Committee.

10.6.11 **EIL:** EIL's new vision statement of "To be a Global Leader Offering Total Energy Solutions for a Sustainable Future." reflects its core principles which is translated through various actions including its commitment for innovation in sustainable energy fields such as green hydrogen, sustainable aviation fuel (SAF) etc. EIL has offered different sustainable engineering solutions such as effluent recycling & zero liquid discharge solutions, innovative water & wastewater integrated solution, biodiversity improvement projects including Miyawaki forests, water & carbon footprint estimation and reduction, carbon capture, waste to energy solutions, waste gas minimizations/ flare mitigation, municipal and industrial waste management, sustainable infrastructure development projects including water and sanitation, environment impact assessment studies etc. and thereby ensuring creation of a sustainable future.

ESG: EIL has taken several in-house initiatives to adopt sustainable practices at work. Some of these initiatives include Installation of Solar based PV Plants, EV charging stations, Use of e-bikes & e-carts within Gurugram office complex, Installation of Water savings nozzles on Taps, providing washable Tea Mugs to employees to avoid use of paper cups. These initiatives have strong bearing on reducing the organization's scope emissions in the long run. In the year 2024–25, EIL has also commissioned approximately 297 kW of solar panels at multiple EIL offices across India.

EIL has embarked on the national decarbonisation bandwagon and accelerated its efforts to achieve a Net Zero carbon emitting corporate by the year 2035. The company is adopting multipronged strategies and developing state of the art less carbon intensive technological solutions both on its own and in collaboration with reputed institutions in India. One of the foremost ESG challenges across industrial sectors is the cultural shift towards sustainability, which EIL has tackled through various initiatives aimed at optimizing water and electricity consumption, adhering to the 3Rs principle (Reduce, Reuse, and Recycle) for resource conservation. Moreover, the organization has progressively reduced paper use by embracing digital interventions. In its commitment to fostering a greener environment, EIL spearheaded the development of a Miyawaki forest in its Gurugram office complex. EIL's Corporate Social Responsibility (CSR) Policy is dedicated to uplifting communities through inclusive growth and environmental stewardship. The company is committed to transforming the nation's social infrastructure sustainably, aligning its CSR initiatives with national priorities. In summary, EIL has emerged as a key stakeholder in providing ESG-compliant, sustainable, and low-carbon technological solutions to industrial sectors in their journey towards decarbonization.

BRSR: As per SEBI (Listing Obligations & Disclosure Requirements) Regulation, 2015, Top 1000 listed companies are required to publish Business Responsibility and Sustainability Report (BRSR). EIL being a listed company falls in the above category, has been providing Business Responsibility and Sustainability Report in the new reporting format of SEBI, which indicates the Company's performance against the principles of the 'National Guidelines on Responsible Business Conduct'. This enables the Stakeholders to have an insight into Environmental, Social and Governance initiatives of the Company and forms a part of the Annual Report.

10.6.12 **ONGC Videsh:** ONGC Videsh strives to ensure safe operations that protect people, environment, communities and material assets. The QHSE management

system of the Company is certified for ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018. Further, the Company is also taking several measures to transition to a low-carbon energy future. Some of the measures which are currently underway to minimize emissions in the existing projects of the Company are:

a) CPO-5, Colombia:

- Micro Gas Turbine (MGT) installation at Mariposa well: Two numbers of 65 KW Natural Gas based Micro turbine installed at Mariposa field as a "New Technology Induction" on pilot basis for flare gas reduction and captive power generation.

b) ACG, Azerbaijan:

- Significant reduction in CO_2 emissions achieved due to the starting of Fuel Gas Recovery Unit (FGRU).
- Switching power consumption at Sangachal Terminal from Gas Turbine based generation to Solar based generation is under implementation. This will reduce emission by ~260-300 Kte/annum.

c) Lower Zakum, UAE:

- Reduction in ~9.15 kTonCO_2 eq/ year by improving Gas Injection compressor efficiency at Zakum West Gas Injection Facilities in Lower Zakum field.
- Use of clean energy (Solar + Nuclear) for offshore power requirement by end of 2025.

d) Rovuma Area-1, Mozambique: The following carbon footprint reduction projects have been planned/under implementation in Rovuma Area-1, Mozambique project:

- Gas Turbine Generator (GTG) Model switch: Switch from original design of 8 x GE Frame 6B DLN (GTG Thermal efficiency ~33%) to 6 x Siemens SGT800 DLE (GTG Thermal efficiency ~39%). This will help in reduction of Fuel Gas (FG) ~14 MMSCFD (yearly average) and thereby reduction of CO_2 emissions of ~250 Ktons CO_2 eq/year.
- Waste Heat Recovery Unit (WHRU) Integration with Power Generation Unit (PGU): The planned integration will help in reduction of fuel gas consumption by ~22 MMSCFD (yearly average), and greenhouse gas emissions by ~420 ktons CO_2 eq/year.
- Plant Solarization-Battery Energy Storage System: Incorporation of plant solarization to reduce emissions from Power Generation Unit by inserting green power in plant grid, is also planned. This will help in reduction of Fuel Gas ~3 MMSCFD (yearly average), reduction of greenhouse gas emissions ~60 ktons CO_2 eq/year.

ESG Performance Highlights

A. Environment:

Received recognition in July 2024 for "Zero Labor Accidents" in CPO-5 block, Colombia for 3 consecutive years from 2021 to 2023 from ARL SURA, a Government authorized entity in charge of administration, advice and prevention of labour risks.

B. Social:

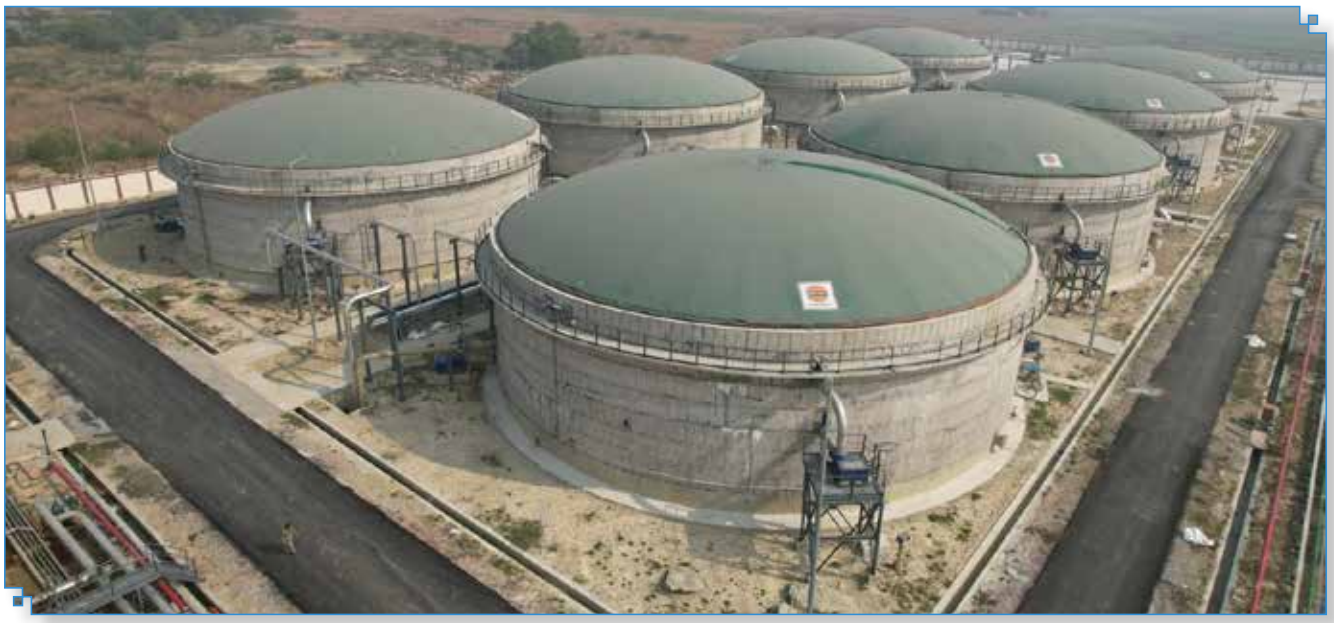
0.03 LTIF (per million person hours works) for 57.97 million Man-Hours worked across 16 projects & HQ. Undertook community development programs in operational areas of GPOC, South Sudan.

C. Governance:

Received the Golden Peacock Award for Risk Management 2023 for excellence in Corporate Governance and risk strategies in November 2024.



IOCL's Solar Power Plant at Sanand



IOCL's CBG Plant at Gorakhpur



ONGC OEC Shed



ONGC Uran Plant



Green Hydrogen Plant in GAIL Vijaipur



ONGC's Rajahmundry asset



ONGC Odalarevu



India's first Green Hydrogen Fuel Cell Bus



BPCL- Solar Panels at LPG Plant



Visakh Refinery Complex with Waterfront Reflection



Bio-refinery project in Assam



MRPL RO

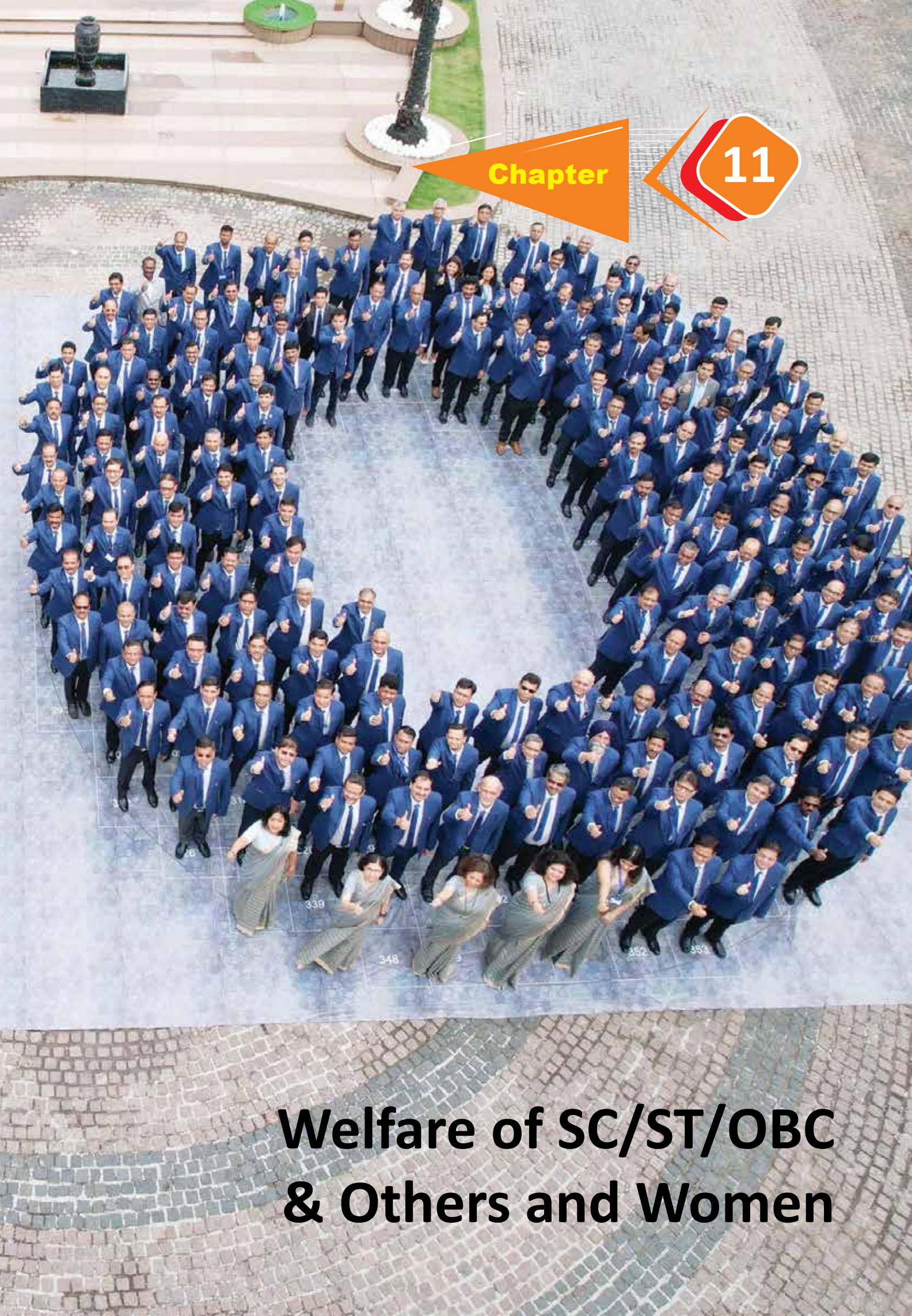


Golf Cart at EIL-Gurugram Campus



Bicycles at EIL-Gurugram Campus





Chapter 11

Welfare of SC/ST/OBC & Others and Women

11 Welfare of SC/ST/OBC & Others and Women

11.1 Welfare of SC/ST/OBC & Others:

The guidelines in respect of 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 the administrative control of this Ministry. The SCT Cell of this Ministry monitors the implementation of reservation policies in the Ministry as well as PSUs and other organizations under the administrative jurisdiction of this 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, EWS, ESM and Persons with Disabilities (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 from time to time on the subject. Remedial action on the grievances of the SCs, STs, OBCs, EWS, ESM and PWD employees of PSUs received through Members of Parliament, National Commission for SCs & STs and National Commission for OBCs are taken. The status of appointment of SCs, STs, OBCs, EWS, ESM and PWDs are monitored by the Ministry through report furnished by PSUs.

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

Various activities have been undertaken by oil and gas PSUs under the Ministry with specific focus on SC/ST/OBC/PwD employees. CSR initiatives/ schemes have been effectively targeting SC/ST/OBC Community.

Backlog of SC/ST/OBC/PWD in Oil & Gas CPSEs under the administrative control of the Ministry as on 31.03.2025 are as below:

Table 11.1: Number of Backlog Vacancies in respect of SC, ST, OBC and PWD (Direct Recruitment)

PSU/ MoP&NG	Group A				Group B				Group C				Group D			
	SC	ST	OBC	PWD	SC	ST	OBC	PWD	SC	ST	OBC	PWD	SC	ST	OBC	PWD
MoP&NG	Not maintained by this Ministry.				NIL	NIL	NIL	NIL	0	2	0	0	Not Applicable.			
CPCL	NIL	NIL	NIL	NIL	2	1	1	4	2	-	4	7	NIL	NIL	NIL	NIL
RGIPT	1	0	1	0	2	1	1	0	1	1	2	0	NA	NA	NA	NA
HPCL[1]	0	0	0	4	-	-	-	-	0	0	0	0	-	-	-	-
IIPE	Presently, no backlog vacancies exist in IIPE for Direct Recruitment.															
MRPL[2]	7															
ONGC[3]	3	1	5	22	-	-	-	-	21	14	50	25	04	02	11	07
Balmer Lawrie & Co. Ltd.	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

PSU/ MoP&NG	Group A				Group B				Group C				Group D			
	SC	ST	OBC	PWD	SC	ST	OBC	PWD	SC	ST	OBC	PWD	SC	ST	OBC	PWD
BPCL	NIL	7	6	39	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
NRL[4]	01	0	0	02	Not applicable	0	0	0	0	0	0	0	0			
IOCL[5]	16	24	38	53	No recruitment undertaken in Group 'B'				10	9	8	73	3	2	3	33
OIDB	0	0	0	0	0				0	0	0	0	0	0	0	0
OIL	0	0	2	0	0	0	0	0	0	3	1	17	-	-	-	-
GAIL	27	20	29	41	01	03	01	07	33	24	43	21	-	-	-	-
BCPL	1	0	2	16	-	-	-	-	-	-	-	3	-	-	-	-
EIL	1	1	5	6	-	-	-	1	1	2	-	2	-	-	-	-
CPCL	NIL	NIL	NIL	NIL	2	1	1	4	2	-	4	7	NIL	NIL	NIL	NIL

Note:

1. HPCL has no posts classified under Group 'B' & 'D' as the entry in Non-Management grades have been reclassified in Group 'C'.
2. No direct recruitment in Group B and D at MRPL. The above backlog vacancies are in induction level where normally recruitments are carried out.
3. There are no backlog vacancies in ONGC. The vacancies remains unfilled in the previous recruitment exercise are carried forward in the subsequent recruitment exercise. 62 vacancies of Group A are under process of recruitment in the year 2025. 62 vacancies of Group 'C '& 11 vacancies of Group 'D' are of Andhra Pradesh, which have been held up due to court case since 2014-15
4. NRL has shortfall in reserved vacancies other than the above backlogs. NRL is making all attempts to clear the shortfall/ backlogs in upcoming recruitment drives.
5. Backlog of SC/ST/OBC vacancies are liquidated through normal recruitment process in IOCL. Special Recruitment Drive is underway to liquidate Pwd Backlogs.

11.2 Welfare of Women:

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

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

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 Ms. Sujata Sharma, Joint Secretary, MoP&NG is the chairperson of the committee with four other members, including one member from NGO. The Committee holds its meetings on regular intervals.

Table 11.2: The number of women employees vis-à-vis total number of employees as on 31.03.2025 in the Oil PSUs

Sl. No.	Name of PSUs/MoP&NG	Total No. of Employees	Total No. of Women Employees
1.	MoP&NG	223	56
2.	CPCL	1426	83
3.	RGIPT	152	24
4.	HPCL	8019	873
5.	IIPE	49	07
6.	MRPL	2545	229
7.	ONGC	24768	1969
8.	Balmer Lawrie & Co. Ltd.	839	92
9.	BPCL	8803	736
10.	NRL	1101	85
11.	IOCL	29855	2677
12.	OIDB	15	06
13.	OIL	6487	510
14.	GAIL	5061	352
15.	BCPL	618	55
16.	EIL	2650	317



CPSEs Manpower



CPSEs Women-power at work place





Chapter 12

Oil & Gas Central Public Sector Enterprises and Organisations

12 Oil & Gas Central Public Sector Enterprises and Organisations

Central Public Sector Enterprises (CPSEs) under the Ministry of Petroleum and Natural Gas:

The Ministry of Petroleum and Natural Gas (MoPNG) oversees several Central Public Sector Enterprises (CPSEs) involved in the exploration, production, refining, and distribution of petroleum and natural gas. Central Public Sector Enterprises (CPSEs) under the Ministry of Petroleum and Natural Gas (MoPNG) play a crucial role in India's energy sector, encompassing activities from exploration and production to refining, distribution, and marketing of petroleum and natural gas. Key CPSEs under MoPNG include Indian Oil Corporation Limited (IOCL), Bharat Petroleum Corporation Limited (BPCL), Hindustan Petroleum Corporation Limited (HPCL), Oil and Natural Gas Corporation Limited (ONGC), and Gas Authority of India Limited (GAIL). These CPSEs, are instrumental in ensuring India's energy security and economic growth.

12.1 Maharatna Central Public Sector Enterprises (CPSEs)

12.1.1 Oil and Natural Gas Corporation Limited (ONGC):

ONGC was incorporated on 23.06.1993 with the objective to transform the statutory commission namely Oil and Natural Gas Commission into a Public Sector Company, through an Act of Parliament and to take over the business of the commission w.e.f. 01.02.1994. ONGC is a global Energy company integrated in the entire energy value-chain. ONGC is a Schedule – 'A', listed Maharatna CPSE in E&P sector under the administrative control of MoPNG, which holds 58.89% of its shareholding.

(i) Major highlights/initiatives for the year 2024-25 (9M)

- KG-DWN-98/2 Cluster-II production illuminates India's energy sector: On 16th Dec'2024, Eastern Offshore Asset (EOA), Kakinada, successfully monetized all oil fields of the KG-DWN-98/2 Cluster-II project by putting 5 oil wells of P-field into production, thereby now producing about ~35000 BOPD of crude oil.
- OPaL established as subsidiary of ONGC: As per Government of India Directive received on 09.08.2024, ONGC has completed total infusion of ₹18,365 Cr in OPaL as on 02.12.2024. ONGC increased its stake in OPaL from 49.36% to 95.69%, establishing OPaL as its seventh subsidiary.
- ONGC forays into RLNG marketing: ONGC has entered the RLNG (Regasified Liquefied Natural Gas) marketing arena, marking a new phase in its strategic marketing trajectory. On 25th October 2024, ONGC achieved a significant milestone by selling over 32 MMSCMD of RLNG through the Indian Gas Exchange (IGX).
- Assam Asset signs Crude Oil Transport Agreement with Oil India for 5 years: To ensure long-term dispatch of crude oil to the refineries, Assam Asset on 3rd October 2024 signed a Crude Oil Transport Agreement (COTA) with Oil India Limited (OIL).
- Consent to Establish (CTE) granted for Madanam Central Processing Facility (CPF): CTE for construction of CPF at Madanam has been granted by Tamil

Nadu Pollution Control Board (TNPCB) on 05.11.2024 with validity upto March-2029.

- ONGC successfully completed Performance Guarantee Test Run (PGTR) of Demo Plant of Green Hydrogen of 40 Kg per Day Capacity at Nandasan Plant of Mehsana Asset.
- Two major contracts for projects in Western Offshore namely, Daman Upside Development Project – Well Head Platforms (DUDP-WP) and Pipeline Replacement Project (PRP – 8), Group B were signed with M/s L&T with the objective to enhance the gas and condensate production. This is likely to add ~ 5 MMSCMD of gas production.
- The order was placed to M/s Mazgaon Dock Limited on 08.08.2024 for construction of a major offshore oil and gas project for blocks awarded under DSF-II. This is likely to add ~ 4 MMSCMD of gas production.
- **ONGC and GAIL sign term sheet for new well gas:** ONGC and GAIL signed a term sheet on 28 November 2024 for the sale of new well gas (NWG) from ONGC's nominated fields. This Agreement addresses the immediate operational challenges and establishes a strategic framework for future growth of ONGC.
- **ONGC and PowerGrid Corporation inked MoU for Green Hydrogen and Clean Energy:** ONGC has signed a MoU with PowerGrid Corporation on 12th December 2024 in New Delhi to collaborate on green hydrogen and clean energy projects. The collaboration aligns with the National Green Hydrogen Mission (NGHM) program which aims to position India as a global leader in green hydrogen production, use and export.
- **ONGC inks MOU with Ever Enviro Resource Management Private Ltd for Compressed Biogas Plants:** The proposed joint venture shall have 50 % equity shareholding each by ONGC's newly formed subsidiary ONGC Green Ltd. (OGL) and Ever Enviro.
- ONGC and IOC ink MoU to establish a small-scale Liquefied Natural Gas (LNG) plant by IOCL near Hatta Gas Field of Vindhyan Basin: This collaboration aims at harnessing the power of LNG to drive sustainable growth and energy security.
- **ONGC, SCCL, and TGREDCO unite to explore geothermal prowess of Manuguru in Telangana:** ONGC, Singareni Collieries Company Limited (SCCL) and Telangana Renewable Energy Development Corporation Ltd. (TGREDCO) signed a tripartite Memorandum of Understanding (MoU) on 2nd August 2024 to explore the renewable energy potential and develop the Manuguru Geothermal Field in the Pranhita Godavari Basin of Telangana.
- **ONGC Engages BP as Technical Services Provider:** ONGC has engaged M/s BP as Technical Service Provider (TSP) for its existing Mumbai High Field with the aim to expeditious realization of the remaining locked up potential of MH field by leveraging cutting-edge technologies and global best practices, securing its future contribution to India's energy landscape.
- **ONGC inks MoU with BHEL for green Hydrogen projects:** ONGC has collaborated with BHEL on 10.01.2025 for jointly exploring the business opportunities in the field of Green Hydrogen projects encompassing entire value chain of Green Hydrogen including but not limited to Electrolysers Technology, storage, fuel cell, Captive power RTC, Hydrogen fired turbines etc. and their applications.
- ONGPL signed Share Purchase Agreement for 100% Acquisition of Ayana Renewable Power Private Limited on 12 February 2025 with National Investment and Infrastructure Fund (NIIF), British International Investment Plc (BII) and its subsidiaries, and Eversource Capital. The transaction is valued at INR 195 billion (USD 2.3 billion).

- ONGC and Tata Power Renewable Energy Limited Signed MoU to Collaborate on Battery Energy Storage Solutions on 12th February 2025 to explore collaborative opportunities in the Battery Energy Storage System (BESS) value chain with ONGC's commitment to enhancing India's energy security through the integration of renewable energy and advanced storage solutions.
- ONGC launches 2nd supply base for Offshore Operations at the Pipavav Port in Gujarat on 10th March 2025 promising faster deliveries, enhanced safety and uninterrupted operations for ONGC's rigs and platforms.
- ONGC launches ultra-deepwater exploration campaign in Andaman Basin to drill three ultra-deepwater wells, marking another crucial phase in ONGC's ultra-deepwater exploration campaign in the Andaman Basin.

ONGC starts drilling of Wildcat well GDA-B in Ballia, UP in Ganga Basin: Frontier Basin commenced drilling operations in the Ballia District of Uttar Pradesh through spudding of new exploratory wildcat well GV-ONO212-GDA-B, in the OALP-VI Block GV-ONHP-2021/2 in the Ganga Basin, a Category-III sedimentary basin.

12.1.1.1 Exploration: During the year 2024-25, ONGC acquired 604 LKM of 2D, 8840 SKM of 3D seismic data and drilled 109 exploratory wells. During the year, ONGC has notified nine (9) new hydrocarbon discoveries (five on-lands and four offshore) in its operated acreages.

Cauvery Basin ventures into ultra-deep waters: On May 9, 2024, the Cauvery Basin began a major exploration project in ultra-deep waters off Puducherry by spudding well CYUD191H-CHAA (CHOLA) at about 1.7 km depth in the OALP-V Block CY-UDWHP-2019/1, using Rig DDKG-1.
ONGC notified that 1 New Prospect discovery "Vadatal-37" in Onland area of Cambay Basin. The detail of the discovery is as under:

Vadatal-37: The exploratory well Vadatal-37 was drilled in Vadatal Ext-I PML (NELP-VI block CB-ONN-2004/2) in Cambay Basin to explore Chhatral, EP-IV and YCS pay in independent fault Block. Two objects were identified in Chhatral and EP-IV lower Pay for conventional production testing. This hydrocarbon success of object-I was notified as New Prospect discovery. The success in the well has established hydrocarbon presence in the independent fault closure prospect and opened the area for further exploration and development in the block and surrounding areas.

15 OALP Bocks covering total area of 82,560.26 sq. km. were awarded to ONGC under OALP bid round-IX. All the awarded OALP blocks are in exploratory phase.

During the year, ONGC submitted Field Development Plans for Asokenagar discovery in Category-III Bengal Basin and Hatta discovery of Category-II Vindhyan Basin which were approved by MoPNG/DGH on 10.07.2024 and 03.10.2024, respectively. Subsequently, ONGC has submitted applications for the PML grants to respective state governments. Implementation of the project shall provide new impetus to development and bring Bengal Onland and Vindhyan Basin on India's oil and gas map soon.

Further, ONGC is having association with the M/s IFP Energies Nouvelles, France with an objective to build long-term cooperative working relationships and collaborate in the development and application of expertise and leveraging suitable technologies relating to the production and recovery enhancement from India's hydrocarbon reservoirs including the development of unconventional resources like the development of shale gas, HP-HT, tight oil & gas fields.

12.1.1.2 Production Initiatives: ONGC has been

able to maintain stable Crude oil & Natural gas production during FY'25. The standalone Crude production for FY'25 stood at 19.558 MMT, reflecting a 0.9% increase over the previous year. The standalone Natural gas production for FY'25 stood at 19.654 BCM.

During FY'25, a total of 578 wells (109 exploratory wells, 403 development wells and 66 sidetrack wells). This is the highest number of well drilled by ONGC in the last 35 years. Other initiative that was undertaken is following.

12.1.1.3 Drilling Initiatives: During 9M FY'25, A total of 413 wells (60 exploratory wells, 300 development wells and 53 sidetrack wells) have been drilled which is 103.76% of the BE target of 398 wells.

- **Commissioning of Mud Plant at Narsapur:** Rajahmundry Asset boosted efficiency by relocating the HPHT Asset Mud Plant to Narsapur, overcoming logistical challenges. The plant now processes both SOBM and clear fluids with a daily capacity of 11,350 barrels.
- **IDT gets patent for 'Lubricating Formulation and Applications thereof':** This patent relates to the use of lubricants in drilling fluids to minimize friction effects such as overpull, torque, and drag during drilling operations of the sub-terranean formation.
- **Real-Time Drilling Operations Centre (RTDOC); a critical digital initiative of ONGC:** The Real-Time Drilling Operations Centre (RTDOC) of ONGC established at the Institute of Drilling Technology (IDT) aims to drive the operational efficiency in drilling operations in ONGC through real-time monitoring and data-driven decision-making.

12.1.1.4 Technical Services Initiatives:

- **Project DOT (Digitalization for Organizational Transformation) launched on 11th October 2024:** This will lead to enhanced equipment reliability through predictive maintenance and streamlined workflow across various departments through automation by integrating advanced technologies like AI, IoT, cloud computing and data analytics in the operations of ONGC.
- **ONGC Ahmedabad Asset's Cutting-Edge Digital War Room 'Urja Utkarsh Kaksh' - Project SANJAI inaugurated:** Ahmedabad Asset on 5th October 2024 inaugurated 'Urja Utkarsh Kaksh', a state-of-the-art Digital War Room which houses the Digital Dashboard-SANJAI (Systematic Analytics Network of Jointly Managed Asset Information). It represents a major leap forward in Ahmedabad Asset's digital transformation initiatives encompassing data management, data visualisation and data analytics capabilities.
- **KDMIPE (Keshava Deva Malaviya Institute of Petroleum Exploration), launched an innovative initiative** to monitor methane emissions over ONGC installations using advanced satellite technology.
- **Institute of Reservoir Studies, Ahmedabad conceptualized and co-created a novel AI-driven top-down reservoir simulation:** The cutting-edge simulation led to the identification and drilling of one location at the GS-3A sand of the Gandhar oil field, testing 17 M3/d of oil, thereby providing a strong argument for the deployment of AI-based solutions in core E&P activities.
- **Logging Services, Mumbai, introduces High-Resolution Ultrasonic Borehole Imaging:** Acoustic Image Trak (LUBIWD) which is acoustic based high resolution borehole imaging service of M/s Baker Hughes was deployed for the first time in Western offshore in the well NLM_9#1WH of N&H Asset to drill 8.5" hole and acquire quality log data.
- **Commencement of 2D Offshore Broad Band Seismic Data Acquisition in Extended Continental Shelf, Western Offshore, under National Seismic Project:** An initiative of the Directorate General of Hydrocarbons (DGH), under

the aegis of the Ministry of Petroleum and Natural Gas (MoPNG), Government of India, this survey holds significant national importance from both strategic and geopolitical perspectives.

- As part of ONGC's commitment to achieve 'Net Zero' by 2038 and to promote renewable energy generation, Surface Team, Ankleshwar Asset successfully commissioned a 5.4 KW off-grid solar power system in the remote coastal region of Gujarat's Aliabet.
- ONGC has implemented a new Vendor Invoice Management Portal, effective 12th December 2024, marking a significant upgrade in our vendor management and invoice processing ecosystem. This strategic initiative aims to modernize our vendor interaction and financial transaction processes.
- **Ankleshwar Asset starts brownfield digital oilfield project:** In a major step towards digitalization, the 'Theoretical Gas Balancing' project was inaugurated in Ankleshwar Asset.
- **75 KW rooftop solar plant inaugurated in Dehradun:** ONGC inaugurated a 75 KW rooftop solar plant in Dehradun on 22 April 2024. Recognizing the importance of harnessing green energy and reducing carbon footprints, the initiative aligns with the national vision of Clean India, Green India, and towards achieving net-zero emissions.

12.1.1.5 Major Awards & Recognitions:

- ONGC is ranked 180th globally & 5th in India in Fortune Global 500 list 2024.
- ONGC is ranked 220th globally & 6th in India in Forbes Global 2000 list 2025.
- ONGC has achieved B- Rating in 2024 in CDP Climate Score, Strengthening its Commitment to Sustainability.
- ONGC bagged the esteemed "Company of the Year 2024 Jury award" in the Maharatna and Navratna category and ONGC Chairman & CEO, Arun Kumar Singh was bestowed with the prestigious "CEO/CMD of the Year 2024 Platinum award" at the 14th Public Sector Enterprises awards by the Indian Chamber of Commerce on 21st December 2024.
- ONGC was conferred with the "Oil & Gas Exploration Company of the Year - 2023" award by Federation of Indian Petroleum Industry on 26th November 2024.
- ONGC won the prestigious "India's Top Value Creator Award 2024" for Oil and Gas exploration by Dun & Bradstreet on 29th November 2024.
- ONGC has been conferred with South Asian Region's one of the most prestigious accolades for financial reporting, SAFA (South Asian Federation of Accountants) Awards, for the Best Presented Annual Reports for the financial year 2022-23 under Category-Public Sector Entities at the SAFA Awards, 2024 held at Colombo, Sri Lanka on 11th November 2024.
- ONGC CSR was honoured with the "Mahatma Award for CSR excellence" on 1st October 2024.
- ONGC bagged the prestigious "Blue Planet Award 2024" for Sustainability Excellence in E&P Operations" at Oil Spill India 2024 on 11th September 2024 at New Delhi
- ONGC bagged the esteemed 25th National Centre for Promotion of Employment for Disabled People (NCPEDP) Helen Keller Award 2024 on 2nd December 2024.
- ONGC received the prestigious "NAB Sarojini Trilok Nath National award 2024" in the best CSR Impact category by the National association for the Blind (NAB).
- ONGC's Director (Exploration), was honoured with the prestigious "Women in Energy Award 2024" at The Economic Times Energy Leadership Summit on 25th September 2024 for her leadership in advancing India's Energy sector.

- ONGC was recognized as the "Best Organisation for Sustainability Reporting" category at the 10th Edition of the India Sustainability Leadership Awards on 20th September 2024 at Bengaluru.
- ONGC was declared winner in the "Public Procurement Project of the Year" category by International Organization, Chartered Institute of Procurement & Supply (CIPS), London, on 18th September 2024.
- ONGC was declared as the winner of the "Project Excellence Contest & Recognition" for ONGC's flagship CSR Project – the Siu-Ka-Pha Multispecialty Hospital at Sivasagar, Assam, presented at AIMA India's prestigious 11th Business Responsibility Summit held on 27th September 2024.
- ONGC clinched four prestigious awards across various categories of oil mines at the inaugural 'Mines Safety Awards 2024', held on 28th July 2024, presented by All India Mines Safety Association (AIMSA) under the aegis of Directorate General of Mines Safety (DGMS) to promote best practices to improve safety standards in mining operations across India.
- ONGC received the prestigious Workplace Occupational Health, Safety and Environmental Excellence (OHS&E) Award in the Gold category at the World Safety Organization's OHS&E Awards 2024 held at Chennai on 27th September 2024.
- ONGC Videsh conferred with the award for Master of Risk- Risk Technology, Large Cap Category in the 10th edition of the India Risk Management Awards constituted by ICICI Lombard & CNBC-TV18 on 27 June 2024.
- ONGC's Corporate HSE and IDT were conferred with "Golden Peacock Environment Management Award 2024" and "Golden Peacock ECO Innovation Award 2024" respectively on 27th June.

12.1.1.6 Financial Performance (ONGC)

₹/Crores

	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
Total Income	96,214	68,141	1,10,345	1,55,517	1,38,402	1,37,846
Net Profit/Loss	13,464	11,246	40,306	40,097*	40,526	35,610
Plan Outlay-Actual	29,538	26,859	27,741	30,208	37,494	62,057
Plan Target	32,921	32,502	29,800	29,950	30,125	30,800**

***Restated ** Target for 2024-25**

12.1.2 Oil India limited (OIL):

OIL, a Government of India Enterprise, and a Maharatna Company under the administrative set-up of MoPNG, is engaged in the business of exploration, production and transportation of crude oil & natural gas both in-country and overseas. The authorized capital of OIL is ₹2,000 Crore and the paid up capital is ₹1626.61 Crore. As on 31.03.2025, Government of India's shareholding is 56.66% of the paid-up equity share capital of OIL.

12.1.2.1 Domestic Portfolio: OIL's in-country operations are spread over areas in the states of Assam, Arunachal Pradesh, Tripura, Nagaland, Odisha, Andhra Pradesh, and Rajasthan, as well as offshore areas in Andaman, Kerala-Konkan, Mahanadi and Krishna-Godavari. OIL is operating in 25 (twenty-five) PML's and 1 PEL covering an area of 4,853 sq. km. allotted under the nomination regime in the states of Assam (21 nos.), Arunachal Pradesh (2 nos.), and Rajasthan (2 nos.) and 1 PEL in Assam.

The Company has acreage under NELP as Operator comprising of 1 (one) onshore block with an area of 396 sq. km. in the state of Assam. OIL is currently carrying out exploration activities in 26 OALP blocks with a cumulative exploration area of 46,842 sq. km. in the states of Assam, Arunachal Pradesh, Tripura, Odisha, Rajasthan, and offshore areas in Andaman, KG and Kerala-Konkan, out of the 30 OALP blocks awarded under OALP Bid Rounds- I to VIII (valid PEL were available for 29 OALP Blocks).

OIL also has 3 (three) DSF blocks as operator, one block each in Tripura and Krishna-Godavari Shallow Offshore under DSF-II Bid round, and one block in Rajasthan under DSF-III Bid round. The total domestic operating acreage of OIL is 52,299 sq. km. as of 31st March, 2025.

OIL also holds 2 (two) blocks under NELP as non-operator with 3725 sq.km. in Gujarat-Kutch (Shallow Offshore) and West Bengal (Onshore). OIL has also 2 (two) blocks with 85.88 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%).

12.1.2.2 Exploration Activities: OIL is currently, engaged in exploration activities in the 26 (twenty-six) OALP blocks in onshore areas in Assam, Arunachal Pradesh, Tripura, Odisha and Rajasthan and in shallow offshore in Andaman and Kerala-Konkan basins. During the year 2024-25, OIL acquired 444.46 LKM of 2D, 1150.82 SKM of 3D seismic data overall and drilled 7 exploratory wells in OALP blocks.

To achieve a comprehensive appraisal of the Indian sedimentary basins, closed 2D seismic profiles have been planned in 07 on land sedimentary basins under proposed Mission Anveshan. Out of the total allocated project quantum of 20,275 LKM 2D seismic API, Oil India (OIL) is entrusted to carry out approx. 9,400 LKM seismic API in the unapprised areas of Rajasthan & Ganga-Punjab Basin with planned profiles covering the states of Rajasthan, Punjab, Bihar & Uttar Pradesh. 2D Seismic campaigns in Rajasthan, Uttar Pradesh (Azamgarh and Badaun) and Bihar (Muzaffarpur) have commenced on 29.10.2024, 21.12.2024 and 05.01.2025 respectively under Mission Anveshan. A total of 2516.18 LKM of 2D Seismic data has been acquired as of 31st March, 2025.

12.1.2.3 Physical Performance

Parameter	Unit	2023-24 (Actual)	2024-25	
			Target (BE)	Actual
Seismic survey				
2D	GLKM	378.72	269	444.46
3D	SQKM	248.73	234	1150.82
Drilling				
Exploratory	'000Mtr	64.788	128.202	76.538
	Wells	17	34	22
Development	'000Mtr	105.654	125.429	97.394
	Wells	44	44	35
Total (Exp+Dev)	'000Mtr	170.442	253.631	173.932
	Wells	61	78	57

Parameter	Unit	2023-24 (Actual)	2024-25	
			Target (BE)	Actual
Crude Oil Production				
Assam	MMT	3.286	3.880	3.380
Arunachal Pradesh		0.032	0.032	0.031
Rajasthan (Heavy Oil)		0.025	0.046	0.033
OIL Total		**3.344**	**3.958**	**3.444**
OIL+OIL's share of JV		3.359	3.958	3.458
Natural Gas Production				
Assam	MMSCM	2.885	3.591	2.935
Arunachal Pradesh		0.035	0.064	0.037
Rajasthan		0.171	0.274	0.199
OIL Total		**3.090**	**3.929**	**3.171**
OIL+OIL's share of JV		3.182	3.929	3.252
LPG Production	**'000T**	**31.55**	**29.000**	**30.525**

12.1.2.4 Reserves Position (2P) as on 31.03.2025: As a result of continued exploration and development activities, OIL, as on 01.04.2025, has established a total in-place volume (BE) of 806.5768 MMT (Oil) & 423.4008 BCM (Gas) (1174.7765 MMTOE O+OEG) in the domestic sector. The 2P/BE remaining producible oil & gas volume of the company stands at 69.3852 MMT and 139.0337 BCM respectively (190.2508 MMTOE O+OEG).

12.1.2.5 Crude Oil Transportation: OIL operates a total network of 1,245 km of crude Oil Pipeline which runs through the states of Assam, West Bengal and Bihar. The total capacity of OIL's crude oil pipeline is 9.0 MMTPA (F+R). The total throughput of the pipeline was 7.138 MMT during FY 2024-25. OIL also operates a 654.3 km long pipeline for evacuation of total 1.72 MMTPA of products from Numaligarh Refinery (NRL) to Siliguri Terminal in West Bengal. During FY 2024-25, OIL transported 1.574 MMT of finished petroleum products through Numaligarh-Siliguri Product Pipeline (NSPL).

The natural gas produced in Assam, and Arunachal Pradesh is sold to different customers, viz. BVFCL, BCPL, AGCL, APGCL, NEEPCO, IOC (AOD), NRL, APL and nearby Tea gardens and small industries. The non-associated gas produced by OIL in Rajasthan is sold to Rajasthan Rajya Vidyut Utpadan Nigam Limited (RRVUNL). OIL also produces Liquefied Petroleum Gas (LPG) in its plant at Duliajan, Assam.

12.1.2.6 Alternate Energy: OIL has strategically diversified into the Alternate Energy Domain, with specific focus on Wind Energy, Solar Energy, Green Hydrogen and CBG segments. OIL has successfully established Commercial Renewable Energy (RE) projects totaling 188.10 MW, comprising 174.10 MW of Wind Energy Projects and 14 MW of Solar Energy Projects. Additionally, plans are underway to establish Solar Power Plants in Assam, with a projected capacity of 645 MW, through a newly formed joint venture with Assam Power Generation Corporation Limited (APGCL), a Government of Assam enterprise. The Joint venture has been incorporated on 21.02.2025. The first plant under this JV will be a 25 MW Solar power plant located at Namrup, Assam.

Furthermore, OIL has received PNGRB approval to blend 2% green hydrogen into the CGD network in Jorhat, Assam. The CLSS unit has already been supplied and is currently under installation, with commissioning expected by mid-April

2025, after which the blending process will begin. In Baddi, Himachal Pradesh, OIL is developing a 1 MW Green Hydrogen Plant in collaboration with Himachal Pradesh Power Corporation Limited (HPPCL). The EPC work is underway, and construction is progressing on schedule for completion by September 2026. Additionally, OIL has signed an MoU with The Fertilisers and Chemicals Travancore Limited (FACT) to explore joint initiatives in the green hydrogen sector, with DPR preparation currently in progress. Under its startup program SNEH, OIL has also developed a hydrogen fuel cell e-bus, which was flagged off by Prime Minister Narendra Modi during India Energy Week 2023. The bus has received MoRTH approval for a trial run in Jorhat, Assam. Furthermore, OIL is working on developing Liquid Organic Hydrogen Carrier (LOHC) technology under the SNEH initiative to enable safe, sustainable, and cost-effective hydrogen transportation, and the project is currently in progress.

In alignment with the GOBARdhan scheme, OIL is actively working to establish 25 Compressed Bio Gas (CBG) plants across India, as advised by the Ministry of Petroleum & Natural Gas (MoP&NG). Currently, land is under possession at six locations: Bhubaneswar, Tinsukia, Sivasagar, Jorhat, Guwahati, and Silchar. EPCOM tenders have been published for the Tinsukia and Bhubaneswar projects, with bid evaluation completed for Tinsukia and ongoing for Bhubaneswar. DPRs for Jorhat, Agartala, and Cuttack have been approved, and EPCOM tenders for these projects will be floated. Furthermore, DPRs for 16 additional locations are under preparation. Approval from the Department of Investment and Public Asset Management (DIPAM) is awaited for the formation of two Joint Venture Companies with M/s GPS Renewables Pvt. Ltd. and M/s Hindustan Waste Treatment Pvt. Ltd. for collaboration on the establishment of CBG plants.

12.1.2.7 Diversification: OIL has strategically diversified its portfolio through key acquisitions in the downstream sector. OIL holds 69.63% stake in Numaligarh Refinery Limited, 10% stake in Brahmaputra Cracker and Polymer limited and 23% stake in Duliajan Numaligarh Pipeline Limited (DNPL). Furthermore, OIL possesses 48.79% equity stake in Assam Petrochemical Limited, which operates a 600 TPD capacity Methanol plant (comprising a new 500 TPD unit and an existing 100 TPD unit) along with a 200 TPD Formaldehyde project.

OIL's Joint Venture Company (JVC), namely HPOIL Gas Private Limited (HOGPL) operates 57 CNG stations (Kolhapur: 427, Ambala & Kurukshetra:730), and 3 Bio CNG Outlets (Kolhapur: 1, Ambala & Kurukshetra: 2). Steel pipelines of 1832.22 inch-km against target of 1142 inch-km in Ambala-Kurukshetra GA and 1921.11 inch-km against target of 1800 inch-km in Kolhapur GA is completed. DPNG connections of 20,951 and 38,857 numbers provided in Ambala-Kurukshetra GA and Kolhapur GA respectively. HOGPL has achieved its MWP target for both Ambala-Kurukshetra and Kolhapur GAs.

OIL's JVC, namely Purba Bharati Gas Private Limited (PBGPL), operates in two GAs – (i) Cachar-Hailakandi-Karimganj and (ii) Kamrup-Kamrup Metro which were awarded in the 9th CGD bid round. In the Cachar-Hailakandi-Karimganj GA, 9 CNG stations are in various stages of commissioning, with one ONGC CGS operational. For the Kamrup-Kamrup Metro GA, 8 CNG stations have been commissioned, and an additional 11 are in different stages of commissioning. PBGPL has established 299.3 inch-km of steel pipeline against a target of 751 inch-km in the Cachar-Hailakandi-Karimganj GA and 378.1 inch-km against a target of 961 inch-km in the Kamrup-Kamrup Metro GA. The company has provided 3,141 PNG connections (Active + Ready)

in the Cachar-Hailakandi-Karimganj GA and 5,800 PNG connections (Ready) in the Kamrup-Kamrup Metro GA. Work for the CGS Noonmati is at the final stage of completion, and CGS Baihata Chariali is under progress in the Kamrup-Kamrup Metro GA.

In the 11th round of bidding, OIL JVC, North East Gas Distribution Company Limited (NEGDCL) won three GAs (Assam-1 no, Tripura-2 Nos.). NEGDCL proposed to fund the "As-Built" project cost for the first five years construction cost of ₹2081.39 Cr for its 3 GAs of North Assam, North Tripura and South Tripura. The company secured financing through equity contributions from both promoters and a term loan of ₹350 Cr earning a credit rating of (A-). Key agreements were finalized, including a gas hook-up agreement with IGGL and a Gas Sale and Transportation Agreement with GAIL. Notably, NEGDCL commenced commercial operations of 5 CNG stations in Tripura in February 2025. The company also completed its first year of incorporation in July 2024 and adopted its first audited financials and annual plan.

OIL also won 2 GAs in the 12th CGD bidding round through its Joint Ventures with HPCL (HOGPL: Nagaland GA) and BPCL (to be incorporated: Arunachal Pradesh GA).

OIL also participated in Tranche IV auction of Critical and Strategic Minerals announced by Ministry of Mines and has been declared as preferred bidder for "Phop Graphite and Vanadium Block" in the state of Arunachal Pradesh. Subsequently, Letter of Intent for Composite License has been issued to OIL by Department of Geology and Mining, Government of Arunachal Pradesh.

12.1.2.8 Overseas Portfolios: The Company's overseas E&P portfolio as on 31.03.2025 is spread over 07 countries covering Russia, Venezuela, Mozambique, Nigeria, Bangladesh, Libya and Gabon. The portfolio includes:

i. Four (4) Producing assets (Russia-3 and Venezuela -1),

ii. Two (2) Discovered and development assets (Mozambique-1 and Nigeria-1)

iii. Four (4) Exploratory assets (Libya-1, Gabon-1, and Bangladesh-2).

As on 31.03.2025, 2P oil & gas reserves position corresponding to OIL's stake in 4 overseas producing and discovered assets namely, Vankorneft & Taas Yuryakh in Russia, Carabobo in Venezuela and Rovuma Area1 in Mozambique stood at 40.9023 MMTOE. During the current financial year 2024-25, OIL's share of cumulative production from overseas assets stood at 2.097 MMTOE. The status of the major developments in the blocks is as under:-

i. Producing Assets (4)

1) JSC Vankorneft, Russia (Rosneft: 50.1%, OIL/IOCL/ BPRL: 23.9%, OVL: 26%): The Company, along with IOCL and BPRL acquired 23.9% stake in JSC Vankorneft, Russia w.e.f 5th October 2016. The asset is held through an SPV Vankor India Pte. Ltd. (VIPL) incorporated jointly by wholly owned subsidiaries of the Company, OIL, IOCL and BPRL in Singapore. As on 31.03.2025, the 2P reserve position corresponding to Company's Participating Interest in this asset has been estimated at 11.2771 MMT of oil and 4.1845 MMTOE of natural gas. During 2024-25, the Company's share of production assets stood at 1.006 MMTOE. Cumulatively till 31.03.2025, an amount USD 369 million has been received at the VIPL level as dividend corresponding to OIL's stake in the project. Further, amount of RUB 9.8 Bn (equivalent to USD 117.1 Mn considering exchange rate of USD~RUB 83.68 as on 31.03.2025) has also been received at the VIPL level in RUB as dividend corresponding to OIL's stake in the project which is yet to converted to USD and repatriated to Singapore.

2) **LLC Taas-Yuryakh Neftegazodobycha (TYNGD):** Russia (Rosneft: 50.1%, OIL/ IOCL/BPRL: 29.9%, British Petroleum: 20%) : The Company along with IOCL and BPRL acquired 29.9% stake in LLC Taas-Yuryakh Neftegaz dobycha (TYNGD), Russia w.e.f 5th October 2016. The asset is held through an SPV Taas India Pte. Ltd (TIPL), incorporated jointly by wholly owned subsidiaries of the Company, OIL, IOCL and BPRL in Singapore.

As on 31.03.2025, the 2P reserve position corresponding to Company's participating interest in this asset has been estimated at 8.67 MMT of oil. During 2024-25, Company's share of production in asset stood at 1.076 MMTOE. Cumulatively till 31.03.2025, an amount equivalent to USD 271 million has been received at TIPL level as dividend and surplus capital repayment corresponding to OIL's stake in the project. Further, an amount of RUB 15.47 Bn (equivalent to USD 184.9 Mn considering exchange rate of USD~RUB 83.68 as on 31.03.2025) has also been received at the TIPL level in RUB as dividend corresponding to OIL's stake in the project which is yet to converted to USD and repatriated to Singapore.

3) **Russia:** License 61 [OIL-50% and PetroNeft Resources Limited-50% (Operator)]: OIL acquired 50% stake in WorldAce Investment Limited (WIL) through its WOS Oil India International BV (OIIBV) on 3rd July 2014 from PetroNeft Resources Plc (PR). The remaining 50% of WIL is owned by PetroNeft Resources plc (PR). WIL has a wholly owned subsidiary named LLC Stimul-T in Russia which holds the license of Block License-61 (L-61). Till date, Lineynoye, West Lineynoye, Arbuzovskoye and Tungolskoye fields have been developed.

Since August'2022, Asset is not producing crude oil due to the closure of Nord Imperial Pipeline. Stimul-T has filed for bankruptcy on 10.05.2023 due to adverse operational and financial circumstances.

4) **Venezuela:** Project Carabobo [Corporation Venezuelan del Petroleo (CVP)-71%, INDOIL Netherland BV 7% (IOCL-3.5%, OIL-3.5%), OVL-11%, Repsol YPF (Spain)- 11%]: The consortium of Repsol (11%), OVL (11%) and INDOIL (7%) (IOCL- 3.5%, OIL- 3.5%) (together termed as Minority Shareholders (MSHs)) hold 29% share, and CVP (PdVSA's Subsidiary) hold remaining 71% share, in a Mixed Company called M/s Petrocarabobo SA (PCB) which is the Operator. OIL and IOCL formed a 50:50 JV company at Netherlands named INDOIL Netherlands B.V. (INDOIL) to invest in the project. The mixed company contract was signed on 12th May 2010 for a period of 25 years.

The Project owns and operates 30 KBD crude treatment plant. Currently, the project activities are delayed due to economic and political crisis in Venezuela.

As on 31.03.2025, the 2P reserve position corresponding to Company's Participating Interest in Project Carabobo has been estimated at 0.10 MMT. During 2024-25, Company's share of production in asset stood at 0.0154 MMTOE.

ii. Development Assets (2)

1) **Mozambique:** Rovuma Area1 (TOTAL (Operator - 26.5%), Mitsui - 20%, ENH - 15% (Carried), BPRL - 10%, BREML - 10%, OVL - 10%, PTTEP - 8.5%): The Company along with OVL acquired 10% participating interest in Area 1 Mozambique on 7th January 2014, through acquisition of 100% shares in Videocon Mozambique Rovuma 1 Limited [since renamed as Beas Rovuma Energy Mozambique Limited (BREML)- OVL 60%, OIL- 40%]. Due to deterioration of the security situation in Cabo Delgado province of Mozambique, the Operator declared Force Majeure on 22nd April 2021. The project is currently under Force Majeure with discussions continuing between the Operator and Government of Mozambique for restoring the normalcy

in the region. As on 31.03.2024, the 2P reserve position of Golfinho-Atum field of Area 1 corresponding to Company's Participating Interest in Rovuma, Area1 has been estimated at 16.2095 MMTOE of natural gas and 0.4566 MMT of condensate.

2) **Nigeria:** Block OML 142 (Formerly OPL 205) [OIL-17.5%, IOCL-17.5%, and Suntera Resources-35% in JV Suntera Nigeria 205 (70% interest in block), Summit Petroleum - 30% (Operator): Suntera Nigeria 205 Ltd. (SN-205), a company incorporated in Nigeria, acquired 40% Participating Interest (PI) and 30% Economic Interest (EI) from Summit Oil International in May 2006. Subsequently, OIL, together with IOCL, acquired 25% (each) shareholding of Suntera Nigeria 205 Ltd.(SN-205), in which Suntera Resources Ltd. holds the remaining 50%. Hydrocarbon discovery (gas and condensate) in the block dates back to 1991-92 (Otien #1 well). After re-entry in the discovery well Otien #1, Extended Well Test (EWT) production from a single zone (zone #8) and re-workover operation of Otien #1 well were completed. An Energy Park is coming close to the Otien field which will help in monetization of gas produced from the field.

iii. Exploratory Assets (4)

1) **Bangladesh:** Block SS-04 and SS-09 [OIL-45%; OVL (Operator)-45%; Bapex:10%(Carried)]: The shallow offshore blocks were awarded in Bangladesh Bid Round-2012. The Production Sharing Contracts for both blocks were signed on 17th February 2014 in Dhaka, Bangladesh for an initial exploration period of five (05) years which was valid till 16.02.2025. Extension of both the Blocks for the period of 2-years are currently under consideration. The consortium has completed the mandatory seismic survey and drilling of 1 (one) onshore well (in block SS-04). Drilling strategy for drilling two offshore wells, 1 (one) each in Blocks SS-04 and SS-09 is being planned.

2) **Libya:** Area 95/96 Block [SIPEX (Operator)- 50%, IOCL-25%, OIL-25%]: The consortium has completed drilling of five wells against MWP of commitment of drilling 08 (Eight) wells. All the drilled wells have struck oil and gas. Drilling of sixth well was in progress when the unrest began and all operations in Area-95/96 were suspended since May, 2014. Due to the unrest, the block was under Force Majeure since May' 2014, however, in view of the improving law and order situation in Libya, the Force Majeure have been lifted from 07.11.2023. NOC, Libya has agreed to grant an extension of the exploration period for 30 months with effect from 07.11.2023 till 06.05.2026. to complete the remaining MWP. Presently, the Consortium has planned to complete the 6th well through re-entry program and drill the remaining two (02) wells to complete the MWP in the Block. Process has been initiated for the re-entry in the 6th well.

3) **Gabon:** Block Shakthi-II [OIL (Operator)-50%, IOCL-50%): An oil discovery was made in the third well (Lassa-1) in the block during the old PSC (G4-220). Two appraisal wells (Lassa-2 & 3) were also drilled as per the MWP of Phase-I of New PSC (G4-245) and 2D Seismic API of 1213.04 LKM in Phase-I was completed. Based on the integrated interpretation and prospect evaluations, the Consortium has entered into Phase-II exploration period in the block which was extended upto 15.04.2025 due to statutory delays and COVID-19 pandemic etc. Currently, drilling preparatory activities are being carried out 8.4 Pipeline.

4) **Sudan:** Product Pipeline [OIL-10% PI and OVL-90% PI]: The Project involved construction of 12" X 741 Km long Cross country Multi Product Pipeline from Al-Rawyan to Port Sudan. The Pipeline has been built on Build, Operate, Lease and Transfer basis. The consortium engaged M/s Dodsal Pte Ltd. as EPC contractor for the project. Project was completed in record time of 15 months (Target was of 16 months). The pipeline got commissioned in 2005.

12.1.2.9 Financial Performance

₹/ Crores

	2020-21	2021-22	2022-23	2023-24	2024-25
Total Income	10,561.45	16,427.65	24,757.85	24,514.28	23987.07
Net Profit/Loss	1,741.59	3,887.31	6,810.40	5,551.85	6114.19
Plan Outlay-Actual	13,331.93	4,366.52	5,534.42	5906.92	8467.33
Plan Target	3,877.00	4,108.00	4,302.00	4,896.00	6,880.00

12.1.2.10 Corporate Social Responsibility (CSR):

OIL is a Responsible Corporate Citizen with full commitment to the principles of CSR towards achieving inclusive and holistic development of its areas of operation and the society as a whole. As specified under Schedule VII of the Companies Act 2013, the company has embarked upon various CSR projects under key thrust areas as follows:

1) **Healthcare and Nutrition:** OIL has launched several flagship projects such as OIL Arogya and OIL Sparsha to improve healthcare accessibility and infrastructure. These initiatives focus on providing medical services, maternal and child healthcare, and addressing malnutrition among vulnerable groups.

2) **Swachh Bharat Abhiyaan (Drinking Water & Sanitation):** Supporting the national cleanliness movement, OIL has constructed school and community toilets, facilitated clean drinking water supply, and implemented solid waste management systems. Awareness drives and community participation through employee-led activities have further strengthened this effort.

3) **Education:** OIL's highly acclaimed OIL Pragyaan Super 30 project provides free residential coaching for JEE and NEET aspirants from economically weaker sections. Other educational initiatives by OIL include OIL Disha, which is designed to nurture the career aspirations of youth by coaching them for various competitive service examinations. Additionally, OIL Sakshyam focuse s on literacy promotion and inclusive education, especially tailored for differently abled individuals, ensuring equitable access to learning opportunities.

4) **Sustainable Livelihood Generation:** Programs such as Rupantar, Jeevika, and dedicated agriculture projects empower rural populations by promoting alternative livelihood options and enhancing income generation capabilities.

5) **Skill Development and Capacity Building:** Through Project Swabalamban and the Skill Development Institute (SDI), Guwahati, OIL imparts vocational and industry-relevant training to youth, especially in the Northeastern region, creating employment-ready individuals.

6) **Women Empowerment:** OIL supports women-centric initiatives like the Centre of Excellence for Handloom, Handicraft & Entrepreneurship and runs a three-year GNM nursing course through its own OIL Nursing School, enabling financial independence and social empowerment of women.

7) **Environment and Sustainability:** OIL is actively involved in afforestation drives, biodiversity conservation, and water body rejuvenation projects. The establishment of a unique Bamboosetum in Digboi is a testament to its environmental stewardship.

8) **Promotion of Art, Culture, and Heritage:** The company supports the preservation and promotion of India's rich cultural and religious heritage through various programs across its operational areas.

9) **Development of Sports:** OIL invests in sports infrastructure and training, including specialized coaching and rehabilitation facilities to nurture sporting talent, particularly in rural and underdeveloped regions.

10) **Rural Infrastructure Development:** OIL contributes to the creation and improvement of essential rural infrastructure such as roads, bridges, community halls, and waiting sheds, enhancing the overall quality of life.

12.1.3 Gail (India) Limited (GAIL):

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

GAIL (India) Ltd. is a Maharatna CPSE under the Ministry of Petroleum & Natural Gas. GAIL has a large network of Natural Gas pipelines of ~16,420 Km; LPG Pipeline of ~2040 Km; five Gas Processing plants for production of LPG and other liquid hydrocarbons with a combined production capacity of around 1.4 MMTPA and a gas based integrated petrochemical plant of capacity 810 KTPA of polymer. GAIL is co-promoter of two other petrochemical projects including 280 KTPA Brahmaputra Cracker and Polymer Limited (BCPL) Complex in Assam and 1.4 MMTPA ONGC Petro-additions Limited (OPaL) project in Gujarat. Petronet LNG, a JV of GAIL, operates two LNG regasification terminals at Dahej & Kochi. GAIL is also the promoter of Konkan LNG Private Limited which operates LNG regasification terminal at Dhabol with design capacity of 5 MMTPA. Further GAIL has 14.72% equity stake in Ramagundam Fertilizer and Chemicals Ltd. (RFCL) incorporated by NFL, EIL & FCIL for producing 2200 MTPD Ammonia and 3850 MTPD Urea. GAIL is also in the process of setting up of a Coal Gasification based Fertilizer plant through a JV- Talcher Fertilizer Ltd. (TFL) formed with Coal India Ltd. (CIL), Rashtriya Chemicals & Fertilizers Ltd. (RCF) each having 31.85% equity share and Fertilizer Corporation of India Ltd. (FCI) which has 4.45% equity. GAIL has also acquired 26% stake in ONGC Tripura Power Company and 26% equity stake in M/s LNG Japonica Shipping Corporation Limited. Further, GAIL has acquired JBF Petrochemicals Limited (JBFPL) of 1.25 MMTPA Purified Terephthalic Acid (PTA) through Corporate Insolvency Resolution Process (CIRP). JBFPL has been renamed as GAIL Mangalore Petrochemicals Limited (GMPL) and is now a wholly owned subsidiary of GAIL.

GAIL is a pioneer in city gas distribution (CGD) business in India. It has presence in 72 Geographical Areas across India after completion of 12th CGD Bidding round. GAIL has 8 JVs and three subsidiaries in India for its CGD business.

Further, GAIL has overseas presence in Russia, USA, Singapore, Myanmar, China, and Egypt. It has opened offices in Singapore, Yangon, Houston and Moscow (Bharat Energy Office). It has a wholly owned subsidiary, GAIL Global (USA) Inc. (GGUI) in USA. GGUI has formed subsidiary, GAIL Global (USA) LNG LLC (GGULL) which has booked 2.3 MMTPA capacity in Cove Point LNG liquefaction project. GAIL has another wholly-owned subsidiary company viz. GAIL Global (Singapore) Pte. Ltd., for trading in LNG and for undertaking overseas investments. GAIL's total LNG sourcing portfolio is about 15.5 MMTPA.

GAIL has participating interest in 13 blocks of which 10 blocks are in India,

2 in Myanmar and 1 shale gas JV in Eagle Ford Basin, Texas, USA. Besides, GAIL has 4.17% equity partnership in South East Asia Gas Pipeline Company (SEAGP) which is transporting gas from Myanmar to China. GAIL has made investments in three companies in downstream business at Egypt and China.

GAIL has renewable portfolio of ~145 MW including ~118 MW of wind and ~27 MW of solar energy. In addition, GAIL is exploring various business opportunities in the Production and Marketing of Compressed Bio Gas (CBG) from organic waste. Emerging areas including ethanol, hydrogen, coal gasification, Small Scale LNG unit, LNG retail vertical etc. are also being explored for new business opportunities.

As part of initiatives taken regarding development of Hydrogen value chain, GAIL has commissioned India's maiden pilot project of blending Hydrogen in City Gas Distribution grid in CGD network of Avantika Gas Limited (AGL), Indore (M.P.) and has commissioned the country's first 10 MW Green Hydrogen electrolyser in Vijaipur, Madhya Pradesh, having a capacity to produce 4.3 TPD of Hydrogen through electrolysis using renewable power.

In order to supply gas to remote demand nodes not having necessary pipeline infrastructure, GAIL procured 02 (two) Small scale LNG skids which were first of its kind in India and successfully commissioned both the Small-Scale LNG (SSLNG) Skids at GAIL, Vijaipur, showcasing the potential of SSLNG technology in connecting isolated sources and consumers to the natural gas supply chain.

GAIL has developed a Net Zero strategy and organization-wide roadmap to achieve a 100% reduction in Scope 1 and Scope 2 emissions by 2035 and 35% reduction in Scope-3 by 2040.

12.1.3.1 Physical and Financial performance: -

Parameters	Units	Performance in 2023-24	Performance in 2024-25
Gas Transportation	MMSCMD	120	127
Gas Marketing	MMSCMD	98	101.5
Liquid Hydrocarbon Production	TMT	995	827
Petrochemical Production	TMT	777	948
LPG Transportation	TMT	4396	4478

Financial

Description	Units	Performance in 2023-24	Performance in 2024-25
Revenue from Operations	₹ Crore	1,30,638	137288
Gross Margin (EBDITA)	₹ Crore	15,583	19168
Profit Before Tax	₹ Crore	11,555	14825
Profit After Tax	₹ Crore	8,836	11312

12.1.3.2 Major Projects/ pipelines under execution by GAIL: -

(i) **Jagdishpur Haldia and Bokaro-Dhamra Pipeline (JHBDPL):** With an aim to ensure cleaner and quality energy in Eastern India at an affordable Price, GAIL is executing Jagdishpur – Haldia & Bokaro – Dhamra Natural Gas Pipeline (JHBDPL) Project (2563 Km), popularly known as the Pradhan Mantri Urja Ganga of Eastern India. Further, the pipeline is also being extended from Barauni to Guwahati (via Siliguri & Bongaigaon) (726 Km), as an integral part of JHBDPL, to connect North East Region (NER) with the National Gas Grid. Total integrated length of JHBDPL is 3289 Kms. The entire JHBDPL including BGPL is being executed at an investment of ₹17,405 crores. It will pass through Uttar Pradesh (335 km), Bihar (719 km), Jharkhand (500 km), West Bengal (696 km), Odisha (785 km) & Assam (254 Km). JHBDPL has revived fertilizers plants of HURL Gorakhpur, HURL Sindri, HURL Barauni & is also meeting the demands of M/s Matix Fertilizers in Durgapur. Further, the network will enable supply of cleaner fuel for domestic & industrial customers in eastern part of India enroute the pipeline.

The entire sections of Integrated Jagdishpur – Haldia & Bokaro – Dhamra Natural Gas Pipeline (JHBDPL) have been commissioned (~3118 km) except Durgapur Haldia Pipeline (~162 km). The balance section is anticipated to be completed in the year 2025.

(ii) **Mumbai Nagpur Jharsuguda Pipeline (MNJPL):** Mumbai-Nagpur-Jharsuguda Pipeline is a 1755 KM pipeline with a capacity of 14.6 MMSCMD originating from Mumbai and ending at Jharsuguda. Also, its spurline will extend from Nagpur (Maharashtra) to Jabalpur (Madhya Pradesh). It is also a part of National Gas Grid (NGG) and will pass through 25 districts in the states of Maharashtra (12 Districts), Madhya Pradesh (3 Districts), Chhattisgarh (9 Districts) & Odisha (1 District). It will originate from Thane (Maharashtra) & will connect to JHBDPL in Jharsuguda (Odisha).

The pipeline shall ensure availability of clean fuel and cater the demand of CGD, industries and anchor load customers. Availability of domestic gas may help in development of major industries like Power, Fertilizer and other industries enroute pipeline in future. PNGRB has also authorized around 15 GA's covering 50 districts (Maharashtra: 19, Madhya Pradesh: 14, Chhattisgarh: 17) where City Gas Distribution Network would be developed in near future.

Pipeline is passing through several Industrial Zones viz. Mhaskal, Aurangabad, Wardha, Amravati, Jalgaon, Nagpur, Gondia in Maharashtra; Jabalpur & Chhindwara in Madhya Pradesh; Raipur, Durg, Bilaspur, Korba & Raigarh in Chhattisgarh; Jharsuguda in Odisha. Construction work is in full swing & nearly 1680 Km of pipeline lowering has been achieved till March, 2025.

(iii) **Srikakulam Angul Pipeline (SAPL):** With an aim to supply of clean and quality energy in Odisha & Andhra Pradesh, this pipeline has a strategic importance as a part of national gas grid and it would connect with GAIL's Jagdishpur Haldia Bokaro Dhamra Pipeline (JHBDPL) network at Angul and with Kakinada Srikakulam Pipeline of Andhra Pradesh Gas Distribution Corporation (APGDC) at Srikakulam. The pipeline will act as vital infrastructure for offtake of gas from existing/upcoming LNG terminals like Dahej, Ennore, Dhamra, Gangavaram (A.P.), Gopalpur FSRU etc.

Total length of Srikakulam Angul Pipeline is 744 Km (619 Km in Odisha and 125 Km in Andhra Pradesh) with a capacity of 6.65 MMSCMD and pass through Angul, Dhenkanal, Cuttack, Khordha, Nayagarh, Gajapati, Ganjam, Raygada, Koraput & Kalahandi Districts of Odisha and Srikakulam & Vizianagaram districts of Andhra Pradesh.

421 Km (Mainline) Pipeline section completed and balance 322 Km (spurline) is under implementation (as of March, 2025 lowering of 258 Km is achieved) which is to be completed in the year 2025.

(iv) **Kochi-Koottanad-Bangalore-Mangalore Pipeline (KKBMPL) Project Phase-II (901 km):** Kochi-Koottanad-Bangalore-Mangalore Pipeline (KKBMPL) Project was conceptualized in the year 2007 by Govt. of India as part of the ambitious National Gas Grid (NGG) and GAIL was authorized by MoPNG to lay this gas pipeline project in the states of Kerala, Karnataka and Tamil Nadu. This 30"/24" Pipeline with total capacity of 16 MMSCMD was planned to evacuate the re-gasified LNG (RLNG) from Kochi LNG terminal to transport to various consumers in the state of Kerala, Tamil Nadu & Karnataka, thereby connecting these three southern states with National Gas Grid. This pipeline will cater to the needs of house-holds as PNG (Piped Natural Gas) for cooking purpose, hotel industries, CNG (Compressed Natural Gas) to vehicles in the transport sector, Power plants, Fertilizer plants and many other industries.

Project is being implemented and being commissioned on progressive manner. **579 km is commissioned and 322 km Krishnagiri-Coimbatore Section is under implementation. Pipeline is to be completed in the year 2025.**

(v) **Dhamra Haldia Pipeline Project:** Dhamra Haldia Pipeline Project is being laid as an expansion of Pradhan Mantri Urja Ganga (PMUG) pipeline project named as Jagdishpur- Haldia & Bokaro Dhamra Pipeline Project (JHBDPL) to meet the additional gas demand of IOCL Haldia and demand of CGD GA en-route in Odisha and West Bengal. The Pipeline is passing through 03 districts in the states of Odisha (154 Km) & 02 districts in the states West Bengal (99 Km).

The Dhamra-Haldia Pipeline is being executed at an investment of ₹1030 crores & is anticipated to be completed in the year 2025. 154 Km of Pipeline section completed in Odisha. Balance 99 Km in West Bengal is under implementation (As of March, 2025 Lowering of 62.8 Km is achieved in W.B.).

(vi) **Gurdaspur Jammu Pipeline Project:** GAIL is constructing 160 Km long Gurdaspur Jammu Pipeline having authorized capacity of 3.1 MMSCMD. This pipeline is envisaged to connect UT of Jammu & Kashmir with National Gas Grid to supply cleaner Natural Gas. The scheduled completion date is July, 2026 (As of March, 2025Lowering of 62.8 Km is achieved in W.B.).

(vii) **Coal Gasification:** GAIL is in the process of setting up a coal gasification-based Urea project through a JV-Talcher Fertilizers Limited (TFL) formed with Coal India Limited (CIL), Rashtriya Chemicals and Fertilizers Limited (RCF), each having 31.85% stake and Fertilizer Corporation of India Limited (FCIL) having 4.45% equity (as per JV agreement). The project with an estimated cost of around ₹17,080 crores is envisaged to produce 2,200 MTPD Ammonia and 3,850 MTPD Urea.

(viii) **Petrochemicals:**

a) GAIL is setting up 500 KTA PDH-PP unit which is India's First Propane

dehydrogenation unit integrated with Polypropylene unit & Offsite Unit at Usar, Maharashtra along with Usar-Uran Propane Pipeline (New Liquid Hydrocarbon Pipeline). The project is located in the existing LPG recovery plant of GAIL-Usar, Raigarh district in Maharashtra. The Propane feed shall be sourced from existing BPCL Uran terminal and the same will be pumped to the GAIL-Usar plant through a dedicated Liquid Propane Pipeline. The Total project cost is ₹11,256 crores. With all major Equipment's & Contracts awarded, Site construction activities are going on full swing and to be completed by October, 2025.

b) **Polypropylene Project, PATA:** GAIL is also setting up 60 KTPA Polypropylene unit at Pata petrochemical complex, Distt. Auraiya U.P. at a cost of approx. ₹1299 Crores. The proposed facility is being set-up inside the existing facilities at Pata Petrochemical Complex & will be utilizing the polymer grade propylene produced in the existing Pata Petrochemical Complex, as a feed-stock for the New Polypropylene (PP) Plant. All Equipment's & Works Contracts have been awarded. Construction activity is going on full scale for the targeted completion of the Project by July, 2025.

c) **GAIL Mangalore Petrochemicals Limited:** GAIL acquired 100% stake in JBF Petrochemicals Limited (JBFPL) through Corporate Insolvency Resolution Process (CIRP) in 2023 through a competitive bidding process organized by NCLT, making it a Wholly Owned Subsidiary (WOS) of GAIL. Subsequent to acquisition, JBFPL has been rechristened as GAIL Mangalore Petrochemicals Limited (GMPL). The name plate capacity of GMPL plant is 1.25 MMTPA of Purified Terephthalic Acid (PTA), a raw material for Polyester Fibre / Yarns, PET etc. The construction of the plant was 95% complete at the time of acquisition and currently, revival activities are under progress, with commissioning planned for FY 25-26.

12.1.3.3 Some of the major achievements of GAIL during FY 2024-25:

- GAIL secured an Excellent MoU rating for FY 2023-24 from DPE.
- Highest ever Daily RE generation 1895.79 MWh on 27.07.2024.
- Highest ever gas sales of 13.01 MMSCMD through JHBDPL network on 03.07.2024
- Highest ever Natural gas transmission of 141.53 MMSCMD on 10th May 2024.
- Highest ever single day polymer sales of 13530 MT achieved on 31st Dec, 2024
- GAIL's share price hit all time high of ₹246 on 31st July, 2024
- Investment approval accorded for C2-C3 liquid pipeline (14"X360 km) from Vijaipur to Pata on 16.05.2024.
- Inauguration of GAIL's First 10 MW Green Hydrogen Plant at Vijaipur on 24.05.2024.
- GAIL signed agreement for chartering new built LNG vessel on long term basis with K-Line.
- GAIL inaugurated integration of open access portal with SAP for booking of pipeline capacity for its customers.
- GAIL inaugurated India's first Natural Gas Closed loop meter prover facility at Gail Dibiyapur Compressor Station.
- Hon'ble Prime Minister has inaugurated GAIL's first CBG plant in Ranchi on 02.10.2024
- GAIL received "NIL" comments from CAG for 15th consecutive year FY 2023-24.
- Approval accorded for equity investment for setting up a 500 Kilo Litres Per Day (KLPD) of First Generation (1G) grain-based Ethanol Plant in the

State of Rajasthan in a Joint Venture (JV) mode on 05.11.2024, subject to approval of DIPAM.

- Approval accorded for equity Investment for equity acquisition in Leafiniti Bioenergy Private Limited an existing CBG Company on 20.12.2024, subject to approval of DIPAM.

12.1.4 INDIAN OIL CORPORATION LIMITED (IOCL):

IndianOil, the Energy of India, is a diversified, integrated energy major with a presence in almost all the streams of oil, gas, petrochemicals and alternative energy sources. The Brand IndianOil leverages high calibre people and state-of-the-art technologies to tap all forms of energy most responsibly and delivering them to the consumers most affordably.

IndianOil's business interests encompass the entire hydrocarbon value chain-from refining, pipeline transportation & marketing to exploration & production of crude oil & gas, petrochemicals, gas marketing, alternative energy sources and globalisation of downstream operations. The brand's global aspirations are fulfilled through IndianOil's business forays in Sri Lanka, Bangladesh, Nepal, Bhutan, Maldives, Mauritius, the UAE, and other countries.

12.1.4.1 Financial Performance: IndianOil's revenue from operations decreased by 2% (₹20,833 Crore) to ₹ 8,45,513 Crore during FY 2024-25 from ₹8,66,345 Crore during FY 2023-24. During FY 2024-25, IndianOil registered a Net Profit of ₹12,962 Crore as compared to ₹39,619 Crore during FY 2023-24 mainly on account of lower refining margins, under recoveries on LPG sale and inventory losses during current period. GRM stood at US$ 4.80/bbl during FY 2024-25 as against US$ 12.05/bbl during FY 2023-24.

12.1.4.3 Refinery Performance: IOCL refineries have cumulatively processed 71.56 MMT crude and 3.0 MMT naphtha in FY 2024-25 compared to 73.308 MMT Crude and 3.11 MMT Naphtha in FY 2023-24. Distillate yield of IOCL Refineries improved to 80.6% in FY 2024-25 compared to 79.3% in FY 2023-24.

With respect to Operational Availability (OA), IOCL stands at 98.1% in FY 2024-25 compared to 97.3% in FY 2023-24 and as regard to Specific Energy Consumption (MBN) (Lower MBN indicates higher energy efficiency), IOCL refineries have achieved 68.9 MBN in FY 2024-25 compared to 68.7 in FY 2023-24.

Catalyst Manufacturing Unit (CMU) based on technology developed by IndianOil's R&D Centre has been successfully commissioned in January 2024. Commissioning of CMU by IndianOil is a step forward towards self-reliance in the technology-intensive domain of refinery catalyst and bolsters its "AtmaNirbhar Bharat" momentum. During FY 2024-25, the Catalyst Manufacturing Unit (CMU) at IndianOil's Panipat Refinery and Petrochemical Complex produced the following quantities of catalyst:

- FCC Additive (IMAX ULTRA): 127.1 Metric Tons
- DHDT Catalyst (INDICAT PRIME): 145.6 Metric Tons

12.1.4.4 Pipeline Performance: During the FY 2024-25, Crude Oil Pipelines achieved a Throughput of 51.26 MMT as against 51.80 MMT during FY 2023-24, and Product Pipelines achieved Highest Yearly Throughput of 45.66 MMT in FY 2024-25 as against 43.99 MMT during FY 2023-24. Further, Gas Pipelines achieved Highest Yearly throughput of 4668 MMSCM in FY 2024-25 as against 3717 MMSCM during FY 2023-24. With addition of 261 Kms to the cross-country network during the FY 2024-25, IOCL continued to expand its Pipeline network and crossed yet another milestone of 20005 Kms with a combined Throughput capacity of 129.9 Million Metric Tonnes per annum (MMTPA) for Crude oil & Product Pipelines and 49.4 Million Standard Cubic Meter Per Day (MMSCMD) for Gas Pipelines.

12.1.4.5 Marketing Performance: Domestic POL sales of 86.8 MMT (Excluding LNG & Own use) was registered during FY 2024-25 as against 85.3 MMT registered in the previous year FY 2023-24.

IndianOil served around 3.2 Crore customers daily at its retail outlets and delivered more than 29 Lakh domestic LPG cylinders per day during FY 2024-25 period to fulfil the energy requirement of India's citizens. During the FY 2024-25 (April-March, 2025), IndianOil commissioned 2,823 retail outlets (ROs), which is the highest among any OMCs. As on 31st March 2025, XtraGreen diesel product being sold through 7,808 ROs Pan India.

India's first super premium petrol XP100, with an octane value of 100 is being sold through 212 ROs across 100 cities as on 31st March 2025. Also, XP95 (95 Octane Premium Petrol) is being sold through 12,237 ROs Pan India.

To promote alternative fuels, IndianOil added 350 new CNG, 4656 electric vehicles (EV) charging and 37 battery swapping stations during FY 2024-25. IndianOil is currently operating 2,437 CNG, 13,614 EV charging and 128 battery swapping stations in the country as on 31.03.25.

IndianOil achieved the total LPG sale of 14.35 MMT during the period April-March, 2025 and released more than 18 Lakh new LPG connections. To improve customer reach and customer satisfaction in services, IndianOil commissioned 46 new LPG distributorships, taking their total number to 12,919 as on 31.03.2025. "Chhotu" [5 KG Free Trade LPG (FTL) Cylinder], has registered a growth of 32.26% during FY 2024-25 with a sale of more than 66 lakh cylinders. Further, during FY 2024-25, more than 7.3 lakh Indane composite cylinders were also marketed to customers which were launched in 5 kg and 10 kg units to offer a new-age and lightweight LPG cylinder to customers and witnessed a robust growth of 63% over same period last year.

The special LPG safety check campaign (Basic Safety Campaign), which began on 5th March 2024 as a door-to-door drive, for inspecting the domestic LPG installations and educating the customers on the safe uses of LPG in their kitchens, especially in low-income households and slum areas, IOCL completed its target of 6 crore safety checks by 31.12.2024.

In the aviation sector, IndianOil maintained its leadership position with a market share of 54.5% by selling 4.89 MMT in FY 2024-25. IndianOil commissioned one New AFS at Ayodhya during the year, taking the total number of AFS set up in the country by IndianOil to 130 as on 31.03.2025.

As part of its initiative to establish a manufacturing hub, IndianOil has developed the world's second-largest integrated lube complex at Amullavoyal, Chennai (LBP Manali). This state-of-the-art facility is designed to meet both domestic as well as international demand.

12.1.4.6 Research and Development (R&D): IndianOil R&D spearheads self-reliance by developing domestic technologies, reducing import dependence, and shaping a sustainable future. A 300 KTA grassroot indDSK unit for PCK was commissioned at Paradip Refinery and successfully completed PGTR achieving guaranteed parameters to meet the need of low sulphur SKO to support pipeline transfers from Paradip Refinery. IOCL R&D jointly with Virdis chemicals successfully developed, patented and completed the commissioning as well as Performance Guarantee Test Run (PGTR) for Bongaigaon Refinery ISOM catalyst achieving guaranteed parameters – RON and Isomerate yield. PP Catalyst i-ZN22® was also developed and trials at Paradip Refinery confirmed superior performance.

The in-house development of indigenous component-based Gasoline and Diesel Multifunctional Additive (GMFA & DMFA) have enabled the marketing of Premium fuels. The premium racing fuel STORM-X for use in Round 3 of the Indian National Car Racing Championship at the Madras International Circuit has been launched this year.

IndianOil R&D developed eCo2Sorb, carbon capture technology was validated in the pilot plant and demonstration in a large-scale Fertilizer plant is in progress. Also, Agri-Elite technology for producing premium quality manure/ Bio-fertilizer production from CBG plant and microbial blend StubVorous®, for in-situ decomposition of crop residue were developed and successfully tested in field trials.

This year, two in-house developed nano-additized products were launched: Propane Plus, a green fuel for industrial use, and **XtraBoost**, an advanced version of Auto-Gas. These additions expand the existing portfolio, which already includes established products such as Xtra-Tej and Indane Nanocut. Commercial roll out of in-house developed Surya Nutan solar cookstoves has been initiated through empanelled vendors.

12.1.4.7 Petrochemical Performance: IndianOil, the second-largest player in India's petrochemicals industry, continues to diversify its portfolio, which includes Polymers (Polyethylene and Polypropylene), LAB (Linear Alkyl Benzene), PTA (Purified Terephthalic Acid), Glycols, and Butadiene. The Propel brand remains a dominant name in the Indian market. During the 2024-25, IndianOil achieved petrochemical sales of 3.1 MMT, a 7.3% increase from the 2.9 MMT in the same period of FY 2023-24. Additionally, the company expanded its product offering with the introduction of new polypropylene grades, P1750 MN at Paradip and 5200 MG at Panipat.

In a landmark move for the petrochemicals business, the IndianOil Board has accorded investment approval for setting up a 300KTA Yarn Project in Bhadrak, Odisha at an estimated cost of ₹4,382 crore in an equal joint venture with MCPI Pvt. Ltd. A unique project in the Eastern region, it comprises a Continuous Polymerization unit with downstream units of Draw Textured Yarn, Fully Drawn Yarn, polyester chips and allied facilities. The Board has also approved installation of Ethylene purification unit and Gas Phase Reactor at the existing Polypropylene plant at Paradip. This investment of ₹305 crore will enable production of impact and random co-polymer grades of Polypropylene at the Paradip facility. Additionally, the Board granted Stage-I approval for a 42 KTPA Propylene Recovery Unit at Haldia at an estimated cost of ₹438 crore.

12.1.4.8 Natural Gas Performance: The Natural Gas vertical continued with its record-breaking performance, achieving ~7.9

MMT of gas offtake in FY 2024-25 period, a 21% year-on-year increase. Strategic agreements of ~5 MMT Long term LNG with ADNOC, Qatar Energy, and TotalEnergies further cemented IndianOil's position as a key player in the Natural Gas sector. Additionally, commissioning of 6 Auto-LNG stations showcased its ability to innovate and expand in emerging markets of Small-Scale LNG. A significant milestone was achieved with the commencement of first 'LNG at Doorstep' supplies from the Dhamra LNG Terminal on November'24. MoUs have been signed with leading gas players to collaborate on exploring business opportunities in natural gas, aimed at expanding IndianOil's footprint in the sector. As a strategic partner & equity investor in IGX, IndianOil traded a total of 296 MMSCM of natural gas in 2024-25, thereby tripling trade volumes on IGX in a single year.

12.1.4.9 City Gas Distribution (CGD): IndianOil has significant contribution in moving towards gas-based economy. Along with JVCs, IndianOil has authorization of total of 49 GAs comprising of 114 districts establishing itself as one of the largest CGD company of the country with highest number of GAs among OMCs.

12.1.4.10 Exploration & Production: Indian Oil continues to explore opportunities in the E&P sphere through Participating Interests (PI), joint ventures and other alliances. As on March 2025, the upstream portfolio tally stands at 14 domestic & 11 overseas assets, of which 10 assets are producing (3 domestic and 7 overseas). Apart from the producing assets, 5 assets are under development, 3 assets have discovery, 1 asset is under appraisal and 6 assets are under exploration. During FY 2024-25, Indian Oil's share of production from its producing assets including overseas and domestic has been 4.45 MMT of oil equivalent (MMToe) as compared to 4.26 MMToe during FY 2023-24.

12.1.4.11 Alternative Energy: IndianOil is steadily progressing towards harnessing renewable energy to minimize carbon emissions for a green economy. IndianOil has an installed capacity of 252.10 MW of renewable energy, comprising 167.60 MW wind power capacity and 84.50 MW solar energy capacity as on 31.03.2025. For FY 2024-25, IndianOil has generated 365.72 GWh of renewable power leading to mitigation of 276.85 TMT (thousand metric tonnes).

During April-March, 2025, solarisation done at 4227 retail outlets taking the total to 35,874. As on 31.03.2025, IndianOil solarised 35,874 Nos. retail outlets with a cumulative solar power installed capacity of near 175.75 MW. For FY 2024-25, this led to a generation of approx. 224.42 GWh, leading to mitigation of 170 thousand metric tonnes of carbon- dioxide equivalent (TMTCO2e) emission.

IndianOil plans to build a renewable portfolio of 31 GW by 2030. To expand this energy portfolio, IndianOil is collaborating with other public and private energy companies working in the space of clean energy technologies.

IndianOil is the lead implementation agency of SATAT (Sustainable Alternative Towards Affordable Transportation). IndianOil has been issuing Letters of Intent (LOIs) for the production and supply of Compressed Biogas (CBG) from time to time. As of 31.03.2025, IndianOil has 714 active LOIs under the SATAT initiative. During FY 2024-25, 13 CBG plants have been commissioned, taking the total number of CBG commissioned plants to 44. CBG is being marketed through 125 Retail Outlets and 4 Industrial Consumers. The CBG produced is being retailed through IndianOil's CBG Retail Outlets under the brand name

'IndiGreen'. In FY 2024-25, IndianOil sold ~8.9 thousand metric tons (TMT) of CBG, and the cumulative sale since initiation of CBG sale September 2019 has crossed 27.8TMT.

IndianOil continues to drive sustainability through its Compressed Bio-Gas (CBG) initiatives, contributing to cleaner energy and waste management. A state-of-the-art 200 TPD mixed waste-based CBG plant has been established to process paddy straw, press mud, and cattle dung, producing 20 TPD of CBG. Additionally, under its Corporate Social Responsibility (CSR) initiative, IndianOil has set up two CBG plants—one at Adarsh Gaushala, Gwalior, and another at Hingonia Gaushala—each processing 100 TPD of cattle dung to generate approximately 2 TPD (~700 TPA) of CBG. The Gwalior CBG plant was virtually inaugurated by the Hon'ble Prime Minister on 2nd October 2024 and will fuel municipal vehicles, advancing the City Waste to City Transport model. Meanwhile, the CBG produced at the Hingonia plant is utilized by the Akshaya Patra Foundation for the preparation of mid-day meals, reinforcing IndianOil's commitment to sustainable energy solutions and social welfare.

12.1.4.12 Sustainable Development: IndianOil ranked no.1 in Dow Jones Sustainability Index (DJSI) in 2024 among companies of Oil and Gas sector in India.

12.1.5 Bharat Petroleum Corporation Limited (BPCL):

Bharat Petroleum (Fortune Global 500 Company) is the second largest Indian Oil Marketing Company and one of the integrated energy companies in India, engaged in refining of crude oil and marketing of petroleum products, with presence in the upstream and downstream sectors of the oil and gas industry. The company attained the coveted Maharatna status, joining the club of companies having greater operational & financial autonomy.

Bharat Petroleum's Refineries at Mumbai, Kochi and Bina have a combined refining capacity of around 35.3 MMTPA. Its marketing infrastructure includes a network of installations, depots, energy stations, aviation service stations, LPG and Lubes distributors. Its distribution network comprises over 23,642 Energy Stations, over 6,269 LPG distributorships, over 500 Lubes distributorships, and 80 POL storage locations, 54 LPG Bottling Plants, 73 Aviation Service Stations, 5 Lube blending plants and 5 cross-country pipelines as on 31.03.2025.

Bharat Petroleum is integrating its strategy, investments, environmental and social ambitions to move towards a sustainable planet. The company has chalked out the plan to offer electric vehicle charging stations at around 7000 energy stations over the next 5 years.

With a focus on sustainable solutions, the company is developing an ecosystem and a road-map to become a Net Zero Energy Company by 2040, in Scope 1 and Scope 2 emissions. Bharat Petroleum has been partnering communities by supporting several initiatives connected primarily in the areas of education, water conservation, skill development, health, community development, capacity building and employee volunteering. With 'Energising Lives' as its core purpose, Bharat Petroleum's vision is to be an admired global energy company leveraging talent, innovation & technology

12.1.5.1 Financial Performance: BPCL's Revenue from Operations declined by 1.27% to ₹5,00,371 Crore in April-March 25 from ₹5,06,806 Crore in April-March 24. This decrease was primarily on account

of decline in selling price of certain petroleum products partly offset by increase in sales volume during the period. During the period April-March 25, BPCL registered a Profit after-tax of ₹13,275 Crore as against ₹26,674 Crore in April-March 24. The decrease in profit from previous year in mainly due to lower GRMs and under-recoveries in LPG in current period. GRM stood at US$ 6.82/bbl. in April-March 25 as against US$ 14.14/bbl. in April-March 24.

12.1.5.2 Contribution to Exchequer: Over the years, BPCL has contributed to the Government exchequer in the form of duties, taxes, and dividend. During the period April-March 25, ₹1,48,348 Crore was paid to the exchequer. An amount of ₹74,303 Crore was paid to the Central Exchequer and ₹74,045 Crore was paid to the States Exchequer during April-March 2025.

12.1.5.3 Refinery Performance:

1) **Mumbai Refinery:** The present installed capacity of Mumbai refinery is 12.00 MMTPA. Mumbai refinery achieved a crude throughput of 15.53 MMT during FY 24-25 (April 2024 to March 2025) with capacity utilization of 129.42 %. For FY 2023-24 (April 2023 to March 2024) crude throughput of 15.05 MMT with capacity utilization of 125.42 %.

2) **Kochi Refinery:** The present installed capacity of Kochi refinery is 15.5 MMTPA. Mumbai refinery achieved a crude throughput of 17.22 MMT during FY 24-25 (April 2024 to March 2025) with capacity utilization of 110.9% . For FY 2023-24 (April 2023 to March 2024) crude throughput of 17.54 MMT with capacity utilization of 111.7%.

3) **Bina Refinery:** The present installed capacity of Bina Refinery is 7.8 MMTPA. Bina Refinery achieved a crude throughput of 7.71 MMT during the FY 2024-25 with a capacity utilization of 98.8%. For FY 2023-24, Crude throughput of 7.13 MMT was achieved, with capacity utilization of 91.4% in view of Refinery Turnaround 2023 for Maintenance & Inspection (M&I).

12.1.5.4 Pipeline Performance: BPCL operates a cross-country pipeline network spanning 3,537 km, with a design capacity of 29 MMTPA. Additionally, pipeline projects of approximately 1,000 km are currently under execution.

BPCL maintained safe and efficient operations across its pipeline network. In FY 2024-25, pipeline throughput reached 27.2 MMT — the highest ever recorded in any financial year. Haulage volumes also saw a YoY 7% increase. To further enhance safety, BPCL commissioned a Pipeline Intrusion Detection System (PIDS) on its crude pipeline, thereby achieving 100% PIDS coverage across all major cross-country pipelines. This real-time monitoring system significantly mitigates the risk of third-party damage. BPCL is actively expanding its pipeline infrastructure in the southern states, with projects progressing steadily.

12.1.5.5 Marketing Infrastructure and performance:

BPCL has a robust distribution network comprising of 22 POL terminals and 58 POL depots, 23642 Retail Outlets, 927 SKO Agencies, 54 LPG bottling plants, 6269 LPG Distributorships, 73 Aviation Service Stations, 5 lubricant blending / filling plants and Pipeline network of 3537 KMs of multiproduct & crude pipeline as on 31.03.2025 with designed capacity of 28.7 MMTPA. The market sales of BPCL in FY 2024-25 was 52.44 MMT with a growth of 2.77 % and market share of 25.04%. During FY 2023-24, the market sales was 51.03 MMT.

BPCL's Retail Business segment achieved growth of 2.55% clocking volume of 33.52 MMT and highest absolute market share among PSUs from last 15 years (During 24-25: 29.7% in MS & 30.0% in HSD). BPCL's #SilentVoice, an inclusion employment initiative, has seen remarkable growth in FY 2024-25 now engaging 560+ SHIs (Speech and Hearing Impaired) across 400+ Retail Outlets covering over 25 cities.

BPCL is serving over 9.46 Crore LPG customers with a strong network of 6269 distributors. During the year 0.33 lakh new customers were enrolled under Ujjwala and 11.08 lakh customers upgraded to double bottle connections. BPCL has initiated a pilot project involving the deployment of LPG cylinder smart vending machine. It will ensure Smart, Secure and round the clock service ensuring customer convenience. The vending solution can be deployed at residential complexes, retail outlets, industrial hubs, remote locations, shopping malls, and transport hubs.

Aviation Turbine Fuel Sales stood at 1968 TMT registering a growth of 3.55% and achieving a market share of 24.74%.

Industrial & Commercial BU achieved highest ever sales of 7.32 MMT. It launched the industry's first Biofuel High Flash High-Speed Diesel (HFHSD) Bunker successfully, in Mumbai. It also developed EPA grade HSD and supplied to major OEMs.

In lubricants business segment, highest ever sale of 423.2 TMT was achieved. MAK established its footprint in 8 countries including Africa, entering Kenya, Uganda and Tanzania, Sri Lanka for lubricants. MAK Lubricants received the prestigious 'Brand of the Decade Award 2024' in the Automotive Lubricants category from Herald and Most Preferred Brand 2024-25' by the Marksmen Daily. MAK Lubricants was honoured with the 'Most Trusted Brand of India 2025-26' award by Marksmen Daily. New product MAK AERO SMOKE OIL developed under the 'Make in India' initiative successfully passed its trial at the Air Force Station Bidar.

BPCL is aggressively scaling its presence in the City Gas Distribution (CGD) space through 52 Geographical Areas (GAs), 26 on own and 26 with JVCs, covering total 154 districts for cleaner energy accessibility, and a low-carbon future. As of March 2025, the BPCL has commissioned 840 CNG stations, connected over 5.81 lakh households to piped natural gas (PNG), and developed a robust pipeline network comprising more than 2,350 km of steel pipelines and 3,800 km of MDPE pipelines within own GAs. BPCL continued to strengthen its presence in the natural gas segment, recording total sales (including internal consumption) of 1.83 MMT, up from 1.77 MMT in the previous year. Reinforcing its long-term commitment to a gas-based economy, BPCL entered into a strategic agreement with ADNOC Trading for the supply of 2.5 MMT of LNG over a five-year period beginning in 2025.

12.1.5.6 Research & Development: Bharat Petroleum's Corporate Research & Development Centre (CRDC) at Greater Noida, Uttar Pradesh and Product & Application Development Centre (P&AD) at, Mumbai are the two research divisions who are proactively involved in adding value to the businesses through research activities.

To gain self-reliance under "AatmaNirbhar Bharat", CRDC has achieved several key technological advancements and commercial successes during April 2024 to March 2025, these include:

BPCL R&D at IEW 2025: At India Energy Week 2025, BPCL R&D showcased groundbreaking innovations, including the model for Net Zero Retail Outlet operation (implemented at RO-Asalwas), renewable power generation from ocean waves, and an innovative ambient-condition CO_2 capture and conversion technology. These technologies received widespread appreciation from industry peers and dignitaries across the oil and gas sector. This led to the signing of a MoU with M/s Eco Wave Power, Israel, during India Energy Week 2025 for the demonstration of renewable power production from ocean waves.

Hydrogen Recovery : The BharatH2Sep membrane technology for hydrogen recovery from off-gas was successfully field-tested, achieving hydrogen purity of 98-99 mol% with 75-80%.

Hydrogen Refuelling Stations : The Company progressed in establishing a hydrogen refueling station for buses at Cochin International Airport Ltd. (CIAL), with scale up of indigenous electrolyzer, based on BARC technology, at MW scale. Furthermore, the company's joint proposal with ANERT, Govt. of Kerala, to set up HRS station at Trivandrum has been supported by MNRE under Green Hydrogen mobility scheme.

High-Efficiency PNG Stove: The Bharat Hi-Star PNG stove achieved 74% thermal efficiency, which is 15-20% higher than commercial burners. Technology licensing agreements were signed with manufacturers for commercial production, and a product launch was planned. The PNG burner was rolled out at a BPCL housing complex in Noida.

Super Absorbent Polymer (SAP): CRDC made progress in SAP technology commercialization, including PFD finalization and P&ID reviews for setting up a 20 kTPA commercial SAP plant at KR. Trials with Glacial acrylic acid as feed for SAP production led to superior grade of SAP production. BPCL received the CHT Innovation Award for the indigenously developed SAP technology.

Green silica: To valorize boiler ash that will be produced from BPCL's under-commissioning Bargarh 2G plant, an in-house process is developed for precipitated silica production with an efficiency of ~70%. Commercial scale production process has been developed.

Bio-plastic Production: CRDC has been working on incorporating biorefineries waste into bioplastics. Bioplastic bag production trials were conducted. Larger scale trials are being planned.

CO_2 capture: Process knowhow for CO_2 capture based on process intensification principle is being developed. Furthermore, process chemistry for CO_2 conversion to valuable chemicals such as methanol, formic acid is being developed.

Niche catalysts: This development comprising of catalysts like Hydroformylation process, DeSox catalyst for FCC operation, 2nd generation dewaxing catalyst have been developed successfully. The same are being scaled up at commercial scale to establish their performance in commercial unit.

FCC Catalyst Technology: An innovative FCC catalyst, "BHARAT-BCA", was developed to upgrade clarified oil (CLO) into gasoline and was scaled up for plant trials. A commercial trial was conducted at MR which showed 2% reduction in HCO+CLO and a 1.75% increase in gasoline yield.

Pilferage-Proof Sleeves for LPG: Innovative security sleeves with track-and-trace feature is developed to prevent LPG pilferage and enhance supply chain management. The innovative seal is prepared through

fusion of two polymeric material having different melting points to protect the QR on sleeves while crimping through hot air sealing machine. The developed sleeves offer the additional advantages of a 40% plastic reduction and seamless integration with existing systems. Currently, pilot trail is being conducted at LPG plant, Roorkee.

Anode grade coke production: In house process know-how has been successfully developed. 4500 MT of Anode grade coke production trial at Kochi refinery was successfully carried out.

BPMARRK® and K Model®: Approvals were obtained to provide services using K Model® and BPMARRK® software products. A web platform for BPMARRK was developed, and K Model® software was upgraded with new features. K Model was used to address desalter operation issues at KR.

Special grade LPG: A specialized hydrocarbon mix of LPG was developed for high-altitude conditions. The performance trails are being conducted at various locations.

Green Initiatives: A hybrid (solar+wind) pilot project with battery storage was initiated to power a retail outlet using Green energy. The trials have been successful. Further development is underway.

Patents and Publications: CRDC filed six patents throughout the year, including methods for organic acid production, sugar production from biomass, pilferage-proof LPG sleeves and solvent for carbon capture. Total 16 patents have been granted.

Likewise, R&D wing of P&AD-Sewree has developed following new lubricant products (April'2024 -March 2025) like Environmentally Acceptable Hydraulic oil, High-performance Neat cutting oil, Engine oils for export market, Engine oil for new generation scooters, Engine oil for OEM, Tractor Fluids, Transmission and driveline lubricants, High-Performance insulating oil.

The company's R&D achievements were recognized with several prestigious awards during the year. Notable honours included the Indian PSU Achievers' Award for Excellence in AatmaNirbhar Bharat Initiatives and the Best Indigenously Developed Technology Award at the CHT-ETM Awards for Hygiene-Grade Super Absorbent Polymer (SAP). Furthermore, Company bagged the OIDB Award for the joint development of Desalter Technology, along with Engineers India Limited. Additionally, the company received the Breakthrough R&D Excellence Award and the Rasayan Udyog Maharatna Award under the "Century of Chemistry in India" initiative.

12.1.5.7 Petrochemical Performance: Bina Petrochemical and Refinery Expansion Project (BPREP), having Capex outlay of ₹43,367 crore, has made steady progress achieving overall progress of 11%. All technology licensors and consultants have been on boarded and process package for all units have been received. Detailed engineering activities are in progress. Tenders for critical equipment and EPC packages have been floated and are expected to be awarded shortly. Site enabling works are nearing completion.

A 400 KTPA Polypropylene Project is being set up at Kochi Refinery at a cost of ₹5044 Crores with expected commissioning in FY 27-28.

12.1.5.8 Natural Gas: BPCL continued to expand its natural gas business in 2024-25 and clocked sales (including internal consumption) of 1.679 MMT as against 1.693 MMT in 2023-24. BPCL now has a customer base of 107 Patrons with the addition of several new customers during the year

besides supplies to its own refineries at Mumbai (Maharashtra) and Kochi (Kerala).

12.1.5.9 City Gas Distribution: BPCL has authorization for development of City Gas Distribution (CGD) Networks by Petroleum and Natural Gas Regulatory Board (PNGRB) for 26 Geographical Areas comprising 81 Districts. CGD projects are progressing in full swing to ensure supply of Natural Gas at the earliest. Till December, 2024 -

- 739 CNG stations have been established (68 during April-December, 2024),
- 4.6 lakhs PNG customers (1.3 during April-December, 2024) are connected,
- CGD network laid with 1618 km (331 km during April-December, 2024) of steel pipeline and 4740 (1352 km during April-December, 2024) of MDPE pipeline.

12.1.5.10 Exploration & Production: Bharat Petro Resources Limited (BPRL) was incorporated in October 2006, as a 100% subsidiary of Bharat Petroleum Corporation Limited (BPCL), to undertake the upstream activities of BPCL.

Bharat Petro Resources Limited (BPRL), has Participating Interest (PI) in fifteen blocks, of which eight are in India and seven overseas, along with equity stakes in two Russian entities holding the license to four producing blocks in Russia. Five of the eight blocks in India were acquired under different rounds of New Exploration Licensing Policy (NELP), one block was awarded under Discovered Small Fields (DSF) Bid Round 1 and two blocks were awarded under the Open Acreage Licensing Policy (OALP) Bid Round 1. Out of the seven overseas blocks, three are in Brazil, two in the United Arab Emirates and one each in Mozambique and Indonesia. BPRL's portfolio comprises of blocks in different phases of exploration, appraisal, development, and production. Covering approximately 19,824 square kilometers, approximately 46% of the acreage owned by BPRL and its subsidiaries is in the offshore expanse.

BPRL's share of Oil & Gas production in FY 24-25 was 2.6 MMTOE.

12.1.5.11 Alternative Energy:

Renewables: BPCL's total installed renewable capacity for the year 2024-25 stands at 102.50 MW, with 90.7 MW from solar and 11.8 MW from wind energy. Additionally, three renewable projects totalling 171 MW are in various stages of development. In 2024-25, BPCL secured a 150 MW capacity through competitive bidding under NTPC's solar utility tender.

BPCL is advancing its green hydrogen initiatives, with the setup of a 5 MW electrolyser for green hydrogen production at its Bina Refinery in Madhya Pradesh. In alignment with the Government of India's vision to promote green hydrogen in the transport sector, BPCL is also establishing a Green Hydrogen Refuelling Station at Kochi, in collaboration with Cochin International Airport Limited.

Further, BPCL is working on green hydrogen production via the biomass route for captive use at both Kochi and Bina Refineries, with a total capacity of 2000 MT. These projects were awarded under the SECI Mode-1 Tranche-1 SIGHT Scheme. BPCL also plans to produce 5 KT per annum of green hydrogen on a Build, Own, and Operate (BOO) basis for refinery use, with a tender already floated, and the results are awaited.

BPCL has signed a quadripartite Memorandum of Understanding (MoU) with M/s. BluJ Aerospace, Agency for New and Renewable Energy Research and Technology (ANERT), Government of Kerala and Cochin

International Airport Limited (CIAL) to develop a green hydrogen-fuelled Vertical Take-off and Landing (VTOL) aircraft ecosystem. BPCL has also signed a MoU with KPIT Technologies to collaborate for hydrogen fuel cell electric buses, promoting sustainable and safe hydrogen-based mobility solutions.

Bio-Fuel: The company's integrated 1G & 2G Bio-Ethanol Refinery at Bargarh, Odisha, with production capacity of 100 KL/D, each, is in the final stage of construction and expected to be commissioned in FY 2025-26.

In line with the Government's Ethanol Blending Petrol (EBP) program, BPCL achieved the highest-ever ethanol blending percentage of 16.35% exceeding the MoU target of 14.5% in FY 2024-25 from 11.7% in the previous year. BPCL has also achieved the highest-ever monthly blending rate of 19.47% in March 2025.

Across all its locations in India, the company is blending 1G Ethanol into Motor Spirit (MS), produced from Sugarcane Juice, B-Heavy Molasses, C-Heavy Molasses, Maize, Damaged Food Grains, and Surplus Rice from FCI. BPCL has procured 241 Cr Ltr of Ethanol in FY 2024-25 from 163 Cr Ltr in FY 2023-24. It has also augmented Ethanol storage capacity at its supply locations, from 135 TKL to 147 TKL in the last financial year.

As an Industry Coordinator for Ethanol procurement, BPCL is spearheading the EBP Program by procuring 1G Ethanol from multiple sources. To provide end-to-end visibility of the entire ethanol value chain, the IEMS (Integrated Ethanol Management System) has been developed and acts as a single window for all concerned ethanol stakeholders. It enables the automation of manual processes and thereby effectively improves the efficiency of business users and enhances the ease of doing business. On behalf of OMCs, BPCL finalized ethanol procurement of 1384 Cr Ltr spanning ESY 2023-24 & ESY 2024-25 at a value of about ₹ One Lakh Crores and IEMS played a crucial role in achieving this milestone.

Furthermore, BPCL, in collaboration with other industry stakeholders, has signed Long-Term Offtake Agreements (LTOAs) facilitating the establishment of 101 ethanol plants in the near future with a total annual off-take quantity of 361 Crore Liters.

In FY 2024-25, BPCL signed MoU with National Sugar Institute (NSI) to explore the possibilities to advance Ethanol Production from Sweet Sorghum as a sustainable feedstock. This initiative highlights BPCL's commitment to create a resilient ethanol ecosystem that contributes to India's energy security to drive innovation and build scalable, green solutions for the energy sector.

The Company's progress in Biodiesel continued in FY 2024-25 with procurement of 83.8 TKL of Biodiesel in the year 2024-25 and sales of 1379 TKL Biodiesel-blended Diesel, thereby achieving a blending of 0.33%.

BPCL has taken initiatives in the field of production of Compressed Biogas (CBG) from biomass waste/biomass sources like Agricultural Residue, Sugarcane press mud, Municipal Solid Waste, etc. 10 CBG plants have been commissioned by BPCL SATAT LOI holders with a total installed CBG production capacity of about 30 TMTPA. The company also added 62 more Retail Outlets that initiated sales of CBG, increasing the number of ROs to 112 with cumulative sales of 15.2 TMT till FY24-25.

BPCL is also in process of setting up 26 CBG plants of approx. 50 TMTPA CBG production capacity in next 2-3 years. BPCL has also proposed to form a JVC

with M/s GPS Renewables Private Limited to setup CBG plants.

12.1.5.12 Sustainable Development: As a responsible Business, BPCL has taken several initiatives for Sustainable Development across its locations related to energy conservation, energy efficiency, renewable energy, carbon sequestration, water management through effluent treatment, rainwater harvesting, water balance study, and waste management etc following the 5R principles - Refuse, Reduce, Reuse, Repurpose, and Recycle across all operations. BPCL has been proactively and continuously working towards increasing the Rainwater Harvesting (RWH) capacity, to reduce the dependency on other sources of fresh water. The total catchment area under RWH has increased to 13.50 lakh sqm, which helped in saving approximately 700 TKL of water during FY 2024-25. BPCL have carried out rainwater harvesting study at BPCL Mumbai Refinery, Bina Refinery and its Housing Colonies for assessment and further enhancement in rainwater harvesting capacities. BPCL has conducted water balance study at all its refineries and selected marketing locations and initiatives are under implementation to save water and make location water neutral.

BPCL has declared to become net zero by 2040 for scope 1 and scope 2 GHG emissions and developed a strategic roadmap, which is dynamic in nature and centred around expanding renewable energy portfolio to 10 GW by 2035, alongside strategic investments in green hydrogen, carbon capture and biofuels, which includes CBG, Ethanol, bio-diesel, etc. BPCL is advancing green initiatives by developing a 2 TPD pilot plant for green hydrogen at Bina Refinery and establishing a green hydrogen refuelling station at Kochi Refinery using indigenous BARC technology. This comprehensive approach underscores its commitment to sustainable energy solutions and innovation. BPCL has significantly expanded its renewable energy capacity to 103.1 MW in FY 2024-25. BPCL has successfully installed solar systems at 2,555 ROs during FY 2024-25 and leading to total of 19,807 ROs as on 31.03.2025.

BPCL is constructing a facility in Bargarh District, Odisha, capable of producing 100 KL per day of both 2nd Generation (2G) and 1st Generation (1G) Bioethanol and expected to be commissioned during FY 2025-26. BPCL has done tie-up with 14 CBG manufacturers for phased off-take of 59.05 TPD. Current off-take at 17 TPD, covering 4% of PNG-D & CNG volume.

BPCL is committed to support the transition to electric mobility through a robust, accessible charging infrastructure and installed 3,313 (total 6,563) charging stations.

Energy Efficient Lighting (EEL) capacity was increased to 114.37 MW during the year FY 2024-25 across operating marketing and refinery locations.

BPCL has planted over 1,70,000 trees using the Miyawaki Technique, Seed Bombing, and conventional methods to boost green cover and biodiversity during FY 2024-25, leading to total tree plantation of 1.22 million trees across BPCL sites. Bina Refinery has planted 1 lakh trees on 90-hectare forest land at Kanjia range, Khurai, Vanmandal North Sagar in association with MP State Forest Department with a total investment of ₹ 1.96 crore.

BPCL has started a campaign to take Certification of Zero Waste to Land-Fill (ZWL) for all its refineries and marketing locations. Accomplishment of zero waste-to-landfill certification is a testament to BPCL's responsible waste management practices and

commitment towards prevention of soil contamination. BPCL's Lubricants Business Unit as brand owner has collected and processed 5,551 MT of plastic waste under EPR in FY 2024-25.

BPCL's sustainability strategy is to address key environmental and social challenges while advancing sustainable growth and innovation. By staying at the forefront of technological advancements, BPCL continue to enhance its sustainability-driven operational excellence, resilience, and lead by example through its commitment and adherence to sustainable practices.

12.1.5.13 Corporate Social Responsibility: Guided by its vision of "Energizing Lives" Bharat Petroleum Corporation Limited (BPCL) continues to create meaningful impact beyond business through its robust Corporate Social Responsibility (CSR) initiatives. The essence of BPCL CSR strategy lies in empowering local communities and fostering inclusive, equitable, and sustainable development. With a strong commitment to nation-building, BPCL aligns its CSR interventions with the national development agenda, focusing primarily on five core thrust areas-Health & Sanitation, Education, Skill Development, Community Development, and Environmental Sustainability, while also addressing other areas outlined in Schedule VII of the Companies Act, 2013. The Corporation also prioritize key initiatives of Government such as DPE Thematic Areas, Aspirational Districts, Swachh Bharat, Skill India, etc.

Some highlights of FY 2024-25:

- Under the spectrum of Healthcare, Cancer poses a formidable challenge to global public health, emerging as a leading cause of mortality. In 2020 alone, there were over 19 million new cases and nearly 10 million deaths globally, accounting for approximately one in six deaths. In the arena of Cancer Care, BPCL has taken major steps toward Establishment of a Patient Accommodation Facility at Tata Memorial Centre Homi Bhabha Cancer Hospital & Research Centre (HBCH&RC), Visakhapatnam (Aspirational District) Andhra Pradesh. This establishment of a patient hostel facility is being created to accommodate 200 patients/family members.
- Under the cancer care initiative, to address women's health with a focus on breast and cervical cancers, the program includes through screening, diagnosis, and referral in Osmanabad (Aspirational District), Maharashtra. It has made significant progress in raising awareness about cancer and other Non-Communicable Diseases (NCDs), emphasizing early detection, health education, and capacity-building for local healthcare workers to ensure sustainable impact. By strengthening community engagement and improving healthcare access, the project has the potential to transform public health outcomes and advance cancer prevention efforts in the region. More than 100 communities have benefited in last fiscal year.
- BPCL has supported the establishment of 10 units of accommodation facilities for staff and visiting medical professionals and ensuring continuity in providing medical care services to the population in Shodhgram, Gadchiroli (Aspirational District), Maharashtra
- In alignment with the Government of India's "Skill India Mission", & MOPNG direction of setting up Skill development Institutes, to enhance youth employability in the Oil and Gas Industry nationwide. BPCL was assigned the responsibility

of developing the SDI in Kochi. BPCL has obtained the approval to expand its activities under Skill development through constructing & operationalising new SDI at Kerala.

- The Lifeline Express "Multispecialty Hospital on Train" has been supported for giving surgical and medical facilities for the treatment of specific health conditions at the doorstep of the patients in remote areas of Nadia (Aspirational District) - West Bengal, Lakhimpur– Assam, Dhalai (Aspirational District) -Tripura. The Lifeline Express is a customized Air-conditioned seven coach train that houses a full-fledged hospital with State-of-the-Art equipment to provide quality multispecialty surgical diagnostics and screening facilities. BPCL has supported 12 locations through Lifeline Express Hospital trains over the years. Through these projects more than two lakh beneficiaries have been benefitted through medical and surgical interventions.
- The BPCL Sports Scholarship Scheme has been designed to induct up to 100 sports scholars over three years. The scheme targets athletes aged 13 to 25, providing them with the opportunity to develop their skills through proper training, coaching, and mentoring.
- Anemia and malnourishment are significant health concerns affecting school children worldwide. These conditions not only impact the physical health of children but also hinder their cognitive development, academic performance, and overall well-being. Addressing the problem of Anemia and malnourishment in school children is crucial to ensure their optimal growth, development, and academic success. To curb the situation, BPCL has taken an initiative to carry out primary health check-up for screening Sickle Cell Anemia and malnutrition in government schools in tribal dominated district Jhabua, Madhya Pradesh.
- Hostel building construction support at Netaji Shubhash Chandra Bose Academy, Silvasa, Dadra Nagar Haveli, Gujarat. Through this project, 120 students will be accommodated comfortably away from their homes.
- As part of BPCL commitment to empowering girls through education, a Girls' Hostel will be constructed at Mummighatti, Dharwad, Karnataka This facility will provide safe and secure accommodation for approximately 250 girls annually, studying at Pre-University College (State Board) and an Integrated B.Ed College in Dharwad at Rashtrothana Parishat, thereby promoting access to education and reducing barriers faced by young women from underserved communities.
- In the domain of preventive healthcare, BPCL will undertake capacity building of 1000 health professionals and also development of 10 palliative care centers. Through this project, it will aim to improve the quality of life for both patients and their families through holistic management of physical, emotional, and spiritual needs.
- Addressing the urgent challenge of child malnutrition, a vital initiative under Poshan Mukh Bharat is set to support over 7,000 children in Bihar's Gaya (Aspirational District) and Kishanganj districts. By providing essential nutritional kits, the project aims to significantly improve child health and development outcomes. Its implementation in Gaya, underscores its strategic importance-targeting areas with the greatest need to drive meaningful, inclusive progress.
- Recognizing the critical need for safe and inclusive residential facilities, a key initiative is underway to construct a hostel in Manduwala,

Dehradun, which will accommodate approximately 120 children annually. The project prioritizes accessibility and equity by offering concessions to students from ST, SC, OBC, and PWD categories. By providing secure accommodation alongside academic support, this initiative is a significant step towards fostering educational inclusion, empowerment, and social upliftment to children.

- Smart classrooms in government schools will greatly enhance children's learning experiences. These technological upgrades will improve access to information, boost engagement, and support better teaching methods. BPCL will be equipping government schools in the Wasambe, Roha, and Srivardhan districts of Maharashtra with smart classrooms to create a modern and effective educational environment.
- Swachhata Pakhwada was celebrated by BPCL & its extended networks from 1st–15th July 2024. More than 95,500 activities were conducted as its effort to clean environment.
- Swachhata Hi Seva was celebrated by BPCL & its extended networks from 14th September to 1st October 2024 and more than 790 activities were conducted.
- CSR expenditure by BPCL for FY 2024-25 is ₹179.37 Crore.

12.1.6 Hindustan Petroleum Corporation Limited (HPCL):

Hindustan Petroleum Corporation Limited (HPCL) is a Maharatna Public Sector Enterprise (CPSE) with annual Gross sales of ₹4,64,247 crore during 2024-25. HPCL has a strong presence in refining & marketing in India with about 22.50% market share in the PSU category as on 31st March 2025

As on March, 2025, HPCL owns and operates Refineries at Mumbai & Visakhapatnam with designed capacities of 9.5 MMTPA & 15.0 MMTPA respectively. HPCL also owns the largest Lube refinery in the country at Mumbai for producing Lube Oil Base Stock with a capacity of 428 TMTPA (installed capacity).

In addition, HPCL holds 48.99% equity stake in JV Company, HPCL-Mittal Energy Limited (HMEL) which operates 11.3 MMTPA capacity refinery at Bathinda in the state of Punjab and also has 16.96% equity stake in Mangalore Refinery and Petrochemicals Limited (MRPL) which operates 15 MMTPA capacity refinery at Mangalore in the state of Karnataka.

HPCL has the second largest network of petroleum product pipelines in India with network length of about 5,134 km. HPCL has a vast marketing network consisting of 19 zonal offices in major cities and 145 regional offices facilitated by a supply & distribution infrastructure comprising 43 terminals/installations/tap off points, 57 aviation service facilities, 55 LPG bottling plants, 4 Lube blending plants, 37 Depots & 32 Exclusive Lube Depots. The customer touch points constitute of 23,747 retail outlets, 1,638 Superior Kerosene Oil (SKO)/ Light Diesel Oil (LDO) dealers, 395 Bazar Lube distributors, 156 Industrial Lube Distributors, 2,038 CNG facilities at retail outlets, 875 door-to-door delivery dispersers and 5,976 EV charging stations and 6,378 LPG distributorships with a customer base of above 9.7 crore LPG consumers as of March, 2025.

HPCL has its Research & Development Centre named 'HP Green R&D Centre' in Bengaluru. The Centre provides advanced technical support to the Refineries and Marketing Strategic Business Units (SBUs) for operational improvement, absorb

new technologies, develop innovative & path breaking technologies, license technologies and become a knowledge hub. HPCL also conducts business through 20 Joint Venture and Subsidiary companies operating across oil & gas value chain.

12.1.6.1 Financial Performance: Gross sales of HPCL in FY 2024-25 was ₹4,64,247 Crore as compared to ₹4,59,815 Crore in FY 2023-24. HPCL has earned Profit After Tax (PAT) of ₹7,365 Crore during FY 2024-25 as compared to ₹14,694 Crore in FY 2023-24. The Refining Margin for HPCL averaged at US$ 5.74 per barrel for FY 2024-25 as against US$ 9.08 per barrel (Gross of Export duty) for FY 2023-24.

12.1.6.2 Contribution to Exchequer: During FY 2024-25, HPCL has contributed a sum of ₹1,05,196 Crore to the exchequer which includes ₹40,698 Crore to Central Exchequer and ₹64,497 Crore to State Exchequer.

12.1.6.3 Refinery Performance: In the Financial year 2024-25, HPCL Mumbai and Visakh Refineries demonstrated exceptional performance in the refining operations, showcasing an impressive improvement. A significant milestone of highest-ever Crude throughput of 25.27 million metric tonnes (MMT) was achieved. Throughput exceeded the design capacity in both the refineries and registered an average capacity utilization of 108.9%. Visakhapatnam refinery achieved its highest-ever annual crude throughput of 15.31 MMT and Mumbai refinery also achieved its highest-ever annual crude throughput of 9.96 MMT. Highest ever productions of MS (4208 TMT), HSD (11083 TMT), MS (4208 TMT), ATF (740TMT) and Bitumen (1420 TMT) achieved during the year. 8 new grades of crudes were processed in Refineries during the year. Both refineries achieved lowest ever F&L during the year.

The construction of ongoing 9 MMTPA integrated grassroot Refinery-cum-Petrochemical project at Balotra, Rajasthan (HRRL) is in advance stages of completion.

12.1.6.4 Pipeline Performance: HPCL is currently operating a petroleum product pipeline network of 5,134 km with mainline capacity of 35.2 MMTPA, which includes branch line capacity of 19 MMTPA. During Apr'24-Mar'25 period, total pipeline throughput of 26.9 MMT was achieved.

To further expand the pipeline network and capacities for enhanced logistic efficiencies and the associated environmental benefits, Bathinda Sangrur Pipeline Project and Haldia Panagarh LPG Pipeline Project are under execution with an estimated investment of about ₹1407 crore.

12.1.6.5 Marketing Performance: During April-March, 2025 period, HPCL has achieved a sales volume of 49.82 MMT including exports & Petrochemical sales. In Domestic Sales segment, HPCL has recorded a sales volume of 47.29 MMT (including Petrochemical sales) and achieved a market share of about 22.50% amongst public sector Oil Marketing Companies (OMCs).

In the Retail segment, HPCL achieved sales volume of 29.98 MMT in April-March, 2025 periods with market share of 26.6% (amongst PSUs). The April-March, 2025 period witnessed commissioning of 1,725 new Retail outlets (taking the number of total retail outlets to 23,747) and commissioning of CNG facilities at 361 Retail outlets (such outlets aggregating to 2,038 Nos). As of March, 2025, 875 Nos of door-to-door Mobile Dispensers and 5,976 Nos of EV Charging Stations are operational. During April-March, 2025, solarisation done at 4,735 outlets taking the total to 22,353 outlets.

During April-March, 2025, LPG business vertical of HPCL recorded sales of 8.95 MMT with a growth of 4.5% over the previous year and market share of 27.30%. During April-March, 2025, HPCL enrolled 12.85 lakh new customers and commissioned 30 new regular LPG distributorships (taking the total number of distributors to 6,378). During April-March, 2025, HPCL enrolled 31.6 Lakh PMUY customers taking the total to 273 Lakh PMUY customers. As of March, 2025, HPCL has customer base of 9.63 crore LPG consumers. Total 55 number of LPG plants is operating at total capacity 6,470 TMTPA. HPCL is setting up the largest LPG cavern in India at Mangalore, with a storage capacity of 80 TMT.

HPCL is continuing to be a leading Lube marketer in the country with a sales volume of 704 TMT ('000 Metric Tonne), with export of 5.6 TMT during the period April-March, 2025.

In Industrial & Consumer (I&C) business line, HPCL recorded overall sales volume of about 6.04 MMT. In Aviation business line, HPCL achieved a Sales volume of 1.09 MMT of aviation turbine fuel. Aviation Service Facility (ASF) network was augmented by commissioning Kanpur, Surat, Jalgaon & Moradabad ASF, taking the total number of ASFs to 57.

In Biofuels & Renewables, HPCL generated Renewable Energy of 14.32 Cr. kWh during April-March, 2025. Company's First Biomass-based CBG Plant in Budaun, Uttar Pradesh has produced 426.69 MT of CBG during April to March 2025.

12.1.6.6 Research and Development (R&D): Hindustan Petroleum Green Research & Development Centre (HPGRDC) has been set up with an objective to provide advanced technological support to Marketing SBUs and Refineries. HPGRDC aims to provide operational excellence, develop and adopt innovative, path breaking technologies and to become a knowledge hub. The research centre is provided with state-of-the-art infrastructure facilities comprising energy efficient green buildings with built-up area of 5.6 lakh square feet. R&D centre has 20 laboratories established under Phase-I and Phase-II which pertains to research areas viz. FCC, Hydro-processing, Catalysis, Bio-processes, Crude Evaluation & Fuels Research, Standard Testing, Analytical, Process Modelling & Simulation and Nano Technology, Petrochemicals & polymers, Centre of Excellence Lubes, Corrosion studies, Novel Separations, Residue Upgradation, Engine and Battery research.

During April 2024-March 2025, 22 products/technologies were developed and launched. Besides these refinery products/technologies, during this period, 21 new lube-based formulations have been launched and commercialized.

During April 2024-March, 2025, 114 patents were filed taking the cumulative Indian and International Patent applications to 661 and 36 patents were granted taking the cumulative patents grant to 246 as on March, 2025.

12.1.6.7 Natural Gas: HPCL is participating in the entire value chain of Natural Gas Business. HPCL has a 5 MMTPA LNG regasification terminal at Chhara port (Gir Somnath District) in Gujarat through a 100% subsidiary company, HPCL LNG Ltd (HPLNG). The terminal has been commissioned in Jan 2025.

HPCL is also participating in development of three cross-country natural gas pipelines (Mehsana to Bathinda, Bathinda to Srinagar and Mallavaram to Bhilwara) through Joint Venture companies viz. GSPL India Gasnet Limited (GIGL) and GSPL India Transco Limited (GITL).

HPCL has successfully commissioned its first LNG dispensing Station at HPCL Retail Outlet, Oran in Sabarkantha District, Gujarat and sales has commenced from this Station.

12.1.6.8 City Gas Distribution: In order to increase HPCL's presence in City Gas Distribution (CGD), HPCL is setting up CGD networks in 134 GAs in the states of Haryana, Uttar Pradesh, Uttarakhand, West Bengal, Rajasthan, Bihar, Jharkhand and Sikkim on a standalone basis. HPCL is also operating CNG network in Ahmedabad on a standalone basis.

HPCL is setting up CGD networks in GAs of Ambala - Kurukshetra (Haryana), and Kolhapur (Maharashtra) districts and Nagaland through joint venture company HPOIL Gas Pvt Ltd (HOGPL).

HPCL is also operating City Gas Distribution (CGD) networks in 7 Geographical Areas (GAs) in the states of Andhra Pradesh, Telangana and Madhya Pradesh through Joint Venture companies Aavantika Gas Limited (AGL), Bhagyanagar Gas Limited (BGL) and Godavari Gas Pvt. Limited (GGPL).

12.1.6.9 Exploration and Production: HPCL is leveraging Renewable energy sources to reduce the carbon footprints and electricity cost across the value chain and is continuously expanding the wind and solar power generation capacities.

As on March, 2025, HPCL has total solar installed power plant capacity of about 123.4 MW. These solar plants are installed in various marketing/ operating locations of the company spread across the country.

HPCL Renewable & Green Energy Ltd (HPRGE) has been formed/ as a wholly owned subsidiary of HPCL for foraying into the green energy business and manage the portfolio of green energy businesses such as biofuels, renewables, green hydrogen, carbon offsets, green mobility and alternative energy businesses.

HPRGE is currently working on multiple renewable energy projects for the purpose of captive greening of various marketing locations & refineries of HPCL. HPRGE has also initiated work on its First Mega Scale Utility Solar Project of 100 MW at Galiveedu, Andhra Pradesh.

HPCL is also having 100.90 MW wind power plant in Maharashtra and Rajasthan. During plants April 2024 to March 2025, these wind farms generated a total Renewable Energy (RE) generation from wind farms of 14.32 Cr. KWh, contributing to sustainable energy growth. Additionally, HPCL's wind power initiatives led to a significant ESG impact, mitigating 0.118 million metric tons of CO_2 emissions. Tejuva Wind Farm (48.3 MW) in Rajasthan became the first in the sector to receive clearance for open access sale of green power. This commercialization will help in realizing additional revenues for the corporation.

12.1.6.10 Alternative Energy

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Bio Fuels: During April-March 2025 period, HPCL achieved Ethanol blending of 16.70% by blending 208 Crore litres of Ethanol in Motor Spirit (MS). HPCL's First 2G Ethanol Bio Refinery project at Bathinda, having Ethanol Production capacity of 100 KLPD from Biomass is under construction. Commenced Commercial Sale at its First Biomass-based CBG Plant of 14.2TPD capacity in Budaun, Uttar Pradesh.

HPCL is actively supporting the Government of India's SATAT initiative to promote Compressed Bio Gas (CBG) as an alternative fuel in the transportation sector. To expand its footprint, HPCL invited Expressions of Interest (EOI) from investors for setting up CBG plants and supplying CBG through its retail network.

During FY 2024-25, HPCL onboarded eight new CBG plants with a total capacity of 50 TPD, bringing the cumulative total to 17 plants with 104.65 TPD capacity. Additionally, 38 new Letters of Intent (LOIs) were issued for CBG plants with a combined capacity of 273.5 TPD, increasing the total active LOIs to 108 with a total capacity of 684.5 TPD. CBG sales thru HPCL's dedicated CBG retail outlets have grown significantly, reaching 3342 MT in 2024-25, a 590% increase from the historical 484.3 MT.

In line with Govt of India vision for "Waste to Energy in Rural India – Gobardhan", HPCL has set up a cow dung based CBG Plant at Pathmeda, Sanchore Rajasthan of 1.6 TPD of CBG capacity through CSR route.

12.1.6.11 Sustainable Development: HPCL seeks to advance environmental sustainability through initiatives that enhance energy efficiency and minimise its ecological impact. HPCL is adopting best-in-class operating systems, practices, and procedures oriented toward environmental preservation to achieve environmental stewardship.

HPCL has implemented Integrated Management System (IMS) (ISO 9001, 14001 & 45001) across HSE functions of its SBUs at organisation level. HPCL refineries and major marketing locations have implemented internationally accepted 'Environment Management Systems' based on ISO-14001 Standards and 'Energy Management Systems' based on ISO-50001.

State-of-the-art effluent treatment plants for treating and recycling effluent water are available at major locations to ensure environmental protection. Hazardous waste treatment and disposal systems are available at various locations that align with (CPCB) requirements. The latest

technologies, such as volatile organic compound (VOC) monitoring and the leak detection and repair (LDAR) programme, have been adopted to monitor and control fugitive emissions at major locations. Vapour recovery systems (VRS) have been installed at various supply locations and retail outlets. Gaseous emissions to the environment and ambient air quality are regularly monitored using the latest technologies, including real-time data transfer to regulatory agencies in major locations. Online monitoring of emissions and air quality has a system of alerts for monitoring and rectifying deviations.

HPCL is implementing its Environmental Strategy for de-carbonization of its operations in line with its target of achieving Net-Zero Scope-1 & Scope-2 emissions by 2040. This roadmap has strong focus for transitioning towards a multi-energy green and low carbon Corporation. HPCL, through its customer-oriented approach, is also committed to providing accessible and affordable clean energy to its customers.

HPCL identified key levers for achieving net zero, such as enhancing energy efficiencies in its operations, switching over to renewable power, replacing grey hydrogen with green hydrogen, reducing flare gas emissions, etc. Towards emission intensity reduction, the Corporation is exploring various business areas such as renewable energy and storage, biogas, biofuels, petrochemicals and green hydrogen.

To accelerate its energy transformation journey, HPCL established an 'Energy Transition Cell', which is dedicated to achieving its Net-Zero goals. HPCL also incorporated HPCL Renewables & Green Energy (HPRGE) Limited, a Wholly Owned Subsidiary for developing its Renewable & Green Energy portfolio.

Progress on Net Zero Commitment (Apr'24-Mar'25 period):

- As a testimony to HPCL's decarbonization efforts, its Secunderabad terminal was certified as "1st Net Zero Operational site" in India. In addition, Ramagundam Depot and Manmad Terminal along with 6 additional locations Miraj IRD, Kolkata Terminal, Sholapur IRD, Durgapur IRD, Vizag new White Oil Terminal, Haldia Terminal are also Net Zero complied.
- HPCL Visakh and Mumbai Refineries achieved a total energy savings of 77,486 SRFT, (equivalent to CO_2 reduction of 2.5 Lakh Tons) in FY 2024-25, through energy conservation initiatives.
- To mitigate Scope 1 emissions, 109 marketing locations use 100% biodiesel in DG sets for backup power generation.
- A total of 76 locations are sourcing 100% green power which eliminates their Scope 2 emissions while 6 pipeline locations meet part of their electrical power requirement through green power.
- HPCL Visakh Refinery has started sourcing 3 MW green power through DISCOM thereby reducing scope 2 emissions.

Other GHG abatement initiatives:

- **Green Hydrogen:** A first-of-its-kind Solid Oxide based Electrolyser (SOE) was commissioned during Apr'24-Jun'24 period at HP Green R&D Centre for producing Green Hydrogen with 99.99% purity. This SOE system consumes around 25% lower energy than Proton Exchange Membrane (PEM) and Alkaline electrolysers. Visakh Refinery commissioned first ever Green Hydrogen Plant (370 TPA capacity) in any Indian Refinery. HPCL

floated tender for procuring 5 KTPA of green hydrogen on BOO basis for its Visakh Refinery.

- **Renewable Power Installed Capacity: Wind:** 100.9 MW; Solar: 123 MWp as of March'25. During April-March, 2025, solarisation done at 4,735 outlets taking the total to 22,353 Retail outlets (i.e. 94% of HPCL retail outlets).
- **EV Infrastructure:** Electric Vehicle (EV) charging facilities were commissioned at 2373 Retail Outlets during FY 2024-25, taking the total number of Retail Outlets with EV Charging facilities to 5976 as of March, 2025.
- **Energy Efficiency:** As part of refinery capacity expansion projects, many energy efficiency measures have been built in by design for both refineries. Mumbai and Visakh Refineries achieved savings of 77,486 Standard Refinery Fuel Tons (SRFT) during FY 2024-25 through energy efficiency initiatives.
- **Natural Gas:**

i. In the natural gas business line, In addition to retail sales through HPCL's City Gas Distribution network, the Company is also expanding its customer base to large industrial units, including fertilizer plants, refineries, Petchem plants, and CGD companies.

ii. HPCL LNG Ltd., (a wholly owned subsidiary of HPCL) successfully completed discharge of the LNG commissioning cargo into the onshore tanks of its 5 MMTPA regasification terminal at Chhara, Gujarat on 12th January 2025 and started its commercial operation effective 1st February 2025.

iii. CNG facility was provided at 237 Retail Outlets during FY 2024-25, taking the total number of Retail Outlets with CNG facility to 2,038 as of March'25.

iv. As of March 2025, HPCL Commenced CNG sales in all its GAs except Sikkim, Commenced PNG sales in 10 GAs. Commenced Commercial and Industrial sales in South 24 Parganas GA

HPCL has adopted a comprehensive rating assessment 'GreenCo' of its marketing locations by the Confederation of Indian Industry (CII) based on various sustainability parameters, which takes a lifecycle approach. HPCL is the first among PSUs to voluntarily opt for CII Green Company (GreenCo) rating in 2014. To improve the 'Green Quotient' of its operations, HPCL continued implementing the GreenCo Rating System at its marketing locations. During the year, HPCL overhauled its systems and infrastructure review at its operating locations concerning green practices and their adoption, integration through assessment, handholding, and transformative approach through consultative guidance. As of March, 2025, 84 locations were certified with the 'GreenCo Rating'.

Mission LiFE is an India-led global mass movement to nudge individual and community action to protect and preserve the environment. HPCL has disseminated the 75 LiFE Actions suggested under Mission LiFE to its internal and external stakeholders for implementation and implemented all the applicable individual LiFE Actions in its operations and areas of influence.

During the year, as part of its ongoing activity to spread awareness, HPCL displayed Mission LiFE creatives at its retail outlets, engaged Pro-Planet People, recollected waste, planted trees, and carried out extensive conservation and promotional activities among the masses. HPCL have been engaging stakeholders through social media campaigns and updating the details of the activities carried out in the Meri Life Portal.

Capability building initiatives towards sustainability such as training programs, awareness sessions, sustainability quizzes, newsletters and technical bulletins were continued during the year to enhance awareness on sustainability. A dedicated module on Sustainability has been included in the syllabus of NSC-HPCL SAT exam which is applicable to all entry and mid-managerial level officers. HPCL is also collaborating with major industrial customers to imbibe ESG practices in the supply chain through the exchange of sustainability best practices.

HPCL continued to focus on ensuring safety and security across its operations and for its customers. To this effect, various initiatives such as establishing HPCL's Health, Safety, Environment and Sustainability Management System (HSESMS) Standards at corporate level and aligning the standards of all SBUs to the same, Integrated work permit System along with Job Safety Analysis (JSA), Management of Change, Incident Management system in SAP, Live firefighting for Officers, implementation of Lifesaving Cardinal Rules, Animated SOP Videos in vernacular languages, Safety committees at Zonal, SBU level and Corporate level, Video Analytics for ensuring Personal Protective Equipment (PPE) & Standard Operating Procedure (SOP) adherence, Daily Safety Moment on the laptops for officers, Safety Awareness Publications, One to One Management interactions with Contract workmen, Spot the hazard and Do Not Walk Past Deviation Campaign, Safety Vulnerability Index were undertaken.

HPCL continues to disclose its sustainability performance through its public disclosures. During the year, HPCL released its maiden Integrated Report for 2023-24 based on Integrated Reporting <IR> Framework of the IFRS Foundation marking a significant step in amalgamating important financial and non-financial information in a single report. This report provides a holistic picture of the value creation process of HPCL in the form of 6 capitals aligned with its Vision, Mission and in the context of its external operating environment. The report also discloses the governance, risk management and stakeholder engagement processes at HPCL. HPCL also continued its externally assured disclosures viz. SEBI-Business Responsibility and Sustainability Reporting (BRSR) and Global Reporting Initiative (GRI)-based Sustainability Report during the year. HPCL supported its industrial customers with their ESG data requests and participation in recommended supplier ESG ratings such as Ecovadis.

12.1.6.12 Projects: HPCL along with its JVs are executing various projects towards strengthening and expansion of refineries and marketing infrastructure.

Projects Completed: The 3.55 MMTPA capacity Residue Upgradation Facility (RUF) at Visakh Refinery is mechanically completed, and pre-commissioning activities are underway. This will be the first unit in the world using LC-MAX technology which enables the highest conversion of bottoms, thereby improving GRM for the Refinery on full capacity.

RUF Pitch Loading Gantry was completed which will facilitate evacuation of pitch (bottom product of RUF) in environment friendly manner at Visakh Refinery. In line Government of India (GOI) Consumption Obligation (GHCO), 370 TPA Green Hydrogen facilities was installed and commissioned at Visakh refinery.

Modernization Project of Visakh Refinery has been completed and pre-commissioning activities are

underway. This modernization project will increase capacity from 8.33 MMTPA to 15 MMTPA and refinery distillate yields from 76% to 86%.

A new Sea Water Reverse Osmosis Plant (SWRO) along with associated pumping facilities at Visakh Refinery has been completed, in order to have a reliable raw water supply. SWRO unit is designed to produce treated raw water at 584 cubic meter/hr by using sea water as feed. The treated raw water will be utilized as make-up water to existing raw water reservoir.

A New Sulphur Forming Unit in SRU has been constructed for handling 970 Tons per day (TPD) of solid and liquid Sulphur, and having an additional flexibility to convert solid Sulphur to granules. These facilities will cater to the Sulphur production of existing Refinery as well.

In line with the Government of India (GOI) guidelines for implementing a gradual 20% Ethanol blending in MS (Motor Spirit) by April 2025, setting up of ethanol infrastructure including storage tanks and associated allied facilities was completed at Sangrur depot.

HPCL has strengthened its LPG supply infrastructure by installing MSVs (Mounded Storage Vessel) at Palghat-Kerala, Anantapur and Rajahmundry at Andhra Pradesh. These MSVs are in addition to the existing storage facilities available at this location which will cater to the increased LPG demand in and around the region.

A New Depot in Raipur, Chhattisgarh has been developed after closure of Bilaspur Depot in order to make up for the lost market share and to expand storage capacity of the existing Raipur Depot for providing 15 days of coverage for HSD and MS.

Revamping of existing facilities also completed at Vashi White Oil Terminal in the state of Maharashtra in which constructed 2x8 + 1x4 Bay TT Gantry, Developed TT parking Area, upgraded pipeline and pumping capacity including modification in tanks to increase the TT filling capacity, associated civil, mechanical, electrical and automation works.

In line with the Government of India (GOI) plan to increase participation of natural gas in energy mix and switch to the more efficient, cleaner and eco-friendly fuel alternative, HPCL LNG Limited (HPLNG) constructed a 5 MMTPA capacity LPG regasification terminal at Chhara, with future expansion provision upto 10 MMTPA. It has marine facilities for ship unloading and 2 tanks of capacity 200000 cubic meter each for LNG storage facilities.

On-Going Projects:

Refinery Projects: HPCL is setting up HP-COAT (Crude to Olefins and Aromatics Technology) demo unit at Visakh Refinery for production of light olefins and aromatics directly from crude oil. In addition, HPCL is also setting up 7.4 KTPA (on feed basis- Used Cooking Oil (UCO)) demonstration plant for HP Triglyceride to Jet fuel (TriJet) process for the production of Synthetic Aviation Fuel (SAF) at Visakh Refinery. Further, HPCL is also setting up 24 KTPA demonstration plant for HP Treated Distillate Aromatic Extract (TDAE) process in Mumbai Refinery which will produce TDAE grade Rubber Processing Oil (RPO).

In addition, HPCL is setting up a new 9 MMTPA capacity greenfield refinery-cum-petrochemical complex at Barmer District of Rajasthan through a joint venture company, HPCL Rajasthan Refinery Ltd (HRRL) which is progressing well.

HPCL is executing Lube Modernization and Bottom Upgradation (LMBU) project at Mumbai Refinery for

enhancing Lube Oil Base Stocks (LOBS) production from 475 KTPA to 764 KTPA with production of superior grade Group-II and Group-III LOBS. Increase in Bitumen production from 586 KTPA to 1073 KTPA.

HPCL is also laying New Bitumen Export Pipeline, connecting Mumbai Refinery Tankages and Third Chemical Berth (TCB) via Old Pir Pau (OPPJ) & New Pir Pau Jetty (NPPJ) within jurisdiction of Mumbai Port Trust (MbPT).

In line with GOI objective, through the National Policy on Bio Fuels 2018, to increase usage of biofuels in the energy and transportation sectors of the country in coming decades, and target of 20% ethanol in MS set by 2025, HPCL is setting up 2G Bio refinery at Bathinda Punjab which will produce 100 KL per day Ethanol and Revamping of existing distillery for producing Grain based Ethanol at Sugauli & Lauriya in Bihar for processing of multi feedstock grain and expansion of existing facilities of Hindustan Biofuel Limited (HBL) from 60 KL per day to 70 KL per day.

Marketing Projects: To cater to the growing demand of petroleum products in country in a cost effective and environment friendly manner, HPCL has undertaken a number of pipeline projects. The major ongoing pipeline infrastructure projects of HPCL include:

(i) Bathinda Sangrur Pipeline

(ii) Haldia Panagarh LPG Pipeline and

(iii) Visakh Raipur Pipeline

To meet the growing requirement of LPG in the country and for enhancing the import capacities, construction of 80 TMT LPG cavern at Mangalore is in progress. Further construction of New LPG facilities at Kamardanga (Assam), Tank Wagon & Railway Siding facility at Madurai LPG Plant (Tamilnadu) are in progress, New Rail fed POL facility at Kamardanga (Assam) are also in progress. HPCL has also started constructing the Aviation Fuel Farm facility at Bhogapuram airport Andhra Pradesh. CGD projects in West Bengal, UP/UK, Rajasthan, Bihar & Jharkhand and Jind and Sonipat are also progressing well. HPCL's first Petrochemical Evacuation Marketing Terminal at Barmer (Rajasthan) are progressing well in line with its stipulated schedule which will significantly contribute towards further strengthening of the marketing infrastructure.

12.1.6.13 Major Awards & Recognitions: During the year Apr'24-Dec'24 period, HPCL was conferred with a number of awards and recognitions at various forums. The following is the list of awards received by HPCL:

a) 'FIPI Oil and Gas Awards 2023' by Federation of Indian Petroleum Industry (FIPI) under the categories:

i. 'Sustainably Growing Corporate of the Year'

ii. 'Innovator of the year (Team)'

b) 'Downstream India Excellence Awards 2024' by Global Refining and Petrochemicals Congress under the categories:

i. 'Leadership Excellence Award Refining'

ii. 'R&D Excellence Hub of the Year'

iii. 'Carbon Emission Management Through Green Initiatives'

c) 'Most Innovative Best Practice' Award in 'Operational Excellence' category in CII Digital Excellence Award 2024 by Confederation of Indian Industry (CII)

d) 'PSU Transformation Awards' at CII DX Awards under the categories:

i. 'Outstanding Contribution to National Development'

ii. 'Leadership Award in Fostering Innovation and Entrepreneurship'

e) 'SHRM (Society for Human Resource Management) HR Excellence Awards 2024' under the categories:

i. 'Excellence in Developing Emerging Leaders'

ii. 'Excellence in Benefits and Wellbeing'

f) 'Corporate Governance and CSR' (silver) award under the Maharatna category in 14th PSE Excellence Awards by the Indian Chamber of Commerce

g) 'Energy and Resources In-House Team of the Year' Award at 6th Annual ALB India Law Awards 2024 by Thomson Reuters

h) 'Golden Peacock Award 2024' by Institute of Directors under the categories:

i. 'Energy Efficiency' to Mumbai Refinery

ii. 'Occupational Health and Safety' to Mumbai Pune Sholapur Pipeline

i) 'PRCI Excellence Awards' by Public Relations Council of India under the categories:

i. 'Corporate Communication'(Gold)

ii. 'Music Video', 'Healthcare Communication Films', 'Government Communications Films' and 'Corporate Event' (Silver)

iii. 'CSR Project for Childcare', 'Education Campaign' and 'Unique HR Initiative' (Bronze)

j) 'Mahatma Award 2024' under the categories:

i. 'Corporate Social Responsibility Excellence'

ii. 'ESG Excellence'

k) 'Refinery of the Year' (Gold) Award to Mumbai Refinery in 15th Exceed Safety and Security Awards by Sustainable Development Foundation

l) 'SKOCH Awards 2024' under the category 'CSR Education' in 97th SKOCH Award 2024 by SKOCH Group.

12.2 Navratna Central Public Sector Enterprises (CPSEs)

12.2.1 ONGC Videsh Limited (OVL):

ONGC Videsh Limited is a wholly owned subsidiary and overseas arm of Oil and Natural Gas Corporation Limited (ONGC), the premier NOC of the country. It was incorporated in 1965 as Hydrocarbons India Limited and was rechristened as ONGC Videsh Limited in 1989. ONGC Videsh is a Schedule "A" Central Public Sector Enterprise 'Navratna' company under the administrative control of the Ministry of Petroleum & Natural Gas. The primary business of ONGC Videsh is exploration, development and production of oil and gas outside the country.

The Company has participation, either directly or through its wholly owned subsidiaries/joint venture companies, in 32 projects across 15 countries, of which 16 are operated/jointly operated and 16 are non-operated.

ONGC Videsh adopts a balanced portfolio approach and maintains a combination of producing, discovered, exploration and pipeline assets. Currently, ONGC Videsh has oil and gas production from 14 Assets, 4 Assets where hydrocarbons have been discovered and are at various stages of development, 11 Assets are under various stages of Exploration and 3 are pipeline projects.

ONGC Videsh is a significant contributor to India's energy security. In terms of reserves and production, it is the second largest Exploration and Production (E&P) company of India, next only to its parent, ONGC. The company holds 2P reserves of 474.140 MMtoe as on 1st April 2025. During FY 2024-25, ONGC Videsh produced 10.278 million metric tons of oil equivalent (MMtoe) of oil and

gas, which is equivalent to about 15.9% of India's domestic oil and gas production.

Major highlights during FY 2024 -25:

- **ACG & BTC Pipeline, Azerbaijan:** ONGC Videsh completed the acquisition of additional PI of 0.615% stake in the Azeri, Chirag and Gunashli (ACG Field) and 0.737% stake in Baku-Tbilisi-Ceyhan (BTC) Pipeline Company in Azerbaijan in Nov'24. Additionally, on 21st September 2024, ONGC Videsh with all Partners signed an addendum to the existing PSA of ACG which enables the parties to progress the exploration, appraisal, development and production from the Non-Associated Gas (NAG) reservoirs of the ACG field and is effective till the end of the existing PSA life i.e. 2049.
- **A1 & A3, Myanmar:** ONGC Videsh greenlit the Phase IV expansion of its A1 and A3 projects encompassing the Mahar, Shwe, and Mya fields on June 25, 2024. Key to this phase is the drilling of four new wells: two in the newly discovered Mahar field and one each in Shwe and Mya. The expansion is projected to sustain peak production through 2032, requiring an additional investment of USD 244.78 million from ONGC Videsh.
- **CPO-5, Colombia:** During FY 2024-25, Exploration activities yielded a new play discovery (LS-3) in the La Urraca area following the drilling of two wells. Furthermore, the Indico-3 new development well commenced production on 10th April 2024. These successes, particularly the contribution of the Indico-3 well and ESP installations in Indico-3, 4, and 5, drove an approximate 25% annual average production increase year-on-year basis in the project, rising from 19,082 to 23,881 barrels of oil per day (BOPD).
- **MECL, Colombia:** Following the transfer of the Minimum Financial Commitment (MFC) from block LLA-69 to Velasquez-2, the project successfully drilled its first exploratory well, Vel-365 W. This, combined with infill drilling, well intervention (work overs), and rig-less optimization, resulted in an annual average production increase of over 30% (from 3,201 BOPD in FY 2023-24 to 4,148 BOPD in FY 2024-25), reaching a peak of approximately 4,600 BOPD in March 2025.
- **GPOC, South Sudan:** Achieved encouraging initial results from its first exploration well, WZNW-01 (~970 BOPD with 30% water cut), leading to the submission and subsequent approval of the Declaration of Commerciality (DoC) in December 2024. The well was then commissioned and commenced production on 18th February 2025. These efforts, along with successful infill drilling and production enhancement work overs, contributed to an approximate 8% annual average production increase from 49,449 BOPD in FY 2023-24 to 50,404 BOPD in FY 2024-25. Furthermore, the implementation of Advanced Inflow Control Device (AICD) technology in two existing development wells has shown promising results for down hole water control.
- **SPOC, South Sudan:** Recorded an annual average production increase of over 90% (from 5,848 to 11,327 BOPD) compared to the previous fiscal year, it's highest ever since production resumption in 2021. This significant improvement was made possible by the resumption of production from the Mala field wells and the effective resolution of crude export flow assurance challenges.
- **Sakhalin-1, Russia:** ONGC Videsh is currently waiting for the requisite permission of the RF Govt. for transfer of abandonment funds in Ruble and expanded list of authorized bank/s.

- **Refinancing:** ONGC Videsh has raised USD 800 million exercising USD 400 million green shoe option due to competitive pricing by way of syndicated bank loan to part refinance USD 830 million long term borrowing matured in July 2024. The Company reduced debt by repaying USD 30 million from internal accruals.
- **Critical Mineral:** ONGC Videsh Ltd, Oil India Ltd, and KHANIJ Bidesh India Ltd signed an MoU with INTERNATIONAL RESOURCES HOLDING RSC LTD (and its Subsidiaries), UAE on 10th September 2024, to collaboratively identify, acquire, and develop critical mineral mining projects globally, including in India. This MoU establishes a framework for cooperation across the entire value chain, leveraging technical and financial strengths for mutually beneficial projects aligned with strategic goals, without present financial obligations.
- The Company won 17th BML Munjal Award for "Business Excellence through Learning and Development" in PSU category on 12th December 2024 from the Hon'ble Union Minister of Commerce and Industry.
- The Company won Golden Peacock award for Risk Management for the Year 2023 recognizing its excellence in corporate governance and risk strategies.
- The Company conferred with the award for Masters of Risk- Risk Technology, Large Cap Category in the 10th edition of the India Risk Management Awards constituted by ICICI Lombard & CNBCTV18 on 27th June 2024.

12.2.2 Engineers India Limited (EIL):

EIL is an ISO 9001:2015 certified Navratna Company established in 1965, with its registered office in New Delhi, to provide Design, Engineering, Project Management, and Technical services in hydrocarbon and other infrastructure sectors.

Over the years, the company has augmented its span of services and has excelled in various sectors i.e., Petroleum Refining, Petrochemicals, Offshore/Onshore Oil & Gas Processing, Chemicals & Fertilizers, Crude, Petroleum products & Gas Pipelines, Terminals & Storage, Sub Surface Strategic Storage, Mining & Metallurgy, Ports & Airports, Defence and Infrastructure &Urban Development etc.

EIL has regional offices in Chennai, Vadodara and Kolkata branch office in Mumbai, overseas engineering/ marketing office in Abu Dhabi. There are Inspection/Procurement offices at various locations all over India and also in London, Milan and Shanghai with construction offices at different

List of Assets Acquired by ONGC Videsh

S. N.	Country	Name of Asset	ONGC Videsh PI	Participating Companies
1	Azerbaijan	ACG	2.925%	ONGC Videsh, BP(Operator), AzACG, MOL, INPEX, ExxonMobil, TPAO, Itochu
2		BTC Pipeline	3.097%	ONGC BTC Limited, BP (Operator), AzBTC, MoL, INPEX, TPAO, Itochu, TOTAL, ENI, ExxonMobil
3	Bangladesh	SS-04	45%	ONGC Videsh (Operator), Oil India Limited (OIL), BAPEX (Carried)
4		SS-09	45%	ONGC Videsh (Operator), Oil India Limited (OIL), BAPEX (Carried)

S. N.	Country	Name of Asset	ONGC Videsh PI	Participating Companies
5	**Brazil**	BC-10	27%	ONGC Videsh, Shell (Operator), Brava Energia (Qatar Energy sold stake in Dec'24)
6		BM-SEAL-4	25%	ONGC Videsh, Petrobras (Operator)
7	**Colombia**	MECL	50%	ONGC Videsh, Petrobras (Operator)
8		CPO-5	70%	ONGC Videsh, SIPC
9		RC-10	50%	ONGC Videsh (Operator), Geopark
10		SSJN 7	50%	ONGC Videsh (Operator), Ecopetrol
11	**Iran**	Block Farzad-B	40%	ONGC Videsh, Canacol Energy Ltd (Operator)
12	**Iraq**	Block 20 (Erstwhile Block 8)	100%	ONGC Videsh (Operator), IOC, OIL
13	**Libya**	Contract Area- 43	100%	ONGC Videsh
14	**Mozambique**	Offshore Area 1, Rovuma Basin	10%	Total Energies (Operator), ONGC Videsh Rovuma Limited, BREML (consortium of ONGC Videsh and OIL), ENH, Mitsui, BPRL, PTTEP
15	**Myanmar**	Block A1	17%	ONGC Videsh, MOGE, Posco International (Operator), Kogas, GAIL
16		Block A3		
17		Offshore Mid-stream Gas pipeline (Pipeco 1)	17%	ONGC Videsh, MOGE, POSCO International (Operator), Kogas, GAIL
18		Onshore Gas pipeline (SEAGP) (Pipeco 2)	8.347%	ONGC Videsh, CNUOC (Operator), MOGE, POSCO International, GAIL, KG-SEAGP
19		Block B-2	97%	ONGC Videsh (Operator), M&S (Carried)
20		Block EP-3	97%	ONGC Videsh (Operator), M&S (Carried)
21	**Russia**	Sakhalin-1	20%	ONGC Videsh, SODECO, Rosneft subsidiaries (SMNG and RN Astra)
22		Vankorneft	26%	ONGC Videsh Vankorneft Pte Ltd, Vankor India Pte Ltd (Consortium of OIL, IOCL & BPRL), Vostok Oil LLC (an affiliate of Rosneft; RN Vankor- Operator)
23		Imperial Energy	100%	ONGC Videsh
24	**South Sudan**	GPOC	25%	ONGC Videsh, CNPC, Nilepet (Petronas exited in October-2024)
25		SPOC	24.125%	ONGC Videsh and Nilepet (Petronas exited in October 2024)
26	**Syria**	AFPC	33.33%	SSPD (Operator), HESBV (Consortium of ONGC Videsh and CNPC)
27		Block 24	60%	ONGC Videsh, IPRMEL(Operator), Tri-Ocean-Mediterranean (TOM)
28	**UAE**	Lower Zakum Concession	4%	SSPD (Operator), HESBV (Consortium of ONGC Videsh and CNPC)

S. N.	Country	Name of Asset	ONGC Videsh PI	Participating Companies
29	Venezuela	San Cristobal	40%	ONGC Videsh, IPRMEL(Operator), Tri-Ocean-Mediterranean (TOM)
30		Carabobo Project -1	11%	ONGC Videsh, PDVSA, Repsol, IOC, OIL
31	Vietnam	Block 06.1	45%	ONGC Videsh, Zarubezhneft EP Vietnam B.V, Petro Vietnam
32		Block 128	100%	ONGC Videsh

project sites both in India and abroad.

EIL has a wholly owned subsidiary, Certification Engineers International Limited for providing certification and inspection services. EIL with National Fertilizer Limited (NFL) and Fertilizer Corporation of India (FCIL) have incorporated Ramagundam Fertilizers and Chemicals Limited (RFCL) as a Joint Venture Company at Ramagundam, Telangana with 26% shareholding. The commercial operation of the RFCL plant has been achieved on March 22, 2021. EIL also holds 4.37% stake in Numaligarh Refinery Limited (NRL).

EIL executes projects under two major segments i.e., Consultancy and Turnkey. 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 include:

Pre-Project Services like Feasibility Studies, Environment Impact Assessment, Technology & Process Licensor selection and Cost Estimation.

Project Management Services from concept to commissioning including 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 in the domain of 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 and Yield & Energy Optimization Studies etc.

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 Web-based complaint management system has been implemented for handling complaints/grievances from public, contractors, vendors, suppliers etc. Company also has designated committee for women.

12.2.2.1 Performance Highlights of 2024-25

Business Performance: During the FY 2024-25, EIL secured new businesses worth ₹7,383 crores which includes business worth ₹3,383 crore in Consultancy segment (₹3,048 crore from domestic clients and ₹334 crore from overseas clients), and ₹4,000 crore in LSTK/OBE segment.

Major assignments secured by company in the domestic segment of its business operations include:

a. Bina Refinery - MPMC & Engineering, Procurement and Construction Management (EPCM) services for Ethylene Cracker Unit and U&O along

with Refinery. Facilities related to Bina Petchem& Refinery Expansion Project (BPREP) at Bina Refinery. Supply Of Know-How/License, Basic Engineering Design Package (BEDP) and other related Services for CDU/VDU, NSU, LPGTU and associated facilities. Project Management Consultancy (PMC) and EPCM Services for Polypropylene (PP) Unit and Revamp of PFCC Project.

b. Services for setting up of 750 KTA PDH and 500 KTA PP Plant with Ethane & Propane storage and handling facility at Dahej Petrochemicals Complex for Petronet LNG.

c. NSEZ Noida - Comprehensive Design Engineering and Project Management Consultancy for Development and Upgradation of Infrastructure at NSEZ Noida, on depository basis for Special Economic Zone Authority.

d. Execution of TNT Plant at HEF-Khadki.

e. Design Engineering, Procurement, Construction, Installation, Testing, Commissioning and Project Management Services for Demo Bio ATF Unit of MRPL.

Infrastructure

a. Development of IIT Jammu Phase-B (On Deposit Basis).

b. Convention Centre at ONGC, Goa on EPC reimbursable/OBE basis.

Study assignments

a. Consultancy Services for Feasibility Studies for BPCL Mumbai Refinery Revamp and PRFCC-PP Unit at Mumbai Refinery/Rasayani (Part-1 & Part-2) for M/s BPCL.

b. Feasibility study for Oil to Petrochemical project at Mangaluru for M/s ONGC.

c. Detailed Feasibility Report (DFR) for Replacement of 259 Km Old Pipeline Section of Numaligarh-Siliguri Product Pipeline (NSPL) for M/s Oil India Ltd.

d. Specialized services Proof Checking Consultancy as per IS:18299 for Civil and Structural Engineering of EPC package For Singrauli (STPP) Stage-III (2x800MW) and Sipat (STPP) Stage III (1x800MW) by M/s NTPC.

e. Structural Audit of Terminal Building and allied Infrastructure for Biju Patnaik International Airport, Bhubaneswar for M/s Airports Authority of India (AAI).

Diversified segment: Detailed Engineering Consultancy Services for Aditya Aluminium Smelter Expansion Project at Lapanga, Sambalpur, Odisha. Detail Engineering Services for Main Reactor Furnace in DRI-2 Unit at Angul of JSPL.

Project Performance: Some of the major projects that were completed during the year include:

a. Commissioning of Green Hydrogen Project at GAIL, Vijaipur.

b. Mechanical Completion of Compressed Air & Cryogenic Nitrogen Plant at Rajasthan Refinery Project.

c. Commissioning of Chhara LNG Terminal Project.

d. Commissioning of two LNG Storage Tanks at Petronet LNG Terminal, Dahej.

e. Completion of laying of world's longest HDD crossing of 26 Inch - 4.027 Km. Crude Pipeline for PNCPL Project, HDD Crossings of 24 Inch - 2.742 Km on Rup Narayan River for DDHPL Project. Image refers HDD crossing 26" Crude Pipeline, PNCPL.

f. Commissioning of Water Pipeline, Overhead Transmission line and Buildings atMongol refinery Project, Mongolia.

g. Commissioning of both trains of HGU, MHC, MS Block and RFCC unit of Dangote Refinery and Petrochemical Project (DRPP), Nigeria. Image 1 shows 2 Trains of HGU in Dangote Refinery and Image 2 shows RFCC in Dangote Refinery.

h. Mechanical completion of Bitumen Blowing Unit (BBU) of MRPL, Mangalore.

Financial Performance: During FY 2024-25, EIL achieved turnover and profit before tax of ₹3028 crore and ₹617 crore, respectively.

12.2.2.2 Human Resource: EIL is a human resource driven organization and operates through a multi-disciplinary engineering workforce at its headquarters and at construction sites, Gurugram office including foreign offices. The manpower strength of EIL was 2639 as on 31st March 2025.

12.2.2.3 Technology Development and commercialization: During the year, several R&D projects were initiated such as Direct CO_2 conversion to Dimethyl Ether, HiGee-Deaeration scale-up, Ejector system optimization, Novel heat exchanger baffles, Amine purification and AC-DC field-based desalting for heavy/blended crude.

Technologies such as LPGTU at BPCL Bina, SAP production at Kochi Refinery and HiGee Deaeration Project at Kochi were commercialized.

Notably, EIL signed a Memorandum of Agreement (MoA) with IIT Roorkee to jointly develop technology for the direct conversion of CO_2 to Dimethyl Ether through catalytic hydrogenation.

MoA signing with IIT Roorkee: EIL is holding membership of Process Science Technology Centre (PSTC), an `industry-academia collaborative research program initiated by University of Texas, USA, Fractionation Research Incorporated (FRI), a non-profit cooperative research organization based at Oklahoma, USA and Process Integration Research Consortium (PIRC), University of Manchester UK.

12.2.2.4 Start-up Initiative- EngSUI: EngSUI is an initiative of EIL that provides intellectual, infrastructural and financial support to start-ups for nurturing start-up Eco-System within India.

EIL funds the Start-up projects working in the field of Hydrocarbon, IT & IIOT, Renewable Energy & Storage, Nano-Materials, Waste to Energy, Bio Fuels, Net Zero Health Safety and Environment. 10 IITs and 4 NITs have registered with EIL's Start-up India Initiative.

Totally 31 number of projects have been funded till date. EIL Board has also approved equity investment through Start-up fund of EIL in addition to ongoing Grant funding.

12.2.2.5 Patent Portfolio: Filing and grant of patents is critical activity for EIL through which it protects its Intellectual Property. In this endeavour, during the year EIL filed 27 patents during 2024-25, further during 2024-25, EIL was granted 02 patents.

12.3 Miniratna Central Public Sector Enterprises (CPSEs)

12.3.1 Balmer Lawrie & Co. Limited (BL):

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

The Company's business interest spans both Manufacturing and Services. The authorized and paid up capital of the Company were ₹300 crore and ₹171 crore respectively as on 31st March, 2025. Balmer Lawrie Investments Ltd., a Government Company, holds

10,56,79,350 equity shares of ₹10 each (totaling to about 61.80% of paid-up equity capital) of the Company.

The Company achieved Net Turnover of ₹2577.63 crore during 2024-25 as against ₹2404.17 crore during 2023-24, registering an increase of approximately 7% over the previous year.

The Profit before Tax of ₹313.79 Crore in 2024-25 as against ₹278.65 Crore in 2023-24, the increase of approximately 13% over the previous year.

The increase is majorly attributable to the remarkable performance by Travel & Vacation and Logistics Services businesses.

The Reserve and Surplus of the Company increased to ₹1356.95 crore as on 31st March 2025 as compared to ₹1256.21 crore as on 31st March 2024.

12.3.2 Balmer Lawrie Investments Limited (BLIL):

The Government of India, in view of its planned deregulation of oil and globalization of the economy, decided to disinvest 33.58%, of its total equity holding of 59.58%, in IBP Company Limited (IBP) to a strategic partner with management control. Consequently, the shareholding of IBP, in its erstwhile subsidiary Balmer Lawrie & Company Limited (BL), was de-merged in favour of Balmer Lawrie Investments Limited (BLIL), which was incorporated on 20th September 2001 under the Companies Act, 1956. The President of India continues to hold 13,24,60,980 Equity shares of Re. 1 each (aggregating 59.67% of the total paid-up Equity capital) in the Company. BLIL is under the administrative control of Ministry of Petroleum & Natural Gas having its registered office at Kolkata.

The Company does not have any business activity, except to hold the Equity shares of its subsidiary, namely, Balmer Lawrie & Co. Ltd. (BL). The major source of income is dividend income received from BL. In addition to the dividend income, the Company earns interest out of its surplus funds deployed in the fixed/term deposit schemes of the Scheduled Banks.

Joint Ventures and Subsidiaries of BLIL:

- BLIL does not have any joint venture with any corporate entity.
- BLIL has at present two subsidiary companies, namely,

i. Balmer Lawrie & Co. Ltd. (as per Section 2(87)(ii)of the Companies Act, 2013)[which is referred to herein as 'BL'] and BL in turn, has 1 subsidiary company as enumerated in serial ii below.

ii. Visakhapatnam Port Logistics Park Limited (as per Section 2(87) (ii) of the Companies Act, 2013).

12.3.3 Chennai Petroleum Corporation Limited (CPCL):

Chennai Petroleum Corporation Limited (CPCL), formerly known as Madras Refineries Limited (MRL) was formed as a joint venture in 1965 between the Government of India (GoI), AMOCO and National Iranian Oil Company (NIOC). AMOCO disinvested CPCL equity in favor of the Government of India in 1985. Later Government of India transferred its equity to IOCL and CPCL became a subsidiary of IOCL in 2001. The present capacity of Manali refinery is 10.5 MMTPA.

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

CPCL has a Wax Plant with a capacity

of 30,000 Metric Tonnes (MT) per annum, to produce paraffin wax for manufacture of candle wax, waterproof formulations and match wax. A Propylene Plant was commissioned in 1988 with an initial capacity of 17,000 MT per annum to supply petrochemical feedstock to neighboring downstream industries, The unit was revamped to enhance the propylene production capacity to 30,000 MT per annum in 2004.

CPCL is targeting to achieve Net Zero by 2046, CPCL is actively establishing an outstanding track record in sustainable development. CPCL accomplishes this through the implementation of diverse 'Environmental Protection & Conservation projects' aimed at preserving our environment for future generations. CPCL has achieved the Total Distillates of 75.7% in 2024-25.

Parameter	FY 2023-24	FY 2024-25
Crude Throughput (MMT)	11.6	10.5
Distillate Yield (%)	76.2	75.7

12.3.3.1 Financial Performance:

(₹Crore)

Parameter	FY 2023-24	FY 2024-25
Turnover	79,207	70,963
Profit Before Tax	3,660	208
Profit After Tax	2,711	173.53

12.3.4 Mangalore Refinery and Petrochemicals Limited (MRPL):

Mangalore Refinery & Petrochemicals Limited (MRPL) is a Schedule-A Miniratna company under the Ministry of Petroleum and Natural gas (MoPNG). MRPL is a subsidiary of ONGC with a present installed capacity 15 MMTPA. MRPL has about 6% share in refining capacity of India. Product slate contains LPG, Naphtha, Polypropylene, MS, Paraxylene, Benzene, Xylol, SKO, ATF, HSD, MFO, Bitumen, Sulphur and Petcoke.

The refinery is located on the west coast in Mangaluru in the state of Karnataka. The refinery has progressively expanded over the years since the commissioning of the Phase-1 in year 1996. Phase-2 was commissioned in 1999 and Phase-3 was commissioned in 2012 with a new Crude unit. The last of the process units under Phase-3 expansion project, the Polypropylene unit, was commissioned during middle of year 2015. The company has amalgamated its erstwhile subsidiary ONGC Mangalore Petrochemicals Limited ("Aromatic Complex") located in Mangalore SEZ with itself with effective date of 1st May 2022.

MRPL has its own power generation facilities for captive use with a total capacity of 311.6 Mega Watt (MW). Additionally, it has a grid interactive roof top Solar Power Plant of 6.06 Megawatt-peak (MWp) capacity at the refinery site and 2.5 MW floating solar plant at its Aromatic Complex.

In addition to Raw water intake from river, MRPL utilizes about 3 to 4 Million Gallons per Day (MGD) of treated sanitary water from Mangalore City. A Sea Water Desalination Plant was commissioned in Dec 2021, with a current capacity of 8 MGD and expandable to 15 MGD, to reduce dependence on fresh water from river for sustainable operations subsequently.

The company has two berths in New Mangalore Port Authority (NMPA) and Single Point Mooring Facility

17 Km. inside the sea within NMPA jurisdiction.

12.3.4.1 Projects

a. Marketing Terminal at Devangonthi was commissioned in August 2024 to receive MS, HSD, and ATF from MRPL via PMHBL pipeline.

b. Power System Upgradation Project aims to enhance grid connectivity (220/33kV and 110/33kV) and upgrade the refinery's electrical and cooling systems. Mechanical completion is expected in Q3 FY 2025-26.

c. PFCC Regenerator Stack Wet Scrubber System, targeting reduction of SPM emissions, achieved mechanical completion in December 2024 and is under commissioning.

d. New Bitumen Blowing Train with 144 KTPA capacity was commissioned in November 2024 to meet demand for VG-30 and VG-40 grades.

e. IBB Pilot cum Demo Plant, in collaboration with CSIR-NCL, is under development for 200 TPA capacity. Mechanical completion is expected by Q2 FY 2025-26.

f. Green Hydrogen Plant of 500 TPA capacity is planned using water electrolysis. It is in the tendering stage and targeted for completion in Q2 FY 2026-27.

g. Bio-ATF Plant of 20 KLPD capacity, based on indigenous technology by EIL/CSIR-IIP, is under implementation with mechanical completion expected in Q4 FY 2026-27.

12.3.4.2 Human Resources: Total employee strength was 2540 as on 31st January, 2025 which includes 228 women employees and 46 employees with physical disabilities. Out of total employee strength of 2540, 1166 employees belong to Management cadre and 1374 employees belong to non-Management cadre.

12.3.4.3 Safety

a. ERDMP certification Audit of Refinery Complex and Aromatics Complex was conducted during 21.04.2024 to 25.04.2024 by M/s ERDMP Academy LLP, Bhopal.

b. Pre-commissioning safety audit of New BBU train-2 project at refinery complex was carried in July, 2024 by technical team from Oil Industry Safety Directorate (OISD).

c. Pre-Commissioning Safety Audit of Devanagonthi Marketing Terminal, Bengaluru was carried out August, 2024 by technical experts' team from OISD.

d. Pre-Commissioning Safety Audit of WSS project at refinery complex was carried out in January, 2025 by technical team from OISD.

12.3.4.4 Environment Management

a. Extended Producer Responsibility (EPR) obligation of 2167 MT for FY 23-24 has been successfully achieved.

b. Oil Spill Contingency Plan (OSCP) for SPM facility-Committee constituted for vetting OSCP's of OHA, scrutinized the MRPL OSCP plan and vetted for 5 years with effect from 22.10.2024.

c. SPM Oil spill contingency plan (OSCP), joint inspection carried out by OISD & Indian coast guard from 27.11.2024 to 28.11.2024.

d. 42,50,790 m^3 (3.41 MGD average) of tertiary treated municipal sewage water from Mangalore city was utilized till Dec-2024. Further, 9,39,829 m^3 (1.55 MGD average) of desalinated water was utilized in MRPL till Dec-2024.

e. 3744 MT of ETP oily sludge processed internally at DCU unit. 842 MT of oily sludge and 1267 MT of PFCC spent catalyst were co-processed in SPCB authorized cement industries till Dec-24.

f. Green belt development activity carried out by planting of 5,332 tree saplings and distribution of 2,239 of fruit tree saplings as a part of "Ek Ped, Maa ke Naam" plantation drive from Apr-24 to Jan-25.

12.3.4.5 Innovation Centre: MRPL's innovation focus spans AI/ML, catalyst and process development, niche products and APIs, driven through in-house R&D and collaborations with institutions like NCL-Pune, IICT-Hyderabad, NIT-Surathkal, and CIPET-Chennai. With 29 patents filed and 12 patents granted, MRPL received the "Special Innovation Award" from the Ministry of Petroleum and Natural Gas for the third consecutive year (2024-25). AI/ML algorithms have been deployed for real-time optimization and predictive maintenance across key units. ₹6.67 crore OIDB grant was approved for setting up a PET depolymerization pilot plant.

MRPL also developed IBB process technology; a patented photo-catalytic deodorization unitand is advancing circular economy projects for plastic waste upcycling. Ongoing research includes ethylene recovery and valorization of refinery molecules, reinforcing MRPL's commitment to sustainable innovation.

12.3.4.6 Awards & Recognitions: During the year, the company has been conferred with following awards and recognitions

a. The Economic Times HR Future Ready Organization

b. Organization with Innovative HR Practices award at the Asian Leadership Awards-2024

c. MRPL honored for Innovative HR Practices at Asian Leadership Awards 2024

d. MRPL received Water conservation award and Horticulture development award for 2024 from Green Maple foundation (GMF).

e. MRPL received Green tech PCWR Award- 2024 in the category of 'Circular Economy Leadership" for its commitment to sustainable waste management.

f. MRPL received Mahatma Award-2024 for Corporate Environment Responsibility (CER).

g. MRPL Aromatic Complex received Prashansa Patra in National Safety Council- Safety Awards 2024 under Group A (Petroleum refineries, gas processing units and Petro-chemical complexes

h. MRPL is selected in Gold Category- for the prestigious "The GEEF Global Environment Award 2025" in Oil Refinery and Petrochemicals Limited Industry category.

Financial Performance Highlights

Parameter	Unit	FY	FY 2023-24	FY 2024-25 (Upto Dec-24)
Throughput	MMT	1,24,686	1,05,190	1,09,239
Turnover (Gross)	₹ Crore	6,711	7,893	2469
PBT	₹ Crore	4,239	5,521	113.2
PAT	₹ Crore	2,638	3,596	50.5
Gross Refinery Margin	$ / Bbl	9.88	10.36	4.45

12.3.5 Numaligarh Refinery Limited (NRL):

Numaligarh Refinery Limited (NRL) was incorporated on 22nd April 1993. NRL's establishment is rooted in the "Assam Accord" signed by the Government of India on 15th August 1985. NRL is a subsidiary of Oil India Limited (OIL) and operates a petroleum refinery at Numaligarh in Golaghat district of Assam. NRL is a Category-I Miniratna PSU. NRL's commercial operations commenced from 1st October 2000. As on 31.03.2025, the share holding pattern of NRL is Oil India Limited (OIL)-69.63%, Government of Assam-26% and Engineers India Limited (EIL) - 4.37%.

NRL has an LPG Bottling Plant at Numaligarh (capacity 42 TMTPA) besides two marketing terminals at Numaligarh and Siliguri. White Oil products, viz. MS, SKO and HSD are transported from Numaligarh to Siliguri through the Numaligarh-Siliguri product pipeline (NSPL) of Oil India Limited.

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, Aviation Turbine Fuel, High Speed Diesel, Superior Kerosene Oil, Paraffin Wax, Raw/Calcined Petroleum Coke and Sulphur. NRL has the largest Wax producing unit in the country.

12.3.5.1 Performance:

Physical Performance:

Parameter	2022-23	2023-24	2024-25
Crude Receipt (TMT)	2,934	2,457	3,033
Crude Throughput (TMT)	3,091	2,510	3,066
Capacity Utilization (%)	103.03	83.67	102.20
Distillate Yield (%)	87.69	86.54	86.73
Specific Energy Consumption (MBN)	61.66	61.57	61.47
Energy Intensity Index (EII)	82.31	81.36	81.09

Financial Performance:

Parameter	2022-23	2023-24	2024-25
Sales Turnover (₹/Cr.)	29,785	23,731	25,147
PBT (₹/Cr.)	4,953	2,912	2,215
PAT (₹/Cr.)	3,703	2,610	1,608
GRM ($/bbl)	19.86	13.17	5.14
Net Worth	11,427	13,926	16,069

Contributions to the Exchequers:

Exchequer	2022-23	2023-24	2024-25
Central Exchequer	4,358	3,389	3,344
State Exchequer	658	430	339
Total	5,016	3,819	3,683

12.3.5.2 Projects

Projects under Implementation

a) Numaligarh Refinery Expansion Project (NREP): The expansion project has two major components which include:

i. 6 MMTPA refinery at Numaligarh-: As on 31.03.2025, overall physical progress is 83.8% and financial progress is 80.76%.

ii. Paradip Numaligarh Crude Oil Pipeline (PNCPL) and Crude Oil Import Terminal (COIT)-The length of the pipeline in 1,635 Kms in length and 9 MMTPA in capacity. As on 31.03.2025, overall physical progress is 83.8% and financial progress is 80.76%.

Under NREP key unit coming under the expansion projectare:

a. Petrochemical Project: The project involves setting up of a 360 KTPA Poly Propylene Unit (PPU) and its associated facilities at Numaligarh. Post implementation of the project, Petrochemical Intensity Index (PII) of NRL will be 3.88%. Environment Clearance of the project has been obtained and EIL is onboarded as EPCM for the project. Project is targeted to be completed in FY 2027-28.

b. DCU Revamp: Revamp of existing Delayed Coker Unit (DCU) by increasing the capacity from 306 KTPA to 560 KTPA for processing Un-converted Oil (UCO) from upcoming Residue Upgradation Facility including Coke Drum Structural Package. For DCU reliability and efficiency improvement additional facilities for ensuring sustainable operation of the unit such as Overhauling of Off Gas Compressor, Process equipment, New Substation building and DCS upgradation are coming up.

c. Dabidubi LPG Facility: Setting up a 15 Kilometer underground LPG pipeline to connect to its LPG facilities being setup at Dabidubi in Golaghat district of Assam. The capacity of the new LPG facility post commissioning will be 700 KTPA.

d. SMT Augmentation: The project involves installation of new tankages, ethanol blending facilities and rail/ road loading spurs in Siliguri Marketing Terminal (SMT) to meet enhanced product evacuation requirements post refinery expansion.

e. Power Recovery Turbine in PFCC unit: A Power Recovery Turbine will be installed in the flue gas section at downstream of reactor-regenerator section of PFCCU as an energy saving initiative. This will generate power from regenerator flue gas to increase the energy efficiency of the unit and will result in reduction of CO_2 emissions from the complex.

b) 2G Bio Refinery (JV project): NRL, in collaboration with two other foreign investors, have formed the Joint Venture Company-'Assam Bio-refinery Private Limited (ABRPL)' which is setting up a second-generation bio-refinery at Numaligarh, Assam to produce ethanol from non-food grade feed stock bamboo. The first trial run has been conducted successfully to establish conversion of bamboo to alcohol.

c) North East Gas Grid Project (JV project): NRL is a partner with 20% stake in the JV company -Indradhanush

Gas Grid Limited (IGGL) which is executing the North East Gas Grid project to lay Natural Gas Pipeline of 4.75 Million Metric Standard Cubic Meter Per Day (MMSCMD) capacity.

d) Green Hydrogen Plant: In line with National Green Hydrogen Mission and to meet the GHCO (Green Hydrogen Consumption Obligation) in coming years, NRL is setting up a Green Hydrogen plant of capacity 300 Kg/hr. (2.4 KTPA) at Numaligarh on EPC basis. This will replace 5% of the present grey hydrogen being used by the refinery which will reduce approximately 24,000 Tons of CO_2 emission per annum.

12.3.5.3 R&D Activities: NRL has been pursuing R&D activities through partnership with academia and research organizations to provide technological inputs to meet corporate objectives of technical excellence in all aspects of refinery operations, develop new value-added products and upgrade the quality of the existing petroleum products. Few of such partnerships and collaborations are mentioned below:

1) NRL Centre of Excellence for developing Sustainable Material at IIT Guwahati

a) Developing Eco packaging material: A project titled "Development of Biodegradable Plastics from Oil and Bio-Refinery Streams" has been undertaken to convert "Furfural" a bio-refinery by product to Polycaprolactone which can be moulded into various shapes for producing eco-packaging materials.

b) Developing green Activated Carbon: A project has been taken up for Design and Development of a Demonstration Plant for production of Marketable Grade Green Activated Carbon from Bamboo Dust. This project aims to develop an industrial-scale demonstration plant for converting 5 MT/batch bamboo dust to green activated carbon by pyrolyzing waste bamboo dust.

c) **Developing process for H_2 Separation and CO_2 Capture from PSA Off Gas:** This R&D project for NRL Refinery is in collaboration with Indian Institute of Technology Guwahati (IITG).

d) **AI Based Procurement RFx Automation:** A Project titled "AI Based Procurement RFx Automation for Numaligarh Refinery Limited" to be carried out in collaboration with Indian Institute of Technology Guwahati (IITG).

2) NRL-NEIST R&D Centre at Jorhat, Assam: Ongoing research projects at CSIR-NEIST:

a. Development of Sustainable Nanocomposite Membrane for CO_2-capture from PSA off gas.

b. Development of Hybrid nano-catalyst for green Hydrogen Production for water electrolysis.

c. Production of high-quality graphene-like nanomaterials from petroleum waste of North Eastern Region.

d. Development of lignocellulolytic multienzyme production process for bamboo based biorefinery.

3) Research Collaboration for commercialization of technology developed by Engineers India Limited: NRL and EIL had entered into a Memorandum of Understanding ("MoU") dated 31.03.2022 to exchange scientific knowledge, encourage joint research in the field of hydrocarbon, petrochemicals, energy technology, and commercialize such jointly developed technologies. As part of this collaboration, NRL and EIL have signed memorandum of agreement to commercialize EIL's patented technology through setting up a 16 TPD Aqueous Ammonia plant to recover ammonia from NH_3-rich

sour gases and convert it into valuable products. Under this project, NRL intends to utilize waste Ammonia rich stream from Sulphur Recovery Unit of NRL's expansion unit for production of Ammonia which has a readymade market in NRL's JV Assam Bio Ethanol Private Limited. Basic Engineering Design Package (BEDP) has been developed. It is envisaged that Aqueous Ammonia project will significantly reduce NOX releases to atmosphere. Moreover, this project will convert waste to value added by product.

4) **Research Collaboration on Alternative Energy – Wind energy project:** NRL is collaborating with the Assam Kaziranga University and Institute of Frontier Science and Application through signing an agreement for executing a research study on Assessment of Wind-Energy Potential in North east India through multi-level and multi-site high-frequency observation and Analysis in Riverine Environment at Turbine Level. The study aims to generate bankable wind resource data which will be reliable to set up wind energy projects if such project is found to be techno-commercially viable. Two numbers of LIDAR machines have been deployed for acquisition of data at two different locations in the Brahmaputra valley.

5) **Research Collaboration for waste to wealth:** NRL has entered into a framework collaboration with CSIR: NEIST, Jorhat for carrying out process improvement, valorisation of its waste products etc. Under this project, Lab scale experiments with 50 Litre batch size was conducted successfully by designing and developing hollow fibre membrane module. A pilot demonstration facility of 1m^3/hr size is under development at NRL site.

6) **Research collaboration for Project at St. Edmund's College, Shillong:** NRL has engaged St. Edmund's College, Shillong for research study on Utilization of cyanobacteria in the bioremediation of crude oil, hydrocarbon storage tank bottom sludge, and ETP hydrocarbon sludge and its environmental biotechnology implications. The aim of this project is Utilization of cyanobacteria in the bioremediation of crude oil, hydrocarbon storage tank bottom sludge and ETP hydrocarbon sludge. Under this project, significant development on culture of cyanobacteria samples collected from NRL have achieved and bio-accumulation study with the cultured bacteria on hydrocarbon sludge is being investigated.

7) **R&D Activities with Rajiv Gandhi Institute of Petroleum Technology (RGIPT), Amethi:** NRL, in its effort to expand research activities has signed Memorandum of Agreement (MoA) on 13.11.2024 with Rajiv Gandhi Institute for Petroleum Technology, Amethi for carrying out following R&D Projects.

a) Electrocatalytic conversion of H_2S and Ammonia in Sour Water to Sulphur, H_2 and Ammonium Sulphate.

b) Methanol-Diesel blending to achieve stable mixtures.

c) Lignin based Bio-adhesive development and its process optimization at pilot scale for demonstration.

d) Electrochemical Conversion of Ethanol-Water Mixture to Acetic Acid and Hydrogen

e) Development of Corrosion Inhibitor Formulations for Mitigating the Corrosion caused by Methanol Blended Diesel.

12.3.5.4 Integrated Information System (IIS): NRL has implemented a comprehensive Business Continuity Management (BCM) system to ensure seamless operations during disruptions. A Disaster Recovery (DR) site has been established on a reputed cloud

platform with 24x7 data replication, ensuring operational resilience.

To protect IT assets, NRL has set up a cloud-based Security Operations Centre (SOC) with a globally recognized SIEM and UEBA solution for centralized monitoring and rapid incident response. This is supported by Endpoint Detection and Response (EDR) and Network Detection and Response (NDR) systems, providing real-time threat detection and prevention across endpoints and networks. Additionally, AI-powered threat intelligence tools monitor the deep and dark web to detect brand misuse and data breaches.

NRL is also leveraging Artificial Intelligence, especially Generative AI, through Microsoft Copilot to boost productivity and creativity. Integrated with Microsoft 365, Copilot helps users generate documents, analyze data, and automate tasks using natural language. These initiatives reflect NRL's commitment to digital transformation and cyber resilience.

12.3.5.5 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.

12.3.5.6 Value Added Projects by NRL: 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.

S. No.	Project	Remark
1	Investment in joint venture: Assam Bio Refinery Private Limited	Under implementation (50% equity participation)
2	Investment in joint venture: Indradhanush Gas Grid Limited	Under Implementation (20% equity participation)
3	NREP – 6 MMTPA Refinery at Numaligarh	Under Implementation
4	Paradeep Numaligarh Crude Oil Pipeline	Under Implementation
5	Green Hydrogen Plant – 2.4 KTPA	Under Implementation

12.4 Other Central Public Sector Enterprises (CPSEs)

12.4.1 Bharat PetroResources Limited (BPRL):

Bharat PetroResources Limited (BPRL) was incorporated in October 2006, as a 100% subsidiary of Bharat Petroleum Corporation Limited (BPCL), to undertake the upstream activities of BPCL. Bharat Petro Resources Limited (BPRL), has Participating Interest (PI) in fifteen blocks, of which eight are in India and seven overseas, along with equity stakes in two Russian entities holding the license to four producing blocks in Russia. Covering approximately 19,824 square kilometres, approximately 46% of the acreage owned by BPRL and its subsidiaries is in the offshore expanse. BPRL's share of Oil & Gas production in FY 24-25 has been 1.98 MMTOE.

(i) **Russia:** BPRL, along with Oil India Limited and Indian Oil Corporation Ltd, holds 23.9% stake in JSC Vankorneft and 29.9% stake in LLC TYNGD through Singapore-incorporated joint ventures. JSC Vankorneft is owned by LLC Vostok and ONGC Videsh Vankorneft Pte Ltd., while LLC TYNGD is owned by RN Upstream LLC and BP. BPRL's effective stake at Vankorneft is 7.887%, with an investment of USD 589 Mn. During the FY 2024-25, production from the Asset has been 12.45 MMTOE (BPRL Share: 0.98 MMTOE). Also, Asset has generated dividends of USD 34.24 Mn for BPRL during the FY.

LLC TYNGD, a Rosneft Group company, holds a stake in the Srednebotuobinskoye field in East Siberia. BPRL has a 9.867% stake, invested USD 430 Mn. During the FY 2024-25, production from the Asset has been 10.71 MMTOE (BPRL Share: 1.06 MMTOE). Also, Asset has generated dividends of USD 45.65 Mn for BPRL during the FY.

(ii) **Lower Zakum Concession:** The Lower Zakum field in Abu Dhabi, a producing field since 1967, is owned by BPRL, IOCL, and OVL. The Indian Consortium holds a 10% stake in the concession, while BPRL holds 30% through its subsidiary. Currently the production is at an average of 410,000 BOPD of crude oil of Das Blend Crude with an overall crude oil production of 18.67 MMT (BPRL Share: 0.56 MMT) in the FY 24-25. During the financial year, BPCL Group Refineries have accessed 2.77 Million barrels of crude oil as its equity oil from Lower Zakum. BPRL has received dividends of USD 5.7 Mn during the aforementioned period.

(iii) **Onshore Block 1 Concession:** BPRL and IOCL were awarded the Onshore Block 1 Concession in March 2019 under the Abu Dhabi 2018 Block Bid Round. The concession covers 6,162 sq. km. in the Al Dhafra region, including Ruwais City and the refining complex. The exploration phase is nine years, with initial, second, and third periods. The concession is currently in its second exploration period, with UBPL committed to drilling two Mirfa Appraisal wells and one Exploratory well. The Ruwais Field development plan was approved in April 2024, and Production Concession agreements were executed in September 2024. The field will be developed with five production wells, with live crude transported via an 85 km multi phase product pipeline to ADNOC Buhasa processing facilities. Oil production is expected in 2026.

(iv) **Mozambique:** BPRL, through its Netherlands based step-down subsidiary company BPRL Ventures Mozambique B.V., holds 10% PI in Offshore Area 1, Rovuma Basin Concession in Mozambique. TotalEnergies EP Mozambique Area 1 Limited, a wholly owned step-down subsidiary of Total Energies S.A. is the Operator with 26.5% PI, and the other consortium partners are MIT Rovuma offshore SU LDA (20%), ENH Rovuma Area Um, S.A. (15%), ONGC Videsh Rovuma Limited (10%), Beas Rovuma Energy Mozambique Limited (10%) and PTTEP Mozambique Area 1 Limited (8.5%).

Offshore Area-1, Mozambique has five discovered gas fields namely, Golfinho-Atum, Prosperidade, Orca, Tubarao-Tigre and Tubarao. Water depth in the discovery field ranges from 500 m to 1800 m. Golfinho-Atum field holds 30.1 Tcf of Recoverable Gas from two reservoirs zones and is currently under development. A total number of 17 exploratory and appraisal wells are drilled in Golfinho-Atum Field. Plateau Production from the field is expected to reach ~ 2 bcf per day. The Prosperidade field contains 34.9 Tcf of recoverable resources from

three reservoir zones. A total of 11 exploratory and appraisal wells have been drilled to delineate the field's limits. The remaining three discovery fields—Orca, Tubarao, and Tubarao-Tigre—collectively contribute 5 Tcf of recoverable resources from three reservoir zones. Following the discovery of vast quantities of natural gas in Rovuma Offshore Area 1 off the coast of northern Mozambique, Area 1 consortium partners announced Final Investment Decision (FID) on June 18, 2019 to initially develop a 2x6.56 MMTPA-Train onshore LNG project for monetization of the gas discovered from offshore Golfinho-Atum discovery area.

After FID, while the project was on schedule and within budget till March 2021, due to the security incidents around the Afungi Project Site during end – March 2021, the consortium declared Force Majeure. The Government of Mozambique is working towards the reestablishment of peace and resolving the security situation. Mozambican military along with forces from Rwanda continue their operations in the region. During the year 2024-25, in order to contribute to the stabilization of the livelihood of the communities in Northern Cabo Delgado, the project has implemented various comprehensive socio-economic initiatives under Pamoja Tunaweza, in the areas of agriculture, water & sanitation, health, education, solarization, aimed at generating revenues for the communities, developing the local economy, preserving the biodiversity and promoting Human Rights. The Project is currently operating in hybrid mode (preservation along with operations without compromising FM conditions). Continuous monitoring of the situation is being conducted by the HSSE team at regular intervals. There has been an improvement in the security situation and as informed by the Operator, the project is expected to restart after satisfactory assurances regarding the security in Cabo Delgado province. The Operator has informed that equipment & infrastructure at site are preserved and in good condition.

(v) **Brazil:** IBV Brasil Petroleo Limited (IBV), incorporated in Brazil, a joint venture company of BPRL Ventures BV with 64.35% shareholding (currently), and balance with Videocon Energy Brazil Ltd (VEBL), step-down subsidiaries of BPRL and Videocon Industries Limited, respectively, currently holds PI in three deep-water blocks in two concessions. IBV holds 40% PI in the BM-SEAL-11 concession and the remaining 60% PI is held by the Operator, Petrobras. The Concession currently consists of two blocks SEAL-M-426 and SEAL-M-349. The Declaration of Commerciality (DoC) was submitted to the Regulator in December 2021. The fields Cavala & Agulhinha (straddling with Agulhinha Oeste in the adjacent BM-SEAL-10 Concession) in BM-SEAL-11 Concession shall be developed along with adjacent fields in BM-SEAL-10 Concession as joint development project named 'Sergipe Alagoas Profundas I (SEAP-I)'. Currently, procurement activities are ongoing with the tender for the Floating Production Storage & Offloading (FPSO) already had been published. In BM-C-30 concession, IBV also holds 35.71% PI and PetroRio Jaguar Petroleo Ltd is the Operator with 64.29% PI.

(vi) **Indonesia:** BPRL has a PI of 16.2%, held through its step-down subsidiary BPRL Ventures Indonesia BV. PT PertaminaHulu Energi Nunukan Company (PHENC), a wholly owned subsidiary of Pertamina, the National Oil Company of Indonesia, has the balance 83.8% PI in the consortium and is the Operator. The Production Sharing Contract (PSC) was signed

on December 12, 2004 and is valid for a period of 30 years, i.e. till 2034. The block is located in shallow waters offshore of Bunyu Island in Tarakan basin of North Kalimantan province. The minimum work program committed as per the PSC under the exploration phase has been completed. Revised Plan of Development (POD) for Badik-West Badikfields submitted to the Regulator in FY 24-25 has been approved as well. The Operator proposes to carry out FEED for the project, which is expected to be complete by December 2025. The POD envisages setting up of a Mini LNG Plant by Gas buyer M/s PTKMJ, who has applied to the authorities for allocation of Gas for this purpose. Negotiations are underway to finalize GSA.

(vii) **CY-ONN-2002/2 (Madanam Field, Onshore Cauvery Basin, Tamil Nadu):** BPRL has PI of 40% in an On-land block CY-ONN-2002/2 in Cauvery basin with ONGC being the Operator with 60% PI. During FY 2024-25, 63,337 MT of oil (BPRL share: 25,335 MT) and 29.25 mmscm of gas (BPRL share: 11.70 mmscm) has been produced from the block. In Thirunagari gas field, one well has been commissioned in the FY with flow rate of ~ 40,000 SCM/day.

(viii) **CB-ONN-2010/11 (Onshore Cambay Basin, Gujarat):** CB-ONN-2010/11, the onshore block was awarded by Government of India to a consortium consisting of GAIL (Operator), BPRL, Engineers India Ltd. (EIL), BF Infrastructures Ltd. (BFIL) and Monnet Ispat & Energy Ltd. (MIEL), under NELP IX Bid Round. Due to MIEL's cash call payment default under the Joint Operating Agreement (JOA), the other non-defaulting parties have agreed to distribute MIEL's 15% PI in proportion to their existing share. Also, due to non-participation of BFIL in the development phase of the block, the revised PI for the block stands as GAIL 47.06%, BPRL 29.41% and EIL 23.52%. The Field Development Plan of Galiyana was approved on 10th February 2020. The field development was completed in 2023 and crude oil production commenced on 18th March 2023. Total crude oil production in FY 2024-25 has been 5382 bbls (724 MT) at Consortium level (BPRL Share: 213 MT).

(ix) **CB-ONHP-2017/9 (Onshore Cambay Basin, Gujarat):** The block CB-ONHP-2017/9 in Cambay basin, Gujarat was awarded to BPRL under Open Acreage Licensing Policy (OALP) Bid Round-I, and the Revenue Sharing Contract (RSC) of the block was signed with Govt. of India on October 1, 2018. BPRL is the lead Operator in the block with PI of 60% and ONGC is the partner with 40% PI.

Based on integrated interpretation of seismic and well data of existing wells in the block, drilling of three wells has been completed, including the minimum work program and commercial Hydrocarbons were not established.

(x) **AA-ONN-2010/3 (Assam Arakan Basin, Assam):** AA-ONN-2010/3, an On-land block was awarded by Government of India to a consortium consisting of OIL, ONGC and BPRL under NELP IX Bid Round. OIL with 40% PI is the Operator of the block. BPRL has 20% PI and ONGC holds 40% PI in the block. The Minimum Work Program (MWP) committed by the consortium in the block has been completed. Due to complications during drilling of the MWP commitment well SDYA-1, it was plugged and abandoned. Operator has requested DGH/MoPNG for a three-year extension for drilling of replacement well in the block.

(xi) **AA-ONHP-2017/12 (Assam Arakan Basin, Assam and Arunachal Pradesh):** Government of India awarded the block AAONHP-2017/12

to OIL India under OALP I Bid Round. BPRL farmed into the block with a PI of 10% in December 2019. The other consortium partners of the block are OIL (60% PI) as Operator, IOCL (20% PI) and Numaligarh Refineries Limited (10% PI). The exploration period has been extended till February 08, 2026. Committed work program includes 2D (200 LKM) and 3D (100 sq.km.) seismic API and 2 wells. NOC for one MWP well was not granted by Aviation Research Centre, therefore DGH has granted proportionate reduction in the block. As per revised committed Minimum Work Program (MWP), all activities viz. 2D and 3D Seismic data Acquisition, Processing and Interpretation are completed except for drilling of one well . Operator is planning to complete MWP well by Extended Reach Drilling (ERD) as this location falls under Dense Forest.

12.4.2 Brahmaputra Cracker & Polymer Limited (BCPL):

The Assam Gas Cracker Project (AGCP) was initiated in pursuance of the Memorandum of Settlement signed between Central Government and All Assam Student Union (AASU) and All Assam Gana Sangram Parishad (AAGSP) on 15th August 1985. A joint venture Company, M/s Brahmaputra Cracker and Polymer Limited (BCPL), was incorporated on 8th January 2007 to implement the AGCP project in Dibrugarh District of Assam. GAIL (India) Limited with 70% of equity participation is the main promoter of BCPL and the remaining 30% equity is equally shared by Oil India Ltd (OIL), Numaligarh Refinery Limited (NRL) and Government of Assam. The feedstock for the complex is Natural Gas from M/s OIL and M/s ONGC and Naphtha from M/s NRL. The complex is designed to process Natural Gas and Naphtha to produce 2,20,000 Tons per annum (TPA) of LLDPE/HDPE (Linear Low-Density Polyethylene/ High Density Polyethylene) & 60,000 Tons per annum (TPA) of PP (Polypropylene). The main complex of BCPL is located at Lepetkata, District, Dibrugarh. BCPL has associated units at Duliajan, District, Dibrugarh and Lakwa, District, Sivasagar and its registered office at Guwahati. The project was commissioned on 2nd January 2016 and was dedicated to the nation by the Hon'ble Prime Minister, on 5th February 2016.

The Cabinet Committee on Economic Affairs on 24th December 2019 approved the feedstock subsidy to BCPL for 15 years of plant operation at an estimated cost of ₹4600 crore approximately and the transfer of administrative control of BCPL from the Department of Chemicals & Petrochemicals to the Ministry of Petroleum & Natural Gas.

BCPL operated at 113% capacity in FY 2024-25 (up to 31st March, 2025). GAIL (India) Limited is the main marketer of the BCPL products. BCPL has extended its product sales to Bhutan in addition to Bangladesh. During the FY 2024-25, the company has generated revenue of ₹3579.20 Crore and earned net profit of ₹15.64 crore. The net worth of the Company was ₹3018.24 Crore as on 31.03.2025. At present two projects Butene-1 and 2nd stage Hydrogenated Pyro gasoline are under construction phase with a revised cost estimation of ₹817.92 Crore with mechanical completion schedule of August 2025.

12.4.3 Indradhanush Gas Grid Limited (IGGL):

Indradhanush Gas Grid Limited (IGGL), a joint venture of IOCL, ONGC, GAIL, OIL and NRL, was incorporated on the 10th of August 2018, with equal equity contribution of 20% for implementation of the North East Gas Grid (NEGG) project in line with the

Hydrocarbon Vision 2030 for North East India released by the Ministry of Petroleum & Natural Gas (MoP&NG) in 2016.

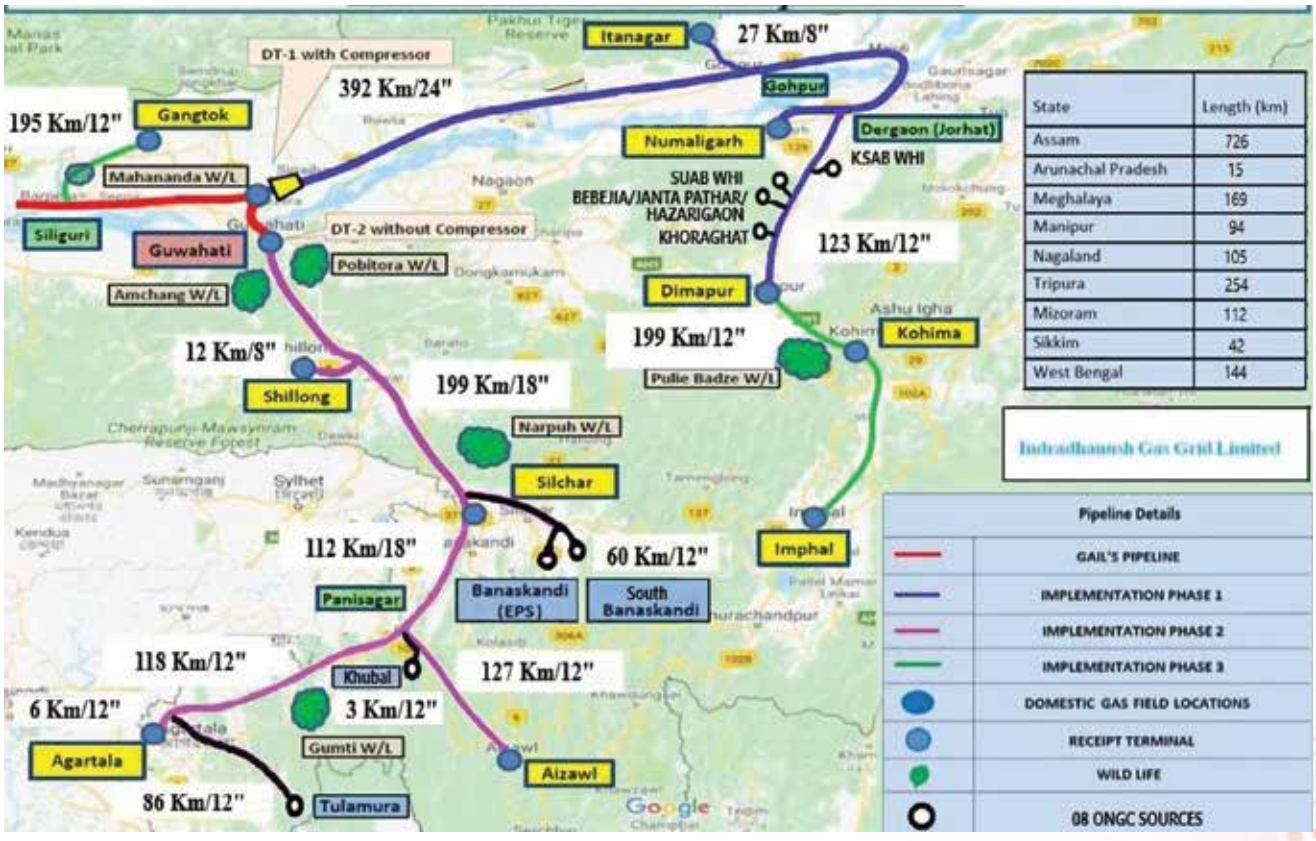
As per Hydrocarbon Vision 2030 for North East India, the NEGG is being set up to connect the capital cities and major demand centres of the eight North Eastern states: Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura and Sikkim as well as the regional gas sources of the Northeast to the National Gas Grid through Barauni-Guwahati Gas Pipeline of GAIL.

The NEGG, a 1670 Km long natural gas pipeline grid having capacity of 4.75 MMSCMD, is being implemented at an estimated project cost of ₹9265 Crore. As on 31.03.2025, NEGG has achieved a physical progress of 84.39%. The project is being implemented in three phases based on the difficulty in work execution for the development of a gas-based economy in North-Eastern India.

The 24" X 392 Km Guwahati-Numaligarh section under Phase I (Sections with plain agricultural terrain) is ready for commissioning and PESO approval is awaited for commissioning of 200 Km stretch of this section. The remaining sections of Phase-I are anticipated for completion by July'25. Phase-II (Sections in hilly terrain) & Phase-III (Sections in hilly terrain and feasibility of laying of pipeline linked to highway width widening) are anticipated to be completed by March 2026 and March 2027 respectively.

The NEGG project is of strategic importance and implementation of the same will ensure reliable and uninterrupted natural gas supplies to the consumers viz. industrial, City Gas Distribution networks in North East region. The NEGG is expected to boost industrial as well as economic growth of the region while conserving the environment and supplementing efforts of the Government for development of a Gas based economy in the North East.

Figure: Route Map of the North East Gas Grid (NEGG)



12.5. Organisations under the Ministry of Petroleum & Natural Gas:

Autonomous bodies under the Ministry of Petroleum and Natural Gas (MoPNG) play a crucial role in regulating and overseeing specific aspects of the oil and gas sector, including exploration, production, refining, and distribution. They also advise the government on policies and regulations related to these activities. These bodies, including the Directorate General of Hydrocarbons (DGH), often have the responsibility of monitoring and advising the government on various aspects of the petroleum sector

12.5.1 Oil Industry Development Board (OIDB):

The Oil Industry Development Board (OIDB) was established on 13th January, 1975 under the Oil Industry (Development) Act, 1974 to provide financial and other assistance for the 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 for the promotion of all such activities as are, in its opinion, conducive to the development of the Oil Industry.

12.5.1.1 Organizational Setup: Oil Industry Development Board comprises of Secretary, MoP&NG as Chairman and other members namely Secretary, Department of Chemical and Petrochemical, Additional Secretary and Financial Advisor, MoPNG, Joint Secretary (PFC-I), Department of Expenditure, Ministry of Finance, Joint Secretary (Exploration), MoPNG, Chairman – IOCL, Chairman & Managing Director - ONGC Ltd., GAIL, BPCL, EIL, Director General, Directorate General of Hydrocarbons, Director (R&D), IOCL and Secretary, Oil Industry Development Board as Member Secretary.

12.5.1.2 Resources of the Board: The funds required for various activities as envisaged under the Act, were made available by the Central Government after due appropriation by Parliament from the proceeds of cess levied and collected on indigenous crude oil. So far OIDB has received an amount of ₹902.40 crore from the Central Government till 1991-92 out of cess collection, which has accumulated to ₹12184.50 crore (Provisional) as on 31.03.2025 through internal generation.

12.5.1.3 Deployment of Funds

i) **Grants:** During the year 2024-25, OIDB had released total grant of ₹264.13 crore till 31.03.2025 to regular grantee institutions viz. Directorate General of Hydrocarbons (DGH), Centre for High Technology (CHT), Oil Industry Safety Directorate (OISD) and Petroleum Planning and Analysis Cell (PPAC) and also to Indian Strategic Petroleum Reserves Ltd. (ISPRL), wholly-owned subsidiary of OIDB, for pre-project activities of Phase-II SPRs.

ii) **Loans :** The financial assistance of ₹685 crore by way of loans was released to Indradhanush Gas Grid Limited (IGGL), Brahmputra Cracker and Polymer Ltd. and Hindustan Petroleum Corporation Ltd. during the financial year 2024-25 till 31.03.2025. OIDB's budget allocation on the Heads of Accounts of Loan to Oil PSUs is ₹785 crore for 2024-25 (RE).

iii) **Equity:** Indian Strategic Petroleum Reserves Ltd. (ISPRL), a wholly owned subsidiary of OIDB, has been entrusted with the construction of Strategic Storage for crude oil at three locations. OIDB has so far released an amount of ₹3790.05 crore as equity investment in ISPRL towards capital cost for establishment of crude cavern projects at Visakhapatnam, Mangalore and Padur under Phase-I. Besides, an amount of ₹22.42 crore has also been

made available to ISPRL so far as grant for pre-project activities for Phase-II SPRs.

iv) **Advance:** OIDB had provided total interest free refundable advance of ₹965.69 crore to Directorate General of Hydrocarbons (DGH) for carrying out seismic surveys in Andaman offshore areas and appraisal of un-appraised offshore basinal areas of EEZ. Besides, OIDB has also provided recoverable advances of ₹50 crore to RGIPT & ₹121.46 crore to ISPRL.

12.5.1.4 Golden Jubilee of Oil Industry Development Board: On January 13, OIDB has completed 50 years. As a part of its Golden Jubilee Celebration, OIDB organized various activities, such as plantation, 02 days Training Programme in association with ICMAI, Skill Development and Meditation Workshop in association with Hydrocarbon Sector Skill Council and Health Awareness Programme. On its Foundation Day on 13th January 2025, workshop titled, "Fuelling Future Energy" was organized in collaboration with Oil India Limited.

12.5.2 Oil Industry Safety Directorate (OISD):

Oil Industry Safety Directorate (OISD), the technical directorate under the Ministry of Petroleum and Natural Gas, has been entrusted with the responsibility of formulating standards, overseeing its implementation through safety audits to enhance safety levels and reduce risk inherent with this industry. OISD standards are implemented on self-regulatory basis by the oil & gas companies.

Petroleum & Natural Gas (Safety in Offshore Operations) Rules, 2008 were notified in the Gazette of India to regulate safety in offshore oil and gas exploration, drilling, production and related activities; and OISD is designated as Competent Authority to exercise the powers and functions as stipulated in these rules, 2008 vide Gazette notification issued in June 2008. The Directorate, under the provisions of these Rules, accords consent for operation of offshore installations in line with goal setting approach at par with international practices.

12.5.2.1 Highlights and Initiatives of OISD during FY 2024-25:

a. The new OISD website was launched by the Hon'ble Minister of Petroleum and Natural Gas during the 'Golden Jubilee' celebration of OIDB on 13th January 2025.

b. An MoU was signed between OISD and API on 12th February 2025 to establish and expand long term cooperation and constructive working relations.

c. 13 standards were revised and approved including new standard on "Hydrogen" in the 41st Safety Council Meeting.

d. Organization/SBU level safety system audit was conducted for RIL, HPCL-Visakh Refinery, ONGC Videsh Ltd., IOCL Refinery & Nayara Energy Limited.

e. Certificationtraining for Internal Auditors started by OISD with 11 programs, Training provided for 252 participants with ₹63 Lakhs revenue generation.

f. 2nd Safety Conclave organized by OISD in association with BPCL at Goa which was attended by 140 delegates from 18 companies.

g. OISD has organized 9001 & 14001 (19), 45001 (12), HAZOP & QRA (30). 61 officers covered during these training programs

h. OISD monitored natural disasters like cyclones, using inputs from IMD. Issued 67 SITREPs, twice daily to MoP&NG and other stakeholders.

i. "Excellent" certificate accorded for co-ordination of first sub-committee of Parliamentary committee on official language and performance of official language.

12.5.2.2 Safety Audits by OISD in FY 2024-25: OISD carries out External Safety Audit (ESA) for onshore & offshore E&P installations, refinery, gas processing plant, central tank farm, LNG terminal, petrochemical plant, cross country pipeline, LPG bottling plant, LPG import facility, depot, terminal, aviation fueling station & lube blending plant on periodic basis to monitor their compliance level with the OISD standards and statutory regulations. OISD safety audit performance in FY 2024-25 is as detailed below:

Type / Installation	Unit	FY 2023-24	FY 2024-25	
			Plan	Actual
Refinery/ Petrochemical/GPP/ CTF/ LNG Terminal	No.	29	26	28
Marketing Installation (POL)	No.	80	79	80
Marketing Installation (LPG)	No.	48	46	48
E&P Onshore	No.	115	110	130
E&P Offshore	No.	28	25	36
Safety Audit at Corporate/SBU level	No.	05	05	05
Construction (PL)/ Port/SPM Audit	No.	11	03	04
Oil spill emergency preparedness joint inspection with ICG	No	06	06	08
Grand Total	No.	322	300	339
Cross country Pipeline	Km.	12362	12000	13373

12.5.2.3 Pre-Commissioning Safety Audits: OISD carries out pre-commissioning safety audits for green-field developments and for major additional facilities at existing locations, to ensure compliance to the statutory requirement and OISD standards at the construction stage itself. Status of PCSA carried out during FY 2024-25 is as follows:

Pre-Commissioning safety audits (PCSA)	Unit	2023-24	2024-25
Refinery/Petrochemical/GPP/CTF/LNG Terminal	No.	18	16
Marketing Installation (POL)	No.	17	23
Marketing Installation (LPG)	No.	10	06
E&P Sector	No.	01	00
Pipeline Locations (Pipeline length covered in Km.)	No (Km.)	17 (1701.7)	10 (1180.92 Km.)
Total	**No.**	**63**	**55**

12.5.2.4 '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. The status for FY 2024-25 is as under:

Grant of Consent to Operate (CTO)- Offshore	Unit	2023-24	2024-25
Fixed offshore Installation	No.	04	02
Mobile offshore Installation	No.	15	04
Total	**No.**	**19**	**06**

12.5.2.5 Revision of OISD Safety Standards: OISD develops Standards for the oil and gas industry through a participative process involving all the stakeholders by leveraging the experience of the committee members and referring to international standards. These standards cover design safety, asset integrity and best operating practices in the various facets of Oil &Gas industry. OISD standards are reviewed periodically to ascertain the needs of developing new standards, updating/ amending existing standards to incorporate the latest technological developments as well as current experiences on the ground.

OISD has developed 109 technical safety standards for the oil & gas Industry. 23 of these standards are included in the statutory provisions of the Petroleum Rules, 2002, the Gas Cylinder Rules, 2016, the Static & Mobile Pressure Vessels (Unfired), Rules, 2016, Oil Miners regulations (OMR), 2017 and PNGRB Regulations.

12 OISD standards after revision and one new standard on 'Hydrogen safety' were approved by 41st Safety Council on 21st May'24 and released for the industry. Also, 11 Nos. of OISD standards were withdrawn due to the merging of standards for ease of implementation by industry.

12.5.2.6 Training/Technical Seminars/ Conferences/Workshops: Training/ Technical Seminars/Conferences/ Workshops for the Oil & Gas industry are conducted by OISD to discuss the latest technological developments, case studies etc.

OISD conducted 11 nos. of 'Internal auditor training', 12 nos. of Suraksha Samwad, one Safety Conclave and other trainings, workshops during FY 2024-25. A total of 5132 participants attended these programs.

Certification training for Internal Auditors started by OISD during FY 2024-25 to enhance 'Auditing Skills' of industry executives. 11 such trainings were held during FY 2024-25. Total 252 internal auditors were trained of various oil and gas industries.

During FY 2024-25, OISD organized 12 nos. 'Suraksha Samwad' webinars covering 4270 participants on various topics including case studies of accidents investigated by OISD, international case studies, best practices, and salient features of revised OISD standards etc.

OISD organized 2nd Safety Conclave in association with BPCL at Goa on 23rd to 24th Oct.'24 which was attended by 140 delegates from 18 companies.

OISD in association with IIT (ISM), Dhanbad organized workshop on 'Safety in Oil and Gas Industry'. A workshop on 'P&NG Rules' was also organized at ONGC, Mumbai.

5 nos. of internal Gyan Sajha sessions were organized for OISD executives and 2 nos. of Suraksha Chetna magazine were published during 2024-25.

12.5.2.7 The Safety Council: Safety Council, the Apex body on safety, reviewed the safety performance in 41st meeting of the Council, on 21st May'24 under the chairmanship of Secretary PNG. Key issues approved and/ or deliberated during the meeting are as under:

- Major activities of OISD undertaken in 2023-24 & activity plan for 2024-25
- Review of compliance status of OISD

safety audit recommendations pending for more than two years and area of concern thereof.

- Approval of 12 revised & one new OISD standard and withdrawal of 11 standards.
- Compliance to the recommendations of HLC related to Baghjan blowout incident in Assam.
- Compliance to the recommendations of HLC related to cyclone Tauktae incident.
- Approval of user charges for Internal Auditor training.
- Ratification of Revised Budget Estimate for FY 23-24 and Budget Estimate for FY 24-25.
- Budget vis-à-vis actual expenditure for FY 2023-24.
- Adoption of the annual audited accounts of OISD for FY 2023-24.
- Appointment of Auditor for FY 2024-25, 2025-26 and 2026-27 (Three Years)
- Approval for engaging Rajbhasha Adhikari for 3 years effective May 2025.
- Accident/Incident analysis.

12.5.2.8 Incident investigation & analysis: OISD investigates major incidents to analyse root cause(s) of the incident. A databank of major incidents of the oil & gas industry is maintained and analysed to assess trends, areas of concern and required corrective action. These are then disseminated to the industry through periodical bulletins 'Suraksha Chetna'; Safety Alerts and Case Studies; Seminars and Workshops.

During FY 2024-25, 19 major incidents have been investigated by OISD and reports have been issued giving root cause analysis and recommendations. OISD uploaded 8 Safety Alerts and 17 Case Studies on OISD website for the oil and gas industry.

12.5.3 Directorate General of Hydrocarbons (DGH):

Directorate General of Hydrocarbons (DGH) was set up on 8th April, 1993 with an objective to promote sound management of the Indian petroleum and natural gas resources having a balanced regard for the environment, and technological and economic aspects of the petroleum activity. The role and functions of DGH are inter-alia as under:

- A nodal agency for implementation of Exploration and Production activities on behalf of the Ministry of Petroleum & Natural Gas.
- To advise Ministry of Petroleum & Natural Gas on Exploration Strategies & Production Policies.
- To provide technical advice to the Ministry of Petroleum and Natural Gas on issues relevant to the exploration and optimal exploitation of hydrocarbons in the country.
- To review the exploration programs of companies operating under Petroleum Exploration Licenses granted under the Oilfields (Regulation and Development) Act, 1948 and the Petroleum and Natural Gas Rules, 1959 to advise the Government on the adequacy of these programs.
- 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 the 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 to 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 the Government in Contract management functions.
- Exploration & Development of unconventional hydrocarbon resources like Gas Hydrate, Shale Gas/Oil and Oil Shale.

12.5.3.1 Government Initiatives in India's E&P Sector:

The Government has opened up the E&P sector to a wider range of players, including small and new entrants, through initiatives like the Discovered Small Field (DSF) Policy, Coal Bed Methane (CBM) Policy, and Hydrocarbon Exploration Licensing Policy (HELP) etc.

Increased exploration activities play a crucial role in boosting the chances of discovering new hydrocarbon reserves, thereby enhancing production capabilities. By venturing into previously unexplored or underexplored regions the likelihood of finding significant oil and gas deposits increases. This not only contributes to the growth of the E&P industry but also helps in meeting the country's energy demands more effectively. To accelerate the exploration activities in the country, Government had launched OALP Bid Round-IX on 3rd January 2024 offering 28 Blocks with an area of around 1,36,596 sq.km. for Exploration and Development through International Competitive Bidding. A total of 9 (nine) Onland Blocks, 8 (eight) Shallow-Water Blocks and 11 (eleven) Ultra Deep-Water Blocks were on offer. The bidding was closed for OALP bid round IX on 21st September 2024 and 60 bids were received. A total of Seven (7) bidders including three (3) public and four (4) private parties participated in the Bid Round. Bid Evaluation has been completed and blocks will be awarded soon. It is expected to significantly boost exploration activities in the country.

In a significant move to expand India's Exploration & Production (E&P) acreage, the Hon'ble Minister MoPNG launched the OALP-X bidding round at the India Energy Week Summit 2025 in New Delhi on February 11, 2025. This round offers 25 blocks across 13 sedimentary basins, totaling 1,91,986.21 sq.km, with a strong offshore focus (19 blocks covering 1,75,115 sq. km) alongside 6 onland blocks (16,871 sq. km). Moreover, notably, 16 blocks, accounting for 97,919.6 sq. km. (51%) fall within areas previously designated as "No-Go" zones.

Additionally, for OALP Round X, a new e-bidding portal has been introduced to enhance transparency and security, along with features designed to improve ease of doing business for investors.

Government incentives such as tax holiday, no revenue for Category-II & III basis will make domestic production more viable and cost effective. Streamlined regulations and a single license system under HELP reduce delays and fast track the monetization of discoveries.

Early Monetization scheme will help in monetization of discovery in advance and will increase the domestic oil and gas production.

Further ER (Enhanced Recovery) Policy will encourage the use of enhanced oil recovery (EOR) and improved oil recovery (IOR) techniques to maximize recovery from existing fields.

Release of about 1 Million sq. km. 'No-Go' area in offshore which were blocked for exploration for decades. In these erstwhile 'No-Go' area, after the release now, so far (including awarded, to be awarded and under expression of interests received areas) for 1,62,389 sq. km. area. Two gas discoveries have also been made by ONGC in Mahanadi offshore recently in a block having 94% area in 'No-Go' area. Andaman offshore area has also been opened for exploration and production activities after a long time. Till now, 14 hydrocarbon discoveries have been made in blocks awarded under OALP out of which one discovery (Jaya) in Gujarat is already producing natural gas @0.48 MMSCMD and condensate @780 BBL/Day while other discoveries are under appraisal.

The government is spending about ₹7500 Cr. for acquisition of seismic data in onland and offshore areas and drilling of stratigraphic wells to make quality data of Indian Sedimentary Basins available to bidders.

The Mission Anveshan Project for acquisition of 2D Seismic data of 20,000 LKM in on-land and Extended Continental Shelf Survey for acquiring 30,000 LKM seismic data in offshore beyond Exclusive Economic Zone (EEZ) of India have already been started and are under progress.

12.5.3.2 Initiatives for Ease of Doing Business: The Government has prioritized the ease of doing business in the Exploration and Production (E&P) sector, with the goal of boosting investment and production. The simplification of procedures and processes results in a more transparent and efficient system, which encourages investment in the sector.

In the era of digital revolution, the government is striving to enhance process efficiency and improve the delivery of government services. A range of measures have been implemented to simplify and digitize the processes throughout the E&P sector's value chain. DGH, under the Ministry of Petroleum and Natural Gas (MoPNG), has taken numerous steps including the 'Self-Certification'. This allows for major processes/approvals to be granted swiftly based on self-certification. A variety of applications and systems such as Production Sharing Contract Management System, Petroleum Exploration Lease/Petroleum Mining Lease Data Management System, Production Database Management System, E-bidding portal etc. have also been launched. These tools assist operators with smooth operations, transparent contract management, expedited approval & clearance grants, and engagement with potential investors.

12.5.4 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

a) Performance Benchmarking of Refineries, Petrochemicals and Pipelines.

b) Performance Improvement in Refineries through Best Practices, Special Studies, Operational Improvement and Process Technology.

c) Energy Efficiency Improvement in Downstream Hydrocarbon Sector.

d) Petroleum Product Quality Improvement.

e) Integration with Alternative Energies and New Initiatives in Downstream Sector for Future Sustainability.

f) Promoting Innovations and R&D in Downstream Hydrocarbon Sector including Hydrogen Research. Co-ordination of activities of Scientific Advisory Committee (SAC) on Hydrocarbons of MoP&NG.

g) Development of import substitute fuels, chemicals and catalysts.

h) Nodal agency for implementation of PM JI-VAN Yojana and SIGHT-2B.

i) Nodal agency for scheme for Financial assistance to Compressed Bio Gas (CBG) producers for procurement of biomass aggregation machinery (BAM).

j) Nodal agency for Implementation of Direct Pipeline Infrastructure (DPI) scheme for CBG promotion.

k) Nodal agency to examine proposals (pertaining to upstream as well as midstream/downstream Oil PSU) received from DPIIT regarding registration of bidders from a country sharing land border with India and furnish comments/recommendations.

l) Review and Recommendation of GTEs applications put up by refineries for approval by MoPNG.

m) Sharing of Best Practices and Information & Knowledge Dissemination.

12.5.4.1 Performance Benchmarking:

1) **Refinery Benchmarking:** Performance Benchmarking of PSU refineries are undertaken regularly by CHT through M/s Solomon Associates (SA), USA. Refineries have entered into a long-term agreement with Solomon for carrying out benchmarking every 2 years to identify various areas of improvement. Performance Benchmarking of PSU refineries for the Study Cycle 2020 and 2022 have been completed. Refinery Performance benchmarking study for the cycle 2024 is in progress. The first milestone of study i.e., Data Coordinator Seminar was completed in Oct'24.

2) **Pipeline Benchmarking:** Performance Benchmarking Study for Pipelines (Liquid, Gas, LPG and SPMs) cycle, initiated for the first time for 2020 cycle and the study for 2022 cycle is completed. Outcome of study has been shared with participating industries.

3) **Petrochemical Benchmarking:** Global Tendering Activities for Petrochemical (Cracker and Polymer) benchmarking units is in progress.

12.5.4.2 Refinery Performance Improvement:

With a view to improve the performance of the Indian refineries to match the global best refineries, various initiatives targeting Energy Efficiency Improvement, Operational availability, OpeX reduction, etc, are in progress have been taken up as detailed below:

1) **PAT (Perform, Achieve and Trade):** The energy reduction Target for refining sector in PAT cycle -2 was set at 5.49% equivalent to 1.01 Million Tonnes of Oil Equivalent (TOE). Against this, the actual energy reduction of 8.05%, equivalent to 1.48 Million TOE was achieved. For the current PAT cycle-6 (2020-21 to 2022-23), the sectoral energy reduction Target of 5.49% has been retained, which is equivalent to energy saving target of 1.17 Million TOE. The targets achieved by the refineries under PAT cycle-6 are under validation process by Bureau of Energy Efficiency (BEE).

2) **Mission Q1 by 2030 in PSU refineries:** A Roadmap on specific energy consumption for PSU Refineries has been prepared for improvement

in energy consumption to bring all refineries in Quartile 1 (Q-1) of Solomon Benchmarking. The target is also aligned with India's NDC (Nationally Determined Contributions) of 45% reduction in Specific Energy Consumption by 2030 over the base year of 2005.

3) **Annual audit on furnace efficiency and steam leaks:** In order to improve energy efficiency and reduce energy consumption, CHT, in association with refineries, organizes Surveys every year in the areas of i) Furnace/Boiler Efficiency and ii) Steam leak. These two areas are taken-up every alternate year. Survey in the area of Furnace/ Boiler Efficiency was conducted during January, 2023 and steam leak survey in all refineries was conducted in January, 2024. Further, Furnace Efficiency/ Boiler survey for the year 2025 was conducted in February 2025.

4) **Development of Water Consumption Norms and Reduction of Water Footprint for Refineries:** A savings of 2369 m^3/hr of water consumption has been achieved against a target of 2901 m^3/hr in 2019-2022. For further reduction of water consumption by 3435 m^3/hr by 2025 is in progress.

5) **Refinery Performance Improvement Programme (RPIP) of PSU Refineries:** CHT coordinated finalisation of refinery wise global consultant for carrying out Refinery performance improvement study. The aim of the study is to ensure yield and energy optimization in the refineries. In first phase, the programme has been undertaken in the 7 refineries (HPCL -Mumbai and Visakh, BPCL-Mumbai and Kochi, IOCL-Panipat, Paradip and Mathura). The phase one has been completed in 2024 by all 7 refineries. The total realised benefits from the study is for ₹1080 Cr.

The Phase-II study for the remaining 8 refineries (IOCL-Barauni, Gujarat, Haldia, Bongaigaon, Guwahati, Digboi, CPCL-Manali and NRL) shall be taken up by Individual refineries. Tendering of phase-II study is in progress.

6) **2.6 Strategic Intervention for Green Hydrogen Transition (SIGHT-2B):** SIGHT 2B is a scheme launched by the Ministry of New and Renewable Energy (MNRE) in India as part of their Strategic Interventions for Green Hydrogen Transition (SIGHT) program. It aims to promote the production of green hydrogen by providing financial incentives to manufacturers.

Under the SIGHT 2B scheme, the implementation agency/agencies shall aggregate demand and call for bids for the production and supply of Green Hydrogen at the lowest cost for a single refinery or multiple refineries. Tranche I of Mode 2B offers a bidding capacity of 200,000 Metric Tons per annum. MNRE vide its letter dated 16th January 2024 notified that the Scheme under Mode 2B will be implemented by the Oil & Gas companies and the Centre for High Technology (CHT). CHT will be responsible for providing secretarial, managerial and implementation support and carrying out other responsibilities as assigned by MoPNG from time to time. Responsibilities of CHT include-

a. Examination of beneficiaries' claims for incentive disbursement.

b. Verifying and reconciliation of disbursement claims with prescribed documents.

c. Compilation of data regarding the progress and performance of the scheme through Quarterly Review Reports and other documents.

d. CHT will submit quarterly progress reports to MNRE through MoP&NG, including details of claims received for incentive disbursement, amounts disbursed, and reasons for delay in disbursement of incentives, if any.

Scheme Incentives: The incentive will be ₹50/kg of Green Hydrogen in the first year of production and supply, ₹40/kg during the second year of production and supply, and ₹30/kg during the third year of production and supply.

12.5.4.3 Promotion of innovation and development of Indigenous Technology: CHT co-ordinates for the activities of Scientific Advisory Committee (SAC) on Hydrocarbons of MOP&NG in identifying and funding of research projects for downstream hydrocarbon sector including projects of National importance and facilitating the energy transition.

Hydrogen Research: CHT has funded various projects for production of hydrogen from different pathways, development and demonstration of fuel cell buses in tie- up with vehicle manufacturer as well as transport operators, storage and dispensing of hydrogen, production of HCNG and demonstration of HCNG fuelled buses in Delhi.

12.5.4.4 Implementation of PM JIVAN Yojana: Pradhan Mantri JI-VAN Yojana was announced in March, 2019 for promotion of 2G ethanol technologies and to support rural economy. The financial outlay of the scheme is ₹1969.5 Crores. CHT has been appointed as the Nodal agency for the implementation of the Scheme. Steering Committee of CHT for PM JI-VAN Yojana, approved financial assistance for 6 commercial projects and 4 demonstration projects. The scheme has been amended in August 2024 to widen the scope with respect to feedstock and product. Bolt-on plants are also been promoted now. Validity of the scheme has been extended to March 2029. RFS will be issued for remaining 6 Commercial and 6 Demonstration advanced biofuel projects.

12.5.4.5 Financial assistance to Compressed Bio Gas (CBG) producers for procurement of Biomass Aggregation Machinery (BAM): Government of India vide notification F. No. L-16020/02/2023-GP-1 (E-45833), dated 2nd Feb'24 has approved the Scheme for providing financial assistance to Compressed Bio Gas (CBG) Producers for procurement of biomass aggregation machinery to support collection of biomass with a total financial outlay of ₹564.75 crore for the period of FY 2023-24 to FY 2026-27. CHT has been appointed as the Project Monitoring Agency (PMA) for the scheme. CHT has developed a dedicated portal for implementation of the Scheme. The application under the scheme can be submitted w.e.f. 1st Apr'24.

12.5.4.6 Processing & Recommending Global Tender Enquiry Proposals to MoP&NG: Purchase of import items through GTE under Rule 161 (iv) of General Financial Rules (GFRs) 2017 up to ₹200 Cr is allowed only after obtaining necessary approval from competent authority (Cabinet secretariat/Administrative Ministry).

In this regard, CHT has been entrusted to examine and technically recommend the proposals pertaining to Downstream and Midstream sector before submitting to the concerned administrative division of the ministry. During the financial year 2024-2025, a total of 103 proposals (88 exempted and 15 non-exempted) have been processed till March 2025.

12.5.4.7 Activities transferred From PCRA to CHT: Post dissolution of PCRA, nine R&D projects which were transferred to CHT have been completed/closed.

12.5.4.8 DPIIT Proposals Regarding registration of bidders from a country sharing land border with India: CHT has been assigned to examine proposals on Industry basis as received from

Department for Promotion of Industries and Internal Trade (DPIIT), regarding registration of the bidders from a country sharing land border with India and furnish is comments/ recommendations. Recommendations provided for 16 out of 18 proposals based on inputs received from industries.

12.5.4.9 Energy Technology Meet (ETM): The 27th ETM formerly known as Refining & Petrochemicals Technology Meet (RPTM) was organized along with at Benguluru, during 12th to 14th November, 2024. The theme of the Meet was kept as "Green Energy Horizons: Advancing Sustainable Refining and Petrochemicals". The event had presentation of 68 oral papers including 58 by foreign speakers spread over 15 Technical Sessions, Panel discussion and 60 Digital papers in Poster Sessions along with 28 Exhibition Stalls. and was attended by more than 1250 delegates/invitees from India and abroad.

12.5.4.10 Activity Committee Meetings (ACM)/ webinars: With the aim of sharing of best operational practices & improvements and dissemination of information on latest developments, CHT organized 9 Nos. of ACMs and webinars in critical areas/technologies in refining sector and pipelines operations. Workshop on Net Zero and Turnaround management also conducted during the year. These meets are attended by large number of participants from the industry, licensors and suppliers.

12.5.4.11 Awards: CHT is actively associated with the following Annual Awards instituted by Ministry of Petroleum & Natural Gas, Government of India

- Best Performing Refinery Award
- Highest reduction in specific carbon emission award
- Innovation Awards in R&D

12.5.5 Rajiv Gandhi Institute of Petroleum Technology (RGIPT):

An Institution of National Importance established by an Act of Parliament and co-promoted by India's leading Public Sector Oil Companies and the Oil Industry Development Board. RGIPT was envisioned as a specialized energy domain institute to drive excellence in education, research, and innovation across the petroleum and energy sectors. Since its foundation in 2008, RGIPT has remained steadfast in its commitment to providing cutting-edge education and high-impact research aligned with the evolving demands of the energy ecosystem—both in upstream and downstream segments. Through rigorous academic programs and translational research initiatives, the Institute nurtures globally competent engineers, technologists, and thought leaders capable of driving sustainable and affordable energy solutions. Our programs span undergraduate, postgraduate, doctoral, and executive education, with a focus on Petroleum Science, Engineering, and Energy Management.

RGIPT has 78 faculty members at Jais Campus, 09 at Energy Institute Bengaluru, and 24 at Assam Energy Institute. RGIPT recently recruited 14 new faculty members at RGIPT, Jais to strengthen the academic and research activity of the institute. The faculty members were appointed across all the departments of RGIPT and have their academic credentials from top institutions.

12.5.5.1 New Academic Programmes: The institute introduced two B. Tech. Programmes during Academic Session 2024-25 namely B. Tech in Chemical Engineering (Major: Petrochemical & Polymers Engineering) & B. Tech. in Petroleum Engineering (Major: Applied Petroleum Geoscience).

12.5.5.2 National Institute Ranking Framework and Best Emerging University (Public category) award from FICCI: RGIPT has secured 80th rank in the Engineering Category in NIRF 2024. RGIPT has maintained its rank stature and is ahead of many other institutions of national importance. The institute has also been honoured with the prestigious "Best Emerging University with Special Jury Recognition" award at the prestigious FICCI Higher Education Excellence Awards 2024. This accolade recognizes RGIPT's exceptional contributions to higher education through innovation, research, and academic excellence, positioning as a leader among emerging universities in India.

12.5.5.3 Research & Development: The Institute has executed 63 Extramural Projects worth ₹2500 Crore funded by both industrial and government funding agencies. The faculty members published more than 300 articles in journals of international repute for the period of last one year. To nurture and promote the environment of Innovation and Research amongst the Undergraduate Students, the Institute initiated the Undergraduate Research Fellowships (URF) scheme, a monthly fellowship of ₹3,000. UG students who work with the faculty on industry relevant research problems shall be awarded with these fellowships. URF will be for two years but renewed at the end of one year.

12.5.5.4 Memorandum of Understandings (MoUs): The institute (RGIPT) signed a MoU with NASSCOM Foundation to promote new innovations and improving digital skills of students to support IT Industry and IT-enabled services. HAL and RGIPT inked an MoU aims to evolve a mutually productive framework for collaboration between the two giants to spur design and development of indigenous solutions in the domain of avionics-based AI/ML, software engineering, IoT, control engineering, communication engineering including optoelectronics. The institute signed MoUs with IIT Patna and Kyushu Institute of Technology (Kyutech) in Japan for both academic and research collaboration.

12.5.5.5 End-to-End H_2 Energy Lab: The Institute (RGIPT) and Company (Yokogawa Technology Solutions India Pvt Ltd.) inked an MoU to jointly setup a leading Centre of Excellence (CoE) at the Energy Institute Bengaluru, a centre of RGIPT and a world class facility that develops end to end future autonomous total energy solution powered by off grid solar PV system for green alternate energy generation, storage, transportation and utilization for power generation and mobility application suited to the Indian context.

12.5.5.6 Industrial Ph.D. Research Fellowships: RGIPT signed MoUs with BPCL and CPCL separately to collaborate for the promotion of education of efficient human resources, research, and innovation, under which it has been agreed by the parties to give opportunities to the CSIR-NET and/or GATE-qualified students to pursue their PhD under the joint supervision of RGIPT and BPCL/CPCL officials on the topics of mutual interests under BPCL-RGIPT Research Fellowships (3 Nos) and CPCL-RGIPT Fellowships (2 Nos.). The participating industries provide an additional 25% higher fellowship amount (Top- up amount) along with the regular fellowships.

12.5.5.7 RGIPT Innovation & Incubation Foundation (RGIPT IIF): RGIPT IIF secured a project entitled "Innovation and Entrepreneurship in Energy, Healthcare, and Agriculture Sectors for Sustainable Development of India" from the Department of Science and Technology (DST) Government of India. The project aims to set up an Inclusive Technology Business Incubator (i-TBI)

at RGIPT. The National Expert Advisory Committee has recommended that the project is to be considered for support under NIDHI i-TBI program. The committee has sanctioned a provisional budget of ₹5 Crore and recommended "Energy, Clean Fuel, Healthcare, Agriculture" as the primary thrust area for the proposed i-TBI.

12.5.5.8 Udaan: Udaan is a Business Plan Competition (BPC) that aims to stimulate the people of Amethi and nearby districts to come forward with their innovative ideas. The competition provides an opportunity to conceptualize and work on plans to shape interesting business models generating innovative products or services. This year 87 proposals were received and after several rounds of evaluations, 04 teams were selected and were awarded cash prizes of ₹25,000 (Winner Team) and ₹15,000 (Runner-up Team) along with a Certificate of Excellence.

12.5.5.9 Energy Institute, Bengaluru (Centre of RGIPT, Jais, Amethi): Energy Institute, Bengaluru (EIB), Centre of RGIPT Jais, is a distinguished academic and research centre to foster technology-driven academic and research programmes in the domain of energy. The has shifted to its permanent campus at Kambalipura, Hosakote, Bengaluru, Karnataka, India and commenced its academic functions and research activities since October 1, 2024. This marks a significant milestone in the Institute's growth and expansion. The centre aims to conduct leading-edge industrial, technological, and fundamental research in the field of energy; quality education to students; offer short-term training courses to Industrial professionals in the field of energy.

Academic Programmes: EIB currently offers two M. Tech programmes namely Renewable Energy and Electric Vehicle Technology along with Ph.D. programmes in the discipline of Electrical and Electronics Engineering, Material Science & Engineering and Computer Science and Engineering. Centre presently hosts a total 14 M. Tech. students and 14 Ph.D. students working in the field of Green Energy, Electric Vehicle Technology and in Digitization of Energy Systems. 7 students are expected to graduate in the convocation of 2024-25. Apart from the above, the Centre also hosts a total of 138 final UG students on RGIPT Jais campus of Computer Science and Engineering, Information Technology, Electronics Engineering, and Mathematics and Computing Department. They are pursuing their final year academics along with Internship as well as Training and Placement activities from Bangalore campus. All students are expected to graduate in the month of May 2025.

Curriculum based Laboratory and research facilities: There are two laboratories, namely the Renewable Energy Laboratory and Electric Vehicle Technology Laboratory established at the Permanent campus. The centre has research laboratories in the areas of Thermal energy storage system, Solar PV, Breath sensor development, Solar Cell, Hybrid Electric vehicles and Biogas.

Events conducted at EIB:

- A two-day symposium on Digitalization in Disruptive Technologies during 16th -17th April 2024 on the applications of Digitalization techniques in Energy Sector.
- A SERB sponsored two-day Workshop on Developments and Innovations in Solar PV/ Floating Solar with its applications in Green Hydrogen Production and EV during 16th-17th May 2024. This was aimed at the aspects of Solar PV, Green Hydrogen Production and EV Modelling.

Construction of EIB Campus: The Government of Karnataka has allotted 150 acres of land in Kambalipura, Hoskote for the construction of EIB campus. Boundary wall was completed. Phase-1 of the campus construction including the Academic block-a G+2 story building, a boys' hostel block (G+3) with a capacity of 150 beds, girls' hostel block (G+2) building of 126 beds, and a dining hall building along with other necessary infrastructure like roads, main Gate, street lights etc. have been completed and academic operations have started from the campus since October 2024. Another boys' hostel (G+4) and a portion of Girls hostel are under construction.

12.5.5.10 Assam Energy Institute (AEI), Sivasagar (Centre of RGIPT, Jais, Amethi): A state-of-the-art new campus is being developed on 100 acres of land to accommodate more than 500 students. Currently, the campus includes Academic building, Workshop Hall, lecture rooms, conference hall, sound systems in large capacity lecture halls and laboratories. Presently two hostels for boys and one hostel for girls are in operation. Another boy's hostel and girls' hostel are under construction. Further, the upcoming new academic block will add additional laboratories, library, conference room, computer labs. The faculty quarters are undergoing construction and the boundary walls with institute gate are near completion.

Academic Programmes: Assam Energy Institute (AEI), Sivasagar (Centre of RGIPT Jais, Amethi) presently has students enrolled in three-year diploma courses and IDD courses in Chemical Engineering, Computer Science Engineering, Electrical Engineering, Electronics and Instrumentation Engineering, Fire and Safety Engineering, Mechanical Engineering and Petroleum Engineering. Admissions to all the diploma programmes are made at the beginning of the odd semester of each session, i.e. July-August each year. This academic year, the admission to Diploma was successfully completed with the joining of 310 students in all the seven streams. The institute has 577 students at undergraduate level and 18 students at Ph.D. level, making a total count of 595 students at AEIS.

Construction works at AEI: To facilitate the accommodation of more students to stay on campus, a new boys' hostel in G+4 with 192 student capacity as well as a girl's hostel in G+4 with 100 student capacity is being constructed. Once complete, the total on-campus students' accommodation capacity will be 504 for boys in three hostels and 190 for girls in two hostels. The institute's new academic building of G+1 will cater to the proper infrastructure for each of its domains, helping the institute to conduct its undergraduate classes in large capacity classrooms and laboratories in a much more efficient way. It will also have rooms for faculty offices, a library, conference room, computer lab etc. The construction of the ground floor is completed, and the first floor is under progress.

Foundation Stone Laying of CBG Plant: Hon'ble PM of India virtually laid the foundation stone for the CBG plant on October 02, 2024, in the premise of AEI Sivasagar. OIL and AEI-RGIPT signed a MoU to collaborate with each other in setting up of a CBG plant under Sustainable Alternative Towards Affordable Transportation (SATAT) scheme, providing technical and administrative support and Research & Development initiatives within the realm of Biogas and its derivatives. Assigned MoU, OIL commits to establishing a state-of-the-art CBG plant at the Assam Energy Institute (AEI) in Sivasagar, a centre of

RGIPT. The plant will be also equipped with modern technology to produce Compressed Biogas (CBG).

12.5.6 Indian Institute of Petroleum & Energy (IIPE):

The Government of India has established the Indian Institute of Petroleum and Energy (IIPE), a domain specific Institute, under the aegis of the Ministry of Petroleum and Natural Gas (MoPNG) in the year 2016 in Visakhapatnam, as per provisions made in the Andhra Pradesh Reorganisation Act, 2014. The Indian Institute of Petroleum and Energy Act, 2017 enacted by the Parliament declared it as an 'Institution of National Importance'. The main objective for establishing this Institute is to meet the quantitative and qualitative gap in the supply of skilled engineers for the petroleum and energy sectors and to promote research activities needed for the growth of these sectors.

Programs/ Courses: IIPE is offering 4-year B.Tech Programs in Petroleum Engineering, Chemical Engineering and Mechanical Engineering in addition to M.Sc in Applied Geology, Web-based M.Tech. in Data Science & Machine Learning and Ph.D. As of 31.03.2025, a total of 468 students are pursuing various courses in the Institute which includes 105 Ph.D. Research Scholars, of which 41 are industry-sponsored candidates. The Institute has initiated the other key academic activities like International Electives, Global Internship Program, B.Tech-MS Programme with University of Houston, USA and Joint B.Tech. - MBA with IIM Visakhapatnam.

Placements: As on 31.03.2025, B.Tech. Placement rate is 87.87% for the Academic year 2024-25 and the placement are going on for the remaining eligible students' of 2025 batch. A total of 26 companies conducted on-campus/off-campus interviews to the students and the highest CTC so far, during this year is 25.57 LPA.

Research & Development: As on 31.03.2025 the Institute held 26 ongoing research projects with a total outlay of ₹53.03 Crore including a research project from NTPC for installing a Green Hydrogen Plant for 1 TPD hydrogen generation from sea water. During the Academic Year 2024-25, 06 projects were sanctioned with an amount of ₹1.94 Crore. In 2024, a total of 44 publications were made as research articles, Book Chapters, Books, and Conference Papers by the faculty members.

Patents: During the year 2024-25, 02 patents titled 'A Biochar-Ceria Nanocomposite composition for enhanced oil recovery' vide application No. 202141057434; and 'Bamboo-derived Nickle Oxide Nanoparticles and a process for the preparation thereof' vide application No. 202441097538 have been filed. 01 design Patent for innovative 'Flat Plate Heat Sink' vide application No. 413189-001 has been granted.

12.5.6.1 Workshops & Seminars:

i. Indo-US Workshop: The Institute in collaboration with Stony Brook University, New York, organized the Indo-US Workshop on Hydrogen and Global Decarbonization from 21st – 23rd May, 2024.

ii. Indo-Polish Workshop: The Institute jointly with the Gdańsk University of Technology, Poland, organised a workshop on "Electronic Structure Calculations and Visualisation with Molecular Nodes" during 30th July - 3rd August, 2024.

iii. High-End Workshop under Accelerate Vigyan Scheme for Karyashala sponsored by the SERB-DST, on topic titled 'Exploring Magnetotelluric Data Insights: Workshop on Data

Preparation, Analysis, Processing, and 3D Inversion Strategies' during the period from 01st-07th July, 2024.

iv. High-End Workshop under Accelerate Vigyan Scheme for Karyashala sponsored by the SERB-DST on the topic titled 'Reservoir Simulation for CO_2 Sequestration' during the period from 08th-14th July, 2024.

v. A certification course on 'Carbon Capture and Utilization' for 12 weeks from 02.11.2024.

vi. Industry-Academia Conclave 2024: Connecting Academia and Industry for a Sustainable World on 28th November, 2024.

vii. A workshop on 'Corrosion Prevention and Remediation Strategies', during 11th-13th December, 2024.

viii. A workshop on 'National Centre for Mathematics (NCM), Advanced Training in Mathematics (ATM) School on Numerical Methods for Partial Differential Equations (NMPDE)', from 16th-27th December, 2024.

ix. A workshop on 'Immersion Program on Recent Advances in Petroleum Engineering' from 20th December 2024 -02nd January, 2025.

x. The Institute organized Local College and Schools-Students Fellowship Program (LCS-SFP) & College and School Teachers' Education and Academic Mentoring (CS-TEAM) programs during December, 2025 to provide training to school children and teachers in line with JIGYASA scheme launched by the Government of India.

xi. A workshop on 'Harnessing Computational Fluid Dynamics in the Energy Sector: Techniques and Applications (H-CFD-2025)', during 23rd-25th January 2025.

xii. Institute hosted a one-day workshop "Samavesha (Episode-10)" on 11.02.2025 in collaboration with I-STEM for familiarising on the usage of I-STEM portal for Scholars and faculty members of the colleges & universities in Visakhapatnam and surrounding Districts. IIPE will be the Satellite Campus of I- STEM.

xiii. A Workshop on 'Crystallization Systems Engineering' during 18th-20th February 2025

xiv. A GIAN Course with International Coordinator Prof. Vahid Vatanpour, Istanbul Technical Institute, on 'Next generation Composite Membranes for Hydrogen Energy and Environmental Application' during 03rd-08th March, 2025.

xv. A GIAN Course on 'Absorption Techniques for CO_2 Capture: Modelling and Simulation Insights' with International Coordinator Prof. Debangsu Bhattacharyya of WestVirginia University, USA is scheduled from 24th-28th March, 2025.

12.5.6.2 Awards: Prof. Shalivahan was conferred with Society of Exploration Geophysicists USA as South and East Asia Honorary Lecturer for Q1/Q2 2024. IIPE has been conferred with the Energy Excellence award (outstanding Achievement in Education 2025) by CHEMTECH Foundation, recognising the Institute's commitment towards academic excellence.

12.5.6.3 Permanent Campus: The Government of Andhra Pradesh allotted the land to an extent of 201.80 acres, at free of cost, at Vangali Village, Sabbavaram Mandal, Anakapalli District (Earlier Visakhapatnam District) for construction of permanent campus for IIPE. The Govt. of Andhra Pradesh has transferred the alienated land on the name of the Institute in the month of March, 2023. The Government of India made the allocation of ₹655.46 crores for setting up of the permanent campus of the Institute.

The Boundary Wall around the alienated land was completed by the Andhra Pradesh Industrial Infrastructure Limited (APIIC). The work for construction of buildings

in the permanent campus has been entrusted to the Central Public Works Department (CPWD). The construction activities of Eastern Academic Block, Boys Hostels (02 Nos.), Guest House, Mess & Dining Hall, E&M Workshop and Staff Quarters are under progress.

An overall 53% of the construction activities have been completed in the permanent campus as on 31.03.2025. The expected date of completion of construction activities is August, 2025 excluding one building.

12.5.6.4 Manpower & Women Employees: IIPE has 34 faculty members, including 04 visiting faculty members & 17 Non-Teaching Staff on regular basis, of which 07 are women employees.

12.5.6.5 Future Plan: The Institute is planned to shift to the permanent campus by the start of the ensuing academic year 2025-26, starting from July, 2025. The Institute is going to start B.Tech Program in Mathematics & Computing for Nationals and the M.Tech Program in Petroleum Engineering for foreign nationals and sponsored candidates from the academic year 2025-26.

12.5.7 Petroleum Panning & Analysis Cell (PPAC):

Petroleum Planning & Analysis Cell (PPAC) was established as an attached office of MoP&NG w.e.f. 1st April 2002 after abolition of the erstwhile Oil Coordination Committee (OCC). Secretary, P&NG chair PPAC's Governing Body (GB) and has senior officials of MoP&NG and Chief Executives of major oil and gas PSUs as members. The GB provides necessary supervision and guidelines for the functioning of PPAC. PPAC discharges the following functions:

a. Maintenance of a database on the Oil and Gas Sector

b. Analysing trends in the international oil market & domestic prices

c. POL demand forecasting

d. Conducting studies in the Oil & Gas and Energy Sector

e. Forecasting and evaluation of petroleum import and export trends

f. To provide inputs to the Government, particularly on the pricing of petroleum products and the administration of subsidy schemes, including PMUY

g. Determination & notification of APM price for natural gas and HT HP Gas price ceilings on a six-monthly basis as per Government guidelines

12.5.7.1 Important Database and dissemination of regular MIS Reports on oil and gas sector: PPAC maintains data related to production, consumption, import and export of crude and petroleum products and oil infrastructure. It also maintains data related to production of natural gas, import of LNG and consumption of natural gas and on the CGD sector. Under the mandate of PPAC, many daily, fortnightly, monthly, six-monthly and annual reports are published on PPAC's website http://ppac.gov.in as well as on the mobile app "PPACE" available on Google Play store. These reports pertain to daily prices of crude oil and petroleum products, Consumption of POL products and Industry Sales Review, LPG Sales, crude oil processing and production, POL products imports & exports, consumption and import of Natural Gas etc. Besides the regular Reports and inputs on Petroleum products, PPAC also carries out many studies on the Demand, Supply, Transportation and Pricing of MS, HSD, LPG, Gas etc. The Reports by the PPAC assist the Policy makers, researchers, students and academics alike.

12.5.7.2 Important Activities: Some of the important activities during 2024-25 undertaken by PPAC were as follows:

(a) **Energy Demand Projections Model (EDPM):** As part of the 'Demand for Petroleum Products' subgroup under the Working Group on Enhancing Refining Capacity by 2040, the Petroleum Planning & Analysis Cell (PPAC) had developed long-term projections for petroleum product consumption across six key end-use sectors-transport, cooking, industry, agriculture, telecom, and buildings. These projections were modeled under three scenarios-Baseline, Transition, and Transformation-reflecting varying levels of energy transition, along with an Optimum scenario that combined elements of all three to capture the most probable sectoral shifts over time. The model, initially based on 2020, was updated to 2022 and recalibrated in line with India's evolving energy policies, projecting demand from 2022 to 2047 in five-year intervals. These projections formed the basis for PPAC's draft report on future refining capacity requirements.

In line with this, the Inter-Ministerial Committee (IMC) for 'Preparation of Roadmap for Ethanol Blending beyond 2025' assigned PPAC the task of undertaking a fresh petrol demand projection for the next 5-7 years. Accordingly, PPAC conducted a detailed sectoral study using its Energy Demand Projection Model (EDPM), specifically focused on the passenger transport segment to assess Motor Spirit (MS) demand. The projections, extending up to 2032, included four scenario analyses, with the Optimum Scenario representing the most realistic and balanced projection, incorporating ethanol blending trends and anticipated transitions in the vehicle fuel mix.

(b) **Advancing Data and Policy Analytics in the Hydrocarbon Sector:** The vision of PPAC is to serve as the most authentic official source for data and policy analysis in India's hydrocarbon sector. It collects data from Oil Marketing Companies (OMCs), government departments, and ministries to generate analytical reports that support informed decision-making and policy formulation.

To enhance efficiency and accuracy, PPAC has adopted advanced technologies and methodologies, including the SAS Visual Analytics platform, which enables dynamic, visual reporting and faster insight generation. The entire process-from data collection and validation to storage and dissemination-has been standardized, ensuring access to clean, reliable data anytime, anywhere. Notably, API integration has been implemented, with three modules completed, accounting for 65% of total data capture, resulting in timely and streamlined data operations. Additionally, Standard Operating Procedures (SOPs) for crude and product code standardization have been introduced, aligning PPAC's data systems with international standards and enhancing overall data management and analytics capabilities.

12.5.7.3 Membership of various Study/ Working Groups for the Oil & Gas Sector: PPAC has been entrusted with several key studies and working groups across the Petroleum and Natural Gas sectors. The Natural Gas Production Cost Analysis, assigned by MoPNG and chaired by Director General-PPAC, compares production costs across Indian geographies with global benchmarks, examines international best practices, and assesses the NG demand-supply scenario up to 2035. In the LPG domain, Director General-PPAC served as Member Secretary in a study chaired by Additional Secretary-MoPNG on the adequacy of LPG storage, covering supply chain vulnerabilities, storage benchmarking, import diversification, and domestic

production enhancement. Director General-PPAC also chaired the CBG Pricing Sub-Group to recommend measures for strengthening the CBG ecosystem and reducing LNG import dependency.

12.5.8 Petroleum and Natural Gas Regulatory Board:

The Petroleum and Natural Gas Regulatory Board (PNGRB) was constituted under the PNGRB Act, 2006, notified via Gazette Notification dated 31 March, 2006. The Act provides for the establishment of PNGRB to protect the interests of consumers and entities engaged in specified activities relating to petroleum, petroleum products and natural gas and to promote competitive markets and for matters connected therewith or incidental thereto. The Board under the Act has to regulate the refining, processing, storage, transportation, distribution, marketing and sale of petroleum, petroleum products and natural gas excluding production of crude oil and natural gas so as to ensure uninterrupted and adequate supply of petroleum, petroleum products and natural gas in all parts of the country. The vision of PNGRB is as under:

"To create a vibrant energy market with rapid and orderly growth through facilitation of flow of investments into the basic infrastructure for efficient transportation and distribution of petroleum, petroleum products and natural gas at minimum cost and high level of protection of consumer interests through fair trade practices and competition amongst the entities so as to ensure the enhanced competitiveness of Indian economy and customer satisfaction"

PNGRB has authorised 34,233 Km Natural Gas Pipeline network across the country till 31st March, 2025. 25,429 Km pipelines are operational which includes Common Carrier Tie-in Connectivity, dedicated pipelines & sub transmission pipelines and the remaining are under construction.

PNGRB has also authorised 13,652.5 Km Petroleum and Petroleum Product Pipelines across the Country till 31st March, 2025, out of this 9,301 Km pipelines are operational and the remaining are under construction.

In order to expand the coverage of CGD Networks, PNGRB has granted authorization for 7 GAs under 12th and 12A CGD Bidding Round. So far 307 GAs have been authorised for development of CGD Network across the country. Providing Piped Natural Gas connections is part of the development of City Gas Distribution (CGD) Networks and the same is carried out by the entities authorized by PNGRB. As on 31st March, 2025, these entities have provided 1.50 Crore Domestic PNG connections and established 8,067 CNG Stations across the country.

PNGRB has created a Hydrogen-Cell and also engaged ICF to create detailed roadmap and action plan outlining steps to implement hydrogen infrastructure across key areas such as regulatory frameworks, technical standards, safety guidelines, and testing labs. PNGRB signed MOUs with American Society of Mechanical Engineers (ASME), American Petroleum Institute (API) and National Safety Council (NSC) to ensure alignment with global best practices and foster capacity building in the industry.

PNGRB organised a comprehensive knowledge sharing workshop in Guwahati, Assam to strengthen Technical and Safety aspects of City Gas Distribution Network in India.

PNGRB has conducted 1st Natural Gas infrastructure conclave at Vizag

in April 2024. The conclave covered detailed panel discussion on various on-going issues in Oil and Gas sector.

PNGRB has also notified amendments in T4S Regulations for City or Local Natural Gas Distribution Networks.

Captive pipelines: Over the past years, the Board has initiated the process for declaring multiple pipelines, alleged to be captive by entities, as common carrier or contract carrier, for facilitating greater access for multiple stakeholders, promoting competitive practices and ensuring that market demands are met more efficiently. By allowing common carrier capacity access, it would avoid unnecessary investments and redundancies, streamline operations, and eliminate that reliance on less efficient modes of transport, such as road and rail. This, in turn, would enhance market responsiveness, reduce transportation costs, and support a more balanced supply chain across the region.

12.5.9 Indian Strategic Petroleum Reserves Limited:

Government of India (GoI) in the interest of meeting the strategic objective of country's energy security, decided on 7th January 2004 to construct Strategic Petroleum Reserves (SPRs) facilities. As India is heavily dependent on import of crude oil to support the economic activities and growth and to meet the energy needs of its citizens, these SPRs would serve as buffer to deal with any situation of supply chain disruptions, especially due to external reasons. Such emergency reserves would enable the country to keep its refineries fed with crude oil even in the face of disruption of crude oil imports and ensure uninterrupted supplies of petroleum products across the country. In exceptional circumstances, the buffer stock of crude oil could be used to partially absorb an abnormal spike in the global oil prices.

To implement the decision of GoI to construct SPR facilities, a Special Purpose Vehicle (SPV) Indian Strategic Petroleum Reserve Limited (ISPRL) was established on 16th June 2004 as a subsidiary of Indian Oil Corporation Limited. Subsequently in January 2006, ISPRL became a wholly owned subsidiary of Oil Industry Development Board (OIDB).

12.5.9.1 ISPRL Phase–I: Under Phase-I of SPR program, ISPRL completed the construction of crude oil in underground rock caverns with 5.33 MMT capacity at three locations namely Visakhapatnam (1.33 MMT) in Andhra Pradesh and Mangalore (1.5 MMT) & Padur (2.5 MMT) in Karnataka.

All the three facilities i.e. Visakhapatnam, Mangalore & Padur were commissioned in June'2015, October'2016 and December'2018 respectively and were dedicated to the Nation by Hon'ble Prime Minister on 10th February' 2019.

The release/sale of strategic crude oil is carried out through an Inter-ministerial Empowered Committee chaired by Secretary, MoP&NG with Secretary, Department of Expenditure, MOF; and Secretary, Ministry of Shipping as Members.

ISPRL operates the storage facilities as custodian of core critical sovereign crude oil reserves. It also coordinates the release and replenishment of strategic crude oil stock during supply disruptions.

Agreement with Abu Dhabi National Oil Company (ADNOC): An agreement was signed between ADNOC and ISPRL on 10th Feb'2018, permitting ADNOC to use one cavern at Mangalore. As per the agreement, ADNOC filled approx. 5.8 Million Barrels of crude in ISPRL's Mangalore cavern in the year

2018. ADNOC can use 50% portion of this oil as commercial supply to its customers in India, while the rest will remain as strategic storage to be released on directions of G.O.I. to meet emergencies such as supply disruptions due to natural disaster or geopolitical factors.

ADNOC successfully dispatched its first commercial consignment to HPCL, Vizag in Dec 2019 as per the terms of Agreement between ADNOC and ISPRL. Thereafter ADNOC has been regularly selling crude consignments from the Mangalore SPR to various Indian Refineries and replenishing as per the contractual terms.

DGFT notification has been issued on 23rd March, 2024 allowing re-export of Crude oil from ISPRL Mangalore Cavern-A. As per the notification AMI (ADNOC Marketing International (India) RSC Limited India) is exempted from STE conditions and is allowed to re-export crude oil from their Commercial Stockpile at Mangalore SPR, at their own cost. Subsequently, a side letter agreement was signed with M/S ADNOC to allow re-export to M/S ADNOC.

ISPRL has signed an MOU with ADNOC in September 2024 for extending the existing agreement for Mangalore for another 7 years (3+2+) after mutual discussion. Also, ADNOC intends to store crude in Vizag. Discussions are in progress.

Commercialization : Cabinet on 8th July' 2021 approved the proposals to utilize part of the petroleum reserves created under Phase-I of Strategic Petroleum Reserve (SPR) for commercialization operations.

ISPRL released crude to State run Refiners HPCL and MRPL from August 2021 to June' 2023 to create space for renting. ISPRL deposited cumulative amount of INR 5372 Crore in Bharat-kosh account of Govt of India realized as revenue from Crude Oil sale.

As a first step towards partial commercialization, ISPRL has entered into an agreement with HPCL for renting 300 TMT (2.17 Millionbbls) Cavern capacity to HPCL w.e.f. 19th January, 2024 at Vishakhapatnam. A formal agreement was signed on 7th February, 2024 in the back drop of IEW 2024 at Goa by CEO & MD, ISPRL & ED (IT), HPCL in presence of Addl. Secy. MOPNG, Secy. OIDB, C&MD, HPCL and other senior officials from ISPRL and HPCL. The leased capacity will be used by HPCL for storage of Basrah Medium Crude oil. In case of an emergency, GOI shall have first right of use of this crude. With this ISPRL has started generating revenue as a first step towards self-reliance.

ISPRL has placed an LOA for renting of 760 TMT cavern space to MRPL on 10th January 2025. However, MRPL is yet to commence storing crude in Cavern 'B' of ISPRL as ISPRL is in the process of obtaining necessary approvals from SEZ authorities.

12.5.9.2 ISPRL Phase-II: Cabinet approved proposal for development of Commercial cum Strategic reserves under Phase II at Chandikhol (4MMT) and Padur (2.5 MMT) along with dedicated SPM's and associated pipelines on PPM mode on 08th July 2021.

M/s Deloitte has been appointed as Transactional Advisor for RFP preparation and Legal Advisor M/S AZB and Partner for preparing concessionaire agreement of Phase II required for PPP model.

1) **2.5 MMT Strategic Petroleum Reserves under Phase--II at Padur, District Udupi, Karnataka:** For land acquisition for Padur project, ISPRL had submitted requirement of acquiring 210 acres land to KIADB in Nov 2020.

KIADB issued final gazette notification for 214.79 Acres Padur land on 22nd Feb 2023. ISPRL has paid an amount of INR 160.5 crore to KIADB for the land as per the demand and ₹15.59 Crore for Forest Area Land, Horticulture and Compensation. ISPRL has paid an amount of ₹ 30.0 crore against demand for R&R package received from KIADB as on 01.01.2025.

Providing encumbrance free land is a condition precedent for concessionaire agreement. Regular follow ups being done with the competent authority for handing over of the land at the earliest.

RFP for development of project at Padur-II was re-floated on 19th, December 2024 with due date as 3rd February, 2025 which was extended upto 27.02.2025.

Bids received on 27.02.2025 are under valuation.

2) **4.0 MMT Strategic Petroleum Reserves under Phase-II at Chandikhol, District Jajpur, Odisha:** Application for 400 Acres of land at Chandikhol District Jajpur, Odisha was submitted to Govt. of Odisha on 30.09.2019. Govt of Odisha, while evaluating the application for land allotment for the Chandikhol Project has advised ISPRL to explores alternate sites for construction of SPR's.

In view of anticipated delay in pursuing alternate land, and need for carrying out feasibility study once again, ISPRL requested Govt of Odisha in July 2024 to allot land at Chandikhol for which ISPRL had earlier submitted application and completed feasibility studies.

Govt of Odisha in the 38th High Level Clearance Authority (HLCA) meeting held on 06.01.2025 given "In Principle" approval to set up SPR of 4.0 MMT at Chandikhol. Further, An MoU was signed between Govt of Odisha & ISPRL on 28th Jan 2025.

Joint visit consisting of M/s EIL, ISPRL and Revenue official was made to Chandikhol site on 31st January 2025 to identify the area de-marketed for allotment by Govt of Odisha.

Vide letter dated 28th February 2025, ISPRL has confirmed the HAL plot nos to be allotted in village Dankari by Govt of Odisha. ISPRL has also requested to stop the quarrying activities on the proposed land.

3) **PHASE-1 EXTESION:** Delegated Invested Board (DIB) on 17.02.2023 approved proposal for Acquisition of land (154.9 Acres) by Indian Strategic Petroleum Reserve Limited (ISPRL) from Mangalore Special Economic Zone Limited (MSEZL) for construction of SPR and associated facilities at Mangalore MSEZL. ISPRL has signed an MoU with MSEZL on 17th March 2023 for acquisition of land (154.90 acres) at MSEZL area Mangalore. ISPRL has paid an amount of INR 112.69 Crore as 10% of the total lease premium amount towards the land as per the terms of MoU.

EIL was awarded the job to carry out detail feasibility report for the above site. Topography and Hydro geological surveys have been completed and data have been collated for DFR for establishing 1.55 MMT capacity caverns Phase-I extension in Mangalore. Final DFR has been submitted by EIL.

Final DFR and project cost estimate has been submitted by EIL in January 2025. The same is under review and shall be put up to competent authority for necessary approvals.

12.5.9.3 Engagement with Oman Tank Terminal Company (OTTCO)

i. Oman is presently building a Sustainable Energy Security Project in Ras Markaz near Duqm Port in Oman. Oman Tanking Terminal Company (OTTCO) established in 2014, which is a wholly-owned subsidiary of OQ,

a commercial company and wholly-owned by the Government of the Sultanate of Oman is key company involved in developing the above project.

ii. OTTCO offered to ISPRL an opportunity to participate in Ras Markaz project through Indian Embassy in Muscat. OTTCO has already built 5.2 Millionbbls capacity above ground crude oil storage tanks for their Refinery in Ras Markaz and commissioned them in 2022. Dedicated SPM and associated pipelines have been also commissioned.

iii. The ISPRL team of CEO & MD and Dy CEO along with Indian Embassy Official Mr. Anoop Bijly visited OTTCO terminal in Raz Markaz to see the recently commissioned facilities of Tank Storage (5.2 Millionbbls) and SPM on Feb 21st, 2023. After the site visit, discussions were held with OTTCO CEO, Mr. Ard Van Hoof for ISPRL's participation in 2nd Phase of Ras Markaz Project. OTTCO offered ISPRL to participate in the project by way of equity or taking storage space in the expansion for phase 2 for 5.2/10 Millionbbls. During the discussions, ISPRL requested for indicative proposals for two models:

1) Leasing of tanks considering various business cases

2) Equity sharing (25/50/90%) in the proposed tank farm assuming 8 tanks of similar capacity as already constructed in Ras Markaz for 5.2 Millionbbls capacity.

iv. For carrying out Feasibility studies for construction of above ground storage tanks, OTTCO had signed an MOU with ISPRL on 25.06.2023.

v. After various rounds of discussions, M/s OQ (parent Company of OTTCO), vide email dated 19.11.2024 submitted their Technical Feasibility Report (TFR) along with detailed Capex Estimates (+/-30%) to ISPRL on 20.01.2025.

vi. After final review and minor corrections, the TFR has been jointly signed on 20th February 2025. OQ further, conveyed that they are in the process of securing internal approvals for submitting a Non-Binding Offer ("NBO") to ISPRL and informed that they will update on the expected submission date in due course. NBO shall be based on +/-30% Capex estimate.

vii. During discussion on TFR, OQ informed ISPRL that they will be submitting their final firm Commercial offer based on Capex estimates with +/- 10% after in-principle go ahead by ISPRL for the project and carrying out FEED studies.

12.5.9.4 Other Projects: In order to further enhance strategic storage capacity in India, in view of its growing imports, ISPRL has engaged EIL for carrying our feasibility studies for:

i. Preparation of DFR for creating Salt Cavern of 5.625 MMT capacity at Bikaner, Rajasthan along with feasibility of having Gas Storage. DFR is expected by end of July 2025.

ii. Construction of Additional Above-Ground Crude Oil Storage Tanks at ISPRL Mangalore (Phase-I). PFR is expected to be completed by June 2025.

iii. The PFR study for SPR's at Bina. Desktop studies are in progress. PFR is expected to be completed by June 2025.



CPCL receiving 'Innovator of the Year – Special Commendation' at the FIPI Awards for breakthroughs in JP-7 and ISROSENE fuels



Exchange of Agreement between IOCL & YHPL, Nepal



Inaugurating the 27th Energy Technology Summit in Bengaluru



Hon'ble Minister in IEW



Hon'ble Minister of MoPNG and Hon'ble Chief Minister of Rajasthan visited HRRL's Barmer Refinery



Guard of Honour by ITBP force during visit of Secretary, MoP&NG at Mangalore site



41st Safety Council Meeting held on 21st May 2024, organized by the Ministry of Petroleum and Natural Gas



Visit of Additional Secretary, MoP&NG and Joint Secretary (M&OR), MoP&NG at Mangalore site



Leadership team at Engineers India Limited (EIL) headquarters during an official meeting



ITC (Russia)



Indian Oil (Mauritius) Ltd : Storage Tanks



ONGC platform complex off India's west coast



ONGC Videsh Mozambique



Flag-off of GAIL Sagar from Cove Point, Maryland, USA



BPCL Aviation Fuelling



RGIPT's 8th Convocation Ceremony

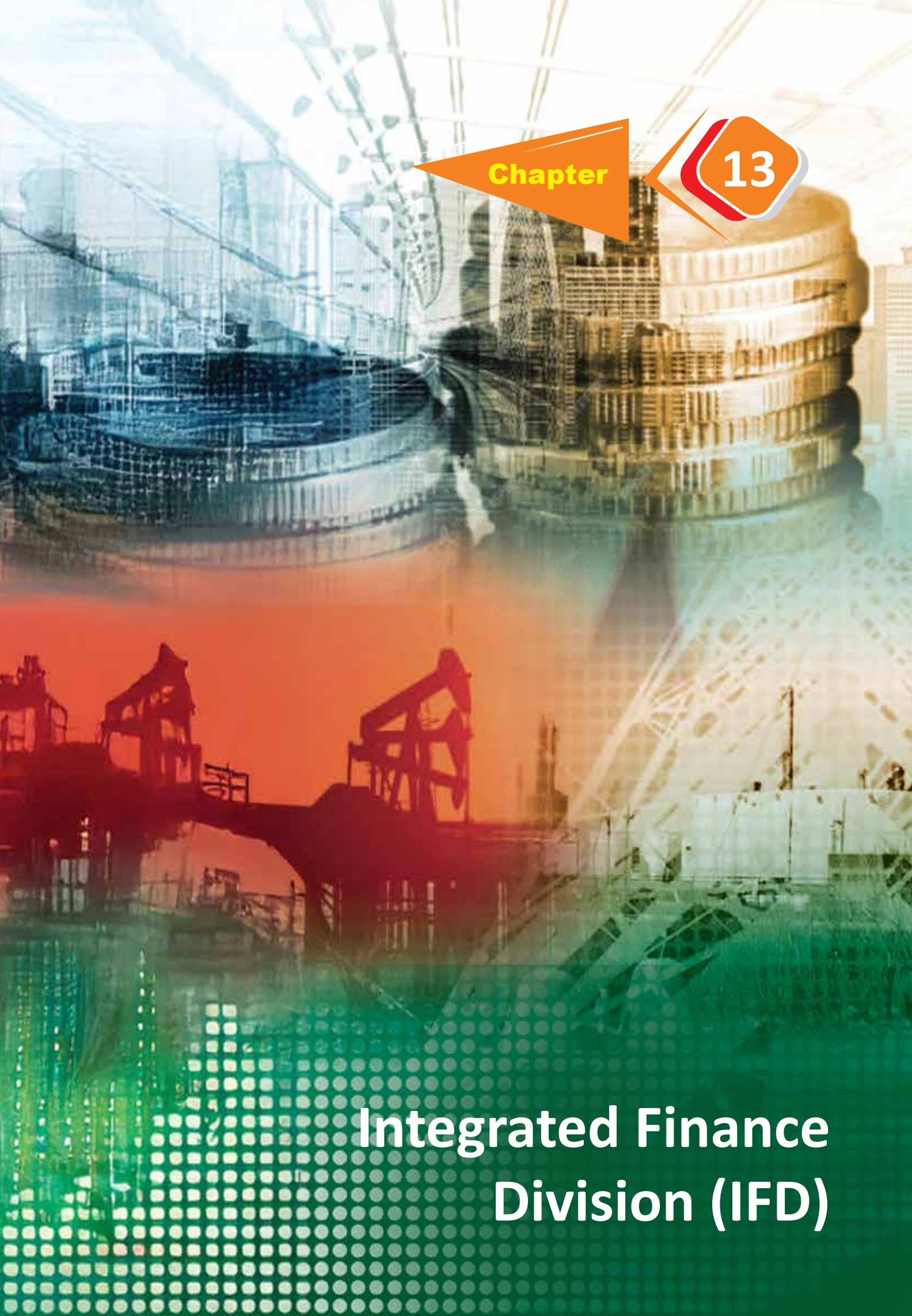


HPCL's Chhara LNG Terminal Project



LNG Storage Tanks at Petronet LNG Terminal, Dahej





Integrated Finance Division (IFD)

13 Integrated Finance Division (IFD)

Integrated Finance Division (IFD), headed by AS&FA is mandated with the dual responsibility of supporting the Secretary of the administrative Ministry/Department as well as representing the Ministry of Finance. Financial Advisers advise administrative Secretaries in:-

i) Policy formulation with a focus on the financial implications of the policy and

ii) Make recommendations in accordance with departmental goals and objectives within the overall macro-framework laid down by Ministry of Finance.

IFD appreciates the policies and priorities of the Ministry/ Department and guides the Secretary in taking transactional decisions on a day to day basis, within the ambit of financial propriety defined by Ministry of Finance, IFD factors in the sectoral priorities/goals/objectives/outcomes without compromising the budgetary integrity.

Budget Estimates

(in ₹crore)

	Actual 2023-24	BE 2024-25	RE 2024-25	Actual 2024-25	BE 2025-26
Revenue Section					
Secretariat-Economic Services	43.84	61.29	59.08	47.42	63.49
Payment of differential royalty to State Governments	20.31	0.01	25.00	20.99	16.36
Payment to ISPRL for Strategic Crude Oil Reserve (O and M)	152.93	220.04	100.00	100.00	179.00
Pradhan Mantri JI-VAN Yojna	75.75	117.41	30.00	7.58	117.41
Direct Benefit Transfer-LPG	1460.00	1500.00	500.00	375.27	1500.00
LPG Connection to Poor Households	8500.00	9094.00	12700.00	12700	9100.00
Other subsidy payable including for North Eastern Region (Domestic Natural Gas)	1633.00	1200.00	1200.00	1103.73	1200.00
Feedstock Subsidy to BCPL/Assam Gas Cracker Complex	563.00	131.00	300.00	300.00	300.00
Project Management Expenditure	84.00	0.01	0.01	0.01	0.01
Indradhanush Gas Grid Limited(IGGL)-part of the North East Natural Gas Pipeline Grid (Programme Component)	1043.38	1000.00	611.92	611.92	700.00
Numaligarh Refinery Expansion Project	475.5	275.00	275.00	275.00	24.50
Scheme for promotion of flagging of merchant ships in India	87.75	387.26	87.75	78.21	100.00
Global Biofuels Alliance	60.00	0.01	0.00	0.00	0.00
Scheme for providing financial support for collection of biomass	0.00	150.00	20.00	1.72	150.00

Scheme for Development of Pipeline infrastructure for injection of Compressed Bio Gas (CBG) in City Gas Distribution (CGD) Network	0.00	497.25	30.00	0.00	250.00
Society for Petroleum Laboratories	0.00	0.01	0.00	0.00	0.00
Indian Institute of Petroleum Energy	90.00	168.00	88.08	0.00	0.00
Additional Transfer to Reserve Fund, OIDF*	0.00	0.00	1000.00	0.00	679.03
Total (Revenue)	**14289.46**	**14801.29**	**17026.84**	**15621.84**	**14379.80**
Capital Section					
Payment to ISPRL for purchase of land (Extension of Phase-I Strategic Petroleum Reserves)	40.00	0.01	50.00	50.00	235.00
Indian Strategic Petroleum Reserve Limited (ISPRL) Phase II (Construction of Caverns)	0.00	408.00	30.00	17.25	100.00
Payment to Indian Strategic Petroleum Reserve Limited (ISPRL) for Crude Oil Reserve	0.00	0.00	0.00	0.00	5597.00
Capital Support to Oil Marketing Companies	0.00	0.01	0.00	0.00	0.00
Mission Anveshan	0.00	332.00	50.00	50.00	592.00
Appraisal of areas in India's Extended Continental Shelf (ECS)	0.00	388.00	50.00	50.00	100.00
Secretariat-Economic Services	0.76	0.95	160.86	160.55	2.13
Transfer to OIDF	0.00	0.00	0.00	0.00	5697.00
Total (Capital)	40.76	1128.97	340.86	327.8026	12323.13
Grand Total (Revenue + Capital)	**14330.22**	**15930.26**	**17367.70**	**15949.64**	**26702.93**

*** ₹1000.00 Cr. for use in the FY 2025-26.**

REVENUE/CAPITAL RECEIPTS (₹ in thousands)

		First Half Year		Second Half Year		Total
ACCOUNTS	**Heads**	**Apr-June**	**July-Sep**	**Oct-Dec**	**Jan-Mar**	**Apr-Mar**
2021-22	**Profit Petroleum**	19809074	22820128	21413773	22706597	86749572
	Royalty	12325810	13556057	14647537	16665494	57194898
	PEL Fees	17172	74432	91914	21082	204600
	PLP	5111	7685	10598	2806	26200
	TOTAL	32157167	36458302	36163822	39395979	144175270
2022-23	**Profit Petroleum**	34161199	16794202	13945031	12427731	77328163
	Royalty	24409904	25623592	25660334	24946170	100640000
	PEL Fees	20800	90347	113901	32053	257101
	PLP	8080	8444	12224	10144	38892
	TOTAL	**58599983**	**42516585**	**39731490**	**37416098**	**178264156**
2023-24	**Profit Petroleum**	15288113	11561854	10919356	13848771	51618094
	Royalty	24267398	24339541	25643683	23792580	98043202
	PEL Fees	48327	143125	99490	71526	362468
	PLP	1242021	46228	148043	253551	1689843
	TOTAL	**40845859**	**36090748**	**36810572**	**37966428**	**151713607**

Upto Detailed Heads	Total Receipts of 6 months		Total Receipts			24-25		25-26
	Apr-Sept	Apr-Sept*	21-22	22-23	23-24	Budget Estimates	Revised Estimates	Budget Estimates
	23-24	24-25						
Profit Petroleum	26849967	11848220	86749572	77328163	51618094	65119445	49534749	70998705
Royalty	48606939	49363981	57194897	100640000	98043202	91634023	84470003	88877706
PEL/ML Fees	191452	166589	204600	257100	362469	217277	333178	499767
PLP&GoI-SOR	1288248	904383	26200	38900	1689842	222846	2170520	2170520
TOTAL	**76936606**	**62283173**	**144175269**	**178264163**	**151713607**	**157193591**	**136508450**	**162546698**

***FY 2024-25 is for the period April to Aug'24.**

CPSE/BANK REVENUE RECEIPTS-DIVIDENDS

Ministry/Department/Union Territory

Major Head: 0050-Dividend & Profits

(₹ in Thousand)

Sl. No	Name of the CPSE/ Bank	Long Term Borrowings as on 31/3/24	Debt-Equity Ratio as on 31/3/24	Dividend paid to Govt. for 23-24		Total dividend paid for 23-24 (sum of columns (a+b))	Interim Dividend/ to be paid in 24-25	Total Dividend paid during 24-25 (sum of columns (b+d))	Cash /Cash equivalent as on 31/03/24	General Reserves on 31/03/24	Capital expenditure during 24-25	Estimated capital expenditure during 25-26
				Interim Dividend in 2023-24	Final Dividend paid/ to be paid in 2024-25							
				a	b	c=a+b	d	e				
1	Engineers India Ltd.	-	-	576917	288459	865376	576917	865376	11434600	20302576	500000	500000
2	GAIL (India) Ltd.	115647500	0.29	18631673	-	18631673	13013758	13013758	5885942	-	101000000	84800000
3	IOCL	577443000	0.66:1	36360999	50905398	87266397	21551978	72457377	8322000	1006568100	309090000	352938500
4	ONGC	39882480	0.02:1	72236454	18522168	90758622	84072505	102594673	300313000	2672342010	347250000	349000000
5	OIL	71418300	0.26	7372500	2303900	9676400	8539795	18216195	30701700	430380400	68800000	78600000
6	BPCL	84898334	0.25:1	24132855	24132855	48265710	17513288	41646143	5163323	381606500	130000000	185000000
7	Balmer Lawrie Investment Ltd			-	503352	503352			13075	531603	NA	NA
	Total	**889289614**		**159311398**	**96656132**	**255967530**	**145268241**	**248793522**	**361833640**	**4511731189**	**956640000**	**1050838500**

Figures for RE 2024-25 and BE 2025-26 are provisional as Budget is yet to be finalized by PSUs

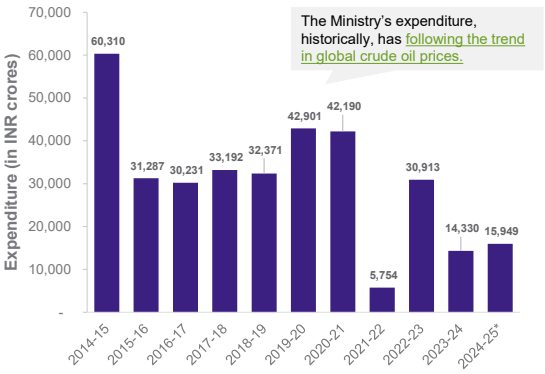
Ministry of Petroleum and Natural Gas

CS Budget Allocation & Trend Analysis

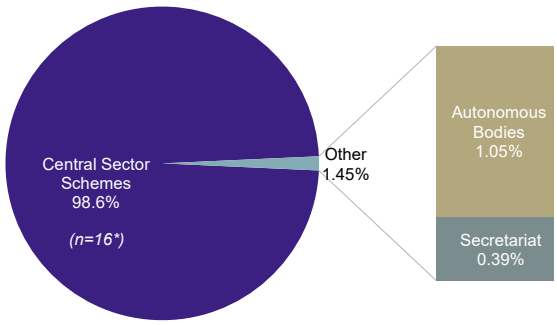
In FY 23-24, M/o PNG actual expenditure was 0.29% of Government of India actual expenditures
In FY 24-25, 98.5% of M/o PNG budget has been allocated to 22 Central Sector Schemes

Ministry Expenditure FY 2014-15 to 2024-25
MoPNG

In INR cr



Demand for Grants 2024-25
MoPNG



₹15930.26 cr

*Note: * Figures for 2024-25 yet to be confirmed by MoF*
Sources: Union Budget 2023-24; PRS.

**Zero budget schemes are excluded from the count of schemes*
Source : Demand for Grants, Budget (2024-25)

1

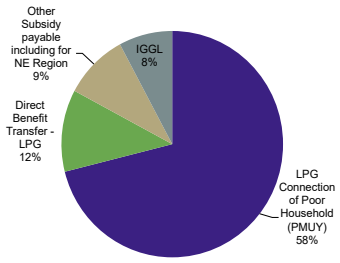
Ministry of Petroleum and Natural Gas

Scheme Allocation & Trend Analysis

Top 4 schemes contribute to over 80% of the M/o PNG 2024-25 CS budget allocations

In INR cr

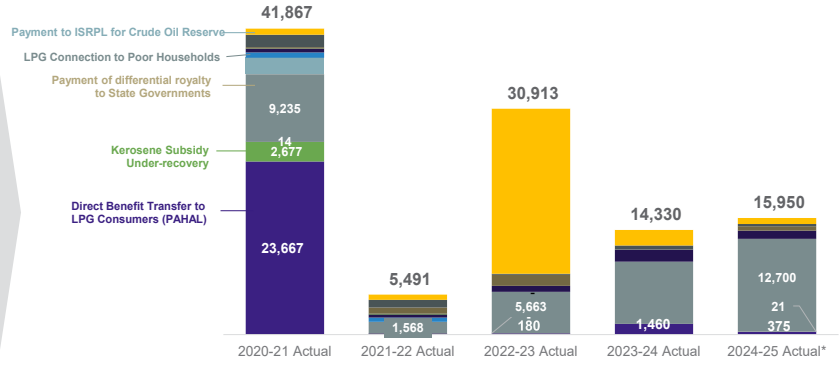
Demand for Grants 2024-25
MoPNG | By Scheme



₹ 15930.26 cr

- Top 4 schemes: **LPG Connection to Poor Households (PMUY), Direct Benefit Transfer-LPG, Indradhanush Gas Grid Ltd (IGGL), Other Subsidy Payable including NE Region** contribute to 80**%** of CS 2024-25 Budget allocations.
- *Others includes ISPRL Phase II (construction of caverns), Payment to ISPRL for Strategic Crude Oil Reserve (O and M), PM JI-VAN Yojna, Feedstock Subsidy to BCPL/Assam Gas Cracker Complex, NREP, Mission Anveshan, Appraisal of areas in India's Extended Continental Shelf, Scheme for Development of Pipeline infrastructure for injection of CBG in CGD Network and Scheme for promotion of flagging of merchant ships in India.*

CS Budget Trend (FY 2020-21 to FY 2024-25)
MoPNG | 5 Year Trend | By Schemes



- The BE 2024-25 of **Direct Benefit Transfer- LPG** has increased as compared to FY 23-24 Actuals.
- The BE 2024-25 of **LPG Connection to Poor Households** has increased as compared to FY 23-24 Actuals.
- The BE 2024-25 of **Other subsidy payable including for NE Region** has significantly decreased as compared to FY22-23 Actuals.
- The BE 2024-25 of **Feedstock subsidy to BCPL/Assam GCC** significantly decreased as compared to FY22-23 Actuals.
- The BE 2024-25 of **Indradhanush Gas Grid Ltd** has decreased as compared to FY22-23 Actuals.

RE - Revised Estimates BE - Budget Estimates

*Source : Demand for Grants, Budget (2020-21, 21-22, 22-23, 23-24, 24-25). * Figures for 2024-25 yet to be confirmed by MoF.*

2



Appendix

Appendix

Appendix-I

Ministry of Petroleum & Natural Gas
(पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय)

1. Exploration for, and Exploitation of Petroleum Resources, including Natural Gas and Coal Bed Methane, Gas Hydrates and Shale Gas.
2. Production, supply, distribution, marketing and pricing of petroleum, including natural gas, Coal Bed Methane and petroleum products.
3. Oil refineries, including Lube Plants.
4. Additives for petroleum and petroleum products.
5. Blending and blending prescriptions for bio-fuels including laying down the standards for such blending.
6. Marketing, Distribution and Retailing of Bio-fuels and its Blended Products
7. Overall coordination concerning Bio-Fuels, National Policy on Bio-fuels, policy/scheme for supporting manufacturing of biofuels Development Board and Strengthening the existing institutional mechanism and research, development and demonstration on transport, stationary and other applications of bio-fuels.
8. Lube blending and greases.
9. Conservation of Petroleum products.
10. Planning, development, control and assistance to all industries dealt with by the Ministry.
11. Strengthening energy security by acquiring oil and gas equity abroad and participation in transnational oil and gas pipeline projects.
12. Creation and administration of strategic petroleum reserve through Indian Strategic Petroleum Reserve Limited (ISPRIL)
13. All attached or subordinate offices or other organization concerned with any of the subjects specified in the list, including Directorate General of Hydrocarbons (DGH), Centre for High Technology (CHT), Oil Industry Development Board (OIDB), Petroleum Conservation Research Association (PCRA), and PPAC etc.
14. Planning development and regulation of oil field service.
15. Public sector project failing under the subject included in this list except such projects which are specially allotted to any other Ministry/ Development.
16. The Oil Field (Regulation and Development) Act, 1948 (53 of 1948).
17. The Oil and Natural Gas commission (Transfer of undertaking and Repeal) Act, 1993 (65 of 1993).
18. The Petroleum Pipeline (Acquisition of right of User in Land) Act, 1962 (50 of 1962).
19. The ESSSO (Acquisition of Undertaking in India) Act, 1974(4 of 1974).
20. The Oil Industry (Deployment Act, 1974 (47 of 1974).
21. The Burmah-Shell (Acquistion of Undertaking in India) Act, 1976 (2 of 1976).
22. The Caltex (Acquisition of Shares of Caltex Oil Refining (India) Limited Act, 1977.
23. Administration of the Petroleum Act, 1934 (30 of 1934) and the rules made there under.
24. Petroleum & Natural Gas Regulatory Board Act, 2006.
25. Matters pertaining to Brahmputra Cracker and Polymer Limited.
26. Matters pertaining to SATAT initiatives.
27. Matter pertaining to natural gas pipelines.
28. Matter pertaining to LNG terminals.
29. The Rajiv Gandhi institute of Petroleum Technology (RGIPT) Act, 2007.
30. Liquefied Petroleum Gas (Regulation of Supply and Distribution) Order, 2000.
31. Matter pertaining to Direct Benefit Transfer of LPG (DBTL) PAHAL.
32. Matter pertaining to Direct Benefit Transfer in Kerosene (DBTK).
33. Matter pertaining to Pradhan Mantri Ujjwala Yojana (PMUY).
34. Administration of CPSEs including their subsidiaries and Joint Ventures.

Appendix-II

List of Public Sector Undertakings and Other Organization under the Administrative Control of the Ministry of Petroleum & Natural Gas.

I Oil Companies in which Government of India has shareholding as on 31.03.2025.

1) Oil & Natural Gas Corporation Limited 58.89%
2) Oil India Limited 56.66%
3) GAIL (India) Limited 51.52%
4) Indian Oil Corporation Limited (IOCL) 51.50%
5) Bharat Petroleum Corporation Limited (BPCL) 52.98%
6) Engineers India Limited 51.32%

II Subsidiaries and other Companies.

1. ONGC Videsh Limited-Wholly owned by ONGC.
2. Mangalore Refinery & Petrochemicals Limited Subsidiary of ONGC.
3. Hindustan Petroleum Corporation Limited (HPCL) subsidiary of ONGC.
4. Petronet MHB Limited (PMNBL) subsidiary of ONGC.
5. ONGC Green Ltd.-wholly owned by ONGC.
6. Bharat Petro Resources Limited-Subsidiary of BPCL.
7. BPCL-KIAL Fuel Farm Facility Pvt. Ltd Subsidiary of BPCL.
8. Numaligarh Refineries Limited-Subsidiary of OIL India Ltd.
9. Chennai Petroleum Corporation Limited Subsidiary of IOCL.
10. IOC Global Capital Management IFSC Ltd Subsidiary of IOCL.
11. Certification Engineers International Limited wholly owned Subsidiary of EIL.
12. GAIL Gas Limited-wholly owned by GAIL.
13. Brahmaputra Cracker and Polymer Limited Subsidiary of GAIL
14. Konkan LNG Limited-Subsidiary of GAIL.
15. Tripura Natural Gas Company Limited Subsidiary of GAIL.
16. Bengal Gas Company Limited-Subsidiary of GAIL
17. GAIL Mangalore Petrochemicals Limited Wholly owned Subsidiary of GAIL.

III Other Organizations

18. Oil Industry Development Board
19. Oil Industry Safety Directorate
20. Centre for High-Technology.
21. Petroleum Planning & Analysis Cell
22. Directorate General of Hydrocarbons
23. Rajiv Gandhi Institute of Petroleum & Technology
24. Petroleum and Natural Gas Regulatory Board
25. Indian Institute of Petroleum Energy
26. Indian Strategic Petroleum Reserves Ltd.

Appendix-III

Production of Crude Oil and Natural Gas

State/Region	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25 (P)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
I. Production of Crude oil (TMT)						
Andhra Pradesh	243	195	202	236	250	284
Arunachal Pradesh	56	53	48	47	52	50
Assam	4093	3902	3988	4164	4359	4452
Gujarat	4707	4651	4627	4850	4950	5135
Rajasthan	6653	5891	5887	5074	4421	3429
Tamil Nadu	415	410	367	324	294	263
Tripura	-	-	3	3	2	2
West Bengal	-	-	0.05	0.01	0.00	0.00
Offshore	16003	15391	14569	14480	15027	15087
Total Crude Oil Production	**32170**	**30494**	**29691**	**29179**	**29357**	**28702**
of which						
ONGC-Nomination	20627	20183	19451	19493	19210	18466
OIL-Nomination	3107	2937	2987	3156	3344	3443
Pvt/JVs-PSC + RSC/CBM	8436	7374	7253	6530	6803	6793
II. Production of Natural Gas (MMSCM)						
Andhra Pradesh	912	827	809	710	722	753
Arunachal Pradesh	46	55	58	53	40	42
Assam	3141	2995	3371	3557	3489	3551
Gujarat	1342	1138	1017	923	926	1053
Jharkhand (CBM)	5	2	4	10	5	47
Madhya Pradesh (CBM)	345	334	290	264	234	294
Rajasthan	1883	2040	2619	2340	2199	1786
Tamil Nadu	1097	911	1067	1109	1016	1013
Tripura	1473	1634	1531	1675	1525	1224
West Bengal (CBM)	306	307	389	399	411	415
Offshore	20635	18429	22869	23409	25871	25928
Total Natural Gas Production	**31184**	**28673**	**34024**	**34450**	**36438**	**36106**
of which						
ONGC-Nomination	23746	21872	20629	19969	19316	18792
OIL-Nomination	2668	2480	2893	3041	3090	3171
PSC Regime	4770	4321	10502	11440	14032	14143

P: Provisional

Note: 1. Production of Crude oil includes Condensate

2.Figures may not tally due to rounding off

Source: E&S Division,MoPNG

Appendix-IV

Installed Capacity and Refinery Crude Throughput (Crude Oil Processed)

(Figures in TMT)

Refinery	Installed Capacity	Refinery Crude Throughput					
	01.04.2025	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25 (P)
(a) PUBLIC SECTOR	**157316**	**156958**	**137575**	**145491**	**161499**	**165886**	**168900**
1. IOCL, Guwahati, Assam - 1962	1200	892.40	849.24	730.22	1079.67	1000.49	1178.20
2. IOCL, Barauni, Bihar - 1964	6000	6515.53	5469.22	5619.66	6785.39	6617.70	6513.26
3. IOCL, Koyali, Gujarat - 1965	13700	13075	11603	13474	15567	15202	15283
4. IOCL, Haldia, West Bengal - 1975	8000	6463.29	6758.51	7305.46	8506.48	8059.59	6934.50
5. IOCLMathura, Uttar Pradesh - 1982	8000	8948	8926	9123	9573	9191	8054
6. IOCL, Digboi, Assam - 1901	650	664.23	605.11	707.83	712.92	710.21	774.11
7. IOCL, Panipat, Haryana - 1998	15000	15038.10	13181.32	14848.85	13810.14	14304.74	15398.27
8. IOCL,'Bongaigaon, Assam - 1974	2700	2044.82	2450.46	2638.50	2775.04	3008.86	2772.08
9. IOCL, Paradip, Odisha-2016	15000	15778.20	12507.94	13217.40	13598.53	15213.43	14657.09
Total IOCL	**70250**	**69419**	**62351**	**67665**	**72408**	**73308**	**71564**
10. BPCL, Mumbai, Maharashtra - 1955	12000	15017	12941	14437	14546	15052	15529
11. BPCL, Kochi, Kerala - 1963	15500	16515	13282	15402	16017	17314	17193
12. BORL, Bina, Madhya Pradesh - 2011	7800	12242	10072	7410	7841	7133	7709
Total BPCL	**35300**	**43774**	**36294**	**37248**	**38404**	**39499**	**40431**
13. HPCL, Mumbai, Maharashtra - 1954	9500	8065	7374	5558	9804	9640	9958
14. HPCL, Visakh, Andhra Pradesh - 1957	13700	9115	9050	8410	9287	12689	15310
Total HPCL	**23200**	**17180**	**16425**	**13968**	**19091**	**22329**	**25268**
15. CPCL, Manali, Tamil Nadu - 1965	10500	10161	8243	9040	11316	11642	10454
16. CPCL- CBR, Narimanam Tamil Nadu - 1993	0	-	-	-	-	-	-
Total CPCL	**10500**	**10161**	**8243**	**9040**	**11316**	**11642**	**10454**
17. NRL, Numaligarh, Assam-1999	3000	2383	2707	2624	3091	2510	3066
19. MRPL, Mangalore, Karnataka- 1996	15000	13953	11475	14871	17116	16533	18044
18. ONGC, Tatipaka, Andhra Pradesh - 2001	66	87	81	75	73	65	74
(b) Private & JVs Sector	**99500**	**101757**	**88080**	**96213**	**93733**	**95660**	**99714**
20. RIL, Jamnagar, Gujarat - 1999	33000	33019	34100	34757	34433	34390	34990
21. RIL, Jamnagar (SEZ), Gujarat - 2008	35200	35876	26841	28264	27872	28300	31192
Total RIL	**68200**	**68895**	**60941**	**63021**	**62305**	**62690**	**66182**
22. NEL, Vadinar, Gujarat - 2006	20000	20620	17067	20164	18692	20322	20487
23. HMEL, Bhatinda, Punjab - 2012	11300	12242	10072	13027	12735	12648	13045
Grand Total (a+b)	**256816**	**258715**	**225656**	**241704**	**255232**	**261546**	**268613**

Appendix-V

Production of Petroleum Products

(Figures in TMT)

Products	2019-20	2020-21	2021-22	2022-23	2023-24 (P)	2024-25 (P)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
LPG	12823	12072	12238	12831	12779	12788
Motor Spirit	38616	35779	40238	42817	45081	48265
Naphtha	20577	19381	19994	17036	18274	18308
ATF	15238	7092	10294	15039	17124	17752
Kerosene	3211	2393	1913	941	983	1008
HSD	111120	100441	107176	113776	115943	118221
LDO	620	729	805	646	657	632
Total Fuel Oils	**9253**	**7431**	**8921**	**10263**	**10442**	**10859**
of which						
a) Furnace Oil	8858	7071	8509	9590	9698	10326
b) LSHS/HHS/RFO	395	360	412	673	744	533
Lube Oils	932	1069	1173	1445	1352	1300
Bitumen	4892	4902	5111	4914	5240	5303
Others	31008	30185	30934	31444	33129	49335
Total Production of Petroleum Products	262940	233513	254306	266539	276058	283771
of which						
Refineries	258181	229301	250254	263047	272576	280452
Fractionators	4760	4212	4051	3492	3482	3318

Note: Totals may not tally due to rounding off figures P: Provisional.

*Others include products like Propylene, solvents (Hexane, Benzene, Toluene, Xylene and Specialty solvents), Reformate, Mineral Turpentine Oil, Carbon Black Feed Stock, Waxes, Sulphur and petcoke etc.

Source: PPAC

Appendix-VI

Consumption of Petroleum Products

(Figures in TMT)

Products	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25 (P)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
LPG	26330	27558	28330	28504	29664	31320
Motor Spirit	29975	27969	30849	34976	37219	40005
Naphtha	14268	14100	14277	12127	13812	13153
SKO	2397	1798	1494	490	479	408
ATF	7999	3698	5008	7378	8247	8985
HSDO	82602	72713	76687	85900	89626	91407
LDO	628	855	1020	726	782	838
Fuel Oil (FO+LSHS)	6302	5586	6255	6958	6520	6459
Lubes/Greases	3833	4097	4570	3737	4087	4589
Bitumen	6720	7524	7874	8041	8807	8330
Petroleum Coke	21708	15605	15772	18343	20319	22063
Others	11365	12791	12099	15842	14696	11614
Total Consumption	**214127**	**194295**	**204233**	**223022**	**234259**	**239171**

Notes: Consumption includes sales by oil companies, own consumption & direct private imports. P: Provisional
Source: PPAC

Imports / Exports of Crude Oil and Petroleum Products

Appendix-VII

ITEM	2020-21			2021-22			2022-23			2023-24			2024-25 (P)		
	TMT	₹Crore	Million USD	TMT	₹Crore	Million USD	TMT	₹Crore	Million USD	TMT	₹Crore	Million USD	TMT	₹Crore	Million USD
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Imports															
1. Crude Oil Import	196461	459779	62248	212382	901262	120675	232700	1260372	157531	234262	1105176	133366	243225	1160618	137174
2. LNG Imports	25055	58329	7881	23417	100521	13472	19852	137210	17114	23996	110994	13405	26959	125953	14908
3. Petroleum Product Import	43248	109430	14770	39017	176835	23656	44598	215854	26912	48693	190069	22933	50903	200183	23673
Petroleum Product Imports															
LPG	16476	53752	7242	17043	91468	12235	18335	107191	13344	18514	86361	10412	20667	105679	12479
MS	1351	4950	674	671	3895	519	1069	8846	1094	717	5500	663	235	1573	188
Naphtha	1199	3844	518	237	1499	199	897	4781	593	1211	6627	800	941	5347	636
ATF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKO	3	12	2	0	0	0	0	0	0	0	0	0	0	0	0
HSD	648	1960	265	43	253	34	322	3584	454	42	312	38	42	276	33
LOBS/ Lube oil	2693	12170	1647	3058	19704	2642	2152	18449	2301	2412	19129	2310	2864	21894	2591
Fuel Oil	6454	14312	1936	8980	32815	4379	8563	33474	4202	9053	33669	4061	7674	29049	3444
Bitumen	2055	4325	586	2581	7678	1029	2797	9945	1237	3244	10875	1314	2900	9326	1100
Petcoke	8256	6410	861	4213	8203	1097	8664	18157	2263	10956	14310	1729	13153	13625	1611
Others (1)	4112	7695	1038	2189	11319	1521	1799	11425	1425	2544	13286	1606	2428	13414	1592
Total Import (1+2+3)	264763	627537	84899	274815	1178618	157803	297151	1613435	201557	306951	1406238	169704	321087	1486754	175755
Exports															
LPG	452	1797	241	513	3214	430	540	3891	486	525	3215	389	551	3611	427
MS	11606	36530	4977	13482	81649	10879	13127	102800	12868	13472	92957	11249	15830	98379	11613
Naphtha	6509	18643	2530	6861	37231	4984	5714	33357	4184	5275	27019	3262	5169	28633	3385
Aviation Turbine Fuel	3544	9377	1287	5186	27112	3661	7264	58598	7285	8579	57959	6994	8554	51267	6075
Kerosene	15	48	7	14	77	10	11	100	13	11	82	10	12	84	10
Diesel	30576	81611	11132	32407	164741	22088	28496	230826	28861	28204	182400	22062	28027	161826	19106
Lubes	15	93	12	10	114	15	14	205	26	15	200	24	17	306	36
Fuel Oil	1177	2318	313	1757	6633	890	1841	7834	973	2103	7961	959	2413	9050	1069
Bitumen	7	23	3	6	28	4	9	42	5	18	72	9	23	98	12
Petcoke/CBFS	577	292	39	187	553	74	284	648	81	28	23	3	692	3231	386
Others (2)	2290	6436	865	2330	10449	1402	3717	20427	2542	4362	22835	2756	3786	19284	2288
Export of Petroleum Products	56769	157168	21406	62755	331801	44438	61015	458729	57323	62593	394723	47717	65076	375769	44407
Net Import	207995	470369	63493	212061	846817	113365	236136	1154707	144234	244358	1011515	121986	256011	1110986	131348
Net Petroleum Product Export	13521	47738	6636	23738	154966	20782	16417	242875	30411	13900	204655	24785	14173	175586	20733

P: Provisional Source: Petroleum Planning & Analysis Cell. (1) Others in import include VGO, Paraffin wax, Petroleum Jelly, Aviation Gas, MTBE, Reformate etc. (2) Others in export include VGO, Benzene, Hexane, MTO, Sulphur etc.

Appendix-VIII

Internal & External Budgetary Resources

(Figures in ₹ Crore)

CPSEs	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
	Actual	Actual	Actual	Actual	Actual	Actual
(1)	(2)	(3)	(4)	(5)	(6)	(7)
ONGC	29538	26859	27741	30208	37494	61110
OVL	5435	5734	4681	2704	3259	5023
OIL	4247	13332	4367	5534	5907	7624
GAIL	4562	6253	7148	9099	11426	10258
IOCL	31421	28684	30391	37287	42236	37557
BPCL	11064	11064	11860	12120	11702	16508
HPCL	16311	14700	16771	14084	14412	13630
MRPL	1318	2179	674	625	1600	1006
CPCL	961	583	636	654	611	660
NRL	529	1029	3605	6596	7984	9038
BL	46	43	22	52	59	50
EIL	171	733	70	62	132	72
Total (I&EBR)	**105603**	**111194**	**107968**	**119027**	**136821**	**162537**

Source: Central Public Sector Enterprises

Appendix-IX

PSU-Wise Variation Profit Before Tax (PBT) and Profit After Tax (PAT) 2024-25 vis-a-vis 2023-24

ONGC: The PBT of ONGC for 12M FY 2024-25 is ₹46,760 Cr. as against ₹53,016 Cr. for 12M FY 2023-24. Similarly, the PAT of ONGC for 12M FY 2024-25 is ₹35,610 Cr. as against ₹40,526 Cr. for 12M FY 2023-24. The reasons for decrease in PBT and PAT during 12MFY 24-25 are increase in exploratory cost written off by ₹4,257 Cr., increase in Depreciation, Depletion and impairment(DD&I cost) by ₹3,858 Cr., increase in variation in stock by ₹1,389 Cr., increase in Operating Expenditure by ₹753, increase in Finance Cost by ₹523 Cr. and increase in Exchange loss by ₹460 Cr. However, the above increase in expenditure partially offset due to decrease in statutory levies by ₹5,830 Cr.

OVL: ONGC Videsh's PBT ₹1,726Cr. for FY 2024-25 is higher by ₹147 Cr. (9.3%) compared to ₹1,580 Cr. in FY 2023-24 (restated). The increase is mainly attributable to lower expenses, impairment charge and foreign exchange gain of ₹2,057 Cr. partly offset by a lower profit from equity-accounted entities ₹1,911 Cr. PAT attributable to owners of the Company is however lower by ₹85 Cr., from ₹541 Cr. in FY 2023-24 to ₹456 Cr. in FY 2024-25. Higher tax expenses and a lower share of expenses of non-controlling interest ₹232 Cr. has lowered the PAT in FY 2024-25.

GAIL: GAIL Profit Before Tax (PBT) increased to ₹14,825 cr. in FY 2024-25 as against ₹11,555 cr. in FY 2023-24. The Profit After Tax (PAT) increased to ₹11,312 Cr. in FY 2024-25 as against ₹8,836 Cr. in FY 2023-24. The robust performance during FY 2024-25 is primarily driven by better physical performance across all major segments.

IOCL: Profit before Tax (PBT) of IOCL was ₹15,882 Cr. in 2024-25 as compared to ₹52,344 Cr. in 2023-24 and Profit after Tax (PAT) was ₹12,962 Cr. as compared to ₹39,619 Cr. in previous financial year. The decrease in PBT and PAT for Financial Year 2024–25 vis-a-vis 2023–24 is primarily due to reduction in core refining margins on account of decline in product cracks in international market from previous year and reduction in marketing margin on retail sale of certain petroleum products as compared to last year. Further, inventory losses in current year and increase in exchange losses from previous year have also contributed towards reduction in profitability. Please find below status of PBT & PAT in respect to Standalone Financial Statements of IOCL:

(Amount in ₹ Cr)

Particulars	2024-25	2023-24
Profit before tax	15,882.34	52,344.21
Profit after tax	12,961.57	39,618.84

BPCL: Profit before Tax (PBT) of BPCL was ₹13,402 Cr. in 2024-25 (Apr-Dec) as compared to ₹29,905 Cr. in 2023-24 (Apr-Dec) and Profit after Tax (PAT) was ₹10,061 Cr. as compared to ₹22,449 Cr. in corresponding period of last financial year. Variation in Profit Before Tax (PBT) and Profit After Tax (PAT) 2024-25 vis-à-vis 2023-24 for BPCL

(Amount in ₹ Cr)

Particulars	2024-25	2023-24
Profit / (Loss) before Tax	17,664	35,548
Profit / (Loss) after Tax	13,275	26,674

Profit for the year 2024-25 is lower as compared to the previous year due to lower GRMs and under-recoveries in LPG in current period.

HPCL: Profit before Tax (PBT) of HPCL was ₹9,621 Cr. in FY 2024-25 as compared to ₹19,153 Cr. in FY 2023-24 and Profit after Tax (PAT) was ₹ 7,365 Cr. in FY 2024-25 as compared to ₹ 14,694 Cr. in FY 2023-24.

MRPL: Profit before tax is ₹ 113.26 Cr. and Profit after tax is ₹51.58 Cr. During FY 2024-25.

CPCL: CPCL posted a turnover of ₹70,963 Cr., Profit Before Tax of ₹208 Cr. and Profit After Tax of ₹174 Cr. in FY 2024-25 as compared to the turnover of ₹79,207 Cr., Profit Before Tax of ₹3660 Cr. and Profit After Tax of ₹2711 Cr. in FY 2023-24. CPCL continued its excellent Operational performance with crude throughput of 10.454 MMT despite M&I shutdown of one of the crude units and secondary treatment facilities. For the FY 2024-25, Gross Refinery Margin (GRM) was recorded at USD 4.22 per barrel against the Singapore GRM of USD 3.8 per barrel. CPCL consistently outperformed Singapore GRMs largely due to optimized refinery production, enhanced product distribution, crude procurement strategies and efficient utilization of secondary units processing capabilities.

NRL: Profit before tax (PBT) for the year ended 31st March 2025 was lower by 23.94% at ₹2,215.28 Crore as compared to ₹2,912.37 Crore in FY 2023-24.Profit after Tax (PAT) at ₹1,607.77 Crore for the financial year ended 31st March 2025 was lower by ₹552.34 Crore as against ₹2,160.11 Crore of the corresponding previous financial year. The lower profit is mainly on account of reduction in margin of the product during the current financial year.

BLCL: The Company achieved of Net Turnover of ₹2577.63 Cr. FY 2024-25 as against ₹2404.17 Cr. during the 2023-24, registering an increase of approximately 7% over the previous year. The profit before Tax of ₹313.79 Cr. in 2024-25 as against ₹278.65 Cr. in 2023-24, an increase of approximately 13% over the previous year.

EIL: Profit before tax and Profit after tax for the period ended 31st March 2025 was at ₹616.73 Cr. and ₹465.24 Cr. respectively.

Appendix-X

Status of CAG Audit Para/s

There were 113 CAG Audit Paras upto FY 2024-25. After the settlement of 9 CAG Audit Paras during FY 2024-25, 104 CAG Audit Paras are pending in the Ministry as on 31.03.2025. Out of these 104 CAG Audit Paras, replies of 68 Audit Paras have been submitted to CAG. Out of 68 CAG Audit Paras, vetting remarks have been received on 28 Audit Paras on which further action is being taken. Further, in case of PAC Para, there were total 59 PAC Paras out of which 53 PAC Paras were settled in FY -2024-25. The replies of remaining of 6 PAC paras have also been sent to PAC on which vetting remarks are still awaited.

Year wise position of ATNs/ARTs of CAG & PAC Audit Paras received upto FY 2024-25

(As on 31.03.2025)

Year	No. of CAG paras on which ATNs have to be submitted to CAG for settlement	Details of the CAG Para on which ATNs are pending.		
		No. of CAG paras on which 1st ATN is yet to be taken	No. of ATNs sent but returned with observations by CAG	No. of ATNs sent by Ministry but vetting remarks have not been received from CAG
(i)	(ii)	(iii)	(iv)	(v)
2014	1	-	1	-
2015	3	-	1	2
2016	7	-	2	5
2017	5	-	2	3
2018	4	-	2	2
2019	9	-	3	6
2020	4	-	-	4
2021	8	-	3	5
2022	15	9	1	5
2023	11	-	5	6
2024	33	27	-	6

Appendix-XI

List of Assets Acquired by Indian PSU's Abroad

Sr. No.	Country	Name of Asset	Company Name	Participating Companies
1	Azerbaijan	ACG	OVL	ONGC Videsh, BP(Operator), AzACG, MOL, INPEX, ExxonMobil, TPAO, Itochu
2		BTC Pipeline	OVL	ONGC BTC Limited, BP (Operator), AzBTC, MoL, INPEX, TPAO, Itochu, TOTAL, ENI, ExxonMobil
3	Bangladesh	SS-04	OVL	ONGC Videsh Limited(Operator), Oil India Limited, BAPEX (carried)
			OIL	
4		SS-09	OVL	ONGC Videsh Limited (Operator), Oil India Limited, BAPEX (Carried)
			OIL	
5	Brazil	BC-10	OVL	ONGC Videsh, Shell (Operator), Brava Energia
6		BM-SEAL-4	OVL	ONGC Videsh, Petrobras (Operator)
7		BM-SEAL-11 (2 blocks)	BPRL	Petrobras, IBV (JV of BPRL)
8		BM-C-30 (1 block)	BPRL	Petrobras, IBV (JV of BPRL)
9	Canada	PNW Project	IOCL	Petronas Energy Canada Ltd. (PECL) (Operator), IOC, Sinopec Huadian, Petroleum Brunei Montney Holdings Limited
10	Colombia	MECL	OVL	ONGC Videsh, SIPC
11		CPO-5	OVL	ONGC Videsh (Operator), Geopark
12		RC-10	OVL	ONGC Videsh (Operator), Ecopetrol
13		SSJN 7	OVL	ONGC Videsh, Canacol Energy Ltd (Operator)
14	Gabon	Block Shakthi- II	IOCL	OIL(Operator), IOCL
			OIL	
15	Indonesia	Nunukan	BPRL	Pertamina (Operator) , BPRL
16	Iran	Block Farzad-B	OVL	ONGC Videsh Limited(Operator), IOC, OIL
17	Iraq	Block 20 (Erstwhile Block 8)	OVL	ONGC Videsh Limited
18	Libya	Contract Area 43	OVL	ONGC Videsh Limited
19		Area 95/96	OIL	OIL, IOCL, SIPEX (Operator)
			IOCL	
20	Mozambique	Offshore Area 1, Rovuma Basin	OVL	ONGC Videsh Rovuma Limited, BREML (consortium of ONGC Videsh Limited, OIL), Total Energies (Operator), ENH, Mitsui, BPRL, PTTEP
			OIL	
			BPRL	
21	Myanmar	Blocks A-1	OVL	ONGC Videsh, MOGE, Posco International(Operator), Kogas, GAIL
		Blocks A-3	OVL	
22		Blocks A-1 & A-3	GAIL (India)	
23		Offshore Mid-stream Gas Pipeline (Pipeco 1)	OVL	ONGC Videsh, MOGE, POSCO International (Operator); Kogas, GAIL
			GAIL (India)	

24		Onshore Gas Pipeline (SEAGP) (Pipeco 2)	OVL GAIL (India) Limited	ONGC Nile Ganga B.V., CNPC-SEAP, MOGE, POSCO International, GAIL, KG-SEAGP
25		Block B-2	OVL	ONGC Videsh (Operator), M&S (Carried)
26		Block EP-3	OVL	ONGC Videsh (Operator), M&S (Carried)
27	Nigeria	OML 142	IOCL OIL	Summit Oil (Operator), Suntera Nigeria Ltd, (JV Partners: Suntera, IndianOil, OIL)
28	Oman	Mukhaizana	IOCL	IOCL, Occidental Mukhaizna LLC, Oman Oil, Liwa Energy Limited (Mubadala), PTTEP (Partex (Oman) Corporation
29	Russia	Sakhalin -1	OVL	ONGC Videsh, SODECO, Rosneft subsidiaries (SMNG and RN Astra)
30		Vankorneft	OVL OIL IOCL BPRL	ONGC Videsh, Vankorneft Pte Ltd, Vankor India Pte Ltd. (consortium of IOCL, OIL & BPRL), Vostok Oil LLC ((an affiliate of Rosneft; RN Vankor - Operator)
31		Imperial Energy	OVL	ONGC Videsh
32		Taas Yuryakh	IOCL OIL BPRL	Rosneft, Taas India Pte Ltd (TIPL - consortium of IOCL, OIL & BPRL), BP Russian Investment Ltd
33		Licence-61	OIL	OIL, Petroneft Resources (Operator)
34	South Sudan	GPOC	OVL	ONGC Videsh, CNPC, Nilepet
35		SPOC	OVL	ONGC Videsh and Nilepet
36	Syria	AFPC	OVL	SSPD(Operator), HESBV (Consortium of ONGC Videsh and CNPC)
37		Block 24	OVL	ONGC Videsh, IPRMEL (Operator), Tri-Ocean-Mediterranean (TOM)
38	UAE	Lower Zakum Concession	OVL IOCL BPRL	FOGBV- Falcon Oil & Gas B.V. (Consortium of ONGC Videsh, IOCL, BPRL), ADNOC (Operator), INPEX, CNPC, TOTAL, ENI
39		Onshore Block 1	IOCL BPRL	UBPL (a JV of BPRL and IOCL)
40	USA	Niobrara Shale Project	IOCL	IOCL USA Inc., Verdad Resources LLC; Haimo Oil & Gas LLC
41		Eagle Ford Joint Venture (JV)	GAIL India	Texas American Resources II, LLC, ("TAR"), Ridgemar, GAIL Global (USA) Inc.
42	Venezuela	San Cristobal	OVL	ONGC Videsh, CVP-PDVSA, PDVSA Social
43		Carabobo Project-1	OVL OIL IOCL	ONGC Videsh Limited, PDVSA, Repsol, IOCL, OIL
44	Vietnam	Block 06.1	OVL	ONGC Videsh, Zarubezhneft EP Vietnam B.V, Petro Vietnam
45		Block 128	OVL	ONGC Videsh

Notes

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IEW
INDIA ENERGY WEEK 2023

BIOGAS

SATAT
SUSTAINABLE ALTERNATIVE TOWARDS AFFORDABLE TRANSPORTATION

An initiative by Ministry of Petroleum and Natural Gas (MoPNG)

उज्ज्वला

सत्यमेव जयते

Ministry of Petroleum and Natural Gas
Government of India

सत्यमेव जयते

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय

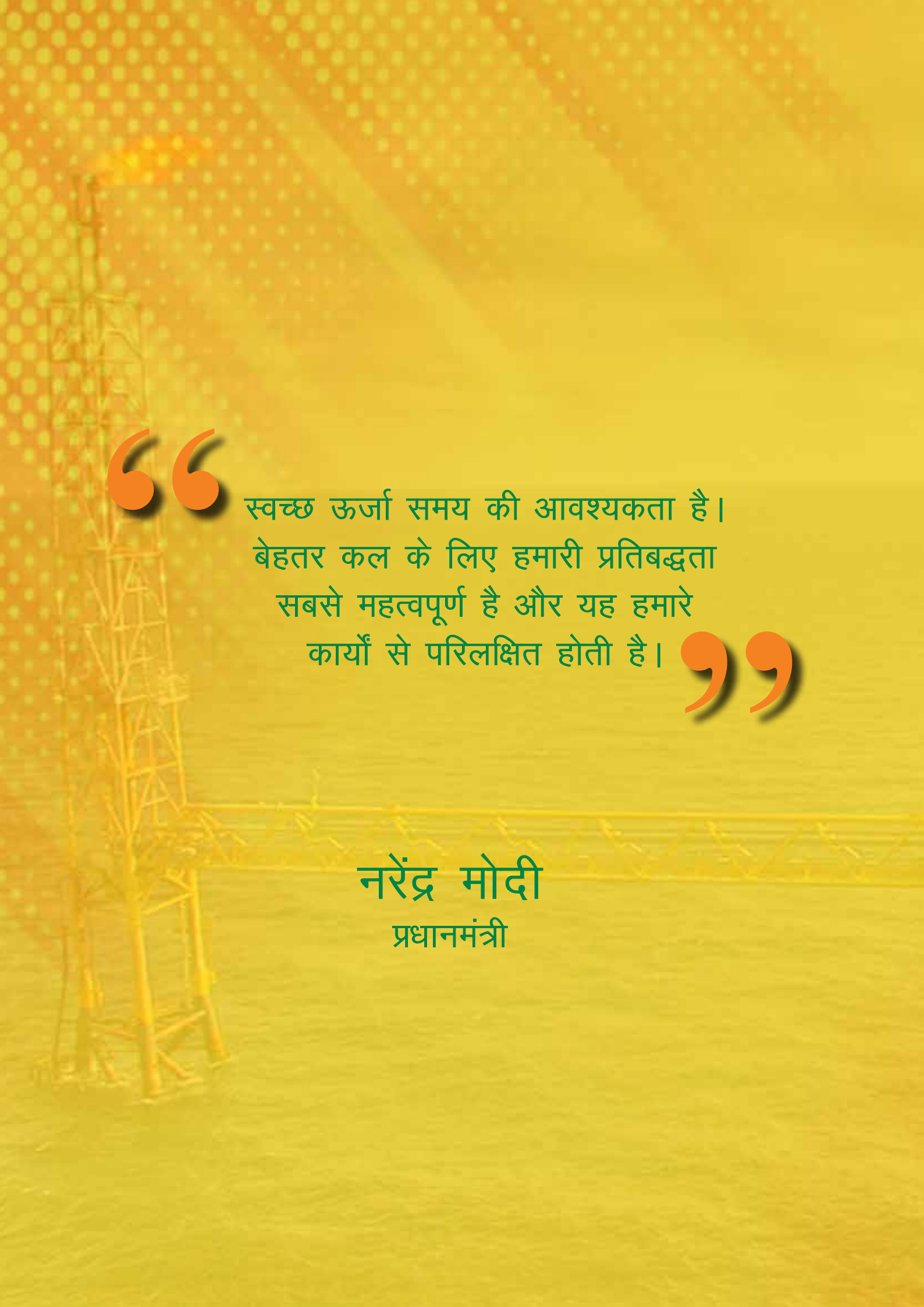
भारत सरकार

भारत की ऊर्जा की नई उड़ान-
स्वच्छ, हरित और उन्नत



नेट ज़ीरो

वार्षिक रिपोर्ट 2024-25


“स्वच्छ ऊर्जा समय की आवश्यकता है।
बेहतर कल के लिए हमारी प्रतिबद्धता
सबसे महत्वपूर्ण है और यह हमारे
कार्यों से परिलक्षित होती है।”
नरेंद्र मोदी
प्रधानमंत्री



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गैस–आधारित अर्थव्यवस्था को अपनाने के प्रयासों में तेज़ी

जैव ईंधन को बढ़ावा देने के लिए घरेलू स्रोतों पर अधिक निर्भरता

जीवाश्म ईंधन, विशेष रूप से पेट्रोलियम और कोयले का स्वच्छ उपयोग

वाहनों को कार्बन–मुक्त बनाने में बिजली का बढ़ता योगदान

2030 तक 450 गीगावाट का नवीकरणीय ऊर्जा लक्ष्य हासिल करना

सभी ऊर्जा प्रणालियों में डिजिटल नवाचार

हाइड्रोजन सहित नए ईंधनों को अपनाना



विषय–सूची

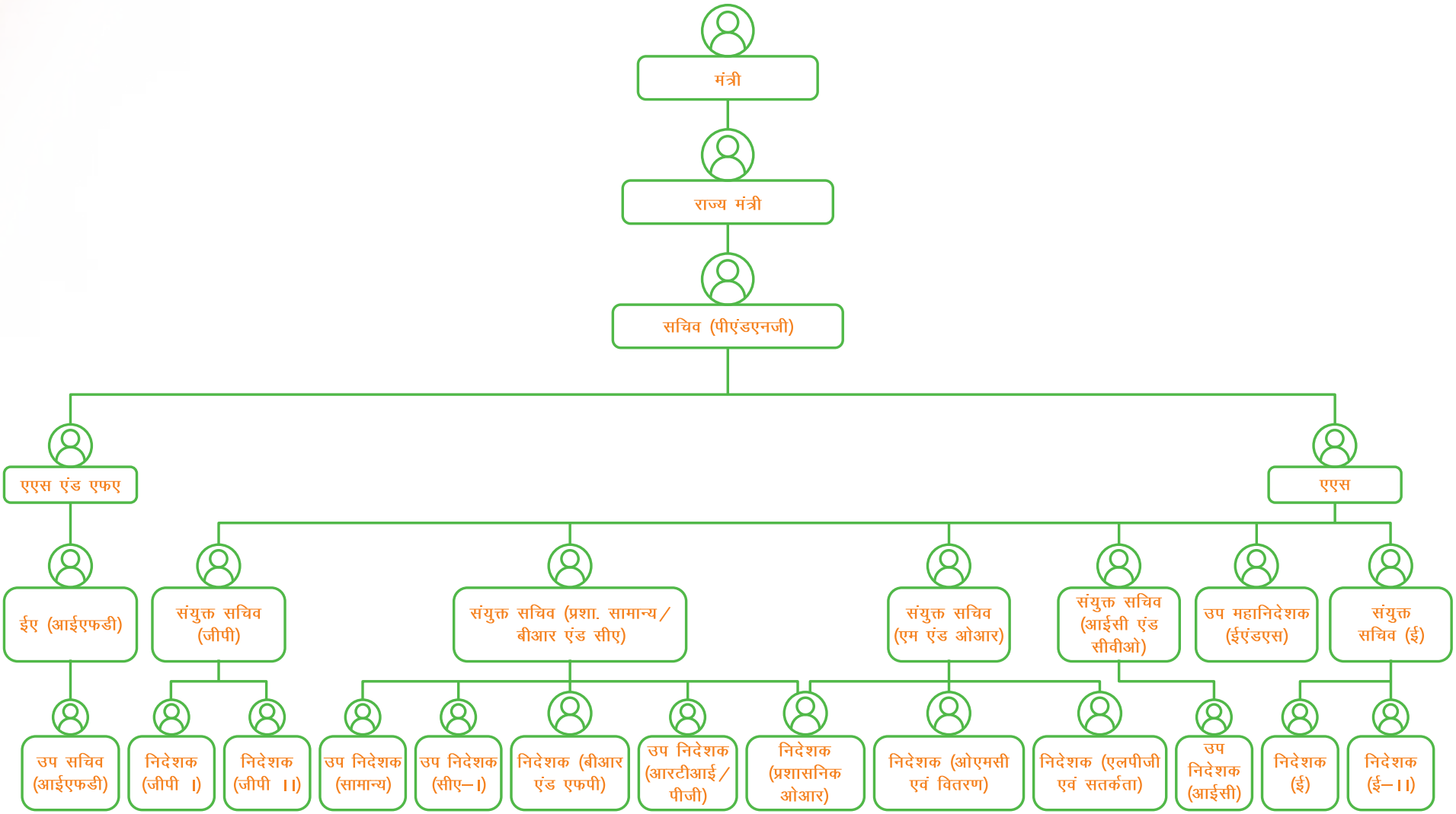
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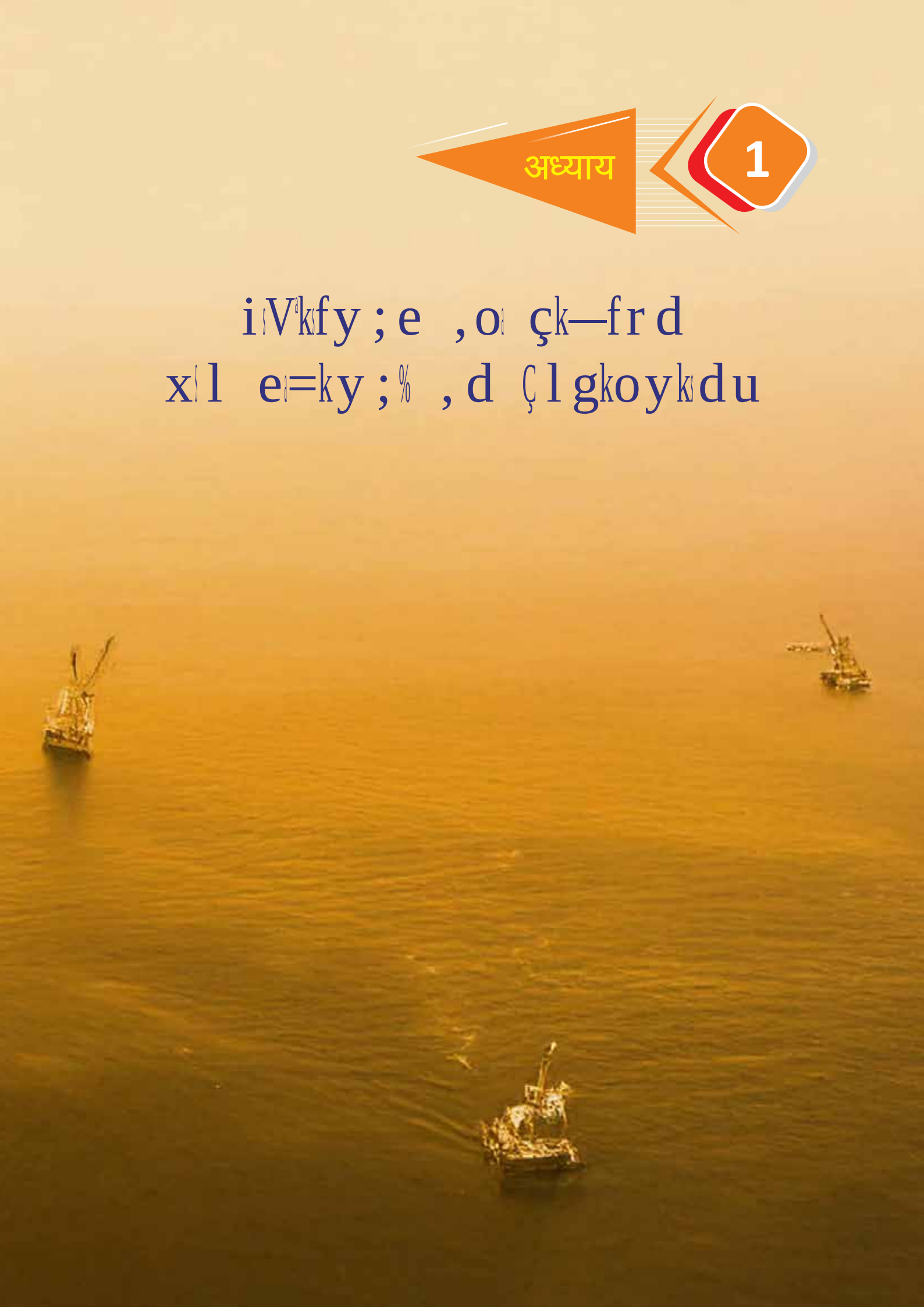
- श्री हरदीप सिंह पुरी –11 जून, 2024 से पेट्रोलियम एवं प्राकृतिक गैस मंत्री
- श्री सुरेश गोपी –11 जून, 2024 से पेट्रोलियम एवं प्राकृतिक गैस राज्य मंत्री
- श्री पंकज जैन, आईएएस (असमः1990) – 30 दिसंबर, 2021 से सचिव
- श्री प्रवीण मल खनूजा, एआई एवं एएसः1994 –12 अगस्त, 2022 से अपर सचिव
- सुश्री कामिनी चौहान रतन, आईएएस (उ.प्रः1997) – 11 जून, 2024 से अपर सचिव एवं वित्तीय सलाहकार सचिव
- सुश्री सुजाता शर्मा, आईएएस (आंध्र प्रदेशः 2006) – 12 दिसंबर, 2022 से संयुक्त सचिव
- श्री आशीष जोशी, आईएएस (उत्तराखंडः 2006) – 19 जुलाई, 2023 से संयुक्त सचिव
- श्री विनोद शेषन, आईएएस (असमः2008) –7 अगस्त, 2024 से संयुक्त सचिव
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- श्री धीरज कुमार ओझा, आईएसएसः1999 –10 दिसंबर, 2021 से उप महानिदेशक
- श्री राजिंदर कुमार, आईईएसः2003 – 11 मार्च, 2022 से आर्थिक सलाहकार
- विशाखा एवं अन्य बनाम राजस्थान राज्य एवं अन्य मामले में माननीय सर्वोच्च न्यायालय द्वारा निर्धारित दिशानिर्देशों और कार्मिक एवं प्रशिक्षण विभाग/ महिला एवं बाल विकास मंत्रालय द्वारा जारी आदेशों के अनुरूप, कामकाजी महिलाओं के यौन उत्पीड़न की शिकायतों की रोकथाम और निवारण हेतु मंत्रालय में एक आंतरिक शिकायत समिति (महिला प्रकोष्ठ) का पुनर्गठन किया गया है। वर्तमान में, पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय में संयुक्त सचिव सुश्री सुजाता शर्मा इस समिति की अध्यक्ष हैं और उनके साथ चार अन्य सदस्य (एक गैर–सरकारी संगठन के सदस्य सहित) हैं।



पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय का संगठनात्मक ढाँचा







अध्याय 1

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1 पेट्रोलियम एवं प्राकृतिक गैस मंत्रालयः एक सिंहावलोकन

पेट्रोलियम एवं प्राकृतिक गैस क्षेत्र का कार्य–निष्पादन – कुछ प्रमुख वृहद–आर्थिक रुझान

1.1 परिचयः

भारत ने हाल के वर्षों में उल्लेखनीय आर्थिक उपलब्धियाँ हासिल की हैं। दुनिया की चौथी सबसे बड़ी अर्थव्यवस्था के रूप में भारत, सबसे तेज़ी से बढ़ने वाली प्रमुख अर्थव्यवस्था के रूप में उभरा है, और 2030 तक 7.3 ट्रिलियन डॉलर के अनुमानित सकल घरेलू उत्पाद के साथ दुनिया की तीसरी सबसे बड़ी अर्थव्यवस्था बनने की दिशा में अग्रसर हो रहा है।

भारत का पेट्रोलियम उद्योग एक व्यापक क्षेत्र है जिसमें पेट्रोलियम और उसके उप–उत्पादों की खोज, उत्पादन, रिफाइनिंग, वितरण और विपणन शामिल है। इसमें कच्चे तेल और प्राकृतिक गैस निकालने जैसी अपस्ट्रीम गतिविधियाँ, तेल और गैस के परिवहन और भंडारण जैसी मिडस्ट्रीम गतिविधियाँ, और पेट्रोल, डीज़ल, एलपीजी और केरोसिन जैसे ईंधनों के शोधन और वितरण जैसी डाउनस्ट्रीम प्रक्रियाएँ शामिल हैं। भारत की ऊर्जा जरूरतों में पेट्रोलियम उद्योग का महत्वपूर्ण योगदान है। यह ऊर्जा सुरक्षा सुनिश्चित करता है और देश की विभिन्न आर्थिक गतिविधियों को आधार प्रदान करता है।

भारत में पेट्रोलियम क्षेत्र तेजी से बढ़ रहा है, जिसका मुख्य कारण बढ़ती ऊर्जा मांग और ऊर्जा सुरक्षा तथा पहुँच पर केंद्रित सरकारी पहलें हैं। भारत पेट्रोलियम उत्पादों की रिफाइनिंग और निर्यात में प्रमुख भूमिका निभा रहा है और वैश्विक तेल मांग में महत्वपूर्ण योगदान देने के लिए तैयार है। जहाँ दुनिया भर की सरकारें ऊर्जा सुरक्षा पर विशेष ज़ोर देते हुए घरेलू सुरक्षा को मज़बूत करने पर ध्यान केंद्रित कर रही हैं, ऐसे में वर्तमान जी20 अध्यक्ष के रूप में भारत को महत्वपूर्ण वैश्विक मुद्दों, विशेष रूप से जलवायु परिवर्तन पर चर्चा का नेतृत्व करने का एक अनूठा अवसर मिला है। भारत ने 2005 की तुलना में उत्सर्जन तीव्रता को 33-35% तक कम किया है और अपनी बिजली का 40% उत्पादन गैर–जीवाश्म ईंधन स्रोतों से सुनिश्चित किया है। अगस्त 2022 में, भारत ने 2070 तक नेट–जीरो उत्सर्जन के लक्ष्य के अनुरूप अपने राष्ट्रीय स्तर पर निर्धारित योगदान को और बढ़ाया। हालांकि, कई विकासशील देशों की तरह, भारत को पर्यावरणीय स्थिरता बनाए रखने के साथ अपने लोगों के लिए ऊर्जा सुरक्षा और समानता सुनिश्चित करने की चुनौती का सामना करना पड़ रहा है।

भारत ऊर्जा समानता सुनिश्चित करने के लिए ऊर्जा की पहुँच और किफ़ायती विकल्पों पर ध्यान दे रहा है, जो भविष्य में प्रति व्यक्ति ऊर्जा मांग बढ़ने का मुख्य कारण बनेगा। माननीय प्रधानमंत्री ने भारत के ऊर्जा भविष्य के चार स्तंभों की परिकल्पना की है – ऊर्जा पहुँच, ऊर्जा दक्षता, ऊर्जा स्थिरता और ऊर्जा सुरक्षा। ये चार स्तंभ भारत के लिए अत्यंत महत्वपूर्ण हैं क्योंकि देश विश्व में एक आर्थिक महाशक्ति बनने की दिशा में अग्रसर है।

ऊर्जा की मांग मुख्य रूप से जीवाश्म ईंधनों से पूरी होती है, जो भारत की प्राथमिक ऊर्जा आवश्यकता का 88.2% है। ऊर्जा संस्थान के 74वें संस्करण, विश्व ऊर्जा सांख्यिकी समीक्षा–2025 के अनुसार, ऊर्जा मिश्रण में कोयले का योगदान 59.3% है, जबकि तेल और गैस का योगदान क्रमशः 28.1% और 6.5% है।

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कोयला	:	59.3%
कच्चा तेल	:	28.1%
नवीकरणीय ऊर्जा	:	3.1%
प्राकृतिक गैस	:	6.5%
पनबिजली	:	1.4%
परमाणु ऊर्जा	:	1.5%

जलवायु प्रतिबद्धताओं और वैश्विक राजनीतिक परिस्थितियों के कारण दुनिया के ऊर्जा परिदृश्य में तेजी से बदलाव हो रहे हैं। इससे ऊर्जा मूल्य श्रृंखला में कम कार्बन वाले विकल्प अपनाने और कार्बन हटाने की दिशा में कदम उठाने की जरूरत बढ़ गई है। 29.52 गीगावाट की रिकॉर्ड वार्षिक वृद्धि के साथ, भारत में कुल स्थापित नवीकरणीय ऊर्जा (आरई) क्षमता 31 मार्च 2025 तक 220.10 गीगावाट पहुँच गई, जो पिछले वित्त वर्ष 198.75 गीगावाट थी। यह प्रगति प्रधानमंत्री नरेंद्र मोदी द्वारा निर्धारित 'पंचामृत' लक्ष्यों के अनुसार 2030 तक 500 गीगावाट गैर–जीवाश्म ईंधन आधारित क्षमता हासिल करने के भारत के लक्ष्य की दिशा में निरंतर प्रगति को दर्शाती है।

पंचामृत

- वर्ष 2030 तक अपनी गैर–जीवाश्म ऊर्जा क्षमता को 500 गीगावाट तक बढ़ाना, जिसमें 450 गीगावाट नवीकरणीय ऊर्जा और 43% नवीकरणीय ऊर्जा खरीद दायित्व शामिल है।
- भारत की 50% बिजली की मांग को नवीकरणीय ऊर्जा स्रोतों से पूरा करना।
- भारतीय अर्थव्यवस्था में कार्बन उत्सर्जन को 45% तक कम करना।
- 2021 से 2030 तक भारत के कुल अनुमानित कार्बन उत्सर्जन को एक अरब टन तक घटाना।
- 2070 तक नेट–जीरो कार्बन उत्सर्जन का लक्ष्य प्राप्त करना।

यह गैर–जीवाश्म ईंधन ऊर्जा अवसंरचना की ओर बदलाव पर ज़ोर देता है और वर्ष 2070 तक कार्बन तटस्थता प्राप्त करने का लक्ष्य रखता है, जिससे उत्सर्जन पूरी तरह शून्य हो जाएगा। इसके अलावा, भारत में 2050 तक अपनी ऊर्जा मांग दोगुनी होने की उम्मीद है, जिसमें ऊर्जा मिश्रण भविष्य के ऊर्जा परिवर्तन और ईंधन के चयन में महत्वपूर्ण भूमिका निभाएगा। उभरते ईंधन और वैकल्पिक ऊर्जा स्रोतों पर ध्यान भविष्य की ऊर्जा प्रणालियों को बनाने और एक प्रभावी राष्ट्रीय ऊर्जा नीति तैयार करने में मुख्य भूमिका निभाएगा। ऊर्जा परिवर्तन, ऊर्जा स्रोतों का विविधीकरण, ऊर्जा स्वतंत्रता और ऊर्जा सुरक्षा जैसे मुद्दे आने वाले वर्षों में भारत के ऊर्जा मिश्रण पर महत्वपूर्ण प्रभाव डालेंगे।

ऊर्जा संसाधनों की बढ़ती मांग को आर्थिक रूप से किफायती और पर्यावरण के लिहाज से टिकाऊ तरीके से पूरा करना एक बड़ी राष्ट्रीय चुनौती है। निकट भविष्य में तेल और गैस का उत्पादन बढ़ाने के लिए, मौजूदा उत्पादन क्षेत्रों और नए विकासशील क्षेत्रों दोनों में लक्षित प्रयास करने होंगे ताकि उत्पादन में गिरावट रोकी जा सके। हालांकि, घरेलू कच्चे तेल का उत्पादन पिछले कुछ वर्षों में स्थिर रहा है या घटा है। मौजूदा क्षेत्रों से, जो अधिकांशतः परिपक्व हैं या जल्दी परिपक्व हो जाएंगे, उत्पादन वृद्धि बहुत सीमित होगी।

उत्पादन लक्ष्यों को हासिल करने के लिए एक बहुआयामी रणनीति की ज़रूरत है। इसमें पहले से उत्पादन कर रहे (पुराने और नए) क्षेत्रों में उत्पादन बढ़ाना, मौजूदा और नए क्षेत्रों में एफडीपी (क्षेत्रीय विकास योजना) को तेज़ी से लागू करना, अब तक उपयोग में न आए क्षेत्रों और खोजों का लाभ उठाना, अधिक कूप शुरू करना, उत्पादन वृद्धि अनुबंधों (पीईसी) को प्रभावी ढंग से लागू करना, मौजूदा क्षेत्रों में उत्पादन बढ़ाने के लिए प्रोत्साहन देना शामिल है। इसके साथ ही, टाइट ऑयल/गैस और एचपी–एचटी भंडार जैसे कठिन क्षेत्रों को विकसित करने के लिए तकनीकी साझेदारों की तलाश करना और कोल बेड मीथेन (सीबीएम), शेल ऑयल/गैस जैसे अपरंपरागत संसाधनों की खोज करना भी आवश्यक है।

प्राकृतिक गैस और कच्चे तेल के घरेलू उत्पादन को बढ़ाने के लिए नए और पर्याप्त हाइड्रोकार्बन भंडारों की खोज बहुत ज़रूरी है। इसके लिए यह आवश्यक है कि वैश्विक तेल कंपनियों की भागीदारी के साथ, पहले से खोजे गए क्षेत्रों में तेजी से ड्रिलिंग की जाए और कम खोजे गए क्षेत्रों में नए खनन कार्य शुरू किए जाएँ। घरेलू उत्पादन बढ़ाने के लिए दो मुख्य कदम जरूरी हैं: (क) ऐसे खनन क्षेत्रों में अन्वेषण करना जहाँ अब तक पूरी तरह खोज नहीं हुई या जहाँ कुछ तेल बाकी है, और (ख) बड़े अन्वेषण क्षेत्रों, विशेष रूप से गहरे और बहुत गहरे समुद्री इलाकों में, नए ब्लॉकों का तेजी से आवंटन करना ताकि वहाँ से तेल और गैस की नई खोजें की जा सकें और उन्हें उत्पादन में लाया जा सके।

अन्वेषण की गति विशेष रूप से समुद्र के किनारे वाले सीमांत इलाकों में बढ़ाना ज़रूरी है। साथ ही, आधुनिक तकनीक, डेटा और अच्छी रणनीतियों के

ज़रिए विदेशी निवेश को आकर्षित करना भी अहम है। अब ध्यान उन इलाकों पर होना चाहिए जहाँ अभी तक तेल या गैस की खोज नहीं हुई है। इसके साथ ही, उन क्षेत्रों में उत्पादन बढ़ाने पर भी ज़ोर देना चाहिए जो पहले से ही परिपक्व हो चुके हैं या होने वाले हैं। इससे देश में तेल और गैस का मौजूदा उत्पादन स्तर न सिर्फ़ बना रहेगा, बल्कि आगे भी बढ़ेगा। इसका मुख्य लक्ष्य नई तकनीक, नवाचार और मज़बूत साझेदारियों की मदद से हमारे भंडारों से ज़्यादा उत्पादन और बेहतर रिकवरी हासिल करना है।

घरेलू उत्पादन बढ़ाने और आयात पर निर्भरता कम करने की रणनीति आज के वैश्विक माहौल और निवेश की स्थिति को ध्यान में रखकर बनाई जानी चाहिए। देश में ऊर्जा की बढ़ती ज़रूरतों, जलवायु परिवर्तन संबंधी चिंताओं, नई तेल–गैस परियोजनाओं में घटते निवेश और विदेशी पूंजी के लिए बढ़ती वैश्विक प्रतिस्पर्धा को देखते हुए, भारत को अपने ईएंडपी क्षेत्र में निजी निवेशकों को आकर्षित करने के लिए नए और व्यापक कदम उठाने होंगे।

'अभी तक खोजे नहीं गए' हाइड्रोकार्बन संसाधनों का पता लगाने के लिए तलछटी बेसिनों में सक्रिय क्षेत्रों को बढ़ाना ज़रूरी है। इसका लक्ष्य आगामी ओएएलपी बोली दौरों के तहत बड़े अन्वेषण क्षेत्रों का आवंटन कर अधिक संसाधन बढ़ाना है। इसके लिए प्रमुख रणनीतिक प्राथमिकताएँ खेल–आधारित अन्वेषण पर ध्यान देना, अन्वेषण कार्य कार्यक्रम का समय पर पूरा करना, ईईजेड सीमा तक पूरी भूकंपीय सर्वेक्षण करना, पेट्रोलियम युक्त अंडमान बेसिन का अन्वेषण करना, अपतटीय और पूर्वोत्तर क्षेत्रों के लिए विशेष बोली दौर आयोजित करना, एनडीआर का उन्नयन करना, नई डेटा अधिग्रहण/प्रसार नीति लागू करना और राष्ट्रीय भू–वैज्ञानिक डेटा अधिग्रहण एवं ड्रिलिंग कार्यक्रम चलाना है।

भारत सरकार ऊर्जा सुरक्षा को मजबूत करने के लिए व्यापक प्रयास कर रही है। "आत्मनिर्भर" बनने के लिए भारत को अपनी आयात निर्भरता कम करनी होगी, जिसका अर्थ है कि उसे त्वरित अन्वेषण एवं उत्पादन (ईएंडपी) गतिविधियों के माध्यम से अपने मौजूदा हाइड्रोकार्बन संसाधनों का पूर्ण दोहन करना होगा।

सरकार ने इसके लिए पाँच–आयामी रणनीति अपनाई है। इसमें घरेलू तेल और गैस उत्पादन बढ़ाना, ऊर्जा दक्षता और संरक्षण को बढ़ावा देना, मांग की आपूर्ति अन्य स्रोत से करना, जैव ईंधन और अन्य वैकल्पिक/नवीकरणीय ऊर्जा को प्रोत्साहित करना, ईवी चार्जिंग सुविधाओं का विकास और रिफाइनरी प्रक्रियाओं में सुधार कर आयातित कच्चे तेल पर निर्भरता कम करना शामिल है।

1.2. तेल, गैस और पेट्रोलियम उत्पादों का उत्पादनः

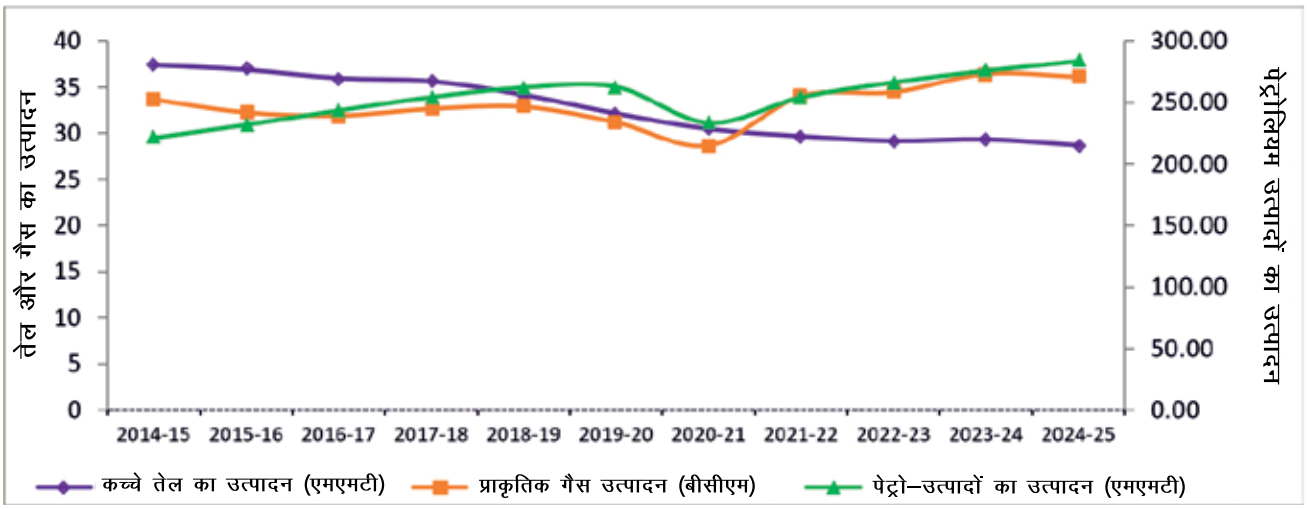
वित्त वर्ष 2024–25 में कच्चे तेल का उत्पादन 28.70 एमएमटी रहा, जबकि 2023–24 में यह 29.36 एमएमटी था। देश में कच्चे तेल का अधिकतम उत्पादन ओएनजीसी के पश्चिमी अपतट से होता है, जो कुल उत्पादन का लगभग 43.32% योगदान देता है। इसी तरह, वित्त वर्ष 2024–25 में प्राकृतिक गैस का उत्पादन 36.11 बीसीएम रहा, जबकि 2023–24 में यह 36.44 बिलियन क्यूबिक मीटर (बीसीएम) था। प्राकृतिक गैस का अधिकतम उत्पादन भी ओएनजीसी के पश्चिमी अपतट से हुआ, जो कुल उत्पादन का लगभग 40.06% है।

वर्ष 2024–25 के दौरान पेट्रोलियम उत्पादों का उत्पादन 283.77 एमएमटी रहा, जो वित्त वर्ष 2023–24 (276.06 एमएमटी) के उत्पादन से 2.79% अधिक है। कच्चे तेल, प्राकृतिक गैस और पेट्रोलियम उत्पादों के उत्पादन के रुझान नीचे दिए गए हैं: –

तालिका–1: कच्चे तेल, प्राकृतिक गैस और पेट्रोलियम उत्पादों के उत्पादन के रुझान

o"k	dPpk r;y dk mRiknu ¼,e,eVh½	dPpk r;y dk mRiknu esa % o`f)	çk—frd xSl mRiknu ¼ch lh,e½	çk—frd xSl dk mRiknu esa % o`f)	iVªksfy;e mRiknksa dk mRiknu ¼,e,eVh½	iVªksfy;e mRiknksa dk mRiknu esa % o`f)
2014-15	37.46	-0.87	33.66	-4.94	221.14	0.17
2015-16	36.94	-1.39	32.25	-4.18	231.92	4.88
2016-17	36.01	-2.53	31.90	-1.09	243.55	5.01
2017-18	35.68	-0.90	32.65	2.36	254.40	4.46
2018-19	34.20	-4.15	32.87	0.69	262.36	3.13
2019-20	32.17	-5.95	31.18	-5.14	262.94	0.22
2020-21	30.49	-5.21	28.67	-8.05	233.51	-11.19
2021-22	29.69	-2.63	34.02	18.66	254.31	8.90
2022-23	29.18	-1.72	34.45	1.25	266.54	4.81
2023-24	29.36	-1.13	36.44	7.10	276.06	8.55
2024-25 ¼अनंतिम)	**28.70**	**-2.23**	**36.11**	**-0.91**	**283.77**	**2.79**

ग्राफ–1: कच्चे तेल, प्राकृतिक गैस और पेट्रोलियम उत्पादों के उत्पादन के रुझान



1.3. रिफाइनिंग क्षमता और रिफाइनरी क्रूड थ्रूपुट:

भारतीय रिफाइनिंग उद्योग ने वैश्विक स्तर पर अपनी खास पहचान बनाई है। भारत दुनिया का चौथा सबसे बड़ा रिफाइनर और चीन के बाद एशिया का दूसरा सबसे बड़ा रिफाइनर है। यह देश रिफाइनिंग के क्षेत्र में एक प्रमुख केंद्र के रूप में उभर रहा है, जिसकी रिफाइनिंग क्षमता घरेलू मांग से कहीं अधिक है।

1 अप्रैल 2025 की स्थिति के अनुसार भारत की तेल रिफाइनिंग क्षमता 256.82 मिलियन मीट्रिक टन प्रति वर्ष (एमएमटीपीए) थी।

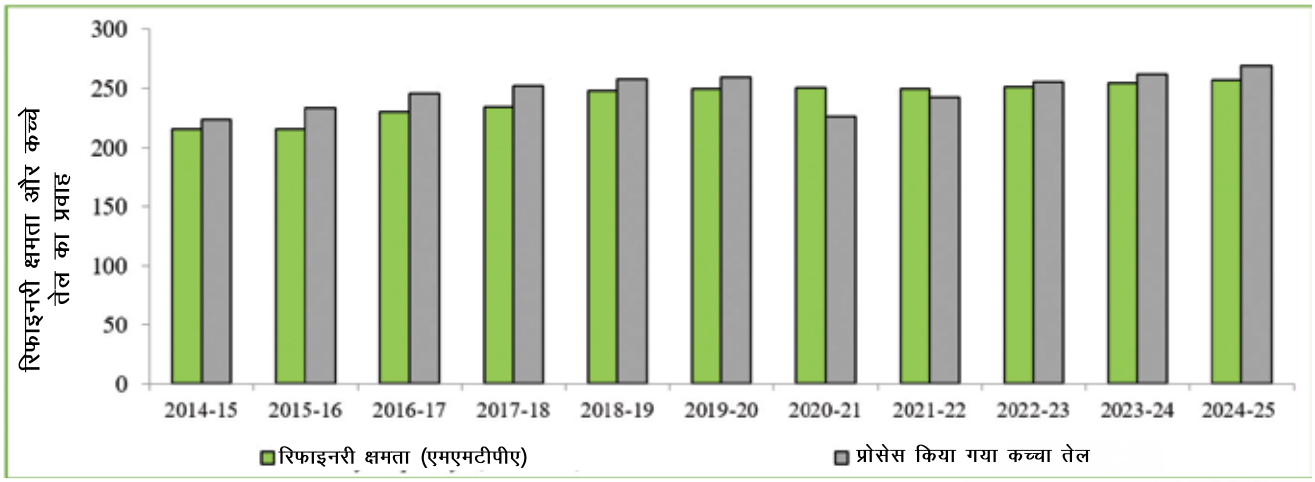
वित्त वर्ष 2024–25 के दौरान कुल 267.70 एमएमटी कच्चा तेल प्रोसेसे किया गया और रिफाइनरी क्षमता का उपयोग 104.24% (अनंतिम) रहा। नीचे रिफाइनिंग क्षमता और कच्चे तेल के प्रवाह का रुझान दिखाया गया है।

तालिका–2: रिफाइनिंग क्षमता और प्रोसेस किए गए कच्चे तेल का रुझान

वर्ष	रिफाइनिंग क्षमता (एमएमटीपीए)@	रिफाइनिंग क्षमता में % वृद्धि	प्रोसेस किया गया कच्चा तेल (एमएमटी)	प्रोसेस किए गए कच्चे तेल में % वृद्धि	वार्षिक रिफाइनिंग क्षमता उपयोग
2014-15	215.07	0.00	223.24	0.33	103.80
2015-16	215.07	0.00	232.86	4.31	108.28
2016-17	230.07	6.97	245.36	5.37	106.65
2017-18	233.97	1.70	251.93	2.68	107.68
2018-19	247.57	5.81	257.20	2.09	103.89
2019-20	249.37	0.73	258.71	0.59	103.75
2020-21	249.87	0.20	225.66	-12.78	90.31
2021-22	249.22	-0.26	241.70	7.11	96.99
2022-23	251.22	0.80	255.23	5.60	101.60
2023-24	253.92	1.07	261.55	2.47	103.00
2024-25 (अनंतिम)	**256.82**	**1.14**	**267.70**	**2.35**	**104.24**

@% प्रारंभिक वर्ष के 1 अप्रैल तक

ग्राफ–2: रिफाइनिंग क्षमता और प्रोसेस किए गए कच्चे तेल का रुझान



1.4. पेट्रोलियम उत्पादों और प्राकृतिक गैस की खपत:

देश ने हाल के वर्षों में लगातार आर्थिक विकास देखा है, जिससे वाहनों की बिक्री बढ़ी है और औद्योगीकरण, शहरीकरण तथा बुनियादी ढांचे का विकास हुआ है। ये सभी कारक परिवहन, ऊर्जा और ईंधन की मांग

बढ़ाने में मदद कर रहे हैं, जिसके कारण ईंधन की खपत में तेजी आई है। वाहनों की संख्या बढ़ने और सड़क परिवहन के अधिक इस्तेमाल के कारण तेल की खपत और आयात में तेजी से वृद्धि हुई है। प्रधानमंत्री उज्ज्वला योजना (पीएमयूवाई) गरीब परिवारों को एलपीजी कनेक्शन प्रदान करती है। ग्रामीण क्षेत्रों में एलपीजी का बढ़ता उपयोग और शहरी क्षेत्रों में पाइपलाइन प्राकृतिक गैस (पीएनजी) के इस्तेमाल में वृद्धि हुई है। परिवहन क्षेत्र में हाल के वर्षों में सबसे तेजी से वृद्धि हुई है और यह अंतिम–उपयोग वाले खंड में सबसे तेज़ी से बढ़ता हिस्सा बन गया है। भारत अपने परिवहन बुनियादी ढांचे का विस्तार कर रहा है, जिसमें राजमार्ग, रेलवे, मेट्रो लाइनें, हवाई अड्डे और बंदरगाह शामिल हैं।

वित्त वर्ष 2024–25 में पेट्रोलियम उत्पादों की खपत लगभग 239.17 एमएमटी रही, जो वित्त वर्ष 2023–24 (234.26 एमएमटी) की तुलना में 2.10% अधिक है। इसी दौरान प्राकृतिक गैस की कुल खपत 71.31 बीसीएम रही, जो वित्त वर्ष 2023–24 (67.51 बीसीएम) की तुलना में 5.63% अधिक है। वित्त वर्ष 2024–25 में प्राकृतिक गैस की लगभग 49.52% माँग स्वदेशी स्रोतों से और 50.48% आयात के माध्यम से पूरी की गई।

तालिका–3: पेट्रोलियम उत्पादों और प्राकृतिक गैस की खपत

वर्ष	पेट्रो–उत्पादों की खपत (एमएमटी)	पेट्रो–उत्पादों की खपत में % वृद्धि	प्राकृतिक गैस की खपत (बीसीएम)	प्राकृतिक गैस की खपत में % वृद्धि
2014-15	165.52	4.49	50.30	-2.94
2015-16	184.67	11.57	50.18	-0.24
2016-17	194.60	5.37	54.41	8.43
2017-18	206.17	5.95	58.47	7.45
2018-19	213.22	3.42	60.60	3.66
2019-20	214.13	0.43	62.61	3.31
2020-21	194.30	-9.26	60.98	-2.60
2021-22	204.23	5.11	64.16	5.21
2022-23	223.02	9.20	59.97	-6.53
2023-24	234.26	5.04	67.51	12.58
2024-25 (अनंतिम)	**239.17**	**2.10**	**71.31**	**5.63**

1.5: संवेदनशील पेट्रोलियम उत्पादों और कच्चे तेल पर मूल्य–निर्धारण नीति:

जुलाई 1975 में प्रशासित मूल्य तंत्र (एपीएम) लागू किया गया, जिसमें पेट्रोलियम उत्पादों के मूल्य निर्धारण को आयात आधारित लागत–प्लस सिद्धांत पर स्थानांतरित किया गया। एपीएम (1975–2002) के तहत विभिन्न तेल पूल खाता बनाए गए ताकि: i) बिक्री मूल्य में स्थिरता सुनिश्चित की जा सके, ii) अंतरराष्ट्रीय मूल्य में उतार–चढ़ाव से उपभोक्ताओं को बचाया जा सके, और iii) केरोसिन जैसे सार्वजनिक वितरण उत्पादों और पेट्रोल व विमानन टर्बाइन ईंधन (एटीएफ) जैसे अन्य उत्पादों से मिली सब्सिडी के जरिए घरेलू एलपीजी के उपभोक्ताओं के लिए कीमत कम रखी जा सके। 01.04.2002 से एपीएम समाप्त कर दिया गया और सरकार ने निर्दिष्ट दरों पर पीडीएस केरोसिन और घरेलू एलपीजी पर सब्सिडी देने का निर्णय लिया। इस बजटीय सब्सिडी के प्रबंधन के लिए 'पीडीएस केरोसिन और घरेलू एलपीजी सब्सिडी

योजना, 2002' तैयार की गई।

पिछले वर्ष में भारतीय रिफाइनरियों द्वारा प्रोसेस किए गए कच्चे तेल में मीठे और खट्टे कच्चे तेल का वास्तविक अनुपात दिखाया गया है। मीठे कच्चे तेल की कीमत के लिए बेंचमार्क "ब्रेंट" कच्चे तेल का दैनिक प्लैट्स आकलन लिया जाता है। खट्टे कच्चे तेल की कीमत के लिए "दुबई" और "ओमान" कच्चे तेल का प्लैट्स आकलन का औसत लिया जाता है। कच्चे तेल का आयात अंतरराष्ट्रीय बाजार में कीमतों के अनुसार किया जाता है।

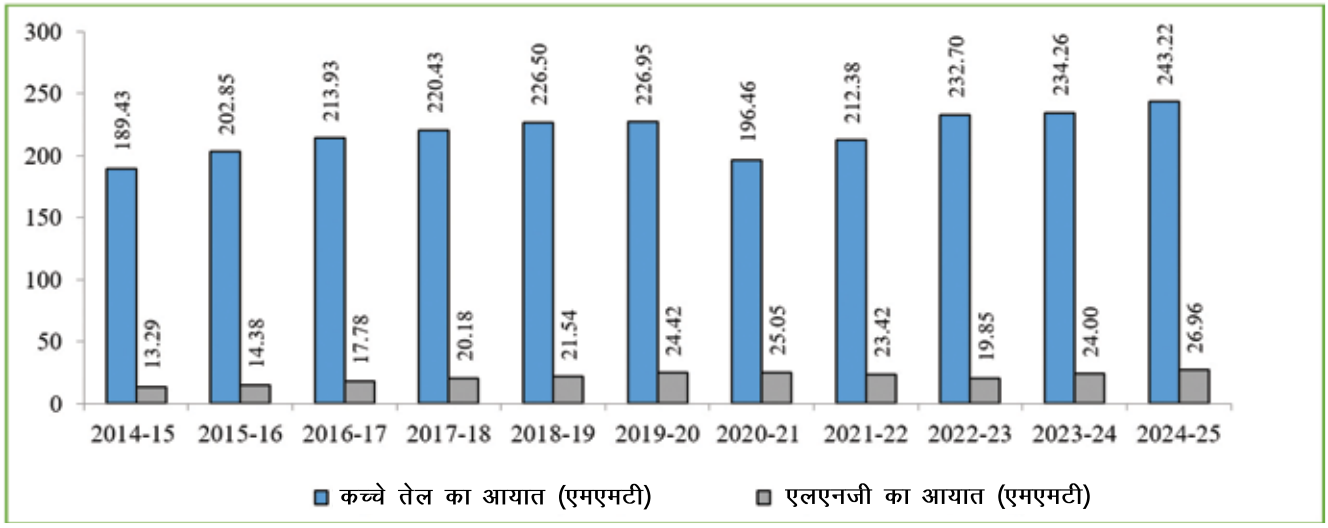
1.6: कच्चे तेल और प्राकृतिक गैस (एलएनजी) का आयात:

2024–25 के दौरान कच्चे तेल का आयात 243.22 एमएमटी (अनंतिम) था, जिसका मूल्य ₹11,60,618 करोड़ (अनंतिम) रहा। इसके मुकाबले, 2023–24 में कच्चे तेल का आयात 234.26 एमएमटी हुआ था, जिसका मूल्य ₹11,05,176 करोड़ था। इससे पता चलता है कि मात्रा के हिसाब से आयात 3.42% और मूल्य के हिसाब से 5.02% बढ़ा है। वहीं, वित्त वर्ष 2024–25 में प्राकृतिक गैस (एलएनजी) का आयात 26.96 एमएमटी (अनंतिम) था, जिसका मूल्य ₹1,25,953 करोड़ (अनंतिम) था। इसके मुकाबले 2023–24 में 24.0 एमएमटी एलएनजी आयात हुआ, जिसका मूल्य ₹1,10,994 करोड़ था। इसका अर्थ है कि एलएनजी आयात मात्रा में 12.33% और मूल्य में 13.48% बढ़ा है। कच्चे तेल और प्राकृतिक गैस (एलएनजी) के आयात में इस वृद्धि का रुझान तालिका–4 और ग्राफ–4 में दिखाया गया है।

तालिका–4: कच्चे तेल और एलएनजी के आयात के रुझान

वर्ष	कच्चे तेल का आयात (एमएमटी)	कच्चे तेल के आयात में % वृद्धि	एलएनजी का आयात (एमएमटी)	एलएनजी के आयात में % वृद्धि
2014-15	189.43	0.10	13.29	2.06
2015-16	202.85	7.08	14.38	8.19
2016-17	213.93	5.46	17.78	23.69
2017-18	220.43	3.04	20.18	13.46
2018-19	226.50	2.75	21.54	6.78
2019-20	226.95	0.20	24.42	13.33
2020-21	196.46	-13.44	25.05	2.61
2021-22	212.38	8.10	23.42	-6.54
2022-23	232.70	9.57	19.85	-15.22
2023-24	234.26	0.67	24.00	20.87
2024-25 (अनंतिम)	**243.22**	**3.42**	**26.96**	**22.80**

ग्राफ–4: कच्चे तेल और प्राकृतिक गैस (एलएनजी) का आयात



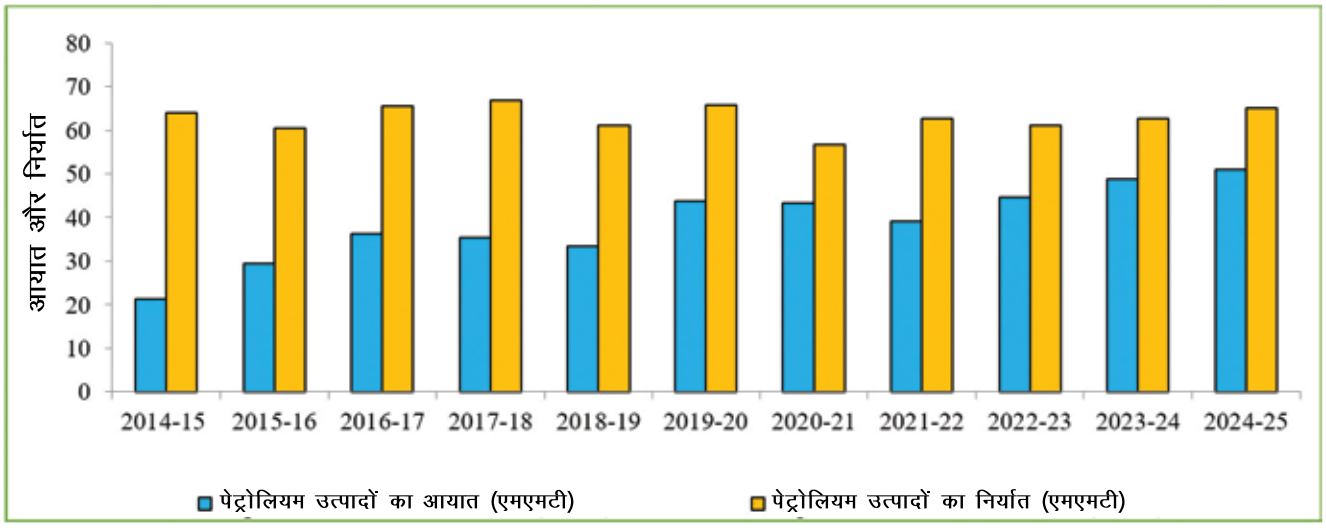
1.7: पेट्रोलियम उत्पादों का आयात और निर्यात:

वित्त वर्ष 2024–25 में पेट्रोलियम उत्पादों का आयात 50.90 एमएमटी (अनंतिम) था, जिसका मूल्य ₹2,00,183 करोड़ (अनंतिम) था। इसके मुकाबले, 2023–24 में आयात 48.69 एमएमटी और मूल्य ₹1,90,069 करोड़ था। इसका अर्थ है कि आयात मात्रा के हिसाब से 7.60% और मूल्य के हिसाब से 5.32% अधिक हुआ। इसके अलावा, 2024–25 में पेट्रोलियम उत्पादों का निर्यात 65.08 एमएमटी (अनंतिम) था, जिसका मूल्य ₹3,75,769 करोड़ (अनंतिम) था। 2023–24 में निर्यात 62.59 एमएमटी और मूल्य ₹3,94,723 करोड़ था। इसका अर्थ है कि निर्यात मात्रा के हिसाब से 2.33% बढ़ा, लेकिन मूल्य के हिसाब से 4.80% कम हुआ। नीचे पेट्रोलियम उत्पादों के आयात और निर्यात की मात्रा का रुझान दर्शाया गया है।

तालिका–5: पेट्रोलियम उत्पादों का आयात और निर्यात:

वर्ष	पेट्रोलियम उत्पादों का आयात (एमएमटी)	पेट्रोलियम उत्पादों के आयात में % वृद्धि	पेट्रोलियम उत्पादों का निर्यात (एमएमटी)	पेट्रोलियम उत्पादों के निर्यात में % वृद्धि
2014-15	21.30	27.57	63.93	-5.79
2015-16	29.46	38.28	60.54	-5.31
2016-17	36.29	23.19	65.51	8.22
2017-18	35.46	-2.28	66.83	2.01
2018-19	33.35	-5.96	61.10	-8.58
2019-20	43.79	31.30	65.69	7.51
2020-21	43.25	-1.23	56.77	-13.57
2021-22	39.02	-9.78	62.75	10.54
2022-23	44.60	14.30	61.01	-2.77
2023-24	48.69	9.18	62.59	2.59
2024-25 (अनंतिम)	**50.90**	**7.60**	**65.08**	**2.33**

ग्राफ–5: पेट्रोलियम उत्पादों के आयात और निर्यात के रुझान



1.8: आपूर्ति में विविधता और विदेशी ईएंडपी परिसंपत्तियों में निवेश:

भारत अपनी बढ़ती ऊर्जा माँग को पूरा करने के लिए 88% से अधिक कच्चे तेल और 50% से अधिक प्राकृतिक गैस का आयात करता है। वैश्विक तेल आपूर्ति श्रृंखलाओं में संभावित जोखिमों को देखते हुए, सरकार ने तेल और गैस के आयात में विविधता लाने को प्राथमिकता दी है।

पिछले कुछ वर्षों में भारत ने नए तेल आपूर्तिकर्ताओं से संपर्क स्थापित किया है, जैसे अमेरिका, रूस, कोलंबिया, घाना, इक्वेटोरियल गिनी, अंगोला और अर्जेंटीना। अब भारत लगभग 40 देशों से कच्चा तेल प्राप्त करता है। ऊर्जा सुरक्षा बढ़ाने और तत्काल खरीद पर निर्भरता कम करने के लिए, भारतीय तेल विपणन कंपनियों (ओएमसी) ने पेट्रोब्रास, ब्राजील और इकोपेट्रोल, कोलंबिया के साथ दीर्घकालिक कच्चे तेल समझौते किए हैं। पिछले पांच वर्षों में खाड़ी सहयोग परिषद (जीसीसी) और ओपेक देशों पर निर्भरता कम हुई है, जो आपूर्ति जोखिमों को घटाने के भारत के रणनीतिक प्रयास को दर्शाता है। इसी तरह, एलएनजी का आयात अब केवल कतर तक सीमित नहीं रहा, बल्कि ऑस्ट्रेलिया, अमेरिका, यूएई आदि देशों से भी किया जाने लगा है।

चूँकि भारत तेल और गैस का शुद्ध आयातक है, इसलिए विदेशी तेल और गैस परिसंपत्तियों में निवेश आवश्यक है। भारत लगातार इन परिसंपत्तियों में निवेश के अवसर तलाश रहा है। 31 मार्च 2025 तक, भारतीय तेल और गैस सार्वजनिक उपक्रमों की 21 देशों में 45 परिसंपत्तियाँ हैं। इन 45 परिसंपत्तियों में से 21 उत्पादन कर रही हैं, 14 में अन्वेषण कार्य चल रहा है, 3 पाइपलाइन परियोजनाएँ हैं, और 7 विकास के विभिन्न चरणों में हैं। वित्त वर्ष 2024–25 के दौरान, तेल और गैस का विदेशी उत्पादन लगभग 20.2 एमएमटीओई था, जो भारत के घरेलू उत्पादन का एक बड़ा हिस्सा है।

1.9: अन्वेषण और लाइसेंसिंग नीति में सुधार:

सरकार ने अन्वेषण गतिविधियों को तेज़ करने, विदेशी और घरेलू निवेश आकर्षित करने और घरेलू उत्पादन बढ़ाने के लिए कई नीतिगत कदम उठाए हैं। तेल और गैस के घरेलू उत्पादन को बढ़ाने और आयात पर निर्भरता कम करने के लिए सरकार की प्रमुख नीतिगत पहलें निम्नलिखित हैं:

1.9.1 दीर्घकालिक पहल:

(i) हाइड्रोकार्बन खोजों के शीघ्र मुद्रीकरण के लिए उत्पादन हिस्सेदारी संविदा (पीएससी) व्यवस्था के अंतर्गत छूट, विस्तार और स्पष्टीकरण संबंधी नीति, 2014

(ii) अन्वेषित लघु क्षेत्र नीति, 2015.

(iii) हाइड्रोकार्बन अन्वेषण और लाइसेंसिंग नीति, 2016

(iv) खुला क्षेत्र लाइसेंसिंग नीति (ओएएलपी): हाइड्रोकार्बन अन्वेषण एवं लाइसेंसिंग पॉलिसी (एचईएलपी), 2017 को लागू करने की रूपरेखा/ कार्यान्वयन की विधियाँ।

(v) उत्पादन हिस्सेदारी संविदा के विस्तार हेतु नीति, 2016 और 2017.

(vi) कोल बेड मीथेन के शीघ्र मुद्रीकरण हेतु नीति, 2017.

(vii) राष्ट्रीय डेटा संग्रह, 2017 की स्थापना।

(viii) तलछटी बेसिनों में अनिर्धारित क्षेत्रों का मूल्यांकन, 2017.

(ix) हाइड्रोकार्बन संसाधनों का पुनर्मूल्यांकन, 2017.

(x) पेट्रोलियम प्रचालन के लिए स्थल पुनर्स्थापन और परित्याग दिशा–निर्देश, 2017.

(xi) एनईएलपी–पूर्व और एनईएलपी ब्लॉकों में उत्पादन हिस्सेदारी संविदा के कामकाज को सुव्यवस्थित करने के लिए नीति ढांचा, 2018.

(xii) पेट्रोलियम एवं प्राकृतिक गैस नियम 2018 के नियम–3 के खंड (ट) के तहत 'पेट्रोलियम' की परिभाषा में संशोधन।

(xiii) तेल और गैस के लिए उन्नत पुनर्प्राप्ति विधियों को बढ़ावा देने और प्रोत्साहित करने की नीति, 2018.

(xiv) मौजूदा उत्पादन हिस्सेदारी संविदा, कोल बेड मीथेन संविदा और नामांकन क्षेत्रों के तहत अपरंपरागत हाइड्रोकार्बन के अन्वेषण और दोहन के लिए नीतिगत ढांचा, 2018.

(xv) कोल इंडिया लिमिटेड (सीआईएल) और उसकी सहायक कंपनियों को आवंटित कोयला खनन पट्टे के तहत क्षेत्रों से कोल बेड मीथेन (सीबीएम) की खोज और दोहन के लिए नीतिगत ढांचा, 2018.

(xvi) एनईएलपी–पूर्व और एनईएलपी ब्लॉकों के संबंध में उत्पादन हिस्सेदारी संविदा के कामकाज को सुव्यवस्थित करने के लिए नीतिगत ढांचा, 2018

(xvii) तेल और गैस के घरेलू अन्वेषण और उत्पादन को बढ़ाने के लिए हाइड्रोकार्बन अन्वेषण एवं लाइसेंस नीति में सुधार, 2019.

(xviii) विवाद समाधान समिति, 2019.

(xix) प्राकृतिक गैस विपणन सुधार, 2020.

(xx) ई–बोली, 2020 के माध्यम से घरेलू स्तर पर उत्पादित प्राकृतिक गैस के लिए बाजार मूल्य की खोज।

(xxi) घरेलू स्तर पर उत्पादित कच्चे तेल की बिक्री का विनियमन, 2022.

(xxii) गहरे पानी, अति गहरे पानी और उच्च दबाव–उच्च तापमान वाले क्षेत्रों में खोजों से उत्पादित गैस का बाजार मूल्य तथा विपणन और मूल्य निर्धारण की स्वतंत्रता के साथ बिक्री और पुनर्विक्रय, 13 जनवरी, 2023.

(xxiii) भारतीय नौसेना के साथ विशेष व्यवस्था के तहत, लगभग 99% निषेध क्षेत्र को अन्वेषण और उत्पादन गतिविधियों के लिए खोल दिया गया है।

(xxiv) भारत सरकार ने तेल और गैस की खोज और उत्पादन बढ़ाने के लिए वर्तमान जरूरतों और बाजार की परिस्थितियों के अनुसार निवेशकों के लिए इस क्षेत्र को और आकर्षक बनाने हेतु तेल क्षेत्र (विनियम और विकास) अधिनियम, 1948 में संशोधन करते हुए तेल क्षेत्र (विनियम और विकास) संशोधन अधिनियम, 2025 लागू किया है।

1.9.2 अल्पकालिक पहलः

(i) मौजूदा खोजों का प्रारंभिक मुद्रीकरण

(ii) आईओआर/ईओआर तकनीकों को लागू करके और पुराने परिपक्व क्षेत्रों को फिर से विकसित करके तेल और गैस की वसूली बढ़ाना।

(iii) तेल/गैस कूपों की ड्रिलिंग।

(iv) सेवा अनुबंधों और आउटसोर्सिंग के माध्यम से तटवर्ती छोटी और सीमांत खोजों का मुद्रीकरण।

(v) मौजूदा पुराने परिपक्व क्षेत्रों का पुनर्विकास और नए या सीमांत क्षेत्रों का विकास।

(vi) चुनिंदा क्षेत्रों में उपयुक्त प्रौद्योगिकियों का उपयोग।

(vii) उत्पादन बढ़ाने वाले अनुबंधों को लागू करना।

(viii) आईओआर/ईओआर तकनीकों को लागू करना।

1.10 मंजूरी/अनुमोदन की प्रक्रिया को आसान बनाने और समन्वय बढ़ाने के लिए पहलः

(i) **अधिकार–प्राप्त समन्वय समिति (ईसीसी):** हाइड्रोकार्बन क्षेत्र से संबंधित रक्षा, पर्यावरण, लाइसेंस आदि मुद्दों पर चर्चा करने के लिए मंत्रिमंडल सचिव की अध्यक्षता में इस समिति का गठन किया गया है।

(ii) **संयुक्त कार्य समूह (जेडब्ल्यूजी):** पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय (एमओपीएनजी) ने अपस्ट्रीम तेल एवं गैस क्षेत्र में ईओडीबी (कारोबार में सुगमता) से जुड़े मुद्दों की पहचान और समाधान के लिए एक संयुक्त कार्य समूह (जेडब्ल्यूजी) का गठन किया है। इस कार्य समूह में प्रमुख ईएंडपी प्रचालकों और

सरकार के प्रतिनिधि शामिल हैं। जेडब्ल्यूजी ने अप्रैल, 2025 में अपनी अंतरिम रिपोर्ट प्रस्तुत की है।

(iii) **'हाइड्रोकार्बन अनुमोदन प्रकोष्ठ' (एचसीसी) का निर्माण:** डीजीएच के तहत एक समर्पित 'हाइड्रोकार्बन अनुमोदन प्रकोष्ठ' की स्थापना की गई है। यह प्रकोष्ठ शीघ्र मंजूरी/ अनुमोदन प्रदान करने के लिए केंद्र/ राज्य सरकार के प्राधिकारियों के साथ संपर्क बनाए रखता है।

(iv) **पूर्वोत्तर समन्वय समिति (एनईसीसी) का गठन:** डीजीएच के एचसीसी के तहत ईसीसी का गठन सितंबर 2021 में किया गया। इसके तहत 18 समन्वयकों को असम, अरुणाचल प्रदेश और त्रिपुरा की राज्य सरकारों के विभिन्न विभागों के साथ समन्वय के लिए नियुक्त किया गया है ताकि तेल और गैस की ईएंडपी से जुड़ी गतिविधियों के लिए जरूरी पर्यावरणीय मंजूरियों और अनुमोदनों के प्रस्तावों की प्रक्रिया को आसान बनाना है। साथ ही, जहाँ जरूरत हो वहाँ राज्य सरकार से प्रशासनिक/ नियामक सहायता प्राप्त करने में मदद करना भी इनका कार्य है।

(v) **ऊर्जा प्रगति पोर्टल (सक्रिय शासन और समय पर कार्यान्वयन के लिए संयुक्त कार्रवाई द्वारा अपस्ट्रीम प्रतिक्रिया):** डीजीएच ने हाल ही में परस्पर चर्चा करने के लिए "ऊर्जा प्रगति" नामक एक वेब–आधारित पोर्टल शुरू किया है, जिसका उद्देश्य अन्वेषण और उत्पादन संचालकों को विभिन्न मंजूरियाँ और अनुमोदन प्राप्त करने में सुविधा देना तथा उनकी निगरानी करना है। यह पोर्टल अपस्ट्रीम हाइड्रोकार्बन क्षेत्र से जुड़े लंबे समय से लंबित मुद्दों को प्राथमिकता देकर उनके समाधान पर ध्यान केंद्रित करता है, जिसमें संचालकों, केंद्रीय मंत्रालयों और राज्य सरकारों जैसे सभी प्रमुख हितधारक शामिल हैं। इस पोर्टल के माध्यम से पीईएल (पेट्रोलियम अन्वेषण लाइसेंस), पीएमएल (पेट्रोलियम खनन पट्टा), एफसी (वन मंजूरी), डब्ल्यूएलसी (वन्यजीव मंजूरी), सीटीई (स्थापना की सहमति)/सीटीओ (प्रचालन की सहमति), ईएसजेड (पारिस्थितिकी संवेदनशील क्षेत्र) और सीआरजेड (तटीय विनियमन क्षेत्र) से संबंधित मंजूरियों का निपटारा किया जाता है।

(vi) **अपस्ट्रीम इंडिया पोर्टल:** ईएंडपी प्रचालकों को सहायता प्रदान करने के लिए एक 'अपस्ट्रीम इंडिया' पोर्टल शुरू किया गया है। यह पोर्टल डीजीएच में उपलब्ध सुविधाओं और बुनियादी ढाँचे को साझा करने, ज्ञान साझा करने के लिए एक मंच बनाने, और नियमित रूप से कार्यशालाएँ, संगोष्ठियाँ, सम्मेलन और प्रशिक्षण सत्र आयोजित करने की सुविधा देता है। इसके साथ ही, यह नवीनतम सरकारी नीतियों, तकनीकों और संसाधनों के उपयोग पर चर्चा के अवसर भी प्रदान करता है।

(vii) **ऊर्जा सुरक्षा समन्वय:** यह एक जीआईएस आधारित प्रणाली है, जो ऊर्जा क्षेत्र में त्वरित जानकारी के आदान–प्रदान, निगरानी और बेहतर निर्णय लेने में मदद करती है।

1.11: प्राकृतिक गैस विपणन सुधार:

(i) गैस आधारित अर्थव्यवस्था की दिशा में एक बड़ा कदम उठाते हुए, सरकार ने अक्टूबर 2014 में 'नए घरेलू प्राकृतिक गैस मूल्य निर्धारण दिशानिर्देश' को मंजूरी दी। ये दिशानिर्देश हेनरी हब (अमेरिका), अल्बर्टा (कनाडा), एनबीपी (यूके), रूस आदि जैसे प्रमुख अंतरराष्ट्रीय केंद्रों में प्रचलित गैस कीमतों पर आधारित थे, ताकि उत्पादकों और उपभोक्ताओं दोनों के हितों में संतुलन बनाया जा सके। प्राकृतिक गैस की कीमत हर छह महीने में संशोधित की जाती थी और पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के तहत पेट्रोलियम योजना और विश्लेषण प्रकोष्ठ (पीपीएसी) द्वारा जारी की जाती थी। ये दिशानिर्देश नामांकन क्षेत्रों और एनईएलपी तथा एनईएलपी–पूर्व ब्लॉकों या क्षेत्रों से उत्पादित प्राकृतिक गैस पर लागू थे, जहाँ कीमत सरकार द्वारा अनुमोदित उत्पादन हिस्सेदारी संविदा (पीएससी) के अनुसार तय की जाती थी।

(ii) इसके बाद, वर्ष 2015 से सरकार ने डीएसएफ, ओएएलपी और सीबीएम व्यवस्थाओं के तहत उत्पादित गैस के लिए, तथा 28 फरवरी 2019 के बाद पूर्वोत्तर क्षेत्र (एनईआर) से उत्पादित गैस और नई गैस खोजों के लिए, विपणन और मूल्य निर्धारण की स्वतंत्रता प्रदान की।

(iii) उच्च दबाव–उच्च तापमान (एचपी–एचटी) रिजर्वायरों और गहरे या अत्यधिक गहरे पानी वाले कठिन क्षेत्रों से गैस उत्पादन को बढ़ावा देने के लिए, सरकार ने 23 मार्च 2016 को प्राकृतिक गैस के लिए मूल्य निर्धारण

की स्वतंत्रता और विपणन की अनुमति दी। इसके तहत पेट्रोलियम योजना और विश्लेषण प्रकोष्ठ (पीपीएसी) द्वारा हर छह महीने में एक मूल्य सीमा निर्धारित की जाती है।

(iv) इसके अलावा, दिनांक 15.10.2020 की अधिसूचना के तहत, गैस के बाजार मूल्य को पारदर्शी और प्रतिस्पर्धी प्रक्रिया से तय करने और साझेदार कंपनियों को बोली लगाने की अनुमति देने के लिए एक मानक प्रक्रिया बनाई गई। गैस आधारित अर्थव्यवस्था की दिशा में आगे बढ़ते हुए, सरकार ने "प्राकृतिक गैस विपणन सुधार" की घोषणा की, जिसका उद्देश्य यह सुनिश्चित करना था कि गैस उत्पादक पारदर्शी और निष्पक्ष प्रक्रिया के माध्यम से बाजार में अपनी गैस का मूल्य तय कर सकें। इसके तहत कुछ क्षेत्र विकास योजनाओं (एफडीपी) को विपणन की स्वतंत्रता दी गई, जहाँ उत्पादन हिस्सेदारी संविदा पहले से ही मूल्य निर्धारण की स्वतंत्रता प्रदान करते हैं। बाद में, 03.12.2020 की अधिसूचना के माध्यम से घरेलू स्तर पर उत्पादित प्राकृतिक गैस के लिए ई–बोली प्रणाली द्वारा बाजार मूल्य तय करने के विस्तृत दिशा–निर्देश जारी किए गए।

(v) इसके अलावा, मूल्य निर्धारण और विपणन स्वतंत्रता वाले गैस उत्पादकों को दिनांक 19.08.2021 के कार्यालय ज्ञापन के तहत पीएनजीआरबी द्वारा अधिकृत गैस एक्सचेंजों के माध्यम से छोटी मात्रा में गैस बेचने की अनुमति दी गई है।

(vi) गैस सुधारों को आगे बढ़ाने और पर्यावरण की सुरक्षा के लिए, सरकार ने 22.11.2021 के कार्यालय ज्ञापन के तहत तेल और गैस कूपों के परीक्षण के दौरान उत्पादित तदर्थ/परीक्षण गैस के मुद्रीकरण के लिए विस्तृत दिशा–निर्देश जारी किए हैं।

(vii) 13 जनवरी 2023 की अधिसूचना के तहत, सरकार ने गहरे पानी, अत्यधिक गहरे पानी और उच्च दबाव/उच्च तापमान वाले क्षेत्रों में खोजों से उत्पादित गैस के विपणन और मूल्य निर्धारण की स्वतंत्रता के साथ–साथ इसकी बिक्री, पुनर्विक्रय और बाजार मूल्य को लेकर स्पष्ट निर्देश दिए हैं।

(viii) ओएनजीसी/ओआईएल के नामांकित क्षेत्रों, नई अन्वेषण लाइसेंसिंग नीति (नेल्प) ब्लॉकों और नेल्प–पूर्व ब्लॉकों से उत्पादित गैस, जहाँ उत्पादन हिस्सेदारी संविदा (पीएससी) में कीमतों के लिए सरकार की स्वीकृति का प्रावधान है, के मूल्य निर्धारण के लिए संशोधित दिशा–निर्देश अप्रैल 2023 में जारी किए गए थे। इन दिशानिर्देशों के अनुसार, ऐसी प्राकृतिक गैस की कीमत भारतीय क्रूड बास्केट के मासिक औसत का 10% होगी, जिसे मासिक आधार पर अधिसूचित किया जाएगा और इसकी एक न्यूनतम और अधिकतम सीमा तय होगी। इसके परिणामस्वरूप, नामांकित क्षेत्रों से एपीएम/एनएपीएम गैस की कीमतें 8.57 अमेरिकी डॉलर प्रति एमएमबीटीयू से घटकर 6.5 अमेरिकी डॉलर प्रति एमएमबीटीयू हो गई हैं।

1.12: किफायती की ओर टिकाऊ विकल्प परिवहन (संधारणीय):

सरकार ने 1 अक्तूबर 2018 को "सस्ते परिवहन के लिए स्थायी विकल्प (संधारणीय)" पहल शुरू की। इसका उद्देश्य विभिन्न अपशिष्ट/बायोमास स्रोतों से कंप्रेस्ड बॉयो गैस (सीबीजी) का उत्पादन करने के लिए एक पारिस्थितिकी तंत्र बनाना और प्राकृतिक गैस के साथ इसके उपयोग को बढ़ावा देना है। को बढ़ावा देने के उद्देश्य से 1 अक्तूबर 2018 को एक पहल शुरू की गई। इस पहल के तहत, तेल एवं गैस विपणन कंपनियाँ (ओजीएमसी) संभावित उद्यमियों से सीबीजी की खरीद के लिए रुचि की अभिव्यक्ति (ईओआई) आमंत्रित करती हैं।

यह पहल गोबरधन योजना, स्वच्छ भारत मिशन/आत्मनिर्भर भारत/नेट जीरो उत्सर्जन के लक्ष्यों के साथ तालमेल बिठाती है। बायोगैस/सीबीजी क्षेत्र के विकास के लिए 'समग्र सरकार' दृष्टिकोण अपनाया जा रहा है। इसके तहत विभिन्न मंत्रालयों और विभागों द्वारा कई सुविधाएँ प्रदान की जा रही हैं। इनमें शामिल हैं: नवीन और नवीकरणीय ऊर्जा मंत्रालय (एमएनआरई) के राष्ट्रीय जैव ऊर्जा कार्यक्रम की अम्ब्रेला योजना के तहत सभी प्रकार के सीबीजी/बायोगैस संयंत्रों के लिए केंद्रीय वित्तीय सहायता; स्वच्छ भारत मिशन शहरी 2.0 योजना के तहत आवासन और शहरी कार्य मंत्रालय द्वारा ठोस अपशिष्ट प्रबंधन के लिए राज्यों और केंद्र शासित प्रदेशों को एमएसडब्ल्यू आधारित सीबीजी संयंत्रों पर अतिरिक्त केंद्रीय सहायता; उर्वरक

विभाग द्वारा जैविक उर्वरक को बढ़ावा देने की नीति के तहत सीबीजी परियोजनाओं से उत्पादित किण्वित जैविक खाद पर 1500 रुपए/मीट्रिक टन की बाजार विकास सहायता; आरबीआई द्वारा प्राथमिकता क्षेत्र ऋण के तहत सीबीजी परियोजनाओं का वर्गीकरण; सीपीसीबी द्वारा मामला–दर–मामला आधार पर 'श्वेत श्रेणी' के तहत सीबीजी परियोजनाओं का वर्गीकरण; और मिश्रित सीएनजी में निहित कंप्रेस्ड बायोगैस पर जीएसटी भुगतान की राशि पर उत्पाद शुल्क में छूट।

सीबीजी–सीजीडी सिंक्रोनाइजेशन योजना के तहत, नगर गैस वितरण (सीजीडी) नेटवर्क के साथ सीबीजी के समन्वय के लिए नीतिगत दिशानिर्देश जारी किए गए हैं।

इसके अलावा, सरकार ने वित्त वर्ष 2023–24 से 2026–27 तक चार वर्षों के लिए बायोमास के संग्रह को बढ़ावा देने हेतु बायोमास एकत्रीकरण मशीनरी की खरीद के लिए सीबीजी उत्पादकों को वित्तीय सहायता प्रदान करने की योजना को मंजूरी दी है। इस योजना के दिशानिर्देश 02.02.2024 को जारी किए गए और आवेदन प्राप्त करने के लिए पोर्टल 01.04.2024 से सक्रिय कर दिया गया है।

देश में सीबीजी के उत्पादन और उपयोग को बढ़ावा देने के लिए, राष्ट्रीय जैव ईंधन समन्वय समिति (एनबीसीसी) ने 24 नवंबर 2023 को सीजीडी क्षेत्र के सीएनजी (परिवहन) और पीएनजी (घरेलू) खंडों में सीबीजी की चरणबद्ध अनिवार्य बिक्री शुरू करने को मंजूरी दी। सीबीजी मिश्रण दायित्व (सीबीओ) वित्त वर्ष 2024–25 तक स्वैच्छिक रहेगा और अनिवार्य दायित्व वित्त वर्ष 2025–26 से लागू होगा। वित्त वर्ष 2025–26, 2026–27 और 2027–28 के लिए सीबीओ को कुल सीएनजी/पीएनजी खपत का क्रमशः 1%, 3% और 4% रखा जाएगा, जबकि 2028–29 से यह 5% होगा।

15.03.2024 को नगर गैस वितरण (सीजीडी) नेटवर्क में सीबीजी के अंतःक्षेपण के लिए पाइपलाइन अवसंरचना (डीपीआई) के विकास हेतु एक योजना को मंजूरी दी है।

31 मार्च, 2025 तक, लगभग 700 मीट्रिक टन प्रतिदिन की कुल उत्पादन क्षमता वाले 100 सीबीजी/बायोगैस संयंत्र चालू हो चुके हैं। लगभग 315 खुदरा बिक्री केंद्र से सीबीजी की बिक्री शुरू हो चुकी है। औद्योगिक ग्राहकों को भी सीबीजी की आपूर्ति की जा रही है। सीबीजी–सीजीडी समन्वय योजना के तहत, सीजीडी नेटवर्क के 54 भौगोलिक क्षेत्रों में सीबीजी की बिक्री शुरू हो चुकी है।

1.13: राष्ट्रीय जैव ईंधन नीति–2018:

राष्ट्रीय जैव ईंधन नीति 2018 में तय किया गया है कि एथेनॉल आपूर्ति वर्ष (ईएसवाई) 2025–26 तक पेट्रोल में 20% एथेनॉल और 2030 तक डीजल में 5% जैव डीजल मिश्रण का लक्ष्य प्राप्त किया जाएगा। इस लक्ष्य को निम्नलिखित तरीकों से हासिल किया जाना है:

क. घरेलू उत्पादन बढ़ाकर एथेनॉल/बायोडीजल की आपूर्ति को सुदृढ़ करना।

ख. दूसरी पीढ़ी (2जी) की बायो रिफाइनरी स्थापित करना।

ग. जैव ईंधन के लिए नए कच्चे माल (फीडस्टॉक) का विकास करना।

घ. जैव ईंधन बनाने के लिए नई तकनीकों का विकास करना।

ङ. जैव ईंधन के लिए अनुकूल माहौल बनाना और इसे मुख्य ईंधनों के साथ मिलाना।

1.14: गैर–पारंपरिक ऊर्जा:

1-14-1 ईबीपी कार्यक्रमः सरकार ने एथेनॉल मिश्रित पेट्रोल (ईबीपी) कार्यक्रम शुरू किया है। इसके तहत तेल कंपनियाँ पेट्रोल में एथेनॉल मिलाकर बेचती हैं, और यह प्रतिशत एथेनॉल की उपलब्धता पर निर्भर करता है। इस कार्यक्रम का उद्देश्य वैकल्पिक और पर्यावरण के अनुकूल ईंधन का उपयोग बढ़ाना, आयात पर निर्भरता कम करना और कृषि क्षेत्र को बढ़ावा देना है।

एथेनॉल का घरेलू उत्पादन बढ़ाने के लिए सरकार ने कई कदम उठाए हैं। इसमें प्रशासित मूल्य तंत्र को फिर से लागू करना, एथेनॉल उत्पादन के लिए वैकल्पिक मार्ग खोलना और ईबीपी के लिए एथेनॉल पर माल और सेवा कर (जीएसटी) को 18% से घटाकर 5% करना शामिल है। इसके अलावा, राष्ट्रीय जैव ईंधन नीति 2018 लागू की गई है, एथेनॉल उत्पादन क्षमता बढ़ाने के लिए चीनी मिलों को वित्तीय मदद दी जा रही है, और उत्पादन के लिए बहु–प्रजनन फीडस्टॉक जैसे बी हैवी मोलासेस, गन्ने का रस,

चीनी, सिरप, क्षतिग्रस्त अनाज, मक्का और अधिशेष एफसीआई चावल के उपयोग की अनुमति दी गई है। फीडस्टॉक के आधार पर एथेनॉल की अलग–अलग कीमत तय की गई है, दीर्घकालिक एथेनॉल खरीद नीति बनाई गई है और एथेनॉल की कमी वाले राज्यों में आसवन क्षमता बढ़ाने की रूपरेखा तैयार की गई है। ये सभी कदम घरेलू उत्पादन बढ़ाने और ऊर्जा सुरक्षा मजबूत करने के लिए उठाए गए हैं।

इन उपायों से सार्वजनिक क्षेत्र की तेल विपणन कंपनियों (ओएमसी) द्वारा एथेनॉल की खरीद में उल्लेखनीय वृद्धि हुई है, जो एथेनॉल आपूर्ति वर्ष (ईएसवाई) 2013–14 (दिसंबर 2013 से नवंबर 2014) के दौरान 38 करोड़ लीटर से बढ़कर ईएसवाई 2023–24 (नवंबर 2023 से अक्टूबर 2024) के दौरान 707.4 करोड़ लीटर हो गई है। भारत में एथेनॉल मिश्रण योजना 2020–25 के अनुरूप, ओएमसी ने ईएसवाई 2021–22 के दौरान 10%, ईएसवाई 2022–23 के दौरान 12% और ईएसवाई 2023–24 के दौरान 14.6% की औसत एथेनॉल मिश्रण दर हासिल की। योजना के तहत ईएसवाई 2025–26 तक पेट्रोल में 20% मिश्रण प्राप्त करने के लिए लगभग 1,016 करोड़ लीटर एथेनॉल की आवश्यकता का अनुमान लगाया गया है। एथेनॉल डिस्टीलेट क्षमता स्थापित करने के लिए नोडल एजेंसी, खाद्य और सार्वजनिक वितरण विभाग (डीएफपीडी) का अनुमान है कि ईबीपी को पूरा करने के लिए प्रति वर्ष 1,700 करोड़ लीटर क्षमता की आवश्यकता होगी। इस जरूरत और अन्य उपयोगों को पूरा करने के लिए एथेनॉल उत्पादन क्षमता बढ़ाने हेतु एक ब्याज अनुदान योजना भी शुरू की गई है। इसके परिणामस्वरूप, डिस्टीलेट क्षमता 2018–19 में 685 करोड़ लीटर प्रति वर्ष से बढ़कर 31.03.2025 तक 1788 करोड़ लीटर प्रति वर्ष हो गई है।

एथेनॉल की कमी वाले राज्यों में अनुमानित 1,106 करोड़ लीटर प्रति वर्ष की समर्पित एथेनॉल क्षमता स्थापित करने के लिए 232 सफल बोलीदाताओं के साथ दीर्घकालिक उठान समझौतों (एलटीओए) पर भी हस्ताक्षर किए हैं।

इनमें से 528 करोड़ लीटर प्रति वर्ष की अनुमानित वार्षिक क्षमता वाले 81 संयंत्र पहले ही चालू हो चुके हैं, जिनमें से अधिकांश अनाज आधारित हैं। एथेनॉल उत्पादन को बढ़ावा देने के लिए विभिन्न फीडस्टॉक्स की शुरूआत ने वर्षों से उपयोग किए जाने वाले फीडस्टॉक मिश्रण में भी विविधता ला दी है। इसके अलावा, तेल विपणन कंपनियों ने अपने खुदरा बिक्री केंद्र पर ई–20 और ई–100 उपलब्ध कराए हैं।

ईएसवाई–वार खरीद/मिश्रण निष्पादन नीचे तालिका में दिया गया है:

ईएसवाई	एथेनॉल खरीद/मिश्रण मात्रा करोड़ लीटर में	मिश्रण प्रतिशत (%)
2014-15	67.4	2.33
2015-16	111.4	3.51
2016-17	66.5	2.07
2017-18	150.5	4.22
2018-19	188.6	5.00
2019-20	173.0	5.00
2020-21	302.3	8.10
2021-22	433.6	10.02
2022-23	508.5	12.06
2023-24	707.4	14.60
2024-25 (मार्च'25 तक)	391.0	18.36

ईएसवाई 2024–25 के लिए विभिन्न फीडस्टॉक से उत्पादित एथेनॉल के लिए आपूर्तिकर्ताओं को भुगतान की जाने वाली पूर्व–मिल कीमतें इस प्रकार हैं:

फीडस्टॉक	ईएसवाई 2024–25@
गन्ने का रस/चीनी/चीनी का सिरप+	65.61
बी हैवी मोलासेसः+	60.73
सी हैवी मोलासेसः+	57.97
क्षतिग्रस्त अनाज	**64.00**
मक्का	**71.86 (5.79 का प्रोत्साहन)**
एफसीआई से अधिशेष चावल :	**58.50**

(@– ईएसवाई 1 नवंबर से 31 अक्तूबर तक) + सरकार द्वारा निर्धारित मूल्य ओएमसी द्वारा निर्धारित : मूल्य परिवहन और आपूर्तिकर्ताओं को अतिरिक्त जीएसटी का भुगतान

1.14.2: 2जी एथेनॉल कार्यक्रमः एथेनॉल के उत्पादन को सुविधाजनक बनाने के लिए, सरकार ने 2019 में **प्रधानमंत्री जी–वीएएन (जैव ईंधन–वातावरणन अनुकूल फसल अवशेष निवारण) योजना** को अधिसूचित किया, जिसे 2024 में संशोधित किया गया था। यह योजना देश में लिग्नोसेल्यूलोसिक बायोमास और अन्य नवीकरण ीय फीडस्टॉक्स का उपयोग करके उन्नत जैव ईंधन सुविधाएँ स्थापित करने हेतु एकीकृत बायोएथेनॉल परियोजनाओं के लिए वित्तीय सहायता प्रदान करती है। इस योजना के तहत 2018–19 से 2028–29 की अवधि के लिए कुल वित्तीय परिव्यय ₹1,969.50 करोड़ है। जैव ईंधन और अन्य क्षेत्रों में नए विकास के साथ कदम मिलाने और अधिक निवेश आकर्षित करने के लिए, सरकार ने प्रधानमंत्री जीवन–वन योजना में बदलाव किया है। अब इस योजना में कृषि और वानिकी अवशेष, औद्योगिक अपशिष्ट, संश्लेषण (साईन) गैस और शैवाल जैसे लिग्नोसेल्यूलोसिक फीडस्टॉक से बनने वाले उन्नत जैव ईंधन को शामिल किया गया है। "बोल्ट–ऑन" संयंत्र और "ब्राउनफील्ड परियोजनाएँ" भी इस योजना के तहत पात्र हैं, जो अपने अनुभव से परियोजनाओं की व्यवहार्यता बढ़ाएँगी। साथ ही, इस क्षेत्र में नई तकनीकों और उन्नत परियोजना प्रस्तावों को प्राथमिकता दी जाएगी ताकि नवाचार को बढ़ावा मिल सके।

1.14.3: बायोडीजल कार्यक्रमः अप्रैल 2024 से जनवरी 2025 तक, तेल विपणन कंपनियों ने डीजल में मिश्रण के लिए 36.7 करोड़ लीटर बायोडीजल खरीदा है।

1.14.4: बायो–जेट (एटीएफ): 2027, 2028 और 2030 तक अंतर्राष्ट्रीय उड़ानों के लिए एटीएफ में एसएएफ का सम्मिश्रण क्रमशः 1%, 2% और 5% होने का लक्ष्य है।

1.15: पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के लिए परिव्ययः

सरकार पूरे देश में पेट्रोलियम और गैस क्षेत्र को बढ़ावा देने के लिए प्रतिबद्ध है। पूंजीगत व्यय बुनियादी ढांचा परियोजनाओं के निर्माण, आर्थिक विकास और निवेश को बढ़ावा देने के साथ रोजगार के अवसर पैदा करता है। वित्त वर्ष 2024–25 में पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के तहत आने वाले सार्वजनिक क्षेत्र के उद्यमों (सीपीएसई) के लिए कुल बजटीय और अतिरिक्त संसाधन ₹1,18,499 करोड़ तय किए गए थे। वहीं, अप्रैल–मार्च 2024–25 के दौरान वास्तविक व्यय ₹1,62,537 करोड़ रहा, जो बजट अनुमान का 137.16% है।

1.16 डिजिटल भुगतान को प्रोत्साहनः

खुदरा बिक्री केंद्र पर डिजिटल भुगतान के बुनियादी ढांचे का उल्लेखनीय विस्तार हुआ है। 31.03.2025 तक देश में कुल 87,610 खुदरा बिक्री केंद्र हैं (आईओसीएल–40,221, बीपीसीएल–23,642, एचपीसीएल–23,747) और ये सभी 2,63,410 पीओएस

टर्मिनलों और 1,03,224 ई–वॉलेट सुविधाओं के साथ डिजिटल भुगतान करने में सक्षम हैं। इसके अलावा, सभी 87,610 खुदरा बिक्री केंद्र और सभी एलपीजी डिस्ट्रीब्यूटर भी भीम यूपीआई के माध्यम से भुगतान करने में सक्षम हैं।

1.17 इलेक्ट्रिक वाहन चार्जिंग स्टेशन:

देश में इलेक्ट्रिक वाहन चार्जिंग अवसंरचना को बढ़ाने के लिए, तेल विपणन कंपनियाँ तकनीकी–व्यावसायिक व्यवहार्यता और पीईएसओ मानदंडों के अनुपालन के आधार पर चरणबद्ध तरीके से देश के विभिन्न हिस्सों में अपने खुदरा बिक्री केंद्र (आरओ) पर इलेक्ट्रिक वाहन चार्जिंग स्टेशन (ईवीसीएस) स्थापित कर रही हैं। 31.03.2025 तक, तेल विपणन कंपनियों ने अपने खुदरा बिक्री केंद्र पर 25,243 ईवी चार्जिंग स्टेशन और 976 बैटरी स्वैपिंग स्टेशन स्थापित कर दिए हैं।

1.18 बाजार प्राधिकार:

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय ने दिनांक 08.11.2019 के संकल्प के माध्यम से परिवहन ईंधनों, अर्थात् एमएस और एचएसडी, के विपणन प्राधिकार संबंधी दिशानिर्देशों को संशोधित किया है। 31.03.2025 तक, 14 संस्थाओं को इन दिशानिर्देशों के अनुसार परिवहन ईंधनों के विपणन के लिए अधिकृत किया गया है।

1.19 स्वच्छ ईंधन तक पहुंच (एलपीजी + पीएनजी):

एलपीजी और पीएनजी दोनों मिलकर घरेलू जरूरतों के लिए स्वच्छ ईंधन उपलब्ध कराते हैं।

एलपीजी: एलपीजी खाना पकाने के लिए विश्व स्तर पर मान्यता–प्राप्त स्वच्छ ईंधन है और यह एसडीजी–7 लक्ष्यों को प्राप्त करने में महत्वपूर्ण भूमिका निभाता है। एलपीजी सीधे एसडीजी 3, 5, 8, 9, 11, 13 में योगदान देता है और अप्रत्यक्ष रूप से शेष 10 एसडीजी में योगदान करता है। 2014 से, भारत सरकार एलपीजी को स्वच्छ खाना पकाने के ईंधन के रूप में बढ़ावा देने दे रही है ताकि बायोमास, लकड़ी और केरोसिन जैसे पारंपरिक ईंधनों का उपयोग कम किया जा सके। पारंपरिक खाना पकाने के ईंधन पर इसके अंतर्निहित लाभों के कारण शहरी और ग्रामीण दोनों क्षेत्रों में एलपीजी की खपत बढ़ रही है। 01.04.2014 तक 14.51 करोड़ सक्रिय घरेलू एलपीजी उपभोक्ता थे, जो 01.04.2025 तक बढ़कर 32.97 करोड़ हो गए हैं।

पीएनजी: भारत में कार्बन उत्सर्जन कम करने के प्रयासों के तहत, सरकार वर्ष 2030 तक प्राकृतिक गैस की हिस्सेदारी को 6.3% से बढ़ाकर 15% करने का लक्ष्य रख रही है, ताकि एक गैस–आधारित अर्थव्यवस्था बनाई जा सके। प्राकृतिक गैस के उपयोग में वृद्धि के कारण 31 मार्च 2025 तक 1.5 करोड़ घरों में पीएनजी कनेक्शन पहुँच चुके हैं। जैसे–जैसे और शहरों में नगर गैस सेवा उपलब्ध होगी, पीएनजी कनेक्शनों की संख्या बढ़ने की उम्मीद है। पाइप्ड नेचुरल गैस, एलपीजी जैसे जीवाश्म ईंधनों की तुलना में अधिक सुरक्षित, सस्ती और सुविधाजनक है। चौबीसों घंटे उपलब्धता और चोरी की रोकथाम जैसे फायदे भी ग्राहकों को पीएनजी अपनाने के लिए आकर्षित कर रहे हैं।

1.20: स्टार्टअप इंडिया:

तेल और गैस क्षेत्र की स्टार्टअप इंडिया पहल के तहत, वित्तपोषण और मार्गदर्शन के लिए सार्वजनिक उपक्रम खुले विज्ञापनों के माध्यम से प्रस्ताव/आवेदन आमंत्रित करते हैं। प्रस्तावों के विषयों में तेल उपक्रमों के अपस्ट्रीम/मिडस्ट्रीम/डाउनस्ट्रीम प्रचालन में इंटरनेट ऑफ थिंग्स (आईओटी) का उपयोग, व्यावसायिक प्रक्रियाओं का डिजिटलीकरण, हरित ईंधन, वैकल्पिक ऊर्जा, हाइड्रोकार्बन उद्योग के लिए उन्नत तकनीकें और सामाजिक प्रासंगिकता शामिल हैं।

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के अंतर्गत आने वाले सार्वजनिक उपक्रमों ने 31.03.2025 तक कुल ₹967.35 करोड़ का स्टार्टअप फंड बनाया है। 31.03.2025 तक, तेल एवं प्राकृतिक गैस मंत्रालय ने कुल 344 स्टार्टअप्स को वित्त–पोषित किया है। गैस पीएसयू द्वारा वितरित निधि का मूल्य ₹299.38 करोड़ है। तेल और गैस पीएसयू द्वारा समर्थित कुछ स्टार्टअप पहले ही परिपक्व हो चुके हैं।

1.21: कौशल विकास:

स्किल इंडिया पहल के तहत, 26.04.2016 को सोसायटी पंजीकरण अधिनियम, 1860 के अंतर्गत हाइड्रोकार्बन क्षेत्र कौशल परिषद (एचएसएससी) की स्थापना की गई। राष्ट्रीय व्यावसायिक मानक (एनओएस)/योग्यता पैक (क्यूपी) विकसित करने के

लिए उद्योग के सदस्यों की सलाह से कई उच्च प्राथमिकता वाले व्यवसायों की पहचान की गई। 31.03.2025 तक, राष्ट्रीय कौशल योग्यता समिति (एनएसक्यूसी) द्वारा 57 क्यूपी को मंजूरी दी जा चुकी है। हाइड्रोकार्बन क्षेत्र के लिए कौशल विकास संस्थान (एसडीआई) भुवनेश्वर, विशाखापत्तनम, कोच्चि, अहमदाबाद, गुवाहाटी और रायबरेली में स्थापित किए गए हैं। मार्च 2025 तक, इन एसडीआई में 43,985 से अधिक प्रशिक्षुओं को प्रशिक्षित किया जा चुका है।

कौशल विकास संस्थान (एसडीआई), भुवनेश्वर का स्थायी परिसर, जिसमें उद्योग के लिए तैयार प्रतिभा पूल बनाने के लिए अत्याधुनिक बुनियादी ढांचा और तकनीक का उपयोग करके विश्व स्तरीय उद्योग आधारित प्रशिक्षण दिया जाता है, 20 अगस्त 2021 को राष्ट्र को समर्पित किया गया।

1.22: एमओपीएनजी में पीएम गतिशक्ति:

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय ने पीएम गति शक्ति पहल को अपनाने में महत्वपूर्ण प्रगति की है। पीएम गति शक्ति का एमओपीएनजी पोर्टल विकसित किया गया है, जो मुख्य एनएमपी प्लेटफॉर्म के साथ जुड़ा हुआ है। इस पोर्टल में, एमओपीएनजी गति शक्ति सेल और कोर टीम की सलाह से कुल 9 परतें और 23 उप–परतें अंतिम रूप दी गई हैं। मानक डेटा बेस संरचना, अर्थात् परतों, उप–परतों, विशेषताओं और मेटाडेटा की परिभाषा तैयार की गई है। एनएमपी पर डेटा की गुणवत्ता बनाए रखने के लिए त्रि–स्तरीय सत्यापन तंत्र (निर्माता, परीक्षक और अनुमोदनकर्ता) लागू किया गया है। गुणवत्ता सुधार कार्यक्रम (क्यूआईपी) के लिए मानक प्रचालन प्रक्रिया (एसओपी) हितधारकों के साथ साझा करके अंतिम रूप दी गई है। पीएमजीएस एनएमपी पोर्टल उपयोगकर्ता नियमावली तैयार की गई है और इसे एनएमपी डैशबोर्ड पर अपलोड किया गया है। पीएनजी क्षेत्र से संबंधित 1 लाख से अधिक परिसंपत्तियों और 1 लाख किलोमीटर पाइपलाइनों का एनएमपी पर सावधानीपूर्वक मानचित्रण किया गया है, जो 9 परतों और 23 उप–परतों के अनुरूप है।

1.23 अपना घर:

सार्वजनिक क्षेत्र की तेल विपणन कंपनियां 2024–25 से 2026–27 के दौरान राष्ट्रीय और राज्य राजमार्गों के किनारे 1,000 खुदरा बिक्री केंद्र पर 'अपना घर' नाम से ट्रकर्स वेसाइड एमिनिटीज (डब्ल्यूएसए) स्थापित करेंगी। इसकी कुल लागत 2,171 करोड़ रुपए होगी (भूमि लागत को छोड़कर)। इसका उद्देश्य सुरक्षित और सुविधाजनक लंबी दूरी की यात्रा सुनिश्चित करना, दुर्घटनाओं की संभावना कम करना, ग्रामीण अर्थव्यवस्था को बढ़ावा देना, ग्रामीण क्षेत्रों में रोजगार पैदा करना और पर्यटन एवं बैंकिंग को बढ़ावा देना है।

'अपना घर' में ढाबा, शयनगृह, शौचालय और खुद खाना बनाने का क्षेत्र जैसी सुविधाएँ हैं। ये लंबी दूरी की यात्रा को सुरक्षित और सुविधाजनक बनाने के लिए डिज़ाइन किए गए हैं, ताकि थकान से होने वाली दुर्घटनाओं की संभावना कम हो और सुरक्षा बढ़े। अपना घर मोबाइल ऐप ट्रक चालकों के लिए बनाया गया है, जिससे वे कहीं से भी शयनगृह बुक कर सकें। 15.02.2025 तक, देश भर में 212 खुदरा बिक्री केंद्र पर अपना घर स्थापित किए जा चुके हैं, जिनमें 2,766 बिस्तरों के साथ अन्य सुविधाएँ भी उपलब्ध हैं।

1.24 ऊर्जा स्टेशन:

ऊर्जा स्टेशन व्यापक ईंधन रिटेल केंद्र के रूप में काम करते हैं, जो निरंतर गतिशीलता के लिए विभिन्न ऊर्जा विकल्प प्रदान करते हैं। इसमें पारंपरिक ईंधन (एमएस और एचएसडी) के साथ–साथ वैकल्पिक ऊर्जा स्रोत जैसे सीएनजी/एलएनजी, इलेक्ट्रिक वाहन चार्जिंग स्टेशन और जैव ईंधन शामिल हैं। इन स्टेशनों का उद्देश्य पर्यावरण के अनुकूल ईंधन अपनाने की प्रक्रिया को तेज करना और भारत सरकार के कार्बन हटाने तथा नेट ज़ीरो लक्ष्यों का समर्थन करना है। ये प्रमुख राजमार्गों, जैसे स्वर्णिम चतुर्भुज और उत्तर–दक्षिण, पूर्व–पश्चिम कॉरिडोर पर रणनीतिक रूप से स्थित हैं, ताकि पूरे देश में सभी प्रकार की ऊर्जा की व्यापक उपलब्धता सुनिश्चित हो। पीएसयू ओएमसी 2024–25 से शुरू होकर अगले पांच वर्षों में ₹6,000 करोड़ के अनुमानित निवेश से 4,000 ऊर्जा स्टेशन स्थापित करेंगी।

1.25 सरकारी कामकाज में हिंदी का उत्तरोत्तर प्रयोग:

राजभाषा विभाग के निर्देशों के अनुसरण में, मंत्रालय में 14 सितंबर, 2024 से 28 सितंबर, 2024 तक हिंदी पखवाड़ा मनाया गया। इस अवसर पर, माननीय मंत्री जी की ओर से सभी सार्वजनिक उपक्रमों सहित हमारे सभी कार्यालयों को एक अपील जारी की गई। इस

पखवाड़े के दौरान विभिन्न हिंदी प्रतियोगिताओं सहित विभिन्न गतिविधियाँ आयोजित की गईं।

मंत्रालय में माननीय पेट्रोलियम एवं प्राकृतिक गैस मंत्री की अध्यक्षता में हिंदी सलाहकार समिति का प्रावधान है। इस समिति का कार्य सरकारी कामकाज में राजभाषा के प्रचार–प्रसार हेतु मंत्रालय को सलाह देना है। 18वीं लोक सभा के आम चुनावों के बाद मंत्रालय की हिंदी सलाहकार समिति का पुनर्गठन किया जाना है और इसके पुनर्गठन की प्रक्रिया चल रही है।

इसी प्रकार, मंत्रालय में संयुक्त सचिव (सामान्य एवं प्रशासन) की अध्यक्षता में एक राजभाषा कार्यान्वयन समिति भी कार्य कर रही है। इस समिति का कार्य मंत्रालय और उसके उपक्रमों में राजभाषा की प्रगति की समीक्षा करना और उसे बढ़ावा देने के लिए सुझाव देना है। समीक्षाधीन वर्ष के दौरान समिति की नियमित बैठकें आयोजित की गईं और समिति के सुझावों पर अनुवर्ती कार्रवाई की गई।

संसदीय राजभाषा समिति ने हमारे सार्वजनिक क्षेत्र के उपक्रमों के लगभग 31 कार्यालयों का दौरा किया, जिनमें ओआईएल, ओएनजीसी, आईओसीएल, बीपीसीएल, एचपीसीएल और गेल आदि के कार्यालय शामिल हैं और इन कार्यालयों में राजभाषा की प्रगति की समीक्षा की। समीक्षाधीन वर्ष के दौरान, मंत्रालय ने राजभाषा नियम, 1976 के नियम 10(4) के अंतर्गत हमारे सार्वजनिक क्षेत्र के उपक्रमों के 11 कार्यालयों को अधिसूचित किया। हमारे सार्वजनिक क्षेत्र के उपक्रमों में राजभाषा की प्रगति का आकलन करने और राजभाषा विभाग द्वारा जारी वार्षिक कार्यक्रम 2024–25 में निर्धारित लक्ष्यों के अनुसरण में, मंत्रालय के उप निदेशक (राजभाषा) ने हमारे सार्वजनिक क्षेत्र के उपक्रमों के 23 से अधिक कार्यालयों का निरीक्षण किया और इन कार्यालयों में हिंदी की प्रगति की समीक्षा की। इसी प्रकार, मंत्रालय के राजभाषा अनुभाग ने भी मंत्रालय के 10 अनुभागों का निरीक्षण किया। संबंधित अधिकारियों को कमियों को दूर करने के लिए मौके पर ही सुझाव दिए गए।

1.26 सूचना का अधिकार:

भारत सरकार की 15 जून 2005 की राजपत्र अधिसूचना के अनुसार, पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय में सूचना का अधिकार (आरटीआई) अधिनियम, 2005 लागू किया गया। यह अधिनियम सार्वजनिक प्राधिकरणों के कामकाज में पारदर्शिता और जवाबदेही बढ़ाने के लिए बनाया गया है। अधिनियम की धारा 4(2) के तहत जनता को नियमित अंतराल पर स्वतः सूचना उपलब्ध कराने के लिए मंत्रालय की वेबसाइट को नियमित रूप से अद्यतन किया जा रहा है। कार्मिक एवं प्रशिक्षण विभाग ने आरटीआईएमआईएस नामक एक ऑनलाइन प्रणाली शुरू की है। इस प्रणाली के जरिए जनता से प्राप्त आरटीआई आवेदनों और अपीलों का निर्धारित समय में तेजी से निपटारा किया जा रहा है। समय पर और सहज तरीके से सूचना उपलब्ध कराने तथा पारदर्शिता बढ़ाने के लिए, इस मंत्रालय के प्रशासनिक नियंत्रण वाले सभी तेल और गैस सार्वजनिक क्षेत्र के उपक्रम और अन्य संगठन अब इस ऑनलाइन आरटीआईएमआईएस पोर्टल से जुड़े हैं।

अप्रैल–मार्च, 2024–25 के दौरान मंत्रालय में आरटीआई अधिनियम, 2005 के तहत 1449 आवेदन/प्राप्तियां तथा 1551 आवेदन/प्राप्तियां और 81 अपीलें प्राप्त हुई हैं।

1.27 लोक शिकायतें

भारत सरकार के मंत्रिमंडल सचिवालय के दिशा–निर्देशों के अनुसार, पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय में एक लोक शिकायत प्रकोष्ठ कार्यरत है। यह प्रकोष्ठ सार्वजनिक क्षेत्र की तेल एवं गैस कंपनियों और इस मंत्रालय के प्रशासनिक नियंत्रणाधीन अन्य संगठनों के विरुद्ध जनता की शिकायतों का समाधान करता रहा है। जून 2008 में "केंद्रीकृत लोक शिकायत निवारण एवं निगरानी प्रणाली (सीपीजीआरएएमएस)" नामक एक ऑनलाइन प्रणाली शुरू की गई थी। इसके अतिरिक्त, जन शिकायतों का तत्काल और त्वरित निवारण सुनिश्चित करने के लिए पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय में एक व्यवस्थित तंत्र भी विकसित किया गया है। पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय और तेल एवं गैस सार्वजनिक उपक्रमों में लंबित शिकायतों की समीक्षा वरिष्ठ अधिकारियों द्वारा नियमित रूप से की जाती है।

वित्त वर्ष 2024–25 के दौरान कुल 22,651 जन शिकायतें (अग्रेनीत 2,308 आवेदनों सहित) प्राप्त हुईं, जिनमें से 31 मार्च 2025 तक 20,864 जन शिकायतों

का निपटारा किया गया।

1.28 साइबर सुरक्षा दिशानिर्देश

राष्ट्रीय महत्वपूर्ण सूचना अवसंरचना संरक्षण केंद्र (एनसीआईआईपीसी) ने तेल और गैस क्षेत्र को एक महत्वपूर्ण क्षेत्र के रूप में चिह्नित किया है। तेल क्षेत्र अपनी उत्पादकता बढ़ाने और कार्यकुशलता सुधारने के लिए प्रचालन और प्रशासन में सूचना और संचार प्रौद्योगिकी (आईसीटी) और प्रचालन प्रौद्योगिकी का तेजी से उपयोग कर रहा है। हालांकि, आईसीटी के बढ़ते उपयोग से साइबर सुरक्षा खतरों और हमलों का जोखिम भी बढ़ गया है। मंत्रालय और संबंधित सार्वजनिक उपक्रम साइबर सुरक्षा की आवश्यकता को समझते हैं ताकि उनकी प्रणालियाँ सुरक्षित और मजबूत बनी रहें।

इसलिए, मंत्रालय और उससे संबद्ध उपक्रमों ने अपने–अपने संगठनों में सीआईएसओ/उप–सीआईएसओ नियुक्त किए हैं। सर्वोत्तम सूचना सुरक्षा प्रणाली प्रथाओं के अनुरूप तंत्र सुनिश्चित करने के लिए, पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के सचिव की अध्यक्षता में "पेट्रोलियम के लिए साइबर संकट प्रबंधन समिति" का गठन किया गया है। इसके सदस्य मंत्रालय और संबंधित सार्वजनिक उपक्रमों के सीआईएसओ हैं। यह समिति तेल सार्वजनिक उपक्रमों की साइबर सुरक्षा प्रणालियों और सीसीएमपीएस की स्थिति की समीक्षा करती है और कमियों की पहचान करती है।

यह सुनिश्चित करने के लिए कि साइबर सुरक्षा केवल तकनीकी मुद्दा न बनकर प्रबंधन का मुद्दा बने, प्रत्येक तिमाही में सभी सार्वजनिक क्षेत्र के उपक्रमों के निदेशक मंडल के सामने सीआईएसओ द्वारा एक प्रस्तुति अनिवार्य कर दी गई है। इसमें साइबर सुरक्षा की तैयारियों की स्थिति और कार्यान्वयन में उपक्रमों को आने वाली बाधाओं पर चर्चा की जाती है। साइबर सुरक्षा से संबंधित तिमाही बैठकों में मंत्रालय की सभी तेल सार्वजनिक उपक्रमों/संबद्ध कार्यालयों के सीआईएसओ/आईटी प्रमुख, एनसीआईआईपीसी, आई4सी, सीईआरटी–इन और एनआईसी के प्रतिनिधि शामिल होते हैं।

इस मंत्रालय ने साइबर सुरक्षा के लिए एक व्यापक संदर्भ ढांचा तैयार करने के लिए तकनीकी विशेषज्ञों की एक समिति बनाई है। इसका पालन मंत्रालय के प्रशासनिक नियंत्रण में आने वाले सभी तेल क्षेत्र के संगठन, उनकी सहायक कंपनियाँ और संयुक्त उद्यम करेंगे। यह ढांचा महत्वपूर्ण बुनियादी ढाँचे को नए खतरों से सुरक्षित रखने और मजबूत साइबर सुरक्षा उपाय सुनिश्चित करने में मदद करेगा।

विभागों और कर्मचारियों के लिए साइबर हमलों से सुरक्षित कार्य वातावरण बनाने और नेटवर्क तथा अनुप्रयोगों की सुरक्षा सुनिश्चित करने के लिए इलेक्ट्रॉनिक्स और सूचना प्रौद्योगिकी मंत्रालय तथा गृह मंत्रालय द्वारा जारी दिशा–निर्देशों को संकलित कर मंत्रालय में सभी के पालन के लिए साझा किया गया है।

मंत्रालय में सभी डेस्कटॉप मशीनों की हार्डवेयर सूची तैयार की जा चुकी है। नेटवर्क को मैलवेयर हमलों से बचाने के लिए ईडीआर (एंडपॉइंट डिटेक्शन एंड रिस्पांस) समाधान और एक एकीकृत एंडपॉइंट प्रबंधन (यूईएम) उपकरण अब मंत्रालय के डेस्कटॉप पर लागू किए गए हैं।

सर्वर सुरक्षा के लिए सीईआरटी–इन द्वारा जारी सभी दिशा–निर्देशों का पालन किया जा रहा है, जिसमें फायरवॉल की तैनाती, ईडीआर ग्राहक सिफारिशें, सर्वर लॉग का रखरखाव, वीपीएन एक्सेस, सर्वर एक्सेस पर प्रतिबंध, डिफ़ॉल्ट उपयोगकर्ताओं को अक्षम करना और एसएसएल का कार्यान्वयन शामिल हैं। मंत्रालय के अंतर्गत सभी सार्वजनिक उपक्रमों को इन दिशा–निर्देशों और सीईआरटी–इन तथा अन्य सरकारी एजेंसियों द्वारा जारी सलाह का पालन करने का निर्देश दिया गया है।

साइबर जागरूकता दिवस के भाग के रूप में, इस मंत्रालय के अधिकारियों और कर्मचारियों के लिए समय–समय पर प्रशिक्षण और जागरूकता कार्यक्रम आयोजित किए जा रहे हैं ताकि साइबर सुरक्षा जोखिमों को न्यूनतम किया जा सके।

1.29 ऊर्जा कूटनीति

भारत सरकार अपनी वैश्विक भागीदारी को बढ़ाने और तेजी से आपस में जुड़ती दुनिया में अपनी ऊर्जा

आवश्यकताओं को सुरक्षित करने में सक्रिय है। भारत की ऊर्जा कूटनीति केवल हाइड्रोकार्बन समृद्ध देशों और ऊर्जा मामलों से जुड़े प्रमुख अंतरराष्ट्रीय संगठनों के साथ ऊर्जा साझेदारी विकसित करने तक सीमित नहीं है, बल्कि वैश्विक दक्षिण के देशों के साथ हाइड्रोकार्बन और स्वच्छ प्रौद्योगिकियों में सहयोग बढ़ाने तक भी विस्तृत है।

भारत वैश्विक दक्षिण के सभी तेल उपभोक्ता देशों के लिए जिम्मेदार मूल्य निर्धारण और वैश्विक तेल बाज़ार की स्थिरता सुनिश्चित करने की माँग करता रहा है। यह भारत को एक विशिष्ट उदाहरण बनाता है और हमारी ऊर्जा रणनीति को मजबूती देता है, जिसे अब दुनिया भर में व्यावहारिक और संतुलित माना जाता है।

भारत अपनी ऊर्जा सुरक्षा को मज़बूत करने के लिए जीसीसी और ओपेक सदस्य देशों सहित स्थापित तेल और गैस उत्पादकों के साथ–साथ गुयाना जैसे नए प्रवेशकों के साथ द्विपक्षीय संबंध सक्रिय रूप से मजबूत कर रहा है। ये साझेदारियाँ द्विपक्षीय सहयोग, समझौता–ज्ञापनों और ओपेक, आईईए और आईईएफ जैसे अंतर्राष्ट्रीय संगठनों के साथ जुड़ाव के माध्यम से मजबूत होती हैं। यह व्यापक दृष्टिकोण वैश्विक ऊर्जा परिवर्तन के दौरान भारत की ऊर्जा सुरक्षा के प्रति प्रतिबद्धता को दर्शाता है।

भारत की ऊर्जा सुरक्षा की खोज चार 'ए'–उपलब्धता, सुगम्यता, सामर्थ्य और स्वीकार्यताकृके ढाँचे के तहत की जाती है, ताकि सभी वर्गों और क्षेत्रों को किफायती मूल्य पर ऊर्जा उपलब्ध हो सके। भारत मानता है कि आने वाले दशक में तेल और गैस भारत के प्राथमिक ऊर्जा मिश्रण में महत्वपूर्ण भूमिका निभाएंगे। साथ ही, यह अपने नागरिकों को किफायती और स्थायी तरीके से ऊर्जा उपलब्ध कराने के लिए सौर, पवन, जैव ईंधन और हाइड्रोजन जैसे सभी प्रकार की ऊर्जा को बढ़ावा दे रहा है। उल्लेखनीय है कि भारत वैश्विक जैव ईंधन गठबंधन का नेतृत्व कर रहा है, जो ऊर्जा परिवर्तन को स्थायी भविष्य की ओर ले जाने की प्रतिबद्धता को दर्शाता है।

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय, ऊर्जा सुरक्षा को मज़बूत करने और भारत के निवेश की सुरक्षा के लिए विदेश मंत्रालय और विदेशों में स्थित भारतीय दूतावासों के साथ मिलकर काम कर रहा है। ऊर्जा कूटनीति की निम्नलिखित प्रमुख विशेषताएँ उल्लेखनीय हैं:

- कच्चे तेल की समय पर और निरंतर आपूर्ति सुनिश्चित करने में भारतीय रिफाइनरियों की सहायता करना।
- ईएंडपी परिसंपत्तियों के अधिग्रहण सहित तेल एवं गैस स्रोतों का भौगोलिक विविधीकरण और विस्तार करना।
- ऊर्जा कॉरिडोर और ऊर्जा सेतुओं का निर्माण करके तेल और गैस क्षेत्र में पड़ोसी प्रथम नीति को बढ़ावा देने के लिए पहल शुरू करना।
- दीर्घकालिक तेल और एलएनजी सौदों पर बातचीत करना।
- आईईएफ और आईईए जैसे अंतर्राष्ट्रीय संगठनों के साथ भारत के संबंधों का लाभ उठाना, ताकि भारत की आवाज़ उत्पादक और उपभोक्ता देशों के बीच संतुलन स्थापित कर सके।
- स्थायी जैव ईंधन को अपनाने के लिए वैश्विक सहयोग को बढ़ावा देने हेतु "वैश्विक जैव ईंधन गठबंधन" का नेतृत्व करना।
- भारत ऊर्जा सप्ताह का आयोजन करना, ताकि नीति निर्माताओं, उद्योग जगत और अन्य हितधारकों के बीच वैश्विक ऊर्जा संवाद में भारत की भूमिका सुदृढ़ हो सके।



भारत की प्रगति को ऊर्जा प्रदान करते हुए



खुला क्षेत्रफल लाइसेंस नीति के 9वें बोली दौर के तहत 28 ब्लॉकों का आवंटन



माननीय पेट्रोलियम एवं प्राकृतिक गैस मंत्री पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के वरिष्ठ अधिकारियों के साथ समीक्षा बैठक करते हुए



माननीय हरदीप एस पुरी पेट्रोलियम और प्राकृतिक गैस संबंधी परामर्शदात्री समिति की बैठक की अध्यक्षता करते हुए



बीपीसीएल और एडनॉक ट्रेडिंग द्वारा दीर्घकालिक एलएनजी आपूर्ति समझौते पर हस्ताक्षर



विश्व आर्थिक मंच (डब्ल्यूईएफ) कार्यक्रम, जिसमें विभिन्न क्षेत्रों के प्रमुख व्यक्ति शामिल हुए



ओएनजीसी पश्चिमी अपतटीय क्षेत्र



एन्नोर एलएनजी टर्मिनल, तमिलनाडु



गोरखपुर, उत्तर प्रदेश में इंडियन ऑयल कंप्रेस बायो गैस (सीबीजी) संयंत्र



पानीपत, हरियाणा में आईओसीएल की 3जी एथेनॉल यूनिट



दूरदराज के घरों तक डिलीवरी कर्मचारी नाव से एलपीजी सिलेंडरों को पहुंचाते हुए



एचपीसीएल का राजमुंदरी टर्मिनल



इलेक्ट्रिक वाहन (ईवी) चार्जिंग स्टेशन



ट्रक और टैक्सी चालकों के लिए हाईवे पर सुविधाएं प्रदान करने के लिए डिज़ाइन की गई 'अपना घर' सुविधा



भारत की सबसे बड़ी भूमिगत एलपीजी भंडारण सुविधा



मोबिलिटी बैटरी स्वैपिंग



अध्याय 2

vUo"k.k vkj mRiknu



2 अन्वेषण और उत्पादन

2.1 संदर्भ/पृष्ठभूमि:

हाइड्रोकार्बन महानिदेशालय (डीजीएच) की स्थापना वर्ष 1993 में भारत सरकार के एक प्रस्ताव के तहत पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय (एमओपीएनजी) के प्रशासनिक नियंत्रण में की गई थी। डीजीएच की स्थापना का उद्देश्य पेट्रोलियम गतिविधियों के पर्यावरण, सुरक्षा, तकनीकी और आर्थिक पहलुओं का ध्यान रखते हुए भारतीय तेल और प्राकृतिक गैस संसाधनों का सुदृढ़ प्रबंधन करना था। इसके साथ ही डीजीएच को अन्वेषित क्षेत्रों और अन्वेषण ब्लॉकों के लिए उत्पादन हिस्सेदारी संविदा (पीएससी), अन्वेषित लघु क्षेत्र नीति, हाइड्रोकार्बन अन्वेषण एवं लाइसेंसिंग नीति (हेल्प) जैसी नीतियों के कार्यान्वयन के माध्यम से निवेश को बढ़ावा देने और ईएंडपी गतिविधियों की निगरानी से संबंधित जिम्मेदारियाँ दी गई हैं।

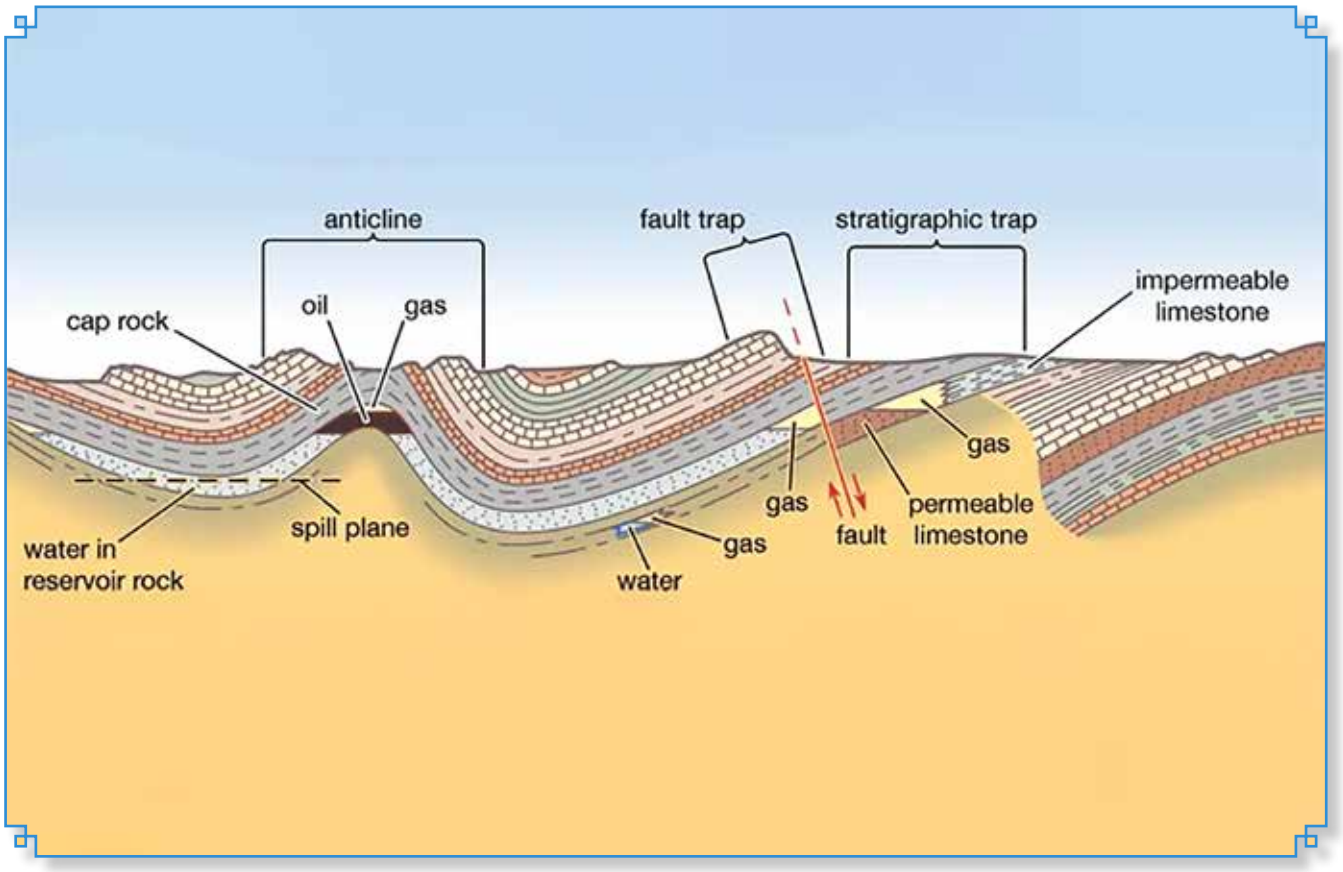
2.2 भारत में तलछटी बेसिन:

भारत में 26 तलछटी बेसिन हैं जो कुल 3.36 मिलियन वर्ग किलोमीटर क्षेत्र में फैले हुए हैं। अपतटीय तलछटी बेसिनों में, 400 मीटर गहराई तक लगभग 0.41 मिलियन वर्ग किलोमीटर क्षेत्र है, जबकि 400 मीटर से अधिक गहरे पानी में तलछटी क्षेत्र लगभग 1.32 मिलियन वर्ग किलोमीटर अनुमानित है। भारतीय तलछटी बेसिनों को वर्तमान में उनकी ज्ञात संभाव्यता के आधार पर तीन मुख्य श्रेणियों में निम्नानुसार बांटा गया है।

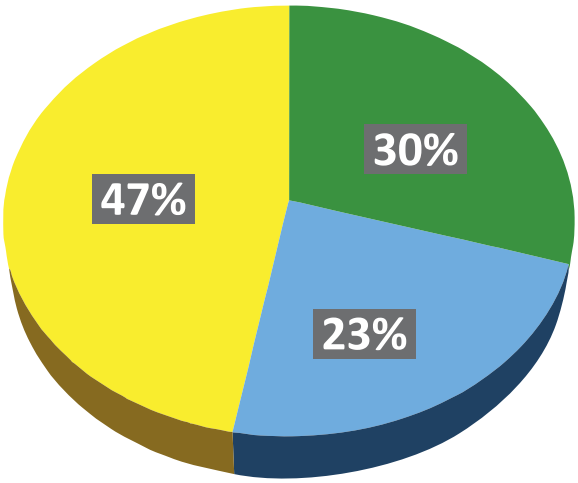
तालिका 2.1: भारतीय तलछटी बेसिनों की श्रेणियाँ:

बेसिनों का प्रकार	क्षेत्रफल (वर्ग कि.मी.)	हाइड्रोकार्बन की संभावना	बेसिन/क्षेत्र
श्रेणी I (7 बेसिन)	9,98,325	स्थापित वाणिज्यिक उत्पादन	कैम्बे, असम शेल्फ, मुंबई अपतटीय, कृष्णा गोदावरी, कावेरी, असम अराकान फोल्ड बेल्ट और राजस्थान
श्रेणी II (5 बेसिन)	7,80,974	हाइड्रोकार्बन के संचय की खोज की गई है, लेकिन अभी तक कोई व्यावसायिक उत्पादन नहीं हुआ है	कच्छ, महानदी–एनईसी, अंडमान, विंध्य, सौराष्ट्र
श्रेणी III (14 बेसिन)	15,86,150	अभी तक हाइड्रोकार्बन संचय ज्ञात नहीं है। सादृश्य द्वारा पूर्वानुमान	हिमालयी वनभूमि, गंगा–पंजाब, केरल–कोंकण, बंगाल–पूर्णिया, करेवा, स्पीति–ज़ांस्कर, सतपुड़ा–दक्षिण–रीवा, दामोदर, नर्मदा, दक्कन सिनेक्लाइज़, भीमा–कालाडगी, कुडप्पा, प्राणहिता–गोदावरी, बस्तर, छत्तीसगढ़
कुल	**33,65,449**		

पेट्रोलियम संचय के लिए भूवैज्ञानिक जमाव के प्रकार



देश में कच्चा तेल और प्राकृतिक गैस का उत्पादन मुख्य रूप से श्रेणी–I तलछटी बेसिनों तक ही सीमित है। इसके अलावा, पाँच श्रेणी–II बेसिनों में पेट्रोलियम संसाधनों की महत्वपूर्ण मात्रा पाई गई है, लेकिन इन बेसिनों से उत्पादन अभी शुरू नहीं हुआ है। विभिन्न श्रेणियों के अनुसार 3.36 मिलियन वर्ग किलोमीटर के कुल भारतीय तलछटी क्षेत्र का वितरण इस प्रकार है:

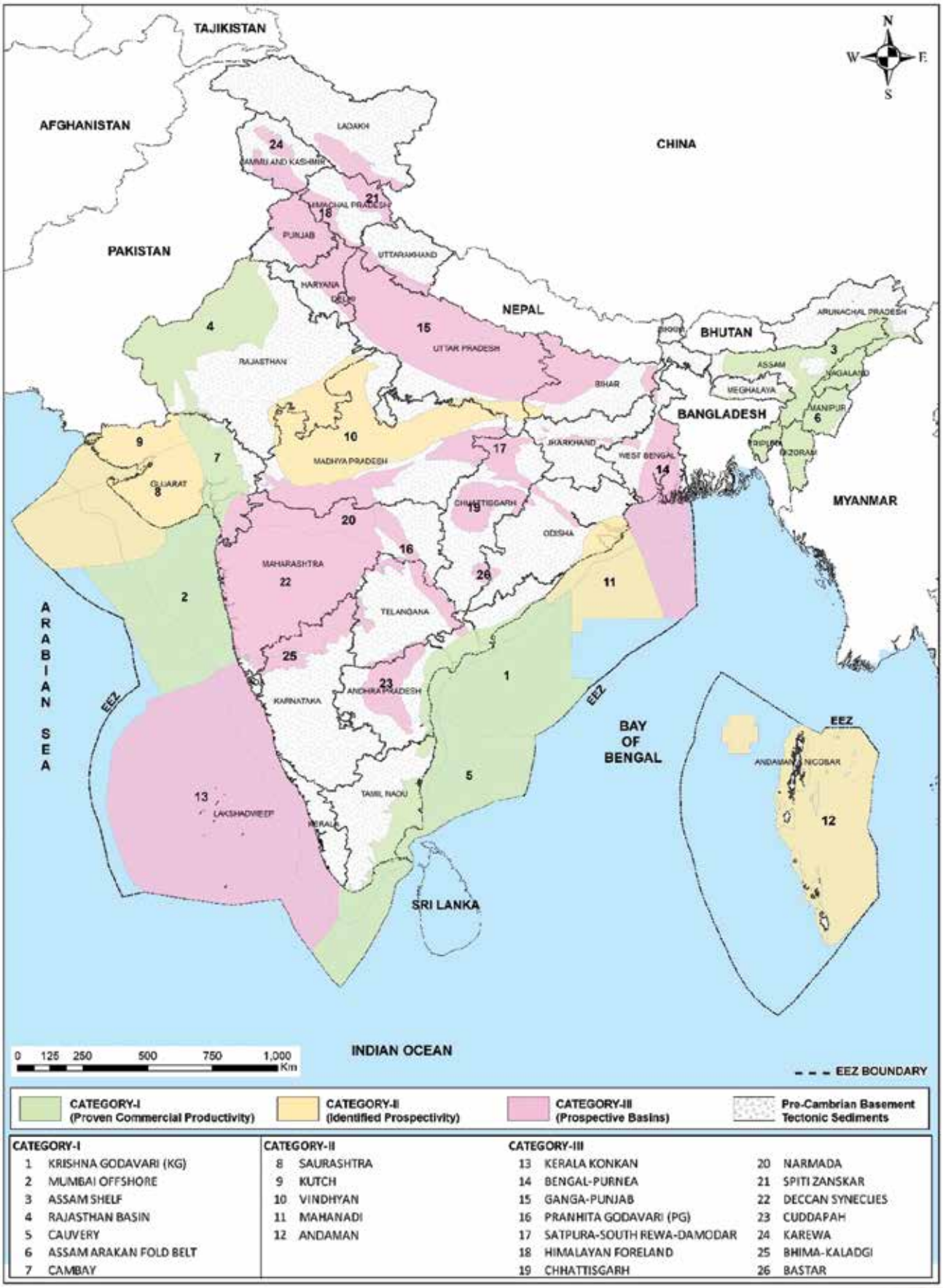


श्रेणी– I
(व्यावसायिक उत्पादन स्थापित)

श्रेणी– II
(अन्वेषित लेकिन कोई व्यावसायिक उत्पादन नहीं)

श्रेणी– III
(अभी खोजा जाना बाकी)

भारतीय तलछटी क्षेत्र



CATEGORY-I		CATEGORY-II		CATEGORY-III			
1	KRISHNA GODAVARI (KG)	8	SAURASHTRA	13	KERALA KONKAN	20	NARMADA
2	MUMBAI OFFSHORE	9	KUTCH	14	BENGAL-PURNEA	21	SPITI ZANSKAR
3	ASSAM SHELF	10	VINDHYAN	15	GANGA-PUNJAB	22	DECCAN SYNECLIES
4	RAJASTHAN BASIN	11	MAHANADI	16	PRANHITA GODAVARI (PG)	23	CUDDAPAH
5	CAUVERY	12	ANDAMAN	17	SATPURA-SOUTH REWA-DAMODAR	24	KAREWA
6	ASSAM ARAKAN FOLD BELT			18	HIMALAYAN FORELAND	25	BHIMA-KALADGI
7	CAMBAY			19	CHHATTISGARH	26	BASTAR

2.3 कच्चे तेल और प्राकृतिक गैस के अनुमानित संसाधन

पारंपरिक हाइड्रोकार्बन संसाधनः

देश के 26 तलछटी बेसिनों में अनुमानित पारंपरिक हाइड्रोकार्बन संसाधन लगभग 41.87 बिलियन टन (तेल और गैस के तेल समतुल्य) हैं, जो कि पहले के 28.08 बिलियन टन के अनुमान की तुलना में लगभग 49% अधिक हैं। बेसिन–वार विवरण इस प्रकार हैं:

तालिका 2.2: भारत में अनुमानित हाइड्रोकार्बन संसाधन (स्रोतः डीजीएच)

बेसिन श्रेणी	संख्या	बेसिन का नाम	अनुमानित संसाधन (एमएमटीओई) अनुमान (2017)	कुल क्षेत्रफल, वर्ग कि.मी.	सक्रिय क्षेत्र (पीईएल/पीएमएल), वर्ग कि.मी.
श्रेणी I (वे बेसिन जिनसे तेल और गैस का उत्पादन और दोहन किया जा रहा है)	1	असम अराकान फोल्ड बेल्ट	1,632.80	80,825.00	12,785.66
	2	असम शेल्फ	6,001.20	56,000.00	30,369.48
	3	कैम्बे	2,585.60	53,500.00	20,646.49
	4	कावेरी	1,964.40	2,40,000.00	20,904.8
	5	कृष्णा गोदावरी	9,554.50	2,30,000.00	20,940.07
	6	मुंबई अपतटीय	9,646.00	2,12,000.00	56,548.69
	7	राजस्थान	4,126.00	1,26,000.00	24,220.88
श्रेणी I कुल			**35,510.50**	**9,98,325.00**	**1,86,416.07**
श्रेणी II (आकस्मिक संसाधनों वाले बेसिन जिनका विकास और मुद्रीकरण किया जाना है)	8	अंडमान	371.40	2,25,918.00	23,262
	9	कच्छ	898.40	58,554.00	13,359.3
	10	महानदी	650.60	99,500.00	28,609.73
	11	सौराष्ट्र	1,325.20	1,94,114.00	10,883
	12	विंध्य	632.50	2,02,888.00	13,722
श्रेणी II कुल			**3,878.10**	**7,80,974.00**	**89,836.03**
श्रेणी III (केवल संभावित संसाधनों वाले बेसिन जिनका अन्वेषण और खोज की जानी है)	13	बस्तर	1.30	5,360.00	
	14	बंगाल–पूर्णिया	828.30	1,21,914.00	17,428.40
	15	भीमा–कलाडगी	3.20	14,100.00	
	16	छत्तीसगढ़	25.00	32,000.00	
	17	कुडप्पा	5.10	40,100.00	3,306
	18	दक्कन–सिनक्लाइज़	11.00	2,37,500.00	
	19	गंगा–पंजाब	128.40	3,04,000.00	2,428
	20	हिमालयी वनभूमि	44.40	30,110.00	666
	21	करेवा	4.00	6,671.00	
	22	केरल कोनाकन	1,244.60	5,80,000.00	11,350
	23	नर्मदा	18.00	95,215.00	2,999
	24	प्राणहिता गोदावरी	95.40	30,000.00	
	25	सतपुड़ा–एस.रीवा–दामोदर	63.00	57,180.00	906
	26	स्पीति–ज़ांस्कर	11.10	32,000.00	
श्रेणी III कुल			**2,482.80**	**15,86,150.00**	**39,083.40**
कुल (एमएमटीओई)			**41,871.40**	**33,65,449.00**	**3,15,335.50**

*** एमएमटीओई : मिलियन मीट्रिक टन तेल और तेल के समतुल्य गैस**

2.3.1 दिनांक 01.04.2025 तक देश के भंडार (2पी) और संसाधन (2सी): देश में ईएंडपी प्रचालन व्यवस्थाएँ, अर्थात् नामांकन, उत्पादन हिस्सेदारी संविदा (पीएससी), खुला क्षेत्रफल लाइसेंस नीति (ओएएलपी), अन्वेषित लघु क्षेत्र (डीएसएफ), और कोल बेड मीथेन (सीबीएम) परंपरागत और अपरंपरागत दोनों प्रकार के हाइड्रोकार्बन भंडारों के लिए लागू हैं। 01.04.2025 तक, प्रचालकों ने देश भर में लगभग 672 एमएमटी कच्चे तेल और 1,074 बीसीएम प्राकृतिक गैस के पुनर्प्राप्ति योग्य (2पी+2सी) भंडार और संसाधनों की सूचना दी है। विभिन्न व्यवस्थाओं में देश के भंडार और आकस्मिक संसाधनों की स्थिति **तालिका 2.3** में दी गई है।

देश स्तर पर रिपोर्ट किए गए संभावित संसाधन (2सी) काफ़ी अधिक हैं और इन्हें एक निर्धारित समय–सीमा के भीतर नई या पुनर्विकास परियोजनाओं द्वारा प्राथमिकता दी जानी चाहिए।

तालिका 2.3: दिनांक 01.04.2025 की स्थिति के अनुसार हाइड्रोकार्बन भंडार की स्थिति

व्यवस्था	मौजूदा 2पी		2पी ईयूआर		2024–2025 के दौरान अभिवृद्धि		भंडार (2पी)		आकस्मिक संसाधन (2सी)	
	तेल+ कंडेन्सेट (एमएमटी)	गैस (बीसीएम)	तेल+ कंडेन्सेट (एमएमटी)	गैस (बीसीएम)	तेल+ कंडेन्सेट (एमएमटी)	गैस (बीसीएम)	तेल+ कंडेन्सेट (एमएमटी)	गैस (बीसीएम)	तेल+ कंडेन्सेट (एमएमटी)	गैस (बीसीएम)
नामांकन (ओएनजीसी और ओआईएल)	6268.7	2793.8	1709.3	1433.3	11.7	17.7	353.5	365.3	111.4	295.1
पीएससी		792.8	233.3	319.8	4.2	-32.7	64.2	146.8	130.6	113.9
डीएसएफ	63.8	91.0	5.4	24.6	0.0	0.1	5.3	24.2	5.0	18.7
ओएएलपी	10.7	66.5	0.1	0.3	0.0	0.0	0.0	0.1	2.0	36.2
सीबीएम	0.0	342.7	0.0	66.3	0.0	1.1	0.0	59.1	0.0	14.7
कुल योग	**7306.7**	**4086.8**	**1948.1**	**1844.3**	**15.94**	**-13.8**	**423.1**	**595.4**	**249.0**	**478.6**

2.3.2 अपरंपरागत हाइड्रोकार्बन संसाधन (सीबीएम): देश में अनुमानित सीबीएम संसाधन लगभग 2,600 बिलियन क्यूबिक मीटर (बीसीएम) या 91.8 ट्रिलियन क्यूबिक फीट (टीसीएफ) हैं, जो 11 राज्यों और क्षेत्रों में फैले हुए हैं। सीबीएम संसाधनों का राज्य/क्षेत्रवार विवरण निम्नानुसार है:

तालिका 2.4: भारत में कोल बेड मीथेन संसाधनों का राज्य/क्षेत्रवार वितरण

संख्या	राज्य	अनुमानित सीबीएम संसाधन (बीसीएम में)	अनुमानित सीबीएम संसाधन (टीसीएफ में)	जीआईआईपी (टीसीएफ में)
1	झारखंड	722.08	25.50	1.92
2	राजस्थान	359.62	12.70	0
3	गुजरात	351.13	12.40	0
4	ओडिशा	243.52	8.60	0
5	छत्तीसगढ़	240.69	8.50	0
6	मध्य प्रदेश	218.04	7.70	3.65
7	पश्चिम बंगाल	218.04	7.70	4.85
8	तमिलनाडु	104.77	3.70	0
9	तेलंगाना और आंध्र प्रदेश	99.11	3.50	0
10	महाराष्ट्र	33.98	1.20	0
11	पूर्वोत्तर	8.50	0.30	0
	d\y lhch,e l\lkèku	**2599.48**	**91.80**	**10.42**

***रूपांतरण कारक: 1 घन मीटर = 35.3147 घन फीट**

2.3.3 **शेल गैस/तेल संसाधनः** शेल गैस/तेल प्राकृतिक गैस/तेल का एक रूप है जो स्रोत चट्टान (आमतौर पर शेल) के छिद्रों और दरारों में फंसा रहता है और बाहर नहीं निकल पाता। इसकी उपस्थिति और निकालने की प्रक्रिया पारंपरिक तरीके से अलग होती है, इसलिए इसे अपरंपरागत संसाधन कहा जाता हैं।

यह अनुमान लगाया गया है कि भारत में कई तलछटी बेसिन (गंगा का मैदान, गुजरात, राजस्थान, आंध्र प्रदेश और अन्य तटीय क्षेत्र), जिनमें हाइड्रोकार्बन युक्त बेसिन (कैम्बे, असम–अराकान और दामोदर) शामिल हैं, शेल तेल और गैस के अच्छे संभावित स्रोत हो सकते हैं। 2011 से, संयुक्त राज्य भूवैज्ञानिक सर्वेक्षण (यूएससजीएस), केंद्रीय खान योजना और डिजाइन संस्थान (सीएमपीडीआई) और ओएनजीसी जैसी विभिन्न एजेंसियों ने देश में शेल गैस भंडार के अनुमान के लिए अध्ययन किए हैं। भारत में शेल गैस और तेल संसाधन क्षमता की संभावनाओं को समझने और उसका दोहन करने के लिए, भारत सरकार ने 14 अक्टूबर 2013 को राष्ट्रीय तेल कंपनियों (एनओसी), ओएनजीसी और ओआईएल के लिए शेल गैस और तेल अन्वेषण नीति की घोषणा की। शेल गैस नीति – 2013 के तहत, ओएनजीसी ने 4 बेसिनों में 50 ब्लॉकों की पहचान की, नामांकन क्षेत्रों में कुल 34 शेल कूप खोदे गए (30 ओएनजीसी द्वारा और 4 ओआईएल द्वारा); हालाँकि, शेल गैस/तेल की वाणिज्यिक संभावना अभी तक सिद्ध नहीं हो सकी है।

2.3.4 **हाइड्रोकार्बन संसाधनों का पुनर्मूल्यांकनः** देश में हाइड्रोकार्बन संसाधनों की क्षमता का अद्यतन आकलन करने के लिए सभी 26 तलछटी बेसिनों का पुनर्मूल्यांकन वर्ष 2017 में किया गया, जो पिछले आकलन के लगभग दो दशक बाद हुआ। इस आकलन में अनुमान लगाया गया कि देश में लगभग 41.87 बिलियन टन (तेल और गैस के तेल समतुल्य) पारंपरिक हाइड्रोकार्बन संसाधन हैं, जो पहले के 28.08 बिलियन टन के अनुमान से लगभग 49% अधिक हैं।

2.4 कच्चा तेल और प्राकृतिक गैस उत्पादन

2.4.1 **कच्चे तेल का उत्पादनः** वित्त वर्ष 2024–25 में देश में लगभग 28.70 मिलियन मीट्रिक टन (एमएमटी) कच्चे तेल का उत्पादन हुआ। इसमें से लगभग 76.3% कच्चा तेल ओएनजीसी और ऑयल इंडिया लिमिटेड द्वारा नामांकन व्यवस्था के तहत उत्पादित किया गया, जबकि शेष 23.7% उत्पादन संविदा व्यवस्था से हुआ। कुल उत्पादन में अपतटीय (समुद्री) क्षेत्रों का हिस्सा लगभग 52.6% है। शेष भूमि क्षेत्रों से कच्चे तेल का उत्पादन मुख्यतः आंध्र प्रदेश, अरुणाचल प्रदेश, असम, गुजरात, राजस्थान, तमिलनाडु और पश्चिम बंगाल से किया जाता है। वित्त वर्ष 2024–25 और पिछले 5 वर्षों में कच्चे तेल के उत्पादन का विवरण नीचे दिया गया है:

तालिका 2.5: राज्य–वार कच्चे तेल के उत्पादन का रुझान (एमएमटी)

स्थान का प्रकार	राज्य/स्थान	2020-21	2021-22	2022-23	2023-24	2024-25
अपतटीय	पूर्वी अपतटीय	0.74	0.63	0.55	1.46	2.44
	गुजरात अपतटीय	0.41	0.34	0.38	0.33	0.18
	पश्चिमी अपतटीय	14.24	13.60	13.55	13.24	12.47
अपतटीय कुल		**15.39**	**14.57**	**14.48**	**15.03**	**15.09**
सार्वजनिक क्षेत्र के उद्यमों का हिस्सा		**14.24**	**13.62**	**13.54**	**13.21**	**12.44**
निजी/संयुक्त उद्यमों का हिस्सा		**1.15**	**0.95**	**0.94**	**1.82**	**2.64**
तटीय	आंध्र प्रदेश	0.19	0.20	0.24	0.25	0.28
	अरुणाचल प्रदेश	0.05	0.05	0.05	0.05	0.05
	असम	3.90	3.99	4.16	4.36	4.45
	गुजरात	4.65	4.63	4.85	4.95	5.13
	राजस्थान	5.89	5.89	5.07	4.42	3.43
	तमिलनाडु	0.41	0.37	0.32	0.29	0.26
	त्रिपुरा	0.003	0.003	0.003	0.002	0.002
	पश्चिम बंगाल	0.00010	0.00010	0.000008	0.00	0.00

स्थान का प्रकार	राज्य/स्थान	2020-21	2021-22	2022-23	2023-24	2024-25
तटीय कुल		15.100	15.133	14.699	14.329	13.61
सार्वजनिक क्षेत्र के उद्यमो का हिस्सा		8.87	8.82	9.11	9.35	9.47
निजी/संयुक्त उद्यमों का हिस्सा		6.23	6.30	5.59	4.98	4.15
कुल योग		30.49	29.69	29.18	29.36	28.70
सार्वजनिक क्षेत्र के उद्यमो का हिस्सा		23.11	22.44	22.65	22.56	21.91
निजी/संयुक्त उद्यमों का हिस्सा		7.39	7.25	6.53	6.80	6.79

2.4.2 **प्राकृतिक गैस उत्पादन:** वित्त वर्ष 2024–25 में देश में लगभग 36.11 बिलियन क्यूबिक मीटर (बीसीएम) प्राकृतिक गैस का उत्पादन हुआ। इसमें से लगभग 60.8% उत्पादन ओएनजीसी और ऑयल इंडिया लिमिटेड द्वारा नामांकन व्यवस्था के तहत किया गया, जबकि शेष 39.2% उत्पादन संविदा व्यवस्था (पीएससी, आरएससी और सीबीएम व्यवस्था) से हुआ। वित्त वर्ष 2024–25 में अपतटीय क्षेत्रों से प्राकृतिक गैस उत्पादन का हिस्सा लगभग 71.8% रहा। शेष प्राकृतिक गैस उत्पादन, जिसमें सीबीएम भी शामिल है, मुख्य रूप से दस राज्यों – आंध्र प्रदेश, अरुणाचल प्रदेश, असम, गुजरात, राजस्थान, तमिलनाडु, त्रिपुरा, झारखंड, मध्य प्रदेश और पश्चिम बंगाल से हुआ। वित्त वर्ष 2024–25 और पिछले पाँच वर्षों में प्राकृतिक गैस उत्पादन का विवरण नीचे दिया गया है:

तालिका 2.6: राज्य–वार प्राकृतिक गैस उत्पादन का रुझान (एमएमएससीएम)

स्थान का प्रकार	राज्य/स्थान	2020-21	2021-22	2022-23	2023-24	2024-25
अपतटीय	पूर्वी अपतटीय	1621.5	7024.8	7999.99	10823.6	11258.79
	गुजरात अपतटीय	147.6	163	231.93	214.375	152.08
	पश्चिमी अपतटीय	16659.9	15681.1	15176.6	14833.12	14516.64
अपतटीय कुल		**18429.1**	**22868.9**	**23408.6**	**25871.09**	**25927.52**
सार्वजनिक क्षेत्र के उद्यमों का हिस्सा		**17086.4**	**15942.9**	**15325.02**	**14978.61**	**15272.69**
निजी/संयुक्त उद्यमों का हिस्सा		**1342.6**	**6926**	**8083.6**	**10892.48**	**10654.83**
तटीय	आंध्र प्रदेश	827.5	808.6	709.694	721.9115	755.98
	अरुणाचल प्रदेश	55.4	57.7	53.314	39.634	41.59
	असम	2995.4	3371.5	3557.47	3489.19	3551.40
	गुजरात	1138.4	1017.3	923.242	926.01	1053.16
	राजस्थान	2039.7	2618.8	2340.15	2198.923	1786.43
	तमिलनाडु	910.9	1066.5	1109.45	1015.771	1013.38
	त्रिपुरा	1633.8	1530.8	1674.94	1524.863	1224.13
तटीय – सीबीएम	झारखंड	1.7	4	10.095	5.371	46.87
	मध्य प्रदेश	333.7	290.1	263.93	234.16	293.96
	पश्चिम बंगाल	307	389.2	399.421	410.947	414.75
तटीय कुल		**10243.4**	**11154.6**	**11041.7**	**10566.78**	**10181.65**
सार्वजनिक क्षेत्र के उद्यमों का हिस्सा		**7265.3**	**7578.3**	**7685.2**	**7427.5**	**7264.86**
निजी/संयुक्त उद्यमों का हिस्सा		**2978.1**	**3576.3**	**3356.5**	**3139.28**	**2916.78**
कुल योग		**28672.4**	**34023.5**	**34450.3**	**36437.87**	**36109.17**
सार्वजनिक क्षेत्र के उद्यमों का हिस्सा		**24351.7**	**23521.2**	**23010.2**	**22406.11**	**22537.55**
निजी/संयुक्त उद्यमों का हिस्सा		**4320.7**	**10502.3**	**11440.1**	**14031.76**	**13571.61**

वित्त वर्ष 2024–25 में, भारत का कोल बेड मीथेन (सीबीएम) उत्पादन 755.58 एमएमएससीएम तक पहुँच गया। भारत में वाणिज्यिक सीबीएम उत्पादन जुलाई 2007 में पश्चिम बंगाल के रानीगंज (दक्षिण) ब्लॉक में शुरू हुआ। मार्च 2025 तक, देश भर के छह ब्लॉकों से कुल सीबीएम उत्पादन दर लगभग 2.22 एमएमएससीएमडी है, जिसमें एक ब्लॉक से परीक्षण गैस और पाँच ब्लॉकों से वाणिज्यिक उत्पादन शामिल है। विशेष रूप से, रानीगंज (दक्षिण) ब्लॉक का वाणिज्यिक सीबीएम उत्पादन लगभग 0.2 एमएमएससीएमडी है। अन्य वाणिज्यिक रूप से उत्पादक ब्लॉकों में एस्सार द्वारा प्रचालित रानीगंज (पूर्व) ब्लॉक, जिसकी उत्पादन दर 0.93 एमएमएससीएमडी है, और ओएनजीसी द्वारा प्रचालित झरिया और बोकारो ब्लॉक, जिनकी उत्पादन दर 0.2 एमएमएससीएमडी है, शामिल हैं। इसके अतिरिक्त, आरआईएल द्वारा प्रचालित सोहागपुर (पश्चिम) ब्लॉक, लगभग 0.89 एमएमएससीएमडी सीबीएम उत्पन्न करता है।

2.5 भारतीय तलछटी क्षेत्रः

भारत का कुल तलछटी क्षेत्र 3.36 मिलियन वर्ग किलोमीटर है, जिसमें से 1.63 मिलियन वर्ग किलोमीटर (48.5%) भूमि क्षेत्र में और 1.73 मिलियन वर्ग किलोमीटर (51.5%) समुद्री क्षेत्र में है। 31 मार्च 2025 तक, कुल 79.47% बेसिन क्षेत्रों का सर्वेक्षण और मूल्यांकन किया जा चुका है।

2.6 अन्वेषण और उत्पादन के लिए आवंटित ब्लॉकः

कंपनियों (सार्वजनिक क्षेत्र की कंपनियाँ और निजी कंपनियाँ) को ब्लॉक या क्षेत्र आवंटित करने के लिए विभिन्न व्यवस्थाएँ रही हैं। इन अन्वेषण और उत्पादन व्यवस्थाओं का संक्षिप्त अवलोकन इस प्रकार हैः

क) **नामांकन आधारः** एनईएलपी शुरू होने से पहले, राष्ट्रीय तेल कंपनियों जैसे ऑयल एंड नेचुरल गैस कॉर्पोरेशन लिमिटेड (ओएनजीसी) और ऑयल इंडिया लिमिटेड (ओआईएल) को अन्वेषण और उत्पादन के लिए ब्लॉक नामांकन के आधार पर दिए जाते थे।

ख) **नेल्प–पूर्व अन्वेषित क्षेत्रः** अगस्त 1992 में सरकार ने निजी क्षेत्र को छोटे और मध्यम आकार के अन्वेषित क्षेत्रों (जो ओएनजीसी और ओआईएल ने खोजे थे) के अनुबंध प्रदान किए। भारत सरकार ने नेल्प–पूर्व अन्वेषित लघु और मध्यम आकार के क्षेत्रों के तहत 29 खोजे गए क्षेत्रों के लिए 28 अनुबंधों पर हस्ताक्षर किए।

ग) **नेल्प–पूर्व अन्वेषण ब्लॉकः** 1990 और नेल्प के कार्यान्वयन से पहले, 28 अन्वेषण ब्लॉक निजी कंपनियों को दिए गए थे, जहाँ ओएनजीसी और ओआईएल को हाइड्रोकार्बन खोजों के बाद ब्लॉक में भागीदारी के अधिकार प्राप्त थे।

घ) **नई अन्वेषण लाइसेंसिंग नीति (नेल्प) – 1999 सेः** नेल्प के तहत, भारतीय निजी और विदेशी कंपनियों को अंतरराष्ट्रीय प्रतिस्पर्धी बोली प्रक्रिया के माध्यम से अन्वेषण ब्लॉक आवंटित किए गए, जहाँ राष्ट्रीय तेल कंपनियां जैसे ओएनजीसी और ओआईएल भी समान स्तर पर प्रतिस्पर्धा में शामिल हुईं। नेल्प व्यवस्था के तहत कुल 254 ब्लॉक आवंटित किए गए।

ड.) **अन्वेषित लघु क्षेत्र (डीएसएफ) नीतिः** इस नीति के तहत सरकार ने राजस्व हिस्सेदारी मॉडल के आधार पर 85 अनुबंध क्षेत्र (डीएसएफ–।, डीएसएफ–।। और डीएसएफ–।।। बोली दौर) आवंटित किए हैं।

च) **हाइड्रोकार्बन अन्वेषण एवं लाइसेंसिंग नीति (HELP):** हाइड्रोकार्बन अन्वेषण एवं लाइसेंसिंग नीति (**HELP**) के तहत, सरकार ने 31 मार्च 2025 तक आठ बोली दौरों में राजस्व–हिस्सेदारी के आधार पर 144 अन्वेषण ब्लॉक आवंटित किए हैं।

भारत सरकार ने 310 उत्पादन हिस्सेदारी संविदाओं (पीएससी) पर हस्ताक्षर किए हैं, जिनमें 29 खोजे गए क्षेत्र, पूर्व–नेल्प के अंतर्गत 28 अन्वेषण ब्लॉक और नेल्प के अंतर्गत 254 ब्लॉक शामिल हैं। इसके अलावा, तीन डीएसएफ (अन्वेषित लघपु क्षेत्र) बोली दौरों के तहत 85 संविदा क्षेत्रों के लिए 85 राजस्व हिस्सेदारी संविदाओं (आरएससीज़) पर हस्ताक्षर किए गए हैं। हेल्प नीति के तहत, ओएएलपी बोली दौर । से VIII में 144 आरएससीज़ पर हस्ताक्षर किए गए हैं। वर्तमान में, विभिन्न बोली दौरों (अन्वेषित क्षेत्र, पूर्व–नेल्प, नेल्प, हेल्प और डीएसएफ) के अंतर्गत अब तक हस्ताक्षरित 310 पीएससीज़ और 229 आरएससीज़ में से 59 पीएससीज़ और 184 आरएससीज़ (डीएसएफ + **HELP**) वर्तमान में चालू हैं।

2.7 पेट्रोलियम अन्वेषण लाइसेंस (पीईएल) और पेट्रोलियम खनन पट्टा (पीएमएल):

नामांकन व्यवस्था के तहत, ओएनजीसी लगभग 48,473 वर्ग कि.मी. क्षेत्र में फैले 3 पीईएल और 325 पीएमएल ब्लॉकों में प्रचालन कर रही है। इसके अलावा, ओआईएल नामांकन व्यवस्था के तहत 4,828.84 वर्ग कि.मी. क्षेत्र में 25 पीएमएल ब्लॉकों का प्रचालन कर रहा है। ओएनजीसी और ओआईएल द्वारा प्रचालित पीईएल/पीएमएल का बेसिन–वार विवरण निम्नानुसार हैः

तालिका 2.7: दिनांक 31.03.2025 की स्थिति के अनुसार नामांकन व्यवस्था (ओएनजीसी) के अंतर्गत बेसिन–वार पीईएल और पीएमएल

बेसिन	नामांकन			
	पीईएल		पीएमएल	
	क्षेत्रफल	(वर्ग कि.मी.)	क्षेत्रफल	(वर्ग कि.मी.)
असम–अराकान (कछार+मिज़ोरम)			6	794
असम–अराकान (त्रिपुरा)			17	3027
असम शेल्फ–नागालैंड	3	1583	39	1560
बंगाल				
कैम्बे			160	5625
कच्छ तटवर्ती क्षेत्र				
सौराष्ट्र				
कावेरी (तटीय)			26	3956
गंगा घाटी				
पूर्णिया				
हिमालयी तटवर्ती क्षेत्र				
कृष्णा–गोदावरी (तटीय)			36	4283
पलार				
झारखंड				
जैसलमेर			4	838
बीकानेर–नागौर				
विंध्य				
सतपुड़ा–दक्षिण रेवा–दामोदर				
नर्मदा				
कुल तटीय	**3**	**1583**	**288**	**20083**
मुंबई अपतटीय (एसडब्ल्यू)			27	25794
मुंबई अपतटीय (डीडब्ल्यू)				
मुंबई अपतटीय (एसडब्ल्यू+डीडब्ल्यू)			27	25794
केरल–कोंकण (एसडब्ल्यू)				
केरल–कोंकण (डीडब्ल्यू)				
केरल–कोंकण (एसडब्ल्यू+डीडब्ल्यू)				
कच्छ (एसडब्ल्यू)				
कच्छ (डीडब्ल्यू)				
कच्छ (एसडब्ल्यू+डीडब्ल्यू)				
सौराष्ट्र (एसडब्ल्यू)			2	422

बेसिन	नामांकन			
	पीईएल		पीएमएल	
	क्षेत्रफल	(वर्ग कि.मी.)	क्षेत्रफल	(वर्ग कि.मी.)
सौराष्ट्र (डीडब्ल्यू)				
सौराष्ट्र (एसडब्ल्यू+डीडब्ल्यू)			2	422
कैम्बे की खाड़ी (एसडब्ल्यू)				
कैम्बे की खाड़ी (डीडब्ल्यू)				
कैम्बे की खाड़ी (एसडब्ल्यू+डीडब्ल्यू)				
कुल पश्चिम अपतटीय (एसडब्ल्यू)			**29**	**26216**
कुल पश्चिम अपतटीय (डीडब्ल्यू)				
कुल पश्चिम अपतटीय (एसडब्ल्यू+डीडब्ल्यू)			**29**	**26216**
कृष्णा–गोदावरी (एसडब्ल्यू)			5	357
कृष्णा–गोदावरी (डीडब्ल्यू)			2	224
कृष्णा–गोदावरी (एसडब्ल्यू+डीडब्ल्यू)			7	581
कावेरी (एसडब्ल्यू)			1	11
कावेरी (डीडब्ल्यू)				
कावेरी (एसडब्ल्यू+डीडब्ल्यू)			1	11
बंगाल अपतटीय (एसडब्ल्यू)				
बंगाल अपतटीय (डीडब्ल्यू)				
बंगाल अपतटीय (एसडब्ल्यू+डीडब्ल्यू)				
महानदी (एसडब्ल्यू)				
महानदी (डीडब्ल्यू)				
महानदी (एसडब्ल्यू+डीडब्ल्यू)				
अंडमान (एसडब्ल्यू)				
अंडमान (डीडब्ल्यू)				
अंडमान (एसडब्ल्यू+डीडब्ल्यू)				
कुल ई. अपतटीय (एसडब्ल्यू)			**6**	**368**
कुल ई. अपतटीय (डीडब्ल्यू)			**2**	**224**
कुल ई. अपतटीय (एसडब्ल्यू+डीडब्ल्यू)			**8**	**592**
कुल अपतटीय (एसडब्ल्यू)			**35**	**26583**
कुल अपतटीय (डीडब्ल्यू)			**2**	**224**
कुल अपतटीय			**37**	**26807**
कुल ओएनजीसी	**3**	**1583**	**325**	**46890**

तालिका 2.8: दिनांक 31.03.2025 की स्थिति के अनुसार नामांकन व्यवस्था (ओआईएल) के तहत बेसिन–वार पीईएल और पीएमएल

बेसिन			पीईएल		पीएमएल		कुल	
			संख्या	क्षेत्रफल (कि.मी.2)	संख्या	क्षेत्रफल (कि.मी.2)	संख्या	क्षेत्रफल (कि.मी.2)
ओआईएल	राजस्थान	तटीय	-	-	2	446.71	2	446.71
	असम–अराकान	तटीय	-	-	23	4382.13	23	4382.13
कुल – ओआईएल			**-**	**-**	**25**	**4828.84**	**25**	**4828.84**

तालिका 2.9: दिनांक 31.03.2025 की स्थिति के अनुसार पीएससी व्यवस्था के तहत पीएसयू/निजी एवं संयुक्त उद्यम कंपनियों के साथ

बेसिन का नाम	पीईएल की संख्या	कुल पीईएल क्षेत्र (वर्ग कि.मी.)	पीएमएल की संख्या	कुल पीएमएल क्षेत्र (वर्ग कि.मी.)
असम–अराकान शेल्फ	6	5968.55	4	263.43
बंगाल–पूर्णिया	1	2364.00	0	0.00
कैम्बे	3	131.59	42	1583.10
कावेरी	0	0.00	4	422.80
कृष्णा गोदावरी	2	2075.87	12	2387.97
महानदी	1	831.73	0	0.00
मुंबई	1	705.57	1	501.06
राजस्थान	0	0.00	3	3287.17
सौराष्ट्र	0	0.00	1	552.00
विंध्य	1	462.00	0	0.00
कुल योग	**15**	**12539.31**	**67**	**8997.53**

***कुल 59 प्रचालन ब्लॉकों के लिए**

तालिका 2.10: दिनांक 31.03.2025 की स्थिति के अनुसार डीएसएफ के तहत निजी/संयुक्त उद्यम कंपनियों के साथ बेसिन–वार पीएमएल

क्र. सं.	बेसिन का नाम	स्वीकृत पीएमएल	पीएमएल क्षेत्र (वर्ग कि.मी.)
1	मुंबई अपतटीय	16	6285.06
2	कृष्णा गोदावरी	16	2147.23
4	असम शेल्फ	6	162.51
5	असम–अराकान फोल्ड बेल्ट	2	541.53
6	कैम्बे	10	1192.8
8	राजस्थान	3	167.0
9	कच्छ	2	2092.3
10	बंगाल–पूर्णिया	1	541.4
	d|y	**56**	**13129.80**

2.7.1 दिनांक 31.03.2025 तक पेट्रोलियम अन्वेषण लाइसेंस (पीईएल) प्रदान करने की स्थिति: आठ ओएएलपी बोली दौरों में आवंटित 144 ब्लॉकों में कुल 177 पीईएल प्रदान किए जाने थे। दिनांक 31.03.2025 तक 2,27,367 वर्ग किलोमीटर क्षेत्र के लिए कुल 158 पीईएल प्रदान किए जा चुके हैं। पीईएल की स्थिति का सारांश इस प्रकार है:

तालिका 2.11: दिनांक 31.03.2025 की स्थिति के अनुसार ओएएलपी के तहत पीईएल की बोली राउंड–वार स्थिति

ओएएलपी बोली दौर	पीईएल की कुल संख्या	स्वीकृत पीईएल	लंबित पीईएल	अस्वीकृत पीईएल	पीईएल लागू नहीं	पीईएल स्वीकृत क्षेत्रफल, वर्ग कि.मी.
ओएएलपी I	76	66	2	8**		55518
ओएएलपी II	18	17	1	0		28394
ओएएलपी III	21	15	2	4**		22678
ओएएलपी IV	7	7	0	0		18510
ओएएलपी V	13	13	0	0		19789
ओएएलपी VI	24	22	2	0		32347
ओएएलपी VII	8	8	0	0		15766
ओएएलपी VIII	10	10	0	0		34365
कुल	**177**	**158**	**7**	**12**	**0**	**227367**

*कुछ आवंटित ब्लॉक कई राज्यों के अधिकार क्षेत्र में आते हैं, इसलिए पीईएल की संख्या आवंटित ब्लॉकों की संख्या से अधिक है।

** तमिलनाडु, पुडुचेरी और आंध्र प्रदेश राज्यों में पीईएल प्रदान न किए जाने के कारण, ठेकेदार द्वारा ब्लॉक/आंशिक क्षेत्र लौटा दिया गया है।

तालिका 2.12: दिनांक 31.03.2025 की स्थिति के अनुसार ओएएलपी के तहत पीईएल की बेसिन–वार स्थिति

बेसिन	पीईएल की कुल संख्या	स्वीकृत पीईएल	लंबित पीईएल	अस्वीकृत पीईएल	पीईएल लागू नहीं	पीईएल स्वीकृत क्षेत्रफल, वर्ग कि.मी.
अंडमान–निकोबार	6	6	0	0		23262
असम अराकान फोल्ड बेल्ट	17	16	1	0		4041
असम शेल्फ	31	29	2	0		20832
बंगाल–पूर्णिया	6	5	1	0		14523
कैम्बे	26	25	1	0		12114
कावेरी	15	6	2	7**		16515
कडप्पा	1	1	0	0		3306
गंगा–पंजाब	4	4	0	0		2428
हिमालयी वनभूमि	1	1	0	0		666
केरल कोंकण	3	3	0	0		11350
कृष्णा गोदावरी	10	5	0	5*		9465
कच्छ	9	9	0	0		11267

बेसिन	पीईएल की कुल संख्या	स्वीकृत पीईएल	लंबित पीईएल	अस्वीकृत पीईएल	पीईएल लागू नहीं	पीईएल स्वीकृत क्षेत्रफल, वर्ग कि.मी.
महानदी	10	10	0	0		27778
मुंबई अपतटीय	9	9	0	0		23263
नर्मदा	2	2	0	0		2999
राजस्थान	16	16	0	0		19482
सतपुड़ा–दक्षिण रीवा–दामोदर	1	1	0	0		906
सौराष्ट्र	5	5	0	0		9909
विंध्य	5	5	0	0		13260
कुल	**177**	**158**	**8**	**12**	**0**	**227367**

कुछ बेसिन कई क्षेत्रों जैसे तटवर्ती/अपतटीय या कई राज्यों को कवर करते हैं।

*तमिलनाडु/पुडुचेरी द्वारा 5 पीईएल अस्वीकार किए जाने के कारण, प्रचालक ने क्षेत्र/ब्लॉक वापस कर दिया।

**तमिलनाडु, आंध्र प्रदेश और पुडुचेरी राज्यों को मिलाकर 7 पीईएल स्वीकृत न किए जाने के कारण, प्रचालक ने ब्लॉक वापस कर दिया।

तालिका 2.13: दिनांक 31.03.2025 की स्थिति के अनुसार नामांकन व्यवस्था के तहत ओएनजीसी और ओआईएल द्वारा किए गए अन्वेषण प्रयास

क्र.सं.	कंपनी	संचयी अन्वेषण			वित्त वर्ष 2024–25 के दौरान		
		2डी भूकंपीय (एलकेएम)	3डी भूकंपीय (वर्ग कि.मी.)	अन्वेषण कूप (संख्या)	2डी भूकंपीय (एलकेएम)	3डी भूकंपीय (वर्ग कि.मी.)	अन्वेषण कूप (संख्या)
1	ओएनजीसी	8,83,690.72	1,40,547.72	6589	191.13	2091.44	71
2	ओआईएल	28030	9816	449	70.94	482.25	15

2.8 पीएससी के तहत निजी/संयुक्त उद्यम कंपनियों द्वारा किए गए अन्वेषण प्रयास:

31.03.2025 तक, पीएससी और आरएससी व्यवस्थाओं के तहत निजी/संयुक्त उद्यम कंपनियों द्वारा बेसिन–वार 2डी भूकंपीय, 3डी भूकंपीय और अन्वेषण कूपों के संदर्भ में किए गए अन्वेषण प्रयास निम्नलिखित हैं:

तालिका 2.14: पीएससी व्यवस्था में अन्वेषण प्रयास (दिनांक 31.03.2025 की स्थिति के अनुसार)

बेसिन	2डी एलकेएम	3डी एसकेएम	अन्वेषण कूप*
अंडमान–निकोबार	27070	16562	6
असम–अराकान फोल्ड बेल्ट	1352	613	4
असम–अराकान फोल्ड बेल्ट	5468	2211	44
बंगाल–पूर्णिया	5247	4909	16
कैम्बे	29994	9167	325
कावेरी	64727	44561	51
डेक्कन सिनेक्लिज़	476	0	0

बेसिन	2डी एलकेएम	3डी एसकेएम	अन्वेषण कूप*
गंगा	3876	263	4
गंगा–पंजाब	2542	1420	4
हिमालयी वनभूमि	810	0	1
केरल कोंकण	52290	14035	7
कृष्णा गोदावरी	76106	71311	210
कच्छ	2985	8345	21
महानदी	59542	64659	53
मुंबई	21349	27285	51
प्राणहिता गोदावरी	195	0	1
राजस्थान	14157	16396	312
सतपुड़ा–दक्षिण रीवा–दामोदर	2050	304	2
सौराष्ट्र	16037	15428	16
विंध्य	3918	858	10
कुल योग	**3,90,191**	**2,98,326**	**1,138**

टिप्पणी: *अन्वेषणात्मक और मूल्यांकन कूपों सहित

आरएससी के अंतर्गत, 31 मार्च, 2025 तक, ब्लॉकों के ठेकेदारों ने 32,131 वर्ग कि.मी. 2डी भूकंपीय डेटा और 41,321 वर्ग कि. मी. 3डी भूकंपीय डेटा प्राप्त कर लिया है और 100 अन्वेषण कूप खोद लिए हैं। बेसिन–वार विवरण इस प्रकार है:

तालिका 2.15: आरएससी व्यवस्था (ओएएलपी) में अन्वेषणात्मक योगदान (दिनांक 31.03.2025 की स्थिति के अनुसार)

बेसिन	2डी भूकंपीय (एलकेएम)	3डी भूकंपीय (एसकेएम)	अन्वेषणात्मक कूप (सं.)
अंडमान–निकोबार	8500.50	2840.80	1
असम अराकान फोल्ड बेल्ट	1113.80	405.20	5
असम शेल्फ	3272.30	648.90	7
बंगाल–पूर्णिया	903.70	3830.60	2
कैम्बे	1518.90	1865.10	21
कावेरी	0.00	8596.99	2
कडप्पा	316.97	331.68	0
गंगा–पंजाब	0.00	597.15	0
हिमालयी वनभूमि	0.00	0.00	0
केरल कोंकण	0.00	1027.78	0
कृष्णा गोदावरी	430.90	1513.90	1
कच्छ	398.00	1357.93	0
महानदी	2305.28	4610.02	7

बेसिन	2डी भूकंपीय (एलकेएम)	3डी भूकंपीय (एसकेएम)	अन्वेषणात्मक कूप (सं.)
मुंबई अपतटीय	940.00	9248.14	26
नर्मदा	0.00	67.26	0
राजस्थान	10701.39	870.46	16
सतपुड़ा–दक्षिण रीवा–दामोदर	0.00	200.73	0
सौराष्ट्र	488.64	1855.97	2
विंध्य	1240.72	1452.65	10
कुल	**32,131.10**	**41,321.26**	**100**

2.8.1 2024–25 में हाइड्रोकार्बन खोजें: वित्त वर्ष 2024–25 के दौरान, कुल 10 हाइड्रोकार्बन खोजें की गई हैं। पाँच खोजें संविदा व्यवस्था के तहत की गई हैं जबकि 5 खोजें नामांकित व्यवस्था के तहत हैं। कुल मिलाकर 10 खोजों में से 7 खोजें ओएनजीसी ने, 2 ऑयल इंडिया लिमिटेड ने और 1 वेदांता लिमिटेड ने की हैं। खोजों का विवरण नीचे दिया गया है:

तालिका 2.16: वर्ष 2024–25 में हाइड्रोकार्बन खोजों का सारांश

क्र. सं.	कंपनी	कुल
1	ओएनजीसी नामांकित व्यवस्था	3
2	ओएनजीसी नामांकित व्यवस्था	2
3	संविदा व्यवस्था	5
कुल		10

तालिका 2.17: वर्ष 2024–25 में हाइड्रोकार्बन खोजों का विवरण

क्र. सं.	खोज का नाम	हाइड्रोकार्बन	ब्लॉक	बेसिन	स्थान	प्रचालक
नामांकित व्यवस्था के अंतर्गत खोजें						
1	वेस्ट मटर–2 (एमआरएक्स)	तेल और गैस	एमएल–मटर	कैम्बे	तटीय	ओएनजीसी
2	चंद्रमणि (बी–56–2)	गैस	एमएल–सी–सीरीज़ फ़ील्ड	मुंबई एसडब्ल्यू	मुंबई एसडब्ल्यू	ओएनजीसी
3	यंदापल्ली–1 (वाईपीएए)	तेल और गैस	मल्लेश्वरम पीएमएल	कृष्णा गोदावरी	कृष्णा गोदावरी	ओएनजीसी
4	मेचाकी–6	तेल	मेचाकी पीएमएल	असम अराकान	असम अराकान	ओआईएल
5	मेचाकी–7	गैस	मेचाकी पीएमएल	असम अराकान	असम अराकान	ओआईएल
संविदा व्यवस्था के तहत खोजें (पीएससी+आरएससी)						
6	राणाघाट	गैस	डब्ल्यूबी–ओएनएन–2005/4	बंगाल	तटीय	ओएनजीसी
7	पूर्ण–1	तेल	सीबी–ओएनएचपी–2019/1	कैम्बे	तटीय	ओएनजीसी
8	एमबीएस191एचडीए–1 (नीलमणि)	गैस	एमबी– ओएसएचपी–2019/1	मुंबई तटीय	उथला पानी	ओएनजीसी

क्र. सं.	खोज का नाम	हाइड्रोकार्बन	ब्लॉक	बेसिन	स्थान	प्रचालक
9	चोल–1	गैस	सीवाई–यूडीडब्ल्यूएचपी–2019/1	कावेरी	अत्यधिक गहरा पानी	ओएनजीसी
10	रुद्र	तेल	एए–ओएनएचपी–2017/4	असम शेल्फ	तटीय	वेदांता

2.9 राष्ट्रीय डेटा भंडार (एनडीआर):

हेल्प के तहत, सरकार ने खुला क्षेत्रफल लाइसेंसिंग (ओएएलपी) तंत्र शुरू किया है, जो निवेशकों को राष्ट्रीय डेटा संग्रह (एनडीआर) में उपलब्ध ईएंडपी डेटा का मूल्यांकन करके अपनी पसंद के ब्लॉक चुनने की अनुमति देता है। इस प्रकार, ओएएलपी के प्रचालन में राष्ट्रीय डेटा संग्रह (एनडीआर) एक आवश्यक और प्रमुख घटक है।

राष्ट्रीय डेटा संग्रह (एनडीआर) की स्थापना डीजीएच में की गई और 28 जून, 2017 को इसका शुभारंभ किया गया, ताकि वाणिज्यिक अन्वेषण, अनुसंधान एवं विकास और शैक्षणिक उद्देश्यों के लिए विभिन्न हितधारकों को संपूर्ण ईएंडपी डेटा उपलब्ध कराया जा सके। 31 मार्च, 2025 तक एनडीआर में लोड किया गया संचयी डेटा इस प्रकार है:

क. 2डी भूकंपीय डेटा: 4.011 मिलियन एलकेएम

ख. 3डी भूकंपीय डेटा: 1.258 मिलियन एसकेएम

ग. कूप और लॉग डेटा: 24,434 कूपों की संख्या

घ. कूप संबंधी रिपोर्टें: 52,941 रिपोर्टें

2.9.1 भविष्य के लिए तैयार राष्ट्रीय डेटा संग्रह 2.0 (एनडीआर 2.0): जून 2017 में इसके चालू होने के बाद से, एनडीआर अपने सभी हितधारकों जैसे निवेशकों, प्रचालकों, सेवा प्रदाताओं, अनुसंधान एवं विकास संस्थानों, शिक्षाविदों और सरकारी निकायों की मांगों को सफलतापूर्वक पूरा कर रहा है। बीच के वर्षों में प्राप्त और उपयोग किए गए पहले और बाद के जमा डेटा की बढ़ती मात्रा और पुराने हार्डवेयर व सॉफ्टवेयर के कारण इसे नए और आधुनिक आईटी प्लेटफॉर्म में अपग्रेड करना जरूरी हो गया है, जो समय के साथ बढ़ सके और उन्नत भंडारण, कंप्यूटिंग और नेटवर्क सुविधाओं से सुसज्जित हो। डेटा प्रबंधन में दक्षता लाने और वैश्विक उपयोगकर्ताओं को कहीं से भी बेहतर पहुँच और सेवा प्रदान करने के लिए, डीजीएच ने वर्तमान क्लाइंट–सर्वर प्लेटफ़ॉर्म को अगली पीढ़ी के क्लाउड–आधारित राष्ट्रीय डेटा संग्रह में अपग्रेड करने का निर्णय लिया है।

अगली पीढ़ी की राष्ट्रीय डेटा संग्रह (एनडीआर 2.0) का उद्देश्य डेटा तक पहुँच (डाउनलोड), डेटा रिपोर्टिंग, सबमिशन (अपलोड) और भंडारण (भूकंपीय क्षेत्र डेटा सहित सभी ईएंडपी डेटा प्रकारों के लिए) में सुधार करना और एक क्लाउड–सक्षम डेटाबेस प्लेटफॉर्म तैयार करना है। एनडीआर को क्लाउड–आधारित प्रणाली में अपग्रेड करने से वैश्विक निवेशक और हितधारक कहीं भी और कभी भी डेटा और वर्चुअल डेटा रूम तक पहुँच सकेंगे।

2.10 कच्चे तेल और गैस उत्पादन बढ़ाने के लिए सरकार द्वारा की गई नीतिगत पहल:

अपस्ट्रीम हाइड्रोकार्बन क्षेत्र को बढ़ावा देने के लिए सरकार ने कई नीतिगत पहलें शुरू की हैं। इन सुधारों का उद्देश्य घरेलू तेल और गैस उत्पादन बढ़ाना, निवेश को आकर्षित करना, बड़े पैमाने पर रोजगार सृजन करना, पारदर्शिता बढ़ाना और मार्गदर्शक सिद्धांतों संबंधी नियामक बोझ को कम करना है। कुछ प्रमुख नीतिगत सुधार इस प्रकार हैं।

2.10.1 हाइड्रोकार्बन अन्वेषण और लाइसेंसिंग नीति/खुला क्षेत्रफल लाइसेंस कार्यक्रम (मार्च 2016): मार्च 2016 में, सरकार ने हाइड्रोकार्बन अन्वेषण और लाइसेंसिंग नीति (हेल्प) शुरू की। हेल्प प्रणाली में लागत वसूली से राजस्व हिस्सेदारी तंत्र में एक आदर्श बदलाव किया गया, जिसमें ठेकेदार उत्पादन शुरू होने पर ही सरकार के साथ राजस्व साझा करता है। इसी के तहत, सरकार ने 30 मार्च 2016 को खुला क्षेत्रफल लाइसेंस कार्यक्रम (ओएएलपी) शुरू किया, जिसे औपचारिक रूप से 1 जुलाई 2017 से लागू किया गया। इस कार्यक्रम के तहत अन्वेषण कंपनियों को सरकार द्वारा आयोजित बोली दौर की प्रतीक्षा किए बिना अपने पसंद के अन्वेषण ब्लॉक चुनने का विकल्प मिलता है।

हेल्प में निवेशकों के लिए कई आकर्षक और सुविधाजनक शर्तें हैं, जैसे कम रॉयल्टी दरें, कोई तेल उपकर नहीं, विपणन और मूल्य निर्धारण की स्वतंत्रता, साल भर बोली लगाने की सुविधा, निवेशकों को अपनी पसंद के ब्लॉक चुनने की आज़ादी, पारंपरिक और अपरंपरागत दोनों प्रकार के हाइड्रोकार्बन संसाधनों के

लिए एक ही लाइसेंस, पूरी अनुबंध अवधि में अन्वेषण की अनुमति, और आसान, पारदर्शी एवं तेज़ बोली और पुरस्कार प्रक्रिया। हेल्प के तहत इच्छुक बोलीदाताओं को साल भर तीन विंडो में अपनी रुचि व्यक्त करने (ईओआई जमा करने) के लिए प्रोत्साहित किया जाता है: 1 अप्रैल से 31 जुलाई, 1 अगस्त से 30 नवंबर और 1 दिसंबर से 31 मार्च।

हेल्प की प्रमुख विशेषताएँ

- राष्ट्रीय डेटा संग्रह (एनडीआर) का उपयोग करके अपने ब्लॉक चुनने का अवसर
- परंपरागत और अपरंपरागत दोनों प्रकार के हाइड्रोकार्बन के लिए एकीकृत लाइसेंस
- सरल और प्रशासन में आसान राजस्व हिस्सेदारी मॉडल
- कम सरकारी नियंत्रण
- आसान प्रवेश और निकास की सुविधा
- पूर्ण पारदर्शिता और समयबद्ध प्रक्रिया
- राष्ट्रीय तेल कंपनियों और वैश्विक निजी कंपनियों के लिए समान अवसर
- बाजार मूल्य निर्धारण और मुक्त बाजार पहुँच
- अत्यधिक–गहरे और उथले जल क्षेत्रों के लिए रियायती रॉयल्टी व्यवस्था
- पूरी संविदा अवधि के लिए अन्वेषण का अधिकार

सरकार ने अन्वेषण गतिविधियों को बढ़ावा देने, तलछटी बेसिनों के अन्वेषित/ आवंटित न किए गए क्षेत्रों में घरेलू और विदेशी निवेश आकर्षित करने, तथा अनुमोदन प्रक्रियाओं को सरल और तेज़ बनाकर व्यापार की सुविधा बढ़ाने के लिए 28 फरवरी 2019 को हेल्प के तहत अपस्ट्रीम क्षेत्र में नीतिगत सुधार अधिसूचित किए हैं। ये सुधार ओएएलपी के चौथे दौर से लागू किए गए। इनमें शामिल हैं: श्रेणी–विशेष बोली मूल्यांकन मानदंड, जिसमें श्रेणी–। बेसिनों में अन्वेषण कार्य कार्यक्रम को अधिक महत्व दिया गया (पहले 50% की बजाय 70%), श्रेणी–।। और ।।। ब्लॉकों की बोली केवल अन्वेषण कार्य कार्यक्रम के आधार पर लगाई गई, अन्वेषण अवधि कम की गई, तेल और गैस उत्पादन में तेजी लाने के लिए रियायती रॉयल्टी दरें, वैकल्पिक विवाद समाधान तंत्र की शुरुआत, और वैधानिक मंजूरी/अनुमोदन में तेजी के लिए अधिकार प्राप्त समन्वय समिति (ईसीसी)।

ओएएलपी में भागीदारी का सारांश: 2,42,056 वर्ग कि.मी. क्षेत्र को कवर करने वाले ब्लॉक सफल बोलीदाताओं को आवंटित किए गए। सीबीएम के लिए ओएएलपी राउंड–III में पांच गैर–सम्मानित ब्लॉकों की पेशकश की गई थी, लेकिन इन ब्लॉकों के लिए कोई बोली प्राप्त नहीं हुई। शेष 144 ब्लॉकों के लिए 252 बोलियां प्राप्त हुईं। ओएएलपी राउंड में भागीदारी का सारांश इस प्रकार है:

तालिका 2.18: ओएएलपी बोली राउंड का विवरण

ओएएलपी बोली राउंड	प्रस्तावित ब्लॉक	प्रतिभागियों की संख्या	बोलियों की संख्या	प्रस्तावित क्षेत्र (वर्ग कि.मी.)	आवंटित क्षेत्र (वर्ग कि.मी.)
ओएएलपी-I	55	9	110	59,282	59,282
ओएएलपी-II	14	8	33	29,233	29,233
ओएएलपी-III	18+5*	5	42	31,722	29,765
ओएएलपी-IV	7	2	8	18,510	18,510
ओएएलपी-V	11	3	12	19,789	19,789
ओएएलपी-VI	21	3	24	35,346	35,346
ओएएलपी-VII	8	4	10	15,766	15,766
ओएएलपी-VIII	10	6	13	34,365	34,365
कुल	**149**	**40**	**252**	**2,44,014**	**2,42,056**

*पांच सीबीएम ब्लॉकों के लिए कोई बोली प्राप्त नहीं हुई।

आठवें दौर तक कुल प्रतिबद्ध निवेश लगभग 3.37 बिलियन अमरीकी डॉलर है। कुल प्रतिबद्ध कार्य कार्यक्रम में 51,725 एलकेएम 2डी भूकंपीय, 66,843 एसकेएम 3डी भूकंपीय और 499 अन्वेषण कूप शामिल हैं। दिनांक 31.03.2025 तक 32,131 एलकेएम 2डी भूकंपीय डेटा, 41,321 वर्ग कि.मी. 3डी भूकंपीय डेटा और 100 कूपों की ड्रिलिंग पूरी हो चुकी है। अब तक कुल 14 खोजें (8 तेल + 6 गैस) की गई हैं।

ओएएलपी बोली राउंड–IX: सरकार ने ओएएलपी बोली राउंड–IX शुरू किया है, जिसमें 3 जनवरी 2024 को अंतरराष्ट्रीय प्रतिस्पर्धी बोली के लिए 1,36,596 वर्ग कि.मी. क्षेत्र में फैले 28 ब्लॉकों की पेशकश की गई। इसमें 9 (नौ) तटीय ब्लॉक, 8 (आठ) उथले पानी के ब्लॉक और 11 (ग्यारह) अत्यधिक गहरे पानी का ब्लॉक शामिल हैं। इस बोली दौर में कुल सात (7) बोलीदाता शामिल थे, जिनमें तीन (3) सार्वजनिक और चार (4) निजी पक्ष थे। बोली मूल्यांकन पूरा हो चुका है और जल्द ही ब्लॉक आवंटित होने की संभावना है।

ओएएलपी बोली दौर–X: माननीय पेट्रोलियम एवं प्राकृतिक गैस मंत्री ने 11 फरवरी 2025 को नई दिल्ली में भारत ऊर्जा सप्ताह शिखर सम्मेलन 2025 में ओएएलपी–X दौर का शुभारंभ किया। इस बोली दौर में 13 तलछटी बेसिनों में फैले 25 ब्लॉक निवेशकों के लिए बोली के लिए उपलब्ध हैं, जिनका कुल क्षेत्रफल 1,91,986.21 वर्ग कि.मी. है। यह दौर मुख्य रूप से अपतटीय केंद्रित है, जिसमें 19 अपतटीय ब्लॉक 1,75,115 वर्ग कि.मी. में फैले हैं, जबकि 6 ब्लॉक 16,871 वर्ग कि.मी. क्षेत्र में हैं। इनमें से लगभग 51% ब्लॉक पहले "निषेध" क्षेत्र के रूप में नामित थे।

इसके अतिरिक्त, ओएएलपी राउंड X के लिए पारदर्शिता और सुरक्षा बढ़ाने हेतु एक नया ई–बोली पोर्टल पेश किया गया है, जिसमें निवेशकों के लिए व्यापार में आसानी को बेहतर बनाने वाली सुविधाएँ भी उपलब्ध कराई गई हैं।

2.10.2 अन्वेषित लघु क्षेत्र नीति (डीएसएफ): सीमांत क्षेत्र नीति को आर्थिक कार्यों संबंधी मंत्रिमंडल समिति (सीसीईए) ने 2 सितंबर 2015 को मंजूरी दी थी। इस नीति के तहत राष्ट्रीय तेल कंपनियों (एनओसी) की गैर–मुद्रीकृत खोजों को उत्पादन में लाने के लिए दिनांक 14.10.2015 की अधिसूचना सं. ओ–19018/22–95–ओएनजी–III जारी की गई। इस नीति का नाम बाद में बदलकर "अन्वेषित लघु क्षेत्र (डीएसएफ) नीति" कर दिया गया।

डीएसएफ दौर की प्रमुख वित्तीय और नीतिगत विशेषताएँ

- परंपरागत और अपरंपरागत हाइड्रोकार्बन के लिए एकल लाइसेंस
- संविदा अवधि के दौरान अन्वेषण गतिविधि पर कोई प्रतिबंध नहीं
- कोई अग्रिम हस्ताक्षर बोनस नहीं
- अंतर्राष्ट्रीय प्रतिस्पर्धी बोली के तहत आमंत्रित बोलियाँ
- मूल्य निर्धारण और बिक्री/विपणन में स्वतंत्रता
- रॉयल्टी, कोई उपकर नहीं, सीमा शुल्क से छूट
- पात्रता: कोई तकनीकी अनुभव आवश्यक नहीं, विदेशी कंपनियों की 100% भागीदारी तक अनुमति।
- अब तक आयोजित डीएसएफ राउंड का विवरण इस प्रकार है:

तालिका 2.19: डीएसएफ बोली दौर का विवरण

डीएसएफ राउंड	डीएसएफ–I	डीएसएफ–II	डीएसएफ–III	एस डीएसएफ	कुल योग
शुरुआत की तिथि	25.05.2016	09.08.2018	10.06.2021	15.04.2025	
कुल प्रस्तावित ब्लॉक	46	25	32	2	105
कुल प्रस्तावित खोजें	67	59	75	3	204

कुल ओ+ओईजी (एमएमटी)	86	190	232	अप्रैल 2025 में प्रदान किया जाएगा	508
कुल प्रस्तावित क्षेत्र (वर्ग कि.मी.)	1551	3042	13000		17593
आरएससी पर हस्ताक्षर की तिथि	27.03.2017	07.03.2019	09.09.2022		
कुल आवंटित ब्लॉक	30	24	31		85
कुल आवंटित खोजें	43	58	74		175
कुल आवंटित ओ+ओईजी (एमएमटी)	45	189	230		464
कुल आवंटित क्षेत्र (वर्ग कि.मी.)	777	3004	12727		16508
प्राप्त ई–बोली	34 संविदा क्षेत्रों के लिए 134 बोलियाँ	24 संविदा क्षेत्रों के लिए 145 बोलियाँ	32 संविदा क्षेत्रों के लिए 107 बोलियाँ		

डीएसएफ I, II और III अनुबंध की स्थिति निम्नानुसार है (31.03.2025 तक):

तालिका 2.20: दिनांक 31.03.2025 तक डीएसएफ बोली दौर की स्थिति

स्थिति	डीएसएफ–I	डीएसएफ–II	डीएसएफ–III	कुल
प्राप्त संविदा क्षेत्र (सीए)	30	24	31	85
सक्रिय संविदा क्षेत्र (सीए)	12	18	26	56
सीए, जहाँ पीएमएल लंबित है	3	1	2	6
सीए–रद्द/त्यागा गया	15	5	3	23

2.10.3 सीबीएम ब्लॉकों के लिए बोली:

- भारत सरकार ने 1997 में कोल बेड मीथेन (सीबीएम) नीति बनाई। देश में सीबीएम अन्वेषण के लिए लगभग 26,000 वर्ग कि.मी. क्षेत्र की पहचान की गई। भारत के सीबीएम संसाधनों का अनुमान लगभग 2,600 बिलियन क्यूबिक मीटर (बीसीएम) है।
- पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय ने चार सीबीएम बोली दौर (2001, 2003, 2005 और 2008) लागू किए, जिनके परिणामस्वरूप 33 सीबीएम ब्लॉक प्रदान किए गए। इनमें से 2 ब्लॉक नामांकन पर और 1 ब्लॉक विदेशी निवेश संवर्धन बोर्ड (एफआईपीबी) मार्ग के माध्यम से शामिल हैं। 16,598 वर्ग कि.मी. क्षेत्रफल में।
- भारत सरकार ने हेल्प के तहत अंतर्राष्ट्रीय प्रतिस्पर्धी बोली के माध्यम से दो विशेष सीबीएम बोली दौर (2021 और 2022) आयोजित किए। इन विशेष दौरों में 4,579 वर्ग कि.मी. क्षेत्र के 7 ब्लॉक (एससीबीएम–21 में 4 और एससीबीएम–22 में 3 ब्लॉक) प्रदान किए गए।
- वर्तमान में, कुल 15 सीबीएम ब्लॉक (7,009 वर्ग कि.मी.) सक्रिय हैं, जिनमें से 4 ब्लॉक अन्वेषण चरण में, 3 विकास चरण में और 5 ब्लॉक उत्पादन चरण में हैं। वित्त वर्ष 2024–25 के दौरान, मार्च 2025 तक सीबीएम का संचयी उत्पादन लगभग 556.83 एमएमएससीएम है।

2.10.4 भारत के तलछटी बेसिनों में भू–वैज्ञानिक आँकड़े प्राप्त करने के लिए भारत सरकार के प्रयास

i. **राष्ट्रीय भूकंपीय कार्यक्रम (एनएसपी):** 12 अक्तूबर 2016 को देश के अप्रमाणित स्थलीय बेसिन क्षेत्रों का मूल्यांकन करने के उद्देश्य से राष्ट्रीय भूकंपीय कार्यक्रम (एनएसपी) शुरू किया गया था। इस कार्यक्रम के तहत सरकार ने 2डी भूकंपीय सर्वेक्षण के लिए 48,243 लाइन कि.मी. (एलकेएम) के आंकड़ों के अधिग्रहण, प्रोसेसिंग और व्याख्या (एपीआई) को मंजूरी दी।

48,243 एलकेएम के कुल लक्ष्य में से 46,960 एलकेएम (~97%) 2डी भूकंपीय आंकड़ों का अधिग्रहण, प्रोसेसिंग और व्याख्या पूरी हो चुकी है। गुजरात ऊर्जा अनुसंधान एवं प्रबंधन संस्थान (जीईआरएमआई), गांधीनगर ने एनएसपी आंकड़ों का तृतीय–पक्ष मूल्यांकन किया और एनडीआर को एक रिपोर्ट सौंपी।

एनएसपी परियोजना के अंतर्गत दुर्गम और कठिन भौगोलिक क्षेत्रों को कवर करने के लिए, जहाँ भूभाग और प्रतिकूल वातावरण के कारण 2डी भूकंपीय

आंकड़े प्राप्त नहीं किए जा सके, लगभग 80 करोड़ रुपए की लागत से 40,000 उड़ान एलकेएम का हवाई भूभौतिकीय सर्वेक्षण भी योजना बनाई गई थी। मंत्रालय की ओर से ऑयल इंडिया लिमिटेड (ओआईएल) ने हवाई गुरुत्वाकर्षण ग्रैडियोमेट्री और गुरुत्वाकर्षण–चुंबकीय (एजीजी और जीएम) डेटा सर्वेक्षण किए और 42,944 उड़ान एलकेएम का अधिग्रहण, प्रोसेसिंग और व्याख्या (एपीआई) पूरी की।

एजीजी और जीएम लक्ष्यों और उपलब्धियों का क्षेत्रवार/राज्यवार विवरण नीचे तालिका में दिया गया है:

तालिका 2.21:

क्षेत्र	लक्ष्य	प्राप्ति (हवाई उड़ान एलकेएम में)
एएस–एपी	2064	2064.46
एएस–एपी–एनएल	8131	8131.15
एएस–एमएल–एमएन–एनएल	11240	11227.83
एमजेड–टीआर	5606	5573.59
पूर्वोत्तर भारत कुल	27,041	26,997.03
कावेरी	11888	12295.14
बस्तर	1764	1833.99
करेवा	1710	1816.93
स्पीति*	7392	-
शेष भारत कुल	**22,754**	**15,946.06**
परियोजना कुल	**49,795**	**42,943.09**

*स्पीति घाटी में ऊँचाई पर शामिल उच्च जोखिम का विश्लेषण करने के लिए परीक्षण उड़ान की गई थी, लेकिन एचएसई (स्वास्थ्य, सुरक्षा और पर्यावरण) संबंधी चिंताओं के कारण वहाँ डेटा प्राप्त नहीं किया जा सका।

ii. **गहन अंडमान अपतटीय परियोजना:** अंडमान बेसिन एक संभावित पेट्रोलियम–समृद्ध क्षेत्र है, जो बंगाल की खाड़ी के दक्षिण–पूर्वी हिस्से में स्थित है और दक्षिण–पूर्व एशिया के सबसे अधिक पेट्रोलियम उत्पादक क्षेत्रों के पास है।

बेसिन में उपलब्ध 2डी/3डी भूकंपीय और कूपों का डेटा बहुत कम था और डेटा कवरेज मध्यम से विरल था। अंडमान और निकोबार (ए एंड एन) द्वीप समूह के आसपास तेल और गैस की अच्छी संभावना है, लेकिन अधिकतर क्षेत्र को "निषिद्ध" क्षेत्र घोषित किया गया था (अंडमान बेसिन में 0.37 मिलियन वर्ग कि.मी.)।

अंडमान अपतटीय क्षेत्र का व्यापक मूल्यांकन करने के लिए डीजीएच ने लगभग 2,81,613 वर्ग कि.मी. क्षेत्र को कवर करते हुए 22,500 एलकेएम 2डी ब्रॉडबैंड भूकंपीय डेटा अधिग्रहण, प्रोसेसिंग और व्याख्या करने की योजना बनाई। इस सर्वेक्षण को भारत सरकार ने द्वीप अंडमान अपतटीय सर्वेक्षण के रूप में शुरू किया।

यह परियोजना ऑयल इंडिया लिमिटेड के माध्यम से क्रियान्वित की गई। अंडमान के गहरे तट से कुल 22,500 एलकेएम भूकंपीय डेटा प्राप्त किया गया। परियोजना मार्च 2023 में पूरी हुई और डेटा एनडीआर पोर्टल पर अपलोड कर दिया गया है।

iii. **निषिद्ध क्षेत्रों में कमी:** सरकार अप्रैल 2022 तक "निषिद्ध" क्षेत्रों को 99% तक कम करने में सफल रही है। अब तक जो क्षेत्र ईईंडपी गतिविधियों के लिए उपलब्ध नहीं थे, वे अब अन्वेषण के लिए खुल गए हैं। इससे भारत के ईईजेड का 10 लाख वर्ग कि.मी. से अधिक क्षेत्र अन्वेषण के लिए उपलब्ध हो गया है।

iv. **अनन्य आर्थिक क्षेत्र (ईईजेड) सर्वेक्षण:** ईईजेड तक भारतीय तलछटी घाटियों के अपतटीय बेसिन क्षेत्रों में लगभग 1.13 लाख वर्ग कि.मी. क्षेत्र अप्रमाणित पड़ा था। देश के (ईईजेड) में फैले अपतटीय बेसिन क्षेत्रों की पूरी जानकारी प्राप्त करने के लिए लगभग 80,000 एलकेएम क्षेत्र में 2डी ब्रॉडबैंड भूकंपीय सर्वेक्षण किए गए। यह कार्य ओएनजीसी द्वारा किया गया और जून 2024 तक लगभग 79,540 एलकेएम 2डी भूकंपीय डेटा का अधिग्रहण, प्रसंस्करण और व्याख्या पूरी हो गई।

v. **मिशन अन्वेषण (प्रगतिशील):** भारतीय तलछटी बेसिनों का व्यापक मूल्यांकन करने के लिए, चल रहे मिशन अन्वेषण के तहत 7 तटीय तलछटी बेसिनों में बंद 2डी भूकंपीय प्रोफाइल की योजना बनाई गई है। इस परियोजना का उद्देश्य बेसिनों का व्यापक मूल्यांकन करना और हाइड्रोकार्बन की संभावनाओं को सामने लाना है। 7 बेसिनों में 20,275 एलकेएम के बंद ग्रिड 2डी भूकंपीय सर्वेक्षण (अधिग्रहण, प्रोसेसंग और व्याख्या) के लिए 792 करोड़ रुपए की परियोजना तैयार की गई है। 31 मार्च 2025 तक कुल 2,954 जीएलकेएम भूकंपीय डेटा प्राप्त किया जा चुका है।

vi. **विस्तारित महाद्वीपीय शेल्फ (प्रगतिशील):** ईईजेड सीमा से परे पश्चिमी और पूर्वी अपतटीय क्षेत्रों में महाद्वीपीय शेल्फ में निकट अंतराल पर उच्च गुणवत्ता वाला भूकंपीय डेटा तलछट की स्थिति के बारे में महत्वपूर्ण जानकारी देगा और महाद्वीपीय शेल्फ क्षेत्र में हाइड्रोकार्बन क्षमता का पता लगाने में मदद करेगा। यह जानकारी समुद्री अर्थव्यवस्था के संदर्भ में अपतटीय क्षेत्रों के लिए दीर्घकालिक ऊर्जा नीति तैयार करने में उपयोगी

होगी। साथ ही, यह कार्य ईईजेड सीमा से परे पूर्वी और पश्चिमी तट में पृथ्वी विज्ञान मंत्रालय द्वारा विस्तारित महाद्वीपीय शेल्फ सीमा के दावे का समर्थन करेगा। प्रस्तावित भूकंपीय परावर्तन प्रोफाइल, जिसमें विस्तारित स्ट्रीमर और उच्च–शक्ति स्रोत शामिल हैं, लक्ष्मी रिज में भू–सम्पत्ति की प्रकृति और उप–बेसमेंट परावर्तन का विवरण निर्धारित करने में मदद करेगा। पूर्वी और पश्चिमी अपतटीय क्षेत्रों में 30,000 एलकेएम 2डी भूकंपीय सर्वेक्षण किया जाना है, जिसमें पश्चिमी क्षेत्र में 15,500 एलकेएम ओएनजीसी द्वारा और पूर्वी क्षेत्र में 14,500 एलकेएम ऑयल इंडिया लिमिटेड द्वारा किया जाएगा। 31 मार्च 2025 तक कुल 22,876 एलकेएम भूकंपीय डेटा प्राप्त किए जा चुके हैं।

2.10.5 प्राकृतिक गैस विपणन सुधार

क) सरकार ने अक्तूबर 2014 में हेनरी हब (यूएसए), अल्बर्टा (कनाडा), एनबीपी (यूके), रूस, आदि जैसे प्रमुख अंतरराष्ट्रीय केंद्रों में प्रचलित कीमतों के आधार पर 'नए घरेलू प्राकृतिक गैस मूल्य निर्धारण दिशानिर्देश' को मंजूरी दी थी ताकि उत्पादक और उपभोक्ता दोनों क्षेत्रों की आवश्यकताओं के बीच संतुलन बनाया जा सके। प्राकृतिक गैस की कीमतों को हर छह महीने में संशोधित किया जाता है और पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के तहत पेट्रोलियम योजना और विश्लेषण प्रकोष्ठ (पीपीएसी) द्वारा अधिसूचित किया जाता है। ये दिशानिर्देश नामांकन क्षेत्रों और नेल्प, नेल्प–पूर्व ब्लॉकों/क्षेत्रों से उत्पादित प्राकृतिक गैस पर लागू होते हैं, जहाँ मूल्य निर्धारण को प्रति उत्पादन हिस्सेदारी संविदा (पीएसी) के तहत सरकार द्वारा अनुमोदित किया जाना है।

ख) 2015 से सरकार ने डीएसएफ, ओएएलपी, सीबीएम व्यवस्थाओं के तहत गैस और दिनांक 28.02.2019 के बाद पूर्वोत्तर क्षेत्र (एनईआर) और नई खोजों से उत्पादित गैस के लिए विपणन और मूल्य निर्धारण की स्वतंत्रता प्रदान की।

ग) उच्च दबाव–उच्च तापमान (एचपी–एचटी) रिजर्वायरों, गहरे पानी और अत्यधिक गहरे पानी वाले कठिन क्षेत्रों से गैस उत्पादन को बढ़ावा देने के लिए, 23 मार्च 2016 को सरकार ने पीपीएसी द्वारा अर्ध–वार्षिक घोषित मूल्य सीमा के साथ गैस के विपणन और मूल्य निर्धारण की स्वतंत्रता सुनिश्चित की।

घ) इसके अलावा, दिनांक 15.10.2020 की अधिसूचना के माध्यम से 'प्राकृतिक गैस विपणन सुधार' की घोषणा की गई, ताकि इलेक्ट्रॉनिक बोली के जरिए पारदर्शी और प्रतिस्पर्धी प्रक्रिया द्वारा गैस उत्पादकों द्वारा बाजार में बेची जाने वाली गैस का बाजार मूल्य तय किया जा सके। इसमें सहयोगियों को गैस की बिक्री के लिए बोली प्रक्रिया में भाग लेने की अनुमति दी गई और कुछ क्षेत्र विकास योजनाओं (एफडीपी) को विपणन की स्वतंत्रता दी गई, जहाँ पीएससी पहले से ही मूल्य निर्धारण की स्वतंत्रता प्रदान करते हैं। घरेलू स्तर पर उत्पादित प्राकृतिक गैस का बाजार मूल्य ई–बोली के माध्यम से तय करने के लिए विस्तृत दिशानिर्देश दिनांक 03.12.2020 की अधिसूचना के माध्यम से जारी किए गए थे। इसके अलावा, ई–बोली लगाने के लिए डीजीएच द्वारा सूचीबद्ध एजेंसियों को भी अधिसूचित किया गया।

ङ.) इसके अलावा, मूल्य निर्धारण और विपणन की स्वतंत्रता वाले गैस उत्पादकों को पीएनजीआरबी द्वारा दिनांक 19.08.2021 के कार्यालय ज्ञापन के माध्यम से अधिकृत गैस एक्सचेंजों के जरिए कम मात्रा में गैस (अर्थात 500 एमएमएससीएम प्रति वर्ष तक) बेचने का अतिरिक्त विकल्प दिया गया है।

च) गैस सुधारों और पर्यावरण संरक्षण को और अधिक गति देने के लिए, सरकार ने दिनांक 22.11.2021 के कार्यालय ज्ञापन के माध्यम से तेल और गैस कूपों के परीक्षण के दौरान उत्पादित तदर्थ/परीक्षण गैस के मुद्रीकरण के लिए विस्तृत दिशानिर्देश भी जारी किए हैं।

छ) 13 जनवरी 2023 की अधिसूचना के माध्यम से, सरकार ने विपणन और मूल्य निर्धारण की स्वतंत्रता वाले गहरे पानी, अत्यधिक गहरे पानी और उच्च दबाव/उच्च तापमान वाले क्षेत्रों में खोजों से उत्पादित गैस के बाजार मूल्य तथा उसकी बिक्री और पुनर्विक्रय पर स्पष्ट दिशा–निर्देश जारी किए।

2.10.6 तेल और गैस के लिए उन्नत रिकवरी विधियों को बढ़ावा देने और प्रोत्साहित करने हेतु नीतिगत ढाँचा (अक्तूबर 2018)

क) सरकार ने मौजूदा क्षेत्रों की उत्पादकता बढ़ाने और घरेलू हाइड्रोकार्बन उत्पादन को अधिक करने के लिए, रॉयल्टी और उपकर में आंशिक छूट सहित राजकोषीय प्रोत्साहनों के माध्यम से उन्नत रिकवरी (ईआर/आईआर) और अपरंपरागत हाइड्रोकार्बन (यूएचसी) उत्पादन विधियों को बढ़ावा देने और प्रोत्साहित करने हेतु नीतिगत ढाँचा मंजूर किया। नीति के तहत इसके क्रियान्वयन की निगरानी के लिए एक उन्नत रिकवरी (ईआर) समिति का गठन किया गया है।

ख) वर्तमान नीति के तहत, 200 से अधिक तेल और गैस क्षेत्रों की उन्नत रिकवरी (ईआर) क्षमता का प्रारंभिक मूल्यांकन किया गया है। ईआर प्रायोगिक चरण की शुरुआत के लिए 19 परियोजनाओं की ईआर स्क्रीनिंग रिपोर्ट को मंजूरी दी गई, जो क्षेत्रवार और ईआर पद्धति अनुसार तैयार की गई थीं। इनमें से पाँच प्रायोगिक परियोजनाओं को मंजूरी मिली और संचालकों को ईआर नीति के तहत संबंधित क्षेत्रों के

लिए वाणिज्यिक कार्यान्वयन योजनाएँ तैयार करने और प्रस्तुत करने के निर्देश दिए गए। इसके अलावा, दो क्षेत्रों को वाणिज्यिक परियोजनाओं को प्रोत्साहित करने के लिए सैद्धांतिक मंजूरी दी गई।

2.10.7 कच्चे तेल के विनियंत्रण संबंधी नीति (जून 2022):

आर्थिक कार्यों संबंधी मंत्रिमंडलीय समिति ने 'घरेलू कच्चे तेल की बिक्री की विनियंत्रण व्यवस्था' को मंजूरी दी। इसके तहत, 1 अक्टूबर 2022 से कच्चे तेल और संघनित तेल का सरकारी आवंटन बंद कर दिया गया, जिससे सभी अन्वेषण और उत्पादन (ईएंडपी) संचालकों को विपणन की स्वतंत्रता मिल गई। अब पीएससी में प्रचालकों को सरकार या उसकी कंपनियों को कच्चा तेल बेचने की शर्त नहीं है, और वे अपने क्षेत्रों से सीधे अंतर्देशीय बाजारों में तेल बेच सकते हैं। हालांकि, कच्चे तेल के निर्यात पर प्रतिबंध पहले की तरह जारी रहेगा। सरकारी राजस्व, जैसे रॉयल्टी, उपकर और संविदात्मक भुगतान, बिक्री मूल्य या भारतीय बास्केट कीमत में से जो अधिक हो, उसके आधार पर तय किया जाएगा, जैसा कि सरकार द्वारा नामित एजेंसी द्वारा निर्धारित किया जाता है।

2.10.8 अपरंपरागत हाइड्रोकार्बन के अन्वेषण और दोहन के लिए नीतिगत ढाँचा (अगस्त 2018):

यह नीति मौजूदा ठेकेदारों को उनके पीएससी और सीबीएम अनुबंधों के तहत निर्धारित शर्तों के अनुसार मौजूदा क्षेत्रों में शेल तेल, गैस और सीबीएम सहित अपरंपरागत हाइड्रोकार्बन की क्षमता का पूरी तरह उपयोग करने के लिए प्रोत्साहित करती है। इसकी पहले अनुमति नहीं थी। इस नीति के कारण पीएससी के तहत 72,027 वर्ग किलोमीटर क्षेत्र और सीबीएम अनुबंध के तहत 5,269 वर्ग किलोमीटर के क्षेत्र को पारंपरिक और अपारंपरिक हाइड्रोकार्बन दोनों के एक साथ अन्वेषण और उत्पादन के लिए खोल दिया गया है।

2.10.9 डेटा सृजन के माध्यम से संभावित धारणा में वृद्धि

क) **राष्ट्रीय डेटा संग्रह (एनडीआर) का उन्नयन:** एनडीआर देश के भूवैज्ञानिक डेटा का एक भंडार है और संभावित निवेशकों को ओएएलपी के तहत ब्लॉक चुनकर बोली लगाने में मदद करता है। ईएंडपी डेटा की लगातार बढ़ती जरूरतों को पूरा करने के लिए, एनडीआर को क्लाउड–सक्षम उन्नत प्रणाली में अपग्रेड किया जा रहा है, ताकि उद्योग को डेटा तक आसान और प्रभावी पहुँच मिल सके।

ख) **हाइड्रोकार्बन संसाधनों का पुनर्मूल्यांकन:** देश में हाइड्रोकार्बन संसाधनों की क्षमता का अद्यतन आकलन करने के लिए, वर्ष 2017 में सभी 26 तलछटी बेसिनों का पुनर्मूल्यांकन किया गया, जो पिछले आकलन के लगभग दो दशकों बाद हुआ था। इसके परिणामस्वरूप पारंपरिक हाइड्रोकार्बन संसाधनों का अनुमान 41.87 बिलियन टन (तेल और गैस को तेल समतुल्य मानते हुए) लगाया गया, जो पिछले अनुमान 28.08 बिलियन टन की तुलना में लगभग 49% अधिक है।

ग) **अन्वेषण एवं लाइसेंसिंग नीति में नीतिगत सुधार (28 फरवरी 2019):** सरकार ने अन्वेषण गतिविधियों को तेज़ करने, विदेशी और घरेलू निवेश को आकर्षित करने और घरेलू तेल व गैस उत्पादन बढ़ाने के लिए 'तेल और गैस के अन्वेषण और लाइसेंसिंग नीति में सुधार' अधिसूचित किया।

2.10.10 हाइड्रोकार्बन खोजों के शीघ्र मुद्रीकरण हेतु दिशानिर्देश (जून 2020):

देश की ऊर्जा सुरक्षा को मजबूत करने के लिए, प्रारंभिक चरण में – जैसे मूल्यांकन, व्यावसायिकता की घोषणा (डीओसी) और क्षेत्र विकास योजना (एफडीपी) प्रस्तुत करने जैसी अन्य गतिविधियों के पूरा होने से पहले – पीएससी/आरएससी के तहत खोजों को मुद्रीकृत करने के लिए दिनांक 23.06.2020 को दिशानिर्देश जारी किए गए।

2.11 ईएंडपी में व्यवसाय सुगमता (ईओडीबी) बढ़ाने हेतु प्रमुख सुधार

- **अनुपालन का बोझ कम करनाकृप्रक्रियाओं को सरल बनाना और दस्तावेज़ स्व–प्रमाणन के आधार पर जमा करना:** अनुपालन का बोझ कम करने और प्रणाली को पारदर्शी एवं तेज़ बनाने के उद्देश्य से, दिनांक 28.02.2020 को दिशानिर्देश जारी किए गए। इसके अंतर्गत स्व–प्रमाणन के आधार पर दस्तावेज़ प्रस्तुत करने की प्रक्रियाओं को सरल बनाया गया और पीएससी अनुबंध के अंतर्गत 3 श्रेणियों में कुल 37 प्रक्रियाओं को युक्तिसंगत किया गया।
- **विवाद समाधान समिति (2019) संबंधी अधिसूचना:** दिनांक 16.12.2019 की अधिसूचना के तहत विवाद समाधान के लिए प्रतिष्ठित व्यक्तियों और विशेषज्ञों की एक बाहरी समिति का गठन किया गया और विवाद समाधान तंत्र की प्रक्रिया और संरचना को अंतिम रूप दिया गया है।
- **डीजीएच को शक्तियों का प्रत्यायोजन (2018–2020):** पीएससी के अंतर्गत प्रचालन को सुव्यवस्थित करने और अनुमोदनों के अतिरिक्त स्तरों को हटाने के लिए, अनुबंध प्रबंधन हेतु कुछ को छोड़कर सभी शक्तियाँ डीजीएच को प्रत्यायोजित कर दी गई हैं।
- उत्पादन हिस्सेदारी संविदा प्रबंधन प्रणाली, पेट्रोलियम अन्वेषण पट्टा/पेट्रोलियम खनन पट्टा डेटा प्रबंधन प्रणाली, उत्पादन डेटाबेस प्रबंधन प्रणाली और

ई–बोली पोर्टल जैसे विभिन्न एप्लिकेशन और सिस्टम भी शुरू किए गए हैं।

- **डिजिटलीकरण ईएंडपी रोडमैप दस्तावेज़:** भारत ईएंडपी पारिस्थितिकी तंत्र के सहयोग से पूरे अपस्ट्रीम मूल्य श्रृंखला में डिजिटलीकरण के अवसरों की पहचान और उन्हें सुगम बनाने के उद्देश्य से, दिनांक 10 जून 2021 को पेट्रोलियम और प्राकृतिक गैस सचिव द्वारा 'ईएंडपी उद्योग के लिए डिजिटलीकरण रोडमैप' जारी किया गया।
- निष्पादन निगरानी डैशबोर्ड: विभिन्न प्रमुख ईएंडपी निष्पादन संकेतकों की निगरानी के लिए 2019 में एक व्यापक डिजिटल निगरानी डैशबोर्ड तैयार किया गया और 2021 में इसे पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के पोर्टल के साथ जोड़ दिया गया।

2.12 ओआरडी अधिनियम संशोधन:

तेल क्षेत्र (विनियमन और विकास) संशोधन अधिनियम, 2025 – एक "ऐतिहासिक सुधार" – भारत के अपस्ट्रीम नियामक ढांचे को आधुनिक बनाने और इसे अंतरराष्ट्रीय सर्वोत्तम प्रथाओं के साथ संगत बनाने के लिए लाया गया। इसके तहत भारत सरकार ने तेल क्षेत्र (विनियमन और विकास) अधिनियम, 1948 में संशोधन किया ताकि:

(i) न केवल कच्चे तेल और प्राकृतिक गैस की, अपितु शेल तेल, शेल गैस, टाइट तेल और टाइट गैस सहित सभी प्रकार के हाइड्रोकार्बन के दोहन की अनुमति दी जा सके, और प्रचालन के सभी चरणों के लिए एक ही परमिट, यानी पेट्रोलियम पट्टे के तहत अनुमति प्रदान की जा सके;

(ii) पट्टे की शर्तों और अवधि में स्थिरता सुनिश्चित की जा सके;

(iii) खनन से संबंधित शब्दावली को हटाकर विरासत संबंधी मुद्दों को सुलझाया जा सके;

(iv) वैकल्पिक तरीकों के माध्यम से समय पर, निष्पक्ष और किफायती विवाद समाधान की सुविधा प्रदान की जा सके;

(v) लगातार उल्लंघन होने पर जुर्माने को ₹25 लाख तक और प्रतिदिन ₹10 लाख तक बढ़ाया जा सके, तथा जुर्माने को शीघ्र लागू करने के लिए एक न्यायनिर्णय प्राधिकरण और अपीलीय तंत्र स्थापित किया जा सके;

(vi) उत्पादन और प्रसंस्करण सुविधाओं तथा बुनियादी ढांचे को साझा करने की अनुमति देकर छोटे प्रचालकों की मदद की जा सके;

(vii) तेल क्षेत्रों में सुरक्षा को बढ़ाया जा सके;

(viii) तेल क्षेत्रों में खनिज तेलों के साथ–साथ पवन और सौर ऊर्जा तथा हाइड्रोजन के दोहन हेतु व्यापक ऊर्जा परियोजनाओं के विकास को सक्षम बनाया जा सके; और

(ix) कार्बन अवशोषण उपयोग और भंडारण तथा कोयला गैसीकरण जैसी नई प्रौद्योगिकियों के उपयोग को बढ़ावा दिया जा सके।



ओएनजीसी डीडीडब्ल्यू प्लेटफॉर्म, पूर्वी अपतटीय क्षेत्र



राजस्थान में मंगला प्रोसेसिंग टर्मिनल



ओएनजीसी का तटीय रिग



ओएनजीसी का बी193 प्लेटफॉर्म, मुंबई अपतटीय क्षेत्र



फ्लोटिंग प्रोडक्शन स्टोरेज और ऑफलोडिंग (एफपीएसओ), पोत



अंडमान में ओआईएल का अपतटीय रिग







अध्याय 3

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3 पाइपलाइनें और प्राकृतिक गैस

चीन और अमेरिका के बाद भारत न केवल दुनिया का तीसरा सबसे बड़ा ऊर्जा उपभोक्ता है बल्कि सबसे तेज़ी से बढ़ते –ऊर्जा उपभोक्ताओं में से एक भी है। वर्ष 2023 में देश की कुल ऊर्जा खपत लगभग 930 मिलियन टन तेल समतुल्य (एमटीओई) थी, जो 2024–25 में बढ़कर करीब 975 एमटीओई हो गई है। वर्तमान में ऊर्जा मिश्रण में प्राकृतिक गैस की हिस्सेदारी लगभग 6.5% है, जिसे आने वाले समय में और बढ़ाने की योजना है। इसके लिए घरेलू गैस उत्पादन बढ़ाने, तरलीकृत प्राकृतिक गैस (एलएनजी) के आयात को बढ़ावा देने, एलएनजी आयात क्षमता में विस्तार करने, राष्ट्रीय गैस ग्रिड को पूरा करने और पूरे देश में नगर गैस वितरण (सीजीडी) नेटवर्क का विस्तार करने पर ज़ोर दिया जा रहा है।

तलिका: प्राकृतिक गैस की क्षेत्रीय खपत नीचे दी गई है

वित्त वर्ष 2024–25 के दौरान प्राकृतिक गैस की खपत (एमएमएससीएम में)			
क्षेत्र	**घरेलू**	**आरएलएनजी***	**कुल**
ऊर्जा क्षेत्र			
बिजली	6117	2775	8892
सीजीडी	10045	5007	15051
रिफाइनरी	1501	4362	5864
पाइपलाइन सिस्टम के लिए आईसी	1967	2	1968
कृषि (चाय बागान)	153	0	153
औद्योगिक	354	766	1120
विनिर्माण	492	1191	1682
अन्य / विविध	9164	1212	10376
गैर–ऊर्जा क्षेत्र			
उर्वरक	2876	17607	20483
पेट्रोकेमिकल	1183	2173	3355
एलपीजी का घटना	919	0	919
स्पंज आयरनस्टील	485	847	1332
कुल	**35254**	**35942**	**71196**
स्रोत तेल और गैस कंपनियां			

*आयातित पुनः गैसीकृत तरलीकृत प्राकृतिक गैस

3.1 गैस ग्रिड

देश में एक राष्ट्रीय गैस ग्रिड (एक राष्ट्र, एक गैस ग्रिड) बनाने और हर जगह प्राकृतिक गैस की उपलब्धता बढ़ाने के लिए, पेट्रोलियम और प्राकृतिक गैस विनियामक बोर्ड (पीएनजीआरबी) ने लगभग 33,475 किलोमीटर लंबा प्राकृतिक गैस पाइपलाइन नेटवर्क मंजूर किया है। मार्च 2025 तक देश में करीब 25,429 किलोमीटर पाइपलाइन चालू हो चुकी है, जबकि लगभग 10,459 किलोमीटर पाइपलाइन निर्माण के अलग–अलग चरणों में है। इन पाइपलाइनों का निर्माण अलग–अलग परियोजना प्रस्तावकों द्वारा नियामक अनुमोदन, तकनीकी योग्यता, और व्यावसायिक व्यवहार्यता को ध्यान में रखते हुए अपने स्वयं के धन से किया जा रहा है।

गैस पाइपलाइन अवसंरचना, गैस स्रोतों को गैस का उपयोग करने वाले बाज़ारों से जोड़कर प्राकृतिक गैस के परिवहन का सबसे सस्ता और सुरक्षित तरीका है। गैस पाइपलाइन वास्तव में गैस बाज़ार की संरचना और उसके विकास को तय करती है। इसलिए, देश के हर हिस्से में प्राकृतिक गैस की पर्याप्त उपलब्धता और समान वितरण सुनिश्चित करने के लिए एक आपस में जुड़ी हुई राष्ट्रीय गैस ग्रिड विकसित की जा

रही है। इस गैस ग्रिड को तय समय में पूरा करने के प्रयास लगातार किए जा रहे हैं।

देश के पूर्वी हिस्से में गैस पाइपलाइन नेटवर्क विकसित करने के लिए, आर्थिक कार्यों संबंधी मंत्रिमंडल समिति (सीसीईए) ने गेल को जगदीशपुर/हल्दिया और बोकारो–धामरा पाइपलाइन परियोजना के विकास हेतु कुल अनुमानित लागत 12,940 करोड़ रुपए का 40 प्रतिशत (5,176 करोड़ रुपए) का आंशिक पूंजी अनुदान मंजूर किया। यह परियोजना 2016 में शुरू हुई थी, जिसने देश के पूर्वी हिस्से को राष्ट्रीय गैस ग्रिड से जोड़ा तथा यह उत्तर प्रदेश, बिहार, झारखंड, ओडिशा और पश्चिम बंगाल राज्यों में औद्योगिक, वाणिज्यिक, घरेलू और परिवहन क्षेत्रों में स्वच्छ और पर्यावरण के अनुकूल ईंधन अर्थात् प्राकृतिक गैस की उपलब्धता सुनिश्चित करेगी। इन पाइपलाइन परियोजनाओं ने अपने मार्ग पर स्थित तीन उर्वरक संयंत्रों अर्थात् गोरखपुर, बरौनी और सिंदरी के पुनरुद्धार में मदद की है। प्रधानमंत्री उर्जा गंगा परियोजना के शुरू होने के बाद एनजीजी के साथ पूर्वोत्तर क्षेत्र को जोड़ना अधिक आसान और व्यवहार्य हो गया है। पूर्वोत्तर क्षेत्र (एनईआर) को राष्ट्रीय गैस ग्रिड से जोड़ने के लिए, जगदीशपुर–हल्दिया और बोकारो–धामरा पाइपलाइन (जेएचबीडीपीएल) का हिस्सा बनाते हुए पाइपलाइन को बरौनी से गुवाहाटी तक (सिलीगुड़ी और बोंगाईगांव के रास्ते) बढ़ाया गया है।

726 किलोमीटर लंबी बरौनी–गुवाहाटी पाइपलाइन बिहार, पश्चिम बंगाल और असम राज्यों से होकर गुजरती है। कुल 3,306 किलोमीटर लंबी पाइपलाइन, जिसमें बरौनी–गुवाहाटी पाइपलाइन भी शामिल है, को लगभग ₹17,233 करोड़ (नवीनतम लागत) के कुल निवेश से बनाया गया है। आगे 253 किलोमीटर लंबी धामरा–हल्दिया पाइपलाइन को भी जेएचबीडीपीएल परियोजना के विस्तार के रूप में गेल को सौंपा गया है। पाइपलाइन नेटवर्क को जोड़ दिया गया है और अब 4 उर्वरक संयंत्रों अर्थात् एचयूआरएल गोरखपुर, बरौनी, सिंदरी और मैटिक्स फर्टिलाइज़र को गैस की आपूर्ति शुरू हो चुकी है। उत्तर प्रदेश, बिहार, झारखंड और पश्चिम बंगाल राज्यों में पाइपलाइन मार्ग के साथ वाराणसी, पटना, रांची और जमशेदपुर जैसे शहरों में नगर गैस वितरण नेटवर्क को भी जोड़ा गया है। कोलकाता–हल्दिया (162 कि.मी.) और धामरा–हल्दिया (103 कि.मी.) पाइपलाइन को छोड़कर, बीजीपीएल और धामरा–हल्दिया सहित एकीकृत जेएचबीडीपीएल के सभी खंड (कुल 3,269 कि.मी.) चालू हो चुके हैं। शेष खंड के वर्ष 2025 तक पूरा होने की उम्मीद है।

तेल और गैस सीपीएसई अर्थात् गेल, आईओसीएल, ओआईएल, ओएनजीसी और एनआरएल के बीच एक संयुक्त उद्यम कंपनी बनाने के लिए एक समझौता–ज्ञापन पर हस्ताक्षर किए गए, जो सिक्किम सहित सभी पूर्वोत्तर राज्यों की राजधानियों को जोड़ने वाली पाइपलाइन बिछाएगी। तदनुसार, दिनांक 10.08.2018 को एक संयुक्त उद्यम कंपनी ''इंद्रधनुष गैस ग्रिड लिमिटेड'' (आईजीजीएल) का गठन किया गया है। यह संयुक्त उद्यम कंपनी चरणबद्ध तरीके से सभी पूर्वोत्तर राज्यों अर्थात असम, सिक्किम, मिजोरम, मणिपुर भविष्य में मणिपुर, अरुणाचल प्रदेश, त्रिपुरा, नागालैंड और मेघालय में ट्रंक पाइपलाइन कनेक्टिविटी विकसित कर रही है। पीएनजीआरबी ने दिनांक 17.11.2020 को आईजीजीएल को नॉर्थ–ईस्ट गैस पाइपलाइन ग्रिड (एनईजीजी) के विकास के लिए अंतिम प्राधिकार जारी किया। यह परियोजना नगर गैस परियोजनाओं को विकसित करने में भी मदद करेगी, जिससे घरों में स्वच्छ खाना पकाने का ईंधन उपलब्ध होगा और पूर्वोत्तर राज्यों के प्रमुख शहरों में औद्योगिक, वाणिज्यिक और परिवहन क्षेत्रों को पर्यावरण के अनुकूल ईंधन मिल सकेगा। सीसीईए ने परियोजना की व्यवहार्यता में सुधार के लिए 5559 करोड़ रुपए के पूंजी अनुदान (परियोजना लागत का 60%) को मंजूरी दी है। इसके अलावा, कुल 1,670 किलोमीटर लंबी एनईजीजी परियोजना में से लगभग 992 किलोमीटर पाइपलाइन बिछाने का कार्य 24 मार्च 2025 तक पूरा हो चुका है। गुवाहाटी से नुमालीगढ़ तक 24 इंच व्यास और 392 किलोमीटर लंबी पाइपलाइन चालू होने के लिए तैयार है।

दक्षिणी क्षेत्र में श्रीकाकुलम–अंगुल पाइपलाइन (एसएपीएल) बनाई जा रही है, जिसकी कुल लंबाई 744 किलोमीटर (ओडिशा में 619 किलोमीटर और आंध्र प्रदेश में 125 किलोमीटर) और क्षमता 6.65 एमएमएससीएमडी है। अब तक 421 किलोमीटर (मेन लाइन) का काम पूरा हो चुका है, जबकि बाकी 322 किलोमीटर निर्माणधीन है (मार्च 2025 तक 258 किलोमीटर का काम पूरा किया जा चुका है) और पूरी पाइपलाइन के वर्ष 2025 में पूरा होने की उम्मीद है। इसके अलावा, दक्षिणी क्षेत्र में गैस की प्रोसेसिंग को सुचारू बनाने के लिए कोच्चि–कूटनाद–बैंगलुरु–मंगलुरु (केकेबीएमपीएल) प्राकृतिक गैस पाइपलाइन का निर्माण भी चल रहा है। इसमें से 579 किलोमीटर पाइपलाइन चालू हो चुकी है, जबकि तमिलनाडु में शेष 322 किलोमीटर का कार्य प्रगति पर है। इस परियोजना के मार्च 2026 तक पूरा होने की संभावना है।

आईओसीएल ने तमिलनाडु, आंध्र प्रदेश, कर्नाटक और केंद्रशासित प्रदेश पुडुचेरी में प्रमुख ग्राहकों और नगर गैस वितरण (सीजीडी) नेटवर्क को प्राकृतिक गैस की आपूर्ति के लिए एन्नौर तिरुवल्लुर 1,080 किलोमीटर लंबी बेंगलुरु–पुदुचेरी–नागपट्टिनम–मदुरै–टूटीकोरिन

प्राकृतिक गैस पाइपलाइन (ईटीबीपीएनएमटीपीएल) पाइपलाइन शुरू की है। यह पाइपलाइन वर्तमान में 7 भौगोलिक क्षेत्रों (जीए) से जुड़ी हुई है अर्थात् चेन्नई और तिरुवल्लूर, कांचीपुरम, त्रिची और नमक्कल, चित्तूर कोलार और वेल्लोर, तिरुवन्नामलाई विल्लुपुरम और कल्लाकुर्ची, मदुरै थेनी और विरुद्ध नगर, तथा कन्याकुमारी थूथुकुडी और तिरुनेलवेली। 7 और भौगोलिक क्षेत्रों से कनेक्टिविटी का कार्य अंतिम चरण में है और निकट भविष्य में इसे चालू किए जाने की संभावना है। इसके अलावा, कावेरी बेसिन रिफाइनरी (सीबीआर) को गैस की आपूर्ति के लिए ईटीबीपीएनएमटीपीएल के अंतर्गत दो स्पर पाइपलाइनों की योजना बनाई गई है। इन स्पर लाइनों के लिए सीसीईए की मंजूरी का इंतजार है। इन पाइपलाइनों के निर्माण से क्षेत्र में औद्योगिक विकास को और गति मिलेगी।

पीएनजीआरबी ने दिनांक 12.07.2023 को गुरदासपुर से जम्मू तक प्राकृतिक गैस पाइपलाइन बिछाने के लिए गेल इंडिया लिमिटेड को अधिकृत किया है। श्रीनगर क्षेत्र की गैस की मांग को पूरा करने के लिए पीएनजीआरबी ने जम्मू से श्रीनगर तक 325 किलोमीटर लंबी पाइपलाइन बिछाने के लिए बोलियां आमंत्रित की हैं। गेल 3.1 एमएमएससीएमडी क्षमता वाली 160 किलोमीटर लंबी गुरदासपुर–जम्मू पाइपलाइन का निर्माण कर रहा है। इस पाइपलाइन का मुख्य उद्देश्य जम्मू और कश्मीर केंद्र शासित प्रदेश को राष्ट्रीय गैस ग्रिड से जोड़कर स्वच्छ प्राकृतिक गैस की आपूर्ति सुनिश्चित करना है। इस परियोजना का पूरा होने का समय जुलाई 2026 निर्धारित किया गया है।

इसके अलावा, पीएनजीआरबी ने एन्नोर, तमिलनाडु से बरशी, महाराष्ट्र तक 875 किलोमीटर लंबी प्राकृतिक गैस पाइपलाइन बिछाने के लिए बोलियाँ आमंत्रित की हैं। यह पाइपलाइन एन्नोर एलएनजी टर्मिनल से शुरू होगी और बरशी में पूर्व–पश्चिम पाइपलाइन से जुड़ जाएगी, जिससे देश की प्रमुख इंटरकनेक्टिंग पाइपलाइनों तक प्राकृतिक गैस का परिवहन संभव हो सकेगा।

3.2 देश में पुनः गैसीकृत अवसंरचना

देश ने वर्ष 2004 में दहेज (गुजरात) स्थित अपने पहले पुनः गैसीकृत एलएनजी (आरएलएनजी) टर्मिनल की स्थापना के साथ तरलीकृत प्राकृतिक गैस (एलएनजी) का पहला आयात शुरू किया। एलएनजी का आयात ओपन जनरल लाइसेंस (ओजीएल) के तहत किया जा रहा है। आयातित आरएलएनजी की आपूर्ति देश भर में आपूर्तिकर्ताओं और खरीदारों के बीच संविदात्मक समझौते के अनुसार बाजार आधारित कीमतों पर की जाती है। एलएनजी टर्मिनलों की स्थापना को एक बुनियादी ढांचा परियोजना माना जाता है और यह 100% प्रत्यक्ष विदेशी निवेश (एफडीआई) के लिए योग्य है।

वर्तमान में, देश में लगभग 52.7 एमएमटीपीए (~ 190 एमएमएससीएमडी) क्षमता वाले आठ (8) प्रचालन एलएनजी पुनर्गैसीकरण टर्मिनल प्रचालित हैं। टर्मिनल–वार विवरण इस प्रकार हैं–

स्थान	स्वामी एवं प्रचालक	क्षमता (एमएमटीपीए)
छारा (गुजरात)	एचपीएलएनजी	5
दहेज (गुजरात)	पीएलएल	17.5
धाबोल (महाराष्ट्र)	गेल (केएलपीएल)	5
धामरा (ओडिशा)	अदानी एलएनजी प्रा. लिमिटेड	5
एन्नोर (तमिलनाडु)	इंडियन ऑयल	5
हजीरा (गुजरात)	शेल	5.2
कोच्चि (केरल)	पीएलएल	5
मुंद्रा (गुजरात)	जीएसपीसी एलएनजी लिमिटेड	5
कुल क्षमता (एमएमटीपीए)		**52.7**

उपर्युक्त के अतिरिक्त, निम्नलिखित एलएनजी टर्मिनल निर्माणाधीन हैं

स्थान	स्वामी एवं प्रचालक	क्षमता (एमएमटीपीए)
दहेज विस्तार (गुजरात)	पीएलएल	5
गोपालपुर (ओडिशा)	पीएलएल	4
जाफराबाद (गुजरात)	स्वान एनर्जी	5
कुल क्षमता (एमएमटीपीए)		**14**

3.3 नगर गैस वितरण (सीजीडी)

नगर गैस वितरण (सीजीडी) नेटवर्क पाइपलाइनों का एक आपस में जुड़ा नेटवर्क है, जो घरेलू, औद्योगिक और वाणिज्यिक क्षेत्रों को प्राकृतिक गैस की आपूर्ति करता है। किसी विशेष भौगोलिक क्षेत्र (जीए) में व्यावसायिक परिसरों और सीएनजी स्टेशनों के लिए सीजीडी नेटवर्क विकसित किए जा रहे हैं। इसका विकास मुख्य गैस पाइपलाइन कनेक्टिविटी, गैस स्रोतों की उपलब्धता और तकनीकी–व्यावसायिक व्यवहार्यता को ध्यान में रखकर किया जाता है।

सीजीडी नेटवर्क घरों तक पाइप के माध्यम से प्राकृतिक गैस (पीएनजी) पहुंचाकर स्वच्छ और पर्यावरण के अनुकूल खाना पकाने का ईंधन उपलब्ध कराता है। इसके साथ ही, यह परिवहन क्षेत्र को कंप्रेस्ड प्राकृतिक गैस (सीएनजी) के रूप में स्वच्छ ईंधन भी प्रदान करता है। परिवहन में सीएनजी के इस्तेमाल से शहरी क्षेत्रों में वाहनों से होने वाले प्रदूषण को कम करने में मदद मिलती है और वायु की गुणवत्ता बेहतर होती है।

- मई 2014 तक देश के विभिन्न भागों में 53 जिलों में (आंशिक या पूरी तरह) फैले लगभग 33 भौगोलिक क्षेत्रों (जीए) में सीजीडी नेटवर्क उपलब्ध था।
- पेट्रोलियम एवं प्राकृतिक गैस विनियामक बोर्ड (पीएनजीआरबी) ने 12वें और 12ए सीजीडी बोली दौर के तहत 103 जिलों को कवर करने वाले सफल बोलीदाताओं को अंतिम रूप दिया है, जिसमें 6 पूर्वोत्तर राज्य अर्थात अरुणाचल प्रदेश, मेघालय, मणिपुर, नागालैंड, सिक्किम और मिजोरम और 2 केंद्र शासित प्रदेश जम्मू एवं कश्मीर तथा लद्दाख शामिल हैं। 12/12ए सीजीडी बोली दौर के पूरा होने के बाद, पीएनजीआरबी ने देश के संपूर्ण मुख्य भूमि क्षेत्र (द्वीपों को छोड़कर) में 307 भौगोलिक क्षेत्रों (गैस) में सीजीडी नेटवर्क के विकास के लिए कंपनियों को अधिकृत किया।
- घरेलू परिवारों को पाइप्ड नेचुरल गैस (पीएनजी) की आपूर्ति मई 2014 में 25.4 लाख परिवारों से बढ़कर मार्च 2025 तक 150.41 लाख परिवारों तक पहुँच गई है। कुल मिलाकर, 31 मार्च 2025 तक देश भर में 8,067 सीएनजी स्टेशन प्रचालित हो रहे हैं, जो लगभग 55 लाख सीएनजी वाहनों को स्वच्छ और किफायती परिवहन ईंधन उपलब्ध करा रहे हैं।

नगर गैस नेटवर्क के विस्तार को बढ़ावा देने और शहरों में प्राकृतिक गैस के उपयोग को बढ़ाने के लिए, सरकार ने निम्नलिखित कदम उठाए हैं–

i. घरेलू गैस, जो आयातित गैस से सस्ती है, को सीजीडी क्षेत्र के पीएनजी (घरेलू) और सीएनजी (परिवहन) खंडों की पूरी आवश्यकता को पूरा करने के लिए आवंटित किया गया है और इसे 'कोई कटौती नहीं' श्रेणी में रखा गया है।

ii. श्रम और रोजगार मंत्रालय (एमओएलई) ने सीजीडी परियोजनाओं को सार्वजनिक उपयोगिता का दर्जा दिया है।

iii. रक्षा मंत्रालय (एमओडी) ने अपने आवासीय क्षेत्रों/यूनिटों में पीएनजी के उपयोग के लिए दिशानिर्देश जारी किए हैं।

iv. लोक उद्यम विभाग (डीपीई) ने सार्वजनिक क्षेत्र के उद्यमों (पीएसई) को अपने–अपने आवासीय परिसरों में पीएनजी की व्यवस्था करने के लिए दिशानिर्देश दिए हैं।

v. आवासन एवं शहरी कार्य मंत्रालय (एमओएचयूए) ने राज्य सरकारों को निम्नलिखित पहलुओं पर परामर्श जारी किए है:

क. स्थानीय परिस्थितियों के अनुसार समयबद्ध अनुमति के साथ–साथ सड़क मरम्मत/अनुमति शुल्क का मानकीकरण करना।

ख. शहरकस्बे के नियोजन चरण में सीएनजी स्टेशनों के विकास के लिए भूमि भूखंड चिन्हित करना और इसे संशोधित मास्टर प्लान में शामिल करना।

ग. वास्तुशिल्पीय डिज़ाइन चरण में आवासीय और वाणिज्यिक भवनों में गैस पाइपलाइन अवसंरचना प्रदान करने के लिए भवन उप–नियमों में आवश्यक संशोधन करना।

vi. इसके अलावा, एमओएचयूए ने सीपीडब्ल्यूडी और एनबीसीसी को सभी सरकारी आवासीय परिसरों में पीएनजी का प्रावधान करने का निर्देश दिया है।

vii. उद्योग एवं आंतरिक व्यापार संवर्धन विभाग (डीपीआईआईटी) ने मौजूदा तेल विपणन कंपनियों के क्षेत्रीय कार्यालयों में सीएनजी वितरण सुविधाएं स्थापित करने की प्रक्रिया को आसान बनाने के लिए संशोधित नियम 2018 को अधिसूचित किया है।

भारत का प्राकृतिक गैस पाइपलाइन अवसंरचना – 2024





आईओसीएल का पाइपलाइन नेटवर्क



गांधार में गेल का गैस प्रोसेसिंग संयंत्र



प्राकृतिक गैस पाइपलाइन बिछाते हुए



एन्नोर एलएनजी टर्मिनल



जहाज की पृष्ठभूमि में प्राकृतिक गैस पाइपलाइनें



बीपीसीएल बीना पनकी पाइपलाइन


LNG STATION



अध्याय 4

fjQkbÇux

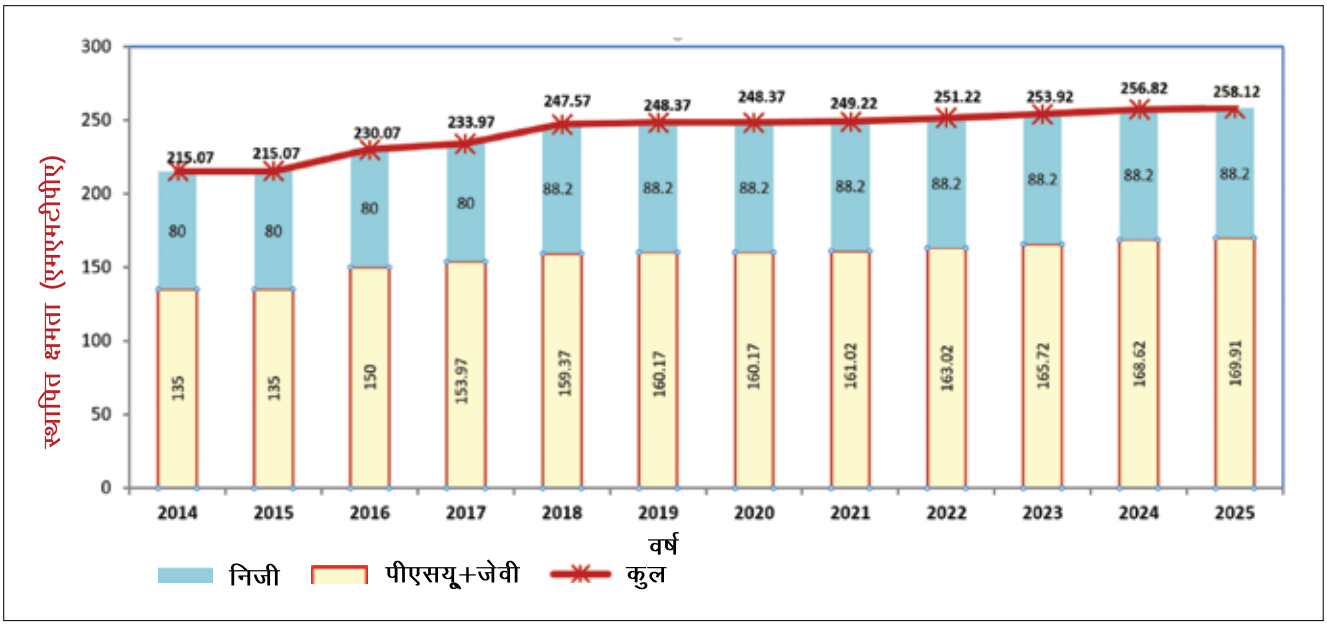


4 रिफाइनिंग

4.1 प्रस्तावना

भारतीय रिफाइनिंग उद्योग ने वैश्विक स्तर पर अपनी एक मजबूत और प्रमुख पहचान बनाई है। भारत तेजी से एक रिफाइनरी हब के रूप में उभर रहा है, जहाँ रिफाइनिंग क्षमता देश की मांग से अधिक है। देश की रिफाइनिंग क्षमता 1998 में 62.0 मिलियन मीट्रिक टन प्रति वर्ष (एमएमटीपीए) से बढ़कर दिनांक 31.03.2025 तक 258.12 (एमएमटीपीए) हो गई है। इसमें कुल 22 रिफाइनरियाँ शामिल हैं – 18 सार्वजनिक क्षेत्र में, 3 निजी क्षेत्र में और 1 संयुक्त उद्यम के रूप में। यह क्षमता न केवल घरेलू जरूरतों को पूरा करती है, बल्कि पेट्रोलियम उत्पादों के निर्यात के लिए भी अधिशेष उपलब्ध कराती है। वर्ष 2001–02 से भारत पेट्रोलियम उत्पादों का शुद्ध निर्यातक बन गया है। वित्त वर्ष 2024–25 में देश ने लगभग 65.08 मिलियन मीट्रिक टन (एमएमटी) पेट्रोलियम उत्पादों का निर्यात किया, जिनकी अनुमानित कीमत 44.41 अरब अमेरिकी डॉलर रही।

4.2 वर्षों के दौरान रिफाइनिंग क्षमता में वृद्धि: पिछले कुछ वर्षों के दौरान रिफाइनिंग क्षमता में हुई वृद्धि का निष्पादन ग्राफ में दर्शाया गया है।



रिफ़ाइनरियों का क्षमता–वार विवरण दिनांक (31.03.2025) की स्थिति के अनुसार नीचे दिया गया है:

क्र. सं.	रिफ़ाइनरी स्थान/चालू होने का वर्ष	कंपनी का नाम	अधिकतम उत्पादन क्षमता (एमएमटीपीए)
1.	डिगबोई – 1901	इंडियन ऑयल कॉर्पोरेशन लिमिटेड	0-65
2.	गुवाहाटी – 1962		1-20
3.	बरौनी – 1964		6-00
4.	कोयली – 1965		13-70
5.	बोंगाईगांव – 1974		2-70

क्र. सं.	रिफ़ाइनरी स्थान/चालू होने का वर्ष	कंपनी का नाम	अधिकतम उत्पादन क्षमता (एमएमटीपीए)
6.	हल्दिया – 1975		8.00
7.	मथुरा – 1982		8-00
8.	पानीपत – 1998		15-00
9.	पारादीप – 2016		15-00
10.	मनाली – 1965	चेन्नई पेट्रोलियम कॉर्पोरेशन लिमिटेड	10-50
कुल आईओसीएल समूह			**80-75**
11.	मुंबई – 1954	हिंदुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड	9-50
12.	विशाखापत्तनम –1957		15-0
कुल एचपीसीएल			**24-50**
13.	मुंबई – 1955	भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड	12-00
14.	कोच्चि – 1963		15-50
15.	बीना – 2011		7-80
कुल बीपीसीएल			**35-30**
16.	नुमालीगढ़ – 2000	नुमालीगढ़ रिफाइनरी लिमिटेड	3-00
17.	मैंगलोर – 1996	मैंगलोर रिफाइनरी एंड पेट्रोकेमिकल्स लिमिटेड	15-00
18.	ततिपका – 2001	तेल एवं प्राकृतिक गैस निगम लिमिटेड	0-07
उप–योग पीएसयू			**158-62**
19.	जामनगर, आरआईएलडीटीए, 1999	रिलायंस इंडस्ट्रीज लिमिटेड	33-00
20.	जामनगर, आरआईएल एसईजेड, 2008	रिलायंस इंडस्ट्रीज लिमिटेड	35-20
21.	वडिनार, 2006	नयारा एनर्जी	20-00
उप–योग निजी क्षेत्र			**88-20**
22.	भटिंडा, एचएमईएल, 2012	एचपीसीएल मित्तल एनर्जी लिमिटेड	11-30
	उप–योग संयुक्त उद्यम		**11-30**
कुल			**258.12**

4.3 ग्रीन फील्ड रिफाइनरी और मौजूदा रिफाइनरियों का विस्तार

क. मौजूदा रिफ़ाइनरियों का विस्तार

वर्ष 2028–29 तक सार्वजनिक क्षेत्र के उपक्रमों के तहत मौजूदा रिफ़ाइनरियों की क्षमता विस्तार योजना इस प्रकार है:

क्र. सं.	कंपनी का नाम	रिफ़ाइनरी का स्थान	लक्षित वर्ष	क्षमता एमएमटीपीए
1.	भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड	मुंबई, महाराष्ट्र	2028-29	4.0
2.	भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल)	बीना, मध्य प्रदेश	2027-28	3.2
3.	भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड	कोच्चि, केरल	2026-27	2.5
4.	इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल)	डिगबोई, असम	2026-27	0.35
5.	इंडियन ऑयल कॉर्पोरेशन लिमिटेड	कोयली, गुजरात	2026-27	4.3
6.	इंडियन ऑयल कॉर्पोरेशन लिमिटेड	बरौनी, बिहार	2026-27	3.0
7.	इंडियन ऑयल कॉर्पोरेशन लिमिटेड	पानीपत, हरियाणा	2026-27	10.0
8.	नुमालीगढ़ रिफाइनरीज लिमिटेड (एनआरएल)	नुमालीगढ़, असम	2025-26	6.0

ख. ग्रीन फील्ड रिफाइनरी

क्र. सं.	कंपनी का नाम	रिफ़ाइनरी का स्थान	लक्षित वर्ष	क्षमता एमएमटीपीए
1.	एचपीसीएल राजस्थान रिफाइनरी लिमिटेड (एचआरआरएल)	बाड़मेर, राजस्थान	2025-26	9.0

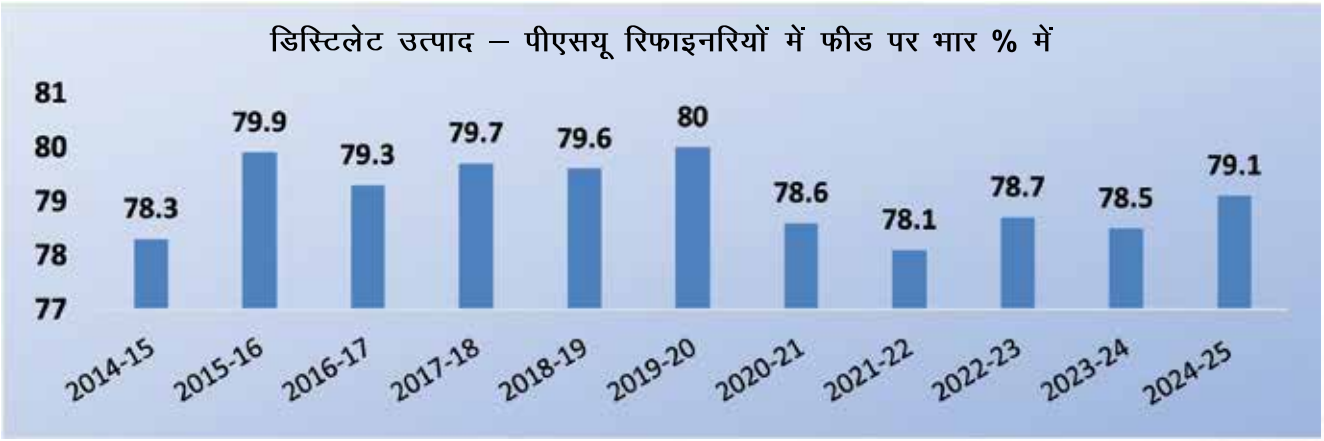
4.4 रिफाइनरी निष्पादन सुधार:

भारतीय सार्वजनिक क्षेत्र की रिफाइनरियाँ आधुनिक तकनीकों से लैस हैं तथा अंतरराष्ट्रीय रुझानों और जरूरतों के अनुसार अपनी तकनीकों को लगातार बेहतर बना रही हैं। इन रिफाइनरियों ने ऊर्जा संरक्षण के विभिन्न उपाय अपनाकर ऊर्जा खपत को कम करना अपनी सबसे बड़ी प्राथमिकता बनाया है।

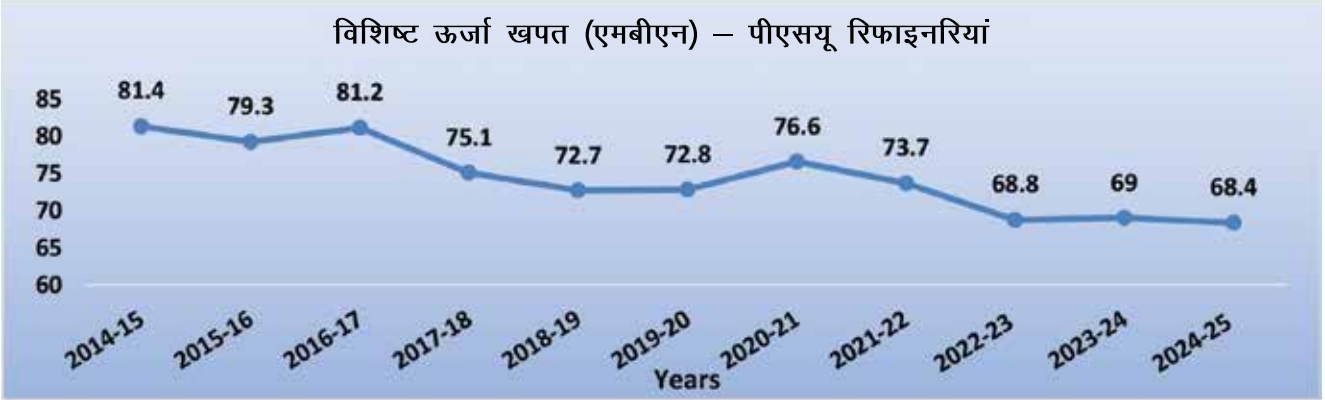
उच्च प्रौद्योगिकी केंद्र (सीएचटी) ने मैसर्स सोलोमन एसोसिएट्स के माध्यम से सार्वजनिक क्षेत्र की रिफाइनरियों का लगातार वर्ष 2010, 2012, 2014, 2016, 2018, 2020 और 2022 में निष्पादन का बेंचमार्क अध्ययन कराया है। वर्तमान में अध्ययन चक्र वर्ष 2024 रहा है।

सार्वजनिक क्षेत्र की रिफाइनरियों ने आधुनिक तकनीक अपनाकर पेट्रोल और डीज़ल के उत्पादन और गुणवत्ता में लगातार सुधार किया है। डिस्टीलेट उत्पाद के मानकीकरण के लिए, सभी भारतीय रिफाइनरियों ने वर्ष 2020–21 से सीएचटी द्वारा विकसित मानक डिस्टीलेट उत्पाद पद्धति को अपनाया है।

सार्वजनिक क्षेत्र की रिफाइनरियों का औसत डिस्टीलेट उत्पाद (कच्चे तेल पर भार प्रतिशत) वर्ष 2005–06 के 73.3% से बढ़कर वर्ष 2024–25 में 79.1% हो गया है। इसी प्रकार, ऊर्जा संरक्षण उपायों ने उद्योग को वर्ष 2005–06 से वर्ष 2024–25 की अवधि के दौरान एमबीटीयू/बीबीएल/एनआरजीएफ के संदर्भ में मापी गई विशिष्ट ऊर्जा खपत (एमबीएन) को लगभग 30% तक कम करने में मदद की है।



2020–21 से, मानकीकरण के लिए सीएचटी की डिस्टीलेट पद्धति को अपनाया गया है।



***बीईई विशिष्ट ऊर्जा खपत द्वारा मान्य 2022–23 एमबीएन के आंकड़े एसईसी या एमबीएन के रूप में लिखे गए हैं।**

एमबीएन =एमबीटीयू/बैरल/एनआरजीएफ;

एमबीटीयू: रिफाइनरी में शुद्ध ऊर्जा एवं हानि (मिलियन ब्रिटिश थर्मल यूनिट);

एनआरजीएफः ऊर्जा कारक;

बीबीएलः बैरल

2015–16 से, मानकीकरण के लिए नई एमबीएन पद्धति अपनाई गई है।

4.5 ऑटो ईंधन गुणवत्ता उन्नयनः

पूरे देश में बीएस–IV गुणवत्ता वाले ईंधन की आपूर्ति दिनांक 01.04.2017 तक चरणबद्ध तरीके से पूरी कर ली गई थी। सरकार ने दिनांक 01.04.2020 से सीधे बीएस–IV से बीएस–VI उत्सर्जन मानकों को लागू करने का निर्णय लिया। सड़क परिवहन और राजमार्ग मंत्रालय ने दिनांक 16.09.2016 को अधिसूचना संख्या जीएसआर 889(E) के तहत बीएस–VI ईंधनों के लिए उत्सर्जन मानक जारी किए। दिल्ली में बढ़ते प्रदूषण स्तर को देखते हुए, सरकार ने दिनांक 01.04.2018 से राष्ट्रीय राजधानी क्षेत्र दिल्ली में बीएस–VI लागू किया। इसके बाद दिनांक 01.04.2019 से इसे राष्ट्रीय राजधानी क्षेत्र के प्रमुख हिस्सों में भी लागू किया गया। पूरे देश में बीएस–VI गुणवत्ता वाले ईंधन की आपूर्ति दिनांक 01.04.2020 से शुरू हुई।



4.6 रिफाइनरियों का संक्षिप्त विवरण

सार्वजनिक क्षेत्र की रिफ़ाइनरियाँ

4.6.1 आईओसीएल रिफ़ाइनरी डिगबोई रिफ़ाइनरी (असम) इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल):

डिगबोई रिफाइनरी की स्थापना वर्ष 1901 में बर्मा ऑयल कंपनी लिमिटेड (जो बाद में असम ऑयल कंपनी लिमिटेड बनी) ने की थी। 14 अक्तूबर 1981 से इंडियन ऑयल कॉर्पोरेशन लिमिटेड ने असम ऑयल कंपनी लिमिटेड की रिफाइनरी और विपणन कार्यों का

प्रचालन अपने हाथ में लिया और इसके लिए एक अलग प्रभाग बनाया। इस प्रभाग में रिफाइनरी और विपणन दोनों की गतिविधियाँ शामिल थीं। डिगबोई रिफाइनरी दुनिया की सबसे पुरानी चालू रिफाइनरी है और यह उच्च गुणवत्ता वाला पैराफिन वैक्स और माइक्रो–क्रिस्टलीन वैक्स का उत्पादन करती है। रिफ़ाइनरी की वर्तमान क्षमता 0.65 एमएमटीपीए है।

4.6.2 गुवाहाटी रिफाइनरी (असम)–इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल):

गुवाहाटी रिफाइनरी जनवरी 1962 में 0.75 एमएमटीपीए की डिज़ाइन क्षमता के साथ शुरू हुई थी। गुवाहाटी रिफाइनरी सार्वजनिक क्षेत्र की पहली रिफाइनरी थी। वर्ष 2003 में, इसने आईओसीएल के अनुसंधान एवं विकास केंद्र द्वारा विकसित नई तकनीक "इंडमैक्स यूनिट" जोकि भारी ईंधन को एलपीजी, पेट्रोल (एमएस) और डीजल में बदलने के लिए विकसित की गई थी, को अपनाने वाली पहली रिफाइनरी होने का गौरव प्राप्त किया। वर्तमान में रिफाइनरी की क्षमता 1.20 एमएमटीपीए है।

4.6.3 बरौनी रिफ़ाइनरी (बिहार)–इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल): बरौनी रिफाइनरी जुलाई 1964 में चालू की गई थी। इसे मूल रूप से असम के स्वदेशी क्रूड तेल को प्रोसेसिंग के लिए डिज़ाइन किया गया था। बाद में इसका नए सिरे से विकास और विस्तार किया गया, जिससे यह अब आयातित क्रूड तेल को भी प्रोसेस करने में सक्षम हो गई है। रिफाइनरी की वर्तमान क्षमता 6.00 एमएमटीपीए है।

4.6.4 कोयली रिफ़ाइनरी/जवाहर नगर रिफ़ाइनरी (गुजरात) – इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल):

कोयली रिफाइनरी अक्तूबर 1965 में चालू हुई थी। इस रिफाइनरी ने देश की पहली हाइड्रोक्रैकर यूनिट शुरू की, जो कच्चे तेल के भारी हिस्सों को उच्च गुणवत्ता वाले केरोसीन/विमानन टरबाइन ईंधन (एटीएफ) और डीजल में बदलती है। इसमें दुनिया का सबसे बड़ा सिंगल ट्रेन लीनियर अल्काइल बेंजीन (एलएबी) संयंत्र भी है, जिसने इंडियन ऑयल के पेट्रोकेमिकल्स क्षेत्र में प्रवेश को दर्शाया। रिफाइनरी की वर्तमान क्षमता 13.70 एमएमटीपीए है।

4.6.5 बोंगाईगांव रिफाइनरी (असम)–इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल):

बोंगाईगांव रिफाइनरी एंड पेट्रोकेमिकल्स लिमिटेड (बीआरपीएल) की स्थापना दिनांक 20.02.1974 को एक पूर्ण स्वामित्व वाली केंद्र सरकार की कंपनी के रूप में हुई थी। मार्च 2001 में बीआरपीएल, इंडियन ऑयल कॉर्पोरेशन लिमिटेड की सहायक कंपनी बन गई। दिनांक 25.03.2009 से बीआरपीएल का विलय उसकी धारिता कंपनी, इंडियन ऑयल कॉर्पोरेशन लिमिटेड में कर दिया गया। बीआरपीएल, जो पहले असम में कच्चे तेल की प्रोसेसिंग करती थी, अब आयातित कच्चे तेल को भी प्रोसेस करने में सक्षम है। रिफाइनरी की वर्तमान क्षमता 2.70 एमएमटीपीए है।

4.6.6 हल्दिया रिफ़ाइनरी (पश्चिम बंगाल)–इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल): हल्दिया रिफाइनरी जनवरी 1975 में चालू हुई थी। यह एक तटीय रिफाइनरी है और पश्चिम बंगाल के पूर्व मेदिनीपुर जिले में, कोलकाता से 136 किलोमीटर दूर हुगली और हल्दी नदियों के संगम के पास स्थित है। यह इंडियन ऑयल समूह की दो रिफाइनरियों में से एक है, जो जूट बैचिंग ऑयल (जेबीओ) का एकमात्र उत्पादक होने के साथ–साथ ल्यूब ऑयल बेस स्टॉक्स (एलओबीएस) का उत्पादन भी करती है। इसकी प्रारंभिक क्रूड प्रोसेसिंग क्षमता 2.5 एमएमटीपीए थी, जबकि वर्तमान क्षमता 8.00 एमएमटीपीए है।

4.6.7 मथुरा रिफ़ाइनरी (उत्तर प्रदेश)–इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल):

मथुरा रिफाइनरी जनवरी 1982 में चालू हुई थी। रिफाइनरी की मुख्य इकाइयाँ रूस की तकनीक से डिज़ाइन की गई थीं। यह भारत की पहली हरित रिफाइनरी है, जिसमें विस्तृत पर्यावरण निगरानी प्रणाली और पारिस्थितिक पार्क मौजूद हैं। रिफाइनरी में एसओ2 उत्सर्जन को नियंत्रित करने के लिए प्राकृतिक गैस का भी उपयोग किया जाता है। रिफाइनरी की वर्तमान क्षमता 8.00 एमएमटीपीए है।

4.6.8 पानीपत रिफ़ाइनरी (हरियाणा)–इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल):

पानीपत रिफाइनरी वर्ष 1998 में चालू हुई थी। यह सार्वजनिक क्षेत्र की पहली आधुनिक एकीकृत रिफाइनरी और पेट्रोकेमिकल कॉम्प्लेक्स है। इसमें शुद्ध टेरेफ्थेलिक एसिड (पीटीए) संयंत्र देश का सबसे बड़ा है। पानीपत नेफ्था क्रैकर यूनिट, मोनो एथिलीन ग्लाइकॉल (एमईजी) यूनिट, पॉलीप्रोपिलीन (पीपी) यूनिट, लीनियर न्यून–घनत्व पॉलीएथिलीन (एलएलडीपीई) और न्यून–घनत्व पॉलीएथिलीन (एचडीपीई) यूनिटों के चालू होने से इंडियन ऑयल के प्लास्टिक उद्योग में प्रवेश का मार्ग प्रशस्त हुआ। रिफाइनरी की वर्तमान क्षमता 15.00 एमएमटीपीए है।

4.6.9 पारादीप रिफाइनरी (ओडिशा)–इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल):

पारादीप रिफाइनरी वर्ष 2016 में चालू हुई थी। यह पारादीप, ओडिशा में स्थित है। यह रिफाइनरी राज्य में औद्योगिक विकास को बढ़ावा देने में आर्थिक प्रोत्साहन के रूप में काम करती है और सहायक उद्योगों के विकास के माध्यम से क्षेत्र में महत्वपूर्ण भूमिका निभाएगी।

रिफाइनरी को 10.8 के समग्र नेल्सन जटिलता कारक के साथ 15.0 एमएमटीपीए कच्चे तेल को संसाधित करने के लिए डिज़ाइन किया गया है। यह 100% उच्च सल्फर और भारी कच्चे तेल को संसाधित करने में सक्षम है और एलपीजी, बीएस–VI गुणवत्ता वाला पेट्रोल (मोटर स्पिरिट), डीजल, केरोसिन, एविएशन टरबाइन ईंधन, प्रोपलीन, सल्फर और पेट्रोलियम कोक जैसे विभिन्न उत्पाद तैयार करता है। रिफाइनरी प्रीमियम गुणवत्ता वाला मोटर स्पिरिट और अन्य हरित ऑटो ईंधन भी तैयार करती है, जिसे अनेक देशों में निर्यात किया जाता है। रिफाइनरी के उत्पाद घरेलू बाजारों और आंशिक रूप से दक्षिण–पूर्व एशियाई निर्यात बाजार की ऊर्जा मागों को पुरा करते है। रिफाइनरी की वर्तमान क्षमता 15.00 एमएमटीपीए है।

एचपीसीएल रिफ़ाइनरियां

4.6.10 मुंबई रिफ़ाइनरी (महाराष्ट्र)– हिंदुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड (एचपीसीएल):

मुंबई रिफाइनरी की स्थापना वर्ष 1952 में स्टैंडर्ड वैक्यूम रिफाइनिंग कंपनी ऑफ़ इंडिया (स्टैनवैक) के रूप में हुई थी और इसे वर्ष 1954 में चालू किया गया। वर्ष 1962 में स्टैनवैक का नाम बदलकर ईएसएसओ इंडिया लिमिटेड कर दिया गया। वर्ष 1969 में ल्यूब ऑयल बेस स्टॉक (एलओबीएस) के निर्माण के लिए ल्यूब इंडिया लिमिटेड अस्थिधारणीयव में आई। 15 जुलाई 1974 को ईएसएसओ और ल्यूब इंडिया लिमिटेड के उपक्रमों का राष्ट्रीयकरण किया गया और उनका विलय करके हिंदुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड (एचपीसीएल) का गठन हुआ। एचपीसीएल–मुंबई रिफाइनरी एचपीसीएल की एकमात्र रिफाइनरी है जो ल्यूब ऑयल बेस स्टॉक का उत्पादन करती है। रिफाइनरी फूड ग्रेड हेक्सेन, रबर प्रोसेसिंग ऑयल (आरपीओ), डायना प्रोसेसिंग ऑयल (स्पष्ट और पारदर्शी पैराफिन प्रकार का प्रक्रिया तेल जिसमें उत्कृष्ट गर्मी प्रतिरोधी एवं मौसम प्रतिरोधी गुण हैं) जैसे विशेष उत्पाद भी बनाती है। रिफाइनरी की वर्तमान क्षमता 9.50 एमएमटीपीए है।

4.6.11 विशाख रिफ़ाइनरी (आंध्र प्रदेश) – हिंदुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड (एचपीसीएल):

एचपीसीएल की विशाख रिफाइनरी वर्ष 1957 में कैल्टेक्स ऑयल रिफाइनिंग (इंडिया) लिमिटेड द्वारा चालू की गई थी। वर्ष 1976 में भारत सरकार ने इस रिफाइनरी का अधिग्रहण किया और वर्ष 1978 में इसे एचपीसीएल में विलय कर दिया गया। यह रिफाइनरी पूर्वी तट पर एचपीसीएल की पहली रिफाइनरी थी और विशाखापत्तनम के पहले प्रमुख उद्योगों में से एक थी। वर्ष 2010 में विशाख में सिंगल पॉइंट मूरिंग (एसपीएम) सुविधा चालू होने के बाद 2 मिलियन बैरल तक तेल ले जाने वाले अत्यधिक विशाल क्रूड कैरियर (वीएलसीसी) रिफाइनरी में पहुँच सकते हैं। रिफाइनरी के पास भारतीय सामरिक पेट्रोलियम रिज़र्व लिमिटेड (आईएसपीआरएल) भी स्थित है। रिफाइनरी की वर्तमान क्षमता 15.00 एमएमटीपीए है।

बीपीसीएल रिफ़ाइनरियां

4.6.12 मुंबई रिफ़ाइनरी (महाराष्ट्र) – भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल):

मुंबई रिफाइनरी जनवरी 1955 में बर्मा शेल रिफाइनरीज लिमिटेड के स्वामित्व में चालू की गई थी। बर्मा शेल के सरकारी अधिग्रहण के बाद, 24 जनवरी 1976 को भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल) का गठन हुआ। बीपीसीएल–मुंबई रिफाइनरी ने 109 प्रकार के कच्चे तेल की प्रोसेसिंग की है। रिफाइनरी में पर्यावरण के अनुकूल ग्रुप ।।/ ।।। बेस ऑयल का उत्पादन करने के लिए ल्यूब बेस ऑयल यूनिट भी स्थापित है। रिफाइनरी की वर्तमान क्षमता 12.00 एमएमटीपीए है।

4.6.13 कोच्चि रिफ़ाइनरी (केरल)–भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल):

कोच्चि रिफाइनरी की स्थापना 27 अप्रैल, 1963 को भारत सरकार, अमेरिका की फिलिप्स पेट्रोलियम कंपनी और कलकत्ता की डंकन ब्रदर्स के बीच हुए समझौते के आधार पर की गई थी। वर्ष 2006 में इसे भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड में विलय कर दिया गया। यह रिफाइनरी बहुत बड़े क्रूड कैरियर (वीएलसीसी) के माध्यम से कच्चा तेल प्राप्त करने में सक्षम है। कोच्चि रिफाइनरी के उत्पाद पोर्टफोलियो में गुणवत्तापूर्ण ईंधन के साथ–साथ पेट्रोकेमिकल फीडस्टॉक और विशेष उत्पाद भी शामिल हैं। रिफाइनरी की वर्तमान क्षमता 15.50 एमएमटीपीए है।

4.6.14 बीना रिफ़ाइनरी (मध्य प्रदेश) – भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल):

बीना रिफाइनरी की स्थापना भारत ओमान रिफाइनरीज लिमिटेड (बीओआरएल) द्वारा की गई थी, जो भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल) और ओक्यू

एसएओसी (पहले ओमान ऑयल कंपनी एसएओसी) का संयुक्त उद्यम है। इसे मई 2011 में चालू किया गया था। मार्च 2020 से यह कंपनी बीपीसीएल की सहायक कंपनी बन गई और जुलाई 2021 में ओक्यू एसएओसी के सभी शेयर भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड द्वारा खरीद लिए गए।

बीना रिफाइनरी भारत के मध्य भाग में स्थित पहली रिफाइनरी है और यह मध्य एवं उत्तरी भारत में पेट्रोलियम उत्पादों की उपलब्धता बढ़ाने में मदद करती है। इसमें अन्य सुविधाओं के रूप में सिंगल पॉइंट मूरिंग (एसपीएम), गुजरात के वाडिनार में कच्चा तेल भंडारण टर्मिनल (सीओटी) और वाडिनार से बीना तक 935 किलोमीटर लंबी क्रॉस–कंट्री क्रूड पाइपलाइन (वीबीपीएल) शामिल है। रिफाइनरी की वर्तमान क्षमता 7.80 एमएमटीपीए है।

सीपीसीएल रिफाइनरी

4.6.15 मनाली रिफाइनरी (तमिलनाडु)–चेन्नई पेट्रोलियम कॉर्पोरेशन लिमिटेड (सीपीसीएल):

चेन्नई पेट्रोलियम कॉर्पोरेशन लिमिटेड (सीपीसीएल), जिसे पहले मद्रास रिफाइनरीज लिमिटेड (एमआरएल) कहा जाता था, वर्ष 1965 में भारत सरकार, एएमओसीओ और नेशनल ईरानी ऑयल कंपनी के बीच एक संयुक्त उद्यम के रूप में स्थापित की गई थी। सीपीसीएल वर्ष 2001 में आईओसीएल की सहायक कंपनी बन गई। सीपीसीएल–मनाली रिफाइनरी भारत की सबसे जटिल रिफाइनरियों में से एक है, जिसमें ईंधन, ल्यूब, वैक्स और डी–पेट्रोकेमिकल फीडस्टॉक्स का उत्पादन किया जाता है। रिफाइनरी की जल आवश्यकताओं को पूरा करने के लिए 5.8 मिलियन गैलन प्रति दिन (एमजीडी) समुद्री जल विलवणीकरण परियोजना उद्योग में अपनी तरह की पहली परियोजना थी। रिफाइनरी की वर्तमान क्षमता 10.50 एमएमटीपीए है।

एनआरएल रिफ़ाइनरी

4.6.16 नुमालीगढ़ रिफ़ाइनरी (असम) – नुमालीगढ़ रिफ़ाइनरी लिमिटेड (एनआरएल):

नुमालीगढ़ रिफाइनरी, जिसे "असम एकॉर्ड रिफाइनरी" के नाम से भी जाना जाता है, अक्तूबर 2000 में चालू हुई थी। एनआरएल की वर्तमान शेयरधारिता पैटर्न में ऑयल इंडिया लिमिटेड 72.15%, असम सरकार 23.48% और इंजीनियर्स इंडिया लिमिटेड 4.37% शामिल हैं। यह रिफाइनरी पूर्वोत्तर की सबसे बड़ी रिफाइनरी है और डिस्टीलेट उत्पादन को अधिकतम करने के लिए हाइड्रोक्रैकर और डिलेड कोकर जैसी आधुनिक इकाइयों से सुसज्जित है। रिफाइनरी की वर्तमान क्षमता 3.00 एमएमटीपीए है।

एमआरपीएल रिफ़ाइनरी

4.6.17 मैंगलोर रिफ़ाइनरी (कर्नाटक) – मैंगलोर रिफ़ाइनरी एंड पेट्रोकेमिकल्स लिमिटेड (एमआरपीएल):

मैंगलोर रिफाइनरी एंड पेट्रोकेमिकल्स लिमिटेड (एमआरपीएल) मार्च 1996 में चालू हुई थी। इसकी स्थापना मूल रूप से हिंदुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड (एचपीसीएल) और आदित्य बिड़ला ग्रुप द्वारा एक संयुक्त उद्यम रिफाइनरी के रूप में की गई थी। मार्च 2003 में एमआरपीएल ओएनजीसी की सहायक कंपनी बन गई। रिफाइनरी में 24 से 46 एपीआई गुरुत्वाकर्षण वाले विभिन्न कच्चे तेलों को संसाधित करने की उच्च लचीलापन है। एमआरपीएल भारत की एकमात्र रिफाइनरी है जिसके पास उच्च सीटेन संख्या वाले प्रीमियम डीजल का उत्पादन करने वाले दो हाइड्रोक्रैकर हैं। यह भारत की एकमात्र रिफ़ाइनरी भी है जिसके पास उच्च ऑक्टेन संख्या के अनलेडेड पेट्रोल का उत्पादन करने वाली दो संधारण ीय कैटेलिटिक रिजेनरेशन (सीसीआर) प्लेटफॉर्मिंग यूनिटें हैं। रिफ़ाइनरी की वर्तमान क्षमता 15.00 एमएमटीपीए है।

ओएनजीसी रिफ़ाइनरी

4.6.18 ततिपका रिफ़ाइनरी (आंध्र प्रदेश) – ऑयल एंड नेचुरल गैस कॉर्पोरेशन लिमिटेड (ओएनजीसी):

ओएनजीसी की मिनी रिफ़ाइनरी (चरण– I) के रूप में स्थापित यह रिफ़ाइनरी सितंबर, 2001 में आंध्र प्रदेश के पूर्वी गोदावरी जिले के ततिपका में चालू की गई थी। रिफ़ाइनरी की वर्तमान क्षमता 0.07 एमएमटीपीए है।

संयुक्त उद्यम रिफ़ाइनरी

4.6.19 गुरु गोबिंद सिंह रिफ़ाइनरी, बठिंडा (पंजाब) – एचपीसीएल मित्तल एनर्जी लिमिटेड (एचएमईएल):

हिंदुस्तान मित्तल एनर्जी लिमिटेड (एचएमईएल) के स्वामित्व वाली गुरु गोबिंद सिंह रिफ़ाइनरी (जीजीएसआर), एचपीसीएल और मित्तल एनर्जी लिमिटेड का एक संयुक्त उद्यम है, जिसे अप्रैल, 2012 में चालू किया गया था। बठिंडा के रणनीतिक स्थान को देखते हुए, यह रिफ़ाइनरी तेल और गैस क्षेत्र में एक सफल सार्वजनिक–निजी भागीदारी का प्रमाण

है। यह रिफ़ाइनरी भारत के उत्तरी राज्यों की ईंधन आवश्यकताओं को पूरा करती है। रिफ़ाइनरी की वर्तमान क्षमता 11.30 एमएमटीपीए है।

4.6.20 राजस्थान रिफाइनरी (बाड़मेर – राजस्थान) – एचपीसीएल राजस्थान रिफाइनरी लिमिटेड (एचआरआरएल):

एचपीसीएल राजस्थान रिफाइनरी लिमिटेड (एचआरआरएल), हिंदुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड (एचपीसीएल) और राजस्थान सरकार (जीओआर) के बीच एक संयुक्त उद्यम है। इस परियोजना में राजस्थान के बालोतरा जिले के पचपदरा में 9.00 एमएमटीपीए क्षमता वाली एक हरित क्षेत्र रिफाइनरी–सह–पेट्रो–रसायन परिसर की स्थापना शामिल है। एचआरआरएल का प्रचालन 2025–26 से शुरू होगा।

निजी क्षेत्र की रिफाइनरियाँ

4.6.21 रिलायंस इंडस्ट्रीज लिमिटेड, जामनगर (गुजरात) – विशेष आर्थिक क्षेत्र (आरआईएल – एसईजेड): यह रिफाइनरी दिसंबर 2008 में चालू हुई थी। यह निर्यात आधारित एसईजेड रिफाइनरी है, जिसमें 'स्वच्छ ईंधन' प्रक्रिया संयंत्र के साथ अनोखा डिज़ाइन और आधुनिक विन्यास सुविधा है। इसे अर्थव्यवस्था और बाजार की मांग के अनुसार ग्रेड बदलने और अधिक लाभ प्राप्त करने के लिए उच्च लचीलेपन के साथ डिजाइन किया गया है। यह नई एसईजेड रिफाइनरी भारत की पहली रिफाइनरी थी जो यूरो–IV ग्रेड का गैसोलीन और डीजल उत्पादन करती है। रिफाइनरी की वर्तमान क्षमता 35.20 एमएमटीपीए है।

4.6.22 रिलायंस इंडस्ट्रीज लिमिटेड, जामनगर (गुजरात)–घरेलू टैरिफ क्षेत्र (आरआईएल–डीटीए):

यह रिफ़ाइनरी जुलाई 1999 में चालू हुई थी। आरआईएल–डीटीए देश की पहली निजी क्षेत्र की रिफ़ाइनरी थी। आरआईएल–डीटीए में पैराक्सिलीन के उत्पादन के लिए एक पेट्रोकेमिकल संयंत्र और पॉलीप्रोपाइलीन के उत्पादन के लिए एक पॉलिमर संयंत्र है। रिफ़ाइनरी की वर्तमान क्षमता 33.00 एमएमटीपीए है।

4.6.23 नयारा एनर्जी लिमिटेड, वाडिनार रिफ़ाइनरी, वाडिनार (गुजरात)

यह रिफ़ाइनरी नवंबर 2006 में चालू हुई थी। वाडिनार रिफ़ाइनरी देश की दूसरी सबसे बड़ी एकल–स्थानीय रिफ़ाइनरी है। रिफ़ाइनरी की वर्तमान क्षमता 20.00 एमएमटीपीए है।

31.03.2025

भारत में रिफाइनरियों का मानचित्र

रिफाइनिंग क्षमता – 258.1 एमएमटीपीए







माननीय पेट्रोलियम और प्राकृतिक गैस मंत्री और राजस्थान के
माननीय मुख्यमंत्री द्वारा एचआरआरएल की बाड़मेर रिफाइनरी का दौरा



एचपीसीएल राजस्थान रिफाइनरी लिमिटेड (एचआरआरएल)



बीपीसीएल की मुंबई रिफाइनरी



एचपीसीएल विशाख रिफाइनरी



आईओसीएल की पारादीप रिफाइनरी





अध्याय 5

foi.ku vkSj forj.k



5 विपणन और वितरण

भारत का तेल और गैस विपणन मज़बूत घरेलू मांग और बड़े निर्यात अवसरों पर आधारित है जोकि देश अपनी बड़ी रिफाइनिंग क्षमता और रणनीतिक स्थिति का उपयोग करके वैश्विक बाज़ारों की ज़रूरतें पूरी करता है। इस क्षेत्र का मुख्य लक्ष्य, सरकार की विभिन्न योजनाएँ, बढ़ी हुई रिफाइनिंग क्षमता और नई तकनीकों की मदद से बढ़ती ऊर्जा आवश्यकताओं को पूरा करना और निर्यात से आय बढ़ाना है। प्रमुख विपणन योजनाओं में पेट्रोल पंपों का विस्तार, डिजिटल भुगतान और चार्जिंग सुविधाएँ शुरू करना, और जैव–ईंधन जैसे पर्यावरण के अनुकूल ऊर्जा विकल्पों को बढ़ावा देना शामिल है।

भारत का पेट्रोलियम उद्योग एक व्यापक क्षेत्र है, जिसमें पेट्रोलियम और उसके उप–उत्पादों की खोज, उत्पादन, रिफाइनिंग, वितरण और विपणन शामिल हैं। इसमें अपस्ट्रीम गतिविधियाँ जैसे कच्चे तेल और प्राकृतिक गैस का निष्कर्षण, मिडस्ट्रीम गतिविधियाँ जैसे परिवहन और भंडारण, और डाउनस्ट्रीम प्रक्रियाएँ जैसे पेट्रोल, डीज़ल, एलपीजी और केरोसिन का रिफाइनिंग और वितरण शामिल हैं। पेट्रोलियम उद्योग भारत की ऊर्जा सुरक्षा सुनिश्चित करता है और विभिन्न आर्थिक गतिविधियों के लिए आधार प्रदान करता है।

विपणन अवसंरचना: दिनांक 31.03.2025 तक सार्वजनिक क्षेत्र की तेल विपणन कंपनियों अर्थात आईओसीएल, बीपीसीएल और एचपीसीएल के पास देश भर में 287 पीओएल टर्मिनल/डिपो, 260 विमानन ईंधन स्टेशन, 87610 खुदरा बिक्री केंद्र हैं जिनमें 25391 ग्रामीण दुकानें शामिल हैं। अखिल भारत स्तर की जानकारी (निजी क्षेत्र सहित) नीचे दी गई है:

तालिका 6.7: दिनांक 01.04.2025 की स्थिति के अनुसार उद्योग विपणन अवसंरचना

विवरण	आईओसीएल	बीपीसीएल	एचपीसीएल	आरएल/आरबीएमएल/आरएसआईएल*	एनईएल##	शेल	अन्य	कुल
पीओएल टर्मिनल/डिपो (संख्या)+	127	80	80	17	3		7	314
विमानन ईंधन स्टेशन (संख्या)/	130	73	57	32			10	302
खुदरा बिक्री केंद्र (कुल) (संख्या)^	40221	23642	23747	1906	6683	361	164	96724
इनमें से, ग्रामीण आरओ (संख्या)	13205	6200	1638					27756
एसकेओ/एलडीओ एजेंसियां (संख्या)	3830	927	6378					6395
1. पीजी वितरक (कुल) (संख्या) (केवल पीएसयू)	1299	6269	6378					25566
एलपीजी बॉटलिंग प्लांट (संख्या) (केवल पीएसयू) #	100	54	55				2	211
एलपीजी बॉटलिंग क्षमता (टीएमटीपीए) (केवल पीएसयू) और	11213	5220	6470				180	23083
एलपीजी सक्रिय घरेलू उपभोक्ता (संख्या करोड़) (केवल पीएसयू)	15.5	8.5	9.0					33.0

+(अन्य 5 एमआरपीएल और 2 एनआरएल); /(अन्य शेलएमआरपीएल); '(अन्य एमआरपीएल), #(अन्य एनआरएल–1, सीपीसीएल–1); और (अन्य–एनआरएल–60, सीपीसीएल–120); ##नयारा एनर्जी लिमिटेड।

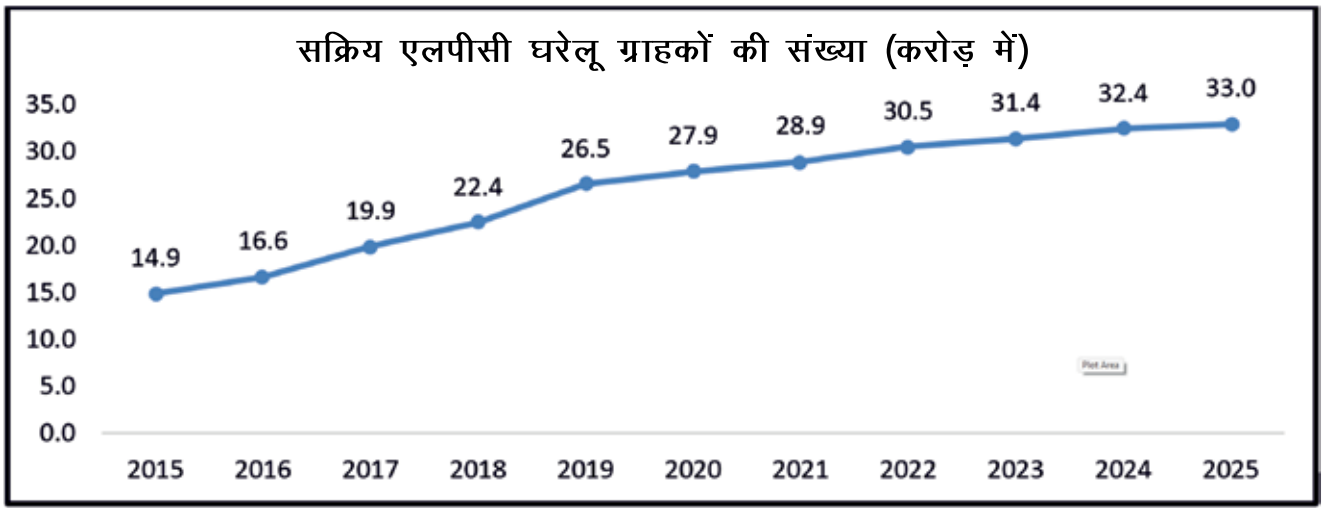
आरबीएमएल–रिलायंस बीपी मोबिलिटी लिमिटेड; आरएसआईएल–आरबीएमएल सॉल्यूशंस इंडिया लिमिटेड।

स्रोत: पीपीएसी

देश में विमानन ईंधन स्टेशन: विमानन ईंधन स्टेशन हवाई अड्डों के संचालन के लिए महत्वपूर्ण है और जिसे हवाई जहाज के ईंधन सुविधा के रूप में जाना जाता है, एक ऐसी सुविधा है जो विमानों के लिए विमानन ईंधन का भंडारण और आपूर्ति करती है। विमानन ईंधन स्टेशन सुरक्षित और कुशल प्रचालन के लिए डिज़ाइन किए गए हैं। विमानन ईंधन पेट्रोलियम आधारित या सिंथेटिक ईंधन का मिश्रण होते हैं और विमान को उड़ान भरने के लिए शक्ति प्रदान करते हैं। हवाई अड्डों पर उपयोग होने वाले विमानन ईंधन की गुणवत्ता और हैंडलिंग के मानक, जमीन पर हीटिंग या सड़क परिवहन जैसे उद्देश्यों के लिए उपयोग किए जाने वाले ईंधन की तुलना में अधिक कठोर होते हैं। 31 मार्च, 2025 तक, भारत में कुल 302 विमानन ईंधन स्टेशन हैं।

5.1. एलपीजी का खुदरा विपणन अवसंरचना:

भारत में एलपीजी का खुदरा विपणन सार्वजनिक क्षेत्र की तेल विपणन कंपनियों (ओएमसी) अर्थात इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल), हिंदुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड (एचपीसीएल), भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल) और निजी कंपनियों जैसे रिलायंस इंडस्ट्रीज, एस्सार, शेल आदि द्वारा किया जाता है। दिनांक 31.03.2025 तक देश में सार्वजनिक क्षेत्र की तेल विपणन कंपनियों द्वारा प्रचालित 23,083 टीएमटीपीए की निर्धारित बॉटलिंग क्षमता वाले 211 एलपीजी बॉटलिंग प्लांट और 25,566 एलपीजी वितरक हैं। दिनांक 31.03.2025 तक देश में कुल सक्रिय एलपीजी उपभोक्ता 32.97 करोड़ थे। वित्त वर्ष 2024–25 के दौरान, कुल 85 नए एलपीजी वितरक और 2 नए बॉटलिंग प्लांट चालू किए गए हैं। इसके अलावा, वित्त वर्ष 2024–25 के दौरान तेल विपणन कंपनियों द्वारा कुल 43.6 लाख नए एलपीजी कनेक्शन जारी किए गए हैं, जिनमें उज्ज्वला योजना के तहत 0.92 लाख कनेक्शन शामिल हैं।



स्रोत: पेट्रोलियम योजना एवं विश्लेषण प्रकोष्ठ

5.2. प्रमुख पहल

5.2.1 पहल (डीबीटीएल योजना): भारत सरकार ने दिनांक 15.11.2014 को देश के 54 जिलों में एलपीजी उपभोक्ताओं के लिए प्रत्यक्ष लाभ अंतरण (डीबीटीएल) योजना, 'पहल' (प्रत्यक्ष हस्तान्तरित लाभ) शुरू की। बाद में इस योजना का विस्तार पूरे देश में किया गया और दिनांक 31.03.2025 तक इस योजना में कुल 30.58 करोड़ एलपीजी उपभोक्ता शामिल हो चुके हैं।

इस योजना का उद्देश्य सब्सिडी को युक्तिसंगत बनाना और सब्सिडी के दुरुपयोग को कम करना है। पहल योजना में शामिल एलपीजी उपभोक्ताओं को गैर–सब्सिडी मूल्य पर रिफिल मिलता है और उनकी एलपीजी सब्सिडी (उनकी पात्रता के अनुसार) सीधे उनके बैंक खातों में जमा की जाती है। पहल के कार्यान्वयन से सब्सिडी प्रबंधन में पारदर्शिता बढ़ी है और देश में एलपीजी उपभोक्ताओं को सशक्त बनाया गया है। इस योजना ने 'छिपे' खाते, एक से अधिक खाते और निष्क्रिय खातों की पहचान करने में भी मदद की है, जिससे सब्सिडी वाले एलपीजी के व्यावसायिक उपयोग को रोका गया है।

5.2.2 गिव–इट–अप: सब्सिडी प्रबंधन के भाग के रूप में, भारत के माननीय प्रधानमंत्री ने 'गिव–इट–अप' अभियान शुरू किया, जिसमें सभी सक्षम एलपीजी उपभोक्ताओं से स्वेच्छा से अपनी एलपीजी सब्सिडी त्यागने का अनुरोध किया गया। गिव–इट–अप अभियान को सामाजिक रूप से प्रतिबद्ध लोगों से जबरदस्त प्रतिक्रिया मिली, और इसके परिणामस्वरूप दिनांक 01.04.2025 तक 1.16 करोड़ से अधिक उपभोक्ताओं ने स्वेच्छा से अपनी एलपीजी सब्सिडी छोड़ दी। सरकार के 'गिव–इट–अप' अभियान को पूरे विश्व से व्यापक प्रशंसा मिली है और यह मनोविज्ञान

और व्यवहार अर्थशास्त्र से प्रेरित सार्वजनिक नीति में प्रयुक्त नज टूल का एक अग्रणी और प्रारंभिक उदाहरण है।

5.2.3 **प्रधानमंत्री उज्ज्वला योजना (पीएमयूवाई):** मई 2016 में, पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय (एमओपीएनजी) ने 'प्रधानमंत्री उज्ज्वला योजना' (पीएमयूवाई) को एक प्रमुख योजना के रूप में लॉन्च किया। इस योजना का उद्देश्य ग्रामीण और वंचित परिवारों को एलपीजी जैसे स्वच्छ खाना पकाने के ईंधन उपलब्ध कराना था, जो अन्यथा पारंपरिक ईंधन जैसे जलाऊ लकड़ी, कोयला, गोबर के उपले आदि का उपयोग कर रहे थे। पारंपरिक ईंधन के उपयोग से ग्रामीण महिलाओं के स्वास्थ्य और पर्यावरण दोनों पर नकारात्मक प्रभाव पड़ता था।

भारत के माननीय प्रधानमंत्री ने दिनांक 01.05.2016 को इस योजना का औपचारिक शुभारंभ किया।

शुरुआत में, पीएमयूवाई ने वित्त वर्ष 2016–17 से शुरू होने वाले 3 वर्षों की अवधि में 5 करोड़ कनेक्शनों का लक्ष्य रखा था। बाद में, सरकार ने प्रधानमंत्री उज्ज्वला योजना (पीएमयूवाई) का लक्ष्य पांच करोड़ से बढ़ाकर आठ करोड़ कर दिया। लक्ष्य में वृद्धि के साथ ही सरकार ने देश के सभी गरीब परिवारों को कवर करने के लिए ऐसे गरीब परिवारों को भी पीएमयूवाई का लाभ दिया, जो एसईसीसी सूची या 7 चिन्हित श्रेणियों में नाम न होने के कारण छूट गए थे। लाभार्थियों की इस विस्तारित सूची में आवेदक द्वारा 14–सूत्रीय स्व–घोषणा के अनुसार अ.जा., अ.ज.जा., प्रधानमंत्री आवास योजना, अति पिछड़ा वर्ग, अंत्योदय अन्न योजना, चाय और पूर्व–चाय बागान जनजातियाँ, वनवासी, द्वीप और नदी द्वीप के लोग और गरीब परिवार शामिल थे।

इस योजना के तहत, सरकार बीपीएल परिवार की वयस्क महिला सदस्य को जमा राशि मुक्त एलपीजी कनेक्शन प्रदान करती है। सरकार प्रत्येक नए कनेक्शन के लिए सिलेंडर और प्रेशर रेगुलेटर, डीजीसीसी कार्ड, सुरक्षा नली और प्रशासनिक/स्थापना शुल्क के रूप में ₹1600/– की सुरक्षा जमा राशि वहन करती है।

पीएमयूवाई योजना के तहत 8 करोड़ एलपीजी कनेक्शन जारी करने का लक्ष्य 31 मार्च, 2020 की निर्धारित तिथि से 7 महीने पहले अर्थात् 7 सितंबर, 2019 को ही प्राप्त कर लिया गया।

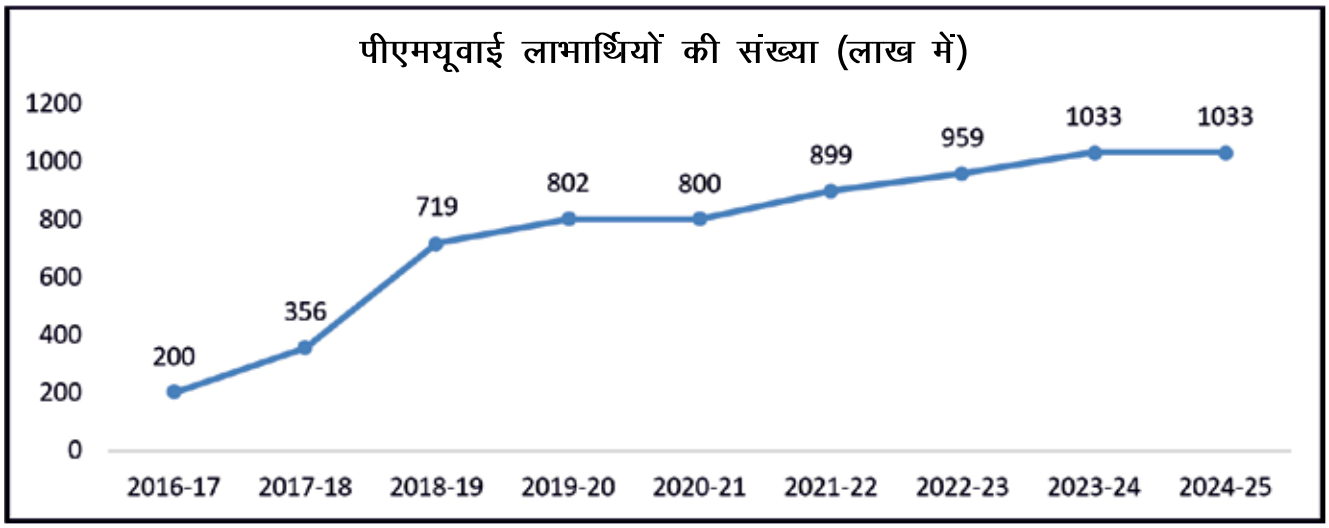
5.2.4 **उज्ज्वला 2.0:** पीएमयूवाई के तहत अतिरिक्त एक करोड़ एलपीजी कनेक्शन प्रदान करने के लिए, माननीय प्रधानमंत्री द्वारा 10 अगस्त, 2021 को उत्तर प्रदेश के महोबा जिले से अखिल भारतीय स्तर पर उज्ज्वला 2.0 का शुभारंभ किया गया।

बिना जमा राशि वाले एलपीजी कनेक्शन के साथ, उज्ज्वला 2.0 सभी लाभार्थियों को पहला रिफिल और हॉटप्लेट निःशुल्क प्रदान करती है। प्रवासी परिवारों के लिए नया कनेक्शन प्राप्त करने हेतु विशेष प्रावधान किया गया है। प्रवासी आवेदक केवल स्व–घोषणा के माध्यम से 'पारिवारिक घोषणा' और 'पते का प्रमाण' प्रस्तुत कर सकते हैं, और यह पर्याप्त माना जाएगा।

आवेदकों के लिए पहली बार सीएससी केंद्र, हेल्पडेस्क और ओएमसी वितरकों आदि जैसे मौजूदा विकल्पों के साथ–साथ ऑनलाइन आवेदन का विकल्प भी उपलब्ध कराया गया है। आवेदक योजना की वेबसाइट www.pmuy.gov.in का उपयोग करके उज्ज्वला कनेक्शन के लिए ऑनलाइन आवेदन कर सकते हैं।

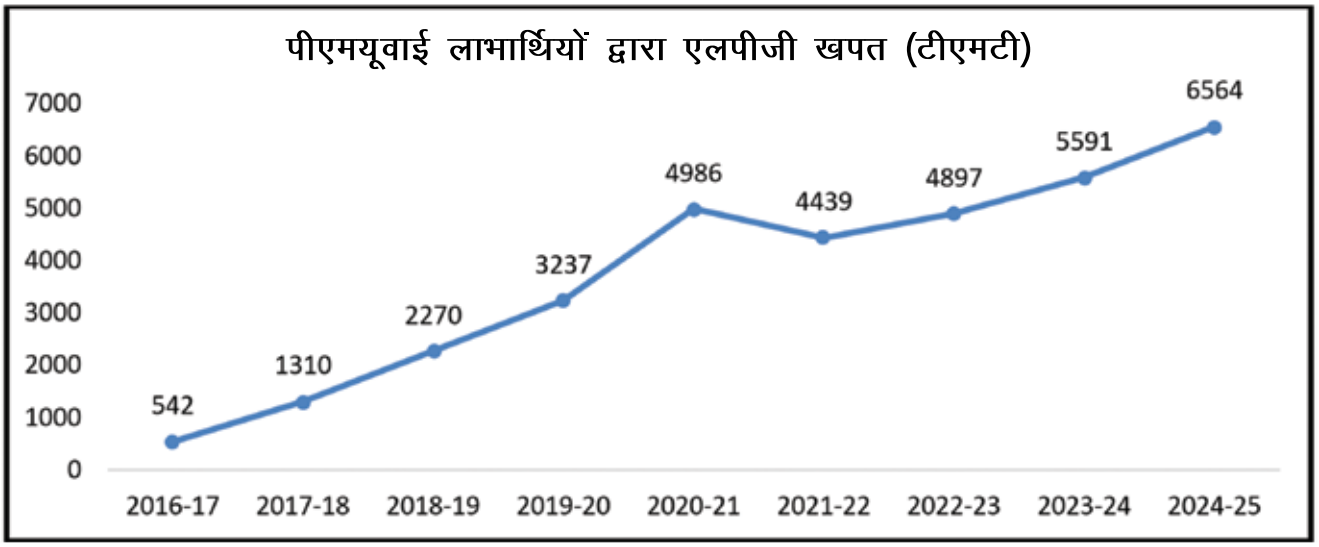
उज्ज्वला 2.0 के तहत 1.0 करोड़ एलपीजी कनेक्शन जारी करने का लक्ष्य जनवरी 2022 तक हासिल कर लिया गया था। इसके अलावा, छूटे हुए परिवारों को कवर करने के लिए, अतिरिक्त 60 लाख कनेक्शन जारी करने का निर्णय लिया गया, जिसे दिसंबर 2022 तक हासिल कर लिया गया था।

सरकार ने सितंबर 2023 में उज्ज्वला योजना का विस्तार कर 75 लाख अतिरिक्त एलपीजी कनेक्शन जारी करने की मंजूरी दी, जिसे जुलाई 2024 तक पूरा किया गया। दिनांक 31.03.2025 तक, देश में कुल 10.33 करोड़ पीएमयूवाई कनेक्शन हैं।



स्रोतः पेट्रोलियम योजना एवं विश्लेषण प्रकोष्ठ

वित्त वर्ष 2023–24 की तुलना में वित्त वर्ष 2024–25 में पीएमयूवाई खपत में 17.4% की वृद्धि हुई है।



स्रोतः पेट्रोलियम योजना एवं विश्लेषण प्रकोष्ठ

पीएमयूवाई परिवारों की प्रति व्यक्ति खपत वर्ष 2019–20 में 3.01 रिफिल (14.2 किलोग्राम घरेलू एलपीजी सिलेंडर के संदर्भ में) से बढ़कर वर्ष 2023–24 में 3.95 और वर्ष 2024–25 में 4.47 हो गई है।

5.2.5 **पीएमयूवाई परिवारों को लक्षित सब्सिडीः** पीएमयूवाई उपभोक्ताओं के लिए एलपीजी को और अधिक सस्ता बनाने और उनके निरंतर उपयोग को सुनिश्चित करने के लिए, सरकार ने मई 2022 में प्रति वर्ष 12 रिफिल तक (और 5 किलो कनेक्शन के लिए आनुपातिक रूप से) 14.2 किलोग्राम सिलेंडर पर ₹200/– की लक्षित सब्सिडी शुरू की। अक्टूबर 2023 में इस सब्सिडी में ₹100 की वृद्धि की गई, जिससे कुल सब्सिडी ₹300 हो गई। यह सब्सिडी सीधे पात्र लाभार्थियों के पंजीकृत बैंक खातों में जमा की जाती है।

5.2.6 **नए एलपीजी कनेक्शनः** एलपीजी घरेलू कनेक्शन मांग पर आसानी से उपलब्ध हैं और संभावित ग्राहकों को कनेक्शन संबंधित वितरक से संपर्क करने और केवाईसी औपचारिकताएँ पूरी करने के बाद जारी किए जाते हैं। तेल विपणन कंपनियों के एलपीजी वितरक तुरंत पंजीकरण करते हैं और नए एलपीजी कनेक्शन के अनुरोध पर कार्रवाई करते हैं। देश में सामान्य एलपीजी कनेक्शन के लिए कोई प्रतीक्षा सूची नहीं है।

वित्त वर्ष	जारी किए गए नए एलपीजी कनेक्शन (करोड़ में)
2021-22	1.58
2022-23	1.01
2023-24	1.12
2024-25	0.44

5.2.7 घरेलू एलपीजी ग्राहकों के लिए पोर्टेबिलिटी

क. **रिफिल पोर्टेबिलिटी:** पोर्टल और मोबाइल ऐप के माध्यम से रिफिल बुक करते समय उपभोक्ताओं को अपने मूल वितरक के अलावा किसी अन्य वितरक को चुनने का विकल्प दिया जाता है। पिन कोड/बाज़ार में सेवा देने वाले सभी वितरकों की सूची प्रदर्शित की जाती है और ग्राहकों को उनकी स्टार रेटिंग के साथ रिफिल पोर्टेबिलिटी अनुरोधों का विवरण भी मिलता है। वर्ष 2024–25 में कुल 15.8 लाख रिफिल पोर्टेबिलिटी अनुरोधों का निपटान किया गया।

ख. **उपभोक्ताओं के लिए एलपीजी कनेक्शन पोर्टेबिलिटी:** एलपीजी ग्राहकों को संबंधित तेल विपणन कंपनियों के वेब पोर्टल और मोबाइल ऐप के माध्यम से उसी क्षेत्र में सेवा देने वाले किसी अन्य वितरक को एलपीजी कनेक्शन ऑनलाइन हस्तांतरण करने की सुविधा पहली बार प्रदान की गई है। वर्ष 2024–25 में, सार्वजनिक क्षेत्र की तेल विपणन कंपनियों ने एलपीजी उपभोक्ताओं से प्राप्त 6.4 लाख कनेक्शन पोर्टेबिलिटी अनुरोधों का निपटान किया।

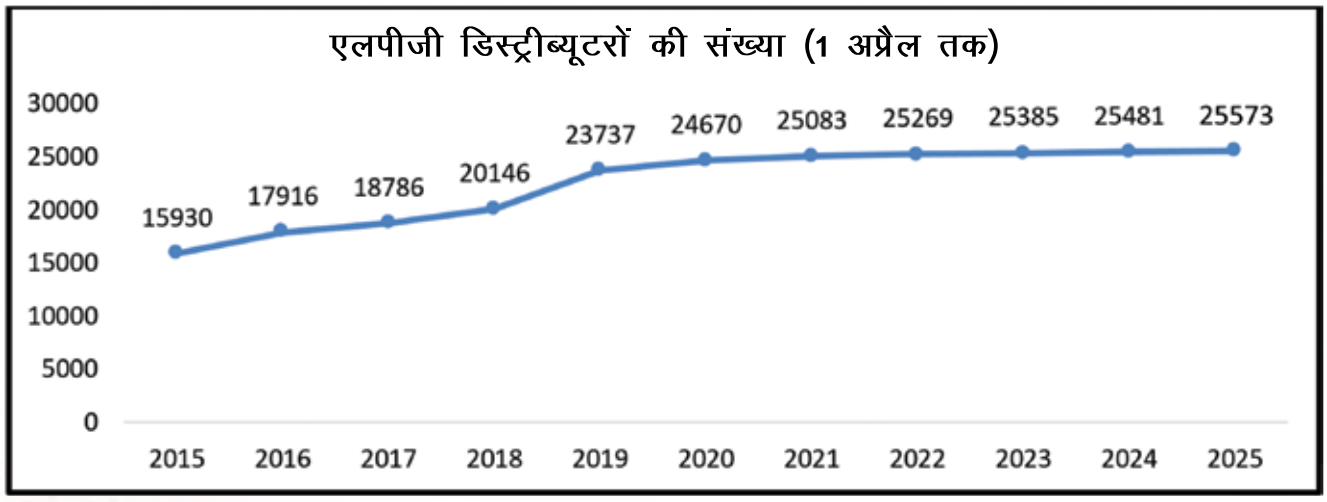
5.2.8 **नई डिस्ट्रीब्यूटरशिप की स्थापना:** वर्तमान में, सभी प्रकार की डिस्ट्रीब्यूटरशिप के चयन की प्रक्रिया एलपीजी डिस्ट्रीब्यूटरशिप के चयन के लिए एकीकृत दिशानिर्देशों के तहत की जाती है। वित्त वर्ष 2021–22 में 214 नई एलपीजी डिस्ट्रीब्यूटरशिप चालू की गईं। वित्त वर्ष 2023–24 में देश भर में कुल 96 नई डिस्ट्रीब्यूटरशिप चालू की गईं और वित्त वर्ष 2024–25 में भी देश भर में कुल 96 नई एलपीजी डिस्ट्रीब्यूटरशिप चालू की गईं। दिनांक 01.04.2025 तक कुल 25,573 डिस्ट्रीब्यूटरशिप हैं।

आंकड़े संख्या में

राज्य/केंद्रशासित प्रदेश	शहरी वितरक	रूर्बन वितरक	ग्रामीण वितरक	दुर्गम क्षेत्रीय वितरक	कुल
चंडीगढ़	26	0	0	0	26
दिल्ली	318	0	0	0	318
हरियाणा	282	103	233	9	627
हिमाचल प्रदेश	69	14	91	37	211
जम्मू एवं कश्मीर	126	34	75	40	275
लद्दाख	0	13	2	9	24
पंजाब	334	258	250	21	863
राजस्थान	434	163	654	134	1385
उत्तर प्रदेश	1007	709	2308	122	4146
उत्तराखंड	114	104	59	40	317
उप–योग (उत्तर)	**2710**	**1398**	**3672**	**412**	**8192**
अरुणाचल प्रदेश	6	6	33	40	85
असम	129	101	308	64	602
मणिपुर	15	13	36	39	103
मेघालय	21	9	19	17	66
मिजोरम	11	6	26	16	59
नगालैंड	15	11	17	40	83
सिक्किम	9	1	9	10	29
त्रिपुरा	18	8	47	14	87
उप–योग (पूर्वोत्तर)	**224**	**155**	**495**	**240**	**1114**

राज्य/केंद्रशासित प्रदेश	शहरी वितरक	रूर्बन वितरक	ग्रामीण वितरक	दुर्गम क्षेत्रीय वितरक	कुल
अंडमान और निकोबार द्वीप समूह	0	4	5	1	10
बिहार	240	252	1502	38	2032
झारखंड	163	52	356	20	591
ओडिशा	173	100	578	114	965
पश्चिम बंगाल	405	164	962	74	1605
उप–योग (पूर्व)	**981**	**572**	**3403**	**247**	**5203**
छत्तीसगढ	105	75	172	182	534
दादरा और नगर हवेली और दमन और दीव	5	1	1	0	7
गोवा	44	4	5	2	55
गुजरात	421	121	487	13	1042
मध्य प्रदेश	472	210	485	385	1552
महाराष्ट्र	1009	192	846	193	2240
उप–योग (पश्चिम)	**2056**	**603**	**1996**	**775**	**5430**
आंध्र प्रदेश	324	299	430	107	1160
कर्नाटक	535	139	551	53	1278
केरल	224	136	321	22	703
लक्षद्वीप	1	0	0	0	1
पुडुचेरी	15	11	3	0	29
तमिलनाडु	566	364	613	109	1652
तेलंगाना	291	105	335	80	811
उप–योग (दक्षिण)	**1956**	**1054**	**2253**	**371**	**5634**
अखिल भारत	**7927**	**3782**	**11819**	**2045**	**25573**

स्रोतः सार्वजनिक क्षेत्र ओएमसीज़ की ओर से आईओसीएल



स्रोतः पेट्रोलियम योजना एवं विश्लेषण प्रकोष्ठ

5.3 विपणन क्षेत्र में प्रमुख पहल

5.3.1 **डिजिटल भुगतान को बढ़ावा:** खुदरा बिक्री केंद्र पर डिजिटल भुगतान के बुनियादी ढांचे का उल्लेखनीय विस्तार हुआ है। दिनांक 31.03.2025 तक, पूरे देश में 87,610 (आईओसीएल–40,221, बीपीसीएल–23,642, एचपीसीएल–23,747) खुदरा बिक्री केंद्र हैं और ये सभी खुदरा बिक्री केंद्र 2,63,410 पीओएस टर्मिनलों और 1,03,224 ई–वॉलेट सुविधाओं वाले डिजिटल बुनियादी ढांचे से लैस हैं। इसके अलावा, सभी 87,610 खुदरा बिक्री केंद्र में भीम यूपीआई सुविधा उपलब्ध है। सभी एलपीजी डिस्ट्रीब्यूटर भी भीम यूपीआई सुविधा से लैस हैं।

5.3.2 **इलेक्ट्रिक वाहन चार्जिंग स्टेशन:** देश में इलेक्ट्रिक वाहन चार्जिंग बुनियादी ढांचे को बढ़ाने के लिए, तेल विपणन कंपनियाँ तकनीकी–व्यावसायिक व्यवहार्यता और पीईएसओ मानदंडों के अनुपालन के आधार पर देश के विभिन्न हिस्सों में अपने खुदरा बिक्री केंद्र (आरओ) पर चरणबद्ध तरीके से इलेक्ट्रिक वाहन चार्जिंग स्टेशन (ईवीसीएस) स्थापित कर रही हैं। दिनांक 31.03.2025 तक, तेल विपणन कंपनियों ने अपने खुदरा बिक्री केंद्र पर 25,243 ईवी चार्जिंग स्टेशन और 976 बैटरी स्वैपिंग स्टेशन स्थापित किए हैं।

5.3.3 **विपणन का प्राधिकार:** पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय ने दिनांक 08.11.2019 को पारित संकल्प के माध्यम से परिवहन ईंधन, अर्थात् एमएस और एचएसडी के विपणन संबंधी प्राधिकार दिशानिर्देशों को संशोधित किया। दिनांक 31.03.2025 तक, 14 कंपनियां ऐसी हैं जिन्हें उक्त संकल्प के प्रावधानों के अनुसार परिवहन ईंधन के विपणन के लिए अधिकृत किया गया है।

5.3.4 **स्वच्छ भारत मिशन:** स्वच्छ भारत मिशन के अंतर्गत, प्रत्येक खुदरा बिक्री केंद्र पर शौचालय की सुविधा सुनिश्चित की गई है। दिनांक 01.07.2025 तक, 88,352 खुदरा विक्रेताओं में शौचालय की सुविधा उपलब्ध है, जिनमें से 70,922 खुदरा विक्रेताओं में पुरुषों और महिलाओं के लिए अलग–अलग शौचालय की सुविधा है।

5.3.5 **घर–घर डिलीवरी:** दिनांक 01.07.2025 तक, तेल विपणन कंपनियों ने डीलरों और स्टार्ट–अप के माध्यम से कुल 3,231 घर–घर डिलीवरी (डीडीडी) सेवाएँ शुरू की हैं।

5.3.6 **ईवी चार्जिंग स्टेशन:** भारी उद्योग मंत्रालय (एमएचआई) ने फेम ।। सब्सिडी योजना के तहत 8,932 इलेक्ट्रिक वाहन चार्जिंग स्टेशन (ईवीसीएस) स्थापित करने के लिए तेल विपणन कंपनियों को ₹873.5 करोड़ मंजूर किए हैं। तेल विपणन कंपनियाँ अपने खुदरा बिक्री केंद्र पर इलेक्ट्रिक वाहन चार्जिंग स्टेशन उपलब्ध करा रही हैं। दिनांक 01.07.2025 तक, फेम–।। सब्सिडी योजना के तहत तेल विपणन कंपनियों ने अपने खुदरा बिक्री केंद्र (आरओ) पर 8,558 ईवीसीएस स्थापित किए हैं, जिनमें से 1,112 ईवीसीएस को ऊर्जा प्रदान की जा चुकी है। इसके अतिरिक्त, तेल विपणन कंपनियों ने अपने स्वयं के संसाधनों से अपने खुदरा बिक्री केंद्र पर 18,259 ईवीसीएस स्थापित किए हैं।

5.3.7 **अपना घर:** सार्वजनिक क्षेत्र की तेल विपणन कंपनियाँ वर्ष 2024–25 से 2026–27 के दौरान तीन वर्षों में 1,000 खुदरा बिक्री केंद्र पर 'अपना घर' नामक ट्रकर्स वेसाइड सुविधाएँ (डब्ल्यूएसए) स्थापित करेंगी। इसका उद्देश्य सुरक्षित और सुविधाजनक लंबी दूरी की यात्रा सुनिश्चित करना, दुर्घटनाओं की संभावना कम करना, ग्रामीण अर्थव्यवस्था को बढ़ावा देना, ग्रामीण क्षेत्रों में रोजगार सृजन करना और पर्यटन एवं बैंकिंग को प्रोत्साहित करना है। दिनांक 01.07.2025 तक, देश भर में 368 खुदरा बिक्री केंद्र पर 4,611 बिस्तरों सहित अन्य सुविधाओं के साथ 'अपना घर' स्थापित किए जा चुके हैं। वर्ष 2025–26 में 438 और 'अपना घर' और वर्ष 2026–27 में शेष 200 का निर्माण पूरा करने का लक्ष्य है।

5.3.8 **पीडीएस एसकेओ आवंटन नीति:** 1 मार्च, 2020 से प्रभावी, पीडीएस केरोसिन का खुदरा विक्रय मूल्य अखिल भारतीय स्तर पर शून्य अल्प–वसूली स्तर पर बनाए रखा जा रहा है। वर्ष 2009–10 के दौरान अपने उच्चतम स्तर पर भारत घरेलू उपयोग के लिए 1.16 करोड़ किलो लीटर (केएल) केरोसिन तेल (एसकेओ) की खपत करता था। 2024–25 में इसे क्रमिक रूप से 96% घटाकर 3.82 लाख किलोलीटर कर दिया गया है, और 21 राज्य/केंद्र शासित प्रदेश अब सार्वजनिक वितरण प्रणाली (पीडीएस) एसकेओ मुक्त हो गए हैं। इस पहल के अंतिम चरण के लिए, राज्यों के परामर्श के बाद जून 2025 में पीडीएस एसकेओ नीति को अंतिम रूप दिया गया है, जिसमें एकल मूल्य लागू किया गया है। सब्सिडी वाले और गैर–सब्सिडी वाले आवंटन की अलग–अलग श्रेणियों को समाप्त कर दिया गया है तथा राज्यों को उपयोग और उप–आवंटन के उद्देश्य को तय करने का अधिकार दिया गया है और भविष्य के आवंटन को वास्तविक खपत से जोड़ा गया है। ये सुधार देश भर में प्रदूषणकारी ईंधन, एसकेओ, के आवंटन और उपयोग में स्वाभाविक और सुचारू कमी का आधार तैयार करते हैं।

5.4 संवेदनशील पेट्रोलियम उत्पादों पर मूल्य निर्धारण नीति:

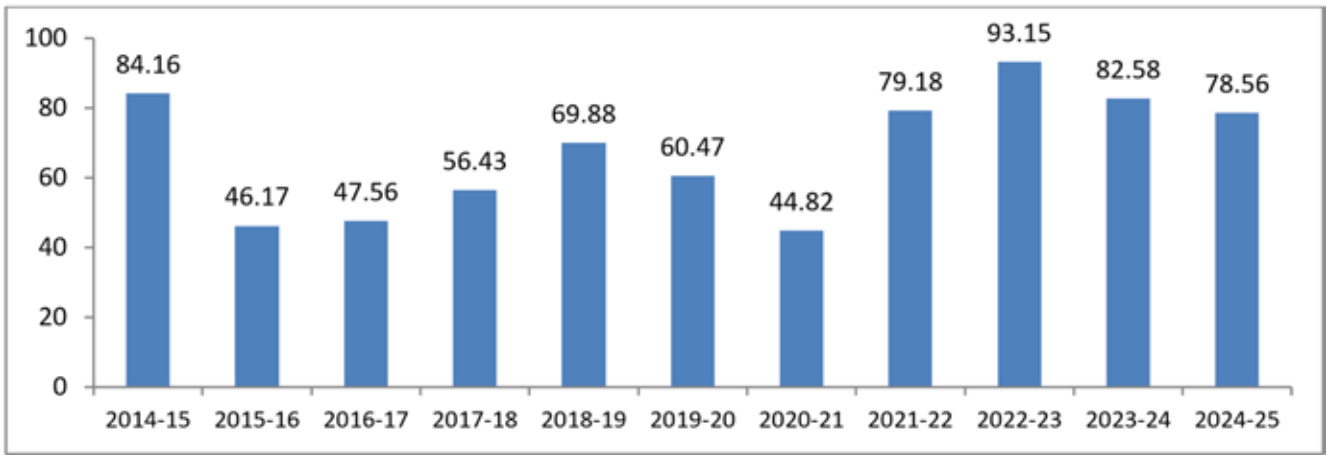
पेट्रोलियम उत्पादों के मूल्य निर्धारण को जुलाई 1975 से प्रशासित मूल्य तंत्र (एपीएम) के तहत लाया गया था, जब पेट्रोलियम उत्पादों के मूल्य निर्धारण को

आयात आधारित सिद्धांतों से लागत–प्लस सिद्धांतों में बदल दिया गया। एपीएम (1975 से 2002) के अंतर्गत विभिन्न तेल पूल खाते निम्नलिखित उद्देश्यों के लिए बनाए गए थेः i) विक्रय मूल्य में स्थिरता सुनिश्चित करना; ii) उपभोक्ताओं को अंतर्राष्ट्रीय मूल्य उतार–चढ़ाव से बचाना; और iii) सार्वजनिक वितरण के लिए केरोसिन और घरेलू रसोई गैस जैसे कुछ उत्पादों के उपभोक्ता मूल्य को पेट्रोल, विमानन टर्बाइन ईंधन (एटीएफ) आदि जैसे अन्य उत्पादों से क्रॉस–सब्सिडी द्वारा सब्सिडी देना।

दिनांक 01.04.2002 से, एपीएम समाप्त कर दिया गया और सरकार ने सार्वजनिक वितरण प्रणाली केरोसिन और घरेलू रसोई गैस की बिक्री पर निर्दिष्ट समान दरों पर सब्सिडी देने का निर्णय लिया। इन बजटीय सब्सिडी का प्रबंधन करने के लिए, सरकार ने 'पीडीएस केरोसिन और घरेलू रसोई गैस सब्सिडी योजना, 2002' बनाई। इस योजना के तहत यह तय किया गया कि इन सब्सिडी को 3–5 वर्षों में चरणबद्ध तरीके से समाप्त किया जाएगा।

5.4.1 **कच्चे तेल का मूल्य निर्धारणः** कच्चे तेल की भारतीय बास्केट भारतीय रिफाइनरियों द्वारा पिछले वर्ष में मीठे और खट्टे कच्चे तेल के वास्तविक प्रोसेसिंग के अनुपात में प्रोसेस किए गए कच्चे तेल का औसत मूल्य दर्शाती है। मीठे कच्चे तेल की कीमत के लिए बेंचमार्क कच्चे तेल "ब्रेंट" का दैनिक प्लैट्स आकलन पर विचार किया जाता है। खट्टे कच्चे तेल के लिए बेंचमार्क कच्चे तेल "दुबई" और "ओमान" के प्लैट्स आकलनों का औसत माना जाता है। वर्ष 2014–15 से वर्ष 2024–25 के दौरान कच्चे तेल की भारतीय बास्केट का रुझान नीचे दिया गया हैः

कच्चे तेल का रुझानः भारतीय बास्केट (डॉलर/बैरल में)

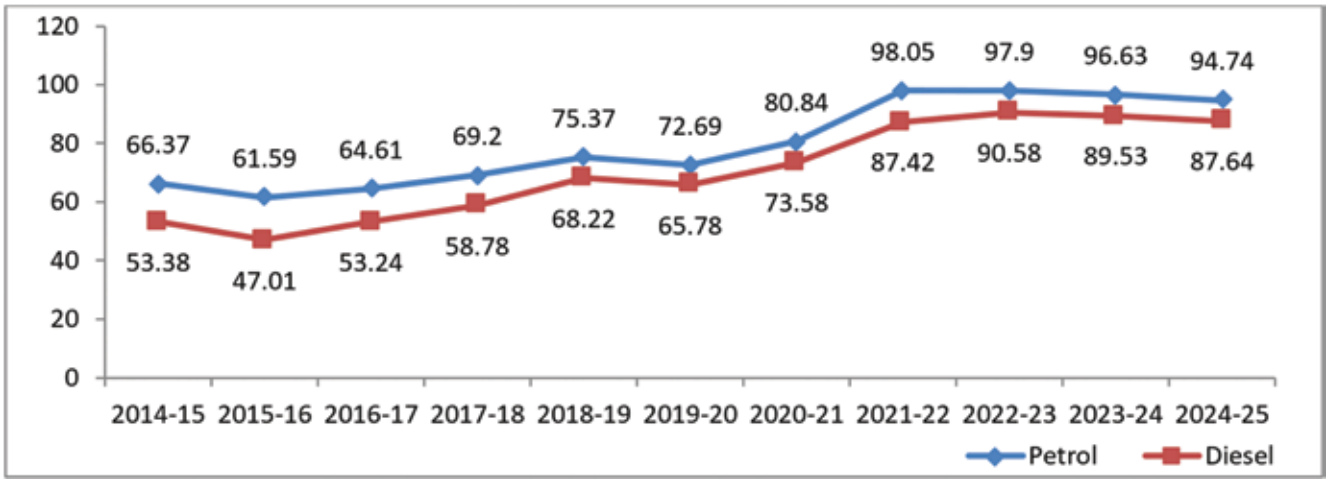


स्रोतः पेट्रोलियम नियोजन एवं विश्लेषण प्रकोष्ठ

घरेलू कच्चे तेल उत्पादक कंपनियों को भी अंतरराष्ट्रीय कच्चे तेल के बेंचमार्क पर आधारित अंतरराष्ट्रीय कच्चे तेल की कीमतें दी जाती हैं जो उनके कच्चे तेल के परख के अनुरूप होती हैं। कच्चे तेल का आयात अंतरराष्ट्रीय कीमतों पर होता है।

5.4.2 **पेट्रोल और डीजलः** पेट्रोल और डीज़ल की कीमतें क्रमशः 26 जून 2010 और 19 अक्तूबर 2014 से बाजार के अनुसार तय की जाती हैं और तब से इनकी कीमतें सार्वजनिक क्षेत्र की तेल विपणन कंपनियाँ (ओएमसी) अर्थात् इंडियन ऑयल कॉर्पोरेशन लिमिटेड, हिंदुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड और भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड द्वारा अंतरराष्ट्रीय बाजार की कीमतों और अन्य बाजार परिस्थितियों के आधार पर निर्धारित की जाती हैं। वर्ष 2014–15 से दिल्ली में पेट्रोल और डीज़ल के वार्षिक औसत खुदरा विक्रय मूल्यों का रुझान नीचे दिया गया हैः

(₹/लीटर)



स्रोतः पेट्रोलियम योजना एवं विश्लेषण प्रकोष्ठ

5.5 **सब्सिडी:** 2019–20 से पेट्रोलियम उत्पादों और प्राकृतिक गैस पर कुल सब्सिडी/अल्प वसूली इस प्रकार हैः

विवरण	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25 (अनंतिम)
केरोसिन						
पीडीएस केरोसिन पर कुल अल्प वसूली	1,833	-	-	-	-	-
एलपीजी						
एलपीजी के लिए प्रत्यक्ष लाभ अंतरण (डीबीटीएल) सब्सिडी (क)	22,726	3,658	242	855	1,227	366
प्रधानमंत्री उज्ज्वला योजना (पीएमयूवाई) सब्सिडी* (ख)	1,446	76	1,569	6,110	10,217	13274
प्रधानमंत्री गरीब कल्याण पैकेज (पीएमजीकेपी) सब्सिडी (ग)		8,162				
एलपीजी घाटा के लिए तेल विपणन कंपनियों को मुआवजा (घ)				22000		
कुल व्यय सब्सिडी/घरेलू एलपीजी पर अल्प वसूली	24,172	11,896	1,811	28,965	11,444	13640

***: पीएमयूवाई परिवारों को लक्षित सब्सिडी शामिल है (पी): अनंतिम**

स्रोतः पेट्रोलियम योजना एवं विश्लेषण प्रकोष्ठ

गैर–सब्सिडी वाले घरेलू एलपीजी की कीमतें अंतर्राष्ट्रीय बाजारों में बदलाव के अनुसार तेल विपणन कंपनियों द्वारा स्वयं निर्धारित की जाती हैं।



प्रधानमंत्री उज्ज्वला योजना (पीएमयूवाई) के तहत, महिलाओं को मुफ़्त एलपीजी सिलेंडर कनेक्शन दिए गए





डिलीवरी कर्मचारी दूरदराज के घरों तक पहुँचने के लिए एलपीजी सिलेंडरों को नाव के माध्यम से पहुँचाते हैं।



दूरदराज के इलाकों में एलपीजी सिलेंडरों की डिलीवरी



चेरलापल्ली एलपीजी संयंत्र में फ्लेक्स स्पीड कैरोसेल



एचपीसीएल कानपुर टर्मिनल



लेह में आईओसीएल का डिपो


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6 अंतर्राष्ट्रीय सहयोग एवं सहभागिता

भारत दुनिया के सबसे बड़े ऊर्जा उपभोक्ताओं में से एक है और इसे तेजी से बढ़ती ऊर्जा महाशक्ति माना जाता है जोकि पारंपरिक और स्वच्छ, दोनों तरह की ऊर्जा की मांग को बढ़ाने में अहम भूमिका निभा रहा है। वर्तमान में भारत दुनिया का तीसरा सबसे बड़ा ऊर्जा, तेल और एलपीजी उपभोक्ता है, साथ ही चौथा सबसे बड़ा एलएनजी आयातक और रिफाइनर भी है।

इसके बावजूद, भारत की प्रति व्यक्ति ऊर्जा खपत अभी भी विश्व औसत का लगभग एक–तिहाई है। जैसे–जैसे देश तेजी से विकास, शहरीकरण और औद्योगीकरण की दिशा में आगे बढ़ रहा है, "आत्मनिर्भर भारत" के लक्ष्य के अनुरूप, ऊर्जा की मांग में तेज़ी से बढ़ोतरी होना तय है।

अंतर्राष्ट्रीय ऊर्जा एजेंसी (आईईए) की विश्व ऊर्जा रिपोर्ट 2024 के अनुसार, भारत की ऊर्जा मांग 2035 तक मौजूदा स्तर से 35% से अधिक बढ़ने की उम्मीद है। रिपोर्ट में बताया गया है कि आने वाले दस वर्षों में भारत में ऊर्जा और तेल की मांग दुनिया के किसी भी अन्य देश की तुलना में सबसे ज्यादा बढ़ेगी। ओपेक ने अपनी विश्व तेल रिपोर्ट 2024 में भी यही बात दोहराई है और अनुमान लगाया है कि भारत दुनिया की सबसे तेजी से बढ़ती अर्थव्यवस्था बनेगा। ओपेक के अनुसार, 2023 से 2050 के बीच भारत की तेल मांग में लगभग 8 मिलियन बैरल प्रतिदिन की बढ़ोतरी होगी, जो दुनिया की कुल बढ़ती तेल मांग का लगभग 47% होगी।

हालाँकि, कच्चे तेल (~88%) और प्राकृतिक गैस (~50%) पर भारत की आयात निर्भरता अभी भी काफ़ी ज़्यादा है। इस बढ़ती माँग और आयात पर निर्भरता को कम करने के लिए भारत सरकार नागरिकों को सस्ती, विश्वसनीय और स्थायी ऊर्जा उपलब्ध कराने के लिए एक व्यावहारिक नीति अपना रही है। यह नीति भारत की ऊर्जा सुरक्षा की चार–स्तरीय रणनीति पर आधारित है, जिसमें ऊर्जा आपूर्ति के स्रोतों में विविधता लाना, देश में अन्वेषण और उत्पादन बढ़ाना, वैकल्पिक ऊर्जा स्रोतों का उपयोग बढ़ाना, और गैस–आधारित अर्थव्यवस्था, हरित हाइड्रोजन तथा इलेक्ट्रिक वाहनों के माध्यम से स्वच्छ ऊर्जा की दिशा में आगे बढ़ना शामिल है।

6.1 कच्चे तेल और एलएनजी आयात में विविधता:

भारत की ऊर्जा सुरक्षा अभी भी कच्चे तेल और प्राकृतिक गैस के आयात पर अधिक निर्भर होने के कारण भू–राजनीतिक जोखिमों के प्रति संवेदनशील बनी हुई है। वैश्विक बाजार में कीमतों में उतार–चढ़ाव और प्रमुख तेल उत्पादक क्षेत्रों में संघर्ष जैसी स्थितियों से आपूर्ति श्रृंखला प्रभावित हो सकती है। इन खतरों ने यह स्पष्ट कर दिया है कि भारत को अपने ऊर्जा स्रोतों में विविधता लाने की आवश्यकता है।

पिछले कुछ वर्षों में भारत ने अमेरिका, रूस, कोलंबिया, घाना और इक्वेटोरियल गिनी जैसे नए देशों से कच्चे तेल की आपूर्ति शुरू की है और साथ ही, अंगोला और अर्जेंटीना से नए प्रकार के कच्चे तेल के ग्रेड भी जोड़े गए हैं। इससे भारत की कच्चे तेल की आपूर्ति अब 40 देशों तक बढ़ गई है।

विशेष रूप से, पिछले पाँच वर्षों में भारत ने खाड़ी सहयोग परिषद (जीसीसी) और ओपेक देशों जैसे पारंपरिक आपूर्तिकर्ताओं पर अपनी निर्भरता में काफी कमी की है, जो आपूर्ति के जोखिमों को कम करने के लिए भारत के रणनीतिक प्रयासों को दर्शाता है।

इसके साथ ही, भारत सरकार जीसीसी और ओपेक सदस्य देशों जैसे पुराने तेल और गैस उत्पादक देशों के साथ–साथ गुयाना जैसे नए देशों के साथ भी अपने द्विपक्षीय संबंधों को मज़बूत कर रही है। इसी प्रकार, एलएनजी आयात भी पारंपरिक आपूर्तिकर्ताओं ऑस्ट्रेलिया, अमेरिका और अन्य देशों में विविधीकृत हो गया है।

भारत की ऊर्जा साझेदारियाँ लगातार मजबूत हो रही हैं, जो ओपेक, आईईए और आईईएफ जैसे अंतरराष्ट्रीय संगठनों के साथ सहयोग और द्विपक्षीय

संबंधों के माध्यम से आगे बढ़ाई जा रही हैं। यह व्यापक दृष्टिकोण दिखाता है कि भारत वैश्विक ऊर्जा बदलाव के दौर में भी अपनी ऊर्जा सुरक्षा को बनाए रखने के लिए पूरी तरह प्रतिबद्ध है।

ऊर्जा सुरक्षा को और मजबूत करने और तुरंत हाजिर (स्पॉट) खरीद पर निर्भरता घटाने के लिए, भारतीय तेल विपणन कंपनियों ने ब्राज़ील की पेट्रोब्रास और कोलंबिया की इकोपेट्रोल के साथ भी दीर्घकालिक कच्चे तेल आपूर्ति समझौते किए हैं।

6.2 वैश्विक जैव ईंधन गठबंधन:

वैश्विक जैव ईंधन गठबंधन (जीबीए) सरकारों, अंतरराष्ट्रीय संगठनों और उद्योगों का एक साझा मंच है। इसे वर्ष 2023 में भारत की जी20 अध्यक्षता के दौरान शुरू किया गया था। इस गठबंधन का उद्देश्य मूल्य श्रृंखला में क्षमता बढ़ाने, राष्ट्रीय कार्यक्रमों को तकनीकी सहायता प्रदान करने, नीतिगत अनुभव साझा करने, नई तकनीकों को बढ़ावा देने और विभिन्न भागीदारों को साथ जोड़ने पर काम करता है, ताकि विश्व में स्थायी जैव ईंधन का इस्तेमाल तेजी से बढ़ सके।

जीबीए लगातार मजबूत हो रहा है और अब इसमें 29 देश और 14 अंतरराष्ट्रीय संगठन सदस्य बन चुके हैं। इसमें एस्वातिनी, फिजी, मेडागास्कर, हंगरी और कंबोडिया जैसे देश भी शामिल हैं। इसके अलावा, कई देशों और अंतरराष्ट्रीय संगठनों ने जीबीए की योजनाओं और गतिविधियों को समर्थन देने के लिए अपने प्रतिनिधि इसमें शामिल किए हैं।

जीबीए के अंतरिम महानिदेशक (सचिव, पेट्रोलियम और प्राकृतिक गैस मंत्रालय) ने 16–17 अप्रैल 2024 को ब्राज़ील की जी20 अध्यक्षता में हुए दूसरे ईटीडब्ल्यूजी सम्मेलन में जीबीए का प्रतिनिधित्व किया। वहाँ उन्होंने जी20 और जीबीए के बीच मजबूत संबंधों की पुष्टि की। धुआँ रहित खाना पकाने पर अपने भाषण में इन पहलों को तेजी से बढ़ाने में जैव ईंधन की भूमिका पर जोर दिया।

दूसरे ईटीडब्ल्यूजी के अवसर पर, 17 अप्रैल 2024 को हाइब्रिड मोड में तीसरी अस्थायी कार्यकारी समिति (टीईसी) की बैठक हुई। इसका उद्देश्य वैश्विक जैव ईंधन विकास के लिए जीबीए की रणनीतिक दिशा को आगे बढ़ाना था। इस बैठक में जीबीए का नया लोगो भी लॉन्च किया गया। इसके अलावा, जीबीए ने ब्राज़ील के बेलो होरिज़ोंटे में आयोजित तीसरे ईटीडब्ल्यूजी में "जीबीए–जी20 एसएएफः भविष्य के ईंधन और भविष्य के रसायन फ़ोरम" की सह–मेजबानी भी की।

वैश्विक जैव ईंधन गठबंधन का लोगो

आईडीजी, जीबीए ने 10–11 जुलाई 2024 को विश्व बायोगैस संघ द्वारा आयोजित विश्व बायोगैस शिखर सम्मेलन 2024 में भाग लिया। उन्होंने उद्घाटन में भाषण दिया, एक पैनल चर्चा की अध्यक्षता की और वैश्विक हितधारकों के साथ द्विपक्षीय बैठकें कीं।

जीबीए ने बाकू, अज़रबैजान में आयोजित कॉप29 में सक्रिय भागीदारी की। जीबीए का मंडप 11 से 22 नवंबर 2024 तक बाकू ओलंपिक स्टेडियम के ग्रीन ज़ोन में लगाया गया था। आईडीजी, जीबीए ने कॉप29 में जीबीए की कई पहलों की अध्यक्षता की। पहली पहल थी "जैव ईंधन को अपनाने में तेजी लाने के लिए स्थायी जैव ईंधन की एक साझा परिभाषा स्थापित करना", जिसके लिए एक गोलमेज सम्मेलन आयोजित किया गया। इसके बाद जीबीए के पहले श्वेतपत्र "डीज़ल परिवर्तन यात्रा में जैव–आधारित डीज़ल की भूमिका" का विमोचन किया गया और जीबीए की आधिकारिक वेबसाइट का शुभारंभ भी किया गया।

आईडीजी, जीबीए ने पेरिस में जीबीए की चौथी टीईसी बैठक (हाइब्रिड) की अध्यक्षता भी की। इस बैठक में सदस्य देशों ने कॉप29 में जीबीए की प्रभावशाली भागीदारी की सराहना की, वैश्विक स्तर पर स्थायी जैव ईंधन को बढ़ावा देने में इसकी महत्वपूर्ण भूमिका को उजागर किया और जीबीए के शासन ढाँचे पर भी चर्चा की।

भारत ऊर्जा सप्ताह 2025 में, जीबीए ने अपने विशेष मंडप में हितधारकों के साथ बातचीत की। इस दौरान आईडीजी, जीबीए की अध्यक्षता में "ऊर्जा परिवर्तन में तेजी लाने के लिए स्थायी जैव ईंधन की परिभाषा" पर एक गोलमेज सम्मेलन भी आयोजित किया गया। जीबीए ने आईडीजी, जीबीए और अंतरराष्ट्रीय संगठनों के नेतृत्व में एक पैनल चर्चा की मेजबानी की, जिसमें जीबीए के प्रमुख श्वेतपत्र "भारत के ऊर्जा परिवर्तन में गैर–अनाज आधारित जैव ईंधन की भूमिका" का विमोचन किया गया और "स्थायी जैव ईंधन पर संयुक्त वक्तव्य" को औपचारिक रूप से अपनाया गया।

6.3. प्रमुख साझेदार देशों के साथ उन्नत द्विपक्षीय ऊर्जा सहयोग

6.3.1 ब्राज़ील के साथ सहभागिता

- भारत और ब्राज़ील के बीच ऊर्जा के क्षेत्र में मजबूत साझेदारी है, जिसमें द्विपक्षीय हाइड्रोकार्बन व्यापार, ब्राज़ील के अपस्ट्रीम क्षेत्रों में भारतीय निवेश और जैव ऊर्जा के क्षेत्र में सहयोगात्मक प्रयास शामिल है।
- ब्राज़ील वित्त वर्ष 2024–25 में भारत को कच्चे तेल का 12वां सबसे बड़ा आपूर्तिकर्ता बना। **द्विपक्षीय व्यापार को और मजबूत करने के लिए, पहली बार बीपीसीएल और पेट्रोब्रास ने अप्रैल 2025 से मार्च 2026 तक 6 मिलियन बैरल कच्चे तेल के लिए एक वैकल्पिक सावधि अनुबंध पर हस्ताक्षर किए।**
- ब्राज़ील अमेरिका में भारत का सबसे बड़ा अपस्ट्रीम निवेश केंद्र और विश्व स्तर पर तीसरा सबसे बड़ा निवेश केंद्र है। भारतीय तेल एवं गैस सार्वजनिक क्षेत्र के उपक्रमों (बीपीआरएल और ओवीएल) की ब्राज़ील में चार परियोजनाओं में भागीदारी है: बीएम–सील–11 और बीएम–सी–30 (बीपीआरएल), बीसी–10 और बीएम–सील–4 (ओवीएल)।
- माननीय मंत्री ने सितंबर 2024 में ब्राज़ील का दौरा किया, जहाँ उन्होंने पेट्रोब्रास के अध्यक्ष और सीईओ, ब्राज़ील के खान एवं ऊर्जा मंत्री, विदेश मंत्री और राष्ट्रपति के सलाहकार सहित प्रमुख नेताओं के साथ द्विपक्षीय चर्चा की। इन बैठकों का मुख्य उद्देश्य तेल व्यापार में सहयोग के अवसरों की पहचान करना, उन्हें बढ़ाना, भारत के ईएंडपी क्षेत्र में भागीदारी और जैव ईंधन के क्षेत्र में सहयोग करना था। **इस यात्रा का एक महत्वपूर्ण परिणाम संधारणीय विमानन ईंधन (एसएएफ) पर एक संयुक्त वक्तव्य जारी करना था, जिसमें अंतरराष्ट्रीय मंचों पर एसएएफ को बढ़ावा देने और दोनों देशों की समन्वित स्थिति बनाए रखने की प्रतिबद्धता को स्पष्ट किया गया।**

6.3.2 जापान के साथ सहभागिता

- भारत और जापान के बीच एक 'विशेष रणनीतिक और वैश्विक साझेदारी' है, जो गहरे आध्यात्मिक, सांस्कृतिक और सभ्यतागत संबंधों पर आधारित है। ऊर्जा क्षेत्र इस द्विपक्षीय साझेदारी का एक महत्वपूर्ण हिस्सा है।
- भारत–जापान ऊर्जा संवाद के तहत, पेट्रोलियम और प्राकृतिक गैस मंत्रालय के संयुक्त सचिव (स्वतंत्र प्रभार) ने दिनांक 03.03.2025 को हाइड्रोकार्बन पर भारत–जापान संयुक्त कार्य समूह की दूसरी बैठक की सह–अध्यक्षता की। इस बैठक में दोनों पक्षों ने हाइड्रोकार्बन क्षेत्र में चल रहे सहयोग और निवेश के अवसरों की समीक्षा की। साझेदारी को और मजबूत करने के लिए लचीले एलएनजी बाज़ार की स्थापना, उन्नत जैव ईंधन, स्वच्छ ऊर्जा प्रौद्योगिकियाँ और रणनीतिक तेल एवं गैस भंडारण जैसे नए रास्तों पर भी चर्चा की गई।

6.3.3 कुवैत के साथ सहभागिता

- भारत और कुवैत ऐतिहासिक रूप से प्राकृतिक व्यापारिक साझेदार रहे हैं। वित्त वर्ष 2024–25 में, कुवैत भारत को कच्चे तेल का छठा सबसे बड़ा आपूर्तिकर्ता और एलपीजी का चौथा सबसे बड़ा आपूर्तिकर्ता रहा।
- हाइड्रोकार्बन पर भारत–कुवैत संयुक्त कार्य समूह की 7वीं बैठक दिसंबर 2024 में नई दिल्ली में आयोजित की गई। इसकी सह–अध्यक्षता पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के संयुक्त सचिव (स्वतंत्र प्रभार) ने की। बैठक में दोनों पक्षों ने तेल और गैस, पेट्रोकेमिकल्स, रणनीतिक भंडारण, हरित हाइड्रोजन, जैव ईंधन और नवीकरणीय ऊर्जा सहित निम्न–कार्बन समाधानों की पूरी मूल्य श्रृंखला में द्विपक्षीय सहयोग की समीक्षा की।
- कुवैत प्रतिनिधिमंडल की नई दिल्ली यात्रा के दौरान, उन्होंने भारतीय सार्वजनिक उपक्रमों की सुविधाओं का भी दौरा किया। दोनों पक्ष पेट्रोकेमिकल्स में संयुक्त उद्यम स्थापित करने, उन्नत ईएंडपी प्रौद्योगिकियों का आदान–प्रदान करने और सहयोग को मजबूत करने के लिए नियमित बी2बी कार्यशालाएँ आयोजित करने के माध्यम से अपने पारंपरिक क्रेता–विक्रेता संबंध को एक व्यापक रणनीतिक साझेदारी में बदलने का लक्ष्य रखते हैं।

6.3.4 ओमान के साथ सहभागिता

- ओमान खाड़ी क्षेत्र में भारत का एक महत्वपूर्ण रणनीतिक साझेदार है और दोनों देश व्यापारिक सहयोग में जुड़े हैं। भारत ओमान से कच्चा तेल, पेट्रोलियम उत्पाद और एलएनजी आयात करता रहता है। वित्त वर्ष 2024–25 में, ओमान भारत के लिए एलएनजी का चौथा सबसे बड़ा स्रोत और एलपीजी का छठा सबसे बड़ा स्रोत था।
- इसके अलावा, भारतीय रणनीतिक भंडारण शाखा (आईएसपीआरएल) और ओमान टैंकिंग टर्मिनल कंपनी एलएलसी (ओटीटीसीओ) ओमान में ओटीटीसीओ द्वारा विकसित की जा रही कच्चे

तेल की भंडारण सुविधा में आईएसपीआरएल की भागीदारी के लिए काम कर रहे हैं। यह दोनों देशों की ऊर्जा सुरक्षा को मजबूत करने की दिशा में एक महत्वपूर्ण कदम है। इसके साथ ही, ईआईएल भी पिछले दो दशकों से अधिक समय से ओमान में अपनी सेवाएँ प्रदान कर रहा है।

6.3.5 कतर के साथ सहभागिता

- कतर भारत की ऊर्जा आपूर्ति में एक महत्वपूर्ण भूमिका निभाता है। वित्त वर्ष 2024–25 में कतर भारत का सबसे बड़ा एलएनजी आपूर्तिकर्ता और एलपीजी का दूसरा सबसे बड़ा आपूर्तिकर्ता रहा।
- माननीय मंत्री नियमित रूप से कतर के ऊर्जा मामलों के राज्य मंत्री और कतर एनर्जी के अध्यक्ष एवं सीईओ साद बिन शेरिदा अल काबी अंतरराष्ट्रीय मंचों पर बातचीत करते हैं। दोनों पक्ष ने व्यापार सहयोग को मजबूत करने और ईएंडपी क्षेत्र में पारस्परिक निवेश के अवसरों का पता लगाने पर विचार–विमर्श किया।
- माननीय मंत्री ने दिसंबर 2024 में कतर के राष्ट्रीय दिवस समारोह में भाग लिया, जिसका आयोजन कतर के राजदूत महामहिम मोहम्मद हसन जाबिर अल–जाबिर ने किया था।
- ऊर्जा के क्षेत्र में पाँचवाँ भारत–कतर संयुक्त कार्य बल (जेटीएफ) 17 फरवरी 2025 को आयोजित किया गया। इसमें दोनों पक्षों ने एलएनजी व्यापार और निवेश के साथ–साथ निम्न–कार्बन समाधानों में सहयोग के अवसरों पर चर्चा की।

6.3.6 रूस के साथ सहभागिता

- रूस भारत का एक दीर्घकालिक और भरोसेमंद साझेदार रहा है। अंतरराष्ट्रीय कच्चे तेल की कीमतों में भारी उतार–चढ़ाव के कारण, भारतीय कंपनियों ने रूस से कच्चे तेल का आयात बढ़ा दिया है। रूस अब भारत का एक प्रमुख कच्चे तेल आपूर्तिकर्ता बन गया है। इसके अलावा, भारतीय सार्वजनिक क्षेत्र के उपक्रमों ने रूस में 5 तेल और गैस ब्लॉकों में निवेश किया है, जो ईएंडपी निवेश के लिए सबसे बड़ा गंतव्य है।
- माननीय मंत्री ने फरवरी 2025 में नई दिल्ली में अपने रूसी समकक्ष, महामहिम श्री सर्गेई त्सिविलेव, ऊर्जा मंत्री, रूसी संघ से मुलाकात की। इस दौरान दोनों पक्षों ने द्विपक्षीय ऊर्जा व्यापार और निवेश बढ़ाने के तरीकों पर चर्चा की।
- सचिव, पेट्रोलियम और प्राकृतिक गैस मंत्रालय ने नवंबर 2024 में रूसी संघ के ऊर्जा उप मंत्री, श्री रोमन मार्शविन के साथ द्विपक्षीय बैठक की। इसमें दोनों पक्षों ने रूस में भारतीय ऊर्जा निवेश की समीक्षा की दोनो पक्षों ने व्यापार व निवेश के माध्यम से ऊर्जा सहयोग बढ़ाने के उपायों पर भी चर्चा की।
- संयुक्त सचिव (आईसी), पेट्रोलियम और प्राकृतिक गैस मंत्रालय ने ऊर्जा और ऊर्जा दक्षता के क्षेत्र में सहयोग पर भारत–रूस कार्य समूह की 25वीं बैठक की सह–अध्यक्षता की। जेडब्ल्यूजी की बैठक के दौरान दोनों पक्षों ने अपने चल रहे संबंधों की समीक्षा की, ऊर्जा मूल्य श्रृंखला में सहयोग बढ़ाने पर चर्चा की और ऊर्जा सुरक्षा, संधारणीय विकास तथा गहन रणनीतिक साझेदारी के नए अवसर तलाशे। दोनों पक्षों ने द्विपक्षीय ऊर्जा व्यापार को आगे बढ़ाने की पुष्टि की, जैसा कि दोनों देशों के नेताओं ने "2030 तक की अवधि के लिए भारत–रूस आर्थिक सहयोग के रणनीतिक क्षेत्रों के विकास पर संयुक्त वक्तव्य" में शामिल किया था।

6.3.7 सऊदी अरब के साथ सहभागिता

- भारत के सबसे बड़े व्यापारिक साझेदारों में से एक के रूप में, सऊदी अरब एक महत्वपूर्ण ऊर्जा आपूर्तिकर्ता है। वित्त वर्ष 2024–25 में, सऊदी अरब भारत के लिए कच्चे तेल का तीसरा सबसे बड़ा स्रोत और रसोई गैस का तीसरा सबसे बड़ा आपूर्तिकर्ता रहा।
- हाइड्रोकार्बन व्यापार के अलावा, सऊदी अरब भारत के रिफाइनिंग क्षेत्र और रणनीतिक पेट्रोलियम रिजर्व (एसपीआर) कार्यक्रम में निवेश के अवसर भी सक्रिय रूप से तलाश रहा है। ये चर्चाएँ भारत–सऊदी अरब उच्च–स्तरीय निवेश कार्यबल के माध्यम से की जा रही हैं, जो द्विपक्षीय निवेश बढ़ाने के लिए बनाया गया एक समर्पित निकाय है। इस कार्यबल का गठन सितंबर 2023 में क्राउन प्रिंस, महामहिम प्रिंस मोहम्मद बिन सलमान बिन अब्दुलअज़ीज़ अल सऊद की भारत की राजकीय यात्रा के दौरान लिए गए महत्वपूर्ण निर्णय के बाद हुआ था। इस सहयोगात्मक ढांचे से दोनों देशों की ऊर्जा सुरक्षा मजबूत करने, निवेश बढ़ाने और आर्थिक संबंधों को और गहरा करने की उम्मीद है।
- इसी संदर्भ में, पेट्रोलियम और प्राकृतिक गैस मंत्रालय के सचिव ने सितंबर 2024 में सऊदी अरब का दौरा किया और रियाद में तेल एवं गैस के सहायक मंत्री, महामहिम मोहम्मद अल–ब्राहिम के साथ चर्चा की।

दोनों पक्षों ने विभिन्न महत्वपूर्ण द्विपक्षीय मुद्दों की समीक्षा की।

6.3.8 यूएई के साथ सहभागिता

- भारत और यूएई के बीच एक घनिष्ठ और सक्रिय साझेदारी है, विशेष रूप से हाइड्रोकार्बन क्षेत्र में। यह सहयोग पूरी हाइड्रोकार्बन मूल्य श्रृंखला में फैला हुआ है, जिसमें कच्चा तेल, एलएनजी, एलपीजी, पेट्रोलियम उत्पाद और अन्वेषण एवं उत्पादन (ईएंडपी) गतिविधियाँ शामिल हैं।
- भारत और यूएई के संबंध अब एक रणनीतिक साझेदारी में बदल गए हैं, जिसमें हाइड्रोकार्बन क्षेत्र पर विशेष ध्यान दिया गया है। वित्त वर्ष 2024–25 में, यूएई भारत के लिए कच्चे तेल का चौथा सबसे बड़ा स्रोत, एलएनजी का तीसरा सबसे बड़ा स्रोत, एलपीजी का सबसे बड़ा आपूर्तिकर्ता और तैयार पेट्रोलियम उत्पादों का दूसरा सबसे बड़ा निर्यात स्थल होगा।
- **भारत और यूएई ने इस वर्ष प्रमुख एलएनजी आयात समझौतों के माध्यम से अपनी द्विपक्षीय व्यापार साझेदारी को और मजबूत किया है:**

क) आईओसीएल ने 2026 से शुरू होकर 14 वर्षों के लिए 1.2 एमएमटीपीए एलएनजी के लिए एडीएनओसी के साथ समझौते पर हस्ताक्षर किए।

ख) बीपीसीएल ने 5 वर्षों में 2.4 एमएमटी एलएनजी के लिए एडीएनओसी के साथ समझौता पर हस्ताक्षर किए।

उल्लेखनीय है कि भारत सावधि अनुबंध के तहत यूएई का सबसे बड़ा एलएनजी निर्यात करने वाला देश बन गया है।

- यूएई के अपस्ट्रीम क्षेत्र में भारत का निवेश इस बढ़ती साझेदारी को दर्शाता है। महत्वपूर्ण निवेशों में लोअर ज़कुम ब्लॉक और अबू धाबी तटीय ब्लॉक 1 शामिल हैं, जो एक बड़ी सफलता की कहानी हैं। सितंबर 2024 में रुवाइस क्षेत्र में तटीय ब्लॉक–1 के लिए उत्पादन रियायत समझौते (पीसीए) पर हस्ताक्षर एक महत्वपूर्ण उपलब्धि है, क्योंकि यह यूएई के अपस्ट्रीम क्षेत्र में काम करने वाली पहली भारतीय कंपनी है।
- निवेश की उपलब्धियों के अलावा, राजनयिक संपर्कों ने इस साझेदारी को और मजबूत किया है। माननीय मंत्री ने संयुक्त अरब अमीरात के उद्योग और उन्नत प्रौद्योगिकी मंत्री तथा एडीएनओसी के प्रबंध निदेशक एवं समूह सीईओ महामहिम से मुलाकात की। महामहिम डॉ. सुल्तान अल जाबेर से एडीआईपीईसी 2024 के अवसर पर अबू धाबी में मुलाकात की। इससे पहले, सितंबर 2024 में महामहिम क्राउन प्रिंस खालिद बिन मोहम्मद बिन जायद अल नाहयान की भारत यात्रा के दौरान दोनों नेताओं ने नई दिल्ली में भी मुलाकात की थी।
- एडीआईपीईसी 2024 के दौरान, माननीय मंत्री ने संयुक्त अरब अमीरात के ऊर्जा और अवसंरचना मंत्री महामहिम सुहैल मोहम्मद अल मजरूई के साथ द्विपक्षीय बैठक की। दोनों पक्षों ने भारत–यूएई ऊर्जा साझेदारी को और मजबूत करने के तरीकों पर चर्चा की और एडीएनओसी समूह को भारत की ऊर्जा सुरक्षा रणनीति में एक विश्वसनीय भागीदार के रूप में मान्यता दी।

6.3.9 संयुक्त राज्य अमेरिका (यूएसए) के साथ सहभागिता

- भारत और अमेरिका का तेल और गैस क्षेत्र में व्यापक सहयोग है। भारत अमेरिका से कच्चा तेल और एलएनजी आयात करता है। अमेरिका भारत के लिए कच्चे तेल का पाँचवाँ सबसे बड़ा और एलएनजी का दूसरा सबसे बड़ा स्रोत है। भारतीय सार्वजनिक उपक्रमों ने अमेरिका से एलएनजी के आयात के लिए 6.5 एमएमटीपीए (गेल और आईओसीएल द्वारा) के दीर्घकालिक अनुबंधों पर हस्ताक्षर किए हैं। इसके अलावा, भारतीय सार्वजनिक उपक्रम कंपनियों ने अमेरिका में तेल और गैस क्षेत्र में निवेश भी किया है।
- सितंबर 2021 में, भारत और अमेरिका ने रणनीतिक स्वच्छ ऊर्जा साझेदारी (एससीईपी) की घोषणा की। माननीय मंत्री ने 16 सितंबर 2024 को वाशिंगटन डी.सी. में अमेरिकी ऊर्जा सचिव महामहिम जेनिफर ग्रानहोम के साथ भारत–अमेरिका एससीईपी की मंत्रिस्तरीय बैठक की सह–अध्यक्षता की। इसमें अमेरिका और भारत सरकार की एजेंसियों ने सहयोग के छह तकनीकी स्तंभों में कई उपलब्धियों का निष्पादन किया और जैव ईंधन, हरित हाइड्रोजन तथा नवीकरणीय ऊर्जा में स्वच्छ ऊर्जा सहयोग की समीक्षा की। वैश्विक ऊर्जा परिदृश्य में भारत और अमेरिका की महत्वपूर्ण भूमिका को देखते हुए, फरवरी 2025 में भारत और अमेरिका के नेताओं ने तेल, गैस और असैन्य परमाणु ऊर्जा में अमेरिका–भारत सुरक्षा साझेदारी के लिए अपनी प्रतिबद्धता दोबारा व्यक्त की।
- माननीय मंत्री ने 16 सितंबर 2024 को वाशिंगटन डी.सी. में अमेरिका के उप–वित्त मंत्री श्री वैली अडेयेमो से मुलाकात की, जिसमें दोनों पक्षों ने बढ़ते द्विपक्षीय हाइड्रोकार्बन व्यापार पर जोर दिया।

- इसके अलावा, माननीय मंत्री ने ह्यूस्टन, अमेरिका में आयोजित गैसटेक 2024 के 52वें संस्करण में भाग लेने के दौरान अमेरिकी विदेश विभाग के ऊर्जा संसाधन मामलों के सहायक सचिव श्री ज्योफ रे पायट और अमेरिकी ऊर्जा विभाग के जीवाश्म ऊर्जा एवं कार्बन प्रबंधन कार्यालय के सहायक सचिव श्री ब्रैड क्रैबट्री के साथ व्यक्तिगत चर्चा भी की।

6.3.10 'पड़ोस' के लिए प्रयासः

'पड़ोसी पहले' भारत की विदेश नीति का एक प्रमुख तत्व है। भारत का मानना है कि अपने पड़ोसी देशों के साथ ऊर्जा संपर्क/कॉरिडोर सहित बेहतर संबंध स्थापित करना, सभी के लिए समान और संतुलित तरीके से अधिक समृद्धि लाएगा।

6.3.10.1 भूटान के साथ सहभागिता

- भारत और भूटान के बीच आपसी विश्वास, सद्भावना और साझा सांस्कृतिक संबंधों पर आधारित एक अनूठा और भरोसेमंद संबंध है। निकट पड़ोसी होने के कारण, भारत भूटान का सबसे बड़ा व्यापारिक साझेदार है।
- भारत और भूटान ने पेट्रोलियम, तेल, लुब्रिकेंट्स (पीओएल) और संबंधित उत्पादों की सामान्य आपूर्ति के लिए एक जी–टू–जी समझौता ज्ञापन पर हस्ताक्षर किए हैं। इस समझौते के तहत भारत सरकार पेट्रोलियम उत्पादों के निर्बाध प्रवाह को सुनिश्चित करेगी। वर्तमान में, भारत भूटान की पेट्रोलियम उत्पादों की पूरी 100% मांग को पूरा कर रहा है।

6.3.10.2 नेपाल के साथ सहभागिता

- पेट्रोलियम क्षेत्र में भारत–नेपाल सहयोग एक उत्कृष्ट साझेदारी का उदाहरण है। भारत 1974 से एक सामान्य आपूर्ति समझौते के माध्यम से नेपाल की पेट्रोलियम उत्पाद आवश्यकताओं की पूरी 100% आपूर्ति कर रहा है।
- सितंबर 2019 में मोतीहारी–अमलेखगंज पेट्रोलियम उत्पाद पाइपलाइन (एमएपीएल) के चालू होने के बाद, जो नेपाल की आपूर्ति सुरक्षा की आधारशिला है, दोनों पक्ष पेट्रोलियम अवसंरचना को और बढ़ाने की दिशा में काम कर रहे हैं। **इसमें अमलेखगंज से चितवन तक मोतीहारी–अमलेखगंज पेट्रोलियम उत्पाद पाइपलाइन (एमएपीएल) का विस्तार, चितवन में ग्रीनफील्ड टर्मिनल** का निर्माण, सिलीगुड़ी–झापा पाइपलाइन का निर्माण और झापा में ग्रीनफील्ड टर्मिनल का निर्माण शामिल है। ये परियोजनाएँ पेट्रोलियम अवसंरचना को मजबूत करेंगी, लागत कम करेंगी और नेपाल के नागरिकों तथा अर्थव्यवस्था की आपूर्ति सुरक्षा में मदद करेंगी।
- भारत ऊर्जा सप्ताह 2025 के अवसर पर, माननीय मंत्री ने नेपाल के ऊर्जा, जल संसाधन और सिंचाई मंत्री महामहिम दीपक खड़का के साथ मुलाकात की, जिसमें दोनों पक्षों ने भविष्य में सहयोग बढ़ाने के तरीकों पर चर्चा की। इसमें नेपाल को एलएनजी आपूर्ति सहित अन्य मुद्दों पर चर्चा हुई और मौजूदा बुनियादी ढांचा सहयोग परियोजनाओं की समीक्षा की गई। भारत और नेपाल के बीच पहला एलएनजी निर्यात समझौता आईईडब्ल्यू'25 के दौरान हस्ताक्षरित किया गया था।
- अगस्त 2024 और दिसंबर 2024 में, माननीय मंत्री ने नेपाल के उद्योग, वाणिज्य और आपूर्ति मंत्री महामहिम दामोदर भंडारी से मुलाकात की। दोनों पक्षों ने विशेष रूप से चल रही और नई बुनियादी ढांचा परियोजनाओं की प्रगति की समीक्षा की। इसमें नई परियोजनाओं के लिए आईओसीएल और एनओसी, नेपाल के बीच बी2बी समझौते पर हस्ताक्षर शामिल थे।

6.3.10.3 श्रीलंका के साथ सहभागिता

- भारत और श्रीलंका के बीच एक सक्रिय ऊर्जा साझेदारी है। भारत पारंपरिक रूप से श्रीलंका के सबसे बड़े व्यापारिक साझेदारों में से एक रहा है, और श्रीलंका सार्क में भारत का एक प्रमुख व्यापारिक साझेदार बना हुआ है।
- भारत श्रीलंका में प्रत्यक्ष विदेशी निवेश (एफडीआई) का एक बड़ा योगदानकर्ता है। कई भारतीय कंपनियों ने श्रीलंका में निवेश किया है और अपनी उपस्थिति स्थापित की है। ऊर्जा संकट के दौरान भारत ने कुल 4 बिलियन अमेरिकी डॉलर की ऋण सीमा के तहत पेट्रोलियम उत्पादों की आपूर्ति करके श्रीलंका की सहायता की।
- भारतीय कंपनियाँ साझेदारी के नए रास्ते तलाश रही हैं, जिनमें त्रिंकोमाली क्षेत्र को ऊर्जा केंद्र के रूप में विकसित करना, भारत से श्रीलंका तक एक अंतरराष्ट्रीय पाइपलाइन का निर्माण और श्रीलंका को तरलीकृत प्राकृतिक गैस (एलएनजी) की आपूर्ति शामिल है।

6.4 अंतर्राष्ट्रीय संगठनों के साथ सहभागिता

6.4.1 पेट्रोलियम निर्यातक देशों के संगठन (ओपेक) के साथ सहभागिता

- वित्त वर्ष 2024–25 के दौरान, भारत ने लगभग 49% कच्चा तेल, 70% एलपीजी और 41% पेट्रोलियम उत्पादों का आयात ओपेक देशों से किया। भारत ओपेक के साथ नियमित रूप से जुड़ा रहा है, जो कच्चे तेल के जिम्मेदार मूल्य निर्धारण को सुनिश्चित करने के लिए भारत की ऊर्जा कूटनीति का एक महत्वपूर्ण हिस्सा है।
- माननीय मंत्री ने नियमित रूप से महामहिम के साथ बातचीत की। ओपेक के महासचिव हैथम अल–घैस के साथ एडीआईपीईसी'2024 और आईईडब्ल्यू'25 के दौरान भी बैठकें हुईं, जिसमें दोनों पक्षों ने वैश्विक ऊर्जा बाजारों की स्थिति और दुनिया भर में भू–राजनीतिक घटनाओं के प्रभाव पर चर्चा की।

6.4.2 अंतर्राष्ट्रीय ऊर्जा एजेंसी (आईईए) के साथ सहभागिता:

भारत–आईईए सहयोग मार्च 2017 से शुरू हुआ, जब भारत आईईए का सहयोगी देश बन गया। तब से, भारत और आईईए विभिन्न क्षेत्रों में सहयोग कर रहे हैं, जिनमें डेटा विश्लेषण, नवीकरणीय ऊर्जा के विस्तार की अंतरराष्ट्रीय सर्वोत्तम प्रथाएँ, ऊर्जा दक्षता, गैस सुरक्षा, तेल भंडार और आपातकालीन तैयारी, निवेश, नवाचार और डिजिटलीकरण शामिल हैं। आईईए अपनी स्थापना से ही जीबीए का निरंतर और मजबूत समर्थक रहा है।

इस वर्ष, भारत ने पेरिस में आयोजित "अफ्रीका में धुंआ रहित खाना पकाने के शिखर सम्मेलन" में आईईए के साथ सहयोग किया। आईईए की उप–कार्यकारी निदेशक सुश्री मैरी बर्स वार्लिक ने भारत ऊर्जा सप्ताह 2025 में भाग लिया, जहाँ आईईए ने पीपीएसी के सहयोग से "भारत गैस रिपोर्ट" जारी की।

6.4.3 अंतर्राष्ट्रीय ऊर्जा मंच (आईईएफ) के साथ सहभागिता

- भारत और आईईएफ के बीच लंबे समय से सहयोग रहा है। 2002 में इसकी स्थापना के बाद से भारत कार्यकारी बोर्ड का स्थायी सदस्य रहा है। पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के संयुक्त सचिव (स्वतंत्र प्रभार) आईईएफ के कार्यकारी बोर्ड के सदस्य हैं। आईईएफ अपनी स्थापना से ही जीबीए का निरंतर और दृढ़ समर्थक रहा है।
- माननीय मंत्री अंतर्राष्ट्रीय मंचों पर आईईएफ महासचिव के साथ सहभागिता करते हैं, जहाँ दोनों पक्ष तेल और गैस बाजार के रुझानों, न्यायसंगत और किफायती ऊर्जा परिवर्तन सहित अन्य महत्वपूर्ण मुद्दों पर चर्चा करते हैं। इसमें अमेरिका में गैसटेक 2024 के दौरान की बैठक भी शामिल है।

6.5 पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय द्वारा आयोजित/भागीदारी वाले अंतर्राष्ट्रीय कार्यक्रम

6.5.1 भारत ऊर्जा सप्ताह 2025:

भारत का प्रमुख ऊर्जा कार्यक्रम और कैलेंडर का पहला प्रमुख वैश्विक ऊर्जा कार्यक्रम, भारत ऊर्जा सप्ताह 2025 (आईईडब्ल्यू'25) का तीसरा संस्करण, 11 से 14 फरवरी 2025 तक यशोभूमि कन्वेंशन सेंटर, नई दिल्ली में आयोजित किया गया।

उद्घाटन सत्र में, माननीय प्रधानमंत्री ने वीडियो संदेश के माध्यम से भारत में विकास और निवेश के अवसरों के साथ–साथ स्थायी भविष्य के लिए तेल, गैस, नवीकरणीय ऊर्जा, जैव ईंधन और परमाणु ऊर्जा जैसे विभिन्न ऊर्जा क्षेत्रों में भारत की प्रगति पर ज़ोर देते हुए अपने विचार साझा किए। उनके संदेश ने आईईडब्ल्यू'25 में होने वाले परिवर्तनकारी ऊर्जा संवाद की दिशा निर्धारित की।

उद्घाटन सत्र में, माननीय पेट्रोलियम एवं प्राकृतिक गैस मंत्री ने इस बात पर ज़ोर दिया कि आईईडब्ल्यू'25 वैश्विक ऊर्जा व्यवस्था में बड़े भू–राजनीतिक बदलावों के बीच एक महत्वपूर्ण मोड़ पर आयोजित हुआ है। मंत्री ने जोर देते हुए कहा कि यह सम्मेलन नीति निर्माता, उद्योग जगत के नेता और अन्य हितधारकों को सार्थक संवाद, विचारों का आदान–प्रदान और एक संतुलित व समावेशी ऊर्जा परिवर्तन की दिशा तय करने का एक अनूठा अवसर प्रदान करता है। उन्होंने ऊर्जा नवाचार और उद्यमिता में भारत के नेतृत्व को भी उजागर किया।

2023 में अपनी स्थापना के बाद से, आईईडब्ल्यू दो वर्षों में लगातार मजबूत होता हुआ दुनिया का दूसरा सबसे बड़ा अंतरराष्ट्रीय ऊर्जा सम्मेलन बन गया है। यह वैश्विक समुदाय के भारत की आर्थिक विकास की कहानी पर अटूट विश्वास और आशा को दर्शाता है और यह भी दिखाता है कि भारत आर्थिक विकास और सामाजिक–आर्थिक गतिशीलता दोनों का प्रमुख प्रेरक बनेगा।

आईईडब्ल्यू'25 में 120 देशों से आए 80,000 से अधिक आगंतुकों और 700 प्रदर्शकों ने चार दिनों तक भाग लिया, जिसमें वेनेजुएला के उपराष्ट्रपति, यूनाइटेड किंगडम के ऊर्जा सुरक्षा और नेट ज़ीरो सचिव,

तंजानिया के उप प्रधानमंत्री और ऊर्जा मंत्री, कतर के ऊर्जा मामलों के राज्य मंत्री और कतर एनर्जी के सीईओ, रूस के प्रथम ऊर्जा उप मंत्री, नेपाल के ऊर्जा, जल संसाधन और सिंचाई मंत्री, सूडान के ऊर्जा और तेल मंत्री, ओपेक के महासचिव, ब्राज़ील के गोआस राज्य के गवर्नर, नाइजीरिया के तराबा राज्य के गवर्नर, आईईए के उप कार्यकारी निदेशक शामिल थे। इसके अलावा बेकर ह्यूजेस, पेट्रोब्रास, विटोल, लैंजाटेक के वैश्विक सीईओ और एडनोक, एक्सॉन मोबिल, इक्विनोर, एसएलबी, लिंडे, हनीवेल और टोटल एनर्जीज़ के वरिष्ठ अधिकारी भी शामिल हुए।

समग्र सरकारी दृष्टिकोण के साथ, आईईडब्ल्यू'25 केवल तेल और गैस कंपनियों की सक्रिय भागीदारी तक ही सीमित नहीं रहा, बल्कि इसमें बिजली, नवीकरणीय ऊर्जा, कोयला, आईटी, शिपिंग, खान एवं खनिज, नीति आयोग और अन्य उद्योग जगत के दिग्गजों सहित संपूर्ण ऊर्जा क्षेत्र की सक्रिय भागीदारी भी शामिल रही।

आईईडब्ल्यू'25 की एक प्रमुख उपलब्धि 10वां खुला क्षेत्रफल लाइसेंस नीति बोली दौर का शुभारंभ था, जो अब तक का सबसे बड़ा दौर था और इसमें अन्वेषण के लिए 25 ब्लॉकों की पेशकश की गई थी।

आईईडब्ल्यू'25 ने महत्वपूर्ण रिपोर्टें जारी करने के लिए भी एक प्रमुख मंच के रूप में काम किया। इस दौरान, आईईए ने पीपीएसी के सहयोग से "इंडिया गैस रिपोर्ट" जारी की और पीपवीएसी ने अपनी वार्षिक पत्रिका प्रस्तुत की। इसके अलावा, ग्लोबल बायोफ्यूल्स अलायंस ने स्थायी जैव ईंधन पर एक संयुक्त वक्तव्य जारी किया, जिसे अंतर्राष्ट्रीय संगठनों का समर्थन मिला, और "भारत के ऊर्जा परिवर्तन में गैर–अनाज आधारित जैव ईंधन की भूमिका" पर एक श्वेतपत्र भी जारी किया गया।

भारत के ऊर्जा क्षेत्र में निवेश के लिए विश्व को आमंत्रित करने की प्रगतिशील नीति का समर्थन करते हुए, आईईडब्ल्यू'25 ने सहयोग के संभावित अवसरों को उजागर करने के लिए एक मंच के रूप में काम किया, जिनमें से कई अवसर सफलतापूर्वक हासिल किए गए। इनमें से कुछ प्रमुख अवसर इस प्रकार हैं:

- ब्राज़ील की पेट्रोब्रास के साथ बीपीसीएल का 6 मिलियन बैरल तक कच्चे तेल के आयात के लिए सावधिक (दीर्घकालिक) समझौता।
- आईओसीएल द्वारा एडीएनओसी के साथ एलएनजी आयात समझौते, 1.2 एमएमटीपीए एलएनजी प्राप्त करने के लिए 7 बिलियन अमेरिकी डॉलर का अनुबंध।
- बीपीसीएल द्वारा 5 वर्षों में 2.4 एमएमटी एलएनजी के लिए एडनोक के साथ आयात समझौता।
- भारत और नेपाल के बीच पहला एलएनजी निर्यात समझौता।
- एलपीजी की खरीद के लिए बीपीसीएल और इक्विनोर के बीच समझौता।
- ईआईएल और ओएनजीसी द्वारा बीपी के साथ तकनीकी साझेदारी।
- अपस्ट्रीम क्षेत्र में सहयोग के लिए ओएनजीसी विदेश और ऑयल इंडिया द्वारा पेट्रोब्रास के साथ साझेदारी समझौता–ज्ञापन।
- आईईडब्ल्यू'25 ने स्टार्ट–अप्स को मंच देकर भारत में ऊर्जा नवाचार को बढ़ावा दिया। इस आयोजन में नवाचार कौशल को बढ़ावा देने के लिए वीसी, इनक्यूबेटर, एक्सेलरेटर, उद्योग जगत के नेता और स्टार्ट–अप्स सहित विभिन्न क्षेत्र के दिग्गज शामिल हुए। इसके तहत दो स्टार्ट–अप प्रतियोगिताएँ आयोजित की गईं; एक घरेलू फोकस वाली (अविन्या) और एक अंतर्राष्ट्रीय ईएंडपी प्रयासों पर केंद्रित (वसुधा), जिसमें 500 से अधिक उद्यमियों ने भाग लिया। भारत के प्रमुख शैक्षणिक संस्थानों के साथ एक हैकथॉन भी आयोजित किया गया। आईईडब्ल्यू'25 में निष्पादनी में एक समर्पित स्टार्ट–अप ज़ोन बनाया गया, जिसमें 25 से अधिक स्टार्ट–अप्स ने अपने नवाचार उद्योग जगत के अग्रणी लोगों के सामने प्रस्तुत किए।
- आईईडब्ल्यू को मिली जबरदस्त प्रतिक्रिया, इसमें हुई वृद्धि और ऊर्जा परिवर्तन पर इसके द्वारा दिखाई गई रणनीतिक दिशा और व्यावहारिकता इस बात का प्रमाण हैं कि भारत वैश्विक ऊर्जा परिवर्तन में महत्वपूर्ण स्थान रखता है और आईईडब्ल्यू ने वैश्विक ऊर्जा आयोजनों में अपनी विशेष पहचान बनाई है।

6.5.2 एडीआईपीईसी 2024:

माननीय मंत्री महोदय ने 4–5 नवंबर 2024 को एडीआईपीईसी–2024 में भाग लेने के लिए यूएई का दौरा किया। उन्होंने एडीआईपीईसी 2024 में एफआईपीआई और भारतीय उद्योग परिसंघ (सीआईआई) द्वारा आयोजित भारतीय मंडप का उद्घाटन किया।

माननीय मंत्री ने यूएई के ऊर्जा एवं उद्योग मंत्री

महामहिम सुहैल मोहम्मद अल मजरूई, मिस्र के पेट्रोलियम एवं खनिज संसाधन मंत्री महामहिम इंजीनियर करीम बदावी और युगांडा की ऊर्जा एवं खनिज विकास मंत्री महामहिम रूथ नानकाबिरवा सेंटामु के साथ "नए वैश्विक नेता और ऊर्जा परिवर्तन" विषय पर मंत्रिस्तरीय पैनल की प्रारंभिक बैठक में भाग लिया। सत्र के दौरान, माननीय मंत्री ने भारत के दृष्टिकोण से संतुलित और विविध ऊर्जा परिवर्तन पर अपने विचार साझा किए और बताया कि यह यात्रा सभी देशों के लिए एक जैसी नहीं है, बल्कि प्रत्येक देश के संसाधनों और आवश्यकताओं के अनुसार लचीली और अनुकूलित रणनीतियों की जरूरत है।

यात्रा के दौरान, माननीय मंत्री ने अपने समकक्षों के साथ द्विपक्षीय चर्चा में भाग लिया, जिसमें महामहिम डॉ. सुल्तान अहमद अल जाबेर, यूएई के उद्योग एवं उन्नत प्रौद्योगिकी मंत्री, जलवायु मामलों के विशेष दूत, एडीएनओसी के समूह प्रबंध निदेशक एवं सीईओ और मसदर के अध्यक्ष; महामहिम सुहैल मोहम्मद अल मजरूई, यूएई के ऊर्जा एवं उद्योग मंत्री; और महामहिम हैथम अल घैस, ओपेक के महासचिव शामिल थे। इसके अतिरिक्त, मंत्री ने बीपी के वैश्विक सीईओ मरे औचिनक्लॉस के साथ भी द्विपक्षीय बैठक की।

6.5.3 तीसरा ग्लोबल साउथ समिट:

"एक संधारणीय भविष्य के लिए सशक्त ग्लोबल साउथ" विषय पर आधारित तीसरा ग्लोबल साउथ समिट, वर्तमान अंतरराष्ट्रीय परिदृश्य की चुनौतियों का समाधान करने हेतु सामूहिक प्रयासों को मजबूत करने में ग्लोबल साउथ की संधारणीय प्रतिबद्धता का प्रतीक है।

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के सचिव ने 17 अगस्त 2024 को तीसरे ग्लोबल साउथ समिट में ऊर्जा मंत्रियों के सत्र की अध्यक्षता की। इस सत्र का विषय था "एक संधारणीय भविष्य के लिए संधारणीय ऊर्जा समाधान", जिसमें 15 से अधिक ग्लोबल साउथ देशों ने भाग लिया।

सत्र के दौरान, सचिव पीएनजी ने वैश्विक ऊर्जा बाजार, कीमतों में उतार–चढ़ाव और चुनौतियों के बारे में चर्चा की, साथ ही विकासशील देशों में स्वच्छ ऊर्जा तकनीक को तेजी से अपनाने के लिए आवश्यक कदमों पर विचार साझा किए।

प्रतिभागियों ने अपने–अपने देशों में जैव ईंधन सहित नए और वैकल्पिक ऊर्जा स्रोतों में हुई प्रगति की नवीनतम जानकारी साझा की तथा ऊर्जा सुरक्षा, पहुंच और लागत जैसी चुनौतियों की पहचान की। उन्होंने कहा कि न्यायसंगत और संतुलित ऊर्जा परिवर्तन हासिल करने के लिए ग्लोबल साउथ के देशों के बीच सर्वोत्तम प्रथाओं और विचारों का आदान–प्रदान करना बेहद महत्वपूर्ण है।

6.5.4 गैसटेक 2024:

माननीय मंत्री ने गैसटेक 2024 के 52वें संस्करण में भाग लेने के लिए एक उद्योग प्रतिनिधिमंडल का नेतृत्व किया, जो प्राकृतिक गैस उद्योग के सबसे बड़े और समर्पित आयोजनों में से एक है। यह आयोजन सितंबर 2024 में ह्यूस्टन, अमेरिका में आयोजित किया गया।

गैसटेक 24 में, माननीय मंत्री ने दो मंत्रिस्तरीय चर्चाओं में भाग लिया, जैसे उद्घाटन सत्र के दौरान मंत्रिस्तरीय गोलमेज सम्मेलन और अमेरिका–भारत व्यापार परिषद (यूएसआईबीसी) और अमेरिका–भारत रणनीतिक साझेदारी मंच (यूएसआईएसपीएफ) के साथ एक गोलमेज सम्मेलन।

अमेरिका–भारत गोलमेज सम्मेलन के दौरान, माननीय मंत्री ने कठिन क्षेत्रों को कार्बन–मुक्त करने में सक्षम परिपक्व और निम्न–कार्बन समाधानों के विकास और उपयोग को बढ़ावा देने के लिए अमेरिकी कंपनियों के साथ सहयोग करने पर भारत की मंशा पर ज़ोर दिया।

माननीय मंत्री ने मिस्र, तुर्की और अमेरिका के ऊर्जा मंत्रियों व अधिकारियों के साथ द्विपक्षीय बैठकें कीं और प्रमुख वैश्विक ऊर्जा कंपनियों के 15 वरिष्ठ अधिकारियों और मुख्य कार्यकारी अधिकारियों के साथ व्यावसायिक बैठकें भी कीं।

गैसटेक 2024 ने भारत की ऊर्जा क्षेत्र में विभिन्न पहलों को प्रदर्शित करने और उन्हें आगे बढ़ाने के लिए एक अच्छा मंच प्रदान किया विशेषकर गैस–आधारित अर्थव्यवस्था के बढ़ते महत्व, प्राकृतिक गैस अवसंरचना में पर्याप्त निवेश और पूरे देश को सीजीडी नेटवर्क से जोड़ने पर जोर दिया। भारत ने ऊर्जा परिवर्तन के लिए वैश्विक समाधान खोजने के साथ–साथ उत्पादन और विनिर्माण क्षमताओं को बढ़ाकर ऊर्जा मांग के केंद्र के रूप में खुद को तेजी से स्थापित किया है।

गैसटेक 2024 के दौरान, स्थायी समाधानों और नवीनतम तकनीकी प्रगति की दिशा में महत्वपूर्ण कदम

उठाते हुए, इंद्रप्रस्थ गैस लिमिटेड (आईजीएल) और प्रमुख अमेरिकी ऊर्जा कंपनियों मैसर्स हीथ कंसल्टेंट्स इनकॉर्पोरेटेड, ह्यूस्टन; मैसर्स जॉन क्रेन (स्मिथ ग्रुप); मेसर्स हनीवेल; मैसर्स नॉक्स वेस्टर्न; मैसर्स ड्रेसर यूटिलिटी सॉल्यूशंस; और मैसर्स निक्कीसो क्लीन एनर्जी के बीच महत्वपूर्ण समझौता–ज्ञापनों (एमओयू) पर हस्ताक्षर किए गए। इसके अलावा, आईओसीएल और शेल ने भी गैस क्षेत्र में सहयोग को मजबूत करने और भारत की गैस–आधारित अर्थव्यवस्था को मज़बूत करने के लिए एक समझौता–ज्ञापन पर हस्ताक्षर किए।

6.6 विदेशी परिसंपत्तियों का अधिग्रहण:

पेट्रोलियम और प्राकृतिक गैस मंत्रालय, देश की ऊर्जा सुरक्षा को मजबूत करने के लिए, भारतीय तेल और गैस सार्वजनिक उपक्रमों को विदेशों में, स्थिर अर्थव्यवस्थाओं में, तेल और गैस उत्पादन के निकट परिसंपत्तियों के अधिग्रहण के अवसरों का सक्रिय रूप से लाभ उठाने में मदद कर रहा है।

31 मार्च 2025 तक, भारतीय तेल और गैस सार्वजनिक उपक्रमों के पास 21 देशों में 45 परिसंपत्तियाँ हैं। इन 45 परिसंपत्तियों में से 21 उत्पादनशील हैं, 14 अन्वेषणाधीन हैं, 3 पाइपलाइन परियोजनाएँ हैं और 7 विकास के विभिन्न चरणों में हैं। अप्रैल 2024 से मार्च 2025 तक, इन परिसंपत्तियों से तेल और गैस का विदेशी उत्पादन लगभग 20.2 एमएमटीओई रहा, जो भारत के घरेलू उत्पादन का एक महत्वपूर्ण हिस्सा है। परिसंपत्तियों की पूरी सूची परिशिष्ट XI में दी गई है।



पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के सचिव और जीबीए के अंतरिम महानिदेशक, श्री पंकज जैन ने ब्राज़ील की जी20 अध्यक्षता में आयोजित दूसरी ईटीडब्ल्यूजी बैठक के दौरान आयोजित वैश्विक जैव ईंधन गठबंधन की तीसरी टीईसी बैठक की अध्यक्षता की



माननीय पेट्रोलियम एवं प्राकृतिक गैस मंत्री, श्री हरदीप सिंह पुरी, ब्राज़ील के राष्ट्रपति के मुख्य सलाहकार, महामहिम सेल्सो अमोरिम से मुलाकात करते हुए



संयुक्त सचिव (स्वतंत्र प्रभार), पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय, सुश्री ईशा श्रीवास्तव ने कुवैत के साथ 7वीं संयुक्त कार्य समूह बैठक की सह–अध्यक्षता की



माननीय पेट्रोलियम एवं प्राकृतिक गैस मंत्री, श्री हरदीप सिंह पुरी ने कतर के राष्ट्रीय दिवस समारोह में भाग लिया



पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के सचिव श्री पंकज जैन ने रियाद में तेल एवं गैस के सहायक मंत्री महामहिम मोहम्मद अल–ब्राहिम से मुलाकात की



माननीय पेट्रोलियम एवं प्राकृतिक गैस मंत्री, श्री हरदीप सिंह पुरी, संयुक्त अरब अमीरात के उद्योग एवं उन्नत प्रौद्योगिकी मंत्री, महामहिम डॉ. सुल्तान अहमद अल जाबेर से मुलाकात करते हुए



माननीय पेट्रोलियम एवं प्राकृतिक गैस मंत्री, श्री हरदीप सिंह पुरी, एससीईपी बैठक के दौरान महामहिम जेनिफर ग्रैनहोम से मुलाकात करते हुए



माननीय पेट्रोलियम एवं प्राकृतिक गैस मंत्री, श्री हरदीप सिंह पुरी, ओपेक के महासचिव, महामहिम हैथम अल–घैस से मुलाकात करते हुए



अफ्रीका में धुंआ रहित खाने पकाने पर शिखर सम्मेलन



माननीय पेट्रोलियम एवं प्राकृतिक गैस मंत्री, श्री हरदीप सिंह पुरी, नेपाल के उद्योग, वाणिज्य एवं आपूर्ति मंत्री, महामहिम श्री दामोदर भंडारी के साथ बैठक करते हुए



माननीय मंत्री महोदय आईईडब्ल्यू, 2025 को संबोधित करते हुए



पेट्रोलियम और प्राकृतिक गैस मंत्रालय के सचिव ने तीसरे वॉयस ऑफ ग्लोबल साउथ शिखर सम्मेलन में में शामिल हुए



माननीय मंत्री हरदीप सिंह पुरी ने ह्यूस्टन में गैसटेक 2025 में अमेरिकी ऊर्जा दूत ज्योफरे पयाट से मुलाकात करते हुए



माननीय मंत्री महोदय एडीआईपीईसी 2024 (ऊर्जा परिवर्तन के लिए बौद्धिक सहयोग) में शामिल हुए





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7 पूर्वोत्तर क्षेत्र का विकास

7.1 पृष्ठभूमि

पूर्वोत्तर में तेल और गैस की खोज मुख्य रूप से स्वतंत्रता के बाद शुरू हुई। इसमें असम ऑयल कंपनी (एओसी) द्वारा नाहरकटी और मोरन क्षेत्रों की खोज और ओएनजीसी द्वारा 1953, 1956 और 1960 में रुद्रसागर तेल क्षेत्रों की खोज शामिल है। इसके बाद, ओआईएल और ओएनजीसी ने असम, अरुणाचल प्रदेश, नागालैंड, त्रिपुरा और मिजोरम में 100 से अधिक तेल और गैस क्षेत्रों का पता लगाया। इनमें जोरजन, कुमचाई, हापजन, शालमारी, डिकोम, कथालोनी, तेंगाखाट, भोगपारा, चबुआ, बाघजन, बारेकुरी, तिचना, गोजालिया, रोखिया, खोबल और होरटोकी जैसे क्षेत्र शामिल हैं।

पूर्व एनईएलपी–पूर्व, एनईएलपी, डीएसएफ और ओएएलपी बोलियों के दौर के माध्यम से इस क्षेत्र को निजी/संयुक्त उद्यम और विदेशी कंपनियों के लिए अन्वेषण के लिए खोल दिया गया था। ओआईएल और ओएनजीसी के पास पर्याप्त मात्रा में उत्पादन योग्य हाइड्रोकार्बन मौजूद हैं और उनके पास जटिल भंडारों के उत्पादन और प्रबंधन का तकनीकी ज्ञान है। साथ ही, वे पूर्वोत्तर में अपनी उत्पादक परिसंपत्तियों से प्रति वर्ष तेल और गैस के समतुल्य (ओ+ओईजी) उत्पादन में योगदान दे रहे हैं (2024–25 में ओआईएल द्वारा लगभग 6.39 एमएमटीओई और पूर्वोत्तर में ओएनजीसी द्वारा 2.612 एमएमटीओई)।

पूर्वोत्तर क्षेत्र में देश के कुल अनुमानित हाइड्रोकार्बन संसाधनों का लगभग 18% (7634 एमएमटी) पाया जाता है। अब तक ईएंडपी कंपनियों ने लगभग 2074 एमएमटी (ओ+ओईजी) की इन–प्लेस (2पी) मात्रा और लगभग 348 एमएमटी (ओ+ओईजी) भंडार और आकस्मिक संसाधन स्थापित किए हैं। इसका अर्थ है कि इस क्षेत्र के लगभग 73% हाइड्रोकार्बन संसाधन अब भी 'खोजे जाने बाकी' श्रेणी में हैं।

ओएनजीसी और ओआईएल नामक दो राष्ट्रीय तेल कंपनियाँ पिछले 60 से अधिक वर्षों से पूर्वोत्तर क्षेत्र में तेल और गैस की खोज और उत्पादन में लगी हुई हैं। इन कंपनियों ने इस बेसिन का एक बड़ा भू–वैज्ञानिक डेटाबेस और गहरी भूवैज्ञानिक समझ विकसित की है।

7.2 नामांकन व्यवस्था के तहत पूर्वोत्तर में अन्वेषण गतिविधियाँ:

ओआईएल अपनी स्थापना के बाद से ही, फरवरी 1959 में, असम राज्य में अन्वेषण और विकास कार्यों में सक्रिय रूप से लगी हुई है।

1969 से 1979 के दौरान, असम और अरुणाचल प्रदेश में व्यापक भूभौतिकीय सर्वेक्षण और विकास कार्य किए गए। इसके परिणामस्वरूप 1972 में जोरजन क्षेत्र की खोज हुई और 1973 में तेंगाखाट (नहरकटिया के पश्चिम) के इओसीन में गैस संसाधन स्थापित किए गए। 31 मार्च 2025 तक, ओआईएल ने पूर्वोत्तर क्षेत्र में 16,309.09 जीएलकेएम से अधिक 2डी भूकंपीय डेटा और लगभग 11,098.71 वर्ग किमी 3डी भूकंपीय डेटा एकत्र किया है। इस दौरान 494 अन्वेषण कूप और 1,451 विकास कूप खोदे गए हैं। ओआईएल 23 पीएमएल में कार्यरत है, जिसमें असम में 21, अरुणाचल प्रदेश में 2 और असम में 24.61 वर्ग किमी के एक पीईएल के तहत 4,382.13 वर्ग कि.मी. क्षेत्र शामिल है।

31 मार्च 2025 तक, ओआईएल के पास असम राज्य में स्थित एक नेल्प अन्वेषण ब्लॉक और 17 ब्लॉक (ओएएलपी राउंड । में 7 ब्लॉक, ओएएलपी राउंड III में 3 ब्लॉक और ओएएलपी राउंड V, VI और VI में 2–2 ब्लॉक और VIII में 1 ब्लॉक) हैं, जो असम, अरुणाचल प्रदेश, नागालैंड और त्रिपुरा में एक प्रचालक के रूप में खुला क्षेत्रफल लाइसेंस नीति (ओएएलपी) के तहत प्रदान किए गए हैं। असम में स्थित एक ओएएलपी राउंड V ब्लॉक को छोड़ दिया गया है। ओआईएल को डीएसएफ राउंड II के तहत दक्षिण त्रिपुरा में 1 ब्लॉक भी प्रदान किया गया है। नागालैंड राज्य (ओएएलपी ।।। के तहत) में ब्लॉक एए–ओएनएचपी–2018/2 को छोड़कर, सभी प्रदान किए गए ओएएलपी ब्लॉकों में अन्वेषण गतिविधियाँ जारी हैं, जिसके लिए नागालैंड सरकार द्वारा पीईएल अभी तक प्रदान नहीं किया गया है।

ओएनजीसी ने असम में अपना अन्वेषण कार्य वर्ष 1956 में शुरू किया। वर्ष 1961 में भूकंपीय सर्वेक्षण और भूगर्भीय मानचित्रण का काम शुरू हुआ, वहीं गुरुत्वाकर्षण–चुंबकीय सर्वेक्षण भी उसी वर्ष शुरू

किया गया। ओएनजीसी और उसके पूर्व कार्यों से प्राप्त भूगर्भीय मानचित्र और भूकंपीय आँकड़ों के विश्लेषण ने बेसिन की संरचना और इसके विकास को समझने में मदद मिली।

ओएनजीसी का पहला वाइल्ड कैट कूप 1960 में दिसंगमुख संरचना पर खोदा गया था, लेकिन पहली व्यावसायिक तेल खोज उसी वर्ष रुद्रसागर संरचना पर हुई थी। प्रारंभिक सफलताओं के आधार पर संरचनात्मक संभावनाओं की पहचान पर भूकंपीय आँकड़ों के माध्यम से विशेष ध्यान दिया गया। पूर्वोत्तर क्षेत्र में, 31.03.2025 तक, ओएनजीसी ने असम में 834 अन्वेषण कूप, त्रिपुरा में 242 कूप, मेघालय में 3 कूप, मिज़ोरम में 4 कूप और नागालैंड में 26 कूप खोदे हैं।

ऊपरी इओसीन से निचले ओलिगोसीन युग के बरेल समूह के रिजर्वायर और ऊपरी मायोसीन युग के तिपाम समूह के रिजर्वायर सबसे अधिक उत्पादक साबित हुए, जिसने अन्वेषकों का विशेष ध्यान आकर्षित किया। असम शेल्फ में रुद्रसागर, पानीडीहिंग, दिसंगमुख, लकवा, लखमनी, सोनारी, गेलेकी, और असम–अराकान फोल्ड बेल्ट में बारामुरा, अगरतला डोम, सुंदुलबारी, कुंजाबन, रोखिया, भुबंदर, गोजालिया और कोनाबन सहित कई तेल और गैस क्षेत्रों की खोज इसी अन्वेषण दृष्टिकोण के साथ की गई।

पिछले लगभग पाँच दशकों में, ओएनजीसी ने उत्तरी असम शेल्फ के शिवसागर और धनसिरी घाटी के स्थापित हाइड्रोकार्बन युक्त क्षेत्रों का विस्तार साबित करने के साथ–साथ नए क्षेत्रों की खोज पर भी ध्यान केंद्रित किया है। इस प्रक्रिया में इसने कछार और पड़ोसी राज्यों त्रिपुरा, पुरा और नागालैंड जैसे रसद और भौगोलिक दृष्टि से कठिन क्षेत्रों में भी हाइड्रोकार्बन क्षेत्र स्थापित किए हैं।

वर्तमान में, पूर्वोत्तर क्षेत्र में, असम में 2 पीईएल ब्लॉक (1 पूर्व–एनईएलपी और 1 ओएएलपी), मिजोरम में 1 एनईएलपी पीईएल ब्लॉक और त्रिपुरा राज्य में 5 पीईएल ब्लॉक (1 एनईएलपी और 4 ओएएलपी) हैं। इसके पास पूर्वोत्तर में 63 पीएमएल ब्लॉक (असम में 44, त्रिपुरा में 18, नागालैंड में 1) भी हैं, जिनमें दीर्घकालिक और अल्पकालिक दोनों पीएमएल शामिल हैं। वित्त वर्ष 2024–25 के दौरान, ओएनजीसी ने 241.72 जीएलके 2डी भूकंपीय डेटा (असम में 89.82 जीएलके और त्रिपुरा में 151.92 जीएलके), 176.74 एसकेएम 3डी भूकंपीय डेटा (असम में 32.81 एसकेएम और त्रिपुरा में 143.93 एसकेएम) प्राप्त किए और 15 अन्वेषण कूप (असम में 8 और त्रिपुरा में 7) खोदे। इसके अलावा, पूर्वोत्तर क्षेत्र में और अधिक क्षेत्र प्राप्त करने के लिए अन्वेषणात्मक भू–वैज्ञानिक एवं भूकंपीय प्रयास जारी हैं।

7.3 पूर्वोत्तर में कच्चे तेल और प्राकृतिक गैस का उत्पादनः

वित्त वर्ष 2024–25 में, पूर्वोत्तर राज्यों में लगभग 4.51 मिलियन मीट्रिक टन (एमएमटी) कच्चा तेल उत्पादित हुआ, जो देश के कुल 28.70 एमएमटी का 15.7% है। पिछले पाँच वर्षों में कच्चे तेल के उत्पादन में राज्यों और कंपनियों के अनुसार रुझान निम्नानुसार रहे हैं:

तालिका–7.1: पूर्वोत्तर में कच्चे तेल के उत्पादन में राज्य–वार और कंपनी–वार रुझान (एमएमटी में)

राज्य/क्षेत्र	कंपनी	2020-21	2021-22	2022-23	2023-24	2024-25
असम	ओआईएल	2.90	2.90	3.11	3.29	3.38
	ओएनजीसी	0.96	0.99	1.01	1.05	1.05
	निजी/संयुक्त उद्यम	0.03	0.04	0.04	0.03	0.03
	कुल	3.90	3.94	4.17	4.36	4.46
अरुणाचल प्रदेश	ओआईएल	0.02	0.02	0.02	0.03	0.03
	निजी/संयुक्त उद्यम	0.03	0.03	0.02	0.02	0.02
	कुल	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**
त्रिपुरा	ओएनजीसी	0.003	0.003	0.003	0.002	0.002
पूर्वोत्तर	**कुल योग**	**3.96**	**3.99**	**4.22**	**4.42**	**4.51**
जिसमें से						
ओआईएल नामांकन कुल		**2.93**	**2.93**	**3.14**	**3.32**	**3.41**
ओएनजीसी नामांकन कुल		**0.97**	**1.00**	**1.01**	**1.05**	**1.05**
पीएससी/आरएससी कुल		**0.06**	**0.07**	**0.07**	**0.05**	**0.04**

यह देखा जा सकता है कि वित्त वर्ष 2024–25 में पूर्वोत्तर में कच्चे तेल के उत्पादन में ओआईएल की हिस्सेदारी लगभग 76% होगी, जबकि ओएनजीसी की हिस्सेदारी लगभग 23% रहेगी। निजी/संयुक्त उद्यम कंपनियों की हिस्सेदारी लगभग 1% है।

वित्त वर्ष 2024–25 में, पूर्वोत्तर राज्यों में असम कच्चे तेल के उत्पादन में सबसे बड़ा योगदानकर्ता रहा, जिसने इस क्षेत्र के कुल उत्पादन का लगभग 98.9% और पूरे भारत के कुल कच्चे तेल उत्पादन का 14.6% प्रदान किया। अरुणाचल प्रदेश का योगदान पूर्वोत्तर के कुल तेल उत्पादन में लगभग 1.08% था, जबकि त्रिपुरा का योगदान लगभग 0.04% रहा।

प्राकृतिक गैस का उत्पादनः प्राकृतिक गैस का उत्पादनः वित्त वर्ष 2024–25 में, पूर्वोत्तर राज्यों ने लगभग 4.82 बिलियन मीट्रिक मानक घन मीटर (बीसीएम) प्राकृतिक गैस का उत्पादन किया, जो पूरे देश के कुल उत्पादन 36.11 बीसीएम का 13.3% है। पिछले 5 वर्षों में प्राकृतिक गैस उत्पादन का राज्य–वार और कंपनी–वार रुझान नीचे दिया गया है:

तालिका–7.2: पूर्वोत्तर में प्राकृतिक गैस उत्पादन का राज्य–वार और कंपनी–वार रुझान (बीसीएम में)

राज्य/क्षेत्र	कंपनी	2020-21	2021-22	2022-23	2023-24	2024-25
असम	ओआईएल	2.24	2.62	2.81	2.89	2.94
	ओएनजीसी	0.39	0.37	0.36	0.34	0.34
	निजी/संयुक्त उद्यम	0.37	0.38	0.39	0.27	0.28
	कुल	**3.00**	**3.37**	**3.56**	**3.49**	**3.55**
अरुणाचल प्रदेश	ओआईएल	0.05	0.05	0.05	0.03	0.04
	निजी/संयुक्त उद्यम	0.005	0.005	0.005	0.005	0.005
	कुल	0.06	0.06	0.05	0.04	0.04
त्रिपुरा	ओएनजीसी	1.63	1.53	1.68	1.53	1.22
पूर्वोत्तर	**कुल योग**	**4.68**	**4.96**	**5.29**	**5.05**	**4.82**
जिसमें से						
ओआईएल नामांकन कुल		**2.29**	**2.67**	**2.85**	**2.92**	**2.98**
ओएनजीसी नामांकन कुल		**2.02**	**1.90**	**2.03**	**1.85**	**1.56**
पीएससी/आरएससी/सीबीएम कुल		**0.38**	**0.39**	**0.40**	**0.28**	**0.28**

वित्त वर्ष 2024–25 के दौरान, ऑयल इंडिया लिमिटेड (ओआईएल) ने पूर्वोत्तर में प्राकृतिक गैस उत्पादन में लगभग 62% योगदान दिया, जबकि ऑयल एंड नेचुरल गैस कॉर्पोरेशन (ओएनजीसी) का योगदान लगभग 32% रहा। इस क्षेत्र में निजी और संयुक्त उद्यम (जेवी) कंपनियों की कुल हिस्सेदारी लगभग 6% थी।

वित्त वर्ष 2024–25 के दौरान, असम ने पूर्वोत्तर राज्यों के कुल प्राकृतिक गैस उत्पादन में लगभग 74% योगदान दिया, जो भारत के कुल प्राकृतिक गैस उत्पादन का 9.8% है। अरुणाचल प्रदेश का योगदान लगभग 0.9% रहा, जबकि त्रिपुरा का हिस्सा लगभग 25% था।

7.4 अन्वेषित लघु क्षेत्र नीतिः

पूर्वोत्तर क्षेत्र में डीएसएफ के अंतर्गत ब्लॉकों का विवरण इस प्रकार है:

तालिका–7.3: पूर्वोत्तर क्षेत्र में डीएसएफ संविदा क्षेत्र

स्थिति	बेसिन	डीएसएफ बोली दौर	राज्य/स्थान	संविदा क्षेत्र	प्रचालक
स्वीकृत पीएमएल	असम शेल्फ	डीएसएफ–I	असम	एए/ओएनडीएसएफ/डीआईपीएलआईएनजी/2016	रामायण इस्पात प्रा. लिमिटेड और महेंद्र इंफ्राटेक प्राइवेट लिमिटेड
				एए/ओएनडीएसएफ/दुआर्मारा/2016	एंटेलोपस एनर्जी प्रा. लिमिटेड
		डीएसएफ–II	असम	एए/ओएनडीएसएफ/दिसाईजान/2018	इनवेनेरे एनर्जी प्रा. लिमिटेड
				एए/ओएनडीएसएफ/हजारीगांव/2018	वेदांता लिमिटेड
				एए/ओएनडीएसएफ/उमातारा/2018	इंडियन ऑयल कॉर्पोरेशन लिमिटेड
		डीएसएफ–III	असम	एए/ओएनडीएसएफ/तिफुक/2021	ऑयलमैक्स एनर्जी प्रा. लिमिटेड
	असम–अराकान फोल्ड बेल्ट	डीएसएफ–II	त्रिपुरा	एए/ओएनडीएसएफ तुलमारा/201	ऑयल इंडिया लिमिटेड
		डीएसएफ–III	असम	एए/ओएनडीएसएफ/तुकबाई/2021	वेदांता लिमिटेड
त्यागा/रद्द किया गया	असम शेल्फ	डीएसएफ–I	असम	एए/ओएनडीएसएफ/जेराईपाथर/2016	इंडियन ऑयल कॉर्पोरेशन लिमिटेड
				एए/ओएनडीएसएफ/बार्सिला/2016	रामायण इस्पात प्रा. लिमिटेड और महेंद्र इंफ्राटेक प्रा. लिमिटेड
				एए/ओएनडीएसएफ/चराइदेव/2016	ऑयलमैक्स एनर्जी प्रा. लिमिटेड
				एए/ओएनडीएसएफ/लक्ष्मीजन/2016	मेघा इंजीनियरिंग एंड इंफ्रास्ट्रक्चर्स लिमिटेड
			अरुणाचल प्रदेश	एए/ओएनडीएसएफ/खेरेम/2016	एचओईसी लिमिटेड, प्राईज पेट्रोलियम
		डीएसएफ–II	असम	एए/ओएनडीएसएफ/मधकाली/2018	अर्श कॉर्पोरेट सर्विसेज प्रा. लिमिटेड (दुगंता)
				एए/ओएनडीएसएफ/तिफुक/2018	शांति जी.डी. इस्पात एंड पावर प्रा. लिमिटेड
	असम–अराकान फोल्ड बेल्ट		असम	एए/ओएनडीएसएफ/हिलारा/2016	प्राइज पेट्रोलियम कंपनी लिमिटेड
		डीएसएफ–I		एए/ओएनडीएसएफ/पथरिया/2016	विजयश्री भास्कर इंडस्ट्रीज प्रा. लिमिटेड
		डीएसएफ–III	असम	एए/ओएनडीएसएफ/पथरिया/2021	वेदांता लिमिटेड

7.5 पूर्वोत्तर में वैकल्पिक हाइड्रोकार्बन स्रोत:

ओएनजीसी द्वारा असम में 3 शेल गैस ब्लॉक प्रचालित किए जा रहे हैं और ओआईएल 4 ब्लॉक का प्रचालन कर रही है। अब तक ओएनजीसी ने दो कूप खोदे हैं – एक नमती एमएल ब्लॉक में (जीकेबीओ) और दूसरा लकवा में (एलडीजी)। ओआईएल ने असम के डिब्रूगढ़, दुमदुमा और चबुआ पीएमएल क्षेत्रों से पारंपरिक कोर प्राप्त किए हैं। इन क्षेत्रों के मूल्यांकन के परिणाम संभावित रूप से कम उत्पादन क्षमता का संकेत देते हैं क्योंकि शेल गैस उत्पादन की प्रारंभिक चरण में प्रवेश हो चुका है। अरुणाचल प्रदेश में, ओआईएल ने पारंपरिक कोर प्राप्त करने के लिए दो स्थानों की पहचान की है – जयरामपुर एक्सटेंशन पीईएल और देवमाली पीईएल। यहाँ शेल गैस/तेल क्षमता स्थापित करने के लिए क्रमशः अपर टिकक पार्टबैट और दिसांग शेल लक्षित क्षेत्रों से व्यापक मात्रा में पारंपरिक कोर प्राप्त किए जाएंगे।

7.6 पूर्वोत्तर विजन 2030:

पूर्वोत्तर विजन दस्तावेज़ पूर्वोत्तर क्षेत्र के लोगों के हित में एक साझा और समन्वित दृष्टिकोण तैयार करने का एक केंद्रित और परामर्शात्मक प्रयास रहा है। विभिन्न हितधारकों, उद्योग जगत और राज्य सरकारों की भागीदारी और सुझावों के साथ, इस विजन दस्तावेज़ में केवल क्षेत्र की महत्वाकांक्षाएँ ही नहीं, बल्कि एक व्यावहार्य कार्यान्वयन रोडमैप भी शामिल है।

योजना का उद्देश्य इस क्षेत्र की हाइड्रोकार्बन क्षमता का लाभ उठाना, स्वच्छ ईंधन तक पहुँच बढ़ाना, पेट्रोलियम उत्पादों की उपलब्धता में सुधार करना, आर्थिक विकास को आसान बनाना और आम लोगों को क्षेत्र की आर्थिक गतिविधियों से जोड़ना है। इसमें अरुणाचल प्रदेश, असम, मणिपुर, मेघालय, मिजोरम, नागालैंड, सिक्किम और त्रिपुरा राज्य शामिल हैं। मंत्रालय ने विजन दस्तावेज़ का मसौदा तैयार करते समय राज्य सरकारों के साथ कई परामर्श भी किए।

यह विजन पांच मुख्य स्तंभों – लोग, नीति, साझेदारी, परियोजनाएँ और उत्पादनकृपर आधारित है। लोगों के लिए इसका उद्देश्य कौशल विकास को बढ़ावा देना, स्थानीय समुदाय की भागीदारी सुनिश्चित करना और घरों तक स्वच्छ ईंधन की पहुँच प्रदान करना है। नीति के तहत, क्षेत्र के विशेष भू–भाग और मौसम को ध्यान में रखते हुए संतुलित योजनाएँ और नई परियोजनाओं के लिए वित्तीय प्रावधान बनाए जाते हैं। साझेदारी में राज्य सरकारों की अधिक भागीदारी और पड़ोसी देशों के साथ व्यापार को बढ़ावा देना शामिल है, साथ ही संपीड़ित प्राकृतिक गैस (सीएनजी) राजमार्ग और नगर गैस वितरण नेटवर्क का विकास भी शामिल है। उत्पादन पक्ष पर जोर उत्पादन बढ़ाने, तकनीक के उपयोग, त्वरित स्वीकृति और सेवा प्रदाता केंद्रों के विकास पर है।

उत्पादन के अलावा, इस योजना में बांग्लादेश, म्यांमार, नेपाल और भूटान के साथ हाइड्रोकार्बन संबंध और व्यापार के अवसरों की खोज, क्षेत्र में 'मेक इन इंडिया' का क्रियान्वयन, स्वास्थ्य और चिकित्सा सुविधाओं का विकास, औद्योगिक नीति और बुनियादी ढाँचे से जुड़े कार्य, कौशल विकास और क्षेत्र में रोजगार सृजन पर ध्यान शामिल है। विज़न वक्तव्य पूरी हाइड्रोकार्बन मूल्य श्रृंखला अर्थात अपस्ट्रीम, मिडस्ट्रीम और डाउनस्ट्रीम के लिए विस्तृत रोडमैप प्रस्तुत करता है। इस रिपोर्ट में उद्देश्यों को हासिल करने के लिए तत्काल, मध्य और दीर्घकालिक पहलों की कार्य योजना भी शामिल है।

विज़न का उद्देश्य वर्ष 2030 तक तेल और गैस का उत्पादन दोगुना करना, स्वच्छ ईंधन को आसानी से उपलब्ध कराना, परियोजनाओं को तेजी से पूरा करना, रोजगार के अवसर पैदा करना और पड़ोसी देशों के साथ सहयोग बढ़ाना है।

विज़न 2030 के तहत निर्धारित एक प्रमुख लक्ष्य को पूरा करने के लिए, सरकार ने पूर्वोत्तर क्षेत्र में चालू ब्लॉकों के अन्वेषण की अवधि 2 वर्ष और मूल्यांकन की अवधि 1 वर्ष बढ़ाने की विशेष छूट दी है। साथ ही, भविष्य में पूर्वोत्तर में उत्पादित प्राकृतिक गैस के विपणन और मूल्य निर्धारण में स्वतंत्रता भी प्रदान की गई है। इससे तेल और गैस संसाधनों के विकास में निवेश बढ़ने की संभावना है।

पूर्वोत्तर विज़न 2030 के तहत, वर्ष 2025–26 से 2027–28 तक पूर्वोत्तर क्षेत्र के असम शेल्फ और असम–अराकान फोल्ड बेसिन क्षेत्रों में भूकंपीय डेटा एकत्र करने और अन्वेषण कूपों की खुदाई के लिए तेल अन्वेषण योजना नीचे तालिका में दी गई है:

तालिका–7.4: पूर्वोत्तर विजन 2030 के अंतर्गत ओआईएल की अन्वेषण योजना

पूर्वोत्तर क्षेत्र	गतिविधि	2025-26	2026-27	2027-28	कुल
असम शेल्फ और असम अराकान फोल्ड बेल्ट	2डी सर्वेक्षण (एलकेएम)	100	50	150	300
	3डी सर्वेक्षण (वर्ग कि.मी.)	177	100	150	427
	अन्वेषण ड्रिलिंग (संख्या)	20	26	30	76

पूर्वोत्तर विज़न 2030 के तहत, 2025–26 से 2027–28 तक पूर्वोत्तर क्षेत्र में ओएनजीसी द्वारा असम शेल्फ और असम–अराकान फोल्ड बेसिन क्षेत्रों में भूकंपीय डेटा अधिग्रहण और अन्वेषण कूपों की खुदाई की योजना नीचे तालिका में दी गई है:

तालिका–7.5: पूर्वोत्तर विजन 2030 के अंतर्गत ओएनजीसी की अन्वेषण योजना

पूर्वोत्तर क्षेत्र	गतिविधि	2025-26	2026-27	2027-28	कुल
असम शेल्फ और असम अराकान फोल्ड बेल्ट	2डी सर्वेक्षण (एलकेएम)	376	150	150	676
	3डी सर्वेक्षण (वर्ग कि.मी.)	308	350	350	1008
	3डी सर्वेक्षण (वर्ग कि.मी.)	27	25	27	79

7.7 हाइड्रोकार्बन अन्वेषण एवं लाइसेंसिंग नीति (एचईएलपी) के अंतर्गत पूर्वोत्तर क्षेत्र में अन्वेषण ब्लॉक:

तेल अन्वेषण और उत्पादन कंपनियाँ पूर्वोत्तर क्षेत्र में गहरी रुचि दिखा रही हैं। 31 मार्च 2025 तक विभिन्न कंपनियों को कुल 35 ब्लॉक आवंटित किए गए हैं। पूर्वोत्तर क्षेत्र में 31 मार्च 2025 तक आवंटित अन्वेषण ब्लॉकों का विवरण और उनकी स्थिति इस प्रकार है:

क्र. सं.	ओएएलपी राउंड	ब्लॉक का नाम	संविदाकार प्रचालक	बेसिन का नाम	मूल संविदा क्षेत्रफल (वर्ग कि.मी.)	टिप्पणियाँ
1	ओएएलपी– I	एए–ओएनएचपी–2017/1	वेदांता लिमिटेड	असम शेल्फ	714.71	नागालैंड क्षेत्र की पीईएल का इंतजार है
2	ओएएलपी– I	ओएएलपी– I एए–ओएनएचपी–2017/10	ऑयल इंडिया लिमिटेड	असम शेल्फ	543.28	
3	ओएएलपी– I	ओएएलपी– I एए–ओएनएचपी–2017/11	वेदांता लिमिटेड	असम शेल्फ	784.55	
4	ओएएलपी– I	ओएएलपी– I एए–ओएनएचपी–2017/12	ऑयल इंडिया लिमिटेड	असम शेल्फ	309.9	
5	ओएएलपी– I	एए–ओएनएचपी–2017/13	ऑयल इंडिया लिमिटेड	असम शेल्फ	840.69	
6	ओएएलपी– I	एए–ओएनएचपी–2017/14	वेदांता लिमिटेड	असम अराकान फोल्ड बेल्ट	1719.17	
7	ओएएलपी– I	एए–ओएनएचपी–2017/15	वेदांता लिमिटेड	असम शेल्फ	1367.38	
8	ओएएलपी– I	एए–ओएनएचपी–2017/16	ऑयल इंडिया लिमिटेड	असम शेल्फ	361.49	
9	ओएएलपी– I	एए–ओएनएचपी–2017/17	ऑयल इंडिया लिमिटेड	असम शेल्फ	309.07	
10	ओएएलपी– I	एए–ओएनएचपी–2017/18	ऑयल इंडिया लिमिटेड	असम शेल्फ	1711.1	
11	ओएएलपी– I	एए–ओएनएचपी–2017/19	एचओसी	असम अराकान फोल्ड बेल्ट	79.21	
12	ओएएलपी– I	एए–ओएनएचपी–2017/2	वेदांता लिमिटेड	असम अराकान फोल्ड बेल्ट	73.19	

क्र. सं.	ओएएलपी राउंड	ब्लॉक का नाम	संविदाकार प्रचालक	बेसिन का नाम	मूल संविदा क्षेत्रफल (वर्ग कि.मी.)	टिप्पणियाँ
13	ओएएलपी– I	एए–ओएनएचपी–2017 / 20	ऑयल इंडिया लिमिटेड	असम अराकान फोल्ड बेल्ट	36.31	
14	ओएएलपी– I	एए–ओएनएचपी–2017 / 3	वेदांता लिमिटेड	असम अराकान फोल्ड बेल्ट	267.94	
15	ओएएलपी– I	एए–ओएनएचपी–2017 / 4	वेदांता लिमिटेड	असम शेल्फ	839.33	नागालैंड क्षेत्र की पीईएल का इंतजार है
16	ओएएलपी– I	एए–ओएनएचपी–2017 / 5	वेदांता लिमिटेड	असम शेल्फ	758.23	
17	ओएएलपी– I	एए–ओएनएचपी–2017 / 6	वेदांता लिमिटेड	असम अराकान फोल्ड बेल्ट	278.79	
18	ओएएलपी– I	एए–ओएनएचपी–2017 / 8	वेदांता लिमिटेड	असम शेल्फ	610.54	
19	ओएएलपी– I	एए–ओएनएचपी–2017 / 9	वेदांता लिमिटेड	असम शेल्फ	18.32	
20	ओएएलपी– III	एए–ओएनएचपी–2018 / 1	वेदांता लिमिटेड	असम शेल्फ	248.87	
21	ओएएलपी– III	एए–ओएनएचपी–2018 / 2	ऑयल इंडिया लिमिटेड	असम अराकान फोल्ड बेल्ट	2526.74	पीईएल का इंतजार है
22	ओएएलपी– III	एए–ओएनएचपी–2018 / 3	ऑयल इंडिया लिमिटेड	असम शेल्फ	1234.42	
23	ओएएलपी– III	एए–ओएनएचपी–2018 / 4	ओएनजीसी लिमिटेड	असम अराकान फोल्ड बेल्ट	44.01	
24	ओएएलपी– III	एए–ओएनएचपी–2018 / 5	ऑयल इंडिया लिमिटेड	असम अराकान फोल्ड बेल्ट	207.74	
25	ओएएलपी–V	एए–ओएनएचपी–2019 / 1	ऑयल इंडिया लिमिटेड	असम शेल्फ	1278.27	
26	ओएएलपी–V	एए–ओएनएचपी–2019 / 2	ऑयल इंडिया लिमिटेड	असम शेल्फ	2405.12	त्यागा गया
27	ओएएलपी–VI	एए–ओएनएचपी–2020 / 1	ऑयल इंडिया लिमिटेड	असम अराकान फोल्ड बेल्ट	557.33	
28	ओएएलपी–VI	एए–ओएनएचपी–2020 / 2	ओएनजीसी लिमिटेड	असम अराकान फोल्ड बेल्ट	50.41	
29	ओएएलपी–VI	एए–ओएनएचपी–2020 / 3	ऑयल इंडिया लिमिटेड	असम अराकान फोल्ड बेल्ट	219.37	

क्र. सं.	ओएएलपी राउंड	ब्लॉक का नाम	संविदाकार प्रचालक	बेसिन का नाम	मूल संविदा क्षेत्रफल (वर्ग कि.मी.)	टिप्पणियाँ
30	ओएएलपी–VI	एए–ओएनएचपी–2021/1	ओएनजीसी लिमिटेड	असम अराकान फोल्ड बेल्ट	37.68	
31	ओएएलपी–VI	एए–ओएनएचपी–2021/1	ओएनजीसी लिमिटेड	असम शेल्फ	24.64	
32	ओएएलपी–VII	एए–ओएनएचपी–2021/2	ओएनजीसी लिमिटेड	असम अराकान फोल्ड बेल्ट	382.05	
33	ओएएलपी–VII	एए–ओएनएचपी–2021/2	ऑयल इंडिया लिमिटेड	असम शेल्फ	2445.3	
34	ओएएलपी–VII	एए–ओएनएचपी–2021/3	ऑयल इंडिया लिमिटेड	असम शेल्फ	1840.87	
35	ओएएलपी–VIII	एए–ओएनएचपी–2022/1	ऑयल इंडिया लिमिटेड	असम शेल्फ	2057.63	पीईएल विलेख निष्पादित नहीं हुआ है

7.8 राष्ट्रीय भूकंपीय कार्यक्रमः

राष्ट्रीय भूकंपीय कार्यक्रम (एनएसपी) 12 अक्तूबर 2016 को शुरू किया गया था। यह पहल भारत के तलछटी घाटियों के अप्रमाणित स्थलीय क्षेत्रों का द्वि–आयामी भूकंपीय सर्वेक्षण करने के उद्देश्य से की गई थी। इसका लक्ष्य इन अप्रमाणित तलछटी घाटियों का मूल्यांकन करना था। इसके तहत स्थलीय क्षेत्रों के लिए कुल 48,243 लाइन किलोमीटर (एलकेएम) द्वि–आयामी भूकंपीय डेटा एकत्र करने की योजना बनाई गई थी। एनएसपी वर्ष 2022 में पूरा हो गया। उन क्षेत्रों में जहाँ दुर्गम भू–भाग और प्रतिकूल पर्यावरण के कारण सर्वेक्षण संभव नहीं हो पाया, वहां वर्तमान में हवाई भू–भौतिकीय सर्वेक्षण करके मूल्यांकन किया जा रहा है। एनएसपी के अंतर्गत क्षेत्र–वार प्राप्त आँकड़े इस प्रकार हैं:

पूर्वोत्तर में राज्य/स्थान के अनुसार एनएसपी विवरण

राज्य/स्थान	2डी भूकंपीय (एलकेएम)
अरुणाचल प्रदेश	185.58
असम	3899.34
मणिपुर	4.74
मेघालय	12.66
मिजोरम	980.00
नगालैंड	0
कुल	**5082.32**

7.9 वायुजनित गुरुत्व ग्रेडियोमेट्री और गुरुत्व चुंबकीय सर्वेक्षण (एजीजी और जीएम):

एनएसपी परियोजना के अंतर्गत उन दुर्गम और प्रतिकूल भौगोलिक क्षेत्रों को कवर किया गया, जहाँ भूकंपीय आँकड़े प्राप्त नहीं किए जा सके थे। इनमें मुख्यतः असम अराकान फोल्ड बेल्ट, असम शेल्फ, कावेरी, बस्तर, करेवा और स्पीति बेसिन के चयनित ट्रैवर्स शामिल हैं। इन क्षेत्रों में वायुजनित गुरुत्व

ग्रेडियोमेट्री और गुरुत्व–चुंबकीय सर्वेक्षण (एजीजी और जीएम) किया गया। यह सर्वेक्षण मंत्रालय की देखरेख में मैसर्स ऑयल इंडिया लिमिटेड द्वारा उड़ान सर्वेक्षण के रूप में संपन्न हुआ। पूर्वोत्तर में एजीजी और जीएम सर्वेक्षण के तहत कुल 26,997 उड़ान एलकेएम डेटा प्राप्त किए गए। यह सर्वेक्षण मई, 2023 में शुरू होकर मई, 2024 में पूरा हुआ। पूर्वोत्तर क्षेत्र में क्षेत्र–वार विवरण इस प्रकार है:

पूर्वोत्तर			
राज्य	**ब्लॉक का नाम**	**लगभग क्षेत्रफल (वर्ग कि.मी.)**	**लाइन स्पेसिंग: 2•20 कि.मी. – एलकेएम**
अरुणाचल प्रदेश	एएस–एपी एंडएएस–मणि–नगा	4,000	2,112
असम	एएस–एपी एंडएएस–मणि–नगा	10,100	5,489
नगालैंड	एएस–मणि–नगा	13,500	7,336
मणिपुर	एएस–मणि–नगा	10,030	5,451
मेघालय	एएस–मणि–नगा	1,700	924
मिजोरम	एएस मिज–त्रि	8,478	4,726
त्रिपुरा	एएस मिज–त्रि	1,722	960
कुल			**26,997**

ओआईएल ने अपने ओएएलपी ब्लॉकों में क्षेत्रीय भूवैज्ञानिक स्थितियों और गतिविधियों को बेहतर समझने के लिए पूर्वोत्तर क्षेत्र में एजीजी और जीएम डेटा अधिग्रहण अभियान शुरू किया है। इस अभियान में वे क्षेत्र भी शामिल हैं जिन्हें पहले कवर नहीं किया जा सका था। पिछले अभियान में ऑयल इंडिया के पीएमएल और काजीरंगा तथा मिकिर पहाड़ियों के आसपास के क्षेत्रों से कुल 34,190 उड़ान एलकेएम डेटा प्राप्त किए गए थे। नया अधिग्रहण अभियान 4 फरवरी, 2025 को शुरू हुआ और 31 मार्च, 2025 तक कुल 5,786.91 उड़ान एलकेएम डेटा एकत्र किया जा चुका है।

7.10 एनईआर की परियोजना स्थिति:

मार्च 2025 तक, तेल और गैस सीपीएसई में ₹5 करोड़ या उससे अधिक लागत वाली 27 परियोजनाएँ कार्यान्वयनाधीन हैं, जिनकी कुल अनुमानित लागत ₹54,723 करोड़ है। चालू वित्त वर्ष 2024–25 में कुल 5 परियोजनाएँ पूरी हो चुकी हैं, जिनकी अनुमानित लागत ₹423 करोड़ है। इस वित्त वर्ष में एनईआर में परियोजनाओं पर कुल संचयी व्यय ₹10,325 करोड़ रहा। विवरण इस प्रकार है।

क्र. सं.	**परियोजना का प्रकार/क्षेत्र**	**चालू परियोजनाओं की कुल संख्या**	**लागत (करोड़ रुपए में)**		**चालू वित्त वर्ष के दौरान पूर्ण की गई परियोजनाएँ**	
			मूल	**अनुमानित**	**संख्या**	**अनुमानित लागत (करोड़ रुपए में)**
I	मेगा परियोजना (₹500 करोड़ से अधिक)	10	37,623	51,478	0	0
II	लघु परियोजना (₹500 करोड़ से कम)	17	3,294	3,244	5	423
कुल योग:		**27**	**40,918**	**54,723**	**5**	**423**

7.11 असम गैस क्रैकर्स परियोजना (अब ब्रह्मपुत्र क्रैकर एंड पॉलीमर लिमिटेड (बीसीपीएल):

असम गैस क्रैकर परियोजना (एजीसीपी) का प्रस्ताव भारत सरकार द्वारा 15 अगस्त, 1985 को हस्ताक्षरित असम समझौते के कार्यान्वयन के भाग के रूप में किया गया था। यह परियोजना देश के पिछड़े क्षेत्रों के औद्योगीकरण के माध्यम से समान विकास सुनिश्चित करने और सामाजिक–आर्थिक सुधारों को बढ़ावा देने की सरकार के प्रयासों का परिणाम है। असम राज्य में इस उद्देश्य को पूरा करने के लिए, भारत सरकार ने डिब्रूगढ़ जिले के लेपेटकाटा गाँव में एक पेट्रोकेमिकल

उद्योग स्थापित करने पर विचार किया। इसका लक्ष्य प्राकृतिक गैस के उच्च गुणवत्ता वाले हिस्सों का मूल्यवर्धन करना है, जिससे प्लास्टिक प्रोसेसिंग और सहायक उद्योगों के लिए अवसर पैदा हों और राज्य के समग्र आर्थिक विकास में प्रत्यक्ष और अप्रत्यक्ष रोजगार के नए अवसर सृजित हों।

यह परियोजना पूर्वोत्तर भारत का सबसे बड़ा पेट्रोकेमिकल परिसर है और बीसीपीएल के कारण पूर्वोत्तर क्षेत्र में पॉलिमर की खपत में उल्लेखनीय वृद्धि हुई है। बांग्लादेश, नेपाल, म्यांमार जैसे देशों के निकट होने के कारण यह संयंत्र एक महत्वपूर्ण स्थान रखता है और इसने बांग्लादेश और भूटान को पॉलिमर का निर्यात भी शुरू कर दिया है। इस संयंत्र में लगभग 700 स्थायी कर्मचारी कार्यरत हैं और ठेके के तहत लगभग 2600 कर्मचारी कार्यरत हैं। इसके अलावा, इस क्षेत्र में विक्रेताओं, ट्रांसपोर्टरों और आपूर्तिकर्ताओं के लिए भी बड़ी संख्या में रोजगार के अवसर सृजित होते हैं। कुल मिलाकर, इस परिष्कृत संयंत्र के आसपास एक सुदृढ़ आर्थिक और औद्योगिक पारिस्थितिकी तंत्र विकसित हुआ है। डाउनस्ट्रीम प्लास्टिक प्रोसेसिंग यूनिटें पूर्वोत्तर क्षेत्र में महत्वपूर्ण अतिरिक्त आय सृजन में सहायक होंगी। बीसीपीएल ने न केवल रोजगार के अवसर प्रदान किए हैं, बल्कि संयंत्र में काम करने वाले स्थानीय लोगों के कौशल विकास में भी योगदान दिया है। बीसीपीएल असम के लेपेटकाटा में पेट्रोकेमिकल परिसर में ब्यूटेन–1 और एचपीजी (द्वितीय चरण) नामक दो नए संयंत्र भी स्थापित कर रहा है।

एक ज़िम्मेदार कॉर्पोरेट नागरिक के रूप में, बीसीपीएल पूर्वोत्तर क्षेत्र के समग्र सामाजिक–आर्थिक विकास को बढ़ावा देने के लिए अपने संयंत्र और उसके आसपास विभिन्न सीएसआर पहलों को आगे बढ़ाता है। बीसीपीएल की सीएसआर पहलों के मुख्य क्षेत्रों में स्वास्थ्य और पोषण, स्वच्छता और सफाई, ग्रामीण विकास और कौशल विकास शामिल हैं। असम में इस कंपनी द्वारा शुरू की गई कुछ प्रमुख परियोजनाओं में सार्वजनिक स्वास्थ्य केंद्रों का बुनियादी ढांचा विकसित करना, बेरोजगार युवाओं के लिए व्यावसायिक प्रशिक्षण कार्यक्रम चलाना, स्कूलों में डिजिटल कक्षाओं की स्थापना, खेल बुनियादी ढांचे का विकास और सामुदायिक शौचालय का निर्माण शामिल हैं।

7.12 पूर्वोत्तर गैस ग्रिड:

पूर्वोत्तर गैस ग्रिड (एनईजीजी) परियोजना का कार्यान्वयन इंद्रधनुष गैस ग्रिड लिमिटेड (आईजीजीएल) द्वारा किया जा रहा है, जो आईओसीएल, ओएनजीसी, गेल, ओआईएल और एनआरएल की एक संयुक्त उद्यम कंपनी है। इस परियोजना का उद्देश्य पूर्वोत्तर के सभी आठ राज्यों अर्थात् असम, अरुणाचल प्रदेश, मेघालय, त्रिपुरा, मिजोरम, नागालैंड, मणिपुर और सिक्किम को प्राकृतिक गैस की आपूर्ति सुनिश्चित करना है। इसकी अनुमानित लागत ₹9,265 करोड़ है।

4.75 एमएमएससीएमडी क्षमता वाली 1670 किलोमीटर लंबी प्राकृतिक गैस पाइपलाइन ग्रिड पूर्वोत्तर भारत के कठिन क्षेत्रों से होकर गुजरती है और गुवाहाटी को क्षेत्र के प्रमुख शहरों जैसे ईटानगर, दीमापुर, कोहिमा, इम्फाल, आइजोल, अगरतला, शिलांग, सिलचर, गंगटोक और नुमालीगढ़ से जोड़ती है।

यह पाइपलाइन ग्रिड बरुआनी–गुवाहाटी पाइपलाइन (बीजीपीएल) के माध्यम से राष्ट्रीय गैस ग्रिड से जुड़ती है, जिसे पूर्वी भारत को राष्ट्रीय गैस ग्रिड से जोड़ने के लिए प्रधानमंत्री ऊर्जा गंगा परियोजना के तहत गेल इंडिया लिमिटेड द्वारा बनाया गया है।

आज तक, निर्धारित भौतिक प्रगति 90.03% के मुकाबले वास्तविक भौतिक प्रगति 85.30% है, और निर्धारित वित्तीय प्रगति 75.20% के मुकाबले वास्तविक वित्तीय प्रगति 68.86% है। हाल के दिनों में आईजीजीएल द्वारा हासिल की गई कुछ प्रमुख उपलब्धियाँ इस प्रकार हैं:

क) **एशिया की सबसे लंबी 5.7 किमी लंबी और 24 इंच व्यास वाली एचडीडी नदी क्रॉसिंग हाइड्रोकार्बन पाइपलाइन:** आईजीजीएल ने ब्रह्मपुत्र नदी के नीचे 24 इंच व्यास वाली हाइड्रोकार्बन पाइपलाइन बिछाने का कार्य सफलतापूर्वक पूरा कर लिया है। यह पाइपलाइन जोरहाट (पश्चिमी तट) और माजुली (उत्तरी तट) को जोड़ती है। इसकी कुल लंबाई 5.7 कि.मी., है, जिसे तीन खंडों में पूरा किया गया है – 1.0 कि.मी., 4.0 कि.मी. और 0.7 कि.मी. लंबाई वाले। पाइपलाइन का मध्य बिंदु नदी तल से 30 मीटर नीचे स्थित है।

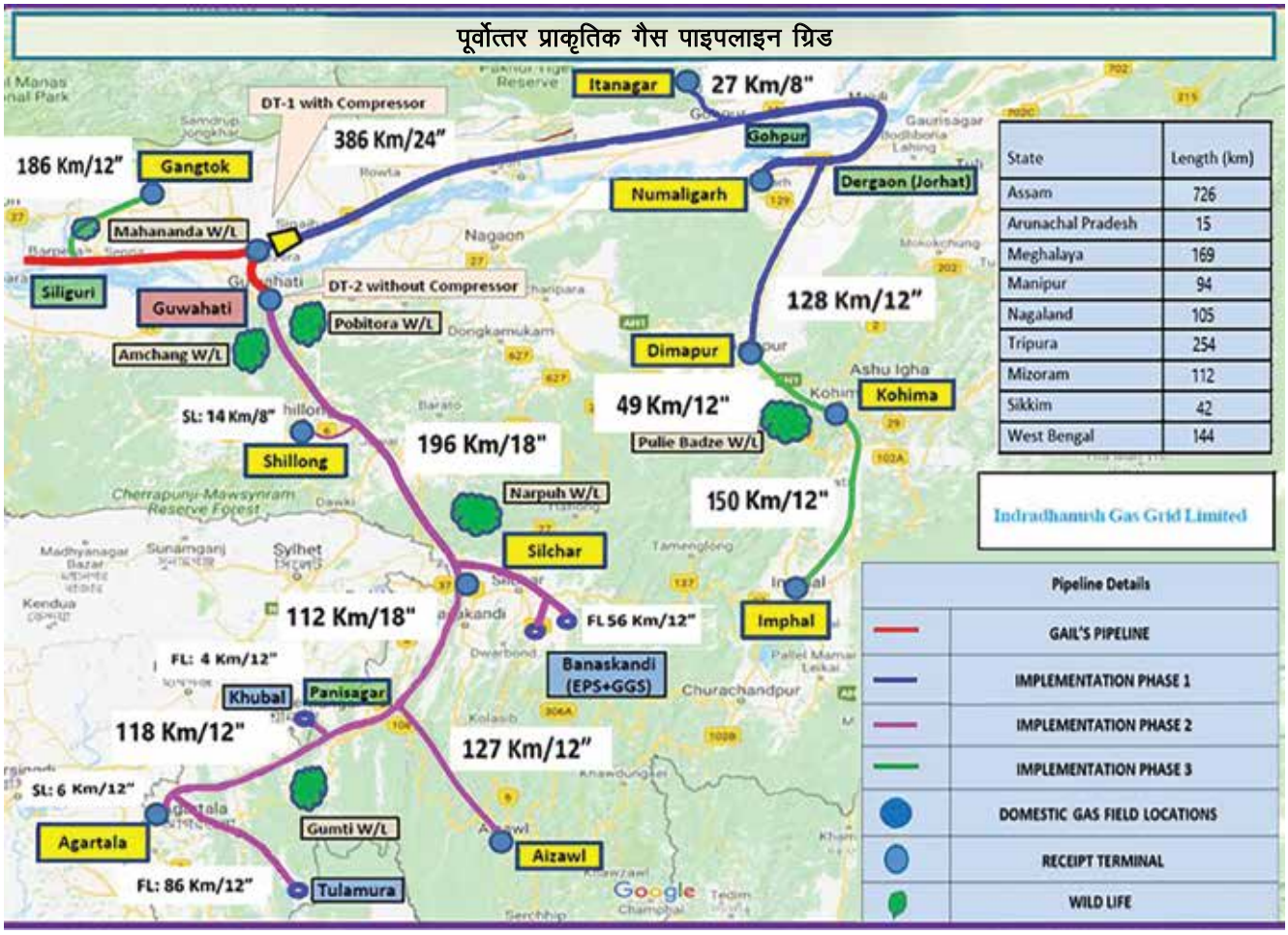
ख) **392 किलोमीटर लंबी गुवाहाटी–नुमालीगढ़ पाइपलाइन का शुभारंभ:** आईजीजीएल ने चरण–। में बैहाटा (गेल के साथ इंटरकनेक्शन बिंदु) से नुमालीगढ़ रिफाइनरी लिमिटेड (एनआरएल) तक 392 किलोमीटर लंबी पाइपलाइन का सफलतापूर्वक शुभारंभ किया, जो 16 जुलाई, 2025 को पूरी हुई। वर्तमान में, एनआरएल को गैस की आपूर्ति के लिए इस पाइपलाइन को 35 किलोग्राम/वर्ग सें.मी. के दबाव पर बनाए रखा गया है। इस पाइपलाइन के माध्यम से एनआरएल और जीएनपीएल मार्ग पर स्थित सीजीडी कंपनियां जैसे एनईजीडीसीएल और अन्य प्रमुख ग्राहकों को प्राकृतिक गैस पहुँचाई जा सकती है।

ग) **प्रमुख ग्राहकों के साथ जीटीए पर हस्ताक्षर:** एनआरएल के साथ गैस ट्रांसमिशन समझौते (जीटीए) पर हस्ताक्षर किए गए हैं। एनआरएल 1 सितंबर, 2025 तक जीएनपीएल खंड से 0.1 एमएमएससीएमडी की प्रारंभिक गैस मात्रा प्राप्त करेगा। साथ ही, जीएनपीएल

के एसवी–05 से नॉर्थ ईस्ट गैस डिस्ट्रीब्यूशन कंपनी लिमिटेड (एनईजीडीसीएल) को गैस पहुँचाने का काम भी प्रगति पर है और गैस का प्रवाह शीघ्र ही शुरू होने की संभावना है।

घ) **ग्रिड के साथ गैस स्रोत का संपर्क:** एनईजीजी के पहले चरण के पूरा होने पर, ओएनजीसी जोरहाट परिसंपत्ति से लगभग 2,07,000 एससीएम गैस ग्रिड में प्रवाहित होने लगेगी, जो वर्तमान में ग्रिड से जुड़ी नहीं है। इस मात्रा में गैस के प्रवाह की अनुमानित तिथि दिसंबर 2025 है, और यह गैस एनईजीजी की डेरगांव–दीमापुर पाइपलाइन के माध्यम से पहुँचेगी।

एनईजीजी के लाभ: एनईजीजी परियोजना एक रणनीतिक महत्व की परियोजना है। इसके कार्यान्वयन से उपभोक्ताओं को विश्वसनीय और निरंतर प्राकृतिक गैस आपूर्ति सुनिश्चित होगी। पूर्वोत्तर क्षेत्र में औद्योगिक और शहरी गैस वितरण नेटवर्क स्थापित होंगे, जिससे क्षेत्र के औद्योगिक और आर्थिक विकास को बढ़ावा मिलेगा, पर्यावरण का संरक्षण होगा और गैस आधारित अर्थव्यवस्था के विकास के लिए सरकार के प्रयासों में मदद मिलेगी।



पूर्वोत्तर प्राकृतिक गैस पाइपलाइन ग्रिड

7.13 कार्यान्वयनाधीन एनआरएल की परियोजनाएँ

7.13.1 नुमालीगढ़ रिफाइनरी विस्तार परियोजना (एनआरईपी): इस विस्तार परियोजना के दो मुख्य घटक हैं: (क) नुमालीगढ़ में 6 एमएमटीपीए क्षमता वाली रिफाइनरी, और (ख) पारादीप–नुमालीगढ़ क्रूड पाइपलाइन एवं कच्चे तेल के आयात टर्मिनल। परियोजना की स्वीकृत लागत ₹28,026 करोड़ है, जिसमें से ₹1,020 करोड़ पूंजीगत सब्सिडी के रूप में स्वीकृत की गई है। संशोधित लागत अनुमान ₹33,901 करोड़ है, जो वर्तमान में अनुमोदन के लिए पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय द्वारा समीक्षा की जा रही है।

i. नुमालीगढ़ में 6 एमएमटीपीए रिफाइनरी–: 31.03.2025 तक, कुल भौतिक प्रगति 71.88% और वित्तीय प्रगति 68.42% है।

ii. पारादीप नुमालीगढ़ क्रूड ऑयल पाइपलाइन (पीएनसीपीएल) और क्रूड ऑयल इम्पोर्ट टर्मिनल (सीओआईटी) – पाइपलाइन की लंबाई 1,635 किलोमीटर और क्षमता 9 एमएमटीपीए है। 31.03.2025 तक, कुल भौतिक प्रगति 83.8% और वित्तीय प्रगति 80.76% है।

एनआरईपी के तहत विस्तार परियोजना के अंतर्गत आने वाली प्रमुख इकाइयाँ निम्न प्रकार हैं:

क. **पेट्रोकेमिकल परियोजना:** इस परियोजना में नुमालीगढ़ में 360 केटीपीए क्षमता वाली पॉलीप्रोपाइलीन यूनिट (पीपीयू) और उससे संबंधित सभी सुविधाओं की स्थापना शामिल है। परियोजना पूरी होने के बाद, एनआरएल का पेट्रोकेमिकल तीव्रता सूचकांक (पीआईआई) 3.88% हो जाएगा। परियोजना के लिए पर्यावरणीय मंजूरी पहले ही प्राप्त कर ली गई है और ईआईएल को इस परियोजना के लिए ईपीसीएम के रूप में नियुक्त किया गया है। इसे वित्त वर्ष 2027–28 तक पूरा करने का लक्ष्य रखा गया है।

ख. **डीसीयू का पुनरुद्धार:** डीसीयू का पुनरुद्धार परियोजना में मौजूदा डिलेड कोकर यूनिट (डीसीयू) को पुनर्जीवित करना शामिल है। इसमें कोक ड्रम स्ट्रक्चरल पैकेज सहित आगामी अवशेष उन्नयन सुविधा से अपरिवर्तित तेल (यूसीओ) की प्रोसेसिंग की क्षमता 306 केटीपीए से बढ़ाकर 560 केटीपीए की जाएगी। डीसीयू की विश्वसनीयता और दक्षता बढ़ाने के लिए अतिरिक्त सुविधाएँ स्थापित की जा रही हैं, जैसे ऑफ गैस कंप्रेसर का ओवरहालिंग, प्रक्रिया उपकरण, नया सबस्टेशन भवन और डीसीएस उन्नयन।

ग. **दाबिदुबी एलपीजी सुविधा:** दाबिदुबी एलपीजी सुविधा के अंतर्गत एनआरएल असम के गोलाघाट जिले में अपनी नई एलपीजी सुविधा से जुड़ने के लिए 15 किलोमीटर लंबी भूमिगत एलपीजी पाइपलाइन बिछा रहा है। चालू होने के बाद इस नई एलपीजी सुविधा की क्षमता 700 केटीपीए होगी।

ग. **दाबिदुबी एलपीजी सुविधा:** दाबिदुबी एलपीजी सुविधा के अंतर्गत, एनआरएल असम के गोलाघाट जिले के दाबिदुबी में अपनी एलपीजी सुविधाओं से जुड़ने के लिए 15 किलोमीटर लंबी भूमिगत एलपीजी पाइपलाइन बिछा रहा है। चालू होने के बाद इस नई एलपीजी सुविधा की क्षमता 700 केटीपीए होगी।

घ. **पीएफसीसी यूनिट में पावर रिकवरी टर्बाइन:** पीएफसीसी यूनिट में पावर रिकवरी टर्बाइन: ऊर्जा बचत के लिए पीएफसीसीयू के रिएक्टर–रीजेनरेटर सेक्शन के डाउनस्ट्रीम में फ़्लू गैस सेक्शन में एक पावर रिकवरी टर्बाइन स्थापित किया जाएगा। इससे रीजेनरेटर फ़्लू गैस से बिजली उत्पन्न होगी, जिससे इकाई की ऊर्जा दक्षता बढ़ेगी और परिसर से सीओ2 उत्सर्जन में कमी आएगी।

7.13.2 2जी बायो रिफाइन एरी (संयुक्त उद्यम परियोजना): एनआरएल ने दो अन्य विदेशी निवेशकों के साथ मिलकर एक संयुक्त उद्यम कंपनी, "असम बायो–रिफाइनरी प्राइवेट लिमिटेड (एबीआरपीएल)" स्थापित की है। यह कंपनी असम के नुमालीगढ़ में दूसरी पीढ़ी की बायो–रिफाइनरी बना रही है, जहाँ गैर–खाद्य ग्रेड फीडस्टॉक जैसे बांस से एथेनॉल का उत्पादन किया जाएगा। बांस को अल्कोहल में परिवर्तित करने के लिए पहला परीक्षण सफलतापूर्वक पूरा कर लिया गया है।

7.13.3 नॉर्थ ईस्ट गैस ग्रिड परियोजना (संयुक्त उद्यम परियोजना): एनआरएल, संयुक्त उद्यम कंपनी "इंद्रधनुष गैस ग्रिड लिमिटेड (आईजीजीएल)" में 20% हिस्सेदारी के साथ भागीदार है। आईजीजीएल, नॉर्थ ईस्ट गैस ग्रिड परियोजना के तहत 4.75 मिलियन मीट्रिक मानक घन मीटर प्रति दिन (एमएमएससीएमडी) क्षमता वाली प्राकृतिक गैस पाइपलाइन बिछाने का कार्य कर रही है।

7.13.4 हरित हाइड्रोजन संयंत्र: राष्ट्रीय हरित हाइड्रोजन मिशन के अनुरूप और भविष्य में हरित हाइड्रोजन उपभोग दायित्व (जीएचसीओ) को पूरा करने के लिए, एनआरएल नुमालीगढ़ में ईपीसी आधार पर 300 किलोग्राम/घंटा (2.4 केटीपीए) क्षमता वाला हरित हाइड्रोजन संयंत्र स्थापित कर रहा है। यह संयंत्र रिफाइनरी में वर्तमान में उपयोग हो रहे ग्रे हाइड्रोजन का 5% प्रतिस्थापित करेगा, जिससे सालाना लगभग 24,000 टन सीओ2 उत्सर्जन में कमी आएगी।



डिगबोई, असम में पहला कूप



असम में ओआईएल सकर रॉड पंप



पूर्वोत्तर में तेल और गैस भूमि ड्रिलिंग रिग



बीसीपीएल की एथिलीन क्रैकिंग यूनिट

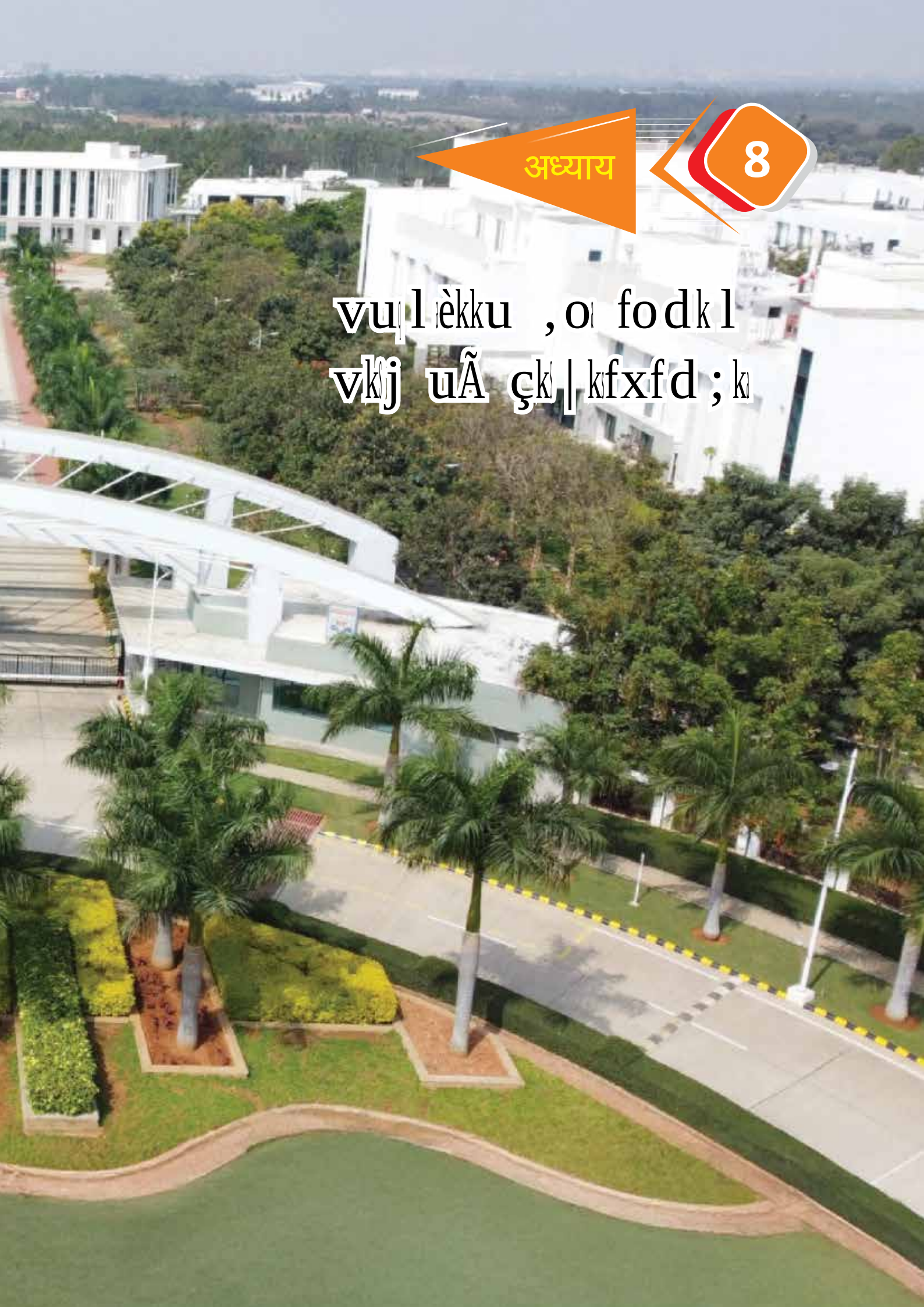


एनआरएल का पीएफसीसी मुख्य फ्रैक्शनेटर कॉलम निर्माण



ओएनजीसी के सीएसआर के तहत शिवसागर, असम में सिउ–का–फा मल्टी–स्पेशलिटी अस्पताल





अध्याय 8

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8 अनुसंधान एवं विकास और नई प्रौद्योगिकियां

तेल क्षेत्र की सार्वजनिक क्षेत्र की कंपनियाँ अपने अनुसंधान एवं विकास कार्यों को मुख्य रूप से तेल और गैस क्षेत्र के विभिन्न पहलुओं पर केंद्रित करती हैं। इनमें अन्वेषण और उत्पादन प्रौद्योगिकियां, शोधन प्रक्रियाएं, पेट्रोकेमिकल्स और ऊर्जा दक्षता शामिल हैं। कुछ सार्वजनिक क्षेत्र की कंपनियों ने अपने अनुसंधान एवं विकास कार्यक्रमों में नवीकरणीय ऊर्जा स्रोतों और स्वच्छ तकनीकों पर भी काम शुरू कर दिया है। व्यावसायिक रणनीति के तहत प्रतिस्पर्धी अनुसंधान, नवाचार और नए तरीकों की खोज को आवश्यक माना गया है।

क. **डाउनस्ट्रीम अनुसंधान एवं विकासः** आईओसीएल, एचपीसीएल, बीपीसीएल, ईआईएल, गेल और एमआरपीएल के अनुसंधान एवं विकास केंद्र रिफाइनरी और पेट्रोकेमिकल उत्पादों के मूल्यवर्धन पर काम कर रहे हैं। ये केंद्र कार्बन अवशोषण, उपयोग और पृथक्करण के साथ–साथ गैसीकरण, जैव ईंधन, अपशिष्ट जल उपचार, पाइपलाइन निरीक्षण, एचसीएनजी मिश्रण, हाइड्रोजन उत्पादन और भंडारण, ईंधन सेल और बैटरी तकनीक जैसे विषयों पर भी अनुसंधान कर रहे हैं।

ख. **अपस्ट्रीम अनुसंधान एवं विकासः** ओएनजीसी और ओआईएल के अनुसंधान एवं विकास केंद्र उन्नत तेल प्राप्ति, कार्बन कैप्चर, उपयोग और पृथक्करण, कोल बेड मीथेन, हाइड्रोजन उत्पादन और भंडारण, बैटरी और ऊर्जा भंडारण प्रणाली, और ईंधन सेल प्रौद्योगिकी आदि जैसे क्षेत्रों में काम कर रहे हैं।

8.1 ऑयल एंड नेचुरल गैस कॉरपोरेशन (ओएनजीसी):

ओएनजीसी अपने अनुसंधान संस्थानों के माध्यम से अनुकूलन और अनुप्रयुक्त अनुसंधान पर काम कर रहा है। इसके सभी अनुसंधान एवं विकास संस्थान अंतरराष्ट्रीय मानकीकरण संगठन (आईएसओ) द्वारा प्रमाणित हैं और इन्हें वैज्ञानिक एवं औद्योगिक अनुसंधान विभाग (डीएसआईआर), विज्ञान एवं प्रौद्योगिकी मंत्रालय द्वारा मान्यता प्राप्त है।

वर्ष 2024–25 में ओएनजीसी ने अपने विभिन्न संस्थानों में पारंपरिक और गैर–पारंपरिक हाइड्रोकार्बन से संबंधित कई अनुसंधान अध्ययन किए।

8.1.1 उद्योग–अकादमिक भागीदारीः

(i) **ओएनजीसी – पी.ए.एन आईआईटी सहयोगात्मक अनुसंधान कार्यक्रमः** हाइड्रोकार्बन और ऊर्जा के वैकल्पिक स्रोतों के अन्वेषण और उत्पादन को बढ़ाने के लिए स्वदेशी प्रौद्योगिकियों के विकास हेतु एक सामूहिक अनुसंधान एवं विकास कार्यक्रम पर काम करने के लिए ओएनजीसी ने 19 जनवरी 2015 को पी.ए.एन आईआईटी के साथ एक सहयोग–ज्ञापन (एमओसी) पर हस्ताक्षर किए हैं। पी.ए.एन आईआईटी सात प्रमुख भारतीय प्रौद्योगिकी संस्थानों, आईआईटी–खड़गपुर, आईआईटी कानपुर, आईआईटी–मद्रास, आईआईटी–बॉम्बे, आईआईटी–दिल्ली, आईआईटी–गुवाहाटी और आईआईटी–रुड़की का एक संघ है। यह निरंतर अनुसंधान, विकास और क्षमता निर्माण के लिए एक दीर्घकालिक पहल है। यह एक दीर्घकालिक पहल है जो अनुसंधान, विकास और क्षमता निर्माण को बढ़ावा देने के लिए शुरू की गई है। इस कार्यक्रम के तहत ओएनजीसी और आईआईटी खड़गपुर (सभी सात आईआईटी की ओर से) के बीच हुए समझौते के तहत अब तक चार चरणों में 40 अनुसंधान परियोजनाएं शुरू की जा चुकी हैं।

(ii) **सीओई–ओजीई परियोजनाएँः** तेल, गैस और ऊर्जा उत्कृष्टता केंद्र, पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय (एमओपीएनजी) द्वारा शुरू किया गया, भारतीय सार्वजनिक उपक्रमों (आईओसीएल, ओएनजीसी, एचपीसीएल, बीपीसीएल, गेल, ओआईएल और ईआईएल) और आईआईटी बॉम्बे के बीच एक संयुक्त

उत्कृष्टता केंद्र है। इसका उद्देश्य भारत के तेल और गैस क्षेत्र को जलवायु परिवर्तन, सीमित संसाधनों और बदलती वैश्विक प्रौद्योगिकियों से उत्पन्न चुनौतियों का सामना करने में सक्षम बनाना और उसे प्रतिस्पर्धी बढ़त देना है। इस पहल के तहत, 14 परियोजनाएँ शुरू की गई हैं और 8 परियोजनाएँ पूरी हो चुकी हैं।

(iii) सहयोग और समझौता–ज्ञापन (एमओयू):

क) भूविज्ञान अनुसंधान केडीएमआईपीई का रणनीतिक सहयोग: केशव देव मालवीय पेट्रोलियम अन्वेषण संस्थान (केडीएमआईपीई), ओएनजीसी, तेलंगाना अक्षय ऊर्जा विकास निगम लिमिटेड (टीजीआरईडीसीओ) और सिंगरेनी कोलियरीज कंपनी लिमिटेड (एससीसीएल), तेलंगाना के बीच "गोदावरी ग्राबेन, प्राणहिता–गोदावरी (पीजी) बेसिन, तेलंगाना, भारत में मनुगुरु भूतापीय क्षेत्र के अन्वेषण और विकास" पर एक त्रिपक्षीय समझौता–ज्ञापन पर दिनांक 02.08.2024 को हस्ताक्षर किए गए। यह समझौता–ज्ञापन सहयोगी अनुसंधान, विकास और नवाचार के क्षेत्रों पर केंद्रित होगा, जिससे संयुक्त परियोजनाओं और संयुक्त ज्ञान के मूल्यांकन को बढ़ावा मिलेगा। यह समझौता भूतापीय ऊर्जा अन्वेषण और दोहन पर विशेष ध्यान देने के साथ–साथ क्षेत्र सत्यापन पर पूरक प्रयासों के आधार पर पाँच (05) वर्षों की अवधि के लिए किया जाएगा।

ख) उप–बेसाल्ट इमेजिंग हेतु संयुक्त भूकंपीय एवं संभाव्य क्षेत्र विश्लेषण हेतु जियोपिक का बीएचयू के साथ सहयोग: उप–सतही इमेजिंग को बेहतर बनाने के लिए, जियोपिक ने बनारस हिंदू विश्वविद्यालय (बीएचयू) के साथ संयुक्त भूकंपीय एवं संभाव्य क्षेत्र विश्लेषण पर एक परियोजना समझौते पर हस्ताक्षर किए हैं। 25 जुलाई, 2022 को हस्ताक्षरित यह समझौता, संयुक्त विश्लेषण तकनीकों के माध्यम से कैम्बे बेसिन में बोआला क्षेत्र के पश्चिम में स्थित ब्लॉक सीबी–ओएनएचपी–2018/2 में उप–बेसाल्ट इमेजिंग को बेहतर बनाने पर केंद्रित है।

ग) रिजर्वायर अध्ययन संस्थान (आईआरएस), अहमदाबाद – अनुसंधान सहयोग: अहमदाबाद के रिजर्वायर अध्ययन संस्थान (आईआरएस) ने भी अंतर्राष्ट्रीय सहयोग के माध्यम से अपनी अनुसंधान क्षमता बढ़ाई है। टेक्सास विश्वविद्यालय (ऑस्टिन) के साथ मिलकर यह संस्थान रासायनिक रूप से संवर्धित तेल रिकवरी (सीईआरओ) तकनीकों पर काम कर रहा है, जिससे भारतीय रिजर्वायर से तेल रिकवरी की दक्षता बढ़ाई जा सके। इसके अतिरिक्त, कैलगरी विश्वविद्यालय के सहयोग से, आईआरएस उन्नत जल अंतःक्षेपण विधियों के माध्यम से तेल विस्थापन दक्षता में सुधार करने के लिए हीरा क्षेत्र में लोएसएएल (कम लवणता जल बाढ़) तकनीक लागू कर रहा है। आईआरएस गुजरात में ओएनजीसी क्षेत्रों में रेजिडेंट माइक्रोबियल संवर्धित उत्पादन पायलट पर द एनर्जी एंड रिसोर्सेज इंस्टीट्यूट (टीईआरआई), दिल्ली के साथ भी काम कर रहा है। इसके अलावा, आईआईटी बॉम्बे में कार्बन अवशोषण, उपयोग और भंडारण (सीसीयूएस) के राष्ट्रीय उत्कृष्टता केंद्र के सहयोग से, आईआरएस ने चयनित ओएनजीसी क्षेत्रों में सीओ भंडारण क्षमता, जोखिम मूल्यांकन और जीवन चक्र विश्लेषण का व्यापक अध्ययन किया है, जो भारत में स्थायी कार्बन प्रबंधन कार्यों को बढ़ावा देता है।

घ) जैव प्रौद्योगिकी और भूविज्ञान संस्थान (आईएनबीआईजीएस), जोरहाट – स्थिरता और रिकवरी पहल: सीएसआईआर–पूर्वोत्तर विज्ञान और प्रौद्योगिकी संस्थान (एनईआईएसटी), जोरहाट, असम के साथ मिलकर ओएनजीसी असम और असम अराकान बेसिन से अपशिष्ट जल–शोधन के लिए एक झिल्ली–आधारित प्रक्रिया विकसित कर रहा है, जिसमें जोरहाट कार्य केंद्र में पानी के दोबारा इस्तेमाल पर जोर दिया जा रहा है। इसके अतिरिक्त, तेजपुर विश्वविद्यालय के साथ ओएनजीसी का सहयोग कई शोध पहलों को आगे बढ़ा रहा है, जिसमें कच्चे तेल के बायोरेमेडिएशन के लिए फाइटोरेमेडिएशन प्रोटोकॉल का विकास, माइक्रो–एयरोफिलिक/एनारोबिक बैक्टीरियल कंसोर्टियम का उपयोग करके पेट्रोलियम हाइड्रोकार्बन दूषित मिट्टी और पानी का जैव सुधार और ऊपरी असम बेसिन में हाइड्रोकार्बन रिकवरी में सुधार के लिए माइक्रोबियल एन्हांस्ड ऑयल रिकवरी (एमईओआर) स्लग का निर्माण शामिल है।

ङ) ओएनजीसी उन्नत प्रशिक्षण संस्थान (एटीआई), गोवा–अपतटीय सुरक्षा एवं पर्यावरण निगरानी: ओएनजीसी उन्नत प्रशिक्षण संस्थान (एटीआई), गोवा ने पर्यावरण निगरानी और अपतटीय सुरक्षा को बेहतर बनाने के लिए प्रमुख अनुसंधान संस्थानों के साथ

साझेदारी की है। इसरो–एनआरएससी के सहयोग से, एटीआई ने पश्चिमी अपतटीय क्षेत्र में तेल रिसाव की उपग्रह निगरानी पर एक परियोजना शुरू की है, जिसमें रिसाव का पता लगाने और प्रतिक्रिया तंत्र को मज़बूत करने के लिए उन्नत सुदूर संवेदन तकनीकों का उपयोग किया जा रहा है। इसके अलावा, सीएसआईआर–राष्ट्रीय समुद्र विज्ञान संस्थान (एनआईओ) के साथ मिलकर, एटीआई अपतटीय डब्ल्यूएन2 प्लेटफ़ॉर्म (एनएलएम और एचआरए परिसंपत्ति) के पास एक क्रेटर निर्माण पर अध्ययन कर रहा है ताकि भूवैज्ञानिक और पर्यावरणीय जोखिमों का मूल्यांकन किया जा सके।

च) **ड्रिलिंग प्रौद्योगिकी संस्थान (आईडीटी), देहरादून – ड्रिलिंग अनुसंधान एवं वैश्विक पहुँच:** ड्रिलिंग प्रौद्योगिकी संस्थान (आईडीटी), देहरादून रणनीतिक सहयोग के माध्यम से अपने अनुसंधान और वैश्विक पहुँच को मज़बूत कर रहा है। आईआईटी खड़गपुर के साथ एक समझौता–ज्ञापन के तहत, आईडीटी 230° से. तक के तापमान को सहन करने में सक्षम तापीय रूप से स्थिर योजक और उच्च–निष्पादन ड्रिलिंग तरल पदार्थ विकसित कर रहा है। इसके अलावा, आरजीआईपीटी, जायस, अमेठी के साथ एक समझौता–ज्ञापन ड्रिलिंग तकनीक में और प्रगति को बढ़ावा दे रहा है। अपनी अंतर्राष्ट्रीय भागीदारी का विस्तार करते हुए, आईडीटी ने 18 दिसंबर 2024 को कोलंबिया स्थित ओएनजीसी विदेश लिमिटेड के साथ कूप इंजीनियरिंग सेवाओं के लिए एक संविदा पर हस्ताक्षर किए हैं, जिसमें कोलंबिया के सीपीओ–5 ब्लॉक में अत्यधिक बहाव वाले कूपों के लिए 4सीपी केसिंग की डिज़ाइनिंग और सत्यापन शामिल है।

छ) **वेल लॉगिंग प्रौद्योगिकी उत्कृष्टता केंद्र, वडोदरा – उपसतह अन्वेषण:** वेल लॉगिंग प्रौद्योगिकी उत्कृष्टता केंद्र, वडोदरा, रूस के स्कोल्टेक के साथ एक सहयोगी परियोजना के माध्यम से उपसतह अन्वेषण को आगे बढ़ा रहा है। यह परियोजना भारतीय बेसिनों में थर्मल पेट्रो भौतिकी अध्ययनों की प्रासंगिकता को समझने और उसकी खोज पर केंद्रित है, जिससे अन्वेषण तकनीकों को बेहतर बनाने और हाइड्रोकार्बन रिकवरी रणनीतियों को बढ़ाने में ओएनजीसी के प्रयासों में और योगदान मिलेगा।

उत्पादन अभियांत्रिकी एवं महासागर प्रौद्योगिकी संस्थान (आईपीईओटी) ने आईआईटी (आईएसएम)–धनबाद के साथ मिलकर "कार्बोनेट रिजर्वायरों में जल एवं गैस शट–ऑफ हेतु नैनो पदार्थ आधारित कण जेल प्रणाली का विकास" नामक एक सहयोगी परियोजना शुरू की है। इस संबंध में दिनांक 21.03.2025 को एक पेटेंट दायर किया गया है।

8.1.2 **आईओआर/ईओआर गतिविधियों के क्षेत्र में ओएनजीसी द्वारा अनुसंधान एवं विकास पहल:** रिकवरी फैक्टर को 40% तक बढ़ाना ओएनजीसी के रणनीतिक लक्ष्यों में से एक है। अहमदाबाद स्थित रिजर्वायर अध्ययन संस्थान (आईआरएस) अपनी प्रमुख परिसंपत्तियों में उन्नत तेल रिकवरी (आईओआर) और उन्नत तेल रिकवरी (ईओआर) पहलों का नेतृत्व कर रहा है, और हाइड्रोकार्बन रिकवरी को बढ़ाने के लिए प्रायोगिक परियोजनाओं और व्यावसायिक स्तर के कार्यान्वयन को जोड़ रहा है। संगठन ने मेहसाणा, अहमदाबाद, असम और जोरहाट जैसे क्षेत्रों में पॉलिमर फ्लडिंग, सर्फेक्टेंट पॉलिमर (एसपी) और अल्कली–सर्फेक्टेंट पॉलिमर (एएसपी) अंत–क्षेपण, गैस अंत–क्षेपण (जीआई), और थर्मल रिकवरी विधियों को लागू करने में उल्लेखनीय प्रगति की है।

8.1.3 **वर्ष 2024–25 में प्रमुख अनुसंधान एवं विकास प्रगति में निम्नलिखित शामिल हैं:**

(i) **लानवा और चराडा क्षेत्रों में चक्रीय भाप उद्दीपन (सीएसएस):** ओएनजीसी ने लानवा क्षेत्र में अपने पहले सीएसएस पायलट को सफलतापूर्वक लागू किया, जिसमें प्रयोगशाला अध्ययनों और रिजर्वायर मॉडलिंग का उपयोग किया गया। इस पहल से सात कूपों की उत्पादकता 7–8 गुना बढ़ी और लगभग 75 टन प्रतिदिन उत्पादन में योगदान मिला।

(ii) **कासोमारीगांव में गैस–सहायता प्राप्त गुरुत्वीय जल निकासी (जीएजीडी):** इस योजना में मध्य–मार्ग सुधारों ने गैस की लपटों को कम किया और तेल उत्पादन को 120 घन मीटर प्रतिदिन बढ़ाया। वर्तमान में, यह परियोजना ओएनजीसी के संधारणीय विकास लक्ष्यों के अनुरूप 25,000–27,000 घन मीटर प्रतिदिन गैस का अंत–क्षेपण कर रही है।

(iii) **मुंबई हाई में कम लवणीयता वाले पानी का इस्तेमाल करके तेल निकालने की तकनीक (एलएसडब्लूएफ):** एमएचएस एल–।।। में एक प्रायोगिक प्रोजेक्ट ने जल कटौती को सफलतापूर्वक स्थिर किया और तेल की कमी को रोका, जिससे अतिरिक्त तेल प्राप्त हुआ। इन परिणामों से उत्साहित होकर, ओएनजीसी ने मुंबई हाई नॉर्थ फील्ड में एलएसडब्ल्यूएफ के विस्तार के लिए व्यवहार्यता अध्ययन पूरा कर लिया है।

ये प्रमुख आईओआर/ईओआर परियोजनाएँ दिखाती हैं कि ओएनजीसी परिपक्व क्षेत्रों से अधिकतम हाइड्रोकार्बन वसूली के लिए टिकाऊ और प्रौद्योगिकी आधारित समाधान अपनाकर उत्पादन दक्षता बढ़ाने के प्रति प्रतिबद्ध है।

8.1.4 **ओएनजीसी द्वारा पंजीकृत अनुसंधान एवं विकास पेटेंट:** वित्त वर्ष 2024–25 के दौरान, ओएनजीसी ने आठ पेटेंट हासिल किए और बारह पेटेंट आवेदन दायर किए। इसके अतिरिक्त, छह कॉपीराइट पंजीकृत किए गए और नौ कॉपीराइट आवेदन दायर किए गए।

8.1.5 **ओएनजीसी में शामिल नई प्रौद्योगिकियां:** वर्ष 2024–25 के दौरान मूल्यांकित/शामिल प्रौद्योगिकियों की मुख्य विशेषताएं नीचे दी गई हैं।

(i) **एलएनजी संयंत्र और कार्बन उत्सर्जन में कमी के लिए समझौता–ज्ञापन:** ओएनजीसी ने विंध्य बेसिन में हाट गैस क्षेत्र के पास एक लघु–स्तरीय तरलीकृत प्राकृतिक गैस (एलएनजी) संयंत्र स्थापित करने के लिए आईओसीएल के साथ एक समझौता–ज्ञापन पर हस्ताक्षर किए हैं। यह पहल बेसिन को श्रेणी ।। से श्रेणी । में उन्नत करेगी और कार्बन उत्सर्जन को कम करने के लिए उन्नत तकनीकों का उपयोग करेगी। यह भारत की अपनी तरह की पहली प्रौद्योगिकी निष्पादन परियोजना है।

(ii) **केडीएमआईपीई में उन्नत प्रयोगशाला सुविधाएँ:** केडीएमआईपीई स्थित स्रोत चट्टान प्रयोगशाला के लिए एक अत्याधुनिक यूवी–रमन स्पेक्ट्रोमीटर खरीदा गया है, जिससे ओएनजीसी की भूवैज्ञानिक इतिहास के पुनर्निर्माण और हाइड्रोकार्बन संरचना का निर्धारण करने की क्षमता में वृद्धि होगी। इसके अतिरिक्त, वैकल्पिक ऊर्जा स्रोतों और हाइड्रोकार्बन अन्वेषण में अत्याधुनिक अनुसंधान के लिए एक हीलियम और हाइड्रोजन प्रयोगशाला स्थापित की जा रही है।

(iii) **रियल–टाइम ड्रिलिंग ऑपरेशंस सेंटर (आरटीडीओसी):** रियल–टाइम ड्रिलिंग ऑपरेशंस सेंटर, तटीय और अपतटीय दोनों रिगों की निगरानी करके ओएनजीसी के ड्रिलिंग कार्यों को सुव्यवस्थित बनाता है। यह एकीकृत कमांड सेंटर निर्णय लेने की क्षमता को बढ़ाता है, डाउनटाइम को कम करता है और प्रचालन दक्षता में सुधार करता है।

(iv) **ड्रिलिंग प्रौद्योगिकी में डिजिटल प्रगति**

- **डिजिटल कूपों कार्यक्रम (डीडब्ल्यूपी):** नवंबर 2024 में लॉन्च किया गया यह क्लाउड–आधारित एप्लिकेशन कूपों की योजना बनाने और कार्यान्वयन को आसान बनाने के लिए स्वचालित वर्कफ़्लो को एक साथ जोड़ता है।
- **कूपों सूचना प्रणाली (डब्ल्यूआईएस):** दिसंबर, 2024 में शुरू किया गया यह प्लेटफॉर्म ड्रिलिंग कार्यों के लिए वास्तविक समय पर निर्णय लेने और डेटा विश्लेषण की सुविधा प्रदान करता है।
- **ड्रिलिंग बिलीफ एनालिटिक्स (डीबीए):** तीन कूपों में परीक्षण के रूप में लागू यह प्रणाली इंटेलिजेंट विश्लेषण का उपयोग करके ड्रिलिंग मानदंडों को बेहतर बनाती है।
- **डॉग–लेग रीमर (डीएलआर):** राजमुंदरी कूपों में परीक्षण किया गया यह उपकरण वेलबोर की स्थिरता बढ़ाता है और ड्रिलिंग के जोखिम को कम करता है।

(v) **एआई–सक्षम कूपों और उन्नत तेल रिकवरी (ईओआर) नवाचार:** अहमदाबाद स्थित रिजर्वायर अध्ययन संस्थान (आईआरएस) ने गंधार क्षेत्र में भारत का पहला एआई–सक्षम कूपों स्थापित किया है, जो एआई–प्रचालित तेल पुनर्प्राप्ति अनुकूलन की दिशा में एक महत्वपूर्ण कदम है। अतिरिक्त ईओआर तकनीकों में शामिल हैं:

- **चक्रीय भाप उत्तेजना (सीएसएस):** अति–भारी तेल वसूली के लिए नए क्षेत्रों में तैनात।
- **गैस–सहायता प्राप्त गुरुत्वाकर्षण जल निकासी (जीएजीडी):** बेहतर गैस अंत क्षेपन दक्षता के लिए कासोमारीगांव क्षेत्र में कार्यान्वित किया गया।

- **निम्न–लवणता वॉटर फ्लडिंग़ (एलएसडब्लूएफ):** मुंबई हाई साउथ (एमएचएस) में शुरू किया गया तथा मुंबई हाई नॉर्थ में पूर्ण पैमाने पर लागू करने की योजना है।
- आईआरएस ने अपनी थर्मल उन्नत ईओआर लैब को हाई–प्रेशर रिच गैस थर्मल ऑक्सीडेशन (एचपीआरटीओ) और हाई–प्रेशर एयर अंतःक्षेपण (एचपीएआई) प्रणालियों के साथ उन्नत किया है, जिससे थर्मल और हाइब्रिड रिकवरी विधियों में अनुसंधान को बढ़ावा मिला है।

(vi) **उन्नत रिजर्वायर गुणांकन उपकरण:** वेल लॉगिंग प्रौद्योगिकी उत्कृष्टता केंद्र, वडोदरा में नए उच्च तकनीक वाले उपकरण पेश किए गए हैं:

- **कैप्री पूर्णतः स्वचालित केशिका प्रणाली:** यह सटीक पेट्रो भौतिक अध्ययन के लिए केशिका दबाव माप को बढ़ाती है।
- **इलेक्ट्रॉनिक विश्लेषणात्मक संतुलन:** यह सरंध्रता–पारगम्यता विश्लेषण के लिए सटीक वजन माप सुनिश्चित करता है।
- **चिलर यूनिट:** सॉक्सिलेशन यूनिट के साथ जुड़कर, यह तापमान नियंत्रण और जल संरक्षण को बेहतर बनाती है और उन्नत रिजर्वायर लक्षण अध्ययन में मदद करती है।

(vii) **आईपीईओटी में तेल एवं गैस उत्पादन में नवाचार:** उत्पादन इंजीनियरिंग एवं महासागर प्रौद्योगिकी संस्थान (आईपीईओटी), पनवेल ने उत्पादन दक्षता में सुधार के लिए कई उन्नत प्रौद्योगिकियां शुरू की हैं:

- **सिंगल फेज़ रिटार्डेड एसिड सिस्टम (एसपीआरएएस):** चूना पत्थर भंडार प्रोत्साहन के लिए पारंपरिक पायसीकारी एसिड का एक बेहतर विकल्प।
- **पीएलए डायवर्टर के साथ एसिड फ्रैक:**
- स्वयं–विघटनशील और किफायती डायवर्टर का उपयोग करके सख्त चूना पत्थरों से उत्पादन बढ़ाता है।
- **कार्बनिक क्ले एसिड:** संरचनाओं को सुरक्षित रखते हुए उत्पादन बढ़ाने के लिए उच्च तापमान वाले बलुआ पत्थर भंडार के लिए डिज़ाइन किया गया।
- **रिग रहित वॉटर शट–ऑफ (आरपीएम):** यह रिग की आवश्यकता के बिना अत्यधिक जल उत्पादन को नियंत्रित करने की एक कुशल विधि है।
- **फाइबर फ्रैक्चरिंग तकनीक:** यह तटवर्ती क्षेत्रों में प्रॉपेंट के फ्लोबैक को रोकती है, जिससे वर्कओवर की लागत कम होती है।
- **रेत संचयन प्रणाली:** परगम्यता बनाए रखते हुए रेत के उत्पादन को स्थिर करती है।

यह प्रगति ओएनजीसी की तकनीकी उत्कृष्टता, प्रचालन दक्षता और संधारणीय हाइड्रोकार्बन अन्वेषण एवं उत्पादन के प्रति प्रतिबद्धता को दर्शाती है। पिछले पाँच वर्षों में, ओएनजीसी ने नवीनतम प्रौद्योगिकी प्राप्त करने के लिए उद्योग जगत के अग्रणी संगठनों के साथ साझेदारी की है और विभिन्न सहयोगात्मक अनुसंधान एवं विकास कार्य किए हैं:

संस्थान/ संगठन	प्रमुख क्षेत्र
एक्सॉन मोबिल	पूर्वी और पश्चिमी तट पर अपतटीय और अन्य पीईएल ब्लॉकों में सीमांत क्षेत्रों में संयुक्त तकनीकी अध्ययन और सहयोग तथा संयुक्त रूप से ईओआई/बोली प्रस्तुत करने के लिए खुले क्षेत्र।
शेवरॉन न्यू वेंचर्स पीटीई लिमिटेड	ओएनजीसी द्वारा प्रचालित और खुले अपतटीय क्षेत्रों का संयुक्त अन्वेषण मूल्यांकन।
शेल	यह सीसीयूएस अध्ययन, भारत में "प्रमुख बेसिनों" के लिए संयुक्त सीओ2 भंडारण अध्ययन और ईओआर स्क्रीनिंग मूल्यांकन पर ध्यान केंद्रित करता है, जिसमें निष्क्रिय तेल एवं गैस क्षेत्र और खारे जलभृत शामिल हैं।
कैलगरी विश्वविद्यालय (यूओसी), कनाडा	उच्च दबाव वायु अंतःक्षेपण उपकरण का प्रशिक्षण, रखरखाव और सेवा।

संस्थान/ संगठन	प्रमुख क्षेत्र
ओक्लाहोमा विश्वविद्यालय, अमेरिका	जियोपिक, ओएनजीसी, अमेरिका के ओक्लाहोमा विश्वविद्यालय में एट्रिब्यूट असिस्टेड सिस्मिक डेटा प्रोसेसिंग एंड इंटरप्रिटेशन (एएएसपीआई) कंसोर्टियम का सदस्य है। यह परिसंघ अनुसंधान कर रहा है, नए कार्यप्रवाह विकसित कर रहा है और एएएसपीआई सॉफ्टवेयर पैकेज को एकीकृत कर रहा है, जो भूकंपीय विश्लेषण में अत्यंत सक्षम है और कई बहुराष्ट्रीय कंपनियों द्वारा उपयोग किया जाता है। विशेषज्ञ नियमित रूप से जीईओपीआईसी अधिकारियों की तकनीकी प्रश्नों में मदद कर रहे हैं
संघ शासित प्रदेश प्रशासन लद्दाख और एलएएचडीसी, लेह और आइसलैंड भू–सर्वेक्षण (आईएसओआर)	लद्दाख में भारत की पहली भूतापीय क्षेत्र विकास परियोजना की स्थापना के लिए। भारत की पहली भूतापीय क्षेत्र की स्थापना में विशेषज्ञता प्रदान करने के लिए।
स्कोल्कोवो इंस्टीट्यूट ऑफ विज्ञान और प्रौद्योगिकी (स्कोल्टेक), मॉस्को	भारतीय बेसिनों में थर्मल पेट्रोफिजिक्स अध्ययन की प्रासंगिकता को समझना और उसका अन्वेषण करना। भारतीय बेसिनों पर लागू गैस हाइड्रेट अनुसंधान एवं प्रौद्योगिकी।

8.1.6 अनुसंधान एवं विकास अध्ययनों से प्राप्त लाभः

ओएनजीसी की सभी अनुसंधान और विकास परियोजनाओं ने तेज़ और प्रभावी अन्वेषण व उत्पादन गतिविधियों को संभव बनाया है। संस्थानों द्वारा किए गए अनुसंधान कार्यों ने आधुनिक तकनीकों के उपयोग से मौजूदा तेल क्षेत्रों में नए तेल की खोज में मदद की है, जिससे भंडार बढ़ा है और कंपनी की सफलता दर में सुधार हुआ है। इन गतिविधियों से रिकवरी फैक्टर में सुधार, तेल उत्पादन में वृद्धि, सीमांत बेसिनों और गहरे पानी के ब्लॉकों में अन्वेषण की चुनौतियों को कम करने और अपारंपरिक ऊर्जा संसाधनों के दोहन में मदद मिली है। अनुसंधान कार्यों ने हाइड्रोकार्बन अन्वेषण और संसाधन मूल्यांकन को भी मज़बूत किया है। इसके मुख्य लाभों में बेहतर भूवैज्ञानिक मॉडल, संरचनात्मक और स्तरीय विश्लेषण, और पेट्रोलियम प्रणाली मॉडलिंग का विकास शामिल है, जिससे अन्वेषण रणनीतियाँ और प्रभावी बनी हैं। इन अध्ययनों ने ऊर्जा परिवर्तन पहलों को सहयोग देते हुए भंडार विश्लेषण, कार्बन भंडारण क्षमता मूल्यांकन, और भूतापीय ऊर्जा के अध्ययन में भी सुधार किया है।

पूरी की गई अनुसंधान और विकास परियोजनाएँ व्यावहारिक उपयोग वाली हैं। इनसे भूकंपीय प्रोसेसिंग, व्याख्या, जटिल रिजर्वायर अध्ययन और मॉडलिंग में आने वाली चुनौतियों को हल करने में मदद मिली है। विकसित किए गए एआई/एमएल आधारित समाधान अधिक प्रभावी हैं, जिनसे मूल्यवर्धन और समय की बचत दोनों होती है।

ओएनजीसी के अनुसंधान और विकास प्रयास पारंपरिक हाइड्रोकार्बन उत्पादन बढ़ाने और हरित ऊर्जा की ओर बढ़ने पर केंद्रित हैं। कार्बन उत्सर्जन घटाने के लिए, ओएनजीसी वर्ष 2038 तक नेट–ज़ीरो उत्सर्जन हासिल करने की अपनी योजना के तहत सौर, पवन (तटीय और अपतटीय) और हरित हाइड्रोजन जैसी नवीकरणीय ऊर्जा परियोजनाओं में बड़े पैमाने पर निवेश कर रही है। इसके अलावा, कंपनी बायोगैस, ऊर्जा दक्षता और अन्य क्षेत्रों में भी अनुसंधान कर रही है। लक्ष्य है वर्ष 2030 तक गैस फ्लेयरिंग को पूरी तरह समाप्त करना। एचएसई क्षेत्र में, ओएनजीसी पहला भारतीय पीएसयू बना है जिसे एनईबीओएसएच गोल्डन लर्निंग पार्टनर का दर्जा मिला है।

8.1.7 अनुसंधान एवं विकास व्यय

वित्त वर्ष	अनुसंधान एवं विकास व्यय (करोड़ रुपए में)
2021–22	531.58
2022–23	569.84
2023–24	686.68
2024–25	458.63
कुल	2246.73

8.2 ऑयल इंडिया लिमिटेड (ओआईएल):

ओआईएल ने दुलियाजान स्थित अपने फील्ड मुख्यालय में दो ज्ञान–आधारित असम अनुसंधान एवं विकास केंद्र स्थापित किए जो अनुसंधान एवं विकास विभाग (आरएंडडी) और गुवाहाटी असम में ऊर्जा अध्ययन उत्कृष्टता केंद्र (सीओईईएस) है ये केंद्र ऊर्जा उद्योग की चुनौतियों के लिए नवीन और किफायती समाधान विकसित करते हैं, खासतौर पर ओआईएल की जरूरतों को ध्यान में रखते हुए। दोनों केंद्रों को भारत सरकार के विज्ञान और प्रौद्योगिकी मंत्रालय के वैज्ञानिक और औद्योगिक अनुसंधान विभाग (डीएसआईआर) से मान्यता–प्राप्त है। इसके अलावा, सीओईईएस को एमओपीएंडएनजी की ईआर नीति, 2018 के अनुसार, 24 नवंबर 2020 से उन्नत रिकवरी परियोजनाओं की समीक्षा और जांच के लिए एक नामित संस्थान के रूप में भी मान्यता दी गई है।

8.2.1 दुलियाजान, असम में अनुसंधान एवं विकास केंद्र से संबंधित गतिविधियाँ

8.2.1.1 उद्योग–अकादमिक सहयोग:

i) ऑयल इंडिया लिमिटेड ने वर्ष 2023 में नई दिल्ली में अखिल सीएसआईआर प्रयोगशालाओं के साथ एक समझौता–ज्ञापन (एमओयू) पर हस्ताक्षर किए हैं ताकि ऑयल इंडिया लिमिटेड के अन्वेषण और उत्पादन प्रचालन के साथ–साथ वैकल्पिक ऊर्जा पर सहयोगात्मक अनुसंधान शुरू किया जा सके। इस समझौता–ज्ञापन के अंतर्गत, सीएसआईआर–आईआईपी, देहरादून और सीएसआईआर–एनजीआरआई, हैदराबाद के साथ अनुसंधान के अग्रणी क्षेत्रों में तीन परियोजनाएँ शुरू की गई हैं:

क) सीओ$_2$ से सिंथेटिक विमानन ईंधन (एसएएफ) उत्पादन पर व्यवहार्यता अध्ययन।

ख) डीजल–मेथनॉल मिश्रण (चरण– I) के लिए योजक के विकास पर अध्ययन।

ग) उप–सतही नमूनों से क्रोनोस्ट्रेटीग्राफिक और उद्गम विश्लेषण। कुछ अन्य परियोजनाओं का कार्य भी चल रहा है।

(ii) ओआईएल जल प्रबंधन, प्रवाह आश्वासन, अवशोषित प्राकृतिक गैस, ऊर्जा भंडारण और हरित हाइड्रोजन उत्पादन जैसी कई परियोजनाओं पर आईआईटी बॉम्बे के साथ मिलकर काम कर रहा है। इन परियोजनाओं में निम्नलिखित शामिल हैं:

क) ड्रिलिंग साइट अपशिष्ट जल प्रबंधन – प्रोटोटाइप विकास।

ख) उत्पादित पानी के उपचार के साथ संसाधनों की रिकवरी और शून्य तरल अपशिष्ट (जेडएलडी) रणनीतियों का विकास।

ग) रसायन के साथ और बिना रसायन के परिवहन पाइपलाइनों में मोम जमने की प्रक्रिया का अध्ययन।

घ) उन्नत बैटरी प्रौद्योगिकियां

ङ) हरित हाइड्रोजन उत्पादन: इलेक्ट्रोलाइजर प्रौद्योगिकी का स्वदेशीकरण, लागत में कमी और निष्पादन में वृद्धि ।

च) स्थायी ईंधन और रसायनों के लिए कैटेलिस्ट और प्रक्रिया विकास।

(iii) आईआईटी गुवाहाटी के साथ भी सक्रिय अनुसंधान सहयोग है। "तेल और गैस अनुप्रयोगों के लिए नैनोमटेरियल का विकास और ओआईएल में नैनोटेक्नोलॉजी प्रयोगशाला की स्थापना" पर अध्ययन जारी है।

(iv) तेल अनुसंधान एवं विकास विभाग आईआईटी जोधपुर के साथ मिलकर "कृत्रिम प्रकाश संश्लेषण के ज़रिए सीआ$_2$ को प्रभावी ढंग से सोखकर हरित ईंधन में बदलने के लिए 2डी–3डी संरचना वाले हरित कैटेलिस्ट" पर एक संयुक्त परियोजना पर काम कर रहा है।

8.2.1.2 ओआईएल द्वारा शुरू की गई आंतरिक आरएंडडी परियोजनाएं

(i) निंगरू पीएमएल ब्लॉक से लिए गए सभी आवश्यक मृदा नमूनों का विश्लेषण किया गया और उनमें मौजूद अवशोषित गैस की जांच की गई।

(ii) रिजर्वायर निरंतरता अध्ययन: ऊपरी असम क्षेत्र के बलिमारा तेल क्षेत्र में किया गया।

(iii) भू–रासायनिक लक्षण: दीमा हसाओ, असम से लिए गए नमूनों का विश्लेषण किया गया।

(iv) स्रोत चट्टान का मूल्यांकन: दीमा हसाओ–1 कूपों

(स्थान ओडीएचए) से विश्लेषण किए गए नमूने।

(v) **एमईओआर कार्यान्वयनः** अवशिष्ट तेल निकालने के लिए मीथेन बनाने वाले जीवों (मीथेनोजेन्स) की साइट पर ही जैविक सक्रियता बढ़ाने पर काम करना।

(vi) **तेल और गैस के लिए माइक्रोबियल जियो–प्रॉस्पेक्टिंग (एमपीओजी):** निंगरू पीएमएल ब्लॉक से सभी नमूनों का विश्लेषण पूरा कर लिया गया है।

(vii) **जैव–सक्रियता अध्ययनः** अवशिष्ट तेल निकालने के लिए मीथेनोजेन्स की साइट पर ही जैविक सक्रियता बढ़ाने का अध्ययन किया गया।

(viii) **जैव–हाइड्रोजन अध्ययनः** सूक्ष्मजीवों का उपयोग कर जैव–हाइड्रोजन उत्पादन की क्षमता बढ़ाने और प्रक्रिया को अनुकूल बनाने पर काम किया जा रहा है।

(ix) **ईओआर के लिए जैव–सर्फेक्टेंट का मूल्यांकनः** उन्नत तेल रिकवरी के लिए सूक्ष्मजीवों की गतिविधि को बढ़ाने के लिए प्राकृतिक स्रोतों से जैव–सर्फेक्टेंट विकसित किया गया।

(ग) **कूपों सक्रिय करनाः** कूपों की अतंःक्षेपन क्षमता और इंजेक्ट करने की क्षमता बढ़ाने के लिए आंतरिक विशेषज्ञता का उपयोग करते हुए कूपों सक्रिय करने का कार्य डिज़ाइन किया गया है। उत्पादन और जल निपटान कूपों के अम्लीकरण के लिए इमल्सीफाइड अम्ल का सूत्रीकरण विकसित किया जा रहा है।

(xi) एनएचके 11डी+18 ब्लॉक में प्रायोगिक पॉलिमर फ्लडिंग परियोजना लागू की गई।

(xii) उप–सतह से रिफाइनरियों तक कच्चे तेल के निरंतर प्रवाह सुनिश्चित करने के लिए व्यापक प्रवाह आश्वासन अध्ययन किया गया।

(xiii) **निम्न तापमान तेल घुलनशील विमल्सीफायर (LT & OSD) का विकासः** ओआईएल ने तेल क्षेत्र के रसायन निर्माताओं के साथ मिलकर एलटी–ओएसडी रसायन विकसित किया है, जो पारंपरिक रसायनों की तुलना में 45° से. तापमान पर भी प्रभावी है, जबकि पारंपरिक रसायन केवल 60° से. पर काम करते हैं।

(xiv) **कच्चे तेल का अध्ययनः** कच्चे तेल में हल्के हाइड्रोकार्बन घटकों की पहचान की गई, जो प्रवाह की सुनिषचितता और मोम जमाव को प्रभावित करते हैं।

8.2.2 ओआईएल द्वारा पंजीकृत पेटेंटः

ओआईएल को छह (6) विभिन्न देशों में 18 पेटेंट प्रदान किए गए हैं– भारत में सात (7), रूस में दो (2), अमेरिका में तीन (3), चीन में दो (2), यूरोपीय संघ में तीन (3) और जापान में एक (1)।

8.2.3 पिछले 3 वर्षों में अनुसंधान एवं विकास व्यय

वित्त वर्ष	अनुसंधान एवं विकास व्यय (करोड़ रुपए में)
2021–22	100.96
2022–23	179.03
2023–24	149.22

8.2.4 सीओईईएस गुवाहाटी, असम से संबंधित गतिविधियाँ

8.2.4.1 बाईपास किए गए तेल की पहचान के लिए भू–सेलुलर मॉडलिंग और रिजर्वायर सिमुलेशन का अध्ययनः

स्थैतिक और गतिशील मॉडलिंग के माध्यम से रिजर्वायर पुनरुद्धार का व्यापक अध्ययन किया जाता है, जिसका उद्देश्य बिना जल निकासी वाले तेल की पहचान करना है। इसके अलावा, रिजर्वायर के लिए सबसे उपयुक्त ईओआर योजना का भी मूल्यांकन किया जाता है।

8.2.4.2 प्रयोगशाला अध्ययनः

क) लकवागांव फील्ड, असम शेल्फ में बरैल संरचना का तलछट अध्ययन किया जा रहा है, ताकि विस्तृत विश्लेषण किया जा सके और पारंपरिक कोर विश्लेषण के आधार पर बरैल संरचना के निक्षेपण वातावरण को समझा जा सके।

ख) पूर्वोत्तर के विश्वविद्यालयों (जैसे मणिपुर और डिब्रूगढ़ विश्वविद्यालय) के साथ उद्योग–अकादमिक सहयोग परियोजनाओं के तहत असम अराकान बेसिन के विभिन्न क्षेत्रों से एकत्रित शेल और कोयला नमूनों का जैविक और भू–रासायनिक विश्लेषण नियमित रूप से किया जा रहा है। यह पहल स्थानीय भूवैज्ञानिक संसाधनों की समझ बढ़ाने में महत्वपूर्ण योगदान देती है।

ग) सीओईईएस ने प्रयोगशाला में रिजर्वायर द्रव के साथ

सीओ2 गैस के मिलने और उन्नत तेल प्राप्ति के लिए इसकी उपयुक्तता का अध्ययन किया है।

घ) बेसाल्ट में सीओ$_2$ प्रेरित खनिजीकरण की उपयुक्तता का आकलन करने के लिए भारत ने एमओईएस–बीजीआरएल के सहयोग से प्रायोगिक अध्ययन और भू–रासायनिक विश्लेषण का उपयोग करते हुए डेक्कन बेसाल्ट की संरचनाओं में सीओ$_2$ अंतःक्षेपण द्वारा प्रेरित खनिजीकरण की प्रक्रिया को समझने का काम किया है।

ङ) उद्योग–अकादमिक परियोजनाओं के तहत स्रोत शैल, बिटुमेन, कच्चे तेल और ड्रिल कटिंग के नमूनों का भू–रासायनिक विश्लेषण किया जाता है। राजस्थान फील्ड्स और महानदी बेसिन परियोजनाओं के नमूनों का उन्नत भू–रासायनिक प्रयोगशाला में नियमित परीक्षण किया जाता है, ताकि उनके उत्पत्ति, परिपक्वता और जैव–अपघटन को समझा जा सके और तेल के नमूनों और स्रोत शैलों के बीच संबंध स्थापित किया जा सके।

8.2.4.3 नेट जीरो पहलः

एक सक्रिय उपाय के रूप में, सीओईईएस ने नीचे दिए गए अनुसार कई अध्ययन शुरू किए हैं:

क) राजस्थान के जैसलमेर बेसिन में सीओ$_2$ के स्थायी भंडारण के लिए व्यवहार्यता अध्ययन।

ख) मकुमनॉर्थ में परिवहन और अंतःक्षेपण के साथ सीओ$_2$ ईओआर के लिए व्यवहार्यता अध्ययन हापजान फील्ड।

8.2.4.4 उद्योग अकादमिक सहयोगः

क) ओआईएल एक समझौता–ज्ञापन के तहत अमेरिका के टेक्सास एएंडएम यूनिवर्सिटी सिस्टम की अनुसंधान एवं विकास शाखा, टेक्सास एएंडएम इंजीनियरिंग एक्सपेरिमेंट स्टेशन (टीईईएस) के साथ संविदा करने जा रहा है। कथलोनी रेत रिजर्वायर में उपसतह मॉडलिंग अध्ययन किया गया, जिससे क्षेत्र के पुनरोद्धार और अनुकूल ईओआर योजनाओं की क्षमता की पहचान हो सके।

ख) आईआईटी–बॉम्बे के साथ समझौता–ज्ञापन के तहत, आईआईटीबी के तेल और गैस ऊर्जा उत्कृष्टता केंद्र (सीओईओजीई) के साथ एक मिशन मोड परियोजना चल रही है, जिसका उद्देश्य सीओ$_2$ भंडारण क्षमता का अनुमान लगाना और पहचाने गए भंडार में वॉल्यूमेट्रिक तथा भू–यांत्रिक बाधाओं को शामिल कर जोखिम–मूल्यांकन और प्रबंधन ढांचा विकसित करना है।

ग) राष्ट्रीय भूकंप विज्ञान केंद्र (एनसीएस) के साथ समझौता–ज्ञापन के तहत, अरुणाचल प्रदेश और असम जैसे भूकंपीय रूप से सक्रिय क्षेत्रों में परित्यक्त तेल और गैस कूपों को भूकंपीय वेधशालाओं में बदलने के लिए एक महत्वपूर्ण और अभिनव परियोजना शुरू की गई है।

घ) पूर्वोत्तर भारत के विश्वविद्यालयों के साथ उद्योग और शैक्षणिक परियोजनाओं पर गुवाहाटी विश्वविद्यालय, डिब्रूगढ़ विश्वविद्यालय, नागालैंड विश्वविद्यालय, मणिपुर और राजीव गांधी विश्वविद्यालय के साथ समझौता–ज्ञापन के तहत काम शुरू किया गया है। ये परियोजनाएँ असम के अराकान बेसिन में फोल्ड–थ्रस्ट बेल्ट और गोंडवाना के भूवैज्ञानिक मानचित्रण, हाइड्रोकार्बन क्षमता का अध्ययन करने के लिए शुरू की गई हैं।

ङ) आईआईटी–खड़गपुर के साथ सहयोग में भारत के असम और राजस्थान के खारे जलभृतों में सीओ2 भू–भंडारण के लिए ट्रैपिंग तंत्रों का परिमाणन किया जा रहा है। इस परियोजना में तेल भंडारों में चट्टान और लवण जल लक्षण वर्णन, शेल और बलुआ पत्थर के नमूनों की सीओ2 नमनीयता अध्ययन, सरंध्रता और पारगम्यता का परिमाणन, सीओ2 घुलनशीलता अध्ययन, केशिका ट्रैपिंग जाँच, और भंडार स्थितियों के अंतर्गत भू–रासायनिक अभिक्रियाओं और गतिकी का अध्ययन शामिल है।

8.2.5 नई प्रौद्योगिकी का समावेशः प्रमुख प्रगतियों में निम्नलिखित शामिल हैं:

(i) हीट ट्रेसिंग केबल के साथ इलेक्ट्रिक डाउन होल हीटिंग।

(ii) वेलहेड, वाल्व, पैकर्स और नियंत्रण लाइनों में रिसाव की मरम्मत के लिए बिना रिग के समाधान।

(iii) क्रोनोसफ्लोः यह एप्लिकेशन ऊर्ध्वाधर कटौती–बैक स्ट्रिपिंग विधि और बेसिन के चरणबद्ध पुनर्निर्माण का उपयोग करके टेक्टोनिक रूप से जटिल बेसिनों का मूल्यांकन करने के लिए 2डी गतिशील बहाली

मॉडलिंग प्रदान करता है।

(iv) **निम्न आवृत्ति निष्क्रिय भूकंपीयः** यह तकनीक सूक्ष्म भूकंपीय कंपनों को पकड़ती है और उनकी व्याख्या करती है, जो उपसतह भूवैज्ञानिक संरचनाओं, तरल प्रवाह और अन्य भू–भौतिक घटनाओं के बारे में मूल्यवान जानकारी प्रदान कर सकती है।

(v) **फिशबोन्सः** यह रिजर्वायर के संपर्क को बढ़ाता है, उत्पादन दर बढ़ाता है और रिकवरी को बढ़ाता है।

(vi) **प्रोपलेंट सक्रियताः** इसमें ठोस रॉकेट ईंधन को एक छोटे विस्फोट की तरह इस्तेमाल करके दबाव स्पंद पैदा किया जाता है, जो आसपास की चट्टानों को चीरता/टोड़ता है और तेल या गैस के प्रवाह को बेहतर बनाता है। यह तकनीक उन कूपों में इस्तेमाल की जाती है जिनकी उत्पादकता कम है या जिनमें समय के साथ उत्पादन घट गया हो।

(vii) **डिजिटल रॉक एटलस तैयार करनाः** यह तकनीक ड्रिल कटिंग के नमूनों का डिजिटल विश्लेषण करती है और पारंपरिक कोर की सफेद रोशनी और यूवी प्रकाश फोटोग्राफी के माध्यम से डेटा प्राप्त करती है। इसके बाद, यह डेटा एक व्यवस्थित प्रक्रिया द्वारा सॉफ्टवेयर में डिजिटल रूप से रिकॉर्ड किया जाता है, ताकि कोर/कटिंग डेटा को संभावना निर्माण, क्षेत्रीय भूवैज्ञानिक अध्ययन, भू–मॉडलिंग आदि में उपयोग किया जा सके।

(viii) **वेल पोर्टफोलियो ऑप्टिमाइज़र (डब्ल्यूपीओ):** यह तकनीकी सलाहकार प्रणाली बहु– मानदंड निर्णय पद्धति का उपयोग करते हुए कूपों की त्वरित जाँच और रैंकिंग के लिए एक मानकीकृत और स्वचालित तरीका प्रदान करती है। यह कूपों की समस्याओं की पहचान करती है, हस्तक्षेप कार्यों की सिफारिश करती है और उत्पादन लाभ की भविष्यवाणी भी करती है।

8.3 गैस अथॉरिटी ऑफ इंडिया लिमिटेड (गेल):

गेल ने हाइड्रोजन उत्पादन, पाइपलाइन अखंडता और सीओ$_2$ अवशोषण के प्रमुख क्षेत्रों में पाँच शोध प्रयासों को इस वित्त वर्ष में संस्थानों के सहयोग से आगे बढ़ाने पर जोर दिया है। इसमें तूती बिट्स, आईआईटी और सीएसआईआर प्रयोगशालाएं शामिल हैं।

8.3.1 संधारणीय उच्च–शुद्धता हाइड्रोजन उत्पादनः गेल (इंडिया) लिमिटेड, बिट्स पिलानी, गोवा के सहयोग से, एक पैक्ड रिएक्टर में रासायनिक लूपिंग दहन (सीएलसी) का उपयोग करके संधारणीय उच्च–शुद्धता हाइड्रोजन उत्पादन पर अनुसंधान कर रहा है। इस नवोन्मेषी प्रक्रिया में ईंधन और वायु के सीधे संपर्क के बिना दहन को संभव बनाने के लिए धातु ऑक्साइड–आधारित ऑक्सीजन वाहक का उपयोग किया जाता है, जिससे प्रभावी रूप से सीओ–मुक्त हाइड्रोजन उत्पादन होता है। सीएलसी तकनीक के उपयोग से इस परियोजना का उद्देश्य हाइड्रोजन उत्पादन, प्रक्रिया दक्षता और कार्बन अवशोषण को बढ़ाना है, जिससे भारत की ऊर्जा रूपांतरण रणनीति में स्वच्छ हाइड्रोजन उत्पादन के लिए एक व्यवहार्य समाधान तैयार हो सके।

8.3.2 संक्षारण अध्ययनः

8.3.2.1 टीईजी संक्षारण अध्ययनः गेल, आईआईटी पटना के सहयोग से, ट्राइ–एथिलीन ग्लाइकॉल (टीईजी) के कारण प्राकृतिक गैस पाइपलाइनों में होने वाले आंतरिक संक्षारण का अध्ययन कर रहा है।

8.3.2.2 पाइपलाइन संक्षारण पर एलपीजी गुणवत्ता मानदंडों का प्रभावः आईआईपी देहरादून में, प्रायोगिक परीक्षण और कम्प्यूटेशनल फ्लुइड डायनेमिक्स (सीएफडी) सिमुलेशन दोनों का उपयोग किया जा रहा है। इस अध्ययन का उद्देश्य यह आकलन करना है कि विभिन्न एलपीजी अशुद्धियाँ जैसे नमी, सल्फर यौगिक और अन्य संदूषकस्टील पाइपलाइनों में संक्षारण में कैसे योगदान देती हैं।

8.3.2.3 पिग अवशेष संरचना और पाइपलाइन संक्षारण का सह–संबंध अध्ययनः सीईसीआरआई, कराईकुडी में किए गए अध्ययन का उद्देश्य प्राकृतिक गैस और एलपीजी पाइपलाइनों में आंतरिक संक्षारण दर और पिग अवशेषों की संरचना एवं मात्रा के बीच संबंध स्थापित करना है। शोधकर्ताओं ने पिग अवशेषों जैसे आयरन ऑक्साइड, सल्फाइड, कार्बोनेट और हाइड्रोकार्बन जमा की रासायनिक और भौतिक संरचना का विश्लेषण कर प्रमुख संक्षारण तंत्रों की पहचान की और संक्षारण अवरोधकों की प्रभावशीलता का मूल्यांकन किया।

8.3.2.4 सल्फर–मुक्त गंधक का विकासः आईआईटी मद्रास के सहयोग से, प्राकृतिक गैस में सल्फर मुक्त गंधक

विकसित करने पर काम किया जा रहा है, ताकि सुरक्षा बढ़ाई जा सके और पर्यावरणीय प्रभाव कम किए जा सकें।

8.3.2.5 घरेलू बर्नर पर हाइड्रोजन समृद्ध प्राकृतिक गैस (एचईएनजी) का प्रभावः

गेल, सीएसआईआर–भारतीय पेट्रोलियम संस्थान (आईआईपी), देहरादून के साथ मिलकर यह अध्ययन कर रहा है कि हाइड्रोजन समृद्ध प्राकृतिक गैस (एचईएनजी) घरेलू खाना पकाने वाले बर्नरों के तापीय निष्पादन को कैसे प्रभावित करती है। इसके निष्कर्ष बर्नर डिज़ाइन को इस तरह अनुकूलित करने में मदद करेंगे कि एचईएनजी का सुरक्षित और कुशल उपयोग हो, और मौजूदा उपकरणों में केवल न्यूनतम संशोधन की आवश्यकता पड़े।

8.3.2.6 ईंधन सेल ग्रेड हाइड्रोजन के ऑन–साइट उत्पादन हेतु 10 किलोवाट प्राकृतिक गैस–आधारित मेम्ब्रेन रिफॉर्मर का विकास (चरण–।।): इस परियोजना का उद्देश्य मेम्ब्रेन रिफॉर्मिंग तकनीक का उपयोग करके उच्च शुद्धता वाला हाइड्रोजन उत्पादन करना और हाइड्रोजन उत्पादन प्रक्रिया को उन्नत बनाना है। परियोजना के चरण–।। में कैटेलिस्ट के निष्पादन सुधार, स्थायित्व परीक्षण और वास्तविक परिस्थितियों में सिस्टम के एकीकरण पर विशेष ध्यान दिया जा रहा है।

8.3.2.7 प्राकृतिक गैस टरबाइन फ़्लू गैस स्ट्रीम से सीओ2 निष्कासनः गेल, बिट्स पिलानी, हैदराबाद परिसर के सहयोग से, एक स्केलेबल और ऊर्जा–कुशल सीओ$_2$ निकालने की तकनीक विकसित कर रहा है जो नमी प्रतिरोधी है और प्राकृतिक गैस टरबाइन फ्लू गैस स्ट्रीम के लिए उपयुक्त है। इसका लक्ष्य एक उन्नत प्रणाली बनाना है जो गैस–आधारित बिजली संयंत्रों की स्थिरता बढ़ाए और वास्तविक परिस्थितियों में प्रभावी ढंग से कार्य करे।

8.3.3 तेल, गैस और ऊर्जा उत्कृष्टता केंद्र (सीओई–ओजीई): गेल, आईआईटी बॉम्बे स्थित तेल, गैस और ऊर्जा उत्कृष्टता केंद्र (सीओई–ओजीई) में कई मिशन–मोड अनुसंधान परियोजनाओं में सक्रिय रूप से शामिल है। यह केंद्र केंद्रीय तेल एवं गैस सार्वजनिक उपक्रमों के लिए उद्योग–संबंधित अनुसंधान और विकास को बढ़ावा देने वाली एक सहयोगात्मक पहल है। इस वर्ष, गेल चार मिशन–मोड परियोजनाओं का नेतृत्व कर रहा है, जो निम्नलिखित क्षेत्रों पर केंद्रित हैं: उत्पादित जल का उपचार, अमोनिया–युक्त ईंधनों का अध्ययन, बाड़मेर और जैसलमेर बेसिनों का भू–रासायनिक विश्लेषण, और अन्य सार्वजनिक उपक्रमों के सहयोग से पाइपलाइन स्टील वेल्डमेंट में हाइड्रोजन पारगमन के प्रभाव का परिमाणन और मॉडलिंग।

8.3.4 अनुसंधान एवं विकास केंद्रः गेल 30 एकड़ में स्थित संस्था भूमि (सोहना, सेक्टर 22) पर एक अत्याधुनिक अनुसंधान एवं विकास केंद्र स्थापित कर रहा है। गेल बोर्ड ने हाल ही में एचएसआईआईडीसी इस भूमि की खरीद के लिए से मंजूरी दी है, जो अनुसंधान और विकास को बढ़ावा देने के प्रति हमारी प्रतिबद्धता को दर्शाता है।

8.3.5 पेटेंटः गेल के पास कुल 37 सक्रिय पेटेंट (34 भारतीय + 3 विदेशी) हैं, जो उत्पादों, प्रक्रियाओं और प्रौद्योगिकियों में नवाचार के प्रति उसकी प्रतिबद्ध ता को दर्शाते हैं। वित्त वर्ष 2024–25 में, गेल ने निम्नलिखित 2 पेटेंट के लिए आवेदन किया है:

- दोषों की निगरानी और पहचान के लिए परिवर्तनीय गति वाले प्रेरक मोटर ड्राइव के वास्तविक समय वर्तमान संकेतों का विश्लेषण करने वाला एक एज डिवाइस।
- पॉलीकार्बोनेट डायोल बनाने के लिए इस्तेमाल किया जाने वाला एक नवीनतम कैटेलिस्ट।

इसके अतिरिक्त, गेल को निम्नलिखित 2 पेटेंट प्रदान किए गए हैं:

- फिल्म–आधारित कम लागत वाले सेंसर के माध्यम से ज्वलनशील ईंधन गैसों का संवेदनशील और तेज़ पता लगाने वाला सेंसर।
- सजातीय कैटेलिस्ट और लीनियर पॉलीइथिलीन बनाने में इसका उपयोग।

8.3.6 पिछले 3 वर्षों में अनुसंधान एवं विकास/नवाचार व्ययः

वित्त वर्ष	आरएंडडी/नवाचार (करोड़ रुपए में)
2022–23	180.71
2023–24	250.20
2024–25	352

8.4 इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल):

अनुसंधान एवं विकास ने विभिन्न क्षेत्रों में 169 से अधिक फॉर्मूलेशन के साथ ईंधन और स्नेहक व्यवसाय समूहों की विपणन आवश्यकताओं को पूरा किया। आर एंड डी ल्यूब समूह को 58 ओईएम अनुमोदन प्राप्त हुए हैं। स्वदेशी घटक–आधारित गैसोलीन और डीजल बहु–कार्यात्मक परिवर्धन (जीएमएफए और डीएमएफए) के आंतरिक विकास ने प्रीमियम ईंधनों के विपणन को सक्षम बनाया है। इस वर्ष, आईओसी रिफाइनरियों में गैसोलिन में एलएसी डोजिंग में प्रीमियम जीएमएफए फॉर्मूलेशन का उपयोग करते हुए प्रारंभिक बैच पानीपत रिफाइनरी से रवाना किया गया है। मद्रास इंटरनेशनल सर्किट में भारतीय राष्ट्रीय कार रेसिंग चौंपियनशिप के तीसरे राउंड में प्रीमियम रेसिंग ईंधन स्टॉर्म–एक्स का उपयोग किया गया।

8.4.1 इसके अलावा, निम्नलिखित गतिविधियों के माध्यम से महत्वपूर्ण अनुमानित लाभ प्राप्त किए गए हैं।

(i) ईंधन और लुब्रिकेंटों का आंतरिक परीक्षण करने के लिए व्यापक सुविधाओं का उपयोग किया जाता है, जैसे जलवायु कक्ष, उत्सर्जन प्रयोगशालाएँ, इंजन और क्षेत्र परीक्षण प्रयोगशालाएँ, और विश्लेषणात्मक प्रभाग की सुविधाएँ, ताकि नए लुब्रिकेंटद्यस, ग्रीस और ईंधन निर्माण की प्रभावकारिता और उपयुक्तता का परीक्षण किया जा सके।

(ii) तीसरे पक्ष को डीआरए प्रौद्योगिकी का लाइसेंस देने से अगले पाँच वर्षों में लगभग 50 करोड़ रुपए की बचत होने का अनुमान है, साथ ही अन्य कंपनियों को बिक्री से अतिरिक्त आवर्ती रॉयल्टी भी प्राप्त होगी।

(iii) अनुसंधान एवं विकास केंद्र प्रत्येक वर्ष औसतन 4000–6000 नमूनों का परीक्षण करता है, जिन्हें क्षेत्रीय टीम द्वारा एकत्र करके विस्तृत मूल्यांकन के लिए भेजा जाता है।

(iv) अनुप्रयुक्त धातुकर्म और संक्षारण अनुसंधान समूह नियमित रूप से सहयोगी प्रभागों के साथ मिलकर कार्य करते हैं, ताकि उन्हें विफलता विश्लेषण और अवशिष्ट जीवन विश्लेषण में सहायता मिल सके और मौजूदा परिसंपत्तियों के जीवन और उपलब्धता को बेहतर बनाने के लिए समाधान प्रदान किए जा सकें, जिससे निश्चित आर्थिक लाभ होता है।

क) पारादीप रिफाइनरी में 300 केटीए आधारभूत इंडडीएसके यूनिट चालू की गई और पीजीटीआर को सफलतापूर्वक पूरा किया गया, जिससे सुनिश्चित मानदंड हासिल हुए और पीडीआर से पाइपलाइन स्थानांतरण के लिए कम सल्फर एसकेओ की जरूरत को पूरा करने की आंतरिक क्षमता विकसित हुई।

ख) बोंगाईगांव रिफाइनरी में आईएसओएम कैटेलिस्ट का सफल विकास, पेटेंट और कमीशनिंग पूरा किया गया, साथ ही गारंटीकृत पैरामीटर–आरओएन और आइसोमरेट उत्पाद हासिल किया गया। लगभग 125 एमटीपीए की वार्षिक घरेलू मांग को देखते हुए, इस सफलता से आने वाले समय में 4–5 करोड़ रुपए की रॉयल्टी मिलने की संभावना है।

ग) अनुसंधान एवं विकास, पानीपत रिफाइनरी में स्थापित उत्प्रेरक निर्माण इकाई (सीएमयू) के प्रचालन के लिए आरएचक्यू के साथ मिलकर काम कर रहा है ताकि आंतरिक रूप से विकसित उत्प्रेरक फॉर्मूलेशन का निर्माण किया जा सके। अनुसंधान एवं विकास (आरएंडडी) के आंतरिक फॉर्मूलेशन पर आधारित एफसीसी जेडएसएम–5 एडिटिव का पहला बैच हाल ही में रवाना किया गया। सीएमयू ने आईओसीएल रिफाइनरियों को हाइड्रो–ट्रिटिंग कैटेलिस्ट और एफसीसी कैटेलिस्ट/योजक आपूर्ति की योजना बनाई है।

घ) वर्ष 2024–25 के दौरान, मैसर्स सूड–केमी (आई) लिमिटेड (एससीआईएल) के सहयोग से, लगभग 3820 मीट्रिक टन आंतरिक रूप से विकसित कैटेलिस्ट/योजक भारतीय रिफाइनरियों को आपूर्ति किए गए।

ङ) अनुसंधान एवं विकास द्वारा विकसित इंडस्कैनो आईपीआईजी उपकरणों से 2024–25 में 4500 कि.मी. से अधिक पाइपलाइन का निरीक्षण किया गया, जबकि पिछले वर्ष यह आंकड़ा 2711 कि.मी. था।

च) दो घरेलू विकसित नैनो एडिटिव उत्पाद–प्रोपेन प्लसी (औद्योगिक उपयोग के लिए हरित ईंधन) और एक्स्ट्राबूस्टसी ऑटो गैस का उन्नत संस्करण–इस वर्ष लॉन्च किए गए, जिससे एक्स्ट्रा–तेज और इंडेन नैनोकट जैसे पहले से स्थापित उत्पादों की श्रृंखला का विस्तार हुआ।

छ) बेहतर संक्षारण संरक्षण के लिए विकसित और क्षेत्र–परीक्षणित नैनोकोट– पे, जो तटीय वातावरण में प्रभावी है और विभिन्न ईंधनों के अनुरूप है।

ज) प्रीमियम एएसए विशेष रूप से एंटी–स्टैटिक एजेंट के रूप में तैयार किया गया है, जो ईंधन में ध्रुवीय अणुओं के माध्यम से विद्युत आवेश को फैलाकर स्थैतिक बिजली के निर्माण को रोकता है, जिससे ईंधन हस्तांतरण के दौरान स्थैतिक डिस्चार्ज का जोखिम कम होता है।

झ) ईवी लुब्रिकेंट्स पोर्टफोलियो को मजबूत करने के लिए, सर्वो फ्यूचरा ईवी ग्रीस (ईवी इलेक्ट्रिक मोटर बेयरिंग के लिए) और सर्वो फ्यूचरा ईवी ट्रांस 75वॉट–90 ट्रांसमिशन ऑयल आफ्टरमार्केट खपत के लिए लॉन्च किया गया।

ञ) कैप्टिव आवश्यकताओं के अलावा, आंतरिक रूप से विकसित एक्स्ट्राफ्लो डीआरए अब मांग वाला उत्पाद बन गया है, जिसकी आपूर्ति एचपीसीएल, बीपीसीएल और एचएमईएल सहित अन्य पाइपलाइन प्रचालकों को की जा रही है।

ट) जैव–प्रौद्योगिकी पहल के तहत, अनुसंधान एवं विकास ने सीबीजी संयंत्र से उच्च गुणवत्ता वाली खाद/जैव–उर्वरक उत्पादन हेतु एग्री–एलीट तकनीक विकसित की। इस तकनीक का जी.बी. पंत कृषि विश्वविद्यालय, पंतनगर में चावल पर आंतरिक कृषि क्षेत्र परीक्षण और मैसर्स मानस एग्रो इंडस्ट्रीज एंड इंफ्रास्ट्रक्चर लिमिटेड (एमएआईआईएल), नागपुर द्वारा व्यावसायिक उत्पादों की तुलना में बेहतर पाया गया।

ठ) फसल अवशेषों के यथास्थान अपघटन के लिए एक सूक्ष्मजीवी मिश्रण स्टबवोरस विकसित किया गया और उत्तर प्रदेश के गोरखपुर में इसका परीक्षण किया गया। हरियाणा और पंजाब के वास्तविक खेतों में 10 एकड़ के पैमाने पर स्टबवोरस तकनीक का सफल निष्पादन होने के बाद, अब पूर्ण व्यावसायीकरण से पहले इसके व्यापक पैमाने पर परीक्षण किए जा रहे हैं।

ड) पानीपत रिफाइनरी में 10 टीपीडी क्षमता वाले 2जी एथेनॉल डेमो प्लांट का यांत्रिक कार्य पूरा हो चुका है और यह चालू होने के अंतिम चरण में है। इससे उसी स्थान पर एंजाइम उत्पादन के साथ आंतरिक रूप से विकसित 2जी एथेनॉल प्रौद्योगिकी के दावों को साबित करने का मार्ग तैयार हुआ है।

ढ) इंडियन ऑयल अनुसंधान एवं विकास ने ईसीओ2सोर्ब नामक स्वदेशी पेटेंट प्राप्त एंजाइमेटिक अमीन कार्बन कैप्चर तकनीक विकसित की है। यह रिफाइनरी से निकलने वाली गैसों से सीओ$_2$ को कम ऊर्जा में अवशोषित करने और मूल्यवर्धित रसायनों (ईओआर) में रूपांतरण के लिए सक्षम है। प्रायोगिक संयंत्र में इस तकनीक का सत्यापन किया जा चुका है और एक बड़े उर्वरक संयंत्र में इसका निष्पादन अंतिम चरण में है, प्रारंभिक परिणाम काफी आशाजनक हैं।

ण) हाइड्रोजन के क्षेत्र में, सभी 15 ईंधन सेल बसें टाटा मोटर्स से प्राप्त हो चुकी हैं और दिल्ली–एनसीआर के निर्दिष्ट मार्गों पर परीक्षण के लिए तैनात की जा रही हैं। कुछ बसें भारतीय सशस्त्र बलों को सौंपी गई हैं और वडोदरा शहर में प्रचालन की योजना है। इंडियन ऑयल अनुसंधान एवं विकास विभिन्न हाइड्रोजन उत्पादन तकनीकों पर लगभग 1 टन/दिन क्षमता वाले प्रायोगिक संयंत्र स्थापित किया जा रहा है।

त) सूर्य नूतन सौर चूल्हों का व्यावसायिक शुरुआत अब सूचीबद्ध विक्रेताओं के माध्यम से शुरू किया गया है। इंडियन ऑयल ने सूर्य नूतन के प्रचार और कार्बन वित्तपोषण के लाभ उठाने के लिए मैसर्स ईकेआई एनर्जी सर्विसेज लिमिटेड के साथ समझौता–ज्ञापन और लाइसेंसिंग समझौते पर हस्ताक्षर किए हैं।

थ) इंडियन ऑयल अनुसंधान एवं विकास (आरएंडडी) स्टार्टअप फंडिंग योजना का नेतृत्व कर रहा है। अब तक 42 स्टार्टअप का चयन और इनक्यूबेशन किया जा चुका है, जिससे 86 आईपीआर प्राप्त हुए हैं। यह इंडियन ऑयल के स्टार्टअप इकोसिस्टम के प्रभाव का उदाहरण है। फंडिंग/समर्थन के प्रमुख क्षेत्र

हैं: आर्टिफिशियल इंटेलिजेंस, रोबोटिक्स, सामाजिक प्रासंगिकता, पाइपलाइन निगरानी और रखरखाव। पिछले स्टार्टअप राउंड की सफलता के आधार पर, अप्रैल 2024 में "हरित संकल्प–अमृत काल अध्याय" विषय के साथ एक विशेष स्टार्टअप राउंड भी पूरा किया गया।

द) आरएंडडी का नया ऊर्जा परिसर निर्माणाधीन है और 2025 में कुछ अनुसंधान ब्लॉकों का प्रचालन शुरू करने की योजना है।

ध) आरएंडडी को वर्ष 2024 में कई पुरस्कार प्राप्त हुए, जिनमें सीआईआई आईपी पुरस्कार; क्लेरिवेट साउथ एशिया इनोवेशन पुरस्कार वर्ष 2024; IV–आईजोमैक्सकैटो और एक्स्ट्राफ्लोटीएम डीआरए के लिए सीएचटी पुरस्कार; ईसीओ2सोर्ब प्रौद्योगिकी और एक्स्ट्राफ्लटीएम के लिए फिक्की केमिकल्स एंड पेट्रोकेमिकल्स पुरस्कार 2024; ईसीओ2सोर्ब के लिए एफआईपीआई पुरस्कार 2023 और कई अन्य शामिल हैं।

8.4.2 पिछले 3 वर्षों में अनुसंधान एवं विकास व्यय (करोड़ रुपए में):

वित्त वर्ष	अनुसंधान एवं विकास व्यय (करोड़ रुपए में)
2022–23	698.21
2023–24	946.14
2024–25	726.95

8.5 भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल):

भारत पेट्रोलियम के ग्रेटर नोएडा, उत्तर प्रदेश स्थित कॉर्पोरेट अनुसंधान एवं विकास केंद्र (सीआरडीसी) और मुंबई स्थित उत्पाद एवं अनुप्रयोग विकास केंद्र (पीएंडएडी) दो अनुसंधान प्रभाग हैं, जो अनुसंधान गतिविधियों के माध्यम से व्यवसायों में मूल्य संवर्धन में सक्रिय रूप से काम कर रहे हैं। आत्मनिर्भर भारत के पहल के तहत, सीआरडीसी ने विभिन्न नवीन और विशिष्ट उत्पाद/प्रक्रियाएँ विकसित की हैं और उन्हें व्यावसायिक रूप देने की दिशा में सक्रिय प्रयास कर रहा है।

8.5.1 उन्नत गतिविधियों का विवरण नीचे दिया गया है:

(i) **हाइड्रोजन रिकवरी:** भारत एच2सेप ने रिफाइनरी से निकलने वाली गैस से हाइड्रोजन प्राप्त करने के लिए झिल्ली (मेम्ब्रेन) प्रौद्योगिकी विकसित की है।

(ii) **हाइड्रोजन ईंधन भरने वाले स्टेशन:** सीआरडीसी कोचीन अंतर्राष्ट्रीय हवाई अड्डा (सीआईएएल) में एक हाइड्रोजन ईंधन भरने वाला स्टेशन (एचआरएस) स्थापित कर रहा है और इसके लिए इलेक्ट्रोलाइज़र और डिस्पेंसर का ऑर्डर दे रहा है। इसके अलावा, सीआरडीसी ने मारुति सुजुकी और एएनईआरटी के साथ हाइड्रोजन ईंधन स्टेशनों के लिए संयुक्त प्रस्ताव भी पेश किए हैं।

(iii) **उच्च दक्षता वाला पीएनजी स्टोव:** भारत हाई–स्टार पीएनजी स्टोव ने 74: तापीय दक्षता हासिल की, जो सामान्य वाणिज्यिक बर्नरों की तुलना में 15–20: अधिक है। वाणिज्यिक उत्पादन के लिए निर्माताओं के साथ प्रौद्योगिकी लाइसेंसिंग समझौतों पर हस्ताक्षर किए गए हैं। यह पीएनजी बर्नर नोएडा स्थित बीपीसीएल आवास परिसर में स्थापित किया गया है।

(iv) **सुपर एब्जॉर्बेंट पॉलीमर (एसएपी):** केआर में 20 केटीपीए क्षमता वाले वाणिज्यिक एसएपी संयंत्र की स्थापना के लिए पीएफडी तैयार किया गया और पीएंडआईडी की समीक्षा की गई। ग्लेशियल ऐक्रेलिक एसिड के साथ किए गए परीक्षणों से उच्च स्तर का एसएपी उत्पादन प्राप्त हुआ। बीपीसीएल को स्वदेशी विकसित एसएपी तकनीक के लिए "सीएचटी इनोवेशन अवार्ड" मिला।

(v) **एफसीसी कैटेलिस्ट प्रौद्योगिकी:** स्पष्ट तेल (सीएलओ) को गैसोलीन में बदलने के लिए अभिनव एफसीसी कैटेलिस्ट "भारत–बीसीए" विकसित किया गया। एक व्यावसायिक परीक्षण में एचसीओ+सीएलओ में 2% की कमी और गैसोलीन उत्पादन में 1.75% की वृद्धि देखी गई।

(vi) **प्राकृतिक गैस पाइपलाइनों में हाइड्रोजन मिश्रण:** सीआरडीसी, सीओईओजीई के सहयोग से आईआईटी–बॉम्बे, आईओसीएल और गेल पाइपलाइन स्टील वेल्डमेंट्स के माध्यम से हाइड्रोजन पारगमन

के प्रभाव को मापने के लिए कम्प्यूटेशनल चरण क्षेत्र मॉडलिंग कर रहे हैं, ताकि सुरक्षित और विश्वसनीय हाइड्रोजन मिश्रण सुनिश्चित किया जा सके।

(vii) **जैव–प्लास्टिक उत्पादनः** सीआरडीसी ने बायोरिफाइनरी अपशिष्ट/उप–उत्पादों से जैविक रूप से नष्ट होने वाला बायोप्लास्टिक विकसित किया है, जो एकल–उपयोग वाले प्लास्टिक का स्थायी विकल्प है। यह सामग्री पर्यावरणीय प्रभाव कम करने के लिए डिज़ाइन की गई है और इसकी कम्पोस्ट–योग्यता सिपेट द्वारा प्रमाणित की गई है।

(viii) **बॉयलर राख से हरित सिलिका उत्पादनः** सीआरडीसी ने बायोमास राख से हरित सिलिका बनाने की प्रक्रिया विकसित की है। 500 किलोग्राम बैच के प्रायोगिक परीक्षण पूरे हो चुके हैं। अब इस तकनीक को बीपीसीएल बरगढ़ बायोरिफाइनरी में निष्पादन स्तर तक बढ़ाया जा रहा है।

(ix) **सीबीजी संयंत्र से समृद्ध किण्वित जैविक खाद का उत्पादनः** सीबीजी संयंत्रों से प्राप्त किण्वित जैविक खाद (एफओएम) के पोषण मूल्य को बढ़ाने के लिए सीआरडीसी ने उन्नत नाइट्रोजन, फास्फोरस और पोटेशियम (एनपीके) युक्त समृद्ध एफओएम (ईएफओएम) विकसित किया है। यह ईएफओएम कृषि में प्रभावी उपयोग और एफओएम के भंडारण या निपटान की समस्याओं को कम करने के लिए डिज़ाइन किया गया है।

(x) **एलपीजी के लिए चोरी–रोधी आवरणः** एलपीजी चोरी रोकने के लिए ट्रैक–एंड–ट्रेस सुविधाओं वाले अभिनव सुरक्षा कवच विकसित किए गए। उपयोगकर्ता प्रतिक्रिया के आधार पर क्यूआर कोड स्कैनिंग सुविधाओं में सुधार किया गया।

(xi) **बीपीएमएआरआरकॉ और के मॉडलः** के मॉडल और बीपीएमएआरआरक सॉफ़्टवेयर का उपयोग सेवाएँ प्रदान करने के लिए अनुमोदन प्राप्त हुआ। बीपीएमएआरआरके के लिए वेब प्लेटफ़ॉर्म विकसित किया गया और के मॉडल सॉफ़्टवेयर को नई सुविधाओं के साथ उन्नत किया गया। के मॉडलो का उपयोग केआर में डिसाल्टर प्रचालन समस्याओं को हल करने में सफल रहा।

(xii) **विशेष ग्रेड एलपीजीः** अत्यधिक ऊंचाई वाले क्षेत्रों के लिए एलपीजी का विशेष हाइड्रोकार्बन मिश्रण विकसित किया गया और इसका सिक्किम में सफल क्षेत्रीय परीक्षण किया गया।

(xiii) **हरित पहलः** एक रिटेल आउटलेट को हरित ऊर्जा (सौर+पवन) और बैटरी भंडारण के माध्यम से बिजली देने के लिए एक हाइब्रिड प्रायोगिक परियोजना शुरू की गई। परीक्षण सफल रहे हैं और आगे का विकास कार्य जारी है।

(xiv) **समुद्री लहरों से नवीकरणीय ऊर्जाः** भारत ऊर्जा सप्ताह 2025 के दौरान, पेट्रोलियम मंत्री श्री हरदीप सिंह पुरी, अध्यक्ष एवं प्रबंध निदेशक श्री जी. कृष्णकुमार और निदेशक (विपणन) श्री सुखमल जैन की गरिमामयी उपस्थिति में, बीपीसीएल के मुंबई तेल टर्मिनल पर 100–300 किलोवाट क्षमता की एक प्रायोगिक परियोजना स्थापित करने हेतु, इज़राइल की मैसर्स इको वेव पावर के साथ एक समझौता–ज्ञापन पर हस्ताक्षर किए गए। इस कार्यक्रम में प्रौद्योगिकी पर एक लघु–स्तरीय कार्यशील मॉडल प्रदर्शित किया गया।

(xv) **ज्वार से बायोएथेनॉलः** बीपीसीएल ने भारत ऊर्जा सप्ताह 2025 के दौरान, पेट्रोलियम मंत्री श्री हरदीप सिंह पुरी, अध्यक्ष एवं प्रबंध निदेशक श्री जी. कृष्णकुमार और निदेशक (विपणन), श्री सुखमल जैन की गरिमामयी उपस्थिति में, मीठी ज्वार को बायोएथेनॉल फीडस्टॉक के रूप में अनुकूलित करने हेतु राष्ट्रीय शर्करा संस्थान, कानपुर के साथ एक समझौता ज्ञापन पर हस्ताक्षर किए।

(xvi) **एकीकृत कार्बन अवशोषण और रूपांतरण तकनीकः** बीपीसीएल ने मैसर्स उर्जानोवासी के सहयोग से एक अभिनव CO_2 अवशोषण और उपयोग (सीसीयू) तकनीक प्रदर्शित की। यह तकनीक CO_2 को अवशोषित कर उसे कैल्शियम कार्बोनेट ($CaCO_3$) में बदलती है। जल–आधारित यह विधि पारंपरिक अमीन समाधानों की तुलना में 10–15: अधिक दक्षता प्रदान करती है और इससे CO_2 के भंडारण तथा संपीड़न की आवश्यकता समाप्त हो जाती है।

(xvii) **पेटेंट और प्रकाशनः** सीआरडीसी ने पूरे वर्ष छह नए पेटेंट दायर किए, जिनमें कार्बनिक अम्ल उत्पादन, बायोमास से चीनी उत्पादन, चोरी–रोधी एलपीजी

स्लीव्स और कार्बन अवशोषण हेतु विलायक शामिल हैं। अब तक कुल 16 पेटेंट प्रदान किए जा चुके हैं।

(xviii) **पर्यावरण के अनुकूल हाइड्रोलिक तेलः** पर्यावरण के प्रति संवेदनशील क्षेत्रों में उपयोग के लिए जैव–निम्नीकरण ीय हाइड्रोलिक तेल विकसित किया गया। यह तेल निर्माण, खनन, वानिकी, कृषि और समुद्री उद्योगों के लिए उपयुक्त है।

(xix) **उच्च निष्पादन वाला नीट कटिंग ऑयलः** गियर हॉबिंग के लिए हाइड्रो–उपचारित बेस ऑयल के साथ उच्च निष्पादन वाला नीट कटिंग ऑयल विकसित किया गया, जो बेहतर लुब्रिकेंट, उपकरण के लंबे जीवन, बेहतरीन सतही फिनिश और कम वाष्पीकरण सुनिश्चित करता है।

(xx) **निर्यात बाजार के लिए इंजन तेलः** भारी व्यावसायिक वाहनों के लिए डीजल इंजन ऑयल और स्कूटरों के लिए इंजन ऑयल विकसित किया गया, जो लंबे समय तक चलता है और ईंधन बचत प्रदान करता है। दोनों उत्पादों को निर्यात बाजार की आवश्यकताओं के अनुसार एपीआई लाइसेंस प्राप्त है।

(xxi) **नई पीढ़ी के स्कूटरों के लिए इंजन ऑयलः** नई पीढ़ी के बीएस VI स्कूटरों के लिए विकसित सिंथेटिक इंजन ऑयल, जो बेहतर ईंधन दक्षता और कैटेलिस्ट सुरक्षा प्रदान करता है। इसमें कम तापमान पर बेहतर प्रवाह क्षमता है और इंजन को तुरंत स्टार्ट करने में मदद करता है।

(xxii) **ओईएम के लिए इंजन ऑयलः** भारत के अग्रणी दोपहिया और तिपहिया वाहन निर्माता के निर्यात मॉडलों के लिए विकसित इंजन ऑयल। इस तेल का ओईएम के आरएंडडी में व्यापक मूल्यांकन किया गया और तीन देशों में इसका परीक्षण किया गया।

(xxiii) **ट्रैक्टर द्रवः** ओईएम फैक्टरी भरण अनुप्रयोगों के लिए यूनिवर्सल ट्रैक्टर ट्रांसमिशन ऑयल (यूटीटीओ) विकसित किया गया, जो सुचारू पावर ट्रांसमिशन, बेहतर घिसाव–रोधी सुरक्षा और बेहतर क्लच निष्पादन सुनिश्चित करता है।

(xxiv) **ट्रांसमिशन और ड्राइवलाइन लुब्रिकेंटः** ऑफ–हाइवे ओईएम, यात्री कारों और वाणिज्यिक वाहनों के लिए उच्च निष्पादन वाले ट्रांसमिशन और ड्राइवलाइन लुब्रिकेंट विकसित किए गए, जो स्थिर हैं और लंबे समय तक चलते हैं।

(xxv) **उच्च–निष्पादन इन्सुलेशन तेलः** उच्च निष्पादन अवरोधित इंसुलेटिंग तेल विकसित किया गया है जो भारी शुल्क वाले ट्रांसफार्मर के लिए है, जिसका उपयोग उत्पादन, ट्रांसमिशन और रेलवे ट्रांसफार्मर में किया जाता है।

(xxvi) ये उपलब्धियाँ बीपीसीएल की नवाचार, संधारणीय विकास और अत्याधुनिक प्रौद्योगिकी एवं अनुसंधान के माध्यम से अपने व्यावसायिक विभागों को सशक्त बनाने की प्रतिबद्धता को प्रदर्शित करती हैं।

8.5.2 बीपीसीएल द्वारा अनुसंधान एवं विकास व्ययः

वित्त वर्ष	अनुसंधान एवं विकास व्यय (करोड़ रुपए)
2022–23	71.68
2023–24	95.87
2024–25	118.51

8.6 हिन्दुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड (एचपीसीएल):

हिन्दुस्तान पेट्रोलियम ग्रीन रिसर्च एंड डेवलपमेंट सेंटर (एचपीजीआरडीसी) की स्थापना का मुख्य उद्देश्य नवाचार के माध्यम से सभी के लिए ऊर्जा और रसायन सुलभ बनाना है। इस अनुसंधान केंद्र को अत्याधुनिक सुविधाओं से लैस किया गया है, जिसमें 5.6 लाख वर्ग फीट का ऊर्जा–कुशल हरित भवन शामिल है। चरण–। और चरण–।। के तहत कुल 20 प्रयोगशालाएँ स्थापित की गई हैं, जो विभिन्न अनुसंधान क्षेत्रों से संबंधित हैं, जैसे एफसीसी, हाइड्रोप्रोसेसिंग, कैटेलिसिस, बायो–प्रोसेस, क्रूड इवैल्यूएशन एंड फ्यूल्स रिसर्च, मानक जांच, विश्लेषणात्मक एवं रसायनिक संश्लेषण, प्रोसेस मॉडलिंग एवं सक्रियता, नैनो टेक्नोलॉजी, पेट्रोकेमिकल्स एंड पॉलिमर्स, सेंटर ऑफ एक्सीलेंस ल्यूब्स, जंग अध्ययन, नॉवेल सेपरेशन, रेसिड अपग्रेडेशन, इंजन, बैटरी रिसर्च, हाइड्रोजन, सौर ऊर्जा, बिटुमेन एवं फुटपाथ अनुसंधान, जल एवं दहन प्रणाली।

एचपीजीआरडीसी ने भारत और विदेश में कुल 661 पेटेंट दायर किए और 246 पेटेंट प्रदान किए, जिससे

नवाचार के प्रति इसकी प्रतिबद्धता स्पष्ट होती है।

वित्त वर्ष 2024–25 में 114 नए पेटेंट दर्ज किए गए और 36 पेटेंट प्रदान किए गए, जो तकनीकी उन्नति के प्रति एचपीजीआरडीसी की प्रतिबद्धता को और मजबूत करते हैं।

एचपीजीआरडीसी को अपने नवाचार और अनुसंधान उत्कृष्टता के लिए तीन प्रतिष्ठित पुरस्कार भी प्राप्त हुए हैं जैसे "एचपी–एईएमई प्रौद्योगिकी: कुशल ग्रीन हाइड्रोजन उत्पादन के लिए अपनी तरह की पहली प्रौद्योगिकी" के लिए 'आरएंडडी संस्थान में सर्वश्रेष्ठ नवाचार' पुरस्कार; "एचपीसीओएसओएल प्रक्रिया: ल्यूब रैफिनेट उपज में सुधार के लिए प्रक्रिया" के लिए 'इनोवेटर ऑफ द ईयर–टीम' एफआईपीआई पुरस्कार 2023–24; भारतीय रासायनिक सोसायटी द्वारा आयोजित 100 वर्षों के समारोह में रसायन उद्योग महारत्न पुरस्कार (28 जनवरी 2025, मुंबई)।

एचपीजीआरडीसी की तकनीकी और रासायनिक/कैटेलिस्ट प्रक्रिया में योगदान 'आत्मनिर्भर भारत' के तहत स्वदेशीकरण प्रयासों को बढ़ावा देता है और विदेशी लाइसेंसदाताओं पर निर्भरता को कम करता है।

8.6.1 वित्त वर्ष 2024–25 के दौरान, एचपीजीआरडीसी की प्रमुख उपलब्धियाँ निम्नलिखित हैं:

(i) एचपीसीएल की मुंबई रिफ़ाइनरी में स्व–विकसित एचपी–डीएके तकनीक (52 केटीए) सफलतापूर्वक चालू हो गई है। इस संयंत्र से बहु–उपयोगी कम सुगंधित सॉल्वैंट्स का उत्पादन होता है, जो आयातित उत्पादों का स्थान लेंगे और भारतीय उद्योग के लिए आत्मनिर्भर समाधान बनेंगे।

(ii) घरेलू स्तर पर विकसित एचपी–पीएसए तकनीक के व्यावसायीकरण के लिए ईआईएल के साथ समझौता–ज्ञापन (एमओए) पर हस्ताक्षर किए गए। इस साझेदारी में एचपीसीएल 'प्रौद्योगिकी लाइसेंसकर्ता' होगा और ईआईएल भारत में इस तकनीक के इंजीनियरिंग, विपणन और व्यावसायीकरण के लिए अनन्य 'प्रौद्योगिकी एवं इंजीनियरिंग भागीदार' होगा।

(iii) एचपी–वीआरयू (वाष्प रिकवरी यूनिट) हसन टर्मिनल तकनीक का शुभारंभ किया गया। यह इकाई टैंकरों और वैगनों से निकलने वाली गैसों में मौजूद वाष्पशील हाइड्रोकार्बनों को प्रभावी ढंग से अवशोषित और पुनःप्राप्त करने के लिए डिज़ाइन की गई है, जिससे प्रचालन की दक्षता बढ़ेगी और पर्यावरणीय स्थिरता सुनिश्चित होगी।

(iv) देवनागोंथी टर्मिनल, बेंगलुरु में एचपी–डीजी क्लीन (पीएम कैप्चर) यूनिट स्थापित की गई, जो राष्ट्रीय हरित न्यायाधिकरण (एनजीटी) के दिशानिर्देशों के अनुरूप डीजल जनरेटरों के निकास गैसों से कण पदार्थों को हटाती है।

(v) 700 बार तक हाइड्रोजन डिस्पेंसिंग सिस्टम के विकास के लिए बर्मिंघम विश्वविद्यालय के साथ सहयोग किया गया।

(vi) एचपीसीएल ने परिवहन क्षेत्र में हरित हाइड्रोजन के निष्पादन हेतु वोल्वो के साथ समझौता किया, जो नवीन एवं नवीकरणीय ऊर्जा मंत्रालय से प्राप्त आरएफपी के अनुरूप है। इसके लिए एआरएआई, पुणे से आशय–पत्र प्राप्त हो गया है।

(vii) दो नई बड़े पैमाने पर उत्पादन सुविधाओं की स्थापना।

(viii) कैटेलिस्ट, योजक और अधिशोषक की बड़े पैमाने वाली उत्पादन सुविधाएं (सीएएएस) स्थापित की गई।

(ix) **उत्पाद उन्नयन सुविधा (पीएसयू):** यह सुविधा अनुसंधान एवं विकास द्वारा विकसित कैटेलिस्टों, अधिशोषकों, योजकों और रसायनों को बड़े पैमाने पर बनाती है और उनके त्वरित निष्पादन तथा व्यावसायीकरण को सक्षम बनाती है।

(ग) एचएमईएल और एमआरपीएल जैसी अन्य रिफाइनरियों में घरेलू स्तर पर विकसित एचपी–ड्यूसर–एनएचटी (दबाव कम करने वाला रसायन) का सफल निष्पादन किया गया। इस रसायन के उपयोग से रिएक्टर का दबाव कम हुआ और यूनिट को वांछित फीड दर पर सुचारू रूप से चलाया जा सका।

(xi) आंतरिक रूप से डिज़ाइन किया गया कम दबाव ड्रॉप स्प्रेमैक्स मुंबई रिफाइनरी में एफसीसी फीड नोजल्स के रूप में चालू किया गया।

(xii) एचपीजीआरडीसी ने दोपहिया वाहनों और यात्री कारों में ई27 ईंधन का भारत का पहला व्यापक आंतरिक मूल्यांकन पूरा किया, जिसमें 1,30,000 किलोमीटर से अधिक की संचयी मील दूरी और बीच–बीच में निष्पादन मूल्यांकन शामिल था।

(xiii) एचपीजीआरडीसी ने नए ऊर्जा क्षेत्रों जैसे सीओ2 रूपांतरण, बायोमास गैसीकरण आदि में प्रतिष्ठित संस्थानों जैसे आईआईपी, एआरसीआई, आईआईएससी और आईआईटी के साथ सहयोगात्मक अनुसंधान परियोजनाएं शुरू कीं।

(xiv) इसी अवधि में, एचपीजीआरडीसी ने 20 नए उत्पादों/प्रौद्योगिकियों का व्यावसायिक निष्पादन किया, जिससे कुल प्रौद्योगिकियों और उत्पादों के निष्पादन की संख्या 83 हो गई है जिसका विवरण नीचे दिया गया है:

क) एचपी–नैनोकूल (नैनो एडिटी जेड सोलर रिफ्ल प्रभाव कोटिंग): एचपी–नैनोकूल एक नैनोकम्पोजिट सौर परावर्तन कोटिंग है। यह नवोन्मेषी और किफ़ायती फ़ॉर्मूला नैनोकणों को जल–आधारित ऐक्रेलिक पेंट में मिलाता है, जिससे व्यावसायिक विकल्पों की तुलना में बेहतर निष्पादन मिलता है। यह कोटिंग एक सौर परावर्तन कोटिंग दिखाती है। 99% की ऊर्जा सूचकांक (एसआरआई) के साथ, प्रकाश परावर्तन में उल्लेखनीय वृद्धि हुई है। एचपी–नैनोकूल का निष्पादन एचपीजीआरडीसी और एचआरआरएल में किया गया है।

ख) **एचपी–डीआरए (व्हाइट ऑयल बहु–उत्पाद पाइपलाइनों के लिए ड्रैग रिड्यूसिंग एजेंट):** पेट्रोलियम उत्पादों के लिए एचपी–डीआरए का सफलतापूर्वक विकास किया गया है, जो पाइपलाइनों में प्रवाह गतिकी को सुधारता है जैसे तरंगों को स्थिर करता है और हलचल कम करता है। यह ड्रैग को अधिकतम रूप से घटाने में सक्षम है। एचपी–डीआरए फॉर्मूलेशन का विस्तार किया गया और एचपीसीएल विशाखा–विजयवाड़ा–सिकंदराबाद पाइपलाइन में इसका सफलतापूर्वक निष्पादन किया गया।

ग) **एचपी–13x31 (नाइट्रोजन अवशोषण हेतु जिओलाइट आधारित अधिशोषक):** जिओलाइट–13एक्स का उपयोग अवशोषण प्रक्रिया में किया जाता है, जिसकी सीओ$_2$ अवशोषण क्षमता बहुत अधिक होती है। यह जिओलाइट प्राकृतिक गैस रिफाइनिंग, ऑक्सीजन गैस संयंत्र, क्रायोजेनिक नाइट्रोजन संयंत्र आदि में उपयोगी है।

घ) **एचपी–टीआईसी (थर्मल इंसुलेशन कोटिंग):** एचपीजीआरडीसी ने इंसुलेशन के अंतर्गत जंग को कम करने के लिए थर्मल इंसुलेशन कोटिंग विकसित की है। यह 120°C से. तापमान सह सकता है और पारंपरिक इंसुलेशन का विकल्प है। इस नए उत्पाद के अनुप्रयोग के लिए न्यूनतम सतह तैयारी की आवश्यकता होती है।

ङ) **एचपी–3डीपीपी (3डी प्रिंटेबल पॉलीप्रोपाइलीन):** यह उत्कृष्ट इंटरलेयर आसंजन, न्यूनतम विरूपण और वैश्विक विकल्पों की तुलना में दोगुनी यांत्रिक शक्ति प्रदान करता है। "मेक इन इंडिया" और आत्मनिर्भर भारत के दृष्टिकोण को बढ़ावा देते हुए, यह उद्योग 4.0–सक्षम नवाचार चिकित्सा कृत्रिम अंगों, ऑटोमोटिव पुर्जों और पैकेजिंग अनुप्रयोगों में आत्मनिर्भरता को मजबूत करता है, जिससे एडिटिव विनिर्माण और उन्नत पॉलीमर समाधानों में भारत की अग्रणी स्थिति और भी सुदृढ़ होती है।

च) **पीसीआर एचडीपीई:** एचडीपीई के उपयोग के बाद रिसाइकलिंग।

छ) **जल आधारित तकनीक का विस्तार:** कूलिंग वाटर सिस्टम में मौजूद कैल्शियम के जमाव को हटाने के लिए बनाई गई रासायनिक दवा।

ज) **एचपी पीएफटी:** पॉलिमर ईंधन टैंक।

झ) **नैनो जेडएसएम–5:** ओलेफिन–एन एफसीसी यूनिट में योजक क्षमता बढ़ाने वाला उत्पाद।

ञ) **एसईयू न्यूट्रमैक्स:** अमीन उपचार यूनिटों के लिए उत्पाद को निष्क्रिय करना।

ट) **फोम–रोधी पदार्थ:** अमीन उपचार इकाइयों में झाग/फोम रोकने वाला पदार्थ।

ठ) **एचपी डीएलए एफएलओ:** डीएलए का संस्करण, जो किफायती होने के साथ बेहतर प्रवाह गुण प्रदान करता है।

ड) **एचपी सीआईसी:** कोल्ड इंसुलेशन कोटिंग।

ढ) **एचपी बायोपी:** खाद्य ग्रेड उपयोग के लिए बायो–घुलनशील पॉलिमर मिश्रण।

ण) **एचपी बायो फिल्म:** जैव–घुलनशील फिल्म।

त) **फ्यूज्ड 3डी:** 3डी प्रिंटिंग के लिए पॉलीप्रोपाइलीन पेलेट्स।

थ) **विज़एबिट वी2.0:** लघु अवशेषों/वीजी10 को वीजी

30 बिटुमेन और वीजी 30 को वीजी 40/वीजी 40 सुपर बिटुमेन में अपग्रेड करने के लिए चिपचिपापन बढ़ाने वाला योजक "एचपी विजाबिट"।

द) **एचपी सीओपी:** एफसीसी यूनिट के लिए सीओ कंबशन प्रमोटर योजक।

ध) **एचपी डायएसिड:** लुब्रिकेंट्स के लिए बहुउद्देशीय योजक।

न) **एचपी नैनोलाइट:** नैनो एडिटाइज्ड हल्के रंग का ग्रीस– टिसोना एन2.

8.6.2 **वित्त वर्ष 2024–25 के दौरान उपलब्धि:** रिफाइनरी और पेट्रोकेमिकल प्रक्रियाओं में उपयोग के लिए कैटेलिस्ट और योजक विकास के संबंध में निम्नलिखित उपलब्धियां हासिल की गई हैं:

क) एचपी–कैटरेफ (सीसीआर के लिए कैटेलिस्ट) का सफलतापूर्वक विस्तार किया गया तथा एचपीसीएल विशाख रिफाइनरी सीसीआर यूनिट में इसका क्षेत्रीय परीक्षण शुरू किया गया।

ख) एचपी–सीओपी (एफसीसी यूनिट के लिए सीओ कंबशन प्रमोटर योजक) को एचपीसीएल एफसीसी यूनिटों में निष्पादन के लिए सफलतापूर्वक बढ़ाया गया।

ग) एचपी–नैनोप्रो (नैनो जेडएसएम–5) एक प्रथम प्रकार की सामग्री है, जिसका सफलतापूर्वक विस्तार किया गया है।

घ) एचपी–पीएमए (उच्च प्रोपिलीन के लिए जेडएसएम–5 योजक) का सफलतापूर्वक विस्तार किया गया।

ङ) एचपी–डीएके कैटेलिस्ट (डीएके प्रौद्योगिकी के लिए कैटेलिस्ट) को मुंबई रिफाइनरी में आंतरिक रूप से विकसित एचपी–डीएके यूनिट में उपयोग के लिए सफलतापूर्वक बढ़ाया गया।

च) एचपी–एनएचटी (नेफ्था हाइड्रोउपचार) कैटेलिस्ट का सफलतापूर्वक विस्तार किया गया।

छ) एचपी–डीएचटी (डीज़ल हाइड्रोउपचार) कैटेलिस्ट का सफलतापूर्वक विस्तार किया गया और प्रायोगिक पैमाने पर परीक्षण पूरा हो गया। इसके अलावा, विस्तार कार्य प्रगति पर है।

ज) एचपी–एएमटी (उन्नत मैट्रिक्स टेक्नोलॉजी एफसीसी कैटेलिस्ट)–घरेलू स्तर पर विकसित एचपी–एएमटी एफसीसी कैटेलिस्ट के विनिर्माण के लिए स्वदेशी प्रयास किए गए।

झ) एमआर में एसईयू–।। के लिए सीएएएस सुविधा में आंतरिक रूप से विकसित डीएचटी कैटेलिस्ट का 15मी.टन उन्नयन पूरा हो गया है।

- इस अवधि के दौरान, उत्कृष्टता केंद्र–ल्यूब्स रिसर्च लैब ने बाजार की आवश्यकताओं के अनुसार 21 नए ल्यूब उत्पाद विकसित किए हैं, जैसे ओईएम होंडा के लिए डाई कास्टिंग ल्यूब्रिकेंट, ओईएम टेनेको के लिए प्रीमियम शॉक एब्जॉर्बर ऑयल–एलवी, ओईएम टेनेको के लिए प्रीमियम शॉक एब्जॉर्बर ऑयल–एचडीबीटी, जीएमएस– रक्षा टेलीप्रिंटर टी–90 टैंक, स्मर्च वाहन और इसी तरह के उपकरणों में लुब्रिकेंट्स के रूप में उपयोग किया जाता है, तेल खनिज हाइड्रोलिक बफ़र, ग्रीसप्रोटेक्टिव पीएक्स 6, ऑयल ओएक्स 13, आरयूएसटीओपी एचपी 50, गेब्रियल के लिए प्रीमियम शॉक एब्जॉर्बर ऑयल–टीएलवी ए संस्करण 2.0, गेब्रियल के लिए प्रीमियम शॉक एब्जॉर्बर ऑयल– टीएलवी बी संस्करण 2.0, कॉपर ड्राइंग ऑयल संस्करण 2.0, एचपी टिसोना एन2, ओसीजी 750 के विरुद्ध कंडक्टर ग्रीस, एचपी नियोसाइन्थ फ्यूटर–X 0डब्ल्यू16, टीवीएस मोटर्स के लिए एचपी रेसर 10डब्ल्यू30, एचपी रेसर 20डब्ल्यू50 टीवीएस मोटर्स के लिए, कम कैल्शियम सल्फोनेट कॉम्प्लेक्स ग्रीस–लिमाप्लेक्स एचटीएक्स 3एन, एचपी एल्युमिनियम हॉट रोलिंग मेटल वर्किंग फ्लूइड, एचपी तेल प्रदर्शन वृद्धि (ओपेन), एचपी कॉनकोट सुपर–कन्वेयर चेन लुब्रिकेंट और हेवी लोड वाले शुगर मिल के लिए कैल्शियम सल्फोनेट रसायन वाली ग्रीस।
- रिफाइनरी और पेट्रोकेमिकल क्षेत्र में तकनीकी उन्नति के दीर्घकालिक लक्ष्यों को ध्यान में रखते हुए, एचपीजीआरडीसी में उच्च स्तरीय तकनीकी और समस्या समाधान विशेषज्ञता के साथ एक वैश्विक प्रौद्योगिकी केंद्र (जीटीसी) स्थापित किया गया।
- एचपीजीआरडीसी द्वारा निम्नलिखित प्रौद्योगिकियां विकसित की गई हैं तथा निष्पादन/वाणिज्यिक यूनिट स्थापित करने की दिशा में इंजीनियरिंग का कार्य प्रगति पर है:

क) एचपीसीएल विशाख रिफाइनरी के लिए डिस्टिलेट

हाइड्रो–ट्रीटर प्रौद्योगिकी।

ख) एचपीसीएल मुंबई रिफाइनरी में एचपी–जेट्रीट प्लांट स्थापित किया गया है, जो केरोसीन से विमानन टरबाइन ईंधन (एटीएफ) का उत्पादन करता है।

ग) सीबीजी संयंत्र (कन्नौज और बरेली) में आंतरिक रूप से विकसित एचपी–रैम्प प्रौद्योगिकी का उपयोग करके 80 टीपीडी फीड चावल के भूसे को प्रोसेस किया जाएगा।

घ) एचपी–एचसीएनजी प्रौद्योगिकी, एक साथ एचसीएनजी और मूल्यवर्धित कार्बन उत्पाद का उत्पादन करने वाली अपनी तरह की पहली तकनीक है।

ङ) एचपी–ट्राईजेट प्रौद्योगिकी, प्रयुक्त खाना पकाने के तेल को टिकाऊ विमानन ईंधन (एसएएफ) और हरित डीज़ल में बदलने वाली तकनीक है।

च) एलुरु बायोरिफाइनरी में एचपी रैंप प्रौद्योगिकी के तहत 150 टीपीडी चावल भूसा आधारित सीबीजी संयंत्र और एचपी एएसएपी प्रौद्योगिकी के तहत चावल भूसा आधारित 3 केएलपीडी 2जी एथेनॉल संयंत्र शामिल हैं।

छ) 120 केटीपीए क्षमता वाली अवशेष हाइड्रोक्रैकिंग (एचपी–स्लरी+) प्रौद्योगिकी।

8.6.3 पिछले 3 वर्षों में अनुसंधान एवं विकास व्यय:

वित्त वर्ष	अनुसंधान एवं विकास व्यय (करोड़ रुपए में)
2022–23	320
2023–24	352
2024–25	391

8.7 मैंगलोर रिफाइनरी और पेट्रोकेमिकल्स लिमिटेड (एमआरपीएल):

एमआरपीएल का नवाचार केंद्र अनुसंधान एवं विकास गतिविधियों का नेतृत्व करता है, जो निम्नलिखित क्षेत्रों पर ध्यान केंद्रित करता है:

(i) प्रक्रिया दक्षता और विश्वसनीयता में सुधार के लिए कृत्रिम बुद्धिमत्ता (एआई) और मशीन लर्निंग (एमएल)।

(ii) रिफाइनरी धाराओं और अणुओं के लिए मूल्य निर्धारण,

(iii) नेट–ज़ीरो प्रौद्योगिकी,

(iv) प्रक्रिया एकीकरण, और

(v) सामरिक और/या आर्थिक योग्यता के विषय।

उक्त प्रमुख क्षेत्रों में अनुसंधान और विकास कार्य आंतरिक टीम और अन्य संस्थानों के साथ मिलकर सहयोगात्मक परियोजनाओं के माध्यम से किए जाते हैं। एमआरपीएल ने सीएसआईआर–एनसीएल, सीएसआईआर–आईआईसीटी, आईआईटी गुवाहाटी, एनआईटी कसूरथकल जैसे प्रमुख संस्थानों के साथ सहयोगात्मक अनुसंधान परियोजनाएँ शुरू की हैं। मार्च 2025 तक, एमआरपीएल ने कुल 29 पेटेंट प्राप्त किए हैं, जिनमें से 12 पहले ही स्वीकृत हो चुके हैं और बाकी की जांच जारी है।

एमआरपीएल इनोवेशन सेंटर को वर्ष 2024–25 के लिए पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय से "विशेष नवाचार पुरस्कार" प्राप्त हुआ है। जनवरी 2025 में, सीएचटी की कार्यकारी समिति ने एमआरपीएल में पीईटी डीपोलीमराइजेशन प्रायोगिक–सह–निष्पादन संयंत्र स्थापित करने के लिए ओआईडीबी से ₹6.67 करोड़ की अनुदान राशि को मंजूरी दी। यह राशि एमआरपीएल की नवोन्मेषी पीईटी डीपोलीमराइजेशन तकनीक के विकास और विस्तार में सहायक होगी, जिससे मोनोमर की कुशल रिकवरी होगी और टिकाऊ प्लास्टिक रीसाइक्लिंग को बढ़ावा मिलेगा।

8.7.1 कृत्रिम बुद्धिमत्ता (एआई)/मशीन लर्निंग (एमएल) नवाचार:

(i) **कैप्टिव पावर प्लांट में बिजली और भाप उत्पादन का वास्तविक समय अनुकूलन:** रिफाइनरी या पेट्रोकेमिकल कॉम्प्लेक्स में बिजली और भाप की माँग बदलती रहती है, और अक्सर एसटीजी/जीटीजी इन उपयोगिताओं को अलग–अलग क्षमताओं पर उत्पन्न करने के लिए लोड में उतार–चढ़ाव का सामना करते हैं। इसके समाधान के लिए एक नया एल्गोरिदम विकसित किया गया है, जो पहले सिद्धांतों को एआई/एमएल मॉडल के साथ जोड़कर प्रत्येक मशीन का डिजिटल ट्विन बनाता है। इन डिजिटल ट्विन का उपयोग अनुकूलक द्वारा भाप और बिजली के लोडिंग का सबसे अच्छा संयोजन तैयार करने में किया जाता है। इसका उपयोग वास्तविक समय की सलाह देने के लिए वेब और मोबाइल इंटरफेस पर किया जाता है। यह एप्लिकेशन ग्रिड, एसटीजी और पीआरडीएस के

बीच वास्तविक समय के आधार पर भाप और बिजली उत्पादन के लिए इष्टतम लोडिंग पैटर्न की गणना करता है। यह अनुप्रयोग एमआरपीएल चरण–1/2 कैप्टिव पावर प्लांट के लिए फरवरी 2021 में लागू किया गया है और अनुमानित ईंधनतेल की बचत 4350 – 8760 टन प्रति वर्ष है, जो 0.22 से 0.44 एमबीएन की कमी के बराबर है।

(ii) **पॉलीप्रोपाइलीन यूनिट का वास्तविक समय अनुकूलन:** विकसित वास्तविक समय पूर्वानुमान मॉडल को पीपीयू के डीसीएस में जोड़ दिया गया है। पूरी प्रणाली बैक–एंड एआई/एमएल मॉडल से लेकर डीसीएस में फ्रंट–एंड एकीकरण तककृआंतरिक रूप से विकसित और लागू की गई है। इस प्रणाली के कारण प्रयोगशाला नमूनों की मात्रा कम हुई है और ऑफ–स्पेक/नॉन–प्राइम पीपीयू उत्पाद का उत्पादन न्यूनतम हुआ है। इससे सालाना अनुमानित वित्तीय लाभ ₹10–15 करोड़ है।

(iii) **कैटेलिटिक क्रैकर (पीएफसीसी) यूनिट के लिए वास्तविक समय अनुकूलन:** प्रक्रिया यूनिटों की दक्षता बढ़ाने के लिए, एमआरपीएल नवाचार केंद्र ने वित्त वर्ष 2023–24 में पीएफसीसी आरटीओ विकसित किया, जो जुलाई 2024 से क्लोज्ड–लूप नियंत्रण में है। यह उन पहले एआई/एमएल आधारित एप्लिकेशन में से एक है जो किसी बड़ी वाणिज्यिक यूनिट को सीधे नियंत्रित करते हैं। इसमें प्रथम–सिद्धांत और एमएल हाइब्रिड एल्गोरिदम पर आधारित उपज पूर्वानुमान मॉडल तैयार किया गया। इस मॉडल के माध्यम से उत्पादों के बाजार मूल्य को ध्यान में रखते हुए आर्थिक रूप से इष्टतम उत्पादन पैटर्न और संबंधित प्रचालन मानदंड (सेट पॉइंट) का अनुमान लगाने के लिए आरटीओ ऐप बनाया गया।

(iv) **आइसोब्यूटिल बेंजीन (आईबीबी) प्रक्रिया प्रौद्योगिकी:** एमआरपीएल एक आईबीबी डेमो–सह–प्रायोगिक संयंत्र स्थापित कर रहा है। आईबीबी का फार्मास्यूटिकल्स में कई उपयोग हैं; उदाहरण के लिए, इबुप्रोफेन जैसी दर्द निवारक दवाओं का निर्माण। इस प्रक्रिया का प्रमाण (पीओसी) विकसित करने के लिए, एमआरपीएल ने सीएसआईआर–एनसीएल के साथ मिलकर आईबीबी के निर्माण हेतु आंतरिक प्रक्रिया विकसित की। एमआरपीएल के अनूठे दृष्टिकोण की विशेषता है कि कैप्टिव फीडस्टॉक्स का उपयोग करके एपीआई की लागत कम की जा सकती है। यह प्रक्रिया उच्च चयनशीलता और रूपांतरण प्रदान करती है। कुल निर्माण लागत मौजूदा तकनीकों की तुलना में कम होने की उम्मीद है। डेमो प्लांट 2025 की तीसरी तिमाही में चालू होगा।

(v) **पीईटी डीपॉलीमराइजेशन प्रक्रिया प्रौद्योगिकी और प्लास्टिक पुनः** उपयोगः सीएसआईआर– एनसीएल के साथ एक सहयोगात्मक शोध कार्य मई 2023 में शुरू हुआ, जो विभिन्न प्लास्टिक अपशिष्टों के डीपॉलीमराइजेशन और अपसाइक्लिंग पर केंद्रित है। पॉलीइथिलीन टेरेफ्थेलेट (पीईटी), जो मुख्य रूप से मिनरल वॉटर की बोतलों में इस्तेमाल होता है, के लिए अवधारणा–आधारित अनुसंधान और विकास।

(vi) पीईटी डीपॉलीमराइजेशन के लिए एक पेटेंट दायर किया गया। यह अभिनव दृष्टिकोण प्लास्टिक से घटक मोनोमर्स की रिकवरी पर केंद्रित है, जो इस क्षेत्र में एक महत्वपूर्ण प्रगति का प्रतीक है। मिश्रित प्लास्टिक अपशिष्ट और मिश्रित फ़ैब्रिक अपशिष्ट डीपॉलीमराइजेशन के लिए दो अन्य पेटेंट प्राप्त किए जा रहे हैं। पीईटी प्रायोगिक–सह–प्रदर्शन संयंत्र दिसंबर 2025 में चालू होने वाला है।

(vii) **दुर्गन्ध निवारण यूनिट – दुर्गन्धयुक्त वेंट गैसों से दुर्गन्ध कम करने की तकनीक:** ऑफ गैस स्ट्रीम से आने वाली गंध को हटाने के लिए वर्ष 2018 में एक सहमति का प्रमाणपत्र (पीओसी) अध्ययन शुरू किया गया था। पीओसी के सफल होने के बाद, रासायनिक प्रतिक्रिया की पूरी समझ के लिए एक छोटे प्रायोगिक स्तर पर अध्ययन किया गया। वित्त वर्ष 2022–23 में, निष्पादन स्तर का रिएक्टर डिजाइन किया गया, जिसने तकनीकी तैयारियों का स्तर 6 (टीआरएल6) प्राप्त किया और एक विस्तृत अध्ययन किया गया। 13 सितंबर, 2023 को भारतीय पेटेंट कार्यालय ने इस तकनीक को पेटेंट प्रदान किया। इसके आधार पर, आंतरिक रूप से विकसित फोटो–कैटेलिटिक गंध कम करने वाली तकनीक का उपयोग करते हुए ईटीपी डब्ल्यूएओ में डियोडोराइजिंग यूनिट (डीईओयू) डिजाइन की गई और इसे 31 अक्टूबर, 2023 को सफलतापूर्वक चालू किया गया। और वर्तमान में कुशलतापूर्वक काम कर रहा

है, जिससे 85% से 90% तक गंध घटाने की क्षमता प्राप्त हो रही है।

(viii) **सक्रिय फार्मा सामग्री (एपीआई) प्रक्रिया प्रौद्योगिकियाँ:** रिफाइनरी अणु मूल्यांकन पहल के अंतर्गत, एमआरपीएल अनुसंधान एवं विकास ने सफलतापूर्वक पीओसी अनुसंधान एवं विकास विकसित किया है और अपनी रिफाइनरी से प्राप्त धाराओं का उपयोग करके कुछ सक्रिय फार्मास्युटिकल सामग्री (एपीआई) बनाने के लिए लगभग 4 पेटेंट हासिल किए हैं। यह उपलब्धि एमआरपीएल की प्रतिस्पर्धात्मकता को बढ़ाएगी और फार्मास्युटिकल क्षेत्र में उसके विविधीकरण को मजबूत करेगी। यह पहल रिफाइनरी से प्राप्त अणुओं को उच्च मूल्य वाले उत्पादों में बदलने और विशेष रसायनों व दवाओं के क्षेत्र में अपनी स्थिति मजबूत करने के प्रति एमआरपीएल की प्रतिबद्धता को दर्शाती है।

8.7.2 प्रमुख उपलब्धियाँ:

(i) एमआरपीएल नवाचार केंद्र को मई 2022 में विज्ञान और प्रौद्योगिकी मंत्रालय के वैज्ञानिक और औद्योगिक अनुसंधान विभाग (डीएसआईआर) से मान्यता प्राप्त हुई।

(ii) एमआरपीएल के अनुसंधान एवं विकास प्रयासों ने पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय, भारत सरकार से वित्त वर्ष 2021–22, 2022–23 और 2023–24 के लिए लगातार तीन वर्षों तक "सर्वश्रेष्ठ नवाचार पुरस्कार" श्रेणी के तहत पुरस्कार जीते, जो निम्नानुसार हैं:

क) **वित्त वर्ष 2021–22:** (i) पॉलीप्रोपाइलीन रिएक्टरों में मेल्ट फ्लो इंडेक्स और ज़ाइलीन घुलनशीलता का वास्तविक समय पूर्वानुमान लगाकर रिएक्टर का बेहतर प्रचालन करना, (ii) कैप्टिव पावर प्लांट में बिजली और भाप के उत्पादन को वास्तविक समय में अनुकूल बनाना।

ख) **वित्त वर्ष 2022–23:** नेट ज़ीरो की दिशा में: पर्यावरण पर कम असर डालने वाली एक नई और ऊर्जा–कुशल कच्चा तेल डिस्टीलेशन प्रक्रिया।

ग) **वित्त वर्ष 2023–24:** प्रक्रिया की दक्षता और विश्वसनीयता बढ़ाने के लिए मूल सिद्धांतों और कृत्रिम बुद्धिमत्ता का संयुक्त उपयोग।

घ) जनवरी 2025 में, सीएचटी की कार्यकारी समिति (ईसी) ने एमआरपीएल में पीईटी डिपोलीमराइजेशन पायलट–सह–निष्पादन संयंत्र स्थापित करने के लिए ओआईडीबी से 6.67 करोड़ रुपए की अनुदान सहायता को मंजूरी दी।

ङ) एमआरपीएल नवाचार केंद्र ने अब तक कुल 29 पेटेंट प्राप्त किए हैं। इन 29 पेटेंटों में से 12 पहले ही सफलतापूर्वक प्रदान किए जा चुके हैं। शेष पेटेंट वर्तमान में पेटेंट अनुदान प्रक्रिया के विभिन्न चरणों में हैं।

8.7.3 प्रमुख चालू अनुसंधान एवं विकास गतिविधियाँ

(i) **निम्नलिखित प्रक्रिया के लिए प्रमुख प्रदर्शन/संयंत्र की स्थापना:**

आइसोब्यूटिल बेंजीन (आईबीबी) प्रदर्शन संयंत्र पॉलीइथिलीन टेरेफ्थेलेट (पीईटी) डीपॉलीमराइजेशन प्रायोगिक–सह–प्रदर्शन संयंत्र गैस चरण बहुलकीकरण प्रायोगिक संयंत्र

(ii) अलग–अलग प्रकार के प्लास्टिक और कपड़े के अपशिष्ट को रासायनिक या यांत्रिक तरीके से छोटे हिस्सों या मूल घटकों में बदलने की तकनीक का विकास।

(iii) सुधार के लिए एआई/एमएल–प्रथम सिद्धांत हाइब्रिड आरटीओ एप्लीकेशन।

(iv) एआई/एमएल – घूमने वाले और स्थिर उपकरणों की विश्वसनीयता बढ़ाने के लिए प्रथम सिद्धांत आधारित हाइब्रिड तकनीक।

8.7.4 अनुसंधान एवं विकास व्यय:

वर्ष	व्यय (करोड़ रुपए)
2022–23	0.57
2023–24	5.11
2024–25	35.95

8.8 चेन्नई पेट्रोलियम कॉर्पोरेशन लिमिटेड (सीपीसीएल):

कंपनी के सभी कार्यों में तकनीकी रूप से अग्रणी बने रहने के लक्ष्य के तहत, सीपीसीएल अनुसंधान एवं विकास केंद्र की स्थापना जुलाई 1984 में की गई। वर्ष 1988 में टीबीपी डिस्टीलेट यूनिट, एफसीसी प्रायोगिक संयंत्र और पेट्रोलियम परीक्षण प्रयोगशाला जैसी सुविधाओं के साथ इसकी शुरुआत हुई।

इसके बाद अनुसंधान कार्यों के लिए कई पायलट

संयंत्र और उन्नत परीक्षण एवं विश्लेषण प्रयोगशालाएं स्थापित की गईं।

8.8.1 हाल के वर्षों के दौरान अनुसंधान एवं विकास गतिविधियों की मुख्य विशेषताएं:

(i) भारतीय प्रौद्योगिकी संस्थान मद्रास (आईआईटीएम), चेन्नई और राजीव गांधी पेट्रोलियम प्रौद्योगिकी संस्थान (आरजीआईपीटी) अमेठी, उत्तर प्रदेश के साथ समझौता–ज्ञापन पर हस्ताक्षर किए गए।

(ii) सहयोगी अनुसंधान परियोजनाओं के माध्यम से रिफाइनरी समस्याओं का समाधान प्रदान करने के लिए सीपीसीएल–आईटीएम अनुसंधान प्रकोष्ठ (सीआईआरसी) का गठन किया गया।

(iii) आईटीएम एनर्जी परिसंघ के संस्थापक सदस्य और उनकी गतिविधियों में सक्रिय रूप से भाग लेते हैं।

(iv) सीपीसीएल ने आईआईटी मद्रास के साथ मिलकर "आरओ रिजेक्ट से क्षारीय जल इलेक्ट्रोलिसिस द्वारा हरित हाइड्रोजन उत्पादन" पर एक संयुक्त परियोजना शुरू की है।

(v) सीपीसीएल आरजीआईपीटी के साथ मिलकर "ईंधन में एथेनॉल मिश्रण (ईबीपी) से होने वाले संक्षारण को कम करने के लिए संक्षारण अवरोधक तैयार करना" पर एक संयुक्त परियोजना कर रहा है।

(vi) सीपीसीएल आरजीआईपीटी के साथ "चावल के भूसे से नैनोसेल्यूलोज का उत्पादन" पर एक सहयोगी परियोजना में शामिल है।

(vii) ग्रुप–। एलओबीएस की गुणवत्ता सुधारने के लिए एक प्रक्रिया विकसित की गई।

(viii) डीएचडीटी से एटीएफ, एमटीओ और जेपी5 के उत्पादन के लिए अनुसंधान कार्य किया गया।

(ix) निम्नलिखित उत्पादों के वाणिज्यिक उत्पादन के लिए अनुसंधान कार्य किया गया:

क) डीआरडीओ के लिए मिसाइल ईंधन।

ख) इसरो के लिए रॉकेट प्रणोदक।

ग) खनिज तारपीन तेल।

घ) माइक्रोक्रिस्टलाइन मोम।

ङ) फार्मा ग्रेड हेक्सेन।

हाल के वर्षों में किए गए अध्ययन:

(i) रिफ़ाइनरी में विभिन्न कच्चे तेलों के लिए क्रूड परख उत्पाद।

(ii) एफसीसी उत्प्रेरक/योजकों का मूल्यांकन और चयन।

(iii) विभिन्न कच्चे तेलों के लिए लुब्रिकेंट/मोम क्षमता का अध्ययन।

(iv) अतिरिक्त फीडस्टॉक के रूप में एचसीजीओ (हैवी कोकर गैस ऑयल) के उपयोग पर अध्ययन।

(v) भारी नेफ्था उपचार के लिए एफसीसीयू जीडीएस इकाई की उपयुक्तता पर एफसीसीयू अध्ययन।

(vi) बीएनएचवीआई ग्रेड ल्यूब ऑयल बेस स्टॉक (एलओबीएस) के उत्पादन में सुधार के लिए डीएस्फाल्टेड ऑयल (डीएओ) का हाइड्रोट्रीटिंग अध्ययन।

(vii) यूसीओ से ग्रुप–।। एलओबीएस के उत्पादन का अध्ययन।

(viii) रबर प्रोसेस ऑयल (आरपीओ) के विभिन्न ग्रेड के उत्पादन पर व्यापक अध्ययन।

बौद्धिक संपदा:

(i) सीपीसीएल अनुसंधान एवं विकास को आठ पेटेंट प्रदान किए गए हैं।

(ii) वित्त वर्ष 2024–25 में एक पेटेंट दायर किया गया।

8.8.2 अनुसंधान एवं विकास व्यय:

वर्ष	कुल (लाख में)
2021–22	715
2022–23	972
2023–24	1072
2024–25	1179

8.9 नुमालीगढ़ रिफाइनरी लिमिटेड (एनआरएल):

एनआरएल उद्देश्यों की प्राप्ति के लिए तकनीकी इनपुट देने हेतु, कंपनी शैक्षणिक और अनुसंधान संस्थानों के साथ साझेदारी करके सीमित अनुसंधान एवं विकास गतिविधियाँ आगे बढ़ा रही है। रिफ़ाइनरी प्रचालन के सभी क्षेत्रों में तकनीकी विशेषज्ञ नए मूल्यवर्धित उत्पाद विकसित करते हैं और मौजूदा पेट्रोलियम उत्पादों की

गुणवत्ता में सुधार करते हैं। ऐसी कुछ साझेदारियों और सहयोगों का विवरण नीचे दिया गया है:

8.9.1 आईआईटी गुवाहाटी में टिकाऊ सामग्री के विकास के लिए एनआरएल उत्कृष्टता केंद्र

(i) टिकाऊ सामग्री

क) इको पैकेजिंग सामग्री का विकास: "विकास" नामक एक परियोजना बायो–रिफाइनरी उप–उत्पाद फुरफुरल को पॉलीकैप्रोलैक्टोन में बदलने के लिए शुरू की गई है। इसे विभिन्न आकारों में ढालकर इको–पैकेजिंग सामग्री तैयार की जा सकती है।

ख) वृत्तीय अर्थव्यवस्था – हरित सक्रिय कार्बन का विकास: बांस के बुरादे से विपणन योग्य ग्रेड का हरित सक्रिय कार्बन बनाने के लिए एक निष्पादन संयंत्र के डिज़ाइन और विकास की परियोजना शुरू की गई है। इसका उद्देश्य 5 मीट्रिक टन/बैच अपशिष्ट बांस के बुरादे को हरित सक्रिय कार्बन में बदलने के लिए औद्योगिक पैमाने का निष्पादन संयंत्र तैयार करना है।

(ii) कार्बन तटस्थता: "पीएसए अपशिष्ट गैस से हाइड्रोजन पृथक्करण और सीओ2 संग्रहण: एनआरएल रिफाइनरी के लिए प्रौद्योगिकी विकास और निष्पादन" नामक एक अनुसंधान परियोजना शुरू की गई है। इसका उद्देश्य लिक्विड पिस्टन कम्प्रेशन तकनीक, मेटल हाइड्रेट तकनीक और मेम्ब्रेन तकनीक का उपयोग करके हाइड्रोजन पृथक्करण और सीआ$_2$ संग्रहण के लिए एकीकृत प्रक्रियाएँ विकसित करना है। यह परियोजना भारत के स्वच्छ ऊर्जा रोडमैप और एनआरएल के संधारणीय विकास लक्ष्यों में योगदान देगी।

(iii) व्यावसायिक प्रक्रिया स्वचालन: भारतीय प्रौद्योगिकी संस्थान गुवाहाटी (आईआईटीजी) के सहयोग से "नुमालीगढ़ रिफाइनरी लिमिटेड के लिए एआई आधारित खरीद आरएफएक्स स्वचालन" नामक परियोजना शुरू की जाएगी। इसका उद्देश्य निविदा और खरीद प्रक्रियाओं को स्वचालित और अनुकूलित करना है, साथ ही भारत सरकार के खरीद नियमों का पालन सुनिश्चित करना और महत्वपूर्ण व्यावसायिक आवश्यकताओं को पूरा करना।

8.9.2 एनआरएल एनईआईएसटी अनुसंधान एवं विकास केंद्र, जोरहाट, असम: सीएसआईआर में शुरू की गई अनुसंधान परियोजनाएं–

(i) पीएसए गैस से CO_2 ग्रहण के लिए टिकाऊ नैनोकम्पोजिट मैम्ब्रेन का विकास।

(ii) जल इलेक्ट्रोलिसिस के माध्यम से हरित हाइड्रोजन उत्पादन के लिए हाइब्रिड नैनो–कैटेलिस्ट का विकास।

(iii) पूर्वोत्तर क्षेत्र के पेट्रोलियम अपशिष्ट से उच्च गुणवत्ता वाले ग्राफीन जैसे नैनोमटीरियल का उत्पादन और उनका प्रयोग।

(iv) बांस आधारित बायोरिफाइनरी के लिए लिग्नोसेल्यूलोलिटिक मल्टी एंजाइम उत्पादन प्रक्रिया का विकास।

8.9.3 उत्सर्जन में कमी + परिपत्रता पर पहल: एनआरएल और ईआईएल के बीच 29 दिसंबर 2022 को एक सहयोग समझौते पर हस्ताक्षर किए गए। इसका उद्देश्य ईआईएल के पेटेंट "अमोनिया युक्त खट्टी गैसों से जलीय अमोनिया का उत्पादन" का संयुक्त रूप से व्यावसायीकरण करना और एनआरएल साइट पर इसका निष्पादन करना है। इस निष्पादन यूनिट को 10 टीपीडी (अधिकतम 16 टीपीडी) जलीय अमोनिया का उत्पादन करने के लिए डिज़ाइन किया जाएगा और यह एनआरईपी के तहत नए एसआरबी के पास स्थित होगी। सफल निष्पादन के बाद, इस तकनीक से एनओएक्स उत्सर्जन में कमी आने की उम्मीद है और असम बायो एथेनॉल प्राइवेट लिमिटेड की जलीय अमोनिया की आवश्यकताओं को पूरा किया जा सकेगा, जिससे पर्यावरणीय स्थिरता और संसाधनों के सर्कुलर उपयोग में योगदान मिलेगा।

8.9.4 नवीकरणीय ऊर्जा–पवन: एनआरएल ने असम काजीरंगा विश्वविद्यालय और सीमांत विज्ञान एवं अनुप्रयोग संस्थान के साथ मिलकर "पूर्वोत्तर भारत में पवन ऊर्जा क्षमता का आकलन" नामक शोध परियोजना शुरू की है। इस अध्ययन में नदी के किनारे टरबाइन स्तर पर पवन की विशेषताओं का बहु–स्तरीय और बहु–स्थल उच्च–आवृत्ति अवलोकन एवं विश्लेषण शामिल है। इसका मुख्य उद्देश्य क्षेत्र में पवन ऊर्जा परियोजनाओं की स्थापना की व्यवहार्यता का मूल्यांकन करने के लिए विश्वसनीय पवन संसाधन डेटा तैयार करना है। इस पहल के तहत, जनवरी 2024 से ब्रह्मपुत्र घाटी के विभिन्न नदी तटीय स्थानों

पर पवन वेग और संबंधित पर्यावरणीय डेटा इकट्ठा करने के लिए दो लिडार मशीनें लगाई गई हैं।

8.9.5 अपशिष्ट से धन प्राप्ति हेतु अनुसंधान सहयोग: एनआरएल ने प्रक्रिया सुधार और अपशिष्ट उत्पादों के मूल्यांकन के लिए सीएसआईआर–एनईआईएसटी, जोरहाट के साथ सहयोग स्थापित किया है। इस सहयोग के तहत "खट्टे और गंदे पानी से फिनोल निकालना, उसका पुनः उपयोग और मूल्य संवर्धन" नामक परियोजना शुरू की गई है। इसका उद्देश्य जल अपव्यय को कम करना और मूल्यवर्धित रसायनों का उत्पादन करना है। परियोजना के अंतर्गत 50 लीटर बैच आकार के प्रयोगशाला–स्तरीय प्रयोग खोखले फाइबर झिल्ली मॉड्यूल के डिज़ाइन और विकास द्वारा सफलतापूर्वक किए गए। एनआरएल स्थल पर इसके लिए 1 मीड/घंटा क्षमता वाला प्रायोगिक निष्पादन संयंत्र विकसित किया जा रहा है।

8.9.6 रिफ़ाइनरी अपशिष्ट प्रबंधन हेतु अनुसंधान सहयोग: एनआरएल ने कच्चे तेल, हाइड्रोकार्बन भंडारण टैंक के तल में जमा गाद और ईटीपी हाइड्रोकार्बन गाद के जैव–उपचार में साइनोबैक्टीरिया के उपयोग और इसके पर्यावरणीय जैव–प्रौद्योगिकी प्रभावों पर अध्ययन के लिए सेंट एडमंड्स कॉलेज, शिलांग को नियुक्त किया है। इस परियोजना की एक महत्वपूर्ण उपलब्धि यह है कि 28–दिवसीय चक्र पूरा होने के बाद, कच्चे तेल, गाद और ईटीपी गाद युक्त उपचारित कल्चर नमूनों में कुल पेट्रोलियम हाइड्रोकार्बन (सी11 से सी48 तक) लगभग शून्य तक कम हो गया।

8.9.7 राजीव गांधी पेट्रोलियम प्रौद्योगिकी संस्थान (आरजीआईपीटी), अमेठी के साथ अनुसंधान एवं विकास गतिविधियाँ: एनआरएल ने अनुसंधान गतिविधियों का विस्तार करने के अपने प्रयास में, निम्नलिखित अनुसंधान एवं विकास परियोजनाओं को पूरा करने के लिए दिनांक 13.11.2024 को राजीव गांधी पेट्रोलियम प्रौद्योगिकी संस्थान, अमेठी के साथ समझौता–ज्ञापन (एमओए) पर हस्ताक्षर किए।

(i) एच$_2$एस और अमोनिया को सल्फर, एच$_2$ और अमोनियम सल्फेट में विद्युत–प्रेरित रूपांतरण।

(ii) स्थिर मिश्रण बनाने के लिए मेथनॉल–डीजल का सम्मिश्रण।

(iii) लिग्निन आधारित जैव–चिपकने वाले पदार्थ का विकास और निष्पादन के लिए पायलट पैमाने पर इसकी प्रक्रिया का अनुकूलन।

(iv) एथेनॉल जल मिश्रण का एसिटिक एसिड और हाइड्रोजन में विद्युत रासायनिक रूपांतरण।

(v) मेथनॉल मिश्रित डीजल के कारण होने वाले संक्षारण को कम करने के लिए संक्षारण अवरोधक फार्मूले का विकास।

8.9.8 अनुसंधान एवं विकास व्यय

वर्ष	व्यय (करोड़ रुपए)
2021–22	715
2022–23	2.09
2023–24	3.08
2024–25	26.71

8.10 बामर लॉरी अनुसंधान एवं विकास:

बामर लॉरी के दो अनुसंधान एवं विकास केंद्र हैं। पहला, एप्लीकेशन रिसर्च डेवलपमेंट (एआरडी) केंद्र, एसबीयू: ग्रीस और लुब्रिकेंट्स के नए उत्पादों के विकास के लिए समर्पित है। दूसरा, एसबीयू: केमिकल्स के लिए उत्पाद विकास केंद्र (पीडीसी) है। ये दोनों केंद्र वैज्ञानिक एवं औद्योगिक अनुसंधान विभाग (डीएसआईआर) द्वारा मान्यता प्राप्त हैं।

8.10.1 अनुप्रयोग अनुसंधान प्रयोगशाला (एआरएल), कोलकाता: आधुनिक अनुसंधान एवं विकास केंद्र अत्याधुनिक परीक्षण रिग/उपकरणों से सुसज्जित है तथा इसमें उच्च योग्य वैज्ञानिक कार्यरत हैं। अनुसंधान एवं विकास प्रयास तकनीकी और लागत में नेतृत्व बनाए रखने के लिए निर्देशित हैं, जिससे ग्राहक संतुष्टि सुनिश्चित होती है। प्रमुख उद्देश्य इस प्रकार हैं:

(i) उत्पादन लागत कम करने और बेहतर उत्पाद निष्पादन देने के लिए तकनीकी प्रगति के अनुसार उत्पादों और प्रक्रियाओं का निरंतर उन्नयन।

(ii) ऑटोमोटिव क्षेत्र के लिए लुब्रिकेंट्स पर विशेष ध्यान देते हुए नए उच्च निष्पादन और विशिष्ट ग्रीस और लुब्रिकेंट्स का विकास।

(iii) औद्योगिक और ऑटोमोटिव दोनों ओईएम के लिए विशेष उत्पादों पर बल देना।

(iv) भविष्य की बाजार जरूरतों के अनुसार पर्यावरण अनुकूल और बायो–निम्नीकरणीय उत्पादों पर बल देना।

8.10.2 वित्त वर्ष 2024–25 में ग्रीस और लुब्रिकेंट्स से संबंधित अनुसंधान एवं विकास गतिविधियाँ

नए प्रकार के ग्रीस विकसित किए गए हैं, जैसे डम्परों के लिए उच्च भार ग्रीस, कम तनाव वाले कंक्रीट (एलआरपीसी) के लिए जल प्रतिरोध और संक्षारण रोकथाम वाले ग्रीस, ओवरहेड कंडक्टरों के लिए ग्रीस, लंबे जीवन वाले ऑटोमोबाइल ग्रीस, कोल्ड रोल स्टील मिलों के नेक रोल बेयरिंग के लिए ग्रीस, उच्च जल प्रवेश वाले ट्रैक्टर अनुप्रयोगों के लिए सल्फोनेट ग्रीस, उच्च चिपचिपाहट वाले बीएस 150 बेस ऑयल का एसएसआई पॉलिमर के साथ प्रतिस्थापन और पूर्वनिर्मित पॉलिमर से पीयू ग्रीस।

अनुसंधान एवं विकास परियोजनाएं भारतीय रेलवे के डीजल और विद्युत इंजनों के लिए सस्पेंशन बीयरिंग और सिंथेटिक गियर केस ऑयल के उच्च निष्पादन ग्रीस, ओवरहेड एल्यूमीनियम कंडक्टरों के लिए ग्रीस, इस्पात संयंत्रों के लिए अग्नि प्रतिरोधी ग्रीस, ऑटोमोटिव के लिए लंबे जीवन बहुउद्देश्यीय और उच्च तापमान व्हील बेयरिंग ग्रीस, हेवी ड्यूटी डीजल इंजन ऑयल (सीआई4 प्लस और सीके4), औद्योगिक ओईएम के लिए 'कीप क्लीन' हाइड्रोलिक ऑयल, उच्च निष्पादन कटिंग ऑयल, एल्यूमीनियम वायर ड्राइंग और मशीनिंग प्रचालन के लिए तेल, स्टील ट्यूब और पाइप के लिए जंग निवारक तेल, हल्के और स्टेनलेस स्टील के लिए उच्च निष्पादन कोल्ड रोलिंग तेल, ऑटोमोटिव के लिए बायोडिग्रेडेबल इंजन और ट्रांसमिशन ऑयल, और आंतरिक एस्टर संश्लेषण के लिए बुनियादी ढांचा शामिल हैं।

8.10.3 उत्पाद विकास केंद्रः मनाली, चेन्नई में चमड़ा, वस्त्र, कृषि और कागज़ रसायनों के क्षेत्र में अनुसंधान हेतु योग्य शोधकर्ताओं की टीम कार्यरत है। यह केंद्र सीएलआरआई चेन्नई, आईआईसीटी हैदराबाद, आईआईएससी बेंगलुरु, आईसीटी मुंबई, आईआईएसईआर पुणे और आईआईटी चेन्नई जैसे प्रमुख तकनीकी संस्थानों के साथ सहयोग करता है। इस केंद्र से उत्पादों के लिए कुल सात भारतीय पेटेंट प्राप्त किए गए हैं। बामर लॉरी ने 219 उत्पादों के लिए जेडडीएचसी एमआरएसएल संस्करण 3.1 स्तर 3.0 प्रमाणन और वस्त्र रसायनों के लिए जीओटीएस प्रमाणन संस्करण 7.0 प्राप्त किया है।

पीडीसी द्वारा इन वर्षों में विकसित प्रौद्योगिकियां इस प्रकार हैं

(i) फोटो सल्फो–क्लोरीनीकरण।

(ii) वनस्पति तेलों का सल्फाइटेशन।

(iii) वसायुक्त अल्कोहल और वसायुक्त अल्कोहल इथोक्सिलेट्स का सल्फोसक्सिनेशन।

(iv) खनिज सिंथेटिक टैनिंग एजेंट।

(v) वनस्पति तेलों और वसायुक्त अल्कोहल का संकर सल्फाइटेशन।

(vi) परिष्करण रसायनों की श्रेणियाँ।

(vii) प्रतिस्थापन सिंटैन/रेजिन सिंटैन/ फॉर्मेल्डिहाइड मुक्त सिंटैन।

(viii) कागज/पैकेजिंग बोर्ड के लिए यादृच्छिक इमल्शन कोपोलीमराइजेशन प्रक्रिया द्वारा पेपर बाइंडर का विकास।

(ix) सल्फोक्लोरीनीकरण प्रतिक्रियाओं से निकलने वाले एसओ2 का उपयोग करके बेसिक क्रोमियम सल्फेट प्रक्रिया का विकास।

बीएलसी ने स्वदेशी तकनीकों का उपयोग करके कई उच्च–निष्पादन वाले फैटलिक्वर विकसित किए हैं, जो बाजार में अच्छी तरह स्वीकार किए जा रहे हैं और कारोबार में वृद्धि में मदद कर रहे हैं। उन्होंने कई पहल की हैं और प्रक्रिया सुधार लागू किए हैं। संयंत्र स्तर पर सल्फोक्लोरीनीकरण अभिक्रियाओं में SO_2 गैस के उपयोग की दक्षता बढ़ाने के लिए आईसीटी, मुंबई के सहयोग से किए गए प्रयास को भारतीय रासायनिक परिषद ने मान्यता और पुरस्कार दिया है। अब हम चमड़े के रसायनों की फिनिशिंग श्रेणी में और अधिक उत्पाद जोड़ने पर ध्यान केंद्रित कर रहे हैं।

8.10.4 वर्तमान गतिविधियाँ

क. उच्च निष्पादन वाले फैटलिक्वर का विकास।

ख. तरल सिंथेटिक एजेंटों का विकास।

ग. परिष्करण रसायनों की श्रृंखला का विकास।

घ. कपड़ा सहायक उपकरणों का विकास।

ङ. कागज उद्योग के लिए टॉपकोट एक्रिलिक बाइंडर का विकास।

च. मैसर्स भारतीय प्रौद्योगिकी संस्थान, चेन्नई के साथ कपड़ा बाजार के लिए विशेष रसायनों का सहयोगात्मक अध्ययन और विकास।

छ. एसबीयू के लिए इंजीनियरिंग विकास पर मैसर्स भारतीय विज्ञान शिक्षा एवं अनुसंधान संस्थान, पुणे के साथ परामर्श।

8.10.5 अनुसंधान एवं विकास गतिविधियों पर व्यय

वित्त वर्ष	आय व्यय (लाख रुपए में)	पूंजीगत व्यय (लाख रुपए में)
2021–22	771.59	19.13
2022–23	729.57	54.76
2023–24	793.43	42.42
2024–25	867.94	33.28

8.11 इंजीनियर्स इंडिया लिमिटेड (ईआईएल):

गुड़गांव स्थित अनुसंधान एवं विकास केंद्र उपकरणों पर आधारित अनुसंधान और प्रौद्योगिकियों के आत्मसात और अनुकूलन के लिए एक राष्ट्रीय सुविधा केंद्र के रूप में कार्य करता रहा है। इसके मुख्य उद्देश्य सहयोगात्मक अनुसंधान करना, उच्च स्तर की कार्यप्रणालियाँ विकसित करना, और हार्डवेयर परीक्षण एवं निदान सेवाएँ प्रदान करना हैं। इन प्रयासों के परिणामस्वरूप 40 से अधिक प्रक्रिया प्रौद्योगिकियाँ और कई महत्वपूर्ण हार्डवेयर डिज़ाइन विकसित किए गए हैं।

8.11.1 प्रौद्योगिकी व्यावसायीकरण प्रयास: विभिन्न आंतरिक रूप से विकसित प्रौद्योगिकियों/सहयोग से विकसित प्रौद्योगिकियों के व्यावसायीकरण हेतु निरंतर प्रयास किए जा रहे हैं। इनमें से कुछ इस प्रकार हैं:

(i) बीपीसीएल बीना में एलपीजीटीयू के लिए तकनीकी जानकारी/लाइसेंस, बेसिक इंजीनियरिंग डिजाइन पैकेज (बीईडीपी), स्वामित्व वाली वस्तुओं और अन्य संबंधित सेवाओं की आपूर्ति।

(ii) कोच्चि रिफाइनरी में सुपर एब्जॉर्बेंट पॉलीमर (एसएपी) उत्पादन संयंत्र के लिए बीईडीपी।

(iii) एमआरपीएल में कोकर एलपीजी उपचार यूनिट के लिए मालिकाना संपर्ककर्ताओं का नवीनीकरण/प्रतिस्थापन।

(iv) कोच्चि रिफाइनरी में 2600 टीपीडी हाईजी डीएरेशन प्लेट के लिए स्केल–अप नॉलेज/प्रक्रिया प्रौद्योगिकी का संयुक्त विकास।

(v) अमोनिया यूनिट (ट्रेन–वन) स्टैंच उर्वरकों के स्टीम नेटवर्क का गतिशील सिमुलेशन।

(vi) एथिलीन क्रैकर यूनिट बीपीसीएल, बीना रिफाइनरी से फ्लेयर लोड अनुमान के लिए गतिशील सिमुलेशन अध्ययन।

(vii) एडीएनओसी रिफाइनरी, अबू धाबी के लिए आरआर ।।। पर क्रूड हीटर (11–बी–01) का सीएफडी अध्ययन।

(viii) पीक एलपी फ्लेयर वॉटर सील ड्रम (952–वीवी–102) की आंतरिक विफलता के लिए सीएफडी विश्लेषण–एचएमईएल भटिंडा।

(ix) बीपीसीएल कोच्चि रिफाइनरी डीएचडीएस बर्नर के लिए हॉट एयर डक्ट वितरण का सीएफडी विश्लेषण।

(x) सीएफडी/एफईएम, एडीएनओसी का उपयोग करके आपातकालीन क्षेत्र कंपन अध्ययन।

(xi) सीएफडी, केएनपीसी का उपयोग करके स्लग कैचर में प्रवाह वितरण।

(xii) ग्रैनुलेशन यूनिट, स्टैंच के लिए डक्ट की सीएफडी मॉडलिंग।

(xiii) एचपीसीएल मुंबई रिफाइनरी में गैसों से हाइड्रोजन की प्राप्ति के लिए आरओजी पीएसए यूनिट का निष्पादन।

8.11.2 प्रौद्योगिकी गठजोड़ को मजबूत करने के लिए की गई पहल

(i) CO_2 को डाइमिथाइल ईथर में परिवर्तित करने की प्रौद्योगिकी के विकास के लिए आईआईटी रुड़की के साथ समझौता–ज्ञापन पर हस्ताक्षर किए गए।

(ii) H_2 पीएसए प्रौद्योगिकी के लिए एचपीसीएल के साथ हस्ताक्षरित समझौता–ज्ञापन में विशेष रूप से एचजीयू–पीएसए, सीसीआर–पीएसए और आरओजी–पीएसए/एफजी–पीएसए के अनुप्रयोग शामिल हैं।

(iii) हाइड्रोकार्बन, पेट्रोकेमिकल और ऊर्जा प्रौद्योगिकी के क्षेत्र में संयुक्त अनुसंधान और ऐसी संयुक्त रूप से विकसित प्रौद्योगिकियों के व्यावसायीकरण के

लिए ईआईएल और आईआईटी कानपुर के बीच समझौता–ज्ञापन पर हस्ताक्षर किए गए।

(iv) **वित्त वर्ष 2024–25 के लिए सदस्यता का नवीनीकरण:**

क) प्रोसेस साइंस टेक्नोलॉजी सेंटर (पीएसटीसी), टेक्सास विश्वविद्यालय, अमेरिका द्वारा शुरू किया गया एक उद्योग–अकादमिक सहयोगात्मक अनुसंधान कार्यक्रम।

ख) फ्रैक्शनेशन रिसर्च इनकॉर्पोरेटेड (एफआरआई), ओक्लाहोमा, अमेरिका में स्थित एक गैर–लाभकारी सहकारी अनुसंधान संगठन है।

ग) प्रोसेस इंटीग्रेशन रिसर्च कंसोर्टियम (पीआईआरसी), मैनचेस्टर विश्वविद्यालय यूके।

8.11.3 आरंभ की गई प्रौद्योगिकी विकास परियोजनाएं: आरंभ की गई कुछ नई परियोजनाएं और चल रही परियोजनाएं इस प्रकार हैं:

(i) कैटेलिस्ट हाइड्रोजनीकरण के माध्यम से सीओ$_2$ को सीधे डाइमिथाइल ईथर में परिवर्तित करने के लिए प्रौद्योगिकी का विकास।

(ii) डीएरेशन की बड़े पैमाने पर उत्पादन विधि विकसित करना।

(iii) प्रौद्योगिकी उन्नयन और बहुस्तरीय इजेक्टर प्रणाली के लिए अनुकूलन सॉफ्टवेयर का विकास।

(iv) शैल और ट्यूब हीट एक्सचेंजर्स में नवीन बैफल्स का विकास।

(v) अमीन शुद्धिकरण प्रक्रिया का अनुकूलन।

(vi) भारी/मिश्रित कच्चे तेलों के प्रबंधन के लिए एसी–डीसी क्षेत्र आधारित विलवणीकरण प्रौद्योगिकी का विकास।

(vii) अमीन सॉल्वैंट का उपयोग करके बायोगैस से सीओ$_2$ अवशोषण के लिए लिक्विड जेट एडैक्टर प्रणाली का विकास।

(viii) एच$_2$ पीएसए प्रौद्योगिकी के लिए स्केल–अप पद्धति का विकास और डेमो पैकेज तैयार करना।

(ix) कोयला स्लरी पाइपलाइन के लिए डिजाइन पद्धति का विकास।

8.11.4 ईआईएल ने पेटेंट और ट्रेडमार्क दोनों के रूप में आईपीआर का विकास किया है: मार्च 2025 तक, 48 सक्रिय पेटेंट हैं और 61 पेटेंट के लिए आवेदन लंबित हैं। पेटेंट पोर्टफोलियो की खास बात यह है कि लगभग 65% दायर पेटेंट का व्यवसायीकरण हो चुका है। इसके अलावा, 28 स्वीकृत ट्रेडमार्क और 4 लंबित आवेदन भी आईपीआर पोर्टफोलियो में शामिल हैं। मार्च 2025 तक इस वर्ष के दौरान 27 नए पेटेंट दायर किए गए हैं।

8.11.5 स्टार्टअप पहल: ईआईएल आरएंडडी, ईआईएल की स्टार्टअप पहल "इंग्लैंड एसयूआई" के माध्यम से भारत के स्टार्टअप इकोसिस्टम को समर्थन देने के लिए पूरी तरह प्रतिबद्ध है। इस पहल के तहत ईआईएल स्टार्टअप को बौद्धिक, संरचनात्मक और वित्तीय सहायता प्रदान करता है। ईआईएल हाइड्रोकार्बन, आईटी और आईआईओटी, नवीकरणीय ऊर्जा और भंडारण, नैनो–सामग्री, अपशिष्ट से ऊर्जा, जैव ईंधन, नेट जीरो, स्वास्थ्य सुरक्षा और पर्यावरण जैसे क्षेत्रों में काम करने वाले स्टार्टअप को वित्त पोषित करता है। 10 आईआईटी और 4 एनआईटी ने ईआईएल की स्टार्टअप इंडिया पहल में पंजीकरण कराया है। अब तक 7 राउंड में कुल 31 परियोजनाओं को वित्तीय सहायता दी गई है। ईआईएल बोर्ड ने अनुदान के अलावा ईआईएल स्टार्टअप फंड के माध्यम से इक्विटी निवेश की भी मंजूरी दी है।



माननीय प्रधानमंत्री पारादीप रिफाइनरी में इंडमैक्स यूनिट के दौरे के दौरान



माननीय मंत्री ने एमआरपीएल के टोल्यूनि उत्पाद का शुभारंभ किया



एचपीसीएल बैंगलोर का अनुसंधान एवं विकास केंद्र



बोंगाईगांव रिफाइनरी में आईएसओएम कैटेलिस्ट की सफल कमीशनिंग



सूर्य नूतन सौर चूल्हे



एचपी–एईएमई तकनीक के लिए अनुसंधान एवं विकास में सर्वश्रेष्ठ नवाचार पुरस्कार:
कुशल हरित हाइड्रोजन उत्पादन के लिए अपनी तरह की पहली तकनीक



वर्ष का सर्वश्रेष्ठ नवप्रवर्तक – 'एचपी–कोसोल प्रक्रियाः ल्यूब रैफिनेट उत्पादन में सुधार की प्रक्रिया' के लिए टीम पुरस्कार



एमआरपीएल ने ऊर्जा प्रौद्योगिकी पुरस्कार जीता



मैसर्स इको वेव पावर, इजराइल और बीपीसीएल के बीच समझौता–ज्ञापन पर हस्ताक्षर



एमआरपीएल का आईबीबी प्रदर्शन संयंत्र



बीपीसीएल अनुसंधान एवं विकास केंद्र, ग्रेटर नोएडा, उत्तर प्रदेश



अनुसंधान एवं विकास केंद्र – 'अनुप्रयोग अनुसंधान प्रयोगशाला', कोलकाता – बामर लॉरी एंड कंपनी लिमिटेड




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9 जैव ईंधन

9.1 गैर–परंपरागत ऊर्जा:

भारत दुनिया की सबसे तेजी से बढ़ती अर्थव्यवस्थाओं में से एक है और इसका विकास लक्ष्य आर्थिक प्रगति, समानता और मानव कल्याण पर केंद्रित है। ऊर्जा सामाजिक और आर्थिक विकास की एक मुख्य ताकत है। देश की राष्ट्रीय ऊर्जा नीति का लक्ष्य है कि ऊर्जा संसाधनों का सही मिश्रण बनाकर ऊर्जा का कुशल उपयोग करना, ऊर्जा सुरक्षा सुनिश्चित करना और पर्यावरण के अनुकूल ऊर्जा सभी तक पहुँचाना। हालाँकि आने वाले वर्षों में भारत में जीवाश्म ईंधनों की भूमिका महत्वपूर्ण बनी रहेगी, लेकिन ये सीमित, गैर–नवीकरणीय और पर्यावरण को नुकसान पहुँचाने वाले हैं। इसलिए, इनका समझदारी से उपयोग जरूरी है। इसके विपरीत, नवीकरणीय ऊर्जा स्रोत देश में उपलब्ध, स्वच्छ और लगभग असीमित हैं। भारत नवीकरणीय संसाधनों से समृद्ध है, इसलिए उनका अधिक से अधिक उपयोग आवश्यक है। इन संसाधनों में बायोमास से बने जैव ईंधन विशेष रूप से महत्वपूर्ण हैं क्योंकि ये संधारणीय विकास को बढ़ावा देते हैं, पारंपरिक ऊर्जा आपूर्ति को मजबूत करते हैं, बढ़ती परिवहन ईंधन की मांग को पूरा करते हैं, और ग्रामीण इलाकों में रहने वाले लोगों की ऊर्जा जरूरतों को पूरा करने में मदद करते हैं।

9.2 एथेनॉल मिश्रित पेट्रोल (ईबीपी) कार्यक्रम

9.2.1 पृष्ठभूमि: सरकार तेल विपणन कंपनियों (ओएमसी) के माध्यम से एथेनॉल मिश्रित पेट्रोल (ईबीपी) कार्यक्रम लागू कर रही है। इसके तहत ये कंपनियाँ 20% तक एथेनॉल मिलाकर पेट्रोल बेचती हैं। एथेनॉल एक हरित ईंधन है, जो पर्यावरण की रक्षा में मदद करता है, विदेशी मुद्रा की बचत करता है, कच्चे तेल पर निर्भरता घटाता है और देश के कृषि क्षेत्र को मजबूत बनाता है। 2001 में किए गए प्रायोगिक परीक्षणों के बाद, भारत सरकार ने 01.01.2003 से नौ राज्यों और चार संघ शासित प्रदेशों में 5% एथेनॉल मिश्रित पेट्रोल बेचने की शुरुआत की।

प्रारंभिक और समेकित दशक के दौरान और ईबीपी कार्यक्रम को गति देने के उद्देश्य से, सरकार ने दिसंबर 2014 के दौरान पेट्रोकेमिकल मार्ग सहित सेल्यूलोसिक और लिग्नोसेल्यूलोसिक सामग्रियों जैसे गुड़ के अलावा अन्य गैर–खाद्य फीडस्टॉक्स से उत्पादित एथेनॉल की खरीद करने का निर्णय लिया। ईबीपी कार्यक्रम के तहत एथेनॉल की कीमत को नियंत्रित करने का भी निर्णय लिया गया।

एथेनॉल आपूर्ति वर्ष (ईएसवाई) 2017–18 से पहले, केवल सी हेवी गुड़, जो चीनी उद्योग का एक उप–उत्पाद है, से बने एथेनॉल को ही ईबीपी कार्यक्रम में इस्तेमाल करने की अनुमति थी। बाद में सरकार ने वर्ष 2018 में नई राष्ट्रीय जैव ईंधन नीति जारी की, जिसमें एथेनॉल बनाने के लिए कई तरह के चीनी और अनाज आधारित कच्चे माल (फीडस्टॉक) के उपयोग की अनुमति दी गई। 2018–19 से, बी हेवी गुड़, खराब हुए अनाज, चीनी, चीनी सिरप और भारतीय खाद्य निगम (एफसीआई) के पास उपलब्ध अतिरिक्त चावल से भी एथेनॉल बनाने की मंजूरी दी गई। इसके अलावा, ईएसवाई 2020–21 से मक्का से भी एथेनॉल बनाने की अनुमति दी गई।

सरकार ने ईबीपी कार्यक्रम को मजबूत करने के लिए कई महत्वपूर्ण कदम उठाए हैं। इनमें एथेनॉल के अंतरराज्यीय आवागमन को आसान बनाने के लिए 1951 के उद्योग (विकास और विनियमन) अधिनियम में संशोधन करना, एथेनॉल पर जीएसटी दर को घटाकर 5% करना, और लंबे समय तक एथेनॉल की खरीद सुनिश्चित करने के लिए एथेनॉल खरीद नीति 2019 लागू करना शामिल है। इसके अलावा, वर्ष 2020 से 2025 की अवधि के लिए एथेनॉल मिश्रण का रोडमैप बनाया गया, जिससे पेट्रोल में एथेनॉल

की मात्रा धीरे–धीरे बढ़ाई जा सके। सड़क, रेलवे और पाइपलाइन के माध्यम से एथेनॉल और एथेनॉल मिश्रित पेट्रोल के परिवहन की सुविधा विकसित की गई। डिस्टिलरी और तेल विपणन कंपनियों में एथेनॉल भंडारण क्षमता बढ़ाई गई। पेट्रोल में 20% एथेनॉल मिश्रण का लक्ष्य, जो पहले वर्ष 2030 तय था, उसे आगे बढ़ाकर एथेनॉल आपूर्ति वर्ष 2025–26 कर दिया गया। अगस्त 2021 में, उन राज्यों के लिए दिशानिर्देश जारी किए गए जहाँ एथेनॉल की कमी है, ताकि वहाँ समर्पित एथेनॉल संयंत्र (डीईपी) लगाए जा सकें और दीर्घकालिक समझौते किए जा सकें। 2018 से 2022 तक एथेनॉल उत्पादन क्षमता बढ़ाने के लिए ब्याज अनुदान योजनाएँ चलाई गईं। साथ ही, लिग्नोसेल्यूलोसिक बायोमास और अन्य नवीकरणीय पदार्थों से उन्नत जैव ईंधन परियोजनाएँ शुरू करने के लिए प्रधानमंत्री जी–वन योजना के तहत वित्तीय सहायता दी गई। इन सभी निर्णयों और उनके प्रभावी क्रियान्वयन के परिणामस्वरूप देश में एथेनॉल की उपलब्धता में बड़ी वृद्धि हुई है।

9.2.2 **एथेनॉल मिश्रण को बढ़ावा देने के लिए केंद्र सरकार द्वारा जारी दिशानिर्देशः** सरकार ने एथेनॉल मिश्रण पर विभिन्न दिशानिर्देश जारी किए हैं, जिनमें अन्य बातों के साथ–साथ निम्नलिखित शामिल हैं:

i. एथेनॉल मिश्रित पेट्रोल (ईबीपी) कार्यक्रम के तहत उत्पादित एथेनॉल के लिए दिसंबर, 2014 में प्रशासित मूल्य तंत्र की शुरुआत।

ii. राष्ट्रीय जैव ईंधन नीति – 2018, और 2022 में इसका संशोधन।

iii. ईबीपी कार्यक्रम के तहत एथेनॉल के अंतर–राज्यीय और अंतर्राज्यीय आवागमन को सुगम बनाने के लिए उद्योग (विकास और विनियम) अधिनियम, 1951 में संशोधन।

iv. ईबीपी कार्यक्रम के लिए एथेनॉल पर जीएसटी दर को घटाकर 5% करना।

v. दीर्घकालिक आधार पर एथेनॉल की खरीद के लिए एथेनॉल खरीद नीति, 2019.

vi. 2020–2025 की अवधि के लिए भारत में एथेनॉल मिश्रण की रूपरेखा।

vii. **पेट्रोल में 20%** एथेनॉल मिश्रण के लक्ष्य को 2030 से आगे बढ़ाकर एथेनॉल आपूर्ति वर्ष (ईएसवाई) 2025–26 करना।

viii. अगस्त 2021 में जारी एथेनॉल की कमी वाले राज्यों में समर्पित एथेनॉल संयंत्र (डीईपी) स्थापित करना और दीर्घकालिक उठान समझौतों पर हस्ताक्षर करना।

ix. एथेनॉल उत्पादन क्षमता बढ़ाने के लिए खाद्य और सार्वजनिक वितरण विभाग (डीएफपीडी) द्वारा 2018 से 2022 तक एथेनॉल ब्याज अनुदान योजनाएँ।

x. लिग्नोसेल्यूलोसिक बायोमास और अन्य नवीकरणीय फीडस्टॉक का उपयोग करके देश में उन्नत जैव ईंधन परियोजनाओं की स्थापना को वित्तीय सहायता प्रदान करने हेतु 2024 में प्रधानमंत्री जी वन (जैव ईंधन वातावरण अनुकूल फसल अवशेष निवारण) योजना 2019 में संशोधन किया।

केंद्र सरकार की पहल और हितधारकों की भागीदारी से जैव ईंधन के क्षेत्र में अच्छी प्रगति हुई है। इसके परिणामस्वरूप कई राज्य सरकारों ने भी अपनी–अपनी जैव ईंधन नीतियाँ बनाई हैं। इन नीतियों के तहत परियोजना लगाने वालों को निवेश बढ़ाने के लिए अतिरिक्त सुविधाएँ और प्रोत्साहन दिए जाते हैं, जिससे किसानों को फायदा होता है और पर्यावरण की भी रक्षा होती है।

9.2.3 **एथेनॉल मूल्य निर्धारणः** तेल विपणन कंपनियाँ पेट्रोल में मिलाने के लिए एथेनॉल की खरीद उसके कच्चे माल (फीडस्टॉक) के आधार पर अलग–अलग एक्स–मिल कीमतों पर करती हैं। वर्ष 2017–18 तक, एथेनॉल केवल सी–हेवी मोलासेस (सीएचएम) से बनाया जाता था। लेकिन एथेनॉल आपूर्ति वर्ष 2018–19 से कई तरह के फीडस्टॉक का उपयोग शुरू हुआ। इस क्षेत्र को बढ़ावा देने के लिए, सरकार ने एथेनॉल की कीमतें उसके फीडस्टॉक के प्रकार के अनुसार अलग–अलग तय करने की मंजूरी दी, ताकि एथेनॉल की आपूर्ति और खरीद सुचारू रहे। गन्ना आधारित फीडस्टॉक से बने एथेनॉल की कीमत सरकार तय करती है, जबकि अनाज आधारित फीडस्टॉक से बने एथेनॉल की कीमत सार्वजनिक क्षेत्र की तेल कंपनियाँ तय करती हैं।

सी–हैवी मोलासेस से बने एथेनॉल की कीमत में 3% की बढ़ोतरी को छोड़कर, 01.12.2022 से ईएसवाई 2024–25 तक एथेनॉल की कीमतें स्थिर रही हैं। चूँकि सी–हैवी मोलासेस से एथेनॉल बनाने के दौरान चीनी का कोई इस्तेमाल या डायवर्जन नहीं होता, इससे देश में चीनी की पर्याप्त उपलब्धता बनी रहती है और ईबीपी कार्यक्रम के लिए एथेनॉल की जरूरत भी पूरी होती है।

इसके अलावा, एथेनॉल उत्पादन के लिए कच्चे माल की उपलब्धता बढ़ाने के लिए इस अवधि में सरकार ने प्रोत्साहन राशि दी है। इसके तहत सी–हैवी मोलासेस (सीएचएम) से बने एथेनॉल पर ₹6.87 प्रति लीटर, मक्का से बने एथेनॉल पर ₹15.51 प्रति लीटर और खराब हुए अनाज (डीएफजी) से बने एथेनॉल पर ₹8.46 प्रति लीटर का प्रोत्साहन दिया गया। इस प्रोत्साहन के कारण, एक्स–मिल आधार पर (जीएसटी को छोड़कर) एथेनॉल का भारित औसत खरीद मूल्य ईएसवाई 2022–23 में ₹61.89 प्रति लीटर से बढ़कर ईएसवाई 2024–25 (फरवरी 2025) में ₹67.73 प्रति लीटर हो गया।

नीचे दी गई तालिका पिछले कुछ वर्षों में विभिन्न फीडस्टॉक्स से बने एथेनॉल की एक्स–मिल कीमतों में हुए बदलाव को दर्शाती है:

एथेनॉल की फीडस्टॉक के अनुसार कीमत (₹/लीटर में)

एथेनॉल आपूर्ति वर्ष	गन्ने का रस/चीनी/सिरप	बी–हैव शीरा	सी–हैवी शीरा			क्षतिग्रस्त खाद्यान्न			मक्का			एफसीआई चावल		
			नियमित मूल्य	प्रोत्साहन राशि	कुल मिल पूर्व–मूल्य	नियमित मूल्य	प्रोत्साहन राशि	कुल मिल पूर्व–मूल्य	नियमित मूल्य	प्रोत्साहन राशि	कुल मिल पूर्व–मूल्य	नियमित मूल्य	प्रोत्साहन राशि	कुल मिल पूर्व–मूल्य
2016-17	ईएसवाई 2016–17 से शुरू		39.00	-	39.00	ईएसवाई 2018–19 से शुरू			ईएसवाई 2020–21 से शुरू					
2017-18			40.85		40.85									
2018-19	59.19	52.43	43.46	-	43.46	47.13	-	47.13						
2019-20	59.48	54.27	43.75	-	43.75	50.36	-	50.36						
2020-21	62.65	57.61	45.69	-	45.69	51.55	-	51.55	51.55	-	51.55	56.87	-	56.87
2021-22	63.45	59.08	46.66	-	46.66	52.92	2.33	55.25	52.92	2.33	55.25	56.87	1.437	58.31
2022–23 (दिसंबर'22 से अक्तूबर'23)	65.61	60.73	49.41	-	49.41	55.54	8.46	64.00	56.35	9.72	66.07	58.50	-	58.50
2023–24 (नवंबर'23 से अक्तूबर'24)	65.61	60.73	49.41	6.87	56.28	64.00	-	64.00	66.07	5.79	71.86	58.50	-	58.50
2024–25 (नवंबर'24 से अक्तूबर'25)		60.73	57.97	-	57.97	64.00	-	64.00	66.07	5.79	71.86	58.50	-	58.50

प्रोत्साहन/राहत योजनाओं का विवरण (एथेनॉल के मूल मूल्य के अतिरिक्त)

ईएसवाई 21–22 (यूक्रेन युद्ध और डीएफजी दर वृद्धि के कारण राहत योजना) तीसरी और चौथी तिमाही, अर्थात् 01.06.22 से 30.11.22 तक

फीडस्टॉक	राहत (₹/लीटर)
एससीजे	1.604
बीएचएम	1.493
सीएचएम	1.179
डीएफजी	2.337
एसएफजी	1.437

ईएसवाई 22–23 (एफसीआई चावल की आपूर्ति बंद होने के कारण डीएफजी और मक्का पर प्रोत्साहन)

फीडस्टॉक	07.08.23 से	22.08.23 से	कुल प्रोत्साहन
डीएफजी	4.75	3.71	8.46
मक्का	6.01	3.71	9.72

ईएसवाई 23–24 (चीनी डायवर्जन प्रतिबंध के कारण सीएचएम और मक्का पर प्रोत्साहन)

सीएचएम: 6.87 ₹/लीटर (पूरे ईएसवाई 23–24 के लिए लागू)

मक्का: 5.79 ₹/लीटर (05.01.24 से लागू)

नीचे दी गई तालिका पिछले वर्षों में एथेनॉल की अनुमानित भारित औसत पूर्व–मिल कीमत दर्शाती है:

भारित औसत एथेनॉल पूर्व–मिल कीमत ₹/लीटर में

ईएसवाई	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25
ईएसवाई पूर्व–मिल कीमत (₹/लीटर)	39.00	40.85	45.25	49.85	55.93	59.82	61.89	66.05	67.73

इसके अलावा, तेल विपणन कंपनियाँ एथेनॉल आपूर्तिकर्ताओं को उनके तय किए गए वास्तविक मूल्य और परिवहन दर के अनुसार जीएसटी का भुगतान कर रही हैं। ईएसवाई 2024–25 के लिए, फरवरी 2025 तक एथेनॉल आवंटन पर आधारित भारित औसत पूर्व–मिल मूल्य का निर्धारण किया गया है। ईएसवाई–वार एथेनॉल की खरीद और पेट्रोल में उसके मिश्रण का निष्पादन नीचे दी गई तालिका में प्रस्तुत किया गया है।

ईएसवाई	एथेनॉल खरीद/मिश्रण मात्रा (करोड़ लीटर)	मिश्रण प्रतिशत (%)
2015-16	111.40	3.51
2016-17	66.50	2.07
2017-18	150.50	4.22
2018-19	188.60	5.00
2019-20	173.00	5.00

ईएसवाई	एथेनॉल खरीद/मिश्रण मात्रा (करोड़ लीटर)	मिश्रण प्रतिशत (%)
2020-21	302.30	8.10
2021-22	433.60	10.02
2022-23	508.50	12.06
2023-24	707.40	14.60
2024-25 (मार्च 2025 तक)	391.00	18.36

नीचे दी गई तालिका ईएसवाई के दौरान विभिन्न फीडस्टॉक्स से आपूर्ति/मिश्रित मात्रा का प्रतिशत दर्शाती है:

ईएसवाई	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	23-24 (आवंटन)*
जूस/सिरप	0%	0%	0%	0%	0%	8%	13%	20%	25%	10%	19%
बीएचएम	0%	0%	0%	0%	17%	39%	61%	61%	46%	22%	13%
सीएचएम	100%	100%	100%	100%	77%	41%	13%	2%	1%	9%	1%
डीएफजी/मक्का	0%	0%	0%	0%	5%	9%	13%	6%	6%	17%	11%
मिश्रण एफसीआई चावल	0%	0%	0%	0%	0%	0%	1%	11%	15%	0%	7%
मक्का	0%	0%	0%	0%	0%	0%	0%	0%	6%	43%	49%
कुल	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
मिश्रण प्रतिशत	2.1%	3.5%	2.0%	4.2%	5.0%	5.0%	8.1%	10.0%	12.1%	14.6%	19.0%

*ईएसवाई 2024–25 के लिए आवंटन की स्थिति दिनांक 31.03.2025 तक है और यदि पूरी आपूर्ति की जाती है, तो अनुमानित मिश्रण प्रतिशत 19% है।

उल्लेखनीय है कि सार्वजनिक क्षेत्र की तेल विपणन कंपनियों ने ईएसवाई 2021–22 में पेट्रोल में 10% एथेनॉल मिश्रण का लक्ष्य तय समय से पहले ही पूरा कर लिया। इसके बाद, ईएसवाई 2022–23 में 12% मिश्रण का लक्ष्य भी हासिल किया। ईएसवाई 2023–24 में, मई 2024 से, तेल कंपनियाँ लगातार पेट्रोल में 15% से अधिक एथेनॉल मिला रही हैं, जिससे औसत मिश्रण बढ़कर 14.60% हो गया। चालू ईएसवाई 2024–25 में, जनवरी 2025 से, सार्वजनिक क्षेत्र की कंपनियाँ पेट्रोल में लगातार 19.5% से अधिक एथेनॉल मिला रही हैं और ईएसवाई 2025–26 तक 20% एथेनॉल मिश्रण के लक्ष्य को पूरा करने की दिशा में अग्रसर हैं।

विभिन्न फीडस्टॉक्स से एथेनॉल की उपलब्धता अच्छी है, जिससे आवश्यक संतुलन बना रहता है। तेल विपणन कंपनियों (ओएमसी) ने देश में 792 करोड़ लीटर प्रति वर्ष की समर्पित एथेनॉल क्षमता के लिए 232 दीर्घकालिक ऑफटेक समझौतों पर हस्ताक्षर किए हैं। इन परियोजना समर्थकों की कुल 1106 करोड़ लीटर प्रति वर्ष की डिज़ाइन क्षमता स्थापित करने की योजना है। इनमें से 86 संयंत्र, जिनकी कुल क्षमता 535 करोड़ लीटर प्रति वर्ष है, पहले ही चालू हो चुके हैं।

9.2.4 ईबीपी कार्यक्रम के कारण अर्जित लाभः ईएसवाई 2014–15 से ईएसवाई 2024–25 (मार्च 2025 तक), सार्वजनिक क्षेत्र की तेल विपणन कंपनियों (ओएमसीज) ने पेट्रोल में 3100 करोड़ लीटर एथेनॉल खरीदा और मिश्रित किया, जिससे पेट्रोल की उतनी ही मात्रा की आवश्यकता कम हो गई। इस कार्यक्रम के कारण विदेशी मुद्रा की बचत लगभग ₹1,29,404 करोड़ होने का अनुमान है। यह एथेनॉल घरेलू रूप से उगाए गए गन्ने और अनाज आधारित फीडस्टॉक से बनाया गया, जिसे डिस्टिलरी ने स्थानीय किसानों से खरीदा, जिससे उनकी कृषि उपज की मांग बढ़ी। ओएमसी को डिस्टिलरी को एथेनॉल की आपूर्ति के लिए जल्दी भुगतान करना आवश्यक होता है, जिससे चीनी मिल/डिस्टिलरी के पूंजी प्रवाह में सुधार हुआ। अनुमान है कि ईएसवाई 2014–15 से ईएसवाई 2024–25 (मार्च 2025 तक) तक, तेल कंपनियों ने डिस्टिलरियों को एथेनॉल खरीद के लिए ₹1,85,334 करोड़ से अधिक का भुगतान किया। चूंकि स्थानीय किसानों से खरीदा गया फीडस्टॉक एथेनॉल की कुल लागत का बड़ा हिस्सा है, इसलिए डिस्टिलरियों ने किसानों को भी बड़ी राशि का भुगतान किया।

पर्यावरण के लिहाज से, अनुमान है कि ईएसवाई 2014–15 से ईएसवाई 2024–25 (मार्च 2025 तक) पेट्रोल में एथेनॉल मिश्रण के कारण शुद्ध सीओ$_2$ में लगभग 659.7 एलएमटी की कमी आई है।

आने वाले वर्षों में, जब पेट्रोल में 20% एथेनॉल मिश्रण होगा, तो न केवल ऊर्जा सुरक्षा और नेट ज़ीरो उत्सर्जन के लक्ष्य हासिल होंगे, बल्कि किसानों और पर्यावरण को मिलने वाले लाभ में भी और सुधार होगा।

ईएसवाई 2014–15 से ईएसवाई 2024–25 (मार्च 2025 तक) पेट्रोल में एथेनॉल मिश्रण के कारण हुई बचत नीचे तालिका में दी गई है।

ईएसवाई 2014–15 से ईएसवाई 2024–25' तक पेट्रोल में एथेनॉल मिश्रण के कारण प्राप्त बचत

क्र. सं.	मानदंड	मार्च 2025	नवंबर 2024–मार्च 2025	ईएसवाई 2014–15 से ईएसवाई 2023–24	संचयी (ईएसवाई 2014–15 से ईएसवाई 2024–25*)
1	करोड़ लीटर में प्राप्त एथेनॉल	90.66	369.53	लागू नहीं	लागू नहीं
2	मिश्रित एथेनॉल, करोड़ लीटर में	88.56	391.03	2,706.75	3,097.78
3	एथेनॉल मिश्रण	19.78%	18.36%	लागू नहीं	लागू नहीं
4	डिस्टिलरीज़ को अनुमानित भुगतान (₹ करोड़)	6,034.49	24,917.21	1,60,416.89	1,85,334.10
5	विदेशी मुद्रा की बचत (₹ करोड़)	3,775.06	16,990.02	1,12,414.48	1,29,404.50
6	विदेशी मुद्रा की बचत (मिलियन डॉलर में)	435.72	1,978.81	14,311.82	16,290.60
7	शुद्ध सीओ2 में कमी (लाख मीट्रिक टन)	18.86	83.28	576.45	659.73
8	कच्चे तेल का प्रतिस्थापन (लाख मीट्रिक टन)	6.28	27.71	191.83	219.54
9	किसानों को अनुमानित भुगतान (₹ करोड़)	3,620.69	14,950.32	96,250.54	1,11,200.86

*ईएसवाई 2024–25 के आंकड़े मार्च' 25 तक उपलब्ध हैं।

9.3 बायोडीजल कार्यक्रम:

सरकार डीजल में बायोडीजल के मिश्रण को बढ़ावा देने और प्रोत्साहित करने के लिए बहु–आयामी दृष्टिकोण अपना रही है। इसमें स्टेशनरी और अन्य इंजनों में सीधे वनस्पति तेल सहित विभिन्न फीडस्टॉक्स के उपयोग की संभावनाओं की खोज की जा रही है। इसी दिशा में, सरकार ने 30 अप्रैल 2019 को राजपत्र अधिसूचना जारी कर "परिवहन उद्देश्यों के लिए हाई–स्पीड डीजल के साथ बायोडीजल के मिश्रण के लिए बिक्री दिशानिर्देश–2019" अधिसूचित किए। बायोडीजल उत्पादन में निवेश को प्रोत्साहित करने के लिए, तेल विपणन कंपनियों (ओएमसी) को डीजल में मिश्रण के लिए आपूर्ति किए जाने वाले बायोडीजल पर अक्तूबर 2021 से जीएसटी दर 12% से घटाकर 5% कर दी गई। राष्ट्रीय जैव ईंधन नीति–2018 के तहत, 2030 तक डीजल में 5: बायोडीजल मिश्रण या बायोडीजल की प्रत्यक्ष बिक्री का एक सांकेतिक लक्ष्य रखा गया है।

देश में लगभग 94% बायोडीजल पाम स्टीयरिन तेल (पीएसओ) से बनाया जाता है। इन कारणों से, तेल विपणन कंपनियों ने बायोडीजल की खरीद में बड़ी वृद्धि की है। यह वित्त वर्ष 2015–16 में 1.1 करोड़ लीटर से बढ़कर वित्त वर्ष 2024–25 में डीजल में मिश्रण के लिए 36.7 करोड़ लीटर हो गई है।

9.4 संधारणीय विमानन ईंधन (एसएएफ)/जैव–विमानन टरबाइन ईंधन (बायो–एटीएफ):

संधारणीय विमानन ईंधन (एसएएफ) विमानन क्षेत्र को कार्बन मुक्त बनाने का एक महत्वपूर्ण तरीका है। एसएएफ पर ध्यान देने से न केवल विमानन उद्योग की पर्यावरणीय स्थिरता बढ़ेगी, बल्कि वैश्विक विमानन क्षेत्र में भारत की नेतृत्व क्षमता भी मजबूत होगी क्योंकि यह अधिक टिकाऊ प्रथाओं की ओर बढ़ रहा है।

सरकार ने अंतर्राष्ट्रीय उड़ानों के लिए एविएशन टर्बाइन फ्यूल (एटीएफ) में क्रमशः 1%, 2% और 5% एसएएफ के सांकेतिक मिश्रण लक्ष्य तय किए हैं, जो वर्ष 2027, 2028 और 2030 से लागू होंगे। यह उल्लेखनीय है कि भारत की पहली वाणिज्यिक उड़ान, जिसमें स्वदेशी रूप से निर्मित एसएएफ मिश्रित एटीएफ का उपयोग हुआ, 19 मई 2023 को पुणे और दिल्ली के बीच सफलतापूर्वक उड़ान भर चुकी है।

तेल विपणन कंपनियाँ 332 केटीपीए कुल नियोजित क्षमता वाली विभिन्न प्रायोगिक और वाणिज्यिक स्तर की सुविधाओं की स्थापना में लगी हुई हैं, जो एचईएफए/सह–प्रसंस्करण/अल्कोहल–टू–जेट तकनीक पर आधारित हैं।

9.5 दूसरी पीढ़ी का एथेनॉल:

दिसंबर 2014 में, सरकार ने अधिशेष बायोमास/कृषि अपशिष्ट से ऊर्जा उत्पादन और पर्यावरण संरक्षण को प्राथमिकता देने के लिए फैसला किया कि गुड़ के अलावा गैर–खाद्य पदार्थ जैसे सेल्युलोसिक और लिग्नोसेल्युलोसिक सामग्री से एथेनॉल बनाया जाए। इसके तहत तेल कंपनियों को सलाह दी गई कि वे दूसरी पीढ़ी (2जी) के एथेनॉल संयंत्र स्थापित करने की व्यवहार्यता का अध्ययन करें, क्योंकि यह तकनीक उस समय वैश्विक स्तर पर अभी प्रारंभिक अवस्था में थी।

देश में 2जी एथेनॉल क्षमता बढ़ाने और इस क्षेत्र में निवेश आकर्षित करने के लिए 2019 में प्रधानमंत्री जी वन (जैव ईंधन–वातावरण अनुकूल फसल अपशिष्ट निवारण) योजना लागू की गई थी। इसे 2024 में संशोधित किया गया ताकि 2जी बायोएथेनॉल परियोजनाओं को वित्तीय सहायता दी जा सके। इस योजना के तहत अधिशेष बायोमास, कृषि अपशिष्ट, औद्योगिक अपशिष्ट आदि को उन्नत जैव ईंधन तकनीक का उपयोग करके एथेनॉल में बदला जा सकता है।

संशोधित योजना में समय–सीमा को पांच साल बढ़ाकर वर्ष 2023–24 से वर्ष 2028–29 किया गया है, साथ ही "बोल्ट–ऑन" संयंत्रों और "ब्राउनफील्ड परियोजनाओं" को शामिल करने के लिए पात्रता का विस्तार किया गया और "2जी एथेनॉल" को उन्नत जैव ईंधन से प्रतिस्थापित करने का प्रावधान भी रखा गया है।

संशोधित योजना के तहत लगभग 12 व्यावसायिक पैमाने की उन्नत जैव ईंधन परियोजनाओं को वित्तीय सहायता दी जाएगी, जिसका कुल खर्च लगभग ₹1969.50 करोड़ होगा। इसके अलावा, लगभग 10 निष्पादन पैमाने की उन्नत जैव ईंधन परियोजनाओं को भी सहायता दी जाएगी।

इसके अतिरिक्त, सार्वजनिक और निजी दोनों क्षेत्रों की कंपनियों को छह व्यावसायिक पैमाने की 2जी जैव–एथेनॉल परियोजनाओं और चार निष्पादन पैमाने की 2जी एथेनॉल परियोजनाओं के लिए वित्तीय सहायता मंजूर की गई है।

इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल) का 2जी एथेनॉल संयंत्र, जिसकी क्षमता 100 केएलपीडी (लगभग 3 करोड़ लीटर) है, धान के भूसे को फीडस्टॉक के रूप में इस्तेमाल करने वाली स्वदेशी तकनीक पर आधारित है। इसे वर्ष 2022 में विश्व जैव ईंधन दिवस पर माननीय प्रधानमंत्री द्वारा राष्ट्र को समर्पित किया गया था और वर्तमान में यह स्थिरीकरण के अंतिम चरण में है।

नुमालीगढ़ रिफाइनरी लिमिटेड असम के नुमालीगढ़ में एक 2जी एथेनॉल संयंत्र स्थापित कर रही है, जिसमें बांस – एक गैर–खाद्य, गैर–लकड़ी लिग्नोसेल्यूलोसिक बायोमास को एथेनॉल में बदला जाएगा। यह एथेनॉल राष्ट्रीय एथेनॉल मिश्रण कार्यक्रम के तहत पेट्रोल में मिलाया जाएगा। संयंत्र को 300 टीएमटीपीए सूखे बांस से 50 टीएमटीपीए (लगभग 6.2 करोड़ लीटर प्रति वर्ष) एथेनॉल उत्पादन के लिए डिज़ाइन किया गया है। इसके अलावा, यह फुरफुरल (18 टीएमटीपीए) और एसिटिक एसिड (11 टीएमटीपीए) जैसे अन्य उच्च–मूल्य वाले हरित रसायन भी बनाएगा। संयंत्र से लगभग 25 मेगावाट हरित ऊर्जा का उत्पादन होने की संभावना है, जो अपनी ऊर्जा जरूरतों को पूरा करेगा और साथ ही ग्रिड को लगभग 5 मेगावाट बिजली भी देगा। बांस को अल्कोहल में बदलने के लिए पहला परीक्षण सफलतापूर्वक किया जा चुका है। यह संयंत्र वर्ष 2025–26 की दूसरी तिमाही तक पूरी तरह से चालू होने की उम्मीद है।

बीपीसीएल ओडिशा के बरगढ़ में 100 केएलपीडी (लगभग 3 करोड़ लीटर प्रति वर्ष) क्षमता वाला 2जी एथेनॉल संयंत्र स्थापित कर रहा है, जिसमें धान के भूसे का उपयोग फीडस्टॉक के रूप में किया जाएगा। परियोजना के दूसरे चरण में एक एकीकृत 1जी एथेनॉल संयंत्र की भी योजना है। यह 2जी संयंत्र यांत्रिक रूप से पूरा हो चुका है और चालू होने के अंतिम चरण में है।

एचपीसीएल पंजाब के भटिंडा में 100 केएलपीडी (लगभग 3 करोड़ लीटर प्रति वर्ष) क्षमता वाला 2जी एथेनॉल संयंत्र स्थापित कर रहा है, जिसमें धान के भूसे का उपयोग किया जाएगा। यह संयंत्र 2025–26 की तीसरी तिमाही में यांत्रिक रूप से पूरा होने का अनुमान है।

9.6 जैव–ईंधन में अनुसंधान और निष्पादन:

पेट्रोलियम और प्राकृतिक गैस मंत्रालय के तहत उच्च प्रौद्योगिकी केंद्र (सीएचटी), जो सार्वजनिक क्षेत्र की तेल कंपनियों (ओएमसीज) की अनुसंधान एवं विकास यूनिट है, भारत में जैव ऊर्जा से जुड़े अनुसंधान और विकास को विभिन्न योजनाओं के माध्यम से समर्थन दे रहा है, जिसमें उन्नत जैव ईंधन पर विशेष ध्यान दिया जा रहा है। आईओसीएल अनुसंधान एवं विकास केंद्र ने लिग्नोसेल्यूलोसिक बायोमास को 2जी एथेनॉल में बदलने के लिए स्वदेशी तकनीक विकसित की है, जो ऑनसाइट एंजाइम उत्पादन के साथ सैकेरिफिकेशन और सह–किण्वन (एसएससीएफ) पर आधारित है। पानीपत में इसका निष्पादन स्तरीय संयंत्र स्थापित किया जा चुका है और यह चालू होने की प्रक्रिया में है। प्रधानमंत्री जी वन योजना के तहत, उन्नत एथेनॉल उत्पादन की नई तकनीकों पर आधारित कई निष्पादन स्तरीय संयंत्रों को भी सहायता प्रदान की जा रही है और ये निर्माणाधीन हैं।

आईओसीएल अनुसंधान एवं विकास केंद्र में 1000 मेगावाट क्षमता वाले दुनिया के पहले प्रायोगिक संयंत्र की स्थापना के लिए अध्ययन उन्नत चरणों में है। इस संयंत्र में गैस किण्वन तकनीक का उपयोग करके प्रतिदिन 10 किलोग्राम सीओ2 का उत्पादन किया जा सकता है। अवायवीय गैस किण्वन तकनीक सीओ2 को एसिटिक एसिड में बदलती है, जबकि वायवीय किण्वन तकनीक इस एसिटिक एसिड को अत्यधिक मूल्यवान ओमेगा–3 फैटी एसिड (डोकोसाहेक्सैनोइक ठोस अपशिष्ट; किफायती जैव ईंधन अम्ल, या डीएचए) और बायोडीजल में परिवर्तित करती है। यह प्रक्रिया औद्योगिक अपशिष्ट गैसों से की जाती है और हाइड्रोजन से प्राप्त हरित ऊर्जा इसे आर्थिक रूप से व्यवहार्य बनाती है।

आईओसीएल ने पानीपत रिफाइनरी में गैस किण्वन तकनीक का उपयोग करके प्रतिदिन लगभग 128 किलोलीटर एथेनॉल का उत्पादन करने वाला तृतीय–पीढ़ी (3जी) एथेनॉल उत्पादन संयंत्र चालू किया है।

विमानन क्षेत्र को कार्बन–मुक्त बनाने की दिशा में एक महत्वपूर्ण कदम के रूप में, भारत की पहली वाणिज्यिक यात्री उड़ान 19 मई, 2023 को स्वदेशी रूप से निर्मित एसएएफ मिश्रण का उपयोग करके सफलतापूर्वक भरी गई। जनवरी 2024 में, प्राज इंडस्ट्रीज लिमिटेड की अनुसंधान एवं विकास यूनिट ने पुणे के निकट पिरंगुट में अल्कोहल से विमानन टरबाइन ईंधन के उत्पादन के लिए पहला पायलट प्रोजेक्ट स्थापित किया, जिसका उद्घाटन भारत के केंद्रीय मंत्री ने किया।

एचपीसीएल ने एक प्रतिष्ठित संस्थान के सहयोग से स्वदेशी रूप से विकसित क्षारीय तकनीक पर आधारित 5 एनएम^3/घंटा क्षमता वाला हरित हाइड्रोजन उत्पादन इलेक्ट्रोलाइज़र असेंबल कर लिया है। एचपीसीएल एचपी–रैम्प (मीथेन उत्पादन के लिए तीव्र अम्लीकरण) तकनीक का उपयोग करके सीबीजी संयंत्र स्थापित करने और स्टीम मीथेन रिफॉर्मर में सीबीजी से लगभग 21 केटीपीए हरित हाइड्रोजन का उत्पादन करने की योजना बना रहा है। भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल) का अनुसंधान एवं विकास विभाग विभिन्न शैक्षणिक संस्थानों के साथ मिलकर हाइड्रोजन भंडारण और स्वदेशी ईंधन सेल प्रणालियों के लिए दीर्घकालिक समाधान विकसित कर रहा है। बीपीसीएल अनुसंधान एवं विकास (आरएंडडी) बीएआरसी के सहयोग से स्वदेशी क्षारीय इलेक्ट्रोलाइज़र तकनीक का विस्तार कर रहा है। साथ ही, हाइड्रोजन के विभिन्न स्तरों के कारण सीजीडी नेटवर्क/ एनजी पाइपलाइन पर पड़ने वाले प्रभाव का अध्ययन भी प्रगति पर है।

वर्तमान प्रयासों का केंद्र 2जी बायोएथेनॉल रिफाइनरियों के लिए किफायती और कुशल एंजाइमों का विकास करना, लिग्निन का उपयोग करके मूल्यवर्धित उत्पाद बनाना, बायोजेट ईंधन का व्यावसायिक उत्पादन, बायोमास, खाद्य अपशिष्ट और नगरपालिका ठोस अपशिष्ट से संपीड़ित बायोगैस का उत्पादन, औद्योगिक अपशिष्ट गैसों से लागत–प्रभावी जैव ईंधन बनाना और हरित हाइड्रोजन पर ध्यान केंद्रित करना है।



आईओसीएल का ऊर्जा केंद्र



एचपीसीएल का सीबीजी संयंत्र, बदायूं, उत्तर प्रदेश





एनआरएल का नुमालीगढ़, असम में 2जी एथेनॉल संयंत्र





बीपीसीएल का बरगढ़, ओडिशा में 2जी एथेनॉल संयंत्र



एचपीसीएल का भटिंडा, पंजाब में 2जी एथेनॉल संयंत्र



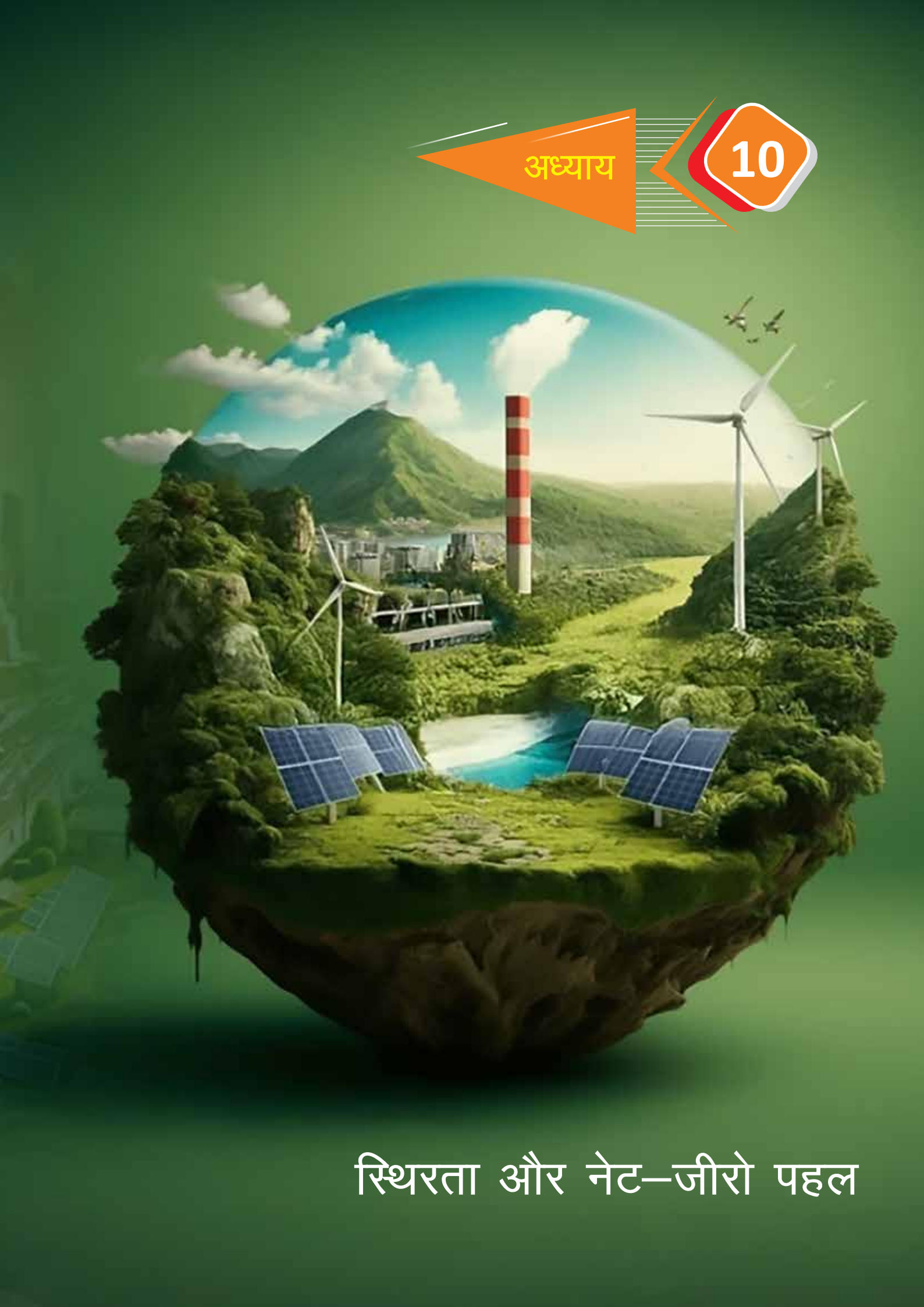


आईओसीएल का पानीपत, हरियाणा में 2जी एथेनॉल संयंत्र




NET
ZERO

अध्याय 10



स्थिरता और नेट–जीरो पहल

10 स्थिरता और नेट–जीरो पहल

10.1 नेट–जीरो पहल:

यूएस और चीन के बाद भारत दुनिया में प्राथमिक ऊर्जा का तीसरा सबसे बड़ा उपभोक्ता है। विश्व भर में ऊर्जा क्षेत्र में बदलाव हो रहा है और देश नवीकरणीय ऊर्जा, गैस, जैव ईंधन और हरित हाइड्रोजन जैसे स्वच्छ ऊर्जा स्रोतों का अधिक उपयोग कर रहा है। भारत के माननीय प्रधानमंत्री ने वर्ष 2047 तक देश को 'ऊर्जा–स्वतंत्र' बनाने का विज़न दिया है। इसके अलावा, कॉप–26 में भारत ने 2070 तक नेट–जीरो कार्बन उत्सर्जन प्राप्त करने की प्रतिबद्धता जताई है।

भारत के विकसित होने के प्रयासों के चलते उसकी प्राथमिक ऊर्जा मांग दोगुनी होने की संभावना है। इस दिशा में तेल और गैस सीपीएसई वर्ष 2050 तक ऊर्जा क्षेत्र में अपनी हिस्सेदारी बढ़ाकर विकसित भारत/2047 के विज़न में योगदान देंगे। भारत ने वर्ष 2005 के आधार वर्ष की तुलना में वर्ष 2030 तक अपनी सकल घरेलू उत्पाद की उत्सर्जन तीव्रता 45% तक कम करने और 2070 तक नेट–जीरो उत्सर्जन प्राप्त करने का लक्ष्य रखा है। साथ ही, वर्ष 2030 तक अपनी पचास प्रतिशत बिजली आवश्यकताओं को नवीकरणीय ऊर्जा स्रोतों से पूरा करने और 500 गीगावाट नवीकरणीय ऊर्जा क्षमता स्थापित करने की योजना है।

भारत के ऊर्जा परिवर्तन लक्ष्यों के अनुरूप, तेल और गैस सीपीएसई अपने प्रचालन और मूल्य श्रृंखला को कार्बन–मुक्त करने के लिए कई उपाय अपना रहे हैं। इनमें नवीकरणीय हाइड्रोजन परियोजनाओं को आगे बढ़ाना, नवीकरणीय ऊर्जा का उपयोग, ऊर्जा दक्षता बढ़ाना, स्वच्छ तकनीकों को अपनाना और कम कार्बन ऊर्जा स्रोतों का इस्तेमाल शामिल है। तेल और गैस सीपीएसई 2046 तक अपने प्रचालन उत्सर्जन (स्कोप 1 और 2) को नेट–जीरो बनाने के लिए प्रतिबद्ध हैं।

इन नेट–जीरो लक्ष्यों को प्राप्त करने के लिए, नीतियों, संरचना, प्रबंधन और प्रचालन में संधारणीयता लाने हेतु एक बहु–विषयक एकीकृत दृष्टिकोण तैयार किया जा रहा है। सीपीएसई विभिन्न विकल्पों का पता लगा रहे हैं और नेट–जीरो रोडमैप को हासिल करने के लिए जरूरी कदमों की पहचान कर रहे हैं। मुख्य रूप से रिफाइनरियों में उत्सर्जन कम करने के प्रयास, ऊर्जा दक्षता बढ़ाने (भट्ठी और बॉयलर के निष्पादन सुधारने) की रणनीतियों को लागू करना, तरल ईंधन की जगह प्राकृतिक गैस का उपयोग और नवीकरणीय ऊर्जा, संपीड़ित बायोगैस (सीबीजी) तथा हरित हाइड्रोजन में निवेश पर ध्यान केंद्रित किया जा रहा है।

ऊर्जा दक्षता बढ़ाने के लिए, जीवाश्म ईंधन की जगह ग्रिड से प्राप्त बिजली का उपयोग और मौजूदा स्टीम रिफॉर्मिंग यूनिटों (रिफाइनरियों में) की जगह ग्रीन हाइड्रोजन का इस्तेमाल प्रस्तावित है। सीपीएसई वाणिज्यिक निर्माताओं के साथ मिलकर इलेक्ट्रोलाइजर स्टैक और बीओपी (संयंत्र संतुलन) जैसे इलेक्ट्रोड और इलेक्ट्रोलिसिस घटकों के लिए संपूर्ण पारिस्थितिकी तंत्र के विकास पर काम कर रहे हैं।

बायो–सीएनजी को रिफाइनरियों में भट्टियों, बॉयलरों, गैस टर्बाइन और विभिन्न विपणन कार्यस्थलों में डीजल जनरेटर के विकल्प के रूप में इस्तेमाल करने का प्रस्ताव है। सीमित बाजार क्षमता वाली रिफाइनरियों में उप–उत्पाद (जैसे ईंधन गैस) के उपयोग से उत्सर्जन कम करने और एसएमआर (ब्लू हाइड्रोजन) से होने वाले उत्सर्जन को घटाने के लिए कार्बन अवेशोषण, उपयोगिता और भंडारण (सीसीयूएस) का भी प्रस्ताव रखा गया है।

वर्ष 2025–26 तक पेट्रोल में एथेनॉल का मिश्रण 20% तक बढ़ाने के सरकार के निर्देश के जवाब में, तेल और गैस सीपीएसई पूरी तरह तैयार हैं। वे उन्नत

जैव ईंधन में निवेश कर रहे हैं और धान के भूसे तथा रिफाइनरी ऑफ–गैस का उपयोग करके 2जी और 3जी एथेनॉल परियोजनाएं शुरू कर रहे हैं। भारत में स्थायी विमानन ईंधन (एसएएफ) संयंत्र स्थापित करने के लिए वैश्विक प्रौद्योगिकी अग्रणी कंपनियों के साथ सहयोग जारी है। वर्ष 2030 तक ऊर्जा मिश्रण में प्राकृतिक गैस की हिस्सेदारी 6% से बढ़ाकर 15% करने के लक्ष्य का समर्थन करने के लिए, प्राकृतिक गैस का बुनियादी ढांचा विकसित किया जा रहा है, जिसमें रिफाइनरी उपयोग के लिए पाइपलाइन और संवर्द्धन तथा नगर गैस वितरण नेटवर्क का विस्तार शामिल है। सीपीएसई संयुक्त उद्यमों के माध्यम से सीबीजी संयंत्र भी स्थापित कर रहे हैं और सीबीजी आधारित हाइड्रोजन उत्पादन की खोज कर रहे हैं। पूरे देश में इलेक्ट्रिफ़ाइड परिवहन के विकास को बढ़ावा देने के लिए ईवी चार्जिंग स्टेशन और बैटरी स्वैपिंग स्टेशन बनाए जा रहे हैं।

देश के वर्ष 2070 तक नेट–ज़ीरो लक्ष्य को ध्यान में रखते हुए, सीपीएसई हरित प्रौद्योगिकियों में अनुसंधान बढ़ाकर नए अवसरों का लाभ उठा रहे हैं। हरित अवसंरचना, अनुसंधान और विकास, और नवीकरणीय ऊर्जा परियोजनाओं में सब्सिडी के माध्यम से इस हरित परिवर्तन को तेजी से आगे बढ़ाया जा रहा है। विभिन्न रणनीतिक व्यावसायिक को उन्नत तकनीकी सहायता दी जा रही है और उभरते क्षेत्रों में उत्पादों और प्रौद्योगिकियों के विकास और व्यावसायीकरण के लिए अनुसंधान एवं विकास की ताकत का उपयोग किया जा रहा है। नेट–ज़ीरो से संबंधित आंतरिक तकनीकों का विकास किया जा रहा है और इसके लिए विभिन्न शैक्षणिक संस्थानों के साथ सहयोग किया जा रहा है। इसके अतिरिक्त, नेट–ज़ीरो चुनौतियों का सामना करने के लिए क्षमता निर्माण के भाग के रूप में, सीपीएसई नेट–ज़ीरो से जुड़े प्रशिक्षण और सुधार उपाय प्रदान कर रहे हैं।

पर्यावरणीय प्रभाव और आर्थिक विकास के बीच संतुलन बनाए रखने के लिए भारत ने हरित प्रौद्योगिकियों में निवेश, नवीकरणीय ऊर्जा को बढ़ावा, प्रौद्योगिकी हस्तांतरण में सहयोग और संधारणीयता सुनिश्चित करने के लिए सख्त उत्सर्जन नियम अपनाए हैं।

सरकार ने स्वच्छ ईंधन जैसे जैव ईंधन (एथेनॉल, कंप्रेस्ड बायोगैस, एसएएफ का मिश्रण) की हिस्सेदारी बढ़ाने के लिए कई पहल की हैं और राष्ट्रीय हरित हाइड्रोजन मिशन की घोषणा की है।

10.1.1 ईबीपी (एथेनॉल मिश्रित पेट्रोल): सरकार ईबीपी कार्यक्रम के तहत पेट्रोल में एथेनॉल के मिश्रण को बढ़ावा दे रही है। देश में 2जी एथेनॉल के उत्पादन को प्रोत्साहित करने के लिए प्रधानमंत्री जी–वन योजना शुरू की गई है। इस योजना में 21.08.2024 को संशोधन किया गया था, जिसमें उन्नत जैव ईंधन और बोल्ट–ऑन/ब्राउनफील्ड संयंत्रों को शामिल किया गया है। योजना की अवधि को मार्च 2028 तक बढ़ा दिया गया है।

10.1.2 सीबीजी को बढ़ावा: सरकार ने 1 अक्टूबर 2018 को सस्ते परिवहन के लिए संधारणीय विकल्प (संधारणीय) पहल शुरू की है, जिसका उद्देश्य विभिन्न अपशिष्ट/बायोमास स्रोतों से कंप्रेस्ड बायोगैस (सीबीजी) के उत्पादन हेतु एक पारिस्थितिकी तंत्र स्थापित करना और प्राकृतिक गैस के साथ इसके उपयोग को बढ़ावा देना है। इस पहल के तहत, तेल एवं गैस विपणन कंपनियाँ (ओजीएमसी) संभावित उद्यमियों से सीबीजी की खरीद के लिए रुचि की अभिव्यक्ति (ईओआई) आमंत्रित करती है।

10.1.3 संधारणीय विमानन ईंधन (एसएएफ): विमानन क्षेत्र को कार्बन मुक्त बनाने के लिए सरकार ने अंतर्राष्ट्रीय उड़ानों के लिए विमानन टरबाइन ईंधन (एटीएफ) में एसएएफ मिश्रण के सांकेतिक लक्ष्य तय किए हैं – 2027 से 1%, 2028 से 2% और 2030 से 5%।

10.1.4 ग्रीन हाइड्रोजन मिशन: सरकार ने राष्ट्रीय हरित हाइड्रोजन मिशन की घोषणा की है, जिसका उद्देश्य हरित हाइड्रोजन को बढ़ावा देना और उसके उत्पादन, उपयोग और निर्यात के लिए आवश्यक बुनियादी ढांचे का विकास करना है। इस मिशन का लक्ष्य 2030 तक 5 एमएमटीपीए हरित हाइड्रोजन का उत्पादन करना है। ग्रीन हाइड्रोजन ट्रांजिशन (साइट)–2बी कार्यक्रम के तहत, रिफाइनरियों को 2030 तक निर्मित–स्वामित्व–प्रचालित मॉडल पर 0.2 एमटीपीए हरित हाइड्रोजन खरीदने की क्षमता आवंटित की गई है। इस कार्यक्रम के लिए कुल ₹17,490 करोड़ का

प्रावधान किया गया है। इसमें दो वित्तीय सहायता योजनाएँ शामिल हैं – एक इलेक्ट्रोलाइज़र के घरेलू निर्माण को प्रोत्साहित करने के लिए और दूसरी हरित हाइड्रोजन के उत्पादन को बढ़ावा देने के लिए।

10.1.5 **प्राकृतिक गैस की बढ़ती हिस्सेदारी:** सरकार ने ईंधन की परिवर्तनकालीन अवधि के रूप में प्राकृतिक गैस की भूमिका को मजबूत करने के लिए 2030 तक भारत की ऊर्जा मिश्रण में इसकी हिस्सेदारी को मौजूदा लगभग 6% से बढ़ाकर 15% करने का लक्ष्य रखा है। पीएनजीआरबी ने देश भर में सीजीडी नेटवर्क के विकास के लिए 307 भौगोलिक क्षेत्रों (जीए) में सीजीडी नेटवर्क के विकास के लिए कंपनियों को अधिकृत किया है, जो मुख्य भूमि क्षेत्र (ओडिशा राज्य सहित) के लगभग 100% को कवर करता है।

10.1.6 **पीएटी (निष्पादन, उपलब्धि और व्यापार):** इसके अलावा, देश में ऊर्जा–प्रधान क्षेत्रों में ऊर्जा दक्षता बढ़ाने के लिए पीएटी (निष्पादन, उपलब्धि और व्यापार) योजना सफलतापूर्वक लागू की जा रही है। यह एक बाज़ार–आधारित प्रणाली है जो व्यापार योग्य ऊर्जा बचत प्रमाणपत्रों के माध्यम से ऊर्जा की विशिष्ट खपत को कम करने में मदद करती है। रिफाइनरी क्षेत्र को वर्ष 2015 में पीएटी के दूसरे चक्र (2016–17 से 2018–19) में शामिल किया गया था। पीएटी–VI (आधार वर्ष: 2018–19; मूल्यांकन वर्ष: 2022–23) के तहत 20 रिफाइनरियों को शामिल किया गया है, जिनका लक्ष्य 1.17 एमटीओई (क्षेत्रीय लक्ष्य का लगभग 5.49%) ऊर्जा खपत में कमी लाना है।

तेल और गैस क्षेत्र उन क्षेत्रों में से है जहाँ कार्बन उत्सर्जन घटाना चुनौतीपूर्ण है, क्योंकि इसके विकल्प सीमित और जटिल हैं। फिर भी, विभिन्न सरकारी तेल कंपनियों ने स्कोप–1 और स्कोप–2 उत्सर्जन को शामिल करते हुए नेट–जीरो प्रचालन उत्सर्जन हासिल करने की योजनाएँ बनाई हैं। पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के अधीन सार्वजनिक उपक्रमों का लक्ष्य 2035 से 2046 के बीच सुरक्षित, विश्वसनीय और किफायती ऊर्जा आपूर्ति सुनिश्चित करते हुए शुद्ध शून्य प्रचालन उत्सर्जन प्राप्त करना है।

10.2 सतत:

किफायती परिवहन के लिए दीर्घकालिक विकल्प (सतत): 1 अक्टूबर 2018 को "किफायती परिवहन के लिए दीर्घकालिक विकल्प (सतत)" पहल शुरू की गई। इसका उद्देश्य विभिन्न अपशिष्ट और बायोमास स्रोतों से कंप्रेस्ड जैव गैस (सीबीजी) के उत्पादन के लिए एक मजबूत पारिस्थितिकी तंत्र तैयार करना और इसे प्राकृतिक गैस के साथ मिलाकर उपयोग को बढ़ावा देना है। इस पहल के तहत तेल और गैस विपणन कंपनियां (ओजीएमसी) संभावित उद्यमियों से सीबीजी की खरीद के लिए रुचि की अभिव्यक्ति (ईओआई) आमंत्रित करती हैं।

यह पहल गोबरधन योजना, स्वच्छ भारत मिशन, आत्मनिर्भर भारत और नेट जीरो उत्सर्जन के लक्ष्यों के अनुरूप है। सीबीजी और बायोगैस क्षेत्र के विकास के लिए सरकार ने 'संपूर्ण सरकार' दृष्टिकोण अपनाया है। इस दिशा में कई मंत्रालय और विभाग मिलकर काम कर रहे हैं। नवीन और नवीकरणीय ऊर्जा मंत्रालय (एमएनआरई) की राष्ट्रीय जैव ऊर्जा कार्यक्रम की अम्ब्रेला योजना के अंतर्गत सभी प्रकार के सीबीजी और बायोगैस संयंत्रों को केंद्रीय वित्तीय सहायता दी जाती है। आवासन और शहरी कार्य मंत्रालय स्वच्छ भारत मिशन शहरी 2.0 योजना के तहत ठोस अपशिष्ट प्रबंधन के लिए राज्यों और केंद्र शासित प्रदेशों को एमएसडब्ल्यू आधारित सीबीजी संयंत्रों पर अतिरिक्त सहायता देता है। उर्वरक विभाग जैविक उर्वरक को बढ़ावा देने की नीति के तहत सीबीजी संयंत्रों से प्राप्त किण्वित जैविक खाद पर ₹1500/ मी.टन की दर से बाजार विकास सहायता प्रदान करता है। कृषि और किसान कल्याण विभाग कृषि मशीनीकरण और फसल अवशेष प्रबंधन योजना के अंतर्गत बायोमास एकत्रीकरण मशीनरी पर प्रोत्साहन देता है। आरबीआई ने सीबीजी परियोजनाओं को प्राथमिकता क्षेत्र ऋण के तहत शामिल किया है। सीपीसीबी इन परियोजनाओं को 'श्वेत श्रेणी' में वर्गीकृत करता है, जबकि सरकार मिश्रित सीएनजी में शामिल सीबीजी पर जीएसटी–भुगतान की राशि पर उत्पाद शुल्क में छूट प्रदान करती है।

सरकार ने सीबीजी–सीजीडी सिंक्रोनाइजेशन योजना के तहत नगर गैस वितरण (सीजीडी) नेटवर्क में सीबीजी को एकीकृत करने के लिए नीतिगत दिशानिर्देश भी जारी किए हैं।

इसके अलावा, वित्त वर्ष 2023–24 से 2026–27 तक चार वर्षों के लिए सरकार ने सीबीजी उत्पादकों को बायोमास एकत्रीकरण मशीनरी की खरीद के लिए

वित्तीय सहायता देने की योजना शुरू की है, ताकि बायोमास के संग्रह को बढ़ावा मिल सके।

देश में सीबीजी के उत्पादन और खपत को बढ़ाने के लिए, राष्ट्रीय जैव ईंधन समन्वय समिति (एनबीसीसी) ने 24 नवंबर 2023 को सीएनजी (परिवहन) और पीएनजी (घरेलू) खंडों में सीबीजी की अनिवार्य बिक्री लागू करने की मंजूरी दी। इस सीबीजी दायित्व (सीबीओ) के तहत 2025–26, 2026–27 और 2027–28 में कुल सीएनजी/पीएनजी खपत का क्रमशः 1%, 3% और 4% हिस्सा सीबीजी से पूरा किया जाएगा, जबकि 2028–29 से यह 5% कर दिया जाएगा।

इसके अतिरिक्त, सरकार ने दिनांक 15.03.2024 को नगर गैस वितरण नेटवर्क में सीबीजी के अंतःक्षेपण के लिए पाइपलाइन अवसंरचना (डीपीआई) विकसित करने की योजना भी शुरू की है, ताकि सीबीजी के उठान को और सुगम बनाया जा सके।

31 मार्च 2025 तक, देश में लगभग 700 मीट्रिक टन प्रतिदिन की कुल उत्पादन क्षमता वाले 100 सीबीजी या बायोगैस संयंत्र चालू हो चुके हैं। लगभग 336 खुदरा बिक्री केंद्रों से सीबीजी की बिक्री शुरू हो चुकी है और औद्योगिक ग्राहकों को भी सीबीजी की आपूर्ति की जा रही है।

10.3 कार्बन अवशोषण, उपयोग और भंडारण (सीसीयूएस):

जलवायु परिवर्तन को कम करने में सीसीयूएस की भूमिका पिछले दो दशकों से चर्चा का विषय रही है। जलवायु परिवर्तन पर अंतर–सरकारी पैनल (आईपीसीसी) की 1.50 से. ग्लोबल वार्मिंग पर रिपोर्ट और विभिन्न देशों की हाल की घोषणाओं ने इस तकनीक के महत्व को और बढ़ा दिया है। भारत ने भी 2070 तक नेट ज़ीरो उत्सर्जन प्राप्त करने की प्रतिबद्धता जताई है। ग्लासगो में हुए 26वें कॉप सम्मेलन में प्रधानमंत्री ने जलवायु परिवर्तन को कम करने के लिए "पंचामृत" का संकल्प प्रस्तुत किया, जिसमें वर्ष 2070 तक नेट ज़ीरो हासिल करना भी शामिल है। परिणामस्वरूप, सौर, पवन और हाइड्रोजन जैसी नवीकरणीय और वैकल्पिक ऊर्जा को बढ़ावा देने, वाहनों से उत्सर्जन घटाने के लिए नए मानक लागू करने, हरित आवरण बढ़ाने, अनुसंधान एवं विकास को प्रोत्साहित करने और सीसीएस/सीसीयूएस जैसी कार्बन–तटस्थ तकनीकों को अपनाने पर विशेष ध्यान दिया जा रहा है। सीसीयूएस तकनीक और संबंधित भूवैज्ञानिक क्षमता का अध्ययन पहले सीमित रूप से किया गया था। हालांकि, अमेरिका की "कार्बन डाइऑक्साइड एन्हांस्ड ऑयल रिकवरी (CO_2–ईओआर)" परियोजना के बाद से पिछले लगभग 50 वर्षों में इस तकनीक में काफी प्रगति हुई है, लेकिन इसकी अधिक पूंजी लागत अभी भी इसे व्यापक रूप से अपनाने में एक बड़ी चुनौती है। तकनीकी पहलुओं के अलावा, राजनीतिक और आर्थिक कारक भी सीसीयूएस को अपनाने में महत्वपूर्ण भूमिका निभाते हैं। भारत जैसे मूल्य–संवेदनशील देश के लिए, इस तकनीक की अतिरिक्त लागत को संतुलित करना एक चुनौती है। फिर भी, नेट ज़ीरो के लक्ष्य और पर्यावरणीय प्रतिबद्धता को देखते हुए, भारत के लिए कार्बन तीव्रता घटाने के विकल्पों की खोज करना आवश्यक है, जिसमें सीसीएस/सीसीयूएस एक अहम कदम साबित हो सकता है।

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के तहत आने वाले सार्वजनिक उपक्रम के ऑयल इंडिया, इंडियन ऑयल कॉर्पोरेशन, भारत पेट्रोलियम कॉर्पोरेशन एचपीसीएल, गेल इंडिया, ओएनजीसी और ईआईएल ने 2 जनवरी 2019 को आईआईटी बॉम्बे के साथ एक समझौता–ज्ञापन पर हस्ताक्षर किए। इस समझौते के तहत एक मिशन मोड परियोजना शुरू की गई है, जिसका उद्देश्य CO_2 भंडारण क्षमता का अनुमान लगाना और CO_2 भंडारण के लिए जोखिम मूल्यांकन और प्रबंधन ढांचा विकसित करना है। इस परियोजना में चयनित क्षेत्रों के डेटा पर प्रयोगशाला और संख्यात्मक अध्ययन किए जा रहे हैं ताकि यह समझा जा सके कि रिजर्वायर CO_2 अंतःक्षेपण पर कैसे प्रतिक्रिया देता है। यह परियोजना 24 महीने की अवधि के लिए है और इसके मई 2025 तक पूरा होने की उम्मीद है।

तेल एवं गैस सार्वजनिक क्षेत्र के उपक्रमों द्वारा की गई पहल निम्नानुसार हैं:

10.3.1 ओएनजीसीः कंपनी ने कार्बन उत्सर्जन कम करने के लिए सीसीयूएस को एक प्रमुख साधन के रूप में प्राथमिकता दी है। कंपनी CO_2 भंडारण और परिपक्व क्षेत्रों से तेल उत्पादन बढ़ाने के लिए साझेदारियों की

खोज कर रही है। गांधार क्षेत्र में प्रस्तावित सीसीयूएस परियोजना से वर्ष 2040 तक 10% अतिरिक्त तेल उत्पादन और लगभग 6 मिलियन टन सीओ$_2$ भंडारण की संभावना है।

इसके अलावा, सीसीयूएस के अनुसंधान एवं विकास कार्य के लिए केडीएमआईपीई में एक प्रयोगशाला स्थापित की गई है। यह प्रयोगशाला कोयले में गैस अवशोषण अध्ययन पर भी काम कर रही है, जो यह समझने में मदद करेगा कि कोयला किस प्रकार सीओ$_2$ को अपनी क्षमता से अधिक मात्रा में अवशोषित और संग्रहित कर सकता है।

12 फरवरी 2025 को ओएनजीसी ने ब्राजील की कंपनी पेट्रोलियो ब्रासीलेरो एसए के साथ एक समझौता–ज्ञापन (''एमओयू'') पर हस्ताक्षर किए। इस समझौते का उद्देश्य अपस्ट्रीम, विपणन, डीकार्बोनाइजेशन और कम–कार्बन समाधानों के क्षेत्रों में नए अवसरों का मूल्यांकन करना है।

यह समझौता ओएनजीसी की रणनीति के अनुरूप है, जिसके तहत जोखिम और विशेषज्ञता साझा करके कंपनी को एक एकीकृत ऊर्जा उद्यम के रूप में मजबूत किया जा सकेगा और एक जिम्मेदार एवं संतुलित ऊर्जा परिवर्तन को सफल बनाया जा सकेगा।

10.3.2 ऑयल इंडिया लिमिटेडः ऑयल इंडिया लिमिटेड (ओआईएल) ने राजस्थान के जैसलमेर बेसिन के बागीतिब्बा क्षेत्र में सीसीएस (कार्बन अवशोषण एवं भंडारण) के लिए उपयुक्त रिजर्वायर/जलभृतों की पहचान करने के लिए एक व्यवहार्यता अध्ययन किया है। अध्ययन के निष्कर्षों के आधार पर, ओआईएल अब एक प्रायोगिक परियोजना स्थापित करने की योजना बना रहा है, ताकि सीसीएस की व्यवहार्यता का व्यावहारिक रूप से आकलन किया जा सके। इसके अलावा, ओआईएल ऊपरी असम बेसिन में अपने परिपक्व मकुम–उत्तरी हापजन क्षेत्र में सीसीयूएस (कार्बन अवशोषण, उपयोग और भंडारण) के लिए भी एक व्यवहार्यता अध्ययन कर रहा है। अपने सीसीएस/सीसीयूएस परियोजनाओं को और मजबूत करने के लिए, ओआईएल ने हाल ही में असम के मकुम–उत्तरी हापजन क्षेत्र में अपने स्तर पर सीओ$_2$– ईओआर (तेल उत्पादन बढ़ाने) का प्रयोगशाला अध्ययन पूरा किया है। साथ ही, उद्योग और शैक्षणिक संस्थानों के सहयोग से भारतीय डेक्कन ट्रैप्स की बेसाल्ट चट्टानों में सीओ$_2$ को खनिज रूप में स्थायी रूप से संग्रहित करने की क्षमता पर भी प्रयोग जारी हैं।

10.3.3 गेलः गेल ने सूक्ष्म शैवाल के माध्यम से 1 टीपीडी सीओ$_2$ प्राप्त करने के लिए मैसर्स सीआईएमएफआर, धनबाद के सहयोग से पाता में एक प्रायोगिक संयंत्र स्थापित किया है। इसमें सूक्ष्म शैवाल की विभिन्न प्रजातियों का अध्ययन किया जा रहा है, ताकि यह पता लगाया जा सके कि वे सीओ$_2$ को अवशोषित करके मूल्यवर्धित उत्पादों में कितनी प्रभावी रूप से परिवर्तित कर सकती हैं। 18 जुलाई 2023 को, गेल ने अमेरिकी कंपनी मैसर्स लैंजाटेक इंक. के साथ एक समझौता–ज्ञापन पर हस्ताक्षर किए हैं। इसका उद्देश्य गेल के प्रचालन में डीकार्बोनाइजेशन परियोजनाओं की संयुक्त रूप से पहचान, मूल्यांकन और क्रियान्वयन करना है। इसके तहत, जैव एथेनॉल उत्पादन के लिए एक प्रायोगिक या वाणिज्यिक संयंत्र स्थापित करने पर दोनों कंपनियों के बीच चर्चा चल रही है।

10.3.4 आईओसीएलः इंडियन ऑयल ने पानीपत में 4.2 करोड़ लीटर प्रति वर्ष क्षमता (128 केएलपीडी) का विश्व का पहला गैस से एथेनॉल (3जी एथेनॉल) उत्पादन संयंत्र रिफाइनरी स्थापित किया है। इंडियन ऑयल दुनिया की पहली तेल रिफाइनिंग कंपनी है जिसने इस तकनीक को अपनाया है। इससे प्रति वर्ष ~ 1.8 लाख टन जीएचजी उत्सर्जन में कमी आएगी। इंडियन ऑयल ने एक नई एंजाइम–सहायता प्राप्त तकनीक (ईसीओ2 सॉर्ब) विकसित की है, जो विशेष एंजाइमों और सॉल्वैंट्स का उपयोग करके सीओ$_2$ को अधिक प्रभावी ढंग से अवशोषित करती है। यह तकनीक पुनर्जनन के दौरान लगने वाली ऊर्जा को कम करती है और अवशोषण की क्षमता को बढ़ाती है। इंडियन ऑयल ने कम ऊर्जा वाली जैव–उत्प्रेरित सीओ$_2$ खनिजीकरण विधि भी विकसित की है, जो सीओ$_2$ को ठोस खनिजों में बदलने की प्रक्रिया को तेज करती है और खनिजीकरण की दक्षता बढ़ाते हुए हाइड्रोलिक अवधारण समय (एचआरटी) को कम करती है।

10.3.5 बीपीसीएलः बीपीसीएल ने स्वदेशी रूप से विकसित किफायती सीओ$_2$ अवशोषण तकनीक को बढ़ावा देने के लिए मैसर्स उर्जानोवासी के साथ सहयोग किया

है, जो एक आईआईटी–बॉम्बे में इनक्यूबेट किया गया स्टार्ट–अप है। यह तकनीक पर्यावरणीय दबाव में जलीय माध्यम का उपयोग करके सीओ$_2$ को अवशोषित करती है और इसे सीएसीओ$_3$ सहित उपयोगी रूपों में परिवर्तित करती है। इसके अलावा, बीपीसीएल रिफाइनरी के फ्लू गैसों से सीओ$_2$ अवशोषित करने के लिए नई ऊर्जा–कुशल प्रक्रियाओं पर काम कर रहा है, जैसे कि अवशोषण आधारित सिम्युलेटेड मूविंग बेड और हाई–जी रोटेटिंग पैक्ड अवधारणा। बीपीसीएल ने अवशोषित सीओ$_2$ को मेथनॉल, फॉर्मिक एसिड और डाइफेनिल कार्बोनेट जैसे रसायनों में बदलने के लिए उत्प्रेरक मार्ग भी विकसित किए हैं। बीपीसीएल सीओ$_2$ को पकड़ने और इसे मूल्यवर्धित उत्पादों में बदलने के लिए बायो–कैटेलिटिक तकनीक की खोज कर रहा है। यह तकनीक CBG संयंत्रों से उत्पन्न जैविक सीओ$_2$ पर भी लागू की जा सकती है।

10.3.6 **एचपीसीएल:** एचपीसीएल ने रोटेटिंग पैक्ड बेड सिस्टम (एचपी–हाईगैस टेक्नोलॉजी) का उपयोग करके विभिन्न धाराओं से कार्बन डाइऑक्साइड को एकत्रित करने की तकनीक विकसित की है। इस तकनीक का मुख्य लाभ यह है कि इससे लम्बे अवशोषण स्तंभों का आकार 10 गुना कम हो जाता है।

एचपीसीएल–विशाख रिफाइनरी में 24 केटीपीए सीओ2 अपशोषण क्षमता वाला एक निष्पादन संयंत्र निर्माणाधीन है।

10.3.7 **एमआरपीएल:** एमआरपीएल नेट ज़ीरो रणनीति और इसके कार्यान्वयन की योजना विकसित करने की प्रक्रिया में है। इसमें सीसीयूएस को स्कोप–1 उत्सर्जन घटाने के लिए डीकार्बोनाइजेशन के उपायों में से एक माना जा रहा है।

10.3.8 **सीपीसीएल:** मौजूदा ग्रे हाइड्रोजन उत्पादन यूनिट से सीओ2 (लगभग 400 टन प्रतिदिन) प्राप्त करने के लिए एक व्यवहार्यता अध्ययन किया जा रहा है। इस परियोजना से सीओ$_2$ उत्सर्जन में 1,20,000 टन सीओई की कमी आने का संभावना है।

10.3.9 **एनआरएल:** मौजूदा एचजीयू से एसएमआर गैस का उपयोग करके 400 मीट्रिक टन/दिन क्षमता का एक कार्बन डाइऑक्साइड संयंत्र स्थापित करने की योजना है। इसके लिए डीएफआर तैयार की जा रही है। नए कार्बन डाइऑक्साइड संयंत्र के तहत, एसएमआर गैस में मौजूद कार्बन डाइऑक्साइड को उसी गैस से एकत्र किया जाएगा। प्रतिदिन लगभग 260 टन कार्बन डाइऑक्साइड एकत्र की जाएगी। इस एकत्र की गई कार्बन डाइऑक्साइड का उपयोग ऑयल इंडिया लिमिटेड अपने कच्चे तेल अन्वेषण स्थलों पर ईओआर गतिविधियों के लिए करेगा।

10.3.10 **ईआईएल:** तेल और गैस क्षेत्र में नेट–जीरो कार्बन उत्सर्जन के लिए ऊर्जा परिवर्तन की चर्चा में मौजूदा हाइड्रोकार्बन परिसंपत्तियों में सीसीयूएस के अवसरों को नजरअंदाज नहीं किया जा सकता। ऊर्जा क्षेत्र, विशेष रूप से बिजली क्षेत्र, जो अभी भी लगभग 70% बिजली उत्पादन के लिए जीवाश्म ईंधन का उपयोग करता है, को कार्बन–मुक्त करने में सीसीयूएस तकनीक महत्वपूर्ण भूमिका निभा सकती है। इसके अलावा, ऐसे क्षेत्रों में जहाँ विद्युतीकरण मुश्किल है और जीवाश्म ईंधन का उपयोग जारी है, वहाँ सीसीयूएस का उपयोग बेहद जरूरी है।

यह भी उल्लेखनीय है कि ब्लू हाइड्रोजन (एसएमआर मार्ग में कार्बन अवशोषण तकनीक सहित) और ग्रीन हाइड्रोजन के बीच बहस अब ग्रीन हाइड्रोजन उत्पादन की लागत कम करने और रिफाइनरियों में बड़े पैमाने पर ग्रीन हाइड्रोजन सुविधाओं के कार्यान्वयन की ओर केंद्रित हो गई है।

10.4 ग्रीन हाइड्रोजन:

हरित हाइड्रोजन विभिन्न क्षेत्रों और मौसमों में उपलब्ध घरेलू नवीकरणीय ऊर्जा संसाधनों का उपयोग कर ईंधन या औद्योगिक कच्चे माल के रूप में काम कर सकता है और विभिन्न उपयोग क्षेत्रों को सक्षम बना सकता है। यह पेट्रोलियम रिफाइनिंग, उर्वरक उत्पादन, इस्पात निर्माण जैसे कठिन क्षेत्रों में जीवाश्म ईंधन से प्राप्त कच्चे माल का सीधे विकल्प बन सकता है। हाइड्रोजन से चलने वाले लंबी दूरी के वाहन और समुद्री जहाज गतिशीलता क्षेत्र के कार्बन–मुक्तिकरण को भी संभव बना सकते हैं।

तेल और गैस सार्वजनिक क्षेत्र के उपक्रमों द्वारा इस दिशा में की गई पहल निम्नलिखित हैं:

10.4.1 **ओएनजीसी:** ओएनजीसी ने उत्पादित जल पर आधारित माइक्रोबियल इलेक्ट्रोलिसिस तकनीक से

ग्रीन हाइड्रोजन का उत्पादन सफलतापूर्वक शुरू किया है, जिसे संधारणीय नवाचार के तहत ईटी ग्लोबल अवार्ड्स में गोल्ड अवार्ड से सम्मानित किया गया है।

ओएनजीसी के मेहसाणा परिसंपत्ति में यह परियोजना ओएनजीसी संयुक्त उद्यम और विकास बोर्ड द्वारा प्रचालित एक अग्रणी मेक–इन–इंडिया पहल है। यह अत्याधुनिक तकनीक और सर्कुलर इकोनॉमी सिद्धांतों का उपयोग करके भारत के ऊर्जा परिवर्तन में ओएनजीसी की नेतृत्व क्षमता को बढ़ाती है।

पारंपरिक तरीकों के विपरीत, यह संयंत्र तेल उत्पादन से निकलने वाले अपशिष्ट जल का उपयोग हरित हाइड्रोजन उत्पादन के लिए करता है, जिससे मीठे पानी की आवश्यकता समाप्त हो जाती है। संयंत्र प्रति किलोग्राम हाइड्रोजन 1 किलोवाट घंटे से कम ऊर्जा पर प्रचालित होता है, पूरी तरह सौर ऊर्जा से चलता है और लगभग 2 अमेरिकी डॉलर प्रति किलोग्राम की अत्यंत किफायती दर पर हाइड्रोजन उत्पादन करता है।

ऊर्जा उत्पादन के साथ–साथ यह संयंत्र अपशिष्ट जल के कुल घुलित ठोस (टीडीएस), रासायनिक ऑक्सीजन मांग (सीओडी) और तेल की मात्रा को कम करता है, जिससे जल शोधन और स्वच्छ ऊर्जा उत्पादन दोनों लाभ प्राप्त होते हैं। ओएनजीसी के ओबी हाइड्रासेल प्लेटफ़ॉर्म के साथ डिजिटल रूप से एकीकृत यह प्रणाली मॉड्यूलर, स्केलेबल और दूरस्थ वास्तविक समय निगरानी में सक्षम है।

यह परियोजना स्वच्छ ऊर्जा, स्वच्छ जल, जलवायु परिवर्तन और जिम्मेदार उपभोग सहित संयुक्त राष्ट्र के संधारणीय विकास लक्ष्यों के प्रति भारत की प्रतिबद्धता का समर्थन करती है। अनुसंधान एवं विकास से लेकर क्षेत्र में तैनाती तक, यह परियोजना अपशिष्ट को मूल्यवान ऊर्जा संसाधनों में बदलने की ओएनजीसी की क्षमता को दर्शाती है और राष्ट्रीय हाइड्रोजन मिशन के अनुरूप हरित हाइड्रोजन अर्थव्यवस्था में ओएनजीसी को अग्रणी बनाती है।

तातिपका रिफाइनरी ग्रीन एच2 संयंत्रः ओएनजीसी तातिपका रिफाइनरी में इलेक्ट्रोलाइजर मार्ग के माध्यम से ग्रीन एच$_2$ के उत्पादन की संभावना तलाश रही है। 40 केटीए ग्रीन हट्र्ज ग्रीन फील्ड परियोजनाएं: ओएनजीसी, एमआरपीएल के साथ हरित हाइड्रोजन उठान व्यवस्था और मंगलुरु में एक ग्रीनफील्ड परियोजना की स्थापना पर चर्चा कर रही है। एमआरपीएल को 10% हरित हाइड्रोजन की आपूर्ति की व्यवहार्यता का आकलन करने के लिए ओएनजीसी और एमआरपीएल दोनों के सदस्यों वाली एक संयुक्त कार्य समिति का गठन किया गया है।

10.4.2 **ऑयल इंडिया लिमिटेडः** ओआईएल को असम के जोरहाट में सीजीडी नेटवर्क में 2% हरित हाइड्रोजन मिलाने के लिए पीएनजीआरबी की मंजूरी मिल गई है। मौजूदा सीजीडी नेटवर्क में हरित हाइड्रोजन मिलाने के लिए सीएलएसएस की स्थापना और कमीशनिंग के लिए पीओ प्रदान किया गया है, लेकिन आपूर्ति और स्थापना का काम अभी बाकी है। बद्दी, हिमाचल प्रदेश में, ऑयल इंडिया हिमाचल प्रदेश पावर कॉर्पोरेशन लिमिटेड के सहयोग से 1 मेगावाट का हरित हाइड्रोजन संयंत्र विकसित कर रहा है। ईपीसी का काम चल रहा है और निर्माण कार्य सितंबर 2026 तक पूरा होने की उम्मीद है। इसके अलावा, ऑयल इंडिया ने हरित हाइड्रोजन क्षेत्र में संयुक्त पहलों की संभावनाओं को तलाशने के लिए द फर्टिलाइजर्स एंड केमिकल्स त्रावणकोर लिमिटेड के साथ एक समझौता–ज्ञापन पर हस्ताक्षर किए हैं, जिसकी विस्तृत परियोजना रिपोर्ट (डीपीआर) तैयार की जा रही है।

ओआईएल सुरक्षित, टिकाऊ और लागत प्रभावी हाइड्रोजन परिवहन को सक्षम करने के लिए एसएनईएच पहल के तहत लिक्विड ऑर्गेनिक हाइड्रोजन कैरियर (एलओएचसी) तकनीक विकसित करने पर काम कर रहा है और परियोजना वर्तमान में प्रगति पर है।

इसके अलावा, पीएलएल, एनटीपीसी, लिंडे और हिमाचल प्रदेश सरकार के साथ हरित हाइड्रोजन मूल्य श्रृंखला में संभावनाओं की खोज के लिए सहयोग भी किया जा रहा है।

10.4.3 **गेलः** गेल ने अपनी संयुक्त उद्यम कंपनी मैसर्स अवंतिका गैस लिमिटेड के इंदौर सीजीडी नेटवर्क में नगर गैस वितरण ग्रिड में हाइड्रोजन मिश्रण की भारत की पहली परियोजना शुरू की थी, लेकिन अगस्त 2024 से यह मिश्रण बंद कर दिया गया है। विजयपुर, मध्य प्रदेश

में गेल ने 1.4 केटीपीए (4.3 टीपीडी) उत्पादन क्षमता वाला अपना पहला ग्रीन हाइड्रोजन संयंत्र चालू किया है। शुरुआत में इस संयंत्र से उत्पादित हाइड्रोजन का उपयोग विजयपुर स्थित मौजूदा संयंत्र में उपकरणों के लिए प्राकृतिक गैस के साथ मिश्रित ईंधन के रूप में किया जा रहा है। इसके अलावा, इसे उच्च दाब वाले कैस्केड के माध्यम से आस–पास के भौगोलिक क्षेत्रों में खुदरा ग्राहकों तक पहुँचाने की योजना है।

10.4.4 **आईओसीएल:** आईओसीएल हाइड्रोजन की बढ़ती लोकप्रियता को देखते हुए विभिन्न हितधारकों के साथ मिलकर टाटा मोटर्स द्वारा विकसित 15 फ्यूल सेल बसों (एफसीबी) का तीन लाख किलोमीटर तक परीक्षण कर रहा है। इसमें यात्री परिवहन के लिए फ्यूल सेल बसों का प्रचालन शामिल है। गुजरात के वडोदरा में परीक्षण के लिए 4 फ्यूल सेल बसें तैनात की गई हैं और इन्हें वडोदरा स्थित इंडियन ऑयल हाइड्रोजन रिफ्यूलिंग स्टेशन में ईंधन भरा जाएगा।

10.4.5 **बीपीसीएल:** भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल) कोच्चि (500 टन प्रति वर्ष) और बीना रिफाइनरी (1500 टन प्रति वर्ष) दोनों में कैप्टिव उपयोग के लिए बायोमास मार्ग से ग्रीन हाइड्रोजन उत्पादन परियोजनाएँ स्थापित कर रही है। इसके अलावा, बीपीसीएल अपनी रिफाइनरियों में उपयोग के लिए निर्माण, स्वामित्व और प्रचालन के आधार पर ग्रीन हाइड्रोजन खरीदने का भी इरादा रखता है और उसने 5 केपीटीए की मात्रा के लिए एक निविदा आमंत्रित की है। परिवहन क्षेत्र में ग्रीन हाइड्रोजन को बढ़ावा देने के भारत सरकार के दृष्टिकोण के अनुरूप, बीपीसीएल कोचीन अंतर्राष्ट्रीय हवाई अड्डा लिमिटेड के सहयोग से कोच्चि में ग्रीन हाइड्रोजन ईंधन भरने का स्टेशन भी स्थापित कर रहा है।

बीपीसीएल बीना रिफाइनरी में ग्रीन हाइड्रोजन उत्पादन के लिए 5 मेगावाट का इलेक्ट्रोलाइजर संयंत्र स्थापित कर रही है। बीपीसीएल आरएंडडी ने स्वदेशी अल्कलाइन इलेक्ट्रोलाइजर तकनीक को मेगावाट पैमाने पर बढ़ाने और निष्पादन के लिए बीएआरसी के साथ एक समझौता–ज्ञापन पर हस्ताक्षर किए हैं। इस संदर्भ में, 0.5 मेगावाट इलेक्ट्रोलाइजर स्टैक का डिजाइन और निर्माण किया गया है। बीपीसीएल और सीआईएएल के बीच हुए समझौता–ज्ञापन के अनुसार कोचीन इंटरनेशनल एयरपोर्ट लिमिटेड (सीआईएएल) में ग्रीन हाइड्रोजन आधारित गतिशीलता को बढ़ावा देने के लिए आगामी हाइड्रोजन रिफ्यूलिंग स्टेशन में इसे स्थापित और चालू किया जा रहा है। इसके अनुरूप, बीपीसीएल ने कम दूरी की कार्गो डिलीवरी/एयर टैक्सी अवधारणा के लिए वर्टिकल टेक–ऑफ और लैंडिंग (वीटीओएल) आधारित विमान अवधारणा विकसित करने के लिए हैदराबाद स्थित स्टार्ट–अप मैसर्स ब्लूजे एयरो, सीआईएएल और केरल सरकार की नवीन एवं नवीकरणीय ऊर्जा अनुसंधान एवं प्रौद्योगिकी एजेंसी (एएनईआरटी) के साथ समझौता–ज्ञापन पर हस्ताक्षर किए हैं। बीपीसीएल ने हाइड्रोजन ईंधन सेल इलेक्ट्रिक बसों के लिए सहयोग करने, टिकाऊ और सुरक्षित हाइड्रोजन आधारित गतिशीलता समाधानों को बढ़ावा देने के लिए केपीआईटी टेक्नोलॉजीज के साथ एक समझौता–ज्ञापन पर भी हस्ताक्षर किए हैं।

इसके अलावा, बीपीसीएल को त्रिवेंद्रम में हाइड्रोजन ईंधन भरने वाले स्टेशन की स्थापना के लिए एमएनआरई द्वारा राष्ट्रीय हरित हाइड्रोजन मिशन के अंतर्गत सहायता प्रदान की गई है। बीपीसीएल ने हाइड्रोजन मूल्य श्रृंखला के भारत–केंद्रित विकास को बढ़ावा देने हेतु उत्कृष्टता केंद्र स्थापित करने हेतु आईआईटी–रुड़की और आईआईटी–दिल्ली के साथ मिलकर एक संयुक्त प्रस्ताव भी प्रस्तुत किया है।

10.4.6 **एचपीसीएल:** एचपीसीएल आरएंडडी (एचपीजीआरडीसी) ने 2019–20 में सौर ऊर्जा से चलने वाले प्रोटॉन एक्सचेंज मेम्ब्रेन (पीईएम) इलेक्ट्रोलाइजर के माध्यम से हाइड्रो प्रोसेसिंग के लिए हाइड्रोजन की पूरी कैप्टिव आवश्यकता को पूरा करने के लिए ग्रीन हाइड्रोजन पारिस्थितिकी तंत्र में शुरुआत की। इसके बाद एचपीजीआरडीसी ने उन्नत क्षारीय (एईएम प्रकार) इलेक्ट्रोलाइजर तकनीक विकसित की, जिसमें आंतरिक रूप से विकसित अत्यधिक कुशल कैटेलिस्ट का उपयोग होता है, जिससे कीमती महान धातु कैटेलिस्ट की आवश्यकता समाप्त हो जाती है। संशोधित आयन एक्सचेंज मेम्ब्रेन को "शून्य–अंतर" डिजाइन के लिए दो छिद्रपूर्ण इलेक्ट्रोड के बीच रखा गया है। एईएम इलेक्ट्रोलाइजर को 1 मेगावाट समतुल्य सेल आकार तक बढ़ाया गया है और वर्तमान में परीक्षण और सत्यापन किया जा रहा है।

मई 2024 में एचपीजीआरडीसी ने 20 किलोवाट क्षमता वाला भारत का पहला सॉलिड ऑक्साइड इलेक्ट्रोलाइजर सेल (एसओईसी) चालू किया, जो पीईएम और अल्कलाइन इलेक्ट्रोलाइजर की तुलना में 20% से 30% अधिक ऊर्जा दक्षता प्रदान करता है। एचपीसीएल ने एआरसीआई और सीजीसीआरआई के सहयोग से स्वदेशी 1 किलोवाट ग 10 सॉलिड ऑक्साइड फ्यूल सेल (एसओएफसी) स्टैक भी विकसित किया।

एचपीसीएल विशाख रिफाइनरी ने जुलाई 2024 में भारत की किसी भी रिफाइनरी में पहला ग्रीन हाइड्रोजन प्लांट चालू किया, जिसकी क्षमता 370 टन प्रति वर्ष है। विशाख रिफाइनरी के लिए 25 वर्षों तक 5 केटीपीए ग्रीन हाइड्रोजन खरीदने के लिए कदम उठाए गए हैं और प्लांट की स्थापना बीओओ आधार पर की जाएगी।

10.4.7 **एमआरपीएलः** एमआरपीएल 500 टीपीए क्षमता वाला एक ग्रीन हाइड्रोजन प्लांट स्थापित कर रहा है, जिसका लक्ष्य 2026–27 की तीसरी तिमाही तक परियोजना को यांत्रिक रूप से पूरा करना है। एसआईजीएचटी–2बी योजना के तहत, एमआरपीएल ने 10 केटीपीए क्षमता के लिए निविदाएं आमंत्रित की हैं।

10.4.8 **सीपीसीएलः** सीपीसीएल बीओओ आधार पर 2 केटीपीए ग्रीन हाइड्रोजन यूनिट स्थापित कर रहा है, जिसके 2027–28 तक चालू होने की संभावना है। राष्ट्रीय ग्रीन हाइड्रोजन अधिदेश के अनुरूप, ग्रीन हाइड्रोजन उत्पादन क्षमता को 2030 तक उत्तरोत्तर बढ़ाकर 10 केटीपीए कर दिया जाएगा।

10.4.9 **एनआरएलः** एनआरएल ईपीसी आधार पर 2.4 केटीपीए क्षमता वाला एक हरित हाइड्रोजन संयंत्र स्थापित कर रहा है, जिसे दिसंबर 2025 तक चालू करने का लक्ष्य है। इसके अलावा, एनआरएल ने एमएनआरई की एसआईजीएचटी 2बी योजना के तहत, बीओओ (निर्माण, स्वामित्व और प्रचालन) आधार पर 10 केटीपीए क्षमता वाला एक हरित हाइड्रोजन संयंत्र स्थापित करने और रिफाइनरी में उपयोग के लिए हरित हाइड्रोजन की आपूर्ति करने के लिए एक निविदा आमंत्रित की है। उपर्युक्त दो हरित हाइड्रोजन परियोजनाओं से कुल सीओ2 उत्सर्जन में लगभग 0.124 एमएमटीपीए की कमी आएगी।

10.4.10 **ईआईएलः** ईआईएल ग्रीन हाइड्रोजन से संबंधित परियोजनाओं के कार्यान्वयन में अग्रणी रहा है, साथ ही इसने इलेक्ट्रोलाइज़र के माध्यम से उत्पादन और मौजूदा प्राकृतिक गैस पाइपलाइनों में हाइड्रोजन मिश्रण का मूल्यांकन भी किया है। ईआईएल ने गेल विजयपुर, उत्तर प्रदेश में 10 मेगावाट की ग्रीन हाइड्रोजन उत्पादन सुविधा स्थापित करने के लिए प्लांट बैलेंस (बीओपी) और संबंधित सुविधाओं के कार्यान्वयन हेतु अपनी सेवाएँ प्रदान की हैं। यह संयंत्र ग्रिड से नवीकरणीय ऊर्जा का उपयोग करके प्रतिदिन 4.3 टन (टीपीडी) ग्रीन हाइड्रोजन का उत्पादन करने के लिए डिज़ाइन किया गया है और इसे हाल ही में चालू किया गया है। इसके अतिरिक्त, ईआईएल विभिन्न अन्य ग्राहकों को ग्रीन हाइड्रोजन/ग्रीन अमोनिया उत्पादन परियोजनाओं के लिए सेवाएँ प्रदान कर रहा है जो औद्योगिक क्षेत्रों को कार्बन मुक्त करने के लिए महत्वपूर्ण हैं।

नई तकनीकों का इस्तेमाल करके, बुनियादी ढांचा मजबूत करके और नवीकरणीय ऊर्जा को शामिल करके, तेल और गैस क्षेत्र भारत की आर्थिक वृद्धि में योगदान देना जारी रख सकता है और एक अधिक टिकाऊ और लचीले ऊर्जा भविष्य की ओर बढ़ सकता है।

10.5 प्रयुक्त तेल का पुनः उपयोगः

प्रयुक्त तेल के दोबारा इस्तेमाल की अवधारणा पिछले बीस वर्षों में तेजी से बढ़ी है। इसमें तेल कंपनियाँ न केवल लुब्रिकेंट्स बनाने के लिए प्रयुक्त तेल से पुनः परिष्कृत तेल का उपयोग करती हैं, बल्कि भविष्य के लिए पेट्रोलियम संसाधनों का सुरक्षित संरक्षण भी करती हैं। इसके अलावा, रीसाइक्लिंग प्रक्रिया में कम ऊर्जा का उपयोग होता है, जिससे वैश्विक जलवायु परिवर्तन की दर को कम करने में मदद मिलती है और पारिस्थितिकी तंत्र में कार्बन उत्सर्जन घटता है। प्रयुक्त लुब्रिकेंट्स का पुनः शोधन करने से पर्यावरण और अर्थव्यवस्था दोनों को लाभ मिलता है। बेस ऑयल बनाने के लिए प्रयुक्त तेल का पुनः शोधन करना, ईंधन बनाने के लिए प्रयुक्त तेल को पुनः संसाधित करने की तुलना में अधिक ऊर्जा बचाता है। इसके लिए आवश्यक ऊर्जा, नए इस्तेमाल न किए गए बेस

ऑयल के उत्पादन की तुलना में केवल एक–तिहाई होती है। इसलिए, लोग रिसायक्लिंग को संसाधनों के संरक्षण, अपशिष्ट कम करने और पर्यावरणीय नुकसान को घटाने के संदर्भ में एक प्राथमिक विकल्प मानते हैं।

10.5.1 **आईओसीएलः** आईओसीएल ने अब तक री–रिफाइंड बेस ऑयल (आरआरबीओ) युक्त कई लुब्रिकेंट लॉन्च किए हैं, जैसे सर्वो रफ़्तार (व्यावसायिक वाहनों के लिए), सर्वो ग्रीनमाइल (पेट्रोल वाहनों के लिए), सर्वो 4टी ग्रीन (फ़ोर स्ट्रोक बाइक इंजन ऑयल) और सर्वो ट्रैक्टर ग्रीन (ट्रैक्टर इंजन ऑयल)। इनमें 25% तक आरआरबीओ शामिल होते हैं। इसके अलावा, आरआरबीओ का उपयोग औद्योगिक हाइड्रोलिक और गियर ऑयल में भी किया जा रहा है। 2024–25 में 2010 किलोलीटर आरआरबीओ खरीदा गया और लगभग 13,900 किलोलीटर आरआरबीओ मिश्रित लुब्रिकेंट बेचे गए।

ईपीआर कानून को लागू करने के लिए तेल विपणन कंपनियों द्वारा अतिरिक्त प्रयासः तेल विपणन कंपनियों ने सभी हितधारकों के साथ बातचीत शुरू कर दी है और प्रयुक्त तेल के उचित निपटान के लिए बल्क उत्पादकों के साथ, प्रयुक्त तेल के संग्रहण के लिए एग्रीगेटर्स के साथ और तेल विपणन कंपनियों को आरआरबीओ एवं ईपीआर प्रमाणपत्रों के निरंतर प्रवाह के लिए रीसाइक्लर्स के साथ बैठकें आयोजित की गई हैं। प्रमुख बल्क उत्पादकों से प्रयुक्त तेल का संग्रहण कर पुनः शोधन के लिए एग्रीगेटर्स की भागीदारी शुरू की गई है।

10.5.2 **बीपीसीएलः** स्थिरता और सर्कुलर अर्थव्यवस्था सिद्धांतों के प्रति बीपीसीएल की प्रतिबद्धता के एक भाग के रूप में, बीपीसीएल ने प्रयुक्त तेल के जिम्मेदार प्रबंधन को बढ़ावा देने के लिए कई पहल की हैं। बीपीसीएल के अनुसंधान एवं विकास (ल्यूब) ने दोबारा शोधित किए गए बेस ऑयल (आरआरबीओ) का उपयोग करके तैयार किए गए ऑटोमोटिव और औद्योगिक लुब्रिकेंट्स की एक श्रृंखला को सफलतापूर्वक विकसित करके उसका व्यावसायीकरण किया है और आरआरबीओ आधारित उत्पाद पोर्टफोलियो का विस्तार करने के लिए आगे काम कर रहा है, जिससे मूल्यवान संसाधनों के पुनः उपयोग की सुविधा मिल रही है। सर्कुलर अर्थव्यवस्था का समर्थन करने के लिए, हम लुब्रिकेंट उत्पाद निर्माणों में उपयोग के लिए अधिकृत रीसाइकलरों से दोबारा शोधित किए गए बेस ऑयल को खरीद रहे हैं और उनके द्वारा उत्पादित रीसाइकल किए गए बेस ऑयल की गुणवत्ता में सुधार के लिए पुनः शोधनकर्ताओं के साथ मिलकर काम कर रहे हैं। बीपीसीएल प्रयुक्त तेल प्रबंधन में ईपीआर (विस्तारित उत्पादक उत्तरदायित्व) के महत्व के बारे में चैनल भागीदारों, ग्राहकों और ऑटोमोटिव ओईएम सहित प्रमुख हितधारकों को विभिन्न प्रशिक्षण कार्यक्रमों के माध्यम से जागरूक कर रहा है। साथ ही, बीपीसीएल ईपीआर प्रयुक्त तेल नीति के विकास में सहयोग कर रहा है और प्रयुक्त तेल प्रबंधन के लिए मजबूत पारिस्थितिकी तंत्र बनाने के लिए बीआईएस, सीपीसीबी और आरईसीआईआईसी जैसी नियामक एवं मानक कंपनियों के साथ सक्रिय रूप से जुड़ा हुआ है। ये प्रयास राष्ट्रीय प्रयुक्त तेल प्रबंधन लक्ष्यों के अनुरूप हैं।

10.5.3 **एचपीसीएलः** एचपीसीएल ने भी प्रयुक्त तेल प्रबंधन को व्यवस्थित करने के लिए कदम उठाए हैं। भारत में प्रयुक्त तेल पारिस्थितिकी तंत्र लंबे समय से अनौपचारिक और अकुशल प्रक्रियाओं से प्रभावित रहा है। संसाधन दक्षता और सर्कुलर अर्थव्यवस्था उद्योग गठबंधन (आरईसीआईआईसी) ने नवंबर 2024 में प्रयुक्त तेल पर एक कार्य समूह बनाया, जिसमें 18 उद्योगों के सदस्य शामिल थे। 24–25 मार्च, 2025 को आयोजित पहली आरईसीआईआईसी वैश्विक संगोष्ठी में इस समूह ने 'भारत की आत्मनिर्भरता को आगे बढ़ानाः प्रयुक्त तेल प्रबंधन में वृत्ताकारता को बढ़ाना' नामक एक ज्ञान–पत्र जारी किया। एचपीसीएल, प्रयुक्त तेल के लिए सीपीसीबी पोर्टल पर उत्पादक के रूप में पंजीकरण कराने वाला पहला सार्वजनिक उपक्रम बन गया।

10.6 संधारणीय विकासः

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के अंतर्गत आने वाले तेल सार्वजनिक क्षेत्र के उपक्रम (पीएसयू) अपनी भविष्य की रणनीतियों और व्यावसायिक गतिविधियों में ईएसजी (पर्यावरण, सामाजिक और शासन) कारकों को शामिल कर रहे हैं। इसका उद्देश्य प्रतिस्पर्धात्मक

लाभ बढ़ाना, निवेशकों को आकर्षित करना, लचीले व्यावसायिक मॉडल तैयार करना और एक अधिक टिकाऊ व समावेशी वैश्विक अर्थव्यवस्था में योगदान देना है। तेल पीएसयू अपने प्रचालन और गतिविधियों में सर्वोत्तम प्रथाओं को अपनाकर ईएसजी लक्ष्यों को प्राप्त करने के लिए प्रतिबद्ध हैं। ईएसजी निष्पादन का राष्ट्रीय और अंतरराष्ट्रीय मानकों के साथ लगातार तुलनात्मक मूल्यांकन किया जाता है। इस संदर्भ में गतिविधियों/उपलब्धियों का सारांश निम्नलिखित है:

10.6.1 **ओएनजीसी:** ओएनजीसी ने अपना डीकार्बोनाइजेशन रोडमैप सार्वजनिक किया है, जो उसकी पारदर्शिता और जवाबदेही को दर्शाता है। कॉप28 में तेल और गैस डीकार्बोनाइजेशन चार्टर (ओजीडीसी) पर हस्ताक्षर करने के बाद, कंपनी ने महत्वाकांक्षी पर्यावरणीय लक्ष्यों के लिए खुद को प्रतिबद्ध किया है। इसका लक्ष्य 2030 तक लगभग शून्य अपस्ट्रीम मीथेन उत्सर्जन प्राप्त करना और उसी वर्ष नियमित रूप से होने वाली आग को समाप्त करना है। वर्ष 2024 में ओएनजीसी को कार्बन डिस्क्लोजर प्रोजेक्ट (सीडीपी) में बी–रेटिंग मिली, जो उसके पर्यावरणीय निष्पादन को बेहतर बनाने के प्रयासों को दर्शाता है।

ओएनजीसी ने अब तक जलवायु परिवर्तन पर संयुक्त राष्ट्र फ्रेमवर्क कन्वेंशन (यूएनएफसीसीसी) के साथ 15 स्वच्छ विकास तंत्र (सीडीएम) परियोजनाएं पंजीकृत की हैं, जिनकी संयुक्त सीईआर उत्पादन क्षमता 27,54,455 सीईआर है और राजस्थान के जैसलमेर में 102 मेगावाट पवन ऊर्जा परियोजना के लिए 230,876 सीईआर जारी करने के लिए यूएनएफसीसीसी में आवेदन किया गया है। वित्त वर्ष 2024–25 में, ओएनजीसी ने आंतरिक ऊर्जा लेखा परीक्षकों के माध्यम से विभिन्न रिगों और प्रतिष्ठानों में 322 ऊर्जा ऑडिट किए। इसके अलावा, उसने अपने पुराने इलेक्ट्रॉनिक उपकरणों और सहायक उपकरणों के जिम्मेदार निपटान के लिए ई–कचरा नीति लागू की है।

10.6.1.1 **मीथेन रिसाव का पता लगाना और उसे नियंत्रित करना:** ओएनजीसी ने टोटलएनर्जीज़ की अग्रणी एयूएसईए (पर्यावरणीय अनुप्रयोगों के लिए एयरबोर्न अल्ट्रालाइट स्पेक्ट्रोमीटर) तकनीक का उपयोग करके मीथेन उत्सर्जन का पता लगाने और मापने का अभियान चलाने के लिए टोटलएनर्जीज़ के साथ एक सहयोग समझौते पर हस्ताक्षर किए हैं। हम टोटलएनर्जीज़ की पेटेंट तकनीक एयूएसईए का उपयोग करके ड्रोन सर्वेक्षण करने की योजना बना रहे हैं ताकि किसी प्रतिष्ठान में मीथेन उत्सर्जन वाले विशिष्ट क्षेत्र का पता लगाया जा सके। रिमोट सेंसिंग और एरियल सर्वेक्षणों द्वारा पहचाने गए हॉटस्पॉट के आधार पर, पाइपलाइन और अन्य उपकरणों में विशिष्ट रिसाव का पता लगाने के लिए जमीनी सर्वेक्षण किए जाते हैं जहां से अनियंत्रित मीथेन गैस निकलती है।

ओएनजीसी, हैंडहेल्ड ऑप्टिकल इमेजिंग आईआर कैमरे से प्रोसेसिंग संयंत्रों में नियमित रूप से गैस रिसाव का पता लगाने का सर्वेक्षण करता है। उपर्युक्त प्रयासों से, ओएनजीसी अकेले वित्त वर्ष 2024–2025 में लगभग 52.16 एमएमएससीएम मीथेन का पता लगाने में सक्षम है, जो 1.06 एमएमटी सीओ2ई के बराबर है। उल्लेखनीय है कि ओएनजीसी 2008 से एलडीएउआर (रिसाव पहचान एवं मरम्मत कार्यक्रम) भी चला रहा है। अब तक, ओएनजीसी ने लगभग 72.64 एमएमएससीएम के अनियंत्रित मीथेन गैस के निकलने का पता लगाकर उसे रोका है, जो 1.47 एमएमटी सीओ2 निकलने के बराबर है।

10.6.1.2 **की गई हरित पहल:** निष्पादन संयंत्र/अनुसंधान एवं विकास संयंत्र: नंदसन ईटीपी, मेहसाणा, गुजरात में जुलाई 2024 में हरित एच2 उत्पादन संयंत्र के लिए उपकरण और मशीनरी प्राप्त हो गई है। स्थापना और कमीशनिंग का कार्य चल रहा है। यह संयंत्र हाइड्रोकार्बन कूप के उत्पादित जल से हरित एच2 का उत्पादन करेगा।

- **टाटीपाका रिफाइनरी ग्रीन एच2 संयंत्र:** ओएनजीसी टाटीपाका रिफाइनरी में इलेक्ट्रोलाइजर मार्ग के माध्यम से ग्रीन एच2 के उत्पादन की संभावना तलाश रही है।
- **40 केटीए ग्रीन एच2 ग्रीन फील्ड परियोजनाएँ:** ओएनजीसी, एमआरपीएल के साथ ग्रीन हाइड्रोजन उठान व्यवस्था और मंगलुरु में एक ग्रीनफील्ड परियोजना की स्थापना के संबंध में चर्चा कर रही है। एमआरपीएल को 10% ग्रीन हाइड्रोजन की आपूर्ति की व्यवहार्यता का आकलन करने के लिए ओएनजीसी और एमआरपीएल दोनों के सदस्यों वाली एक संयुक्त

कार्य समिति का गठन किया गया है।

- इसके अलावा, सीसीयूएस के आरएंडडी कार्य के लिए केडीएमआईपीई में एक प्रयोगशाला स्थापित की गई है। यह प्रयोगशाला कोयले में गैस को अवशोषित करने का अध्ययन भी कर रही है, जो सीओ2 को एकत्र करने के लिए अच्छा माध्यम बन सकता है क्योंकि इसमें गैस को अधिक मात्रा में संग्रहित करने की क्षमता होती है।

10.6.1.3 दोहरा भौतिकता मूल्यांकन (डीएमए): संधारणीय विकास के प्रति अपनी मजबूत प्रतिबद्धता के तहत, ओएनजीसी ने ईएसजी रिपोर्टिंग में वैश्विक सर्वोत्तम प्रथाओं के अनुसार एक विस्तृत दोहरी मूल्यांकन प्रक्रिया शुरू की है। इसका मतलब है कि ओएनजीसी यह देखती है कि पर्यावरण और सामाजिक कारक कंपनी के वित्तीय निष्पादन को कैसे प्रभावित करते हैं, और साथ ही यह भी कि कंपनी के प्रचालन समाज और पर्यावरण को कैसे प्रभावित करते हैं। दोनों पहलुओं को मिलाकर, ओएनजीसी यह सुनिश्चित करती है कि उसके निर्णय सही जोखिम और अवसरों को ध्यान में रखकर लिए जाएँ, जिससे वह कम कार्बन वाले भविष्य की ओर जिम्मेदार ऊर्जा नेता के रूप में काम कर सके।

10.6.1.4 ईएसजी रेटिंग: पर्यावरण और स्थिरता के प्रति अपनी बढ़ती प्रतिबद्धता को दिखाते हुए, ओएनजीसी ने अपनी सीडीपी क्लाइमेट रेटिंग में बड़ा सुधार किया है। अपनी रिपोर्टिंग के पहले ही वर्ष में कंपनी ने बी–स्कोर हासिल किया, जो पहले की एफ रेटिंग की तुलना में बहुत बेहतर है। यह सुधार ओएनजीसी के सक्रिय जलवायु प्रकटीकरण और जोखिम प्रबंधन प्रयासों को दर्शाता है। इसके अलावा, एसएंडपी वैश्विक कॉर्पोरेट संधारणीय आकलन (सीएसए) में भी ओएनजीसी का ईएसजी स्कोर 13 से बढ़कर 28 हो गया, जो कंपनी के ईएसजी शासन, पर्यावरण प्रबंधन और सामाजिक जिम्मेदारी पर बढ़ते ध्यान को दर्शाता है। ये उपलब्धियाँ ओएनजीसी की वैश्विक स्थिरता मानकों के साथ रणनीतिक मेल और जिम्मेदार व्यावसायिक प्रथाओं के माध्यम से दीर्घकालिक मूल्य सृजन के प्रति प्रतिबद्धता को दर्शाती हैं।

10.6.1.5 ईएसजी रिपोर्टिंग: ओएनजीसी हर साल अपनी एकीकृत वार्षिक रिपोर्ट और बीआरएसआर, जो सेबी द्वारा मान्यता प्राप्त है, प्रकाशित करता है। इन रिपोर्टों में स्थिरता से जुड़े विवरण और ईएसजी की मुख्य बातें शामिल होती हैं। रिपोर्टों की सटीकता और विश्वसनीयता सुनिश्चित करने के लिए तृतीय–पक्ष लेखा परीक्षकों द्वारा इन्हें बाहरी रूप से सत्यापित किया जाता है। इस नियमित और सत्यापित रिपोर्टिंग से पारदर्शिता बढ़ी है और ओएनजीसी अब हर साल ईएसजी से जुड़े विस्तृत आँकड़े सार्वजनिक करता है।

10.6.1.6 ईएसजी नीतियाँ: स्थिरता और जिम्मेदार व्यावसायिक प्रथाओं के प्रति अपनी प्रतिबद्धता दिखाते हुए, ओएनजीसी ने कई नई नीतियाँ बनाई हैं। इनमें समान अवसर नीति, मानवाधिकार नीति, भ्रष्टाचार और रिश्वतखोरी विरोधी नीति, जैव विविधता नीति, पर्यावरण नीति, स्वास्थ्य और सुरक्षा नीति, जन समर्थन नीति, आपूर्तिकर्ता आचार संहिता और संधारणीय जल प्रबंधन नीति शामिल हैं। ये नीतियाँ ओएनजीसी के सभी कार्यों में ईएसजी सिद्धांतों को लागू करने और जवाबदेही, समावेशिता व पर्यावरण संरक्षण की संस्कृति को बढ़ावा देने की उसकी रणनीति को दर्शाती हैं।

10.6.1.7 मुख्य स्थिरता विशेषताएं:

क. पर्यावरण

क) डीकार्बोनाइजेशन प्रतिबद्धता: ओएनजीसी के डीकार्बोनाइजेशन रोडमैप को सार्वजनिक रूप से साझा किया गया है, जिसका लक्ष्य वर्ष 2038 तक स्कोप 1 और 2 उत्सर्जन के लिए नेट जीरो हासिल करना है।

ख) ओएनजीसी ने कॉप28 में तेल और गैस डीकार्बोनाइजेशन चार्टर पर हस्ताक्षर किए हैं, जिसमें वर्ष 2030 तक अपस्ट्रीम मीथेन उत्सर्जन को लगभग शून्य करने और नियमित आग लगने की घटनाओं को समाप्त करने का लक्ष्य रखा गया है।

ग) मीथेन प्रबंधन: ट्रोपोमी उपग्रह तकनीक से 166 स्थानों पर मीथेन उत्सर्जन की 24×7 निगरानी की जाती है। हैंडहेल्ड गैसफाइंड आईआर कैमरों से किए गए सर्वेक्षणों में 2024–25 में 52.16 एमएमएससीएम भगोड़ा मीथेन गैस की पहचान हुई, जिससे 1.06 एमएमटीसीओ2ई उत्सर्जन रोका गया। 2007 से अब तक कुल 72.64 एमएमएससीएम मीथेन उत्सर्जन

रोका गया है, जिससे 1.47 एमएमटीसीओ2ई की कमी हुई।

घ) नवीकरणीय ऊर्जा: 2024–25 में ओएनजीसी ने 212.05 मिलियन यूनिट नवीकरणीय ऊर्जा का उत्पादन किया। 31 मार्च 2025 तक कंपनी की कुल स्थापित नवीकरणीय ऊर्जा क्षमता 194.5 मेगावाट (41.5 मेगावाट सौर + 153 मेगावाट पवन) है।

ङ) एलईडी पहल: वित्त वर्ष 2023–24 में स्थापित 5,049 एलईडी लाइटों से 75.9 मिलियन यूनिट बिजली बची। अब तक ओएनजीसी के सभी संयंत्रों में कुल 3.6 लाख एलईडी लाइटें लग चुकी हैं।

च) उत्सर्जन में कमी: उत्सर्जन नियंत्रण और ऊर्जा दक्षता कार्यक्रमों से 2,23,734 मी.टन सीओ2ई की बचत हुई। सभी उत्पादों में पर्यावरण और सामाजिक प्रभावों के साथ जिम्मेदार उपयोग की जानकारी शामिल है।

छ) रणनीतिक निवेश: ओएनजीसी 2030 तक ऊर्जा दक्षता पहलों में ₹1 लाख करोड़ और 2038 तक ₹2 लाख करोड़ निवेश कर रही है। ग्रुप कैप्टिव मॉडल के तहत 1,000 मेगावाट (500 मेगावाट पवन + 500 मेगावाट सौर) हाइब्रिड नवीकरणीय ऊर्जा परियोजना के लिए 12 अगस्त 2024 को निविदा जारी की गई।

ज) कार्बन अवशोषण: केडीएमआईपीई में कार्बन कैप्चर, उपयोग और भंडारण (सीसीयूएस) प्रयोगशाला खोली गई और आईआईटी बॉम्बे के एनसीओई–सीसीयू के साथ तीन साल की अनुसंधान साझेदारी की गई।

झ) कार्बन समायोजन: ओएनजीसी ने यूएनएफसीसीसी के साथ 15 स्वच्छ विकास तंत्र (सीडीएम) परियोजनाएं पंजीकृत की हैं, जिनमें कुल 27,54,455 प्रमाणित उत्सर्जन कटौती (सीईआर) जारी की गई।

ञ) ऊर्जा लेखा परीक्षा: आंतरिक लेखा परीक्षकों द्वारा रिगों और प्रतिष्ठानों पर 322 ऊर्जा लेखा परीक्षाएं की गईं।

ट) ई–कचरा प्रबंधन: जीवन–अंत इलेक्ट्रॉनिक उपकरणों के जिम्मेदार निपटान के लिए ई–कचरा नीति लागू की गई।

ठ) जीवन चक्र मूल्यांकन: छह उत्पादों के पर्यावरणीय प्रभावों का मूल्यांकन किया गया, जिसमें जलवायु परिवर्तन, अम्लीकरण, समुद्री सुपोषण और मीठे पानी के सुपोषण शामिल हैं।

ख. सामाजिक:

क) कर्मचारी कल्याण: ओएनजीसी ने अपने कुल राजस्व का 1.81% कर्मचारी और श्रमिक कल्याण उपायों के लिए खर्च किया।

ख) स्वास्थ्य और सुरक्षा: वित्त वर्ष 2024–25 के लिए सुरक्षा संकेतक: एलटीआईएफआर – 0.29 (ओएनजीसी), 0.18 (ठेकेदार); आर–डब्ल्यूआरआई – 0.42 (ओएनजीसी), 0.35 (ठेकेदार)।

ग) सभी कर्मचारियों और श्रमिकों को मानवाधिकार मुद्दों और नीतियों पर प्रशिक्षण दिया गया है।

घ) विविधता और समावेशन: 59% खरीद इनपुट एमएसएमई और छोटे उत्पादकों से प्राप्त किए जाते हैं, जिनमें 3% महिलाओं के स्वामित्व वाले और 4% अ.जा./अ.ज.जा. उद्यमों से प्राप्त होते हैं।

ङ) सीएसआर प्रभाव: ओएनजीसी की सीएसआर पहलों से वित्त वर्ष 2024–25 में 1.46 करोड़ लोग लाभान्वित हुए, जिनमें मुख्य रूप से कमजोर समुदाय शामिल थे, और कुल सीएसआर व्यय 911 करोड़ रुपए रहा।

च) प्रमाणन: सभी प्रचालन स्थल आईएसओ 9001 (गुणवत्ता प्रबंधन), आईएसओ 14001 (पर्यावरण), आईएसओ 37001 (रिश्वत–विरोधी) और आईएसओ 45001 (व्यावसायिक स्वास्थ्य और सुरक्षा) मानकों के लिए प्रमाणित हैं।

छ) संयुक्त राष्ट्र ग्लोबल कॉम्पैक्ट: ओएनजीसी संयुक्त राष्ट्र ग्लोबल कॉम्पैक्ट का हस्ताक्षरकर्ता है।

ज) सूचना सुरक्षा: वित्त वर्ष 2024–25 में डेटा उल्लंघन की कोई घटना दर्ज नहीं की गई।

ग. शासन:

क) हितधारक सहभागिता: शिकायत निवारण तंत्र सार्वजनिक चैनलों के माध्यम से आंतरिक और बाह्य दोनों हितधारकों के लिए सुलभ हैं।

ख) नैतिक स्रोत: सभी विक्रेता और आपूर्तिकर्ता बाल श्रम और जबरन श्रम पर प्रतिबंध सहित वैधानिक और

मानवाधिकार कानूनों के अनुपालन के लिए लिखित वचनबद्धता प्रदान करते हैं। ₹1 करोड़ से अधिक मूल्य की परियोजनाओं के लिए निष्पक्षता और पारदर्शिता सुनिश्चित करने हेतु एक सत्यनिष्ठा समझौते की आवश्यकता होती है।

10.6.2 **ओआईएल:** ऑयल इंडिया लिमिटेड (ओआईएल) ने खुद को एक अग्रणी, भविष्य–तैयार एकीकृत ऊर्जा कंपनी के रूप में स्थापित करने के लिए एक नया विज़न प्रस्तुत किया है। हमारा विज़न वक्तव्य: "उत्कृष्ट निष्पादन के माध्यम से भारत की संधारणीय ऊर्जा सुरक्षा के लिए प्रतिबद्ध एक अग्रणी और भविष्य–तैयार एकीकृत ऊर्जा कंपनी बनना" है। इस विज़न का केंद्र स्थिरता है और कंपनी सभी हितधारकों, सुरक्षा और धरती के लिए सकारात्मक बदलाव लाने हेतु ईएसजी सिद्धांतों को अपनाने के लिए प्रतिबद्ध है।

वित्त वर्ष 2024–25 के दौरान किए गए प्रमुख ईएसजी पहलें इस प्रकार हैं:

क. पर्यावरण

क) ओआईएल पर्यावरणीय स्थिरता के क्षेत्र में अग्रणी है तथा उसने वर्ष 2040 तक एक महत्वाकांक्षी लक्ष्य निर्धारित किया है।

ख) नवीकरणीय और गैर–परंपरागत ऊर्जा व्यवसाय को आगे बढ़ाने के लिए 31 जनवरी 2025 को ओआईएल ग्रीन एनर्जी लिमिटेड नामक एक पूर्ण स्वामित्व वाली सहायक कंपनी का गठन किया है।

ग) ओआईएल वनरोपण प्रयासों में सक्रिय रूप से योगदान दे रहा है, तथा पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय के ग्रीन क्रेडिट कार्यक्रम के तहत वृक्षारोपण के लिए 419 हेक्टेयर आरक्षित भूमि सुरक्षित कर रहा है तथा आगे विस्तार की योजना बना रहा है।

घ) ओआईएल ओजीडीसी में शामिल होने वाली दूसरी भारतीय तेल और गैस कंपनी बन गई, जो कॉप28 (2023) में शुरू की गई एक वैश्विक पहल है।

ङ) ऑयल इंडिया ने भारत में अपने संयंत्रों में मीथेन उत्सर्जन का पता लगाने और मापने के लिए टोटलएनर्जीज़ के साथ सहयोग किया है। ड्रोन पर लगे सेंसरों का उपयोग करने वाली एयूएसईए तकनीक का उपयोग करते हुए, यह साझेदारी वैश्विक सर्वोत्तम प्रथाओं के अनुरूप व्यापक उत्सर्जन निगरानी और कमी सुनिश्चित करती है।

ख. सामाजिक:

क) ओआईएल व्यवस्थित प्रशिक्षण कार्यक्रमों के माध्यम से निरंतर सीखने और व्यावसायिक विकास की संस्कृति को बढ़ावा देता है।

ख) भर्ती नीतियां समान अवसर और एक ऐसा कार्यस्थल सुनिश्चित करती हैं जो विविधता और समावेशिता को महत्व देता है।

ग) अब तक का सबसे कम एलटीआईएफआर (0.071) हासिल किया, जो कर्मचारी सुरक्षा के प्रति मजबूत प्रतिबद्धता को दर्शाता है।

घ) एक सुस्थापित स्वास्थ्य, सुरक्षा और पर्यावरण (एचएसई) प्रणाली सर्वोत्तम प्रक्रियाओं का पालन सुनिश्चित करती है।

ङ) नियमित लेखा–परीक्षा, डिजिटल निगरानी और प्रोजेक्ट "कवच" सुरक्षा प्रणालियों को और मजबूत बनाते हैं।

च) रिश्वत विरोधी नीतियों, व्हिसल ब्लोअर नीति को कायम रखता है, तथा नैतिक शासन के लिए ट्रांसपेरेंसी इंटरनेशनल इंडिया के साथ सहयोग करता है।

छ) सीएसआर कार्यक्रम समुदायों की ज़रूरतों के आधार पर बनाए जाते हैं, ताकि उनका प्रभाव सही और मापने योग्य हो।

ग. शासन:

ऑयल इंडिया लिमिटेड (ओआईएल) कंपनी अधिनियम, 2013, सेबी (एलओडीआर) विनियम, 2015, डीपीई दिशानिर्देशों और वैश्विक सर्वोत्तम प्रथाओं का पालन करके मज़बूत कॉर्पोरेट प्रशासन के लिए प्रतिबद्ध है। कंपनी का प्रशासनिक ढाँचा पारदर्शिता, नैतिक व्यावसायिक आचरण और शेयरधारकों व हितधारकों के प्रति जवाबदेही सुनिश्चित करता है।

क) पारदर्शिता और सुरक्षा के प्रति प्रतिबद्धता

- नियमित ईएसजी और स्थिरता रिपोर्ट से हितधारकों को कंपनी के निष्पादन की पूरी जानकारी मिलती है।

- साइबर सुरक्षा में उत्कृष्टता: ओआईएल ने कोई साइबर उल्लंघन नहीं होने की सूचना दी, जिससे उसकी डिजिटल सुरक्षा पर प्रतिबद्धता दिखती है।

ख) बोर्ड संरचना और विविधता

- बोर्ड विविधता अनुपात: 1:7 (प्रत्येक सात बोर्ड सदस्यों के लिए एक महिला निदेशक)।
- बोर्ड स्तरीय निरीक्षण: 8 बोर्ड उप–समितियां विभिन्न व्यावसायिक कार्यों की देखरेख करती हैं, तथा प्रभावी शासन सुनिश्चित करती हैं।
- बोर्ड विविधता नीति: वित्त वर्ष 2025 में, विभिन्न प्रतिनिधित्व और समावेशी नेतृत्व सुनिश्चित करने के लिए एक स्पष्ट और व्यवस्थित योजना को मंजूरी दी गई और प्रकाशित किया गया।

घ. ईएसजी रिपोर्टिंग:

ऑयल इंडिया लिमिटेड (ओआईएल) पारदर्शी और विस्तृत ईएसजी रिपोर्टिंग के लिए प्रतिबद्ध है, जो नियमों और वैश्विक सर्वोत्तम प्रथाओं के अनुसार है।

क) व्यावसायिक उत्तरदायित्व और स्थिरता रिपोर्टिंग (बीआरएसआर):

- सेबी ने वर्ष 2021 में बीआरएसआर के तहत शीर्ष 1000 कंपनियों के लिए ईएसजी निष्पादन रिपोर्ट करना अनिवार्य किया है।
- ओआईएल ने वित्त वर्ष 2021–22 में अपनी पहली स्वैच्छिक बीआरएसआर रिपोर्ट जारी की, उसके बाद 2022–23 और 2023–24 की अनिवार्य रिपोर्टें प्रकाशित कीं, जिन्हें तीसरे पक्ष ने सत्यापित किया।
- वर्ष 2024–25 से, ओआईएल ने सेबी के अद्यतन दिशानिर्देशों के अनुसार अपने बीआरएसआर को सही तरीके से सत्यापित कराया।
- स्थिरता रिपोर्टिंग: ओआईएल 2012 से ग्लोबल रिपोर्टिंग पहल (जीआरआई) मानकों का पालन करते हुए स्थिरता रिपोर्ट प्रकाशित कर रहा है।

ख) कार्बन डिस्क्लोजर परियोजना (सीडीपी) निष्पादन:

- ओआईएल ने अपने जलवायु परिवर्तन स्कोर को "एफ" से "सी" तक सुधारा तथा जल सुरक्षा में "बी–" रेटिंग प्राप्त की, जो पर्यावरणीय जिम्मेदारी के प्रति उसकी प्रतिबद्धता को दर्शाता है।

10.6.3 गेल: गेल की संधारणीय विकास रिपोर्टें अंतर्राष्ट्रीय पेट्रोलियम उद्योग पर्यावरण संरक्षण संघ (आईपीआईईसीए) के नवीनतम दिशानिर्देशों के अनुसार बनाई जाती हैं। आईपीआईईसीए एक वैश्विक तेल और गैस उद्योग संघ है जो पर्यावरण और समाज से जुड़े मुद्दों पर काम करता है। गेल की रिपोर्टों की सत्यता एक बाहरी एजेंसी द्वारा सुनिश्चित की जाती है। यह सत्यापन टाइप 2 उच्च–स्तरीय एए1000एएस वी3 मानक के अनुसार होता है। सत्यापन प्रक्रिया में कंपनी के विभिन्न स्थल, कार्यालय और विभागों का दौरा और आभासी बैठकें शामिल होती हैं ताकि दिए गए आंकड़े सही और विश्वसनीय हों।

10.6.3.1 सेबी द्वारा अधिदेशित बीआरएसआर: गेल वित्तीय वर्ष 2012–13 से वार्षिक रिपोर्ट के एक भाग के रूप में व्यावसायिक उत्तरदायित्व एवं स्थायित्व रिपोर्ट (बीआरएसआर) प्रकाशित कर रहा है, जिसमें स्थायित्व के क्षेत्र में किए जा रहे कार्यों का विवरण दिया जाता है। गेल की बीआरएसआर का आश्वासन एक बाहरी आश्वासन एजेंसी द्वारा भी दिया जाता है। आश्वासन लेखा परीक्षक विभिन्न कार्यालयों से प्राप्त आंकड़ों का सत्यापन करता है और उचित आश्वासन प्रदान करने के लिए प्रमुख गेल स्थलों का भी दौरा करता है। बीआरएसआर में लागू आश्वासन बिंदुओं को शामिल करने के बाद लेखा परीक्षक द्वारा आश्वासन प्रमाणपत्र प्रदान किया जाता है। ये रिपोर्टें गेल की वेबसाइट www.gailonline.com पर देखी जा सकती हैं।

10.6.3.2 सीआईआई ग्रीनको रेटिंग को अपनाना: सीआईआई ग्रीन कंपनी (ग्रीनको) रेटिंग प्रणाली एक ऐसे दृष्टिकोण का समर्थन करती है जो टिकाऊ निष्पादन पर आधारित है। यह रेटिंग प्रणाली ऊर्जा दक्षता, नवीकरणीय ऊर्जा, ग्रीनहाउस गैस उपशमन, भौतिकता संरक्षण आदि जैसे मानदंडों के आधार पर कंपनियों के पारिस्थितिक पहलुओं का मूल्यांकन करती है।

गेल ने अपने सभी प्रचालन स्थलों पर सीआईआई ग्रीनको रेटिंग लागू की है। इसका उद्देश्य उत्पादों, सेवाओं और प्रचालनों को और अधिक टिकाऊ बनाने के लिए नेतृत्व और मार्गदर्शन प्रदान करती है। कंपनी अपने कर्मचारियों और बाहरी हितधारकों को नई हरित तकनीकों और सर्वोत्तम प्रथाओं पर प्रशिक्षित करती है

ताकि वे अपने काम में सुधार और पर्यावरण की रक्षा कर सकें।

निम्नलिखित गेल साइटें सीआईआई ग्रीनको रेटिंग से मान्यता–प्राप्त है:

- प्लैटिनम प्रमाणन: जेएचबीडीपीएल– रांची, केकेबीएमपीएल–कोच्चि और दाभोल–बेंगलुरु पाइपलाइन
- स्वर्ण प्रमाणन: पाता पेट्रोकेमिकल संयंत्र
- रजत प्रमाणन: विजयपुर गैस प्रोसेसिंग संयंत्र, वाघोडिया गैस प्रोसेसिंग संयंत्र, गंधार गैस प्रोसेसिंग संयंत्र, झाबुआ कंप्रेसर स्टेशन और विजाग–सिकंदराबाद पाइपलाइन।

कांस्य: छैंसा कंप्रेसर

10.6.3.3 ईएसजी रेटिंग: 2025 में, गेल को लगातार आठवीं बार, लंदन स्टॉक एक्सचेंज ग्रुप सस्टेनेबिलिटी इंडेक्स के एक भाग के रूप में एफटीएसई4गुड इंडेक्स सीरीज़ में शामिल किया गया है, जो तेल एवं गैस क्षेत्र में मज़बूत ईएसजी प्रथाओं को दर्शाता है। गेल को पृथ्वी पुरस्कार–2024, ऊर्जा एवं खनन श्रेणी–2024 पुरस्कार और भारत की सर्वाधिक स्थायी कंपनियों का 2023–24 पुरस्कार प्राप्त हुआ है। गेल ने "सी" से "बी" स्तर पर दो पायदान ऊपर उठकर एक महत्वपूर्ण उपलब्धि भी हासिल की है। इसका अर्थ है कि कंपनी ने जलवायु परिवर्तन के प्रबंधन और रिपोर्टिंग में अपने निष्पादन को बेहतर बनाया है।

स्थिरता के प्रति निरंतर प्रयास और समर्पण के सम्मान में, गेल को जून 2025 में हैदराबाद में आयोजित सीआईआई ग्रीनको शिखर सम्मेलन 2025 के दौरान 'ग्रीनको चैंपियन पुरस्कार' से सम्मानित किया गया। इसके अतिरिक्त, महत्वाकांक्षी नेट–ज़ीरो उत्सर्जन लक्ष्य को प्राप्त करने की दिशा में गेल की सक्रिय पहलों के सम्मान में, गेल को 11 जून 2025 को नई दिल्ली में यूबीएस फ़ोरम द्वारा प्रतिष्ठित "वर्ष 2025 का सर्वश्रेष्ठ संधारणीय पहल पुरस्कार–नेट–ज़ीरो प्राप्ति" से सम्मानित किया गया।

10.6.3.4 गेल के ईएसजी निष्पादन की मुख्य विशेषताएं

क. पर्यावरण

क) गेल 16,421 किलोमीटर एनजी पाइपलाइन और 2,040 किलोमीटर एलपीजी पाइपलाइन का नेटवर्क प्रचालित करता है।

ख) गेल की स्थापित क्षमता 118 मेगावाट पवन ऊर्जा और 27 मेगावाट सौर ऊर्जा है। गेल ने 2035 तक 3.5 गीगावाट नवीकरणीय ऊर्जा उत्पादन का लक्ष्य रखा है।

ग) नेट जीरो रणनीति का लक्ष्य वर्ष 2035 तक स्कोप–1 और स्कोप–2 उत्सर्जन में 100% कमी लाना तथा वर्ष 2040 तक स्कोप–3 उत्सर्जन में 35% कमी लाना है।

घ) 0.78 मिलियन घन मीटर अपशिष्ट जल को रीसाइकल किया गया। ताजे पानी की खपत को कम करने के लिए पाता (उत्तर प्रदेश) में शून्य तरल निर्वहन (जेडएलडी) परियोजना का कार्यान्वयन किया जा रहा है।

ङ) गेल ने "एक पेड़ माँ के नाम" पहल के तहत वित्त वर्ष 2024–25 के दौरान लगभग 50,000 पेड़ लगाए हैं।

च) माननीय प्रधानमंत्री ने 02.10.2024 को रांची में गेल के पहले 05 टीपीडी सीबीजी संयंत्र का उद्घाटन किया।

छ) विजयपुर में गेल के पहले हरित हाइड्रोजन संयंत्र (10 मेगावाट) का उद्घाटन श्री पंकज जैन, माननीय सचिव, पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय, भारत सरकार द्वारा 24 मई, 2024 को किया गया।

ज) गेल ने विजयपुर (मध्य प्रदेश) में 01 प्राकृतिक गैस टरबाइन चालित पाइपलाइन कंप्रेसर को विद्युत चालित (3.6 मेगावाट) में परिवर्तित किया है।

ख. सामाजिक

क) वित्त वर्ष 2024–25 में गेल की सीएसआर परियोजनाओं से 15 लाख से अधिक लोग लाभान्वित हुए।

ख) इंजीनियरिंग प्रवेश परीक्षाओं के लिए कोचिंग ले रहे 180 छात्रों में से 168 ने गेल की उत्कर्ष पहल के माध्यम से जेईई मेन्स 2025 उत्तीर्ण किया है।

ग) 13 राज्यों के 30 जिलों में 60 मोबाइल मेडिकल यूनिट (एमएमयू) कार्यरत हैं, तथा गेल आरोग्य पहल के रूप में दूरदराज और ग्रामीण क्षेत्रों में स्वास्थ्य सेवाएं प्रदान कर रही हैं।

घ) गेल ने एमएसई से 1,760 करोड़ रुपए मूल्य की वस्तुओं और सेवाओं की खरीद की, जो कुल पात्र खरीद का लगभग 48% है।

ङ) अ.जा./अ.ज.जा. उद्यमियों के स्वामित्व वाले एमएसई से वस्तुओं और सेवाओं की खरीद 167 करोड़ रुपए रही जो कुल पात्र खरीद का 4-6% है और महिला उद्यमियों से 280 करोड़ रुपए रही जो कुल पात्र खरीद का 7.8% है।

च) वित्त वर्ष 2024–25 के लिए गेल का ग्राहक संतुष्टि सूचकांक 92% है।

ग. शासन

क) फिच और मूडीज़ ने गेल (इंडिया) लिमिटेड की दीर्घकालिक विदेशी मुद्रा जारीकर्ता डिफ़ॉल्ट रेटिंग (आईडीआर) को क्रमशः 'बीबीबी–' और 'बीएए3' पर पुनः स्थापित किया है, जो भारत की सॉवरेन रेटिंग तक सीमित है और आउटलुक 'स्थिर' है। मैसर्स इंडिया रेटिंग्स ने गेल की रेटिंग (घरेलू) को 'एएए' के रूप में पुनः स्थापित किया है।

ख) वित्त वर्ष 2024–25 में, गेल को सीपीजीआरएएमएस पोर्टल के माध्यम से आंतरिक और बाहरी हितधारकों से 250 शिकायतें प्राप्त हुईं और इनमें से 100% का तुरंत समाधान किया गया।

ग) जून 2025 में हैदराबाद में आयोजित सीआईआई ग्रीनको शिखर सम्मेलन 2025 के दौरान गेल को 'ग्रीनको चैंपियन पुरस्कार' से सम्मानित किया गया।

घ) 23 अगस्त, 2024 को दिबियापुर कंप्रेसर स्टेशन पर भारत की पहली क्लोज्ड लूप मीटर प्रोवर सुविधा का उद्घाटन किया जाएगा।

ङ) गेल को स्थिरता रिपोर्टिंग और जिम्मेदार व्यावसायिक प्रथाओं के प्रति अनुकरणीय प्रतिबद्धता के लिए वित्त वर्ष 2023–24 के लिए "आईसीएआई स्थिरता रिपोर्टिंग पुरस्कार" का विजेता घोषित किया गया।

च) गेल ने अपने पुराने सैप ईसीसी 6.0 सिस्टम को नवीनतम सैप एस4/हाना में बदल लिया है। इस बदलाव से प्रक्रियाएँ आसान और सुव्यवस्थित हो जाएँगी, स्वचालन अधिक बुद्धिमान होगा और वास्तविक समय में डेटा विश्लेषण की सुविधा मिलेगी।

छ) वित्त वर्ष 2024–25 के लिए 95.5% के आंतरिक लक्ष्य के मुकाबले 96.37% का एचएसई स्कोर हासिल किया गया।

10.6.4 आईओसीएल: इंडियन ऑयल अपनी भविष्य की रणनीतियों और व्यावसायिक गतिविधियों में ईएसजी कारकों को शामिल कर रहा है ताकि प्रतिस्पर्धात्मक लाभ बढ़ाया जा सके, निवेशकों को आकर्षित किया जा सके और लचीले व्यावसायिक मॉडल तैयार किए जा सकें।

कंपनी अपने प्रचालन में सर्वोत्तम प्रक्रियाओं को अपनाकर ईएसजी लक्ष्यों को पूरा करने और एक अधिक टिकाऊ एवं समावेशी वैश्विक अर्थव्यवस्था में योगदान देने के लिए प्रतिबद्ध है। इसके अलावा, इंडियन ऑयल का ईएसजी निष्पादन राष्ट्रीय और अंतर्राष्ट्रीय मानकों के साथ नियमित रूप से तुलना (बेंचमार्क) किया जाता है। नीचे इस संबंध में की गई प्रमुख गतिविधियाँ और उपलब्धियों का सार दिया गया है।

क. पर्यावरण

क) इंडियन ऑयल, इंडियन ऑयल एंड गैस कॉर्पोरेट – ब्लूमबर्ग एनईएफ ग्लोबल एनर्जी ट्रांजिशन स्कोर में शीर्ष पर है।

ख) विश्व स्तर पर मान्यता–प्राप्त डॉव जोन्स सस्टेनेबिलिटी इंडेक्स (डीजेएसआई) 2025 में भारतीय तेल एवं गैस कंपनियों में शीर्ष स्थान प्राप्त किया।

ग) नवीकरणीय ऊर्जा क्षमता ~252 मेगावाट

घ) इंडियन ऑयल के सभी स्थानों पर 100% ऊर्जा कुशल प्रकाश व्यवस्था

ङ) आज तक 62 लाख पेड़ जीवित हैं

च) 1,20,000 एमटीसीओ2ई

छ) वृक्षारोपण के माध्यम से कार्बन पृथक्करण

ज) 39.8 बिलियन लीटर अपशिष्ट जल का पुनर्चक्रण

झ) नवीकरणीय ऊर्जा और हरित प्रयासों में 536.5 करोड़ रुपए का निवेश

ञ) 1.5 एमएमटी सीओ2ई+ जीएचजी उत्सर्जन में

बचाव / कमी / उपशमन

ट) 3,30,174 मीट्रिक टन अपशिष्ट का पुनः उपयोग / पुनर्चक्रण / पुनर्प्राप्ति

ठ) 228 शून्य तरल निर्वहन स्थान।

ख. सामाजिक

क) वित्त वर्ष 2024–25 के दौरान सीएसआर व्यय ₹583.04 करोड़ और 1.36 करोड़ से अधिक सीएसआर लाभार्थी।

ख) स्थायी कर्मचारियों के लिए 0.083 चोट लगने के कारण समय हानि आवृत्ति दर (एलटीआईएफआर) और स्थायी श्रमिकों के लिए 0.068 चोट लगने के कारण समय हानि आवृत्ति दर (एलटीआईएफआर)।

ग) प्रत्येक इकाई / क्षेत्र / मुख्यालय स्तर पर पोश कार्यान्वयन के लिए आंतरिक समितियां, जिनकी अध्यक्षता वरिष्ठ स्तर की महिला कर्मचारी करती हैं।

घ) सुरक्षा संस्कृति को बढ़ाने के लिए इंडियन ऑयल में स्वास्थ्य, सुरक्षा और पर्यावरण (एच,एसएंडई) नीति लागू की गई।

ङ) 42.17% खरीदारी एमएसएमई / एमएसई से।

च) 93% से अधिक स्थायी कर्मचारी विभिन्न संघ / एसोसिएशन से जुड़े हैं।

ग. शासन

क) वित्तीय वर्ष 2024–25 के अंत तक 99.98% ग्राहक शिकायतें बंद कर दी गईं।

ख) सुशासन के लिए 12 बोर्ड समितियाँ और सरकार द्वारा नामित निदेशकों सहित 3 महिला निदेशक। पूर्णकालिक निदेशकों का औसत अनुभव 30 वर्ष से अधिक।

ग) भ्रष्टाचार से संबंधित जोखिम के लिए 100% प्रचालन स्थलों का मूल्यांकन किया गया।

घ) वित्त वर्ष 2024–25 के दौरान प्रतिस्पर्धा–विरोधी व्यवहार के शून्य मामले दर्ज किए गए।

- इंडियन ऑयल ऊर्जा दक्षता, नवीकरणीय ऊर्जा, अपशिष्ट प्रबंधन, जैव विविधता संरक्षण आदि जैसे बहुआयामी दृष्टिकोण के माध्यम से ईएसजी के लिए प्रतिबद्ध है। कंपनी ने ऊर्जा बचत, नवीकरणीय ऊर्जा, वृक्षारोपण आदि जैसे काम करके 2024–25 में अपने ग्रीनहाउस गैस उत्सर्जन में 1.55 मिलियन मीट्रिक टन सीओ2ई कम किया।
- इंडियन ऑयल, व्यावसायिक उत्तरदायित्व और स्थिरता रिपोर्ट (बीआरएसआर) के माध्यम से भारतीय प्रतिभूति एवं विनिमय बोर्ड (सेबी) की गैर–वित्तीय रिपोर्टिंग आवश्यकताओं का अनुपालन करता है, जो पारदर्शी रूप से हितधारकों को गैर–वित्तीय डेटा, योजनाओं और निष्पादन के बारे में जानकारी प्रदान करती है। इंडियन ऑयल की तृतीय–पक्ष आश्वासित बीआरएसआर 2024–25 https://iocl.com/business.responsibility.report से देखी जा सकती है।
- इंडियन ऑयल वर्तमान में पर्यावरण, सामाजिक और शासन आयामों से संबंधित विभिन्न पहलों के माध्यम से 11 संयुक्त राष्ट्र संधारणीय विकास लक्ष्यों में योगदान दे रहा है।
- जैव विविधता के क्षेत्र में, मैंग्रोव वृक्षारोपण सहित बड़े पैमाने पर वृक्षारोपण किया गया है। पृथ्वी को हरा–भरा बनाने में योगदान देने के हमारे प्रयासों के तहत, इंडियन ऑयल ने 2024–25 के दौरान 7 लाख से अधिक पेड़ लगाए हैं और अनुमान है कि वित्त वर्ष 2024–25 के अंत तक हमारी संगठनात्मक सीमाओं के भीतर और बाहर लगभग 62 लाख पेड़ जीवित रहेंगे, जिसके परिणामस्वरूप लगभग 0.124 एमएमटी सीओ2 के बराबर उत्सर्जन कम होगा। अन्य संरक्षण परियोजनाओं के अलावा, इंडियन ऑयल ने चीतों के अंतरमहाद्वीपीय पुनर्वास का भी समर्थन किया।
- इंडियन ऑयल ने भारत सरकार के ग्रीन क्रेडिट कार्यक्रम (जीसीपी) में भागीदारी शुरू कर दी है। इस कार्यक्रम के अंतर्गत, चार राज्यों – गुजरात, तेलंगाना, राजस्थान और बिहार – में 1077.01 हेक्टेयर क्षेत्र में वृक्षारोपण के लिए कुल ₹56.02 करोड़ का भुगतान जारी किया गया है।
- इंडियन ऑयल ने जैविक कचरे को सीबीजी में परिवर्तित करने के लिए उन्नत बायोगैस प्रौद्योगिकियों को एकीकृत करने हेतु सीबीजी संयंत्र स्थापित करने

के लिए एवरएनवायरो, जीपीएस रिन्यूएबल्स जैसी फर्मों के साथ साझेदारी भी की है।

- **जल प्रबंधन:** इंडियन ऑयल की जल प्रबंधन पहलों में उपचारित अपशिष्ट जल का उपयोग, वर्षा जल संचयन और सीवेज उपचार संयंत्रों की स्थापना शामिल है, जो जल के दोबारा इस्तेमाल और संरक्षण में महत्वपूर्ण योगदान देते हैं।
- **अपशिष्ट प्रबंधन एवं परिपत्रता:** "अनबॉटल्ड" अभियान के तहत बेकार पीईटी बोतलों को टिकाऊ कपड़ों में बदला जाता है, जिससे प्लास्टिक कचरे का जिम्मेदार रीसाइकलिंग बढ़ता है।
- इंडियन ऑयल ने अपने ब्रांड साइक्लोप्लास्ट के तहत रीसाइकल किए गए पॉलिमर ग्रैन्यूल्स लॉन्च किए हैं। इन ग्रैन्यूल्स को वर्जिन पॉलिमर के साथ मिलाकर इस्तेमाल किया जाता है, जो पर्यावरण–अनुकूल पैकेजिंग समाधान की दिशा में एक महत्वपूर्ण कदम है।

10.6.5 बीपीसीएल: एक अग्रणी महारत्न सार्वजनिक क्षेत्र की कंपनी होने के नाते, बीपीसीएल की रणनीति भारत के नेट–ज़ीरो उत्सर्जन लक्ष्य पर केंद्रित है। भारत में विकास की चुनौतियों और तेज़ी से बदलते बाज़ारों को ध्यान में रखते हुए, हम समझते हैं कि "न्यायसंगत परिवर्तन" जरूरी है जिसमें लोगों को साथ लेकर हम मिलकर एक नई ऊर्जा अर्थव्यवस्था की ओर बढ़ रहे हैं।

10.6.5.1 ईएसजी निष्पादन की मुख्य विशेषताएं: प्रमुख ईएसजी निष्पादन निम्नानुसार हैं:

क) नवीकरणीय स्थापित क्षमता 154.86 मेगावाट तक पहुंच गई और 171 मेगावाट विकास के अधीन है।

ख) कुल खपत की गई बिजली में 4.76% नवीकरणीय ऊर्जा हिस्सेदारी हासिल की गई।

ग) रिफाइनरी ऊर्जा संरक्षण (ईएनसीओएन) पहल के माध्यम से जीएचजी उत्सर्जन में 1,31,396 एमटीसीओ2ई की कमी हुई।

घ) बीना रिफाइनरी में 5 मेगावाट ग्रीन हाइड्रोजन प्लांट चालू किया गया।

ड.) बरगढ़, ओडिशा में एक एकीकृत 2जी और 1जी बायो–एथेनॉल संयंत्र की स्थापना की गई, जिसकी कुल उत्पादन क्षमता 200 किलोलीटर प्रतिदिन है। ₹1,557 करोड़ की स्वीकृत लागत वाली यह परियोजना मार्च 2025 में प्री–कमीशनिंग चरण में थी और एथेनॉल का उत्पादन सितंबर 2025 से शुरू होने वाला है।

च) पूरे भारत में कुल 12.18 लाख वृक्षों के माध्यम से हरित आवरण में वृद्धि।

छ) सीएसआर पहलों के तहत ₹179.37 करोड़ व्यय के साथ 41,89,337 लाभार्थियों को कवर किया गया और वित्त वर्ष 2024–25 के दौरान लगभग 50% लाभार्थी कमजोर और हाशिए पर रहने वाले समूहों से हैं।

ज) पिछले 11 वर्षों में कुल सीएसआर व्यय ₹1658.95 करोड़ तक पहुंच गया।

झ) रिफाइनरियों में दुर्घटनाओं (एलटीए) के बिना 125.55 मिलियन मानव घंटे का कार्य प्राप्त किया गया।

ञ) एमएसएमई/एमएसई से 31.80% खरीद हासिल की गई, जो 25% के अनिवार्य लक्ष्य से अधिक है।

ट) कंपनी में 134 सतर्कता जागरूकता सत्र आयोजित किए गए।

ठ) बोर्ड में 18.18% महिला निदेशक हैं।

ड) स्वतंत्र निदेशकों की अध्यक्षता में 100% बोर्ड स्तरीय समितियां।

10.6.5.2 ऊर्जा प्रबंधन

वर्ष	विशिष्ट ऊर्जा खपत (एमबीएन में)		
	बीना	मुंबई	कोच्चि
वित्त वर्ष 2023–24	67.2	60.9	62.8
वित्त वर्ष 2024–25	63.3	60.9	64.8
% परिवर्तन	5.8% कमी	कोई परिवर्तन नहीं	3.18% वृद्धि

ऊर्जा दक्षता बीपीसीएल की एक बड़ी प्राथमिकता है, क्योंकि इससे पर्यावरण की रक्षा होती है और रिफाइनरियों में लागत भी घटती है। कंपनी का ध्यान ऊर्जा संसाधनों के बेहतर उपयोग और स्थायी ऊर्जा स्रोतों को अपनाने पर है, जिससे लंबे समय में अधिक मूल्य पैदा किया जा सके। ऊर्जा का समझदारी से

उपयोग करके, नवीकरणीय ऊर्जा अपनाकर और स्वच्छ स्रोतों की ओर बढ़ते हुए, बीपीसीएल पर्यावरण की सुरक्षा, लागत में बचत, प्रतिस्पर्धात्मकता में बढ़ोतरी और भविष्य के विकास की दिशा में कदम बढ़ा रही है। बीपीसीएल की सभी तीन रिफाइनरियों में ऊर्जा संरक्षण (एनकॉन) योजनाएँ शुरू की गई हैं, जिनसे ऊर्जा खपत में उल्लेखनीय कमी आई है।

10.6.5.3 ऊर्जा परिवर्तन: बीपीसीएल की नवीकरणीय ऊर्जा व्यवसाय इकाई कंपनी के स्वच्छ ऊर्जा लक्ष्यों को आगे बढ़ा रही है। इसका उद्देश्य कंपनी के ऊर्जा मिश्रण में हरित विकल्पों को शामिल कर उसे विविध बनाना और बीपीसीएल को एक एकीकृत ऊर्जा कंपनी के रूप में विकसित करना है।

10.6.5.4 स्वीकृत परियोजनाएँ

- उत्तर प्रदेश के प्रयागराज में ग्राउंड माउंटेड सौर परियोजना
- मध्य प्रदेश और महाराष्ट्र राज्यों में पवन फार्म परियोजनाएँ
- कोच्चि, केरल में एकीकृत हरित हाइड्रोजन संयंत्र और हाइड्रोजन पुनः ईंधन फिलिंग स्टेशन

10.6.5.5 जल प्रबंधन: क्योंकि यह शोधन प्रक्रियाओं और शीतलन प्रणालियों में उपयोग होता है। प्रभावी जल प्रबंधन से पर्यावरणीय प्रभाव घटता है, लागत कम होती है, उत्पादकता बढ़ती है और जल संकट या नियमों से जुड़े जोखिमों को नियंत्रित किया जा सकता है। यह रणनीति उत्पादन को बेहतर बनाती है, दक्षता बढ़ाती है और कंपनी के वित्तीय निष्पादन को मजबूत करती है। कुशल जल प्रबंधन के लिए बीपीसीएल लगातार वर्षा जल संचयन (आरडब्ल्यूएच) क्षमता बढ़ाने और अन्य जल स्रोतों पर निर्भरता कम करने के प्रयास कर रही है।

- 1041 टीकेएल से अधिक (हजार किलो लीटर) वर्षा जल संचयन क्षमता
- 14.33 लाख वर्ग मीटर का वर्षा जल संचयन क्षेत्र

10.6.5.6 अपशिष्ट प्रबंधन: बीपीसीएल अपने सभी कार्यों में 5 सिद्धांतों (इंकार करना, कम करना, पुनः उपयोग करना, पुनः प्रयोजन करना और पुनर्चक्रण) का पालन करता है। कंपनी पर्यावरण पर पड़ने वाले प्रभाव को कम करने और अपशिष्ट का उचित प्रबंधन करने के लिए कुशल अपशिष्ट प्रबंधन को प्राथमिकता देती है। बीपीसीएल यह सुनिश्चित करता है कि तेल युक्त मिट्टी या अवशेष जैसे खतरनाक अपशिष्टों का सुरक्षित और जिम्मेदार निपटान किया जाए। इसके लिए उपचार, भंडारण और निपटान सुविधाओं (टीएसडीएफ) के माध्यम से सुरक्षित लैंडफिल विधियों का उपयोग किया जाता है। सभी खतरनाक और गैर–खतरनाक अपशिष्टों का उपचार और पुनः उपयोग पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय, सीपीसीबी और एसपीसीबी के नियमों के अनुसार किया जाता है। बीपीसीएल को अपनी सभी रिफाइनरियों और विपणन इकाइयों के लिए "शून्य अपशिष्ट लैंडफिल प्रमाणन" भी प्राप्त हुआ है। ब्रांड स्वामी के रूप में ईपीआर के तहत ल्यूब्स व्यवसाय यूनिट के माध्यम से 5,551 मीट्रिक टन प्लास्टिक अपशिष्ट एकत्रित कर पुनः संसाधित किया गया।

10.6.5.7 जैव विविधता प्रबंधन: बीपीसीएल का लक्ष्य वृक्षारोपण करके जैव विविधता पर पड़ने वाले प्रभाव को न्यूनतम करना है। वित्त वर्ष 2024–25 में, हमने मियावाकी वनीकरण, बीज बमबारी और पारंपरिक वृक्षारोपण विधियों जैसी तकनीकों का उपयोग करके 1.78 लाख से अधिक पेड़ लगाए। इससे हमारा कुल हरा–भरा क्षेत्र बढ़कर 12,17,784 पेड़ों तक पहुँच गया, जिससे लगभग 25,571 मीट्रिक टन सीओ2 समतुल्य (एमटीसीओ2ई) को कम करने में योगदान मिला। अपने पर्यावरणीय संरक्षण को और सुदृढ़ करने के लिए, हमने खुरई, सागर जिले के कंजिया रेंज में स्थित बीना रिफाइनरी के पास 90 हेक्टेयर की हरित पट्टी विकसित करने के लिए मध्य प्रदेश राज्य वन विभाग के साथ साझेदारी की। यह पहल जुलाई 2024 में ₹1.96 करोड़ के निवेश के साथ शुरू की गई थी, जिसका उपयोग अगले पाँच वर्षों तक इस पहल को बनाए रखने के लिए किया जाएगा।

10.6.5.8 सामाजिक: समावेशी भविष्य के प्रति प्रतिबद्धता: बीपीसीएल एक ऐसा कार्यस्थल बनाने पर जोर देता है जहाँ हर व्यक्ति का सम्मान हो, और विविधता और समान अवसरों को प्रोत्साहन मिले। कंपनी अपने कर्मचारियों के कल्याण और सुरक्षा को सर्वोच्च प्राथमिकता देती है और जिन समुदायों की सेवा

करती है, उनके साथ सक्रिय रूप से जुड़ी रहती है। बीपीसीएल मानवाधिकारों और नैतिक श्रम प्रथाओं का पालन करते हुए समाज के उत्थान के लिए काम करता है। कंपनी ऐसा कार्यस्थल बनाती है जहाँ समावेशिता, विविधता, खुला संवाद और सहयोग को बढ़ावा दिया जाता है। इसके अलावा, बीपीसीएल की प्रतिबद्धता सामुदायिक कल्याण और परोपकारी गतिविधियों तक भी फैली हुई है। इन प्रयासों के माध्यम से कंपनी समाज पर सार्थक और सकारात्मक प्रभाव डालने और संधारणीय विकास में योगदान देने के लिए लगातार कार्य कर रही है।

10.6.5.9 वित्त वर्ष 2024–25 की मुख्य विशेषताएं

क) सभी कर्मचारी और श्रमिक (गैर–स्थायी श्रमिकों सहित) स्वास्थ्य, सुरक्षा उपायों और कौशल उन्नयन पर प्रशिक्षित किए गए।

ख) रिफाइनरियों में बिना किसी दुर्घटना के कुल 125.55 मिलियन मानव–घंटे पूरे किए गए।

ग) कंपनी ने ₹179.37 करोड़ रुपए सीएसआर गतिविधियों पर खर्च किए।

घ) स्वास्थ्य, सुरक्षा, सुरक्षा और पर्यावरण (एचएसएसई) पर 2,553 मानव–घंटों में कुल 2,361 प्रतिभागियों को प्रशिक्षित किया गया।

ङ) सभी स्थायी कर्मचारियों और श्रमिकों को मानवाधिकार मुद्दों और नीतियों पर प्रशिक्षण दिया गया।

च) कर्मचारियों के लिए रिपोर्ट योग्य चोट लगने से समय के नुकसान की आवृत्ति दर (आरएलटीआईएफआर) शून्य रही।

10.6.5.10 कर्मचारी संतुष्टि बढ़ाना (ईएसई): बीपीसीएल में कर्मचारियों के कल्याण के लिए कई महत्वपूर्ण पहलें लागू की गई हैं। 'रोशनी प्लस' कार्यक्रम के तहत कर्मचारियों और उनके परिवार के सदस्यों को गोपनीय मनोवैज्ञानिक परामर्श सेवाएं दी जाती हैं। 'ईएसई' पहल के माध्यम से कार्य–जीवन संतुलन, जागरूकता और स्वस्थ आदतों पर ऑनलाइन एक्टिवलाइफ वेबिनार और ऑफलाइन सेमिनार आयोजित किए जाते हैं, जिनसे 2,500 से अधिक लोग लाभान्वित हुए हैं। 'सहकर्मीमित्र' पहल के तहत 63 कर्मचारियों को भावनात्मक प्राथमिक चिकित्सा प्रदाता के रूप में नियुक्त किया गया है, जो मानसिक स्वास्थ्य जागरूकता को बढ़ावा देते हैं और बीपीसीएल के विभिन्न स्थानों पर सहयोग प्रदान करते हैं। नए सहकर्मी मित्रों को अपने साथियों की सहायता करने के लिए विशेष प्रशिक्षण दिया जाता है।

10.6.5.11 व्यावसायिक स्वास्थ्य एवं सुरक्षा: बीपीसीएल का आदर्श वाक्य "सुरक्षा सर्वप्रथम, सुरक्षा अनिवार्य" सुरक्षा, स्वास्थ्य और पर्यावरण के प्रति उसकी प्रतिबद्धता को दर्शाता है। कंपनी का लक्ष्य शून्य दुर्घटनाएं, प्रभावी हाइड्रोकार्बन नियंत्रण, जोखिमों में कमी और प्रचालनों में निरंतर सुधार हासिल करना है। बीपीसीएल ने विभिन्न प्रचालन स्तरों (प्रचालन स्थल, क्षेत्रीय/मुख्यालय और कॉर्पोरेट स्तर) पर त्रि–स्तरीय स्वास्थ्य, सुरक्षा और पर्यावरण (एचएसई) समितियाँ स्थापित की हैं। ये समितियाँ नियमित रूप से सुरक्षा प्रोटोकॉल की समीक्षा करती हैं, घटनाओं की जाँच करती हैं और सुरक्षा उपायों को बेहतर बनाने के लिए सुधार सुझाती हैं।

क) स्वास्थ्य, सुरक्षा और पर्यावरण (एचएसई) पहल:

- **प्रशिक्षण कार्यक्रम:** बीपीसीएल अपने कर्मचारियों और ठेकेदारों के लिए ओआईएसडी–एसटीडी–154 और अन्य सांविधिक दिशानिर्देशों के अनुसार व्यापक सुरक्षा प्रशिक्षण कार्यक्रम आयोजित करता है। इनमें आग से सुरक्षा, प्राथमिक उपचार, आपातकालीन स्थिति में प्रतिक्रिया और खतरनाक पदार्थों को सुरक्षित रूप से संभालने जैसे विषय शामिल होते हैं। इन कार्यक्रमों का उद्देश्य यह सुनिश्चित करना है कि सभी लोग सुरक्षा मानकों का पालन करने के लिए पूरी तरह तैयार हों।
- **नियमित स्वास्थ्य जांच:** बीपीसीएल समय–समय पर कर्मचारियों के लिए स्वास्थ्य जांच शिविर आयोजित करता है ताकि बीमारियों का समय पर पता लग सके और उनका इलाज किया जा सके।
- **व्यावसायिक स्वास्थ्य केंद्र:** मुख्य प्रचालन स्थलों पर बीपीसीएल ने स्वास्थ्य सेवाएं प्रदान करने और कर्मचारियों की सेहत की निगरानी करने के लिए डॉक्टरों से युक्त स्वास्थ्य केंद्र स्थापित किए हैं।

ख) आपातकालीन तैयारी और प्रतिक्रिया

- **मॉक ड्रिल:** बीपीसीएल आग, गैस रिसाव या प्राकृ

तिक आपदाओं जैसी स्थितियों से निपटने के लिए कर्मचारियों को तैयार करने हेतु नियमित अभ्यास (मॉक ड्रिल) करता है।

- **आपातकालीन प्रतिक्रिया दलः** कंपनी ने प्रशिक्षित दल बनाए हैं जो किसी भी आपात स्थिति में तुरंत कार्रवाई करने के लिए तैयार रहते हैं। उन्हें समय–समय पर प्रशिक्षण और नवीनतम तकनीक की जानकारी दी जाती है।
- **सुरक्षा ऑडिट और निरीक्षणः** संभावित खतरों की पहचान और सुधार के लिए बीपीसीएल नियमित रूप से आंतरिक और बाहरी सुरक्षा जांच करता है।
- **जोखिम आकलनः** कंपनी संभावित सुरक्षा जोखिमों को पहचानने और कम करने के लिए हैज़ॉप, एचआईआरए और क्यूआरए जैसी आधुनिक तकनीकों का उपयोग करती है।

ग) जागरूकता और संचार

- सुरक्षा बुलेटिन और अलर्ट
- सुरक्षा अभियान
- सुरक्षा जागरूकता सप्ताह

10.6.6 एचपीसीएलः एचपीसीएल अपनी रणनीतियों और व्यावसायिक कामकाज में ईएसजी कारकों को शामिल कर रहा है ताकि प्रतिस्पर्धा में बढ़त मिले, निवेशक आकर्षित हों, लचीला व्यावसायिक मॉडल बने और एक टिकाऊ व समावेशी वैश्विक अर्थव्यवस्था में योगदान दिया जा सके। कंपनी अपने कामकाज में सर्वोत्तम तरीकों को अपनाकर अपने ईएसजी लक्ष्यों को हासिल करने के लिए पूरी तरह प्रतिबद्ध है।

इसके अलावा, एचपीसीएल अपने ईएसजी निष्पादन की तुलना देश और विदेश की अन्य कंपनियों से लगातार करती रहती है ताकि सुधार के नए अवसर खोजे जा सकें।

10.6.6.1 ईएसजी पहलः

क) ईएसजी एकीकरण और रणनीतिः

- कंपनी की रणनीतियों और रोज़मर्रा के कामकाज में ईएसजी सिद्धांत शामिल किए गए हैं।
- इसका उद्देश्य प्रतिस्पर्धा में बढ़त हासिल करना, निवेशकों को आकर्षित करना, मजबूती बनाए रखना और टिकाऊ विकास को बढ़ावा देना है।

ख) ईएसजी निष्पादन को सुदृढ़ करनाः

- सीडीपी, एसएंडपी, इकोवैडिस सहित वैश्विक ईएसजी रेटिंग में भागीदारी।
- सीडीपी जलवायु स्कोर 2024 में 'सी' (2023) और 'डी' (2022) से सुधरकर 'बी' (प्रबंधन) हो गया।
- 2024 में कंपनी ने सीडीपी जल सुरक्षा रेटिंग में 'बी–' ग्रेड हासिल किया।

ग) ईएसजी भौतिकता मूल्यांकनः

- वर्ष 2024 में नवीनतम भौतिकता मूल्यांकन किया गया।
- जीआरआई–11, एसएएसबी, आईपीआईसीए मानकों के अनुरूप।
- समकक्षों के साथ बेंचमार्क किया गया तथा 30 सरकारी विनियमों और निवेशक रिपोर्टों से जानकारी ली गई।

घ) ईएसजी जोखिम प्रबंधनः

- ईएसजी जोखिमों को उद्यम जोखिम प्रबंधन (ईआरएम) ढांचे में शामिल किया गया।
- सीओएसओ ईआरएम 2017 और आईएसओ 31000:2018 के अनुरूप।
- प्रचालन, विनियामक, वित्तीय, रणनीतिक, स्थिरता, साइबर सुरक्षा और व्यवसाय निरंतरता जोखिमों को शामिल करता है।

ङ.) पर्यावरणीय स्थिरताः

- वर्ष 2040 तक नेट जीरो (स्कोप 1 और 2) लक्ष्य।
- स्थापित नवीकरणीय क्षमताः 224.33 मेगावाट (सौरः 123.43 मेगावाट; पवनः 100.9 मेगावाट)।
- 110 विपणन स्थान (एलपीजी एसबीयू में 36 और एसओडी एसबीयू में 74) डीजी सेटों में 100% बायोडीजल का उपयोग करते हैं।
- 94% खुदरा बिक्री केंद्र सौर ऊर्जा से प्रचालित।
- सीएनजी सुविधाओं के साथ 2,038 आउटलेट।
- 5,976 खुदरा बिक्री केंद्र पर ईवी चार्जिंग सुविधाएं।
- विशाख रिफाइनरी में प्रायोगिक ग्रीन हाइड्रोजन संयंत्र चालू किया गया।

- सीआईआई ग्रीनको रेटिंग चुनने वाला पहला पीएसयू; वित्त वर्ष 2025 में 84 स्थान।
- एचएसई में आईएसओ 9001, 14001, 45001 (एकीकृत प्रबंधन प्रणाली) लागू किया गया; ऊर्जा प्रबंधन के लिए आईएसओ–50001.

च) सामाजिक स्थिरता:

- सुरक्षा प्रशिक्षण के समझौता–ज्ञापन लक्ष्य को पार किया गया।
- 1,472 अधिकारियों ने एनएससी–एचपीसीएल सुरक्षा योग्यता परीक्षा (10 मॉड्यूल, 40+ सुरक्षा मानक) पूरी की।
- वित्त वर्ष 2025 में ₹87.35 करोड़ का सीएसआर व्यय, जिससे 40 लाख से अधिक लोग लाभान्वित हुए।
- 11 आकांक्षी जिलों में ₹19.08 करोड़ सीएसआर व्यय।
- 10.9% महिला कार्यबल; वित्त वर्ष 2025 में 14.37% महिला नियुक्तियां।

छ) शासन एवं पारदर्शिता:

- मानवाधिकार नीति और संधारणीय खरीद नीति (आईएसओ 20400) सार्वजनिक डोमेन में डाली गई है।
- मजबूत शिकायत निवारण तंत्र; वित्त वर्ष 2025 में कोई डेटा उल्लंघन नहीं हुआ।
- 2022–23 से सेबी के दिशानिर्देशों के अनुसार बीआरएसआर प्रकाशित; 2023–24 की रिपोर्ट तीसरे पक्ष (आईएसएई 3000) द्वारा सुनिश्चित।
- वित्त वर्ष 2011–12 से जीआरआई–आधारित स्थिरता रिपोर्टिंग; ईएसजी प्रकटीकरण के लिए कई पुरस्कार।
- एकीकृत रिपोर्टिंग फ्रेमवर्क पर आधारित वित्त वर्ष 24 के लिए एकीकृत वार्षिक रिपोर्ट जारी की गई।

10.6.7 एमआरपीएल: एमआरपीएल की ईएसजी निष्पादन की मुख्य विशेषताएं:

क. पर्यावरण

क) नवीकरणीय ऊर्जा से खपत: 2,04,225 जीजे और ऊर्जा बचत: 16,21,338 जीजे।

ख) प्रति मीट्रिक टन प्रोसेस किए गए कच्चे तेल पर हमारी समग्र ग्रीनहाउस गैस उत्सर्जन तीव्रता (दायरा–1,2) में पिछले वित्तीय वर्ष की तुलना में 5.9% की कमी हुई। संयंत्रों के माध्यम से कार्बन पृथक्करण: 5800 टीसीओ2 प्रति वर्ष।

ग) रोपे गए पौधे: 5762 और कुल 699 एकड़ हरित पट्टी

घ) उत्पन्न अपशिष्ट: 15,245 मीट्रिक टन, निपटाया/रीसाइकल किया गया अपशिष्ट: 11,978 मीट्रिक टन तथा 41 मीट्रिक टन कृमि खाद का संग्रहण किया गया।

ङ) जल खपत: 2,21,27,450 घन मीटर जिसमें नदी, डिसल और उपचारित सीवेज शामिल है।

च) जल खपत (प्रति मीट्रिक टन प्रोसेस किया गया कच्चा तेल) में पिछले वित्तीय वर्ष की तुलना में 15.2% की कमी।

ख. सामाजिक

क) कुल सीएसआर व्यय: 29.08 करोड़ रुपए और लाभार्थियों की संख्या: लगभग 3.8 लाख।

ख) चोट लगने के कारण समय हानि की आवृत्ति दर (एलटीआईएफआर) (प्रति दस लाख व्यक्ति घंटे काम): कर्मचारियों के लिए शून्य।

ग) कुल खरीद का 54.82% एमएसएमई से किया गया, जिसमें से 21.78% सीधे भारत के भीतर की गई। लगभग 1% अ.जा./अ.ज.जा. उद्यमियों के स्वामित्व वाले एमएसई से और 3.9% महिला उद्यमियों के स्वामित्व वाले एमएसई से की गई।

ग. शासन:

प्रतिस्पर्धा विरोधी आचरण तथा रिश्वतखोरी/भ्रष्टाचार के आरोपों के संबंध में शून्य शिकायतें।

10.6.7.1 भौतिकता विश्लेषण: हितधारकों की अपेक्षाओं को समझने और उन्हें प्राथमिकता देने के लिए, एमआरपीएल ने अप्रैल 2024 में एक व्यापक भौतिकता मूल्यांकन किया, जिसमें कंपनी और उसके हितधारकों के लिए सबसे महत्वपूर्ण पर्यावरणीय, सामाजिक और प्रशासनिक (ईएसजी) विषयों की पहचान और मूल्यांकन किया गया। पहचाने गए उच्च प्राथमिकता

वाले भौतिक विषयों में उत्सर्जन प्रबंधन, जल प्रबंधन, अपशिष्ट प्रबंधन और चक्रीयता, जलवायु परिवर्तन और अनुकूलन, मानव पूंजी प्रबंधन, कॉर्पोरेट प्रशासन, व्यावसायिक नैतिकता, जोखिम प्रबंधन, ऊर्जा प्रबंधन और दक्षता, व्यावसायिक स्वास्थ्य और सुरक्षा शामिल हैं।

10.6.7.2 पर्यावरण प्रबंधनः एमआरपीएल ने ऊर्जा प्रबंधन, ग्रीनहाउस गैस (जीएचजी) उत्सर्जन में कमी, जल संरक्षण, अपशिष्ट प्रबंधन और जैव विविधता संरक्षण जैसे महत्वपूर्ण क्षेत्रों में पहलों को लागू किया है।

- ऊर्जा प्रबंधन के प्रयास हमारी सभी सुविधाओं में दक्षता में सुधार लाने और सौर ऊर्जा जैसे नवीकरणीय ऊर्जा स्रोतों को शामिल करने पर केंद्रित रहे, ताकि ऊर्जा की तीव्रता और कार्बन उत्सर्जन को कम किया जा सके, तथा 2038 तक हमारे नेट–जीरो उत्सर्जन लक्ष्य को प्राप्त करने में सहायता मिल सके।
- जल संरक्षण हमारी प्रमुख प्राथमिकता है। इसमें उन्नत पुनर्चक्रण प्रणालियाँ, विलवणीकरण संयंत्र और अनुकूलित अपशिष्ट प्रबंधन शामिल हैं, जो पारिस्थितिकी तंत्र की सुरक्षा करते हुए जल का जिम्मेदाराना उपयोग सुनिश्चित करते हैं। अपशिष्ट प्रबंधन में हम वृत्तीय अर्थव्यवस्था के सिद्धांतों का पालन करते हैं, जिसमें अपशिष्ट तेल की पुनर्प्राप्ति और वर्मी–कम्पोस्टिंग जैसी पहलों के माध्यम से पुनर्चक्रण, पुनः उपयोग और जिम्मेदार निपटान पर ध्यान दिया जाता है।
- हरित पट्टी विकास, वनरोपण और आवास पुनर्स्थापन पहलों के माध्यम से हमारे निरंतर प्रयासों से स्थानीय पारिस्थितिकी तंत्र और सामुदायिक कल्याण में उल्लेखनीय वृद्धि हुई है।

10.6.7.3 सामाजिक उत्तरदायित्वः एमआरपीएल अपने प्रचालन और समुदाय में भागीदारी के माध्यम से सकारात्मक और समावेशी सामाजिक प्रभाव बढ़ाता है। कंपनी अपने कर्मचारियों, हितधारकों और उन समुदायों के प्रति जिम्मेदार है जिनमें वह काम करता है। कर्मचारियों के लिए, एमआरपीएल महिला अधिकारियों के नेतृत्व विकास कार्यक्रम और प्रबंधन प्रशिक्षण जैसी पहलों के जरिए स्वास्थ्य, सुरक्षा और करियर विकास को प्राथमिकता देता है।

एमआरपीएल स्थानीय स्रोतों से खरीद को बढ़ावा देता है, आपूर्तिकर्ताओं के लिए क्षमता निर्माण सत्र आयोजित करता है और कड़े नैतिक व टिकाऊ मानकों का पालन करके जिम्मेदार मूल्य श्रृंखला सुनिश्चित करता है। ग्राहकों और अन्य हितधारकों के साथ जुड़ाव कंपनी की रणनीति का आधार है, जिसमें मजबूत शिकायत निवारण, उत्पाद सुरक्षा और सभी संवादों में पारदर्शिता सुनिश्चित की जाती है।

- एमआरपीएल ने चार विक्रेता बैठकें आयोजित कीं। एमआरपीएल ने एमएसएमई सम्मेलनों में भी भाग लिया, जो क्रमशः एफकेसीसीआई, सीआईआई और कासिया के सहयोग से आयोजित किए गए थे। इसके अतिरिक्त, एमआरपीएल ने वर्ष के दौरान सीआईआई एमएसएमई नेतृत्व शिखर सम्मेलन और बिजनेस नेटवर्क इंटरनेशनल (बीएनआई) सम्मेलन में भी भाग लिया। इसके अलावा, एमआरपीएल ने चेन्नई पेट्रोलियम कॉर्पोरेशन लिमिटेड (सीपीसीएल) के सहयोग से एक विशेष विक्रेता विकास सम्मेलन में भी भाग लिया। इन जागरूकता कार्यक्रमों के अंतर्गत एमएसएमई विक्रेताओं सहित 550 से अधिक विक्रेताओं को शामिल किया गया है।
- एमएसएमई से खरीदः खरीद का 54.82%
- अ.जा./अ.ज.जा. एमएसएमई से खरीदः कुल खरीद का 1%
- महिला एमएसएमई से खरीदः कुल खरीद का 3.9:.

10.6.7.4 शासन और नैतिक नेतृत्वः हमारी शासन व्यवस्था सक्रिय जोखिम प्रबंधन, जिम्मेदार नेतृत्व और नैतिक प्रचालन पर ध्यान देती है। व्हिसलब्लोअर नीति, सीएसआर और एसडी नीति तथा एकीकृत प्रबंधन प्रणाली जैसी नीतियाँ संगठन के सभी स्तरों पर जवाबदेही मजबूत करती हैं और स्थिरता को बढ़ावा देती हैं। निष्पादन–आधारित मूल्यांकन और पारदर्शी रिपोर्टिंग हितधारकों का विश्वास बढ़ाती हैं और निरंतर सुधार को प्रोत्साहित करती हैं। व्यापक उद्यम–व्यापी जोखिम प्रबंधन (ईआरएम) नीति महत्वपूर्ण जोखिमों का समाधान करती है और प्रभावी शमन सुनिश्चित करती है। हमारी शासन व्यवस्था हितधारकों के हितों की रक्षा, निर्णय लेने में स्थिरता और लचीले एवं टिकाऊ भविष्य के निर्माण के लिए नैतिक नेतृत्व को

बढ़ावा देती है।

10.6.7.5 **बीआरएसआर रिपोर्टिंग:** सेबी के दिशानिर्देशों के तहत, एमआरपीएल वित्त वर्ष 2022–23 से बीआरएसआर पर रिपोर्टिंग कर रहा है।

10.6.8 **सीपीसीएल:** सीपीसीएल पर्यावरण, सामाजिक और प्रशासनिक (ईएसजी) सिद्धांतों के प्रति प्रतिबद्ध है, जिन्हें कंपनी की स्थिरता और नैतिक प्रभाव को आंकने के लिए अपनाया जाता है। भारतीय प्रतिभूति एवं विनिमय बोर्ड (सेबी) द्वारा अनिवार्य व्यावसायिक उत्तरदायित्व और स्थिरता रिपोर्टिंग (बीआरएसआर) ढांचा भारतीय कंपनियों को उनके ईएसजी निष्पादन का खुलासा करने में मार्गदर्शन प्रदान करता है।

सीपीसीएल के ईएसजी निष्पादन की मुख्य विशेषताएं:

क. पर्यावरण

क) स्टार ऑफ द इंडस्ट्री अवार्ड – वर्ष का अभिनव उत्पाद और वर्ष का कुशल रिफाइनर – ग्लोबल रिफाइनिंग एवं पेट्रोकेमिकल कांग्रेस।

ख) कॉर्पोरेट कार्यालय में 22 पवन चक्कियाँ, 17.6 मेगावाट और 6 किलोवाट रूफटॉप पर पवन चक्कियाँ स्थापित की गईं।

ग) इमारतों और रिफाइनरी परिसर में छत पर 2.3 मेगावाट ग्राउंड माउंटेड और रूफ टॉप सौर पैनल लगाए गए।

घ) मीठे पानी पर शून्य निर्भरता, 5 एमजीडी एशिया का पहला शहरी सीवेज संयंत्र में सुधार।

ङ) वित्त वर्ष 2024–25 में 6.6 एमजीडी से 5.4 एमजीडी तक न्यूनतम जल खपत।

च) स्वच्छ ईंधन के उपयोग में लगभग 20% की वृद्धि । 87.4 – अब तक का सबसे कम ऊर्जा तीव्रता सूचकांक। अब तक का सबसे कम ईंधन और हानि 8.51%.

छ) पिछले 5 वर्षों के दौरान लगभग 15,000 पेड़ लगाए गए और 176 एकड़ हरित पट्टी के रूप में स्थापित किया गया।

ख. सामाजिक:

क) राष्ट्रीय मानव संसाधन उत्कृष्टता पुरस्कार 2024 और गुणवत्ता नेतृत्व पुरस्कार 2024.

ख) 65.58 मिलियन सुरक्षित मानव घंटे

ग) 2012 दुर्घटना–मुक्त दिन

घ) सीएसआर व्यय 49.6 करोड़ रुपए

ङ) एमएसएमई से 56.46% खरीद, अ.जा./अ.ज.जा. के स्वामित्व वाले उद्यमों से 6.74% खरीद और महिला स्वामित्व वाले उद्यमों से 3.5% खरीद।

ग. शासन:

क) जनहित प्रकटीकरण और मुखबिर संरक्षण संकल्प (पीआईडीपीआई) का कार्यान्वयन।

ख) महिला कर्मचारियों की शिकायतों के समाधान के लिए सक्रिय रूप से कार्यरत महिला प्रकोष्ठ।

ग) डिजिटल सुरक्षा बढ़ाने के लिए साइबर सुरक्षा प्रचालन केंद्र का शुभारंभ किया गया।

घ) सीवीसी दिशानिर्देशों के अनुसार सत्यनिष्ठा समझौते का 100% अनुपालन।

ङ) कोई निवेशक शिकायत और लोक शिकायत लंबित नहीं।

सीपीसीएल अपने निवेशकों, कर्मचारियों, ग्राहकों और समुदायों सहित सभी हितधारकों के साथ सक्रिय रूप से जुड़ता है ताकि उनकी ईएसजी संबंधी समस्याओं और अपेक्षाओं को समझा जा सके और उनका समाधान किया जा सके। कंपनी ने अपनी मूल कंपनी आईओसीएल की योजना के अनुरूप 2046 तक नेट–जीरो उत्सर्जन प्राप्त करने के लिए एक महत्वाकांक्षी योजना बनाई है। इस रोडमैप में नवीकरणीय ऊर्जा का उपयोग बढ़ाना, प्राकृतिक गैस जैसे स्वच्छ ईंधनों का अधिकतम उपयोग और विभिन्न ऊर्जा संरक्षण उपाय शामिल हैं। इसके अलावा, सीपीसीएल अपने हरित क्षेत्र विकास का विस्तार करके भविष्य के उत्सर्जन की भरपाई करने का लक्ष्य रखता है। हरित हाइड्रोजन और नवीकरणीय ऊर्जा की हिस्सेदारी बढ़ाकर, सीपीसीएल अपने कार्बन उत्सर्जन को कम करने और एक स्थायी भविष्य में योगदान देने के लिए प्रतिबद्ध है।

10.6.9 **एनआरएल:** एनआरएल 2023 से स्वेच्छा से व्यावसायिक उत्तरदायित्व और स्थिरता रिपोर्ट (बीआरएसआर) तैयार कर रहा है। यह रिपोर्ट सेबी और एमसीए की सिफारिशों के अनुसार, राष्ट्रीय उत्तरदायी व्यावसायिक

आचरण दिशानिर्देश (एनजीआरबीसी) पर आधारित है और पर्यावरण, सामाजिक और शासन (ईएसजी) पहलुओं की जानकारी देती है। बीआरएसआर का उद्देश्य स्थिरता रिपोर्टिंग को वित्तीय रिपोर्टिंग के समान महत्व देना है।

अब कंपनियों को "निवेश ग्रेड" ईएसजी दर्जा प्राप्त करने के लिए समय पर, सही, पूर्ण और ऑडिट योग्य डेटा एकत्र करना होगा। बीआरएसआर ढांचा एनआरएल के व्यवसायों की स्थिरता और संसाधन उपयोग के पहलुओं की निगरानी और मूल्यांकन में मदद करता है।

एक ज़िम्मेदार कंपनी के रूप में, एनआरएल ने पारदर्शी रिपोर्टिंग और जिम्मेदार विकास सुनिश्चित करने के लिए स्वेच्छा से बीआरएसआर रिपोर्टिंग को अपनाया है। यह व्यावसायिक उत्तरदायित्व और स्थिरता रिपोर्ट (बीआरएसआर) एनआरएल की स्थिरता यात्रा और निष्पादन का संक्षिप्त विवरण प्रस्तुत करती है।

वर्ष 2038 तक नेट ज़ीरो कार्बन उत्सर्जन का लक्ष्य रखते हुए, एनआरएल ने कई तकनीकों को अपनाया है। पर्यावरण के क्षेत्र में, कंपनी ने बांस पौधा लगाने की पहल शुरू की है, जो कार्बन पृथक्करण और स्थायी वानिकी प्रथाओं में मदद करती है। इसके साथ ही, एनआरएल अपने कार्बन उत्सर्जन को कम करने के लिए नवीकरणीय ऊर्जा परियोजनाओं में निवेश कर रहा है। कागज रहित प्रचालन और 24/7 जल निपटान अनुबंध जैसी पहल यह सुनिश्चित करती हैं कि अपशिष्ट का प्रबंधन जिम्मेदारी से हो और आसपास के पारिस्थितिक तंत्र की सुरक्षा बनी रहे। डिजिटल मोर्चे पर, सेंसर आधारित निगरानी, एआई आधारित सीसीटीवी, स्मार्ट ट्रक पार्किंग, डिजिटल फायर और सुरक्षा कमांड सेंटर जैसी तकनीकों का इस्तेमाल परिवर्तन यात्रा का समर्थन करने के लिए किया गया है। ये पहल स्थायी और कुशल प्रचालन में कंपनी की प्रतिबद्धता को दिखाती हैं और प्रौद्योगिकी के महत्व को रेखांकित करती हैं।

सामाजिक क्षेत्र में, एनआरएल अपने कर्मचारियों और उनके परिवारों के कल्याण पर ध्यान देता है। कंपनी ने ठेकेदारों के बच्चों के लिए शिशुगृह बनाए हैं, ठेका श्रमिकों को छात्रवृत्तियाँ प्रदान की हैं, और कर्मचारियों के लिए निःशुल्क वार्षिक स्वास्थ्य जांच की सुविधा उपलब्ध कराई है। ये पहल सहायक और समावेशी कार्य वातावरण को बढ़ावा देती हैं।

हमारी शासन पद्धतियाँ निष्पक्षता और सामाजिक–आर्थिक समता पर आधारित हैं। एनआरएल यह सुनिश्चित करता है कि कर्मचारियों को कानून द्वारा निर्धारित न्यूनतम वेतन से अधिक वेतन मिले और समुदाय के आर्थिक विकास को बढ़ावा मिले।

संक्षेप में, नवाचार–केंद्रित स्थिरता एनआरएल की मुख्य कॉर्पोरेट रणनीति का हिस्सा है, जिसमें पर्यावरण, सामाजिक और शासन (ईएसजी) प्रथाओं के लिए एक समग्र दृष्टिकोण शामिल है।

10.6.10 बामर लॉरी एंड कंपनी लिमिटेडः बामर लॉरी के स्थिरता के लक्ष्य इसके कुल व्यावसायिक लक्ष्यों के साथ मेल खाते हैं और इसका स्थिरता रोडमैप सभी हितधारकों के हितों की रक्षा पर केंद्रित है। कंपनी अपने प्रक्रियाओं और प्रतिष्ठानों में कार्बन उत्सर्जन कम करने और ग्राहकों के लिए ऐसे उत्पाद व समाधान बनाने में निवेश कर रही है, जिससे वे अपने कार्बन उत्सर्जन को घटा सकें। इसके तहत ऊर्जा प्रबंधन, उत्सर्जन प्रबंधन, जल प्रबंधन, अपशिष्ट प्रबंधन, कर्मचारी स्वास्थ्य और सुरक्षा, सामुदायिक विकास और कॉर्पोरेट प्रशासन को बेहतर बनाने के लिए कई पहल की गई हैं। बामर लॉरी ने वित्त वर्ष 2022–23 से अपनी वार्षिक रिपोर्ट में व्यावसायिक स्थिरता और उत्तरदायित्व रिपोर्ट (बीआरएसआर) प्रकाशित करना शुरू किया, जो कंपनी की वेबसाइट पर उपलब्ध है।

बामर लॉरी एंड कंपनी लिमिटेड के ईएसजी निष्पादन की मुख्य विशेषताएं:

क. पर्यावरण

क) नवीकरणीय ऊर्जा उत्पादन का 4% हिस्सा।

ख) सभी बीएल संयंत्रों और यूनिटों के लिए 100% ऊर्जा कुशल प्रकाश व्यवस्था।

ग) 30% इनपुट सामग्री का स्रोत स्थायी है।

घ) विस्तारित उत्पादक उत्तरदायित्व (ईपीआर) के अंतर्गत 1367.9 मीट्रिक टन प्लास्टिक का निपटान किया गया।

ङ) जीएचजी उत्सर्जनः कार्यक्षेत्र 1% 8609.37 एमओसीओ2ई और कार्यक्षेत्र 2% 11798.86 एमओसीओ2ई।

ख. सामाजिकः

₹ 4.28 करोड़ सीएसआर खर्च और 19730 सीएसआर लाभार्थियों की संख्या।

ग. शासनः

क) 82 सतर्कता जागरूकता सत्र

ख) 100% ग्राहक शिकायत बंद (अनंतिम)

ग) भ्रष्टाचार से संबंधित जोखिमों के लिए 100% प्रचालन स्थल का मूल्यांकन किया गया।

घ) सभी बोर्ड स्तरीय समितियों का गठन कंपनी अधिनियम 2013 के लागू प्रावधानों के अनुसार किया जाता है। सेबी विनियम और डीपीई दिशानिर्देश।

ङ) सार्वजनिक हित प्रकटीकरण और मुखबिर संरक्षण संकल्प (पीआईडीपीआई) को बामर लॉरी एंड कंपनी लिमिटेड में लागू किया गया है।

कार्बन उत्सर्जन को कम करने के लिए, कंपनी ने अपनी रणनीतियों में पारंपरिक ऊर्जा स्रोतों की जगह नवीकरणीय ऊर्जा का उपयोग, ऊर्जा–कुशल विनिर्माण प्रक्रियाएँ, वीएफडी (परिवर्तनीय आवृत्ति ड्राइव), मोटर, लाइट और भवन अपनाना, तथा कार्बन समायोजन विनिर्माण प्रक्रियाओं में निवेश शामिल किया है। स्थायित्व नीति के तहत, कंपनी ने अब तक 1,346 किलोवाट क्षमता वाला सौर ऊर्जा संयंत्र स्थापित किया है। इससे जीवाश्म ईंधन पर निर्भरता कम होती है और नवीकरणीय ऊर्जा का उपयोग बढ़ाकर हमारी ऊर्जा आवश्यकताओं को पूरा किया जा सकता है। भारत के 4 एसबीयू–औद्योगिक पैकेजिंग संयंत्रों ने एलडीओ की जगह पीएनजी/एलपीजी का उपयोग शुरू कर दिया है।

जल उपयोग कम करने और अपव्यय घटाने के लिए मुख्य कदमों में कम पानी वाले उपकरणों का उपयोग, जल–मुक्त शौचालय, अपशिष्ट जल की रीसाइकलिंग, अपशिष्ट जल संयंत्रों के माध्यम से उपचार और वर्षा जल संचयन प्रणालियों का कार्यान्वयन शामिल हैं। अपशिष्ट जल का उपचार और निपटान सभी वैधानिक नियमों के अनुसार किया जाता है। बामर लॉरी वायु उत्सर्जन मानकों का भी सख्ती से पालन करता है, जो पर्यावरण संरक्षण अधिनियम, 1986 में निर्धारित हैं।

खतरनाक कचरे का निपटान खतरनाक और अन्य अपशिष्ट (प्रबंधन एवं सीमा पार संचलन) नियम, 2016 के अनुसार सख्ती से किया जाता है। कंपनी के सभी संयंत्र और प्रमुख प्रतिष्ठान पर्यावरण मानकों आईएसओ 14001 के अनुसार प्रमाणित हैं। कंपनी अपने संगठन में एकल–उपयोग वाले प्लास्टिक के उपयोग को कम करने पर लगातार ध्यान दे रही है। यह उत्पादों में प्लास्टिक के उपयोग को घटाने और स्थायी विकल्पों को अपनाने के लिए नियमित रूप से हितधारकों के साथ मिलकर काम करती है। बीआरएसआर प्रकाशित करने के अलावा, कंपनी के पास एक ईएसजी समिति भी है, जिसमें प्रचालन समिति के सदस्य वरिष्ठ अधिकारी शामिल हैं।

10.6.11 ईआईएलः ईआईएल का नया विजन है "एक संधारणीय भविष्य के लिए संपूर्ण ऊर्जा समाधान प्रदान करने वाला वैश्विक कंपनी बनना।" यह विजन कंपनी के मूल सिद्धांतों को दर्शाता है और विभिन्न कार्यों में परिलक्षित होता है, जैसे हरित हाइड्रोजन और संधारणीय विमानन ईंधन (एसएएफ) आदि जैसे संधारणीय ऊर्जा क्षेत्रों में नवाचार। ईआईएल ने कई संधारणीय इंजीनियरिंग समाधान प्रस्तुत किए हैं, जिनमें अपशिष्ट रीसाइकलिंग और शून्य तरल निर्वहन समाधान, अभिनव जल और अपशिष्ट जल एकीकृत समाधान, मियावाकी वनों सहित जैव विविधता सुधार परियोजनाएं, जल और कार्बन उत्सर्जन का अनुमान और कमी, कार्बन अवशोषण, अपशिष्ट से ऊर्जा समाधान, अपशिष्ट गैस न्यूनीकरण और फ्लेयर उपशमन, नगरपालिका और औद्योगिक अपशिष्ट प्रबंधन, जल और स्वच्छता सहित संधारणीय बुनियादी ढांचा विकास परियोजनाएं, पर्यावरण प्रभाव आकलन अध्ययन शामिल हैं। इन पहलों के माध्यम से ईआईएल एक संधारणीय और जिम्मेदार भविष्य सुनिश्चित कर रहा है।

ईएसजीः ईआईएल ने कार्यस्थल पर स्थायी प्रक्रियाओं को अपनाने के लिए कई आंतरिक पहल की हैं। इनमें सौर ऊर्जा आधारित पीवी संयंत्रों की स्थापना, ईवी चार्जिंग स्टेशन लगाना, गुरुग्राम कार्यालय परिसर में ई–बाइक और ई–कार्ट का उपयोग, नलों पर पानी बचाने वाले नोजल लगाना, कर्मचारियों को कागज़ के कपों के बजाय धोने योग्य चाय के मग उपलब्ध

कराना शामिल हैं। इन पहलों का दीर्घकालिक प्रभाव संगठन के कार्बन उत्सर्जन को कम करने में होगा। वर्ष 2024–25 में, ईआईएल ने भारत भर के कार्यालयों में लगभग 297 किलोवाट के सौर पैनल भी चालू किए हैं।

ईआईएल ने राष्ट्रीय डीकार्बोनाइजेशन अभियान शुरू किया है और 2035 तक नेट जीरो कार्बन उत्सर्जन वाली कंपनी बनने के लिए अपने प्रयास तेज कर दिए हैं। कंपनी बहुआयामी रणनीति अपना रही है और अपने स्तर पर तथा भारत के प्रमुख संस्थानों के सहयोग से अत्याधुनिक कम कार्बन उत्सर्जन वाली प्रौद्योगिकियाँ विकसित कर रही है। उद्योगों में सबसे बड़ी ईएसजी चुनौतियों में से एक स्थिरता की संस्कृति अपनाना है, जिसे ईआईएल ने संसाधन संरक्षण के लिए 3 सिद्धांत (कम करें, पुनः उपयोग करें और पुर्नःचक्रण करें) अपनाकर पानी और बिजली की खपत कम करने के लिए कई पहल के माध्यम से पूरा किया है। इसके अलावा, डिजिटल तकनीकों को अपनाकर कागज का उपयोग भी धीरे–धीरे कम किया गया है। हरित पर्यावरण को बढ़ावा देने के लिए, ईआईएल ने अपने गुरुग्राम कार्यालय परिसर में मियावाकी जंगल विकसित किया। कंपनी की कॉर्पोरेट सामाजिक जिम्मेदारी (सीएसआर) नीति समुदायों के समावेशी विकास और पर्यावरण प्रबंधन के माध्यम से उनके उत्थान के लिए समर्पित है। ईआईएल अपनी सीएसआर पहलों को राष्ट्रीय प्राथमिकताओं के साथ मिलाकर देश के सामाजिक बुनियादी ढांचे को स्थायी रूप से सुधारने के लिए प्रतिबद्ध है।

बीआरएसआरः सेबी (सूचीबद्धता देयताएं एवं प्रकटीकरण अपेक्षाएं) विनियम, 2015 के अनुसार, शीर्ष 1000 सूचीबद्ध कंपनियों को व्यावसायिक उत्तरदायित्व एवं स्थायित्व रिपोर्ट (बीआरएसआर) प्रकाशित करना अनिवार्य है। ईआईएल, एक सूचीबद्ध कंपनी होने के नाते, उपर्युक्त श्रेणी में आती है और सेबी के नए रिपोर्टिंग प्रारूप में व्यावसायिक उत्तरदायित्व एवं स्थायित्व रिपोर्ट प्रदान करती रही है, जो 'उत्तरदायी व्यावसायिक आचरण पर राष्ट्रीय दिशानिर्देशों' के सिद्धांतों के अनुरूप कंपनी के निष्पादन को दर्शाती है। इससे हितधारकों को कंपनी की पर्यावरणीय, सामाजिक और प्रशासनिक पहलों की जानकारी मिलती है और यह वार्षिक रिपोर्ट का एक भाग बनती है।

10.6.12 ओएनजीसी विदेशः ओएनजीसी विदेश लोगों, पर्यावरण, समुदायों और भौतिक संपत्तियों की सुरक्षा सुनिश्चित करने हेतु सुरक्षित प्रचालन सुनिश्चित करने का प्रयास करता है। कंपनी की क्यूएचएसई प्रबंधन प्रणाली आईएसओ 9001:2015, आईएसओ 14001:2015 और आईएसओ 45001:2018 प्रमाणित है। इसके अलावा, कंपनी कम कार्बन ऊर्जा वाले भविष्य की ओर बढ़ने के लिए कई उपाय भी कर रही है। कंपनी की मौजूदा परियोजनाओं में उत्सर्जन को कम करने के लिए वर्तमान में किए जा रहे कुछ उपाय इस प्रकार हैं:

क) सीपीओ–5, कोलंबियाः

- मारिपोसा कूप पर माइक्रो गैस टरबाइन (एमजीटी) की स्थापनाः मारिपोसा क्षेत्र में फ्लेयर गैस में कमी और कैप्टिव विद्युत उत्पादन के लिए पायलट आधार पर "नई प्रौद्योगिकी प्रेरण" के रूप में 65 किलोवाट प्राकृतिक गैस आधारित दो माइक्रो टरबाइन स्थापित किए गए।

ख) एसीजी, अज़रबैजानः

- ईंधन गैस रिकवरी यूनिट (एफजीआरयू) की शुरुआत के कारण सीओ$_2$ उत्सर्जन में उल्लेखनीय कमी आई है।
- संगाचल टर्मिनल पर बिजली की खपत को गैस टर्बाइन आधारित उत्पादन से सौर ऊर्जा आधारित उत्पादन में बदलने का कार्य चल रहा है। इससे उत्सर्जन में लगभग 260–300 केटीई/वर्ष की कमी आएगी।

ग) लोअर ज़ाकुम, यूएईः

निचले जाकुम क्षेत्र में जाकुम वेस्ट गैस अंतःक्षेपण सुविधाओं में गैस अंतःक्षेपण कंप्रेसर दक्षता में सुधार करके ~9.15 कि.टनसीओ2 समतुल्य/वर्ष में कमी।

वर्ष 2025 के अंत तक अपतटीय विद्युत आवश्यकता के लिए स्वच्छ ऊर्जा (सौर + परमाणु) का उपयोग।

घ) रोवुमा क्षेत्र–1, मोजाम्बिकः रोवुमा क्षेत्र–1, मोजाम्बिक परियोजना में निम्नलिखित कार्बन उत्सर्जन न्यूनीकरण

परियोजनाओं की योजना बनाई गई है/कार्यान्वयन किया जा रहा है:

- गैस टर्बाइन जनरेटर (जीटीजी) मॉडल बदलना: 8 × जीई फ्रेम 6B डीएलएन (तापीय दक्षता ~33%) को 6 × सिमेन्स एसजीटी800 डीएलई (तापीय दक्षता ~39%) में बदलना। इससे ईंधन गैस की खपत में लगभग 14 एमएमएससीएफडी (वार्षिक औसत) की कमी आएगी और सीओ2 उत्सर्जन में लगभग 250 केटन सीओ$_2$ समतुल्य/वर्ष की कमी होगी।
- अपशिष्ट ऊष्मा पुनर्प्राप्ति इकाई (डब्ल्यूएचआरयू) का पीजीयू के साथ एकीकरण: इस एकीकरण से ईंधन गैस की खपत में लगभग 22 एमएमएससीएफडी (वार्षिक औसत) की कमी आएगी और ग्रीनहाउस गैस उत्सर्जन में लगभग 420 किलोटन सीओ$_2$ समतुल्य/वर्ष की कमी होगी।
- प्लांट सोलराइजेशन–बैटरी ऊर्जा भंडारण प्रणाली: प्लांट ग्रिड में हरित ऊर्जा डालकर बिजली उत्पादन इकाई से होने वाले उत्सर्जन को कम करने के लिए सोलराइजेशन प्रणाली लागू की जाएगी। इससे ईंधन गैस में लगभग 3 एमएमएससीएफडी (वार्षिक औसत) की कमी और ग्रीनहाउस गैस उत्सर्जन में लगभग 60 किलोटन सीओ$_2$ समतुल्य/वर्ष की कमी होगी।

ईएसजी निष्पादन की मुख्य विशेषताएं

क. पर्यावरण:

जुलाई 2024 में कोलंबिया के सीपीओ–5 ब्लॉक को "शून्य श्रम दुर्घटनाओं" के लिए एआरएल एसयूआरए द्वारा 2021 से 2023 तक लगातार तीन वर्षों के लिए मान्यता–प्राप्त हुई। यह संस्था श्रम जोखिमों के प्रबंधन, परामर्श और रोकथाम के लिए जिम्मेदार सरकारी प्राधिकृत कंपनी है।

ख. सामाजिक:

16 परियोजनाओं और मुख्यालय में 57.97 मिलियन मानव–घंटे के लिए 0.03 एलटीआईएफ (प्रति मिलियन व्यक्ति–घंटे कार्य)। जीपीओसी, दक्षिण सूडान के प्रचालन क्षेत्रों में सामुदायिक विकास कार्यक्रम चलाए।

ग. शासन:

नवंबर 2024 में कॉर्पोरेट प्रशासन और जोखिम रणनीतियों में उत्कृष्टता के लिए जोखिम प्रबंधन 2023 के लिए गोल्डन पीकॉक पुरस्कार प्राप्त किया।



साणंद में आईओसीएल का सौर ऊर्जा संयंत्र



गोरखपुर में आईओसीएल का सीबीजी संयंत्र



ओएनजीसी ओईसी शेड



ओएनजीसी उरण संयंत्र



गेल विजयपुर में हरित हाइड्रोजन संयंत्र



ओएनजीसी की राजमुंदरी परिसंपत्ति



ओएनजीसी ओडालारेवु



भारत की पहली हरित हाइड्रोजन ईंधन सेल बस



बीपीसीएल–एलपीजी संयंत्र में सौर पैनल



विशाख रिफाइनरी परिसर, और पानी में दिखाई देता उसका प्रतिबिंब



असम में जैव–रिफाइनरी परियोजना



एमआरपीएल आरओ



ईआईएल–गुरुग्राम परिसर में गोल्फ कार्ट



ईआईएल–गुरुग्राम परिसर में साइकिलें





अध्याय 11

अ.जा./अ.ज.जा./ओबीसी एवं अन्य और महिलाओं का कल्याण

11 अ.जा./अ.ज.जा./ओबीसी एवं अन्य और महिलाओं का कल्याण

11.1 अ.जा./अ.ज.जा./ओबीसी एवं अन्य का कल्याण:

कार्मिक एवं प्रशिक्षण विभाग, लोक उद्यम विभाग, सामाजिक न्याय एवं अधिकारिता मंत्रालय और जनजातीय कार्य मंत्रालय द्वारा समय–समय पर जारी किए गए दिशा–निर्देशों के अनुसार अनुसूचित जाति, अनुसूचित जनजाति, अन्य पिछड़ा वर्ग और दिव्यांगजनों के लिए आरक्षण की नीतियाँ पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय और उसके नियंत्रणाधीन सार्वजनिक क्षेत्र के उपक्रमों (पीएसयू) में लागू की जा रही हैं। इस मंत्रालय का अनुसूचित जाति एवं अनुसूचित जनजाति प्रकोष्ठ मंत्रालय के साथ–साथ इस मंत्रालय के प्रशासनिक अधिकार क्षेत्र के अंतर्गत आने वाले सार्वजनिक क्षेत्र के उपक्रमों और अन्य संगठनों में आरक्षण नीतियों के कार्यान्वयन की निगरानी करता है। सार्वजनिक क्षेत्र के उपक्रमों ने अ.जा., अ.ज.जा., ओबीसी, ईडब्ल्यूएस, ईएसएम और दिव्यांगजनों (पीडब्ल्यूडी) के कर्मचारियों के हितों की रक्षा और उनकी शिकायतों के निवारण के लिए अपने मुख्य संपर्क अधिकारियों/संपर्क अधिकारियों की देखरेख में कार्यान्वयन प्रकोष्ठों का भी गठन किया है। सार्वजनिक क्षेत्र के उपक्रमों के संपर्क अधिकारी राष्ट्रपति के निर्देशों के साथ–साथ इस विषय पर समय–समय पर जारी भारत सरकार के विभिन्न आदेशों के कार्यान्वयन को सुनिश्चित करने के लिए जिम्मेदार हैं। संसद सदस्यों, राष्ट्रीय अनुसूचित जाति एवं अनुसूचित जनजाति आयोग और राष्ट्रीय अन्य पिछड़ा वर्ग आयोग के माध्यम से सार्वजनिक क्षेत्र के उपक्रमों के अ.जा., अ.ज.जा., ओबीसी, ईडब्ल्यूएस, ईएसएम और दिव्यांगजनों से प्राप्त शिकायतों पर कार्रवाई की जाती है। सार्वजनिक क्षेत्र के उपक्रमों द्वारा प्रस्तुत रिपोर्ट के माध्यम से मंत्रालय द्वारा अ.जा., अ.ज.जा., ओबीसी, ईडब्ल्यूएस, ईएसएम और दिव्यांग कर्मचारियों की नियुक्ति की स्थिति की निगरानी की जाती है।

अ.जा./अ.ज.जा./ओबीसी के कल्याण संबंधी संसदीय समिति की टिप्पणियों और सेवा में अ.जा./अ.ज.जा. के लिए आरक्षण पर राष्ट्रपति के निर्देशों के अनुसरण में, इस मंत्रालय के मुख्य संपर्क अधिकारी के नेतृत्व में एक टीम सार्वजनिक क्षेत्र के उपक्रमों की यूनिटों द्वारा बनाए गए आरक्षण रोस्टर का वार्षिक निरीक्षण करती है।

मंत्रालय के अंतर्गत तेल एवं गैस के पीएसयू द्वारा अ.जा./अ.ज.जा./ओबीसी/दिव्यांग कर्मचारियों पर विशेष ध्यान केंद्रित करते हुए विभिन्न गतिविधियाँ चलाई जाती हैं। सीएसआर पहल/योजनाएँ अ.जा./अ.ज.जा./ओबीसी समुदाय को प्रभावी रूप से लाभ पहुंचाने के लिए बनाई और लागू की जा रही हैं।

दिनांक 31.03.2025 तक मंत्रालय के प्रशासनिक नियंत्रणाधीन तेल एवं गैस सीपीएसई में अ.जा./अ.ज.जा./ओबीसी/दिव्यांग वर्ग का बैकलॉग नीचे दिया गया है:

तालिका 11.1: अ.जा., अ.ज.जा., ओबीसी और दिव्यांगजन (सीधी भर्ती) के संबंध में बैकलॉग रिक्तियों की संख्या

पीएसयू/ एमओपीएंडएनजी	समूह क				समूह ख				समूह ग				समूह घ			
	अ.जा.	अ.ज.जा.	ओबीसी	पीडब्ल्यूडी	अ.जा.	अ.ज.जा.	ओबीसी	पीडब्ल्यूडी	अ.जा.	अ.ज.जा.	ओबीसी	पीडब्ल्यूडी	अ.जा.	अ.ज.जा.	ओबीसी	पीडब्ल्यूडी
एमओपीएंडएनजी	आंकड़े इस मंत्रालय द्वारा नहीं रखे जाते हैं।				शून्य	शून्य	शून्य	शून्य	0	2	0	0	लागू नहीं			
सीपीसीएल	शून्य	शून्य	शून्य	शून्य	2	1	1	4	2	—	4	7	शून्य	शून्य	शून्य	शून्य
आरजीआईपीटी	1	0	1	0	2	1	1	0	1	1	2	0	लागू नहीं	लागू नहीं	लागू नहीं	लागू नहीं
एचपीसीएल[1]	0	0	0	4	—	—	—	—	0	0	0	0	—	—	—	—
आईआईपीइ	वर्तमान में, आईआईपीई में सीधी भर्ती के लिए कोई बैकलॉग रिक्तियां मौजूद नहीं हैं।															
एमआरपीएल[2]	7															
ओएनजीसी[3]	3	1	5	22	—	—	—	—	21	14	50	25	04	02	11	07
बाल्मर लॉरी एंड कंपनी लिमिटेड	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य
बीपीसीएल	शून्य	7	6	39	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य	शून्य
एनआरएल[4]	01	0	0	02	लागू नहीं	0	0	0	0	0	0	0	0			
आईओसीएल[5]	16	24	38	53	ग्रुप 'बी' में कोई भर्ती नहीं की गई				10	9	8	73	3	2	3	33
ओआईडीबी	0	0	0	0	0				0	0	0	0	0	0	0	0
ओआईएल		0	2	0	0	0	0	0	0	3	1	17	—	—	—	—
गेल	27	20	29	41	01	03	01	07	33	24	43	21	—	—	—	—
बीसीपीएल	1	0	2	16	—	—	—	—	—	—	—	3	—	—	—	—
ईआईएल	1	1	5	6	—	—	—	1	1	2	—	2	—	—	—	—
सीपीसीएल	शून्य	शून्य	शून्य	शून्य	2	1	1	4	2	—	4	7	शून्य	शून्य	शून्य	शून्य

टिप्पणी:

1. एचपीसीएल में ग्रुप 'बी' और 'डी' के अंतर्गत कोई पद वर्गीकृत नहीं है क्योंकि गैर–प्रबंधन ग्रेड में प्रविष्टि को ग्रुप 'सी' में पुनर्वर्गीकृत किया गया है।

2. एमआरपीएल में ग्रुप बी और डी में कोई सीधी भर्ती नहीं है। उपक्त बैकलॉग रिक्तियां इंडक्शन स्तर पर हैं, जहाँ सामान्यतः भर्तियाँ की जाती हैं।

3. ओएनजीसी में कोई बैकलॉग रिक्तियां नहीं हैं। पिछली भर्ती प्रक्रिया में रिक्त रह गए रिक्त पदों को अगली भर्ती प्रक्रिया में आगे बढ़ाया जाता है। वर्ष 2025 में ग्रुप ए की 62 रिक्तियों पर भर्ती की प्रक्रिया चल रही है। ग्रुप 'सी' की 62 रिक्तियां और ग्रुप श्डीश की 11 रिक्तियां आंध्र प्रदेश से हैं, जो 2014–15 से अदालती मामलों के कारण रुकी हुई हैं।

4. एनआरएल में उपर्युक्त बैकलॉग के अलावा आरक्षित रिक्तियों की कमी है। एनआरएल आगामी भर्ती अभियानों में इस कमी/बैकलॉग को पूरा करने के लिए हर संभव प्रयास कर रहा है।

5. आईओसीएल में सामान्य भर्ती प्रक्रिया के माध्यम से अ.जा./अ.ज.जा./ओबीसी की रिक्तियों का बैकलॉग समाप्त किया जाता है। दिव्यांगजनों के बैकलॉग को समाप्त करने के लिए विशेष भर्ती अभियान चलाया जा रहा है।

11.2 महिलाओं का कल्याण:

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय और उसके प्रशासनिक नियंत्रणाधीन सार्वजनिक क्षेत्र के उपक्रम/संगठन महिला कर्मचारियों के कल्याण और सशक्तिकरण के लिए कई पहल कर रहे हैं। महिलाओं को प्रोत्साहित करने और लैंगिक समानता को बढ़ावा देने के लिए उनके व्यावसायिक विकास और स्वास्थ्य पर केंद्रित विशेष कार्यक्रम आयोजित किए जाते हैं। इनमें बाहरी और आंतरिक प्रशिक्षण, महिला स्वास्थ्य संबंधी सत्र, और सार्वजनिक क्षेत्र में महिलाओं के मंच की राष्ट्रीय बैठक में भाग लेने के लिए प्रायोजन जैसी गतिविधियाँ शामिल हैं।

सार्वजनिक क्षेत्र के उपक्रमों में महिला कर्मचारियों के हितों की देखभाल के लिए महिला मंच बनाए गए हैं। राष्ट्रीय महिला आयोग द्वारा जारी "क्या करें और क्या न करें" की सूची सभी कर्मचारियों के बीच साझा की गई है। कार्यस्थलों पर यौन उत्पीड़न की शिकायतों के समाधान के लिए समितियाँ गठित की गई हैं।

विशाखा बनाम राजस्थान राज्य मामले में माननीय सर्वोच्च न्यायालय द्वारा निर्धारित दिशानिर्देशों और कार्मिक एवं प्रशिक्षण विभाग/महिला एवं बाल विकास मंत्रालय द्वारा जारी आदेशों के अनुसार, कामकाजी महिलाओं के यौन उत्पीड़न की शिकायतों की रोकथाम और निवारण हेतु मंत्रालय में एक आंतरिक शिकायत समिति (महिला प्रकोष्ठ) का गठन किया गया है। वर्तमान में, पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय की संयुक्त सचिव सुश्री सुजाता शर्मा इस समिति की अध्यक्ष हैं, जिनके साथ एक गैर–सरकारी संगठन के सदस्य सहित चार अन्य सदस्य हैं। समिति नियमित अंतराल पर अपनी बैठकें आयोजित करती है।

तालिका दिनांक 11.2: 31.03.2025 तक तेल पीएसयू में महिला कर्मचारियों की संख्या बनाम कुल कर्मचारियों की संख्या

क्र. सं.	पीएसयू/एमओपीएंडएनजी का नाम	कर्मचारियों की कुल संख्या	महिला कर्मचारियों की कुल संख्या
1.	एमओपीएंडएनजी	223	56
2.	सीपीसीएल	1426	83
3.	आरजीआईपीटी	152	24
4.	एचपीसीएल	8019	873
5.	आईआईपीई	49	07
6.	एमआरपीएल	2545	229
7.	ओएनजीसी	24768	1969
8.	बामर लॉरी एंड कंपनी लिमिटेड	839	92
9.	बीपीसीएल	8803	736
10.	एनआरएल	1101	85
11.	आईओसीएल	29855	2677
12.	ओआईडीबी	15	06
13.	ओआईएल	6487	510
14.	गेल	5061	352
15.	बीसीपीएल	618	55
16.	ईआईएल	2650	317



सीपीएसई की जनशक्ति



सीपीएसई के कार्यस्थल पर महिला–शक्ति





अध्याय 12

तेल और गैस केंद्रीय सार्वजनिक क्षेत्र के उद्यम और संगठन

12 तेल और गैस केंद्रीय सार्वजनिक क्षेत्र के उद्यम और संगठन

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के अंतर्गत केंद्रीय सार्वजनिक क्षेत्र उद्यम (सीपीएसईज):

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय (एमओपीएनजी) देश की उन केंद्रीय सार्वजनिक क्षेत्र के उद्यमों (सीपीएसई) की देखरेख करता है जो पेट्रोलियम और प्राकृतिक गैस की खोज, उत्पादन, रिफाइनिंग, वितरण और विपणन का काम करती हैं। इस मंत्रालय के तहत आने वाली प्रमुख सीपीएसईज हैं – इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल), भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल), हिन्दुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड (एचपीसीएल), ऑयल एंड नेचुरल गैस कॉर्पोरेशन लिमिटेड (ओएनजीसी), और गैस अथॉरिटी ऑफ इंडिया लिमिटेड (गेल)। ये कंपनियाँ भारत की ऊर्जा जरूरतों को पूरा करने, ऊर्जा सुरक्षा बनाए रखने और आर्थिक विकास में अहम भूमिका निभाती हैं।

12.1 महारत्न केंद्रीय सार्वजनिक क्षेत्र उद्यम (सीपीएसईज)

12.1.1 ऑयल एंड नेचुरल गैस कॉर्पोरेशन लिमिटेड (ओएनजीसी):

ओएनजीसी की स्थापना 23 जून 1993 को संसद के एक अधिनियम के तहत की गई थी, ताकि तेल और प्राकृतिक गैस आयोग को एक सार्वजनिक क्षेत्र की कंपनी में बदला जा सके। इसने 1 फरवरी 1994 से आयोग के कामकाज की जिम्मेदारी संभाली। ओएनजीसी एक वैश्विक ऊर्जा कंपनी है जो खोज, उत्पादन से लेकर आपूर्ति तक पूरी ऊर्जा प्रक्रिया में जुड़ी है। यह पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के तहत आने वाली एक 'महारत्न' सार्वजनिक क्षेत्र की कंपनी है, जिसमें सरकार की 58.89% हिस्सेदारी है।

(i) **वर्ष 2024–25 के लिए प्रमुख विशेषताएं/पहलें (9एम)**

- **केजी–डाउन–98/2 क्लस्टर–।। परियोजना ने भारत के ऊर्जा क्षेत्र में नई ऊर्जा जोड़ी:** 16 दिसंबर 2024 को काकीनाडा स्थित पूर्वी अपतटीय परिसंपत्ति (ईओए) ने पी–फील्ड के 5 तेल कूपों से उत्पादन शुरू किया। इसके साथ ही इस परियोजना के सभी तेल क्षेत्रों का सफलतापूर्वक प्रचालन शुरू हो गया है, जिससे अब लगभग 35,000 बैरल प्रतिदिन कच्चे तेल का उत्पादन हो रहा है।
- **ओपीएएल की स्थापना ओएनजीसी की सहायक कंपनी के रूप में हुई:** दिनांक 09.08.2024 को प्राप्त भारत सरकार के निर्देशों के अनुसार, ओएनजीसी ने दिनांक 02.12.2024 तक ओपीएएल में कुल ₹18,365 करोड़ का निवेश पूरा कर लिया है। ओएनजीसी ने ओपीएएल में अपनी हिस्सेदारी 49.36% से बढ़ाकर 95.69% कर ली है, जिससे ओपीएएल उसकी सातवीं सहायक कंपनी बन गई है।
- ओएनजीसी ने आरएलएनजी के विपणन क्षेत्र में कदम रखा है, जो इसके कारोबार के लिए एक नई उपलब्धि है। 25 अक्तूबर को, ओएनजीसी ने इंडियन गैस एक्सचेंज (आईजीएक्स) के माध्यम से 32 मिलियन घन मीटर (एमएमएससीएमडी) से अधिक आरएलएनजी बेचकर एक बड़ी उपलब्धि हासिल की।
- **असम परिसंपत्ति ने ऑयल इंडिया के साथ 5 वर्षों के लिए कच्चे तेल परिवहन समझौते पर हस्ताक्षर किए:** रिफाइनरियों को कच्चे तेल का दीर्घकालिक प्रेषण सुनिश्चित करने के लिए, असम परिसंपत्ति ने 3 अक्तूबर 2024 को ऑयल इंडिया लिमिटेड (ओआईएल) के साथ एक कच्चे तेल परिवहन समझौते (सीओटीए) पर हस्ताक्षर किए।
- **मदनम केंद्रीय प्रोसेसिंग सुविधा (सीपीएफ) के लिए स्थापना की सहमति (सीटीई) प्रदान की गई:** मदनम

में सीपीएफ बनाने की अनुमति दिनांक 05.11.2024 को तमिलनाडु प्रदूषण नियंत्रण बोर्ड (टीएनपीसीबी) द्वारा दी गई है। यह अनुमति मार्च 2029 तक के लिए मान्य है।

- मेहसाणा परिसंपत्ति के नंदसन संयंत्र में 40 किलोग्राम प्रतिदिन क्षमता वाले ग्रीन हाइड्रोजन के डेमो प्लांट का निष्पादन गारंटी परीक्षण (पीजीटीआर) सफलतापूर्वक पूरा कर लिया गया है।
- पश्चिमी अपतटीय क्षेत्र में दमन अपसाइड डेवलपमेंट प्रोजेक्ट–वेल हेड प्लेटफॉर्म्स (डीयूडीपी–डब्ल्यूपी) और पाइपलाइन रिप्लेसमेंट प्रोजेक्ट (पीआरपी–8), ग्रुप बी नामक परियोजनाओं के लिए मैसर्स एलएंडटी के साथ दो प्रमुख अनुबंधों पर हस्ताक्षर किए गए, जिनका उद्देश्य गैस और कंडेनसेट उत्पादन को बढ़ाना है। इससे गैस उत्पादन में लगभग 5 एमएमएससीएमडी की वृद्धि होने की संभावना है।
- डीएसएफ–।। के अंतर्गत आवंटित ब्लॉकों के लिए एक प्रमुख अपतटीय तेल एवं गैस परियोजना के निर्माण हेतु मैसर्स मझगांव डॉक लिमिटेड को 08.08.2024 को ऑर्डर दिया गया। इससे गैस उत्पादन में लगभग 4 एमएमएससीएमडी की वृद्धि होने की संभावना है।
- **ओएनजीसी और गेल ने नए कूपों से निकलने वाली गैस के लिए टर्म शीट पर हस्ताक्षर किए:** ओएनजीसी और गेल ने 28 नवंबर 2024 को एक टर्म शीट पर हस्ताक्षर किए, जिसके तहत ओएनजीसी के नए कूपों से निकलने वाली गैस (एनडब्ल्यूजी) की बिक्री की जाएगी। यह समझौता मौजूदा प्रचालन चुनौतियों को हल करने में मदद करेगा और ओएनजीसी के भविष्य के विकास के लिए एक रणनीतिक आधार तैयार करेगा।
- **ओएनजीसी और पावरग्रिड कॉर्पोरेशन ने हरित हाइड्रोजन और स्वच्छ ऊर्जा परियोजनाओं पर सहयोग के लिए समझौता किया:** ओएनजीसी ने 12 दिसंबर 2024 को नई दिल्ली में पावरग्रिड कॉर्पोरेशन के साथ एक समझौता–ज्ञापन पर हस्ताक्षर किए। यह सहयोग राष्ट्रीय हरित हाइड्रोजन मिशन (एनजीएचएम) कार्यक्रम के अनुरूप है, जिसका उद्देश्य भारत को हरित हाइड्रोजन उत्पादन, उपयोग और निर्यात में वैश्विक अग्रणी बनाना है।
- **ओएनजीसी ने संपीड़ित बायोगैस संयंत्रों के लिए एवर एनवायरो रिसोर्स मैनेजमेंट प्राइवेट लिमिटेड के साथ समझौता–ज्ञापन किया:** प्रस्तावित संयुक्त उद्यम में ओएनजीसी की नवगठित सहायक कंपनी ओएनजीसी ग्रीन लिमिटेड (ओजीएल) और एवर एनवायरो प्रत्येक की 50% इक्विटी हिस्सेदारी होगी।
- **विंध्य बेसिन के हट्टा गैस फील्ड के पास आईओसीएल द्वारा एक छोटे पैमाने पर तरलीकृत प्राकृतिक गैस (एलएनजी) संयंत्र स्थापित करने के लिए समझौता–ज्ञापन पर हस्ताक्षर किए:** इस साझेदारी का उद्देश्य एलएनजी की क्षमता का उपयोग करके संधारणीय विकास और ऊर्जा सुरक्षा को मजबूत करना है।
- **ओएनजीसी, एससीसीएल और टीजीआरईडीसीओ तेलंगाना में मनुगुरु की जियोथर्मल दक्षता का पता लगाने के लिए गठबंधन किया:** ओएनजीसी, सिंगरेनी कोलियरीज कंपनी लिमिटेड (एससीसीएल) और तेलंगाना अक्षय ऊर्जा विकास कॉर्पोरेशन लिमिटेड (टीजीआरईडीसीओ) ने 2 अगस्त 2024 को तेलंगाना के प्राणहिता गोदावरी बेसिन में नवीकरणीय ऊर्जा क्षमता का पता लगाने और मनुगुरु भूतापीय क्षेत्र को विकसित करने के लिए एक त्रिपक्षीय समझौता–ज्ञापन (एमओयू) पर हस्ताक्षर किए।
- **ओएनजीसी ने मैसर्स बीपी को तकनीकी सेवा प्रदाता के रूप में नियुक्ति किया:** ओएनजीसी ने अपने मुंबई हाई फील्ड के लिए बीपी कंपनी को तकनीकी सेवा प्रदाता (टीएसपी) नियुक्त किया है। इसका उद्देश्य आधुनिक तकनीकों और वैश्विक सर्वोत्तम तरीकों का उपयोग करके फील्ड की बची हुई क्षमता को जल्द हासिल करना और भारत की ऊर्जा जरूरतों में इसके भविष्य के योगदान को सुनिश्चित करना है।
- **ओएनजीसी ने ग्रीन हाइड्रोजन परियोजनाओं के लिए बीएचईएल के साथ समझौता–ज्ञापन पर हस्ताक्षर किए:** ओएनजीसी ने दिनांक 10.01.2025 को बीएचईएल के साथ मिलकर ग्रीन हाइड्रोजन परियोजनाओं में नए व्यापारिक अवसरों की खोज के लिए सहयोग किया है। यह साझेदारी ग्रीन हाइड्रोजन की पूरी प्रक्रिया को कवर करती है, जिसमें इलेक्ट्रोलाइजर तकनीक, भंडारण, फ्यूल सेल, आरटीसी बिजली उत्पादन, हाइड्रोजन चालित टर्बाइन और उनके उपयोग शामिल हैं।

- ओएनजीपीएल ने 12 फरवरी 2025 को एनआईआईएफ, बीआईआई और उसकी सहयोगी कंपनियों, तथा एवरसोर्स कैपिटल के साथ अयाना रिन्यूएबल पावर प्राइवेट लिमिटेड की 100% हिस्सेदारी खरीदने के लिए एक समझौते पर हस्ताक्षर किए। इस सौदे का मूल्य 195 अरब रुपए (लगभग 2.3 अरब अमेरिकी डॉलर) है।

- ओएनजीसी और टाटा पावर रिन्यूएबल एनर्जी लिमिटेड ने 12 फरवरी 2025 को बैटरी ऊर्जा भंडारण समाधान पर सहयोग करने के लिए समझौता–ज्ञापन पर हस्ताक्षर किए। इसका उद्देश्य बैटरी ऊर्जा भंडारण प्रणाली (बीईएसएस) से जुड़ी संभावनाओं पर मिलकर काम करना है। ओएनजीसी नवीकरणीय ऊर्जा और आधुनिक भंडारण तकनीकों के संयोजन से भारत की ऊर्जा सुरक्षा को मजबूत करने के लिए प्रतिबद्ध है।

- ओएनजीसी ने 10 मार्च, 2025 को गुजरात के पिपावाव बंदरगाह पर अपना दूसरा अपतटीय आपूर्ति केंद्र शुरू किया है। इससे रिगों और प्लेटफार्मों को तेज और सुरक्षित आपूर्ति मिलेगी तथा कामकाज बिना रुकावट के चल सकेगा।

- ओएनजीसी ने अंडमान बेसिन में तीन अति–गहरे पानी के कूपों की खुदाई शुरू की है। यह अंडमान बेसिन में ओएनजीसी के गहरे पानी के अन्वेषण अभियान का एक और अहम चरण है।

- **गंगा बेसिन में उत्तर प्रदेश के बलिया में वाइल्डकैट कूप जीडीए–बी की खुदाई शुरू की:** फ्रंटियर बेसिन ने उत्तर प्रदेश के बलिया जिले में गंगा बेसिन के ओएएलपी–VI ब्लॉक जीवी–ओएनएचपी–2021/2 में नया अन्वेषण कूप जीवी–ओएनओ212–जीडीए–बी खोदना शुरू किया है।

12.1.1.1 **अन्वेषण:** वर्ष 2024–25 के दौरान, ओएनजीसी ने 604 एलकेएम 2डी, 8840 एसकेएम 3डी भूकंपीय डेटा प्राप्त किया और 109 अन्वेषण कूपों की खुदाई की। वर्ष के दौरान, ओएनजीसी ने अपने प्रचालित क्षेत्रों में नौ (9) नई हाइड्रोकार्बन खोजों (पाँच भूमि पर और चार अपतटीय) की अधिसूचना जारी की है।

कावेरी बेसिन ने अति–गहरे जल में अन्वेषण प्रारंभ किया: कावेरी बेसिन ने 9 मई 2024 को पुडुचेरी के अति–गहरे जल क्षेत्र में एक बड़ी अन्वेषण परियोजना शुरू की। इसके लिए रिग डीडीकेजी–1 का उपयोग करते हुए, ओएएलपी–V ब्लॉक सीवाई–यूडीडब्ल्यूएचपी–2019/1 में लगभग 1.7 किमी गहराई पर कूप सीवाईयूडी191एच–सीएचएए (सीएचओएलए) खोदा गया। ओएनजीसी ने यह भी बताया है कि कैम्बे बेसिन के ऑनलैंड क्षेत्र में "वडताल–37" नाम की एक नई संभावना की खोज हुई है। इस खोज का विवरण इस प्रकार है:

वडाताल–37: कैम्बे बेसिन के वडाताल एक्सटेंशन–I पीएमएल (एनईएलपी–VI ब्लॉक सीबी–ओएनएन–2004/2) में अन्वेषण कूप वडाताल–37 खोदा गया। यह कूप स्वतंत्र भ्रंश ब्लॉक में छत्रल, ईपी–IV और वाईसीएस पे की अन्वेषण के लिए था। पारंपरिक उत्पादन परीक्षण में छत्रल और ईपी–IV लोअर पे में दो हाइड्रोकार्बन स्रोत पाए गए। इनमें से वस्तु–I को नई संभावना के रूप में अधिसूचित किया गया। इस कूप की सफलता ने स्वतंत्र भ्रंश क्षेत्र में हाइड्रोकार्बन की मौजूदगी साबित की और ब्लॉक व आसपास के क्षेत्रों में आगे अन्वेषण और विकास के रास्ते खोल दिए हैं।

ओएएलपी बोली दौर–IX के अंतर्गत ओएनजीसी को कुल 82,560.26 वर्ग किलोमीटर क्षेत्रफल वाले 15 ओएएलपी ब्लॉक आवंटित किए गए। सभी आवंटित ओएएलपी ब्लॉक अन्वेषण चरण में हैं।

वर्ष के दौरान, ओएनजीसी ने श्रेणी–III बंगाल बेसिन में अशोकनगर खोज और श्रेणी–II विंध्य बेसिन में हट्टा खोज के लिए क्षेत्र विकास योजनाएँ प्रस्तुत कीं, जिन्हें क्रमशः पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय/डीजीएच द्वारा दिनांक 10.07.2024 और 03.10.2024 को अनुमोदित किया गया। इसके बाद, ओएनजीसी ने संबंधित राज्य सरकारों को पीएमएल अनुदान के लिए आवेदन प्रस्तुत किए हैं। इस परियोजना के लागू होने से विकास को नई गति मिलेगी और बंगाल तटीय तथा विंध्य बेसिन जल्द ही भारत के तेल और गैस के मानचित्र पर शामिल हो जाएंगे।

इसके अलावा, ओएनजीसी का फ्रांस की कंपनी आईएफपी एनर्जीज न्यूवेल्स के साथ सहयोग है। इसका उद्देश्य लंबी अवधि का सहयोग स्थापित करना, भारत के हाइड्रोकार्बन भंडारों से उत्पादन और रिकवरी बढ़ाने में विशेषज्ञता विकसित करना

और लागू करना, तथा शेल गैस, हाई प्रेशर–हाई तापमान (एचपी–एचटी), टाइट ऑयल और गैस जैसे अपरंपरागत संसाधनों के विकास के लिए आधुनिक तकनीकों का उपयोग करना है।

12.1.1.2 उत्पादन पहलः ओएनजीसी वित्त वर्ष 2025 के दौरान कच्चे तेल और प्राकृतिक गैस का उत्पादन स्थिर बनाए रखने में सक्षम रही है। वित्त वर्ष 2025 के लिए एकल कच्चे तेल का उत्पादन 19.558 एमएमटी रहा, जो पिछले वर्ष की तुलना में 0.9% की वृद्धि दर्शाता है। वित्त वर्ष 2025 के लिए एकल प्राकृतिक गैस का उत्पादन 19.654 बीसीएम रहा।

वित्त वर्ष 2025 के दौरान, कुल 578 कूप (109 अन्वेषण कूप, 403 विकास कूप और 66 साइडट्रैक कूप) खोदे गए। यह पिछले 35 वर्षों में ओएनजीसी द्वारा खोदे गए कूपों की सबसे अधिक संख्या है। अन्य पहल जो की गई, वह निम्नलिखित हैः

12.1.1.3 ड्रिलिंग पहलः 9एम के दौरान, वित्त वर्ष 2025 में कुल 413 कूप (60 अन्वेषण कूप, 300 विकास कूप और 53 साइडट्रैक कूप) खोदे गए हैं, जो कि 398 कूपों के बजट अनुमान लक्ष्य का 103.76% है।

- **नरसापुर में मड प्लांट का शुभारंभः** राजमुंदरी परिसंपत्ति ने एचपीएचटी परिसंपत्ति मड प्लांट को नरसापुर में स्थानांतरित करके, रसद संबंधी चुनौतियों को पार करते हुए, दक्षता में वृद्धि की है। यह प्लांट अब 11,350 बैरल की दैनिक क्षमता के साथ एसओबीएम और क्लियर फ्लूइड दोनों का प्रोसेसिंग करता है।
- **आईडीटी को 'लुब्रिकेटिंग निर्माण और उसके एप्लीकेशन' के लिए पेटेंट प्राप्त हुआः** यह पेटेंट ड्रिलिंग तरल पदार्थों में लुब्रिकेंट के उपयोग से जुड़ा है, जिससे भूमिगत संरचना की ड्रिलिंग के दौरान घर्षण, ओवरपुल, टॉर्क और ड्रैग कम किया जा सके।
- वास्तविक समय ड्रिलिंग प्रचालन केंद्र (आरटीडीओसी); ओएनजीसी की एक महत्वपूर्ण डिजिटल पहलः ओएनजीसी का वास्तविक समय ड्रिलिंग ऑपरेशन सेंटर (आरटीडीओसी), जो ड्रिलिंग प्रौद्योगिकी संस्थान (आईडीटी) में स्थापित है, वास्तविक समय निगरानी और डेटा आधारित निर्णय लेने के जरिए ड्रिलिंग कार्यों की दक्षता बढ़ाने के लिए बनाया गया है।

12.1.1.4 तकनीकी सेवा पहलः

- **प्रोजेक्ट डीओटी (संगठनात्मक परिवर्तन के लिए डिजिटलीकरण) 11 अक्तूबर 2024 को लॉन्च किया गयाः** इससे ओएनजीसी के प्रचालन में एआई, आईओटी, क्लाउड कंप्यूटिंग और डेटा एनालिटिक्स जैसी आधुनिक तकनीकों को जोड़कर स्वचालन के माध्यम से विभिन्न विभागों में पूर्वानुमानित रखरखाव और सुव्यवस्थित कार्यप्रवाह के जरिए उपकरणों की विश्वसनीयता बढ़ाई जा सकेगी।
- **ओएनजीसी अहमदाबाद परिसंपत्ति के अत्याधुनिक डिजिटल वॉर रूम 'ऊर्जा उत्कर्ष कक्ष'–प्रोजेक्ट संजय का उद्घाटनः** अहमदाबाद परिसंपत्ति ने 5 अक्तूबर 2024 को 'ऊर्जा उत्कर्ष कक्ष' का उद्घाटन किया। यह एक आधुनिक डिजिटल वॉर रूम है, जिसमें डिजिटल डैशबोर्ड–संजय (संयुक्त रूप से प्रबंधित परिसंपत्ति जानकारी का विश्लेषण नेटवर्क) शामिल है। यह अहमदाबाद परिसंपत्ति की डिजिटल सुधार पहलों में एक बड़ी प्रगति है, जिसमें डेटा प्रबंधन, विजुअलाइजेशन और विश्लेषण की क्षमताएँ शामिल हैं।
- **केडीएमआईपीई (केशव देव मालवीय पेट्रोलियम अन्वेषण संस्थान)** ने उन्नत उपग्रह तकनीक का उपयोग करके ओएनजीसी प्रतिष्ठानों पर मीथेन उत्सर्जन की निगरानी के लिए एक नई पहल शुरू की।
- **अहमदाबाद स्थित रिजर्वायर अध्ययन संस्थान ने एआई–प्रचालित टॉप–डाउन रिजर्वायर सिमुलेशन की संकल्पना और उसका सह–निर्माण कियाः** इस अत्याधुनिक सिमुलेशन के फलस्वरूप गंधार तेल क्षेत्र के जीएस–3ए रेत पर ड्रिलिंग की गई और 17 एम3/दिवस तेल का परीक्षण किया गया, जिससे ईएंडपी गतिविधियों में एआई के उपयोग का आधार मजबूत हुआ।
- **लॉगिंग सर्विसेज, मुंबई ने उच्च–रिजॉल्यूशन अल्ट्रासोनिक बोरहोल इमेजिंग शुरू कीः** ध्वनिक इमेज ट्रैक (एलयूबीआईडब्ल्यूडी) जो मैसर्स बेकर ह्यूजेस की ध्वनिक आधारित उच्च रिजॉल्यूशन बोरहोल इमेजिंग सेवा है, को पहली बार पश्चिमी अपतटीय में एनएंडएच परिसंपत्ति के कूप एलएलएम 9#1डब्ल्यूएच

में 8.5'' छेद ड्रिल करने और गुणवत्ता लॉग डेटा प्राप्त करने के लिए तैनात किया गया था।

- **राष्ट्रीय भूकंपीय परियोजना के अंतर्गत विस्तारित महाद्वीपीय शेल्फ, पश्चिमी अपतट में 2डी अपतटीय ब्रॉड बैंड भूकंपीय डेटा अधिग्रहण का प्रारंभ:** पेट्रोलियम और प्राकृतिक गैस मंत्रालय (एमओपीएनजी), भारत सरकार के तहत हाइड्रोकार्बन महानिदेशालय (डीजीएच) द्वारा यह सर्वेक्षण किया गया। यह सर्वेक्षण रणनीतिक और भू–राजनीतिक दोनों दृष्टिकोणों से देश के लिए बहुत महत्वपूर्ण है।
- 2038 तक 'नेट जीरो' लक्ष्य प्राप्त करने और नवीकरणीय ऊर्जा उत्पादन को बढ़ावा देने की ओएनजीसी की प्रतिबद्धता के भाग के रूप में, सरफेस टीम, अंकलेश्वर परिसंपत्ति ने गुजरात के अलियाबेट के सुदूर तटीय क्षेत्र में 5.4 किलोवाट की ऑफ–ग्रिड सौर ऊर्जा प्रणाली को सफलतापूर्वक चालू किया।
- ओएनजीसी ने 12 दिसंबर 2024 से नया विक्रेता चालान प्रबंधन पोर्टल शुरू किया। यह पोर्टल विक्रेता प्रबंधन और चालान प्रक्रिया को आधुनिक बनाने के लिए एक महत्वपूर्ण कदम है। इस रणनीतिक पहल का उद्देश्य हमारे विक्रेता संपर्क और वित्तीय लेनदेन प्रक्रियाओं को आधुनिक बनाना है।
- **अंकलेश्वर परिसंपत्ति ने ब्राउनफील्ड डिजिटल ऑयलफील्ड परियोजना शुरू की:** डिजिटलीकरण की दिशा में एक बड़े कदम के रूप में, अंकलेश्वर परिसंपत्ति में 'सैद्धांतिक गैस संतुलन' परियोजना का उद्घाटन किया गया।
- **देहरादून में 75 किलोवाट के रूफटॉप सौर संयंत्र का उद्घाटन:** ओएनजीसी ने 22 अप्रैल 2024 को देहरादून में 75 किलोवाट के रूफटॉप सौर संयंत्र का उद्घाटन किया। हरित ऊर्जा के दोहन और कार्बन उत्सर्जन को कम करने के महत्व को स्वीकार करते हुए, यह पहल स्वच्छ भारत, हरित भारत के राष्ट्रीय दृष्टिकोण और नेट–जीरो उत्सर्जन प्राप्त करने के अनुरूप है।

12.1.1.5 प्रमुख पुरस्कार एवं सम्मान

- ओएनजीसी को विश्व स्तर पर 180वां स्थान तथा फॉरच्यून ग्लोबल 500 सूची 2024 में भारत को 5वां स्थान दिया गया है।
- फोर्ब्स ग्लोबल 2000 सूची 2025 में ओएनजीसी को विश्व स्तर पर 220वां तथा भारत में 6वां स्थान प्राप्त हुआ है।
- ओएनजीसी ने वर्ष 2024 में सीडीपी जलवायु स्कोर में बी–रेटिंग हासिल की है, जिससे स्थिरता के प्रति उसकी प्रतिबद्धता मजबूत हुई है।
- महारत्न और नवरत्न श्रेणी में प्रतिष्ठित"कंपनी ऑफ द ईयर 2024 जूरी अवार्ड'' मिला और ओएनजीसी के अध्यक्ष और सीईओ, अरुण कुमार सिंह को 21 दिसंबर 2024 को इंडियन चौंबर ऑफ कॉमर्स द्वारा 14वें सार्वजनिक क्षेत्र उद्यम पुरस्कारों में प्रतिष्ठित"सीईओ/सीएमडी ऑफ द ईयर 2024 प्लेटिनम अवार्ड'' से सम्मानित किया गया।
- ओएनजीसी को 26 नवंबर 2024 को भारतीय पेट्रोलियम उद्योग महासंघ द्वारा "वर्ष 2023 की तेल एवं गैस अन्वेषण कंपनी'' पुरस्कार से सम्मानित किया गया।
- ओएनजीसी ने 29 नवंबर 2024 को डन एंड ब्रैडस्ट्रीट द्वारा तेल और गैस अन्वेषण के लिए प्रतिष्ठित "भारत का शीर्ष मूल्य निर्माता पुरस्कार 2024'' जीता।
- ओएनजीसी को वित्तीय रिपोर्टिंग के लिए दक्षिण एशियाई क्षेत्र के सबसे प्रतिष्ठित पुरस्कारों में से एक, एसएएफए (दक्षिण एशियाई लेखाकार संघ) पुरस्कार से सम्मानित किया गया है। 11 नवंबर 2024 को कोलंबो, श्रीलंका में आयोजित एसएएफए पुरस्कार, 2024 में, सार्वजनिक क्षेत्र की कंपनियों की श्रेणी के तहत वित्तीय वर्ष 2022–23 के लिए सर्वश्रेष्ठ प्रस्तुत वार्षिक रिपोर्ट के लिए यह पुरस्कार प्रदान किया गया है।
- ओएनजीसी सीएसआर को 1 अक्तूबर 2024 को "सीएसआर उत्कृष्टता के लिए महात्मा पुरस्कार'' से सम्मानित किया गया।
- 11 सितंबर 2024 को नई दिल्ली में ऑयल स्पिल इंडिया 2024 में ईएंडपी प्रचालन में स्थिरता उत्कृष्टता के लिए प्रतिष्ठित "ब्लू प्लैनेट अवार्ड 2024'' जीता।
- ओएनजीसी ने 2 दिसंबर 2024 को प्रतिष्ठित 25वां राष्ट्रीय दिव्यांगजन रोजगार संवर्धन केंद्र

(एनसीपीईडीपी) हेलेन केलर पुरस्कार 2024 जीता।

- ओएनजीसी को नेशनल एसोसिएशन फॉर द ब्लाइंड (एनएबी) द्वारा सर्वश्रेष्ठ सीएसआर प्रभाव श्रेणी में प्रतिष्ठित"एनएबी सरोजिनी त्रिलोक नाथ राष्ट्रीय पुरस्कार 2024'' प्राप्त हुआ।
- ओएनजीसी की निदेशक (अन्वेषण) को भारत के ऊर्जा क्षेत्र को आगे बढ़ाने में उनके नेतृत्व के लिए 25 सितंबर 2024 को द इकोनॉमिक टाइम्स एनर्जी लीडरशिप समिट में प्रतिष्ठित "वुमेन इन एनर्जी अवार्ड 2024'' से सम्मानित किया गया।
- 20 सितंबर 2024 को बेंगलुरु में इंडिया सस्टेनेबिलिटी लीडरशिप अवार्ड्स के 10वें संस्करण में "सस्टेनेबिलिटी रिपोर्टिंग के लिए सर्वश्रेष्ठ संगठन" श्रेणी के रूप में मान्यता दी गई।
- ओएनजीसी को 18 सितंबर 2024 को अंतर्राष्ट्रीय संगठन, चार्टर्ड इंस्टीट्यूट ऑफ प्रोक्योरमेंट एंड सप्लाई (सीआईपीएस), लंदन द्वारा "वर्ष की सार्वजनिक खरीद परियोजना'' श्रेणी में विजेता घोषित किया गया।
- शिवसागर, असम में सिउ–का–फा मल्टीस्पेशलिटी अस्पताल के लिए"प्रोजेक्ट एक्सीलेंस कॉन्टेस्ट एंड रिकॉग्निशन'' का विजेता घोषित किया गया, जिसे 27 सितंबर 2024 को आयोजित एआईएमए इंडिया के प्रतिष्ठित 11वें बिजनेस रिस्पॉन्सिबिलिटी समिट में प्रस्तुत किया गया।
- ओएनजीसी ने 28 जुलाई 2024 को आयोजित उद्घाटन 'खान सुरक्षा पुरस्कार 2024' में तेल खदानों की विभिन्न श्रेणियों में चार प्रतिष्ठित पुरस्कार जीते। ये पुरस्कार अखिल भारतीय खान सुरक्षा संघ (एआईएमएसए) द्वारा खान सुरक्षा महानिदेशालय (डीजीएमएस) के तत्वावधान में पूरे भारत में खनन कार्यों में सुरक्षा मानकों में सुधार के लिए सर्वोत्तम प्रथाओं को बढ़ावा देने के लिए प्रदान किए गए।
- विश्व सुरक्षा संगठन के ओएचएसएंडई पुरस्कार 2024 में स्वर्ण श्रेणी में प्रतिष्ठित कार्यस्थल व्यावसायिक स्वास्थ्य, सुरक्षा और पर्यावरण उत्कृष्टता (ओएचएस एंड ई) पुरस्कार प्राप्त हुआ।
- 27 जून 2024 को आईसीआईसीआई लोम्बार्ड और सीएनबीसी–टीवी18 द्वारा आयोजित इंडिया रिस्क मैनेजमेंट अवार्ड्स के 10वें संस्करण में मास्टर ऑफ रिस्क–रिस्क टेक्नोलॉजी, लार्ज कैप श्रेणी के लिए पुरस्कार से सम्मानित किया गया।
- ओएनजीसी के कॉर्पोरेट एचएसई और आईडीटी को 27 जून को क्रमशः "गोल्डन पीकॉक पर्यावरण प्रबंधन पुरस्कार 2024'' और"गोल्डन पीकॉक ईसीओ इनोवेशन पुरस्कार 2024'' से सम्मानित किया गया।

12.1.1.6 वित्तीय निष्पादन (ओएनजीसी)

₹/करोड़

	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
कुल आय	96,214	68,141	1,10,345	1,55,517	1,38,402	1,37,846
कुल लाभ/(हानि)	13,464	11,246	40,306	40,097*	40,526	35,610
योजना परिव्यय–वास्तविक	29,538	26,859	27,741	30,208	37,494	62,057
योजना लक्ष्य	32,921	32,502	29,800	29,950	30,125	30,800**

***पुनः घोषित **2024–25 के लिए लक्ष्य**

12.1.2 ऑयल इंडिया लिमिटेड (ओआईएल):

ऑयल इंडिया लिमिटेड भारत सरकार की एक महारत्न कंपनी है, जो पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के अंतर्गत काम करती है। यह भारत और विदेश में कच्चा तेल और प्राकृतिक गैस खोजने, निकालने और प्राधिकृत करने के काम में लगी हुई है। इसकी अधिकृत पूंजी ₹2,000 करोड़ और चुकता पूंजी ₹1,626.61 करोड़ है। 31 मार्च 2025 तक, भारत सरकार के पास ऑयल इंडिया लिमिटेड की चुकता इक्विटी का 56.66% हिस्सा है।

12.1.2.1 घरेलू पोर्टफोलियो: ओआईएल के देश में प्रचालन असम, अरुणाचल प्रदेश, त्रिपुरा, नागालैंड, ओडिशा,

आंध्र प्रदेश और राजस्थान राज्यों के साथ–साथ अंडमान, केरल–कोंकण, महानदी और कृष्णा–गोदावरी के अपतटीय क्षेत्रों में फैले हुए हैं। ओआईएल 25 (पच्चीस) पीएमएल और 1 पीईएल में प्रचालन कर रहा है, जो नामांकन व्यवस्था के तहत असम (21), अरुणाचल प्रदेश (2) और राजस्थान (2) राज्यों में आवंटित 4,853 वर्ग किलोमीटर क्षेत्र को कवर करता है और असम में 1 पीईएल है।

कंपनी के पास एनईएलपी के अंतर्गत एक प्रचालक के रूप में 396 वर्ग किलोमीटर क्षेत्रफल वाला एक तटवर्ती ब्लॉक शामिल है। ओआईएल वर्तमान में असम, अरुणाचल प्रदेश, त्रिपुरा, ओडिशा, राजस्थान और अंडमान, केजी और केरल–कोंकण के अपतटीय क्षेत्रों में 46,842 वर्ग किलोमीटर के संचयी अन्वेषण क्षेत्र वाले 26 ओएएलपी ब्लॉकों में अन्वेषण गतिविधियाँ कर रही है। ये ओएएलपी बोली दौर–I से VIII के अंतर्गत आवंटित 30 ओएएलपी ब्लॉकों में से हैं (29 ओएएलपी ब्लॉकों के लिए वैध पीईएल उपलब्ध थे)।

ओआईएल के पास प्रचालक के रूप में 3 (तीन) डीएसएफ ब्लॉक भी हैं, जिनमें से एक ब्लॉक त्रिपुरा और कृष्णा–गोदावरी शैलो ऑफशोर में डीएसएफ–।। बोली दौर के तहत, और एक ब्लॉक राजस्थान में डीएसएफ–।।। बोली दौर के तहत है। 31 मार्च, 2025 तक ओआईएल का कुल घरेलू प्रचालन क्षेत्रफल 52,299 वर्ग कि.मी. है।

ओआईएल के पास नेल्प के अंतर्गत नॉन–प्रचालक के रूप में गुजरात–कच्छ (उथला अपतटीय) और पश्चिम बंगाल (तटीय) में 3725 वर्ग किलोमीटर क्षेत्रफल वाले 2 (दो) ब्लॉक भी हैं। ओआईएल के पास असम और अरुणाचल प्रदेश में पूर्व–नेल्प संयुक्त उद्यमों के अंतर्गत नॉन–प्रचालक के रूप में 85.88 वर्ग किलोमीटर क्षेत्रफल वाले 2 (दो) ब्लॉक भी हैं, अर्थात खारसांग पीएससी (भागीदारी हित–40%) और ब्लॉक एएपी–ओएन–94/1 (दिरोक–भागीदारी हित–44.086%)।

12.1.2.2 अन्वेषण गतिविधियाँ: ओआईएल वर्तमान में असम, अरुणाचल प्रदेश, त्रिपुरा, ओडिशा और राजस्थान के तटवर्ती क्षेत्रों और अंडमान एवं केरल–कोंकण बेसिनों के उथले अपतटीय क्षेत्रों में 26 (छब्बीस) ओएएलपी ब्लॉकों में अन्वेषण गतिविधियों में संलग्न है। वर्ष 2024–25 के दौरान, ओआईएल ने 444.46 एलकेएम 2डी, 1150.82 एसकेएम 3डी भूकंपीय डेटा प्राप्त किया और ओएएलपी ब्लॉकों में अन्वेषणात्मक कूप खोदे।

भारतीय तलछटी घाटियों का व्यापक अध्ययन करने के लिए, प्रस्तावित मिशन अन्वेषण के तहत 7 स्थलीय तलछटी घाटियों में 2डी भूकंपीय प्रोफाइल बनाने की योजना बनाई गई है। कुल 20,275 किलोमीटर की परियोजना में से, ऑयल इंडिया (ओआईएल) को राजस्थान और गंगा–पंजाब बेसिन के अछूते क्षेत्रों में लगभग 9,400 किलोमीटर का कार्य सौंपा गया है, जो राजस्थान, पंजाब, बिहार और उत्तर प्रदेश को कवर करता है। मिशन अन्वेषण के तहत राजस्थान, उत्तर प्रदेश (आजमगढ़ और बदायूं) और बिहार (मुजफ्फरपुर) में 2डी भूकंपीय अभियान क्रमशः दिनांक 21.12.2024 और 5 जनवरी 2025 को शुरू हो चुके हैं। दिनांक 31 मार्च 2025 तक कुल 2,516.18 किलोमीटर 2डी भूकंपीय डेटा एकत्र किया जा चुका है।

12.1.2.3 वास्तविक निष्पादन

मानदंड	यूनिट	2023–24 (वास्तविक)	2024–25	
			लक्ष्य (बीई)	वास्तविक
भूकंपीय सर्वेक्षण				
2डी	जीएलकेएम	378.72	269	444.46
3डी	एसक्यूकेएम	248.73	234	1150.82
ड्रिलिंग				
अन्वेषनात्मक	'000 मीटर	64.788	128.202	76.538
	कूप	17	34	22

मानदंड	यूनिट	2023–24 (वास्तविक)	2024–25	
			लक्ष्य (बीई)	वास्तविक
विकास	'000 मीटर	105.654	125.429	97.394
	कूप	44	44	35
कुल (व्यय+विकास)	'000 मीटर	170.442	253.631	173.932
	कूप	61	78	57
कच्चे तेल का उत्पादन				
असम	एमएमटी	3.286	3.880	3.380
अरुणाचल प्रदेश		0.032	0.032	0.031
राजस्थान (भारी तेल)		0.025	0.046	0.033
ओआईएल कुल		3.344	3.958	3.444
ओआईएल+ओआईएल का संयुक्त उद्यम में हिस्सा		3.359	3.958	3.458
प्राकृतिक गैस उत्पादन				
असम	एमएमएससीएम	2.885	3.591	2.935
अरुणाचल प्रदेश		0.035	0.064	0.037
राजस्थान		0.171	0.274	0.199
ओआईएल कुल		3.090	3.929	3.171
ओआईएल+ओआईएल का संयुक्त उद्यम में हिस्सा		3.182	3.929	3.252
एलपीजी उत्पादन	'000 टन	31.55	29.000	30.525

12.1.2.4 दिनांक 31.03.2025 की स्थिति के अनुसार आरक्षित स्थिति (2पी): निरंतर अन्वेषण और विकास के परिणामस्वरूप, ओआईएल ने अब तक कुल 806.5768 एमएमटी तेल और 423.4008 बीसीएम गैस (कुल 1,174.7765 एमएमटीओई) का भंडार स्थापित किया है। घरेलू क्षेत्रों में ओ़ओईजी के लिए कंपनी का 2पी/बीई शेष उत्पादित तेल और गैस क्रमशः 69.3852 एमएमटी और 139.0337 बीसीएम (कुल 190.2508 एमएमटीओई ओ़ओईजी) है।

12.1.2.5 कच्चे तेल का परिवहनः ओआईएल 1,245 किलोमीटर लंबी कच्चे तेल की पाइपलाइन का प्रचालन करता है, जो असम, पश्चिम बंगाल और बिहार से गुजरती है। इस पाइपलाइन की कुल क्षमता 9.0 एमएमटीपीए है। वित्त वर्ष 2024–25 में इसमें कुल 7.138 एमएमटी तेल का प्रवाह हुआ। ओआईएल पश्चिम बंगाल में नुमालीगढ़ रिफाइनरी (एनआरएल) से सिलीगुड़ी टर्मिनल तक 654.3 किलोमीटर लंबी पाइपलाइन से 1.72 एमएमटीपीए उत्पादों की निकासी भी करता है। वित्त वर्ष 2024–25 में इस नुमालीगढ़–सिलीगुड़ी पाइपलाइन (एनएसपीएल) के माध्यम से 1.574 एमएमटी तैयार पेट्रोलियम उत्पादों का परिवहन किया गया।

असम और अरुणाचल प्रदेश में उत्पादित प्राकृतिक गैस विभिन्न ग्राहकों, अर्थात बीवीएफसीएल, बीसीपीएल, एजीसीएल, एपीजीसीएल, नीपको, आईओसी (एओडी), एनआरएल, एपीएल और आसपास के चाय बागानों और छोटे उद्योगों को को बेची जाती है।

राजस्थान में ओआईएल द्वारा उत्पादित गैर–संबद्ध गैस राजस्थान राज्य विद्युत उत्पादन निगम लिमिटेड (आरआरवीयूएनएल) को बेची जाती है। ओआईएल

दुलियाजान, असम स्थित अपने संयंत्र में तरलीकृत पेट्रोलियम गैस (एलपीजी) का भी उत्पादन करती है।

12.1.2.6 वैकल्पिक ऊर्जा: ओआईएल ने पवन ऊर्जा, सौर ऊर्जा, ग्रीन हाइड्रोजन और सीबीजी जैसे वैकल्पिक ऊर्जा क्षेत्रों में अपनी गतिविधियों को बढ़ाया है। कंपनी ने अब तक कुल 188.10 मेगावाट की वाणिज्यिक अक्षय ऊर्जा परियोजनाएँ स्थापित की हैं, जिनमें 174.10 मेगावाट पवन ऊर्जा और 14 मेगावाट सौर ऊर्जा शामिल हैं। इसके अलावा, ओआईएल असम सरकार के उद्यम एपीजीसीएल के साथ मिलकर असम में 645 मेगावाट क्षमता वाला सौर ऊर्जा संयंत्र स्थापित करने की योजना बना रहा है। यह संयुक्त उद्यम 21 फरवरी 2025 को स्थापित किया गया। इसके तहत पहला संयंत्र नामरूप, असम में 25 मेगावाट का सौर ऊर्जा संयंत्र होगा।

इसके अलावा, ओआईएल को असम के जोरहाट में सीजीडी नेटवर्क में 2% ग्रीन हाइड्रोजन मिलाने की पीएनजीआरबी से मंजूरी मिल गई है। सीएलएसएस यूनिट की आपूर्ति पहले ही की जा चुकी है और वर्तमान में इसकी स्थापना चल रही है, जिसे अप्रैल 2025 के मध्य तक चालू करने की उम्मीद है, जिसके बाद मिश्रण प्रक्रिया शुरू होगी। हिमाचल प्रदेश के बद्दी में, ओआईएल हिमाचल प्रदेश पावर कॉर्पोरेशन लिमिटेड (एचपीपीसीएल) के साथ मिलकर 1 मेगावाट का ग्रीन हाइड्रोजन प्लांट विकसित कर रहा है। ईपीसी का कार्य चल रहा है और निर्माण सितंबर 2026 तक पूरा होने की उम्मीद है। इसके अलावा, ओआईएल ने ग्रीन हाइड्रोजन क्षेत्र में सहयोग बढ़ाने के लिए द फर्टिलाइजर्स एंड केमिकल्स त्रावणकोर लिमिटेड (एफएसीटी) के साथ समझौता–ज्ञापन पर हस्ताक्षर किए हैं, और इसकी डीपीआर तैयारी चल रही है। अपने स्टार्टअप कार्यक्रम स्नेह के तहत, ओआईएल ने हाइड्रोजन ईंधन सेल ई–बस भी विकसित की है। साथ ही, सुरक्षित, संधारणीय और किफायती हाइड्रोजन परिवहन के लिए ओआईएल एसएनईएच पहल के तहत लिक्विड ऑर्गेनिक हाइड्रोजन कैरियर (एलओएचसी) तकनीक विकसित कर रहा है, और यह परियोजना प्रगति पर है।

गोबरधन योजना के तहत, ओआईएल पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय (एमओपीएंडएनजी) की सलाह पर पूरे भारत में 25 संपीड़ित बायो गैस (सीबीजी) संयंत्र स्थापित करने पर काम कर रहा है। वर्तमान में छह स्थानों पर भूमि सुरक्षित की गई है: भुवनेश्वर, तिनसुकिया, शिवसागर, जोरहाट, गुवाहाटी और सिलचर। तिनसुकिया और भुवनेश्वर परियोजनाओं के लिए ईपीसीओएम निविदाएं जारी की गई हैं। तिनसुकिया के लिए बोली मूल्यांकन पूरा हो चुका है, जबकि भुवनेश्वर के लिए प्रक्रिया जारी है। जोरहाट, अगरतला और कटक परियोजनाओं के लिए डीपीआर को मंजूरी मिल गई है और इन परियोजनाओं के लिए ईपीसीओएम निविदाएं जारी की जाएँगी। इसके अलावा, 16 अन्य स्थानों के लिए डीपीआर तैयार की जा रही है। सीबीजी संयंत्रों की स्थापना में सहयोग के लिए मैसर्स जीपीएस रिन्यूएबल्स प्राइवेट लिमिटेड और मैसर्स हिन्दुस्तान वेस्ट ट्रीटमेंट प्राइवेट लिमिटेड के साथ दो संयुक्त उद्यम कंपनियों के गठन के लिए निवेश और सार्वजनिक संपत्ति प्रबंधन विभाग (दीपम) से मंजूरी का इंतजार है।

12.1.2.7 विविधीकरण: ऑयल इंडिया ने डाउनस्ट्रीम क्षेत्र में महत्वपूर्ण अधिग्रहणों के जरिए अपने पोर्टफोलियो में रणनीतिक विविधता लाई है। ओआईएल के पास नुमालीगढ़ रिफाइनरी लिमिटेड में 69.63% हिस्सेदारी, ब्रह्मपुत्र क्रैकर एंड पॉलिमर लिमिटेड में 10% और दुलियाजान में नुमालीगढ़ पाइपलाइन लिमिटेड (डीएनपीएल) में 23% हिस्सेदारी है। इसके अलावा, ओआईएल के पास असम पेट्रोकेमिकल लिमिटेड में 48.79% इक्विटी है, जो 600 टीपीडी क्षमता वाले मेथनॉल संयंत्र (जिसमें 500 टीपीडी नई इकाई और 100 टीपीडी मौजूदा इकाई शामिल है) और 200 टीपीडी फॉर्मेल्डिहाइड परियोजना का प्रचालन करती है।

ऑयल की संयुक्त उद्यम कंपनी, अर्थात् एचपीओआईएल गैस प्राइवेट लिमिटेड (एचओजीपीएल), 57 सीएनजी स्टेशन (कोल्हापुर: 427, अंबाला और कुरुक्षेत्र: 730) और 3 बायो सीएनजी आउटलेट (कोल्हापुर: 1, अंबाला और कुरुक्षेत्र: 2) प्रचालित करती है। अंबाला–कुरुक्षेत्र में 1,142 इंच–कि.मी. के लक्ष्य के मुकाबले 1,832.22 इंच–कि.मी. स्टील पाइपलाइन पूरी की गई है, जबकि कोल्हापुर में 1,800 इंच–कि.मी. के लक्ष्य के मुकाबले 1,921.11 इंच–कि.मी. पाइपलाइन

पूरी हुई है। अंबाला–कुरुक्षेत्र और कोल्हापुर में क्रमशः 20,951 और 38,857 डीपीएनजी कनेक्शन दिए गए हैं। एचओजीपीएल ने दोनों क्षेत्रों में अपने एमडब्ल्यूपी लक्ष्य को हासिल कर लिया है।

ओआईएल की जेवीसी, अर्थात् पूर्व भारती गैस प्राइवेट लिमिटेड (पीबीजीपीएल), दो भौगोलिक क्षेत्रों में काम करती है–(i) कछार–हैलाकांडी–करीमगंज और (ii) कामरूप–कामरूप मेट्रो, जिन्हें 9वें सीजीडी बोली दौर में प्रदान किया गया था। कछार–हैलाकांडी–करीमगंज भौगोलिक क्षेत्र में, 9 सीएनजी स्टेशन चालू होन के विभिन्न चरणों में हैं, जिसमें एक ओएनजीसी सीजीएस चालू है। कामरूप–कामरूप मेट्रो भौगोलिक क्षेत्र के लिए, 8 सीएनजी स्टेशन चालू किए गए हैं, और अतिरिक्त 11 चालू होने के विभिन्न चरणों में हैं। पीबीजीपीएल ने कछार–हैलाकांडी–करीमगंज भौगोलिक क्षेत्र में 751 इंच–कि.मी. के लक्ष्य के मुकाबले 299.3 इंच–कि.मी. स्टील पाइपलाइन स्थापित की है। कंपनी ने कछार–हैलाकांडी–करीमगंज भौगोलिक क्षेत्र में 3,141 पीएनजी कनेक्शन (सक्रिय तैयार) और कामरूप–कामरूप मेट्रो भौगोलिक क्षेत्र में 5,800 पीएनजी कनेक्शन (तैयार) प्रदान किए हैं। सीजीएस नूनमती का कार्य अंतिम चरण में है, और सीजीएस बैहाटा कामरूप–कामरूप मेट्रो भौगोलिक क्षेत्र में चारियाली का काम प्रगति पर है।

बोली के 11वें दौर में, ओआईएल जेवीसी, नॉर्थ ईस्ट गैस डिस्ट्रीब्यूशन कंपनी लिमिटेड (एनईजीडीसीएल) ने तीन भौगोलिक क्षेत्रों (असम–1 नंबर, त्रिपुरा–2 नंबर) जीते। एनईजीडीसीएल ने अपने 3 भौगोलिक क्षेत्रों उत्तरी असम, उत्तरी त्रिपुरा और दक्षिण त्रिपुरा के लिए पहले पांच वर्षों के निर्माण लागत ₹2081.39 करोड़ के लिए "अस–बिल्ट" परियोजना लागत को निधियां देने का प्रस्ताव किया। कंपनी ने दोनों प्रमोटरों से इक्विटी योगदान और ₹350 करोड़ के आवधिक ऋण के जरिए (ए–) क्रेडिट रेटिंग हासिल की। प्रमुख समझौतों को अंतिम रूप दिया गया, जिसमें आईजीजीएल के साथ गैस हुक–अप समझौता और गेल के साथ गैस बिक्री और परिवहन समझौता शामिल है। विशेष रूप से, एनईजीडीसीएल ने फरवरी 2025 में त्रिपुरा में 5 सीएनजी स्टेशनों का वाणिज्यिक प्रचालन शुरू किया। कंपनी ने जुलाई 2024 में अपने निगमन का पहला वर्ष भी पूरा कर लिया है और अपनी पहली लेखापरीक्षित वित्तीय और वार्षिक योजना को अपना लिया है।

ओआईएल ने एचपीसीएल (एचओजीपीएलः नागालैंड भौगोलिक क्षेत्र) और बीपीसीएल (निगमित होने वालीः अरुणाचल प्रदेश भौगोलिक क्षेत्र) के साथ अपने संयुक्त उद्यमों के माध्यम से 12वें सीजीडी बोली दौर में 2 भौगोलिक क्षेत्र भी जीते।

ओआईएल ने खान मंत्रालय द्वारा घोषित महत्वपूर्ण एवं सामरिक खनिजों की नीलामी के चौथे चरण में भी भाग लिया और उसे अरुणाचल प्रदेश राज्य में "फॉप ग्रेफाइट और वैनेडियम ब्लॉक" के लिए पसंदीदा बोलीदाता घोषित किया गया। इसके बाद, अरुणाचल प्रदेश सरकार के भूविज्ञान एवं खनन विभाग द्वारा ओआईएल को समग्र लाइसेंस हेतु आशय–पत्र जारी किया गया।

12.1.2.8 विदेशी पोर्टफोलियोः दिनांक 31.03.2025 की स्थिति के अनुसार कंपनी का विदेशी ईएंडपी पोर्टफोलियो रूस, वेनेजुएला, मोजाम्बिक, नाइजीरिया, बांग्लादेश, लीबिया और गैबॉन सहित 7 देशों में फैला हुआ है। पोर्टफोलियो में निम्नलिखित शामिल हैं:

i. चार (4) उत्पादक परिसंपत्तियाँ (रूस–3 और वेनेजुएला–1),

ii. दो (2) अन्वेषित और विकास परिसंपत्तियाँ (मोजाम्बिक–1 और नाइजीरिया–1)

iii. चार (4) अन्वेषणात्मक परिसंपत्तियाँ (लीबिया–1, गैबॉन–1, और बांग्लादेश–2)

दिनांक 31.03.2025 की स्थिति के अनुसार, ओआईएल की 4 विदेशी उत्पादक और खोजी गई परिसंपत्तियों (रूस के वानकोर्नेफ्ट और तास युर्याख, वेनेजुएला के कैराबोबो और मोजाम्बिक के रोवुमा एरिया 1) में हिस्सेदारी के अनुसार 2पी तेल और गैस भंडार की कुल मात्रा 40.9023 एमएमटीओई थी। चालू वित्त वर्ष 2024–25 के दौरान, विदेशी परिसंपत्तियों से संचयी उत्पादन में ओआईएल का हिस्सा 2.097 एमएमटीओई रहा। ब्लॉकों में प्रमुख विकास की स्थिति इस प्रकार है:–

i. **उत्पादक परिसंपत्तियाँ (4)**

1) **जेएससी वानकोर्नेफ्ट, रूस (रोसनेफ्टः 50.1%, ओआईएल/आईओसीएल/बीपीआरएलः23.9%, ओवीएलः 26%):** कंपनी ने आईओसीएल और बीपीआरएल के साथ मिलकर 5 अक्तूबर 2016 से रूस की जेएससी वैंकोरनेफ्ट में 23.9% हिस्सेदारी हासिल की है। यह परिसंपत्ति सिंगापुर में कंपनी की पूर्ण स्वामित्व वाली सहायक कंपनियों, ओआईएल, आईओसीएल और बीपीआरएल द्वारा संयुक्त रूप से निगमित एक विशेष प्रयोजन वाहन (एसपीवी) वैंकोर इंडिया प्राइवेट लिमिटेड (वीआईपीएल) के माध्यम से धारित है। दिनांक 31.03.2025 की स्थिति के अनुसार, इस परिसंपत्ति में कंपनी के सहभागी हित के अनुरूप 2पी आरक्षित स्थिति 11.2771 एमएमटी तेल और 4.1845 एमएमटीओई प्राकृतिक गैस अनुमानित की गई है। 2024–25 के दौरान, उत्पादन परिसंपत्तियों में कंपनी की हिस्सेदारी 1.006 एमएमटीओई रही। अब तक, परियोजना में ओआईएल की हिस्सेदारी के अनुसार, वीआईपीएल से लाभांश के रूप में कुल 369 मिलियन अमेरिकी डॉलर प्राप्त हुए हैं। इसके अलावा, ओआईएल की हिस्सेदारी के अनुसार वीआईपीएल से रूबल में 9.8 बिलियन रूबल का लाभांश भी मिला है (31.03.2025 तक की यूएसडी–आरयूबी विनिमय दर के अनुसार लगभग 117.1 मिलियन अमेरिकी डॉलर), जिसे अभी तक अमेरिकी डॉलर में परिवर्तित नहीं किया गया है और सिंगापुर वापस नहीं भेजा गया है।

2) **एलएलसी तास–युर्याख नेफ्टेगाजोडोबाइचा (टीवाईएनजीडी): रूस (रोसनेफ्टः 50.1%, ओआईएल/आईओसीएल/बीपीआरएलः 29.9%, ब्रिटिश पेट्रोलियमः 20%):** कंपनी ने आईओसीएल और बीपीआरएल के साथ मिलकर एलएलसी तास–युर्याख में 29.9% हिस्सेदारी प्राप्त की। यह परिसंपत्ति नेफ्टेगाज डोबिचा (टीवाईएनजीडी), रूस द्वारा 5 अक्तूबर 2016 से अधिगृहीत की गई है। इसे एसपीवी तास इंडिया प्राइवेट लिमिटेड (टीआईपीएल) के माध्यम से लिया गया है, जो कंपनी की पूर्ण स्वामित्व वाली सहायक कंपनी ओआईएल, आईओसीएल और सिंगापुर स्थित बीपीआरएल द्वारा मिलकर बनाई गई है।

दिनांक 31 मार्च 2025 की स्थिति के अनुसार, इस परिसंपत्ति में ओआईएल की हिस्सेदारी के अनुसार 2पी आरक्षित तेल की मात्रा 8.67 एमएमटी आंकी गई है। 2024–25 में, परिसंपत्ति में ओआईएल का उत्पादन हिस्सा 1.076 एमएमटीओई रहा। अब तक, टीआईपीएल स्तर पर ओआईएल की हिस्सेदारी के अनुसार परियोजना से लाभांश और पूंजी चुकौती के रूप में कुल 271 मिलियन अमेरिकी डॉलर प्राप्त हुए हैं। इसके अलावा, रूबल में 15.47 बिलियन (31 मार्च 2025 की विनिमय दर के अनुसार लगभग 184.9 मिलियन अमेरिकी डॉलर) का लाभांश भी ओआईएल की हिस्सेदारी के अनुसार टीआईपीएल स्तर पर प्राप्त हुआ है, जिसे अभी अमेरिकी डॉलर में परिवर्तित किया जाना है और सिंगापुर भेजा जाना है।

3) **रूसः** लाइसेंस 61 {ओआईएल–50% और पेट्रोनेफ्ट रिसोर्सेज लिमिटेड–50% (प्रचालक)}: ओआईएल ने 3 जुलाई 2014 को पेट्रोनेफ्ट रिसोर्सेज पीएलसी (पीआर) से अपने डब्ल्यूओएस ऑयल इंडिया इंटरनेशनल बीवी (ओआईआईबीवी) के माध्यम से वर्ल्डऐस इन्वेस्टमेंट लिमिटेड (डब्ल्यूआईएल) में 50% हिस्सेदारी हासिल की। डब्ल्यूआईएल की शेष 50% हिस्सेदारी पेट्रोनेफ्ट रिसोर्सेज पीएलसी (पीआर) के पास है। डब्ल्यूआईएल की रूस में एलएलसी स्टिमुल–टी नामक एक पूर्ण स्वामित्व वाली सहायक कंपनी है, जिसके पास ब्लॉक लाइसेंस–61 (एल–61) का लाइसेंस है। अब तक, लाइनिनोय, वेस्ट लाइनिनोय, अर्बुजोव्स्कोये और तुंगोलस्कॉय क्षेत्रों का विकास किया जा चुका है।

अगस्त 2022 से, नॉर्ड इंपीरियल पाइपलाइन बंद होने के कारण यह परिसंपत्ति कच्चा तेल उत्पादन नहीं कर रही है। प्रतिकूल प्रचालन और वित्तीय हालात के कारण, स्टिमुल–टी ने 10 मई 2023 को दिवालियापन के लिए आवेदन किया है।

4) **वेनेजुएलाः** प्रोजेक्ट कैराबोबो {कॉर्पोरेशन वेनेजुएला डेल पेट्रोलियो (सीवीपी)–71%, इंडोइल नीदरलैंड बीवी 7% (आईओसीएल–3.5%, ओआईएल–3.5%), ओवीएल–11%, रेपसोल वाईपीएफ (स्पेन)–11%}: रेपसोल (11%), ओवीएल (11%) और इंडोइल (7%) (आईओसीएल–3.5%, ओआईएल–3.5%) (सामूहिक रूप से अल्पसंख्यक शेयरधारक (एमएसएच) कहा जाता है) के परिसंघ के पास 29% हिस्सेदारी है, और सीवीपी (पीडीवीएसए की सहायक कंपनी) शेष 71% हिस्सेदारी रखती है, जो मैसर्स पेट्रोकाराबोबो एसए (पीसीबी) नामक एक मिश्रित कंपनी में प्रचालक है।

ओआईएल और आईओसीएल ने परियोजना में निवेश करने के लिए नीदरलैंड में इंडोइल नीदरलैंड बीवी (इंडोइल) मिश्रित कंपनी बनाने के अनुबंध पर 12 मई 2010 को 25 वर्ष की अवधि के लिए हस्ताक्षर किए गए थे।

परियोजना के पास 30 केबीडी क्षमता वाला कच्चा तेल उपचार संयंत्र है और इसका प्रचालन वह स्वयं करता है। वर्तमान में, वेनेजुएला में आर्थिक और राजनीतिक संकट के कारण परियोजना की गतिविधियाँ विलंबित हैं।

दिनांक 31 मार्च 2025 की स्थिति के अनुसार, प्रोजेक्ट कैराबोबो में ओआईएल की हिस्सेदारी के अनुसार 2पी आरक्षित तेल की मात्रा 0.10 एमएमटी आंकी गई है। 2024–25 में, कंपनी का उत्पादन हिस्सा 0.0154 एमएमटीओई रहा।

ii. विकास परिसंपत्तियां (2)

1) **मोजाम्बिक:** रोवुमा एरिया 1 में (कुल हिस्सेदारी: प्रचालक–26.5%, मित्सुई–20%, ईएनएच–15% कैरीड, बीपीआरएल–10%, बीआरईएमएल–10%, ओवीएल–10%, पीटीटीईपी–8.5%) ओआईएल ने ओवीएल के साथ मिलकर 7 जनवरी 2014 को वीडियोकॉन मोजाम्बिक रोवुमा 1 लिमिटेड खजिसे बाद में ब्यास रोवुमा एनर्जी मोजाम्बिक लिमिटेड (बीआरईएमएल) कहा गयाय ओवीएल 60%, ओआईएल 40%, के 100% शेयरों के अधिग्रहण के माध्यम से एरिया 1 मोजाम्बिक में 10% हिस्सेदारी हासिल की। मोजाम्बिक के काबो डेलगाडो प्रांत में सुरक्षा स्थिति बिगड़ने के कारण, प्रचालक ने 22 अप्रैल 2021 को अप्रत्याशित घटना की घोषणा की। परियोजना वर्तमान में इसी अप्रत्याशित घटना के अधीन है और क्षेत्र में सामान्य स्थिति बहाल करने के लिए प्रचालक और मोजाम्बिक सरकार के बीच चर्चा जारी है। दिनांक 31.03.2024 की स्थिति के अनुसार रोवुमा एरिया 1 में ओआईएल की हिस्सेदारी के अनुसार, गोल्फिन्हो–अतुम क्षेत्र की 2पी आरक्षित मात्रा 16.2095 एमएमटीओई प्राकृतिक गैस और 0.4566 एमएमटी कंडेनसेट अनुमानित की गई है।

2) **नाइजीरिया:** ब्लॉक ओएमएल 142 (पूर्व में ओपीएल 205) में ओआईएल की हिस्सेदारी 17.5%, आईओसीएल की 17.5% और सनटेरा रिसोर्सेज की 35% है। यह संयुक्त उद्यम सनटेरा नाइजीरिया 205 में प्रचालित है, जिसमें ब्लॉक की 70% हिस्सेदारी है और समिट पेट्रोलियम 30% (प्रचालक) है। सनटेरा नाइजीरिया 205 लिमिटेड (एसएन–205), जो नाइजीरिया में निगमित कंपनी है, ने मई 2006 में समिट ऑयल इंटरनेशनल से 40% भागीदारी हित (पीआई) और 30% आर्थिक हित (ईआई) का अधिग्रहण किया। इसके बाद, ओआईएल ने आईओसीएल के साथ मिलकर एसएन–205 की 25%–25% शेयरधारिता हासिल की। खोजे गए कूप ओटियन रु1 में पुनः प्रवेश के बाद, क्षेत्र #8 से एकल क्षेत्र के 3 विस्तारित कूप परीक्षण (ईडब्ल्यूटी) उत्पादन और ओटियन #1 कूप का पुनः प्रचालन पूरा हो गया। ओटियन क्षेत्र के निकट एक ऊर्जा पार्क बनाया जा रहा है, जो इस क्षेत्र से उत्पादित गैस के मुद्रीकरण में मदद करेगा।

iii. अन्वेषणात्मक परिसंपत्तियाँ (4)

1) **बांग्लादेश:** ब्लॉक एसएस–04 और एसएस–09 {ओआईएल–45%; ओवीएल (प्रचालक)–45%; बापेक्स: 10% (वहन)}: उथले अपतटीय ब्लॉक बांग्लादेश बोली दौर–2012 में प्रदान किए गए थे। दोनों ब्लॉकों के लिए उत्पादन हिस्सेदारी संविदाओं पर 17 फरवरी 2014 को ढाका, बांग्लादेश में पांच (05) वर्षों की प्रारंभिक अन्वेषण अवधि के लिए हस्ताक्षर किए गए, जो 16.02.2025 तक वैध था। वर्तमान में दोनों ब्लॉकों की अवधि को 2–वर्ष के लिए बढ़ाए जाने पर विचार किया जा रहा है। परिसंघ ने अनिवार्य भूकंपीय सर्वेक्षण और 1 (एक) तटवर्ती कूप (ब्लॉक एसएस–04 में) की खुदाई पूरी कर ली है। ब्लॉक एसएस–04 और एसएस–09 में प्रत्येक में 1 (एक) अपतटीय कूपों की खुदाई के लिए ड्रिलिंग रणनीति की योजना बनाई जा रही है।

2) **लीबिया:** एरिया 95/96 ब्लॉक में [सिपेक्स (प्रचालक)–50%, आईओसीएल–25%] ओआईएल–25%, परिसंघ ने 08 (आठ) कूपों की खुदाई की प्रतिबद्धता के तहत पांच कूपों की खुदाई पूरी कर ली है, और सभी खोदे गए कूपों में तेल और गैस मिली है। अशांति शुरू होने पर छठे कूप की ड्रिलिंग प्रगति पर थी और एरिया 95/96 में सभी प्रचालन

मई 2014 से निलंबित थे। अशांति के कारण ब्लॉक मई 2014 से अप्रत्याशित परिस्थितियों के अधीन था। लीबिया में कानून और व्यवस्था की स्थिति में सुधार को देखते हुए, एनओसी ने अप्रत्याशित परिस्थितियों को हटा दिया और 7 नवंबर 2023 से 30 महीने के लिए अन्वेषण अवधि बढ़ाने की सहमति दी, ताकि शेष एमडब्ल्यूपी पूरा किया जा सके। वर्तमान में, परिसंघ ने पुनः प्रवेश कार्यक्रम के माध्यम से छठे कूप को पूरा करने और ब्लॉक में शेष दो (02) कूपों की खुदाई करके एमडब्ल्यूपी पूरा करने की योजना बनाई है। छठे कूप में पुनः प्रवेश की प्रक्रिया शुरू कर दी गई है।

3) **गैबॉन:** ब्लॉक शक्ति–।। {ओआईएल (प्रचालक)–50%, आईओसीएल–50%): पुराने पीएससी (जी4–220) के दौरान ब्लॉक में तीसरे कूप (लासा–1) में तेल की खोज की गई थी। नए पीएससी (जी4–245) के चरण–। के एमडब्ल्यूपी के अनुसार दो मूल्यांकन कूप (लासा–2 और 3) भी ड्रिल किए गए और चरण–। में 1213.04 एलकेएम का 2डी भूकंपीय एपीआई पूरा हो गया। एकीकृत व्याख्या और संभावना मूल्यांकन के आधार पर, परिसंघ ने ब्लॉक में चरण–।। अन्वेषण अवधि में प्रवेश किया है, जिसे वैधानिक देरी और कोविड–19 महामारी के कारण 15.04.2025 तक बढ़ाया गया था। वर्तमान में, ड्रिलिंग की तैयारी 8.4 पाइपलाइन पर की जा रही है।

4) **सूडान:** उत्पाद पाइपलाइन {ओआईएल–10% भागीदारी हित और ओवीएल–90% भागीदारी हित}: इस परियोजना में अल–राव्यान से पोर्ट सूडान तक 12'' x 741 कि.मी. लंबी क्रॉस कंट्री बहु उत्पाद पाइपलाइन का निर्माण शामिल था। पाइपलाइन का निर्माण बिल्ड, ऑपरेट, लीज और ट्रांसफर (बीओएलटी) के आधार पर किया गया है। परिसंघ ने परियोजना के लिए ईपीसी ठेकेदार के रूप में मैसर्स डोडसल प्राइवेट लिमिटेड को नियुक्त किया। परियोजना 15 महीने में पूरी हुई, जबकि लक्ष्य 16 महीने का था। पाइपलाइन वर्ष 2005 में चालू हुई।

12.1.2.9 वित्तीय निष्पादन

₹/करोड़

	2020-21	2021-22	2022-23	2023-24	2024-25
कुल आय	10,561.45	16,427.65	24,757.85	24,514.28	23987.07
कुल लाभ/(हानि)	1,741.59	3,887.31	6,810.40	5,551.85	6114.19
योजना परिव्यय–वास्तविक	13,331.93	4,366.52	5,534.42	5906.92	8467.33
योजना लक्ष्य	3,877.00	4,108.00	4,302.00	4,896.00	6,880.00

12.1.2.10 कॉर्पोरेट सामाजिक उत्तरदायित्व (सीएसआर): ऑयल इंडिया एक जिम्मेदार कॉर्पोरेट नागरिक है और अपने कार्यक्षेत्र तथा समाज के समग्र और समावेशी विकास के लिए सीएसआर के सिद्धांतों के प्रति पूरी तरह प्रतिबद्ध है। कंपनी अधिनियम 2013 की अनुसूची VII के अनुसार, कंपनी ने निम्नलिखित प्रमुख क्षेत्रों में विभिन्न सीएसआर परियोजनाएँ शुरू की हैं:

1) **स्वास्थ्य सेवा और पोषण:** ओआईएल ने स्वास्थ्य सेवा की पहुँच और बुनियादी ढाँचे में सुधार के लिए ओआईएल आरोग्य और ओआईएल स्पर्श जैसी कई प्रमुख परियोजनाएँ शुरू की हैं। ये पहल चिकित्सा सेवाएँ, मातृ एवं शिशु स्वास्थ्य सेवा प्रदान करने और कमजोर वर्गों में कुपोषण की समस्या को दूर करने पर केंद्रित हैं।

2) **स्वच्छ भारत अभियान (पेयजल एवं स्वच्छता):** राष्ट्रीय स्वच्छता आंदोलन का समर्थन करते हुए, ओआईएल ने स्कूल और सामुदायिक शौचालयों का निर्माण किया है, स्वच्छ पेयजल आपूर्ति को सुगम बनाया है और ठोस अपशिष्ट प्रबंधन प्रणालियाँ लागू की हैं। कर्मचारियों के नेतृत्व वाली गतिविधियों के माध्यम से जागरूकता अभियान और सामुदायिक भागीदारी ने इस प्रयास को और मजबूत किया है।

3) **शिक्षा:** ओआईएल की प्रसंशनीय ''ओआईएल प्रज्ञान सुपर 30'' परियोजना आर्थिक रूप से कमजोर वर्गों के जेईई और नीट उम्मीदवारों को मुफ्त आवासीय कोचिंग प्रदान करती है। ओआईएल की अन्य शैक्षिक पहलों में ''ओआईएल दिशा'' भी शामिल है, जो युवाओं को विभिन्न प्रतियोगी सेवा परीक्षाओं की कोचिंग देकर उनके करियर लक्ष्यों को साकार करने में मदद करती है। इसके अलावा, ओआईएल ने साक्षरता कार्यक्रम भी शुरू किया है, जो साक्षरता बढ़ाने और समावेशी शिक्षा पर ध्यान केंद्रित करता है, विशेष रूप से दिव्यांगजनों के लिए, ताकि सभी को समान सीखने के अवसर मिल सकें।

4) **संधारणीय आजीविका सृजन:** रूपान्तर, जीविका और समर्पित कृषि परियोजनाएं जैसे कार्यक्रम वैकल्पिक आजीविका विकल्पों को बढ़ावा देकर और आय सृजन क्षमताओं को बढ़ाकर ग्रामीण आबादी को सशक्त बनाते हैं।

5) **कौशल विकास और क्षमता निर्माण:** परियोजना के तहत, स्वावलंबन और कौशल विकास संस्थान (एसडीआई), गुवाहाटी के सहयोग से, ओआईएल युवाओं को, खासकर पूर्वोत्तर क्षेत्र में, व्यावसायिक और उद्योग–संबंधित प्रशिक्षण देता है, ताकि वे रोजगार के लिए तैयार हो सकें।

6) **महिला सशक्तिकरण:** ओआईएल महिला–केंद्रित पहलों का समर्थन करता है, जैसे हथकरघा, हस्तशिल्प और उद्यमिता उत्कृष्टता केंद्र। इसके अलावा, ओआईएल अपने नर्सिंग स्कूल के माध्यम से तीन वर्षीय जीएनएम नर्सिंग पाठ्यक्रम चलाता है, जिससे महिलाओं को आर्थिक स्वतंत्रता और सामाजिक सशक्तिकरण प्राप्त होता है।

7) **पर्यावरण और स्थिरता:** ओआईएल वनरोपण अभियान, जैव विविधता संरक्षण और जल निकायों के पुनरुद्धार परियोजनाओं में सक्रिय रूप से भाग लेता है। डिगबोई में एक विशेष बांस सेटलम की स्थापना इसके पर्यावरण संरक्षण के प्रयासों का प्रमाण है।

8) **कला, संस्कृति और विरासत को बढ़ावा देना:** कंपनी अपने कार्यक्षेत्रों में विभिन्न कार्यक्रमों के माध्यम से भारत की समृद्ध सांस्कृतिक और धार्मिक विरासत के संरक्षण और संवर्धन में योगदान देती है।

9) **खेलों का विकास:** ओआईएल विशेष रूप से ग्रामीण और पिछड़े क्षेत्रों में खेल प्रतिभाओं को विकसित करने के लिए विशेष कोचिंग, पुनर्वास सुविधाओं सहित खेल अवसंरचना और प्रशिक्षण में निवेश करता है।

10) **ग्रामीण अवसंरचना विकास:** ओआईएल ग्रामीण क्षेत्रों में सड़कों, पुलों, सामुदायिक हॉलों और प्रतीक्षालय जैसी जरूरी अवसंरचना के निर्माण और सुधार में योगदान देता है, जिससे जीवन की गुणवत्ता में सुधार होता है।

12.1.3 गेल (इंडिया) लिमिटेड (गेल):

गेल (इंडिया) लिमिटेड को अगस्त, 1984 में पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय (एमओपीएंडएनजी) के तहत एक केंद्रीय सार्वजनिक क्षेत्र उपक्रम (पीएसयू) के रूप में शामिल किया गया था, जिसका मिशन "राष्ट्रीय अर्थव्यवस्था के लाभ के लिए प्राकृतिक गैस और उसके अंशों के प्रभावी और आर्थिक उपयोग में तेजी लाना और अनुकूलन करना'' था।

गेल (इंडिया) लिमिटेड पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के अधीन एक महारत्न सीपीएसई है। गेल के पास लगभग 16,420 किलोमीटर लंबी प्राकृतिक गैस पाइपलाइनों का एक बड़ा नेटवर्क है; लगभग 2040 किलोमीटर लंबी एलपीजी पाइपलाइन; एलपीजी और अन्य तरल हाइड्रोकार्बन के उत्पादन के लिए लगभग 1.4 एमएमटीपीए की संयुक्त उत्पादन क्षमता वाले पांच गैस प्रोसेसिंग संयंत्र और 810 केटीपीए पॉलीमर क्षमता वाला एक गैस आधारित एकीकृत पेट्रोकेमिकल संयंत्र है। गेल दो अन्य पेट्रोकेमिकल परियोजनाओं का को–प्रमोटर है, जिनमें असम में 280 केटीपीए क्षमता वाला ब्रह्मपुत्र क्रैकर एंड पॉलीमर लिमिटेड (बीसीपीएल) कॉम्प्लेक्स और गुजरात में 1.4 एमएमटीपीए क्षमता वाली ओएनजीसी पेट्रो–एडिशंस लिमिटेड (ओपीएएल) परियोजना शामिल है। गेल का एक संयुक्त उद्यम पेट्रोनेट एलएनजी, दाहेज और कोच्चि में दो एलएनजी पुनर्गैसीकरण टर्मिनलों का प्रचालन करता है। गेल कोंकण एलएनजी प्राइवेट लिमिटेड का प्रमोटर भी है जो धाबोल में 5 एमएमटीपीए की डिजाइन क्षमता के साथ एलएनजी रीगैसिफिकेशन टर्मिनल का प्रचालन करता है। इसके अलावा, गेल के पास एनएफएल, ईआईएल और एफसीआईएल

द्वारा 2200 एमटीपीडी अमोनिया और 3850 एमटीपीडी यूरिया के उत्पादन के लिए शामिल रामागुंडम फर्टिलाइजर एंड केमिकल्स लिमिटेड (आरएफसीएल) में 14.72% इक्विटी हिस्सेदारी है। गेल एक संयुक्त उद्यम के माध्यम से कोयला गैसीकरण आधारित उर्वरक संयंत्र स्थापित कर रहा है। यह तालचेर फर्टिलाइजर लिमिटेड (टीएफएल), कोल इंडिया लिमिटेड (सीआईएल), और राष्ट्रीय केमिकल्स एंड फर्टिलाइजर्स लिमिटेड (आरसीएफ) के साथ मिलकर बनाया गया है, जिसमें प्रत्येक की 31.85% इक्विटी हिस्सेदारी है और फर्टिलाइजर कॉर्पोरेशन ऑफ इंडिया लिमिटेड (एफसीआई) की 4.45% हिस्सेदारी है। गेल ने ओएनजीसी त्रिपुरा पावर कंपनी में 26% हिस्सेदारी और मैसर्स एलएनजी जैपोनिका शिपिंग कॉर्पोरेशन लिमिटेड में 26% इक्विटी हिस्सेदारी भी हासिल की है। इसके अलावा, गेल ने कॉर्पोरेट दिवाला समाधान प्रक्रिया (सीआईआरपी) के माध्यम से जेबीएफ पेट्रोकेमिकल्स लिमिटेड (जेबीएफपीएल) से एमएमटीपीए शुद्ध टेरेफ्थैलिक एसिड (पीटीए) का अधिग्रहण कर लिया है। जेबीएफपीएल का नाम बदलकर गेल मैंगलोर पेट्रोकेमिकल्स लिमिटेड (जीएमपीएल) कर दिया गया है और अब यह गेल की पूर्ण स्वामित्व वाली सहायक कंपनी है।

गेल भारत में नगर गैस वितरण (सीजीडी) व्यवसाय में अग्रणी है। 12वें सीजीडी बोली दौर के पूरा होने के बाद, इसकी उपस्थिति पूरे भारत भर में 72 भौगोलिक क्षेत्रों में है। भारत में गेल की अपने सीजीडी व्यवसाय के लिए 8 संयुक्त उद्यम और तीन सहायक कंपनियाँ हैं।

इसके अलावा, गेल की रूस, अमेरिका, सिंगापुर, म्यांमार, चीन और मिस्र में भी उपस्थिति है। इसने सिंगापुर, यंगून, ह्यूस्टन और मॉस्को (भारत ऊर्जा कार्यालय) में कार्यालय खोले हैं। अमेरिका में इसकी एक पूर्ण स्वामित्व वाली सहायक कंपनी, गेल ग्लोबल (यूएसए) इंक. (जीजीयूआई) है। जीजीयूआई ने एक सहायक कंपनी, गेल ग्लोबल (यूएसए) एलएनजी एलएलसी (जीजीयूएलएल) का गठन किया है, जिसने कोव पॉइंट एलएनजी द्रवीकरण परियोजना में एमएमटीपीए क्षमता बुक की है। गेल की एक और पूर्ण स्वामित्व वाली सहायक कंपनी, गेल ग्लोबल (सिंगापुर) प्राइवेट लिमिटेड, एलएनजी के व्यापार और विदेशी निवेश के लिए कार्यरत है। गेल का कुल एलएनजी सोर्सिंग पोर्टफोलियो लगभग 15.5 एमएमटीपीए है।

गेल की 13 ब्लॉकों में भागीदारी है, जिनमें से 10 ब्लॉक भारत में, 2 म्यांमार में और ईगल फोर्ड बेसिन, टेक्सास, अमेरिका में एक शेल गैस संयुक्त उद्यम है। इसके अलावा, गेल की साउथ ईस्ट एशिया गैस पाइपलाइन कंपनी (एसईएजीपी) में 4.17% इक्विटी भागीदारी है, जो म्यांमार से चीन तक गैस का परिवहन करती है। गेल ने मिस्र और चीन में डाउनस्ट्रीम व्यवसाय में तीन कंपनियों में निवेश किया है।

गेल के पास लगभग 145 मेगावाट का नवीकरणीय ऊर्जा पोर्टफोलियो है, जिसमें लगभग 118 मेगावाट पवन और लगभग 27 मेगावाट सौर ऊर्जा शामिल है। इसके अतिरिक्त, गेल जैविक अपशिष्ट से संपीड़ित जैव गैस (सीबीजी) के उत्पादन और विपणन में विभिन्न व्यावसायिक अवसरों की खोज कर रहा है। नए व्यावसायिक अवसरों के लिए एथेनॉल, हाइड्रोजन, कोयला गैसीकरण, लघु एलएनजी यूनिट, एलएनजी खुदरा क्षेत्र आदि जैसे उभरते क्षेत्रों की भी खोज की जा रही है।

हाइड्रोजन मूल्य श्रृंखला के विकास के संबंध में की गई पहल के एक भाग के रूप में, गेल ने अवंतिका गैस लिमिटेड (एजीएल), इंदौर (मध्य प्रदेश) के सीजीडी नेटवर्क में नगर गैस वितरण ग्रिड में हाइड्रोजन मिश्रण की भारत की पहली प्रायोगिक परियोजना शुरू की है और मध्य प्रदेश के विजयपुर में देश का पहला 10 मेगावाट ग्रीन हाइड्रोजन इलेक्ट्रोलाइजर चालू किया है, जिसमें नवीकरणीय ऊर्जा का उपयोग करके इलेक्ट्रोलिसिस के माध्यम से 4.3 टीपीडी हाइड्रोजन का उत्पादन करने की क्षमता है।

आवश्यक पाइपलाइन अवसंरचना के अभाव वाले दूरस्थ मांग केंद्रों को गैस की आपूर्ति करने के लिए, गेल ने (दो) लघु पैमाने एलएनजी स्किड्स खरीदे, जो भारत में अपनी तरह के पहले थे और गेल, विजयपुर में दोनों लघु–स्तरीय एलएनजी (एसएसएलएनजी) स्किड्स को सफलतापूर्वक चालू किया, जिससे पृथक स्रोतों और उपभोक्ताओं को प्राकृतिक गैस आपूर्ति श्रृंखला से जोड़ने में एसएसएलएनजी प्रौद्योगिकी की क्षमता प्रदर्शित हुई।

गेल ने 2035 तक स्कोप 1 और स्कोप 2 उत्सर्जन में 100% कमी और 2040 तक स्कोप–3 में 35% कमी हासिल करने के लिए नेट जीरो कार्यनीति और संगठन–व्यापी रोडमैप विकसित किया है।

12.1.3.1 भौतिक एवं वित्तीय निष्पादनः–

मानदंड	यूनिट	2023–24 में निष्पादन	2024–25 में निष्पादन
गैस परिवहन	एमएमएससीएमडी	120	127
गैस विपणन	एमएमएससीएमडी	98	101.5
तरल हाइड्रोकार्बन उत्पादन	टीएमटी	995	827
पेट्रोकेमिकल उत्पादन	टीएमटी	777	948
एलपीजी परिवहन	टीएमटी	4396	4478

वित्तीय निष्पादन

विवरण	यूनिट	2023–24 में निष्पादन	2024–25 में निष्पादन
प्रचालन से राजस्व	₹ करोड़	1,30,638	137288
सकल मार्जिन (ईबीडीआईटीए)	₹ करोड़	15,583	19168
कर पूर्व लाभ	₹ करोड़	11,555	14825
कर पश्चात् लाभ	₹ करोड़	8,836	11312

12.1.3.2 गेल द्वारा निष्पादित प्रमुख परियोजनाए/पाइपलाइनें:–

(i) **जगदीशपुर हल्दिया और बोकारो–धामरा पाइपलाइन (जेएचबीडीपीएल):** पूर्वी भारत में किफायती मूल्य पर स्वच्छ और गुणवत्तापूर्ण ऊर्जा सुनिश्चित करने के उद्देश्य से, गेल जगदीशपुर–हल्दिया और बोकारो–धामरा प्राकृतिक गैस पाइपलाइन (जेएचबीडीपीएल) परियोजना (2563 कि.मी.) का कार्यान्वयन कर रहा है, जिसे पूर्वी भारत की प्रधानमंत्री ऊर्जा गंगा के रूप में जाना जाता है। इसके अलावा, पूर्वोत्तर क्षेत्र (एनईआर) को राष्ट्रीय गैस ग्रिड से जोड़ने के लिए, पाइपलाइन को जेएचबीडीपीएल के एक अभिन्न अंग के रूप में बरौनी से गुवाहाटी (सिलीगुड़ी और बोंगाईगांव के रास्ते) (726 कि.मी.) तक बढ़ाया जा रहा है। जेएचबीडीपीएल की कुल एकीकृत लंबाई 3289 कि.मी. है। बीजीपीएल सहित पूरे जेएचबीडीपीएल को 17,405 करोड़ रुपए के निवेश से क्रियान्वित किया जा रहा है। यह उत्तर प्रदेश (335 कि.मी.), बिहार (719 कि.मी.), झारखंड (500 कि.मी.), पश्चिम बंगाल (696 कि.मी.), ओडिशा (785 कि.मी.) और असम (254 कि.मी.) से होकर गुजरेगी। जेएचबीडीपीएल ने एचयूआरएल गोरखपुर, एचयूआरएल सिंदरी, एचयूआरएल बरौनी के उर्वरक संयंत्रों को पुनर्जीवित किया है और दुर्गापुर स्थित मैसर्स मैटिक्स फर्टिलाइजर्स की माँग भी पूरी कर रही है। इसके अलावा, यह नेटवर्क पाइपलाइन के रास्ते भारत के पूर्वी हिस्से में घरेलू और औद्योगिक ग्राहकों को स्वच्छ ईंधन की आपूर्ति सुनिश्चित करेगा।

जगदीशपुर–हल्दिया और बोकारो–धामरा प्राकृतिक गैस पाइपलाइन (जेएचबीडीपीएल) के सभी खंड (लगभग 3118 कि.मी.) चालू हो चुके हैं, सिवाय दुर्गापुर–हल्दिया पाइपलाइन (लगभग 162 कि.मी.) के। शेष खंड के वर्ष 2025 में पूरा होने की उम्मीद है।

(ii) **मुंबई नागपुर झारसुगुड़ा पाइपलाइन (एमएनजेपीएल):** मुंबई–नागपुर–झारसुगुड़ा पाइपलाइन 14.6 एमएमएससीएमडी क्षमता वाली 1755 किलोमीटर लंबी पाइपलाइन है जो मुंबई से शुरू होकर झारसुगुड़ा में समाप्त होगी। इसकी मुख्य लाइन नागपुर (महाराष्ट्र) से जबलपुर (मध्य प्रदेश) तक जाएगी। यह राष्ट्रीय गैस ग्रिड (एनजीजी) का भी एक हिस्सा है और महाराष्ट्र (12 जिले), मध्य प्रदेश (3 जिले), छत्तीसगढ़ (9 जिले) और ओडिशा (1 जिला) राज्यों के 25 जिलों से होकर गुजरेगी। यह ठाणे (महाराष्ट्र) से शुरू होगी और झारसुगुड़ा (ओडिशा) में जेएचबीडीपीएल से जुड़ेगी।

यह पाइपलाइन स्वच्छ ईंधन की उपलब्धता सुनिश्चित करेगी और नगर गैस वितरण (सीजीडी), उद्योगों और एंकर लोड ग्राहकों की माँग को पूरा करेगी। घरेलू गैस की उपलब्धता भविष्य में बिजली, उर्वरक जैसे प्रमुख उद्योगों और पाइपलाइन के मार्ग में आने वाले अन्य उद्योगों के विकास में सहायक हो सकती है। पीएनजीआरबी ने 50 जिलों (महाराष्ट्रः 19, मध्य प्रदेशः 14, छत्तीसगढ़ः 17) को कवर करने वाले लगभग 15 भौगोलिक क्षेत्रों को भी अधिकृत किया है, जहाँ निकट भविष्य में नगर गैस वितरण नेटवर्क विकसित किया जाएगा।

पाइपलाइन कई औद्योगिक क्षेत्रों से होकर गुजर रही है। महाराष्ट्र में म्हस्कल, औरंगाबाद, वर्धा, अमरावती, जलगांव, नागपुर, गोंदियाय मध्य प्रदेश में जबलपुर और छिंदवाड़ा; छत्तीसगढ़ में रायपुर, दुर्ग, बिलासपुर, कोरबा और रायगढ़; ओडिशा में झारसुगुड़ा. निर्माण कार्य पूरे जोरों पर है और मार्च, 2025 तक लगभग 1680 किलोमीटर पाइपलाइन बिछाने का काम पूरा कर लिया गया है।

(iii) **श्रीकाकुलम अंगुल पाइपलाइन (एसएपीएल):** ओडिशा और आंध्र प्रदेश में स्वच्छ और गुणवत्तापूर्ण ऊर्जा की आपूर्ति के उद्देश्य से, इस पाइपलाइन का राष्ट्रीय गैस ग्रिड के एक भाग के रूप में रणनीतिक महत्व है और यह अंगुल में गेल की जगदीशपुर हल्दिया बोकारो धामरा पाइपलाइन (जेएचबीडीपीएल) नेटवर्क और श्रीकाकुलम में आंध्र प्रदेश गैस वितरण निगम (एपीजीडीसी) की काकीनाडा श्रीकाकुलम पाइपलाइन से जुड़ेगी। पाइपलाइन दहेज, एन्नोर, धामरा, गंगावरम (एपी), गोपालपुर एफएसआरयू आदि जैसे मौजूदा/निर्माणाधीन एलएनजी टर्मिनलों से गैस के उठाव के लिए महत्वपूर्ण बुनियादी ढांचे के रूप में कार्य करेगी।

श्रीकाकुलम अंगुल पाइपलाइन की कुल लंबाई 744 किलोमीटर (ओडिशा में 619 किलोमीटर और आंध्र प्रदेश में 125 किलोमीटर) है, जिसकी क्षमता 6.65 एमएमएससीएमडी है और यह ओडिशा के अंगुल, ढेंकनाल, कटक, खोरधा, नयागढ़, गजपति, गंजम, रायगड़ा, कोरापुट और कालाहांडी जिलों और आंध्र प्रदेश के श्रीकाकुलम और विजयनगरम जिलों से होकर गुजरती है।

421 किलोमीटर (मेनलाइन) पाइपलाइन खंड पूरा हो चुका है और शेष 322 किलोमीटर (स्परलाइन) कार्यान्वयन के अधीन है (मार्च, 2025 तक 258 किलोमीटर पाइपलाइन बिछाई जा चुकी है) जिसे वर्ष 2025 में पूरा किया जाना है।

(iv) **कोच्चि–कूट्टनद–बेंगलुरु–मैंगलोर पाइपलाइन (केकेबीएमपीएल) परियोजना चरण–।। (901 कि.मी.):** कोच्चि–कूट्टनद–बेंगलोर–मैंगलोर पाइपलाइन (केकेबीएमपीएल) परियोजना की अवधारणा वर्ष 2007 में भारत सरकार द्वारा महत्वाकांक्षी राष्ट्रीय गैस ग्रिड (एनजीजी) के भाग के रूप में की गई थी और गेल को एमओपीएनजी द्वारा केरल, कर्नाटक और तमिलनाडु राज्यों में इस गैस पाइपलाइन परियोजना को बिछाने के लिए अधिकृत किया गया था। 16 एमएमएससीएमडी की कुल क्षमता वाली इस 30''/24'' पाइपलाइन की योजना कोच्चि एलएनजी टर्मिनल से पुनः गैसीकृत एलएनजी (आरएलएनजी) को निकालने के लिए बनाई गई थी ताकि केरल, तमिलनाडु और कर्नाटक राज्य में विभिन्न उपभोक्ताओं तक परिवहन किया जा सके, जिससे इन तीन दक्षिणी राज्यों को राष्ट्रीय गैस ग्रिड से जोड़ा जा सके। यह पाइपलाइन घरों में खाना पकाने के लिए पीएनजी (पाइप्ड नेचुरल गैस), होटल उद्योग, परिवहन क्षेत्र में वाहनों के लिए सीएनजी (संपीड़ित प्राकृतिक गैस), बिजली संयंत्रों, उर्वरक संयंत्रों और कई अन्य उद्योगों की जरूरतों को पूरा करेगी।

परियोजना का कार्यान्वयन और कमीशनिंग तेजी से जारी है। **579 किलोमीटर का काम पूरा हो चुका है और 322 किलोमीटर का कृष्णागिरि–कोयंबटूर खंड निर्माणाधीन है। पाइपलाइन का पूरा काम 2025 तक पूरा होने की योजना है।**

(v) **धामरा हल्दिया पाइपलाइन परियोजनाः** आईओसीएल हल्दिया की अतिरिक्त गैस मांग और ओडिशा और पश्चिम बंगाल के रास्ते में सीजीडी भौगेलिक क्षेत्र की मांग को पूरा करने के लिए धामरा हल्दिया पाइपलाइन परियोजना को प्रधानमंत्री ऊर्जा गंगा (पीएमयूजी) पाइपलाइन परियोजना के विस्तार के रूप में रखा जा रहा है, जिसे जगदीशपुर–हल्दिया और बोकारो धामरा पाइपलाइन परियोजना (जेएचबीडीपीएल) नाम

दिया गया है। पाइपलाइन ओडिशा राज्य के जिलों (154 कि.मी.) और पश्चिम बंगाल राज्य के 02 जिलों (99 कि.मी.) से होकर गुजर रही है।

धामरा–हल्दिया पाइपलाइन का निर्माण ₹1030 करोड़ की लागत से किया जा रहा है और इसके वर्ष 2025 तक पूरा होने का अनुमान है। ओडिशा में 154 किलोमीटर पाइपलाइन खंड पूरा हो चुका है। पश्चिम बंगाल में शेष 99 किलोमीटर का कार्य प्रगति पर है (मार्च 2025 तक पश्चिम बंगाल में 62.8 किलोमीटर पाइपलाइन बिछाई जा चुकी है)।

(vi) **गुरदासपुर जम्मू पाइपलाइन परियोजनाः** गेल 160 किलोमीटर लंबी गुरदासपुर–जम्मू पाइपलाइन का निर्माण कर रहा है जिसकी अधिकृत क्षमता 3.1 एमएमएससीएमडी है। इस पाइपलाइन का उद्देश्य स्वच्छ प्राकृतिक गैस की आपूर्ति के लिए केंद्र शासित प्रदेश जम्मू और कश्मीर को राष्ट्रीय गैस ग्रिड से जोड़ना है। इसकी निर्धारित पूर्णता तिथि जुलाई, 2026 है (मार्च, 2025 तक पश्चिम बंगाल में 62.8 किलोमीटर पाइपलाइन बिछाई जा चुकी है)।

(vii) **कोयला गैसीकरणः** गेल, कोल इंडिया लिमिटेड (सीआईएल) और राष्ट्रीय केमिकल्स एंड फर्टिलाइजर्स लिमिटेड (आरसीएफ) के साथ मिलकर तालचेर फर्टिलाइजर्स लिमिटेड (टीएफएल) नामक संयुक्त उद्यम के माध्यम से कोयला गैसीकरण आधारित यूरिया परियोजना स्थापित कर रहा है। इसमें प्रत्येक की 31.85% हिस्सेदारी है और फर्टिलाइजर कॉर्पोरेशन ऑफ इंडिया लिमिटेड (एफसीआईएल) की 4.45% हिस्सेदारी है। लगभग 17,080 करोड़ रुपए की अनुमानित लागत वाली इस परियोजना से प्रतिदिन 2,200 मीट्रिक टन अमोनिया और 3,850 मीट्रिक टन यूरिया का उत्पादन होने की योजना है।

(viii) **पेट्रोकेमिकल्सः**

क) केटीए पीडीएच–पीपी यूनिट स्थापित कर रहा है, जो भारत की पहली प्रोपेन डिहाइड्रोजनीकरण यूनिट है, जो पॉलीप्रोपाइलीन यूनिट और ऑफसाइट यूनिट के साथ एकीकृत है। यह यूनिट उसर, महाराष्ट्र में स्थित है और इसके साथ ही उसर–उरण प्रोपेन पाइपलाइन (नई लिक्विड हाइड्रोकार्बन पाइपलाइन) भी स्थापित की जाएगी। यह परियोजना महाराष्ट्र के रायगढ़ जिले में गेल–उरण के मौजूदा एलपीजी रिकवरी प्लांट में स्थित है। प्रोपेन फीड मौजूदा बीपीसीएल उरण टर्मिनल से प्राप्त किया जाएगा और इसे एक समर्पित लिक्विड प्रोपेन पाइपलाइन के माध्यम से गेल–उरण संयंत्र तक पंप किया जाएगा। परियोजना की कुल लागत ₹11,256 करोड़ है। सभी प्रमुख उपकरण और अनुबंध प्रदान किए जाने के साथ, साइट निर्माण गतिविधियाँ पूरे जोरों पर चल रही हैं और ये अक्तूबर, 2025 तक पूरी हो जाएँगी।

ख) **पॉलीप्रोपाइलीन परियोजना, पाताः** गेल पाता पेट्रोकेमिकल कॉम्प्लेक्स, जिला औरैया, उत्तर प्रदेश में 60 केटीपीए क्षमता वाली पॉलीप्रोपाइलीन (पीपी) यूनिट भी स्थापित कर रहा है, जिसकी अनुमानित लागत लगभग ₹1,299 करोड़ है। यह नई यूनिट मौजूदा पाता पेट्रोकेमिकल कॉम्प्लेक्स के भीतर बनाई जा रही है और इसमें पहले से निर्मित पॉलीमर ग्रेड प्रोपाइलीन का उपयोग फीडस्टॉक के रूप में होगा। सभी उपकरण और निर्माण कार्य के ठेके दे दिए गए हैं, और परियोजना को जुलाई 2025 तक पूरा करने का लक्ष्य रखा गया है।

ग) **गेल मैंगलोर पेट्रोकेमिकल्स लिमिटेडः** गेल ने 2023 में एनसीएलटी द्वारा आयोजित प्रतिस्पर्धी बोली प्रक्रिया के जरिए कॉर्पोरेट इन्सॉल्वेंसी रिजॉल्यूशन प्रोसेस (सीआईआरपी) के तहत जेबीएफ पेट्रोकेमिकल्स लिमिटेड (जेबीएफपीएल) में 100% हिस्सेदारी हासिल की, जिससे यह गेल की पूर्ण स्वामित्व वाली सहायक कंपनी बन गई। अधिग्रहण के बाद, कंपनी का नाम बदलकर गेल मैंगलोर पेट्रोकेमिकल्स लिमिटेड (जीएमपीएल) कर दिया गया। जीएमपीएल प्लांट की नाममात्र क्षमता शुद्ध टेरेफ्थेलिक एसिड (पीटीए) की है, जो पॉलिएस्टर फाइबरध्यार्न और पीईटी जैसी वस्तुओं के लिए कच्चा माल है। अधिग्रहण के समय प्लांट का निर्माण लगभग 95% पूरा हो चुका था।

12.1.3.3 वित्त वर्ष 2024–25 के दौरान गेल की कुछ प्रमुख उपलब्धियाँ:

- गेल ने वित्त वर्ष 2023–24 के लिए डीपीई से उत्कृष्ट एमओयू रेटिंग प्राप्त की।
- दिनांक 27.07.2024 को अब तक का सबसे अधिक दैनिक नवीकरणीय ऊर्जा उत्पादन 1895.79 मेगावाट–घंटा दर्ज किया गया।

- दिनांक 03.07.2024 को जेएचबीडीपीएल नेटवर्क के माध्यम से अब तक की सबसे अधिक गैस बिक्री 13.01 एमएमएससीएमडी हुई।
- दिनांक 10 मई, 2024 को 141.53 एमएमएससीएमडी का अब तक का उच्चतम प्राकृतिक गैस संचरण दर्ज किया गया।
- दिनांक 31 दिसंबर, 2024 को 13,530 मीट्रिक टन की अब तक की सबसे अधिक एकल दिवस पॉलिमर बिक्री हासिल की गई।
- दिनांक 31 जुलाई, 2024 को गेल के शेयर की कीमत ₹246 तक पहुंच गई।
- दिनांक 16.05.2024 को विजयपुर से पाता तक सी2–सी3 तरल पाइपलाइन (14''x 360 कि.मी.) के लिए निवेश की मंजूरी दी गई।
- विजयपुर में गेल के पहले 10 मेगावाट ग्रीन हाइड्रोजन प्लांट का उद्घाटन दिनांक 24.05.2024 को हुआ।
- गेल ने के–लाइन के साथ दीर्घकालिक आधार पर नवनिर्मित एलएनजी पोत को किराए पर लेने के लिए समझौते पर हस्ताक्षर किए।
- गेल ने अपने ग्राहकों के लिए पाइपलाइन क्षमता की बुकिंग हेतु सैप के साथ ओपन एक्सेस पोर्टल का उद्घाटन किया।
- दिबियापुर कंप्रेसर स्टेशन पर भारत की पहली प्राकृतिक गैस क्लोज्ड लूप मीटर प्रूवर सुविधा का उद्घाटन किया गया।
- माननीय प्रधानमंत्री ने दिनांक 02.10.2024 को रांची में गेल के पहले सीबीजी संयंत्र का उद्घाटन किया।
- गेल को वित्त वर्ष 2023–24 में लगातार 15वें वर्ष सीएजी से "शून्य" टिप्पणियाँ प्राप्त हुईं।
- दिनांक 05.11.2024 को राजस्थान में 500 किलो लीटर प्रति दिन (केएलपीडी) क्षमता वाला पहला पीढ़ी (1जी) अनाज आधारित एथेनॉल संयंत्र संयुक्त उद्यम (जेवी) के माध्यम से स्थापित करने के लिए इक्विटी निवेश को मंजूरी दी गई, जो डीआईपीएएम की मंजूरी के अधीन है।
- मौजूदा सीबीजी कंपनी लीफनीटी बायोएनर्जी प्राइवेट लिमिटेड में इक्विटी अधिग्रहण के लिए इक्विटी निवेश हेतु दिनांक 20.12.2024 को अनुमोदन प्रदान किया गया, जो दीपम के अनुमोदन के अधीन है।

12.1.4 इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल):

इंडियन ऑयल भारत की एक विविध और एकीकृत ऊर्जा कंपनी है, जो तेल, गैस, पेट्रोकेमिकल्स और वैकल्पिक ऊर्जा के लगभग सभी क्षेत्रों में कार्यरत है। यह ब्रांड अत्याधुनिक तकनीकों और कुशल कर्मचारियों की मदद से ऊर्जा का जिम्मेदारीपूर्वक उपयोग करता है और उसे उपभोक्ताओं तक किफायती दरों पर पहुँचाता है।

इंडियन ऑयल के व्यवसाय में हाइड्रोकार्बन की पूरी श्रृंखला शामिल है – कच्चे तेल और गैस की खोज, उत्पादन, शोधन, पाइपलाइन परिवहन, विपणन, पेट्रोकेमिकल्स, गैस विपणन, वैकल्पिक ऊर्जा और डाउनस्ट्रीम ऑपरेशन्स। कंपनी की वैश्विक मौजूदगी श्रीलंका, बांग्लादेश, नेपाल, भूटान, मालदीव, मॉरीशस, यूएई और अन्य देशों में उसके व्यावसायिक प्रयासों के माध्यम से है।

12.1.4.1 वित्तीय निष्पादन: इंडियन ऑयल का प्रचालन राजस्व वित्त वर्ष 2023–24 के ₹8,66,345 करोड़ से 2% (₹20,833 करोड़) घटकर वित्त वर्ष 2024–25 के दौरान ₹8,45,513 करोड़ हो गया। वित्त वर्ष 2024–25 के दौरान, इंडियन ऑयल ने वित्त वर्ष 2023–24 के ₹39,619 करोड़ की तुलना में ₹12,962 करोड़ का शुद्ध लाभ दर्ज किया, जिसका मुख्य कारण कम रिफाइनिंग मार्जिन, एलपीजी बिक्री पर अल्प वसूली और चालू अवधि के दौरान मांग सूची घाटा था। वित्त वर्ष 2023–24 के 12.05 अमेरिकी डॉलर प्रति बैरल की तुलना में वित्त वर्ष 2024–25 के दौरान जीआरएम 4.80 अमेरिकी डॉलर प्रति बैरल रहा।

12.1.4.2 राजकोष में योगदान: पिछले कुछ वर्षों में, इंडियन ऑयल ने शुल्क, कर और लाभांश के माध्यम से सरकारी खजाने में सबसे बड़ा योगदान दिया है। वित्त वर्ष 2024–25 के दौरान, राजकोष में ₹2,32,299 करोड़ का भुगतान किया गया, जबकि वित्त वर्ष 2023–24 के दौरान ₹2,41,629 करोड़ का भुगतान किया गया था। वित्त वर्ष 2024–25 के दौरान केंद्रीय राजकोष को ₹1,10,313 करोड़ और राज्यों के राजकोष को

₹1,21,986 करोड़ का भुगतान किया गया, जबकि वित्त वर्ष 2023–24 के दौरान क्रमशः ₹1,21,171 करोड़ और ₹1,20,458 करोड़ का भुगतान किया गया था।

12.1.4.3 रिफाइनरी निष्पादनः आईओसीएल रिफाइनरियों ने वित्त वर्ष 2024–25 में कुल 71.56 एमएमटी कच्चा तेल और 3.0 एमएमटी नेफ्था प्रोसेस किया। पिछले वर्ष, 2023–24 में, यह आंकड़ा 73.308 एमएमटी कच्चा तेल और 3.11 एमएमटी नेफ्था था। इसी दौरान, रिफाइनरियों की डिस्टिलेट उत्पादन 79.3% से बढ़कर 80.6% हो गया।

प्रचालन उपलब्धता (ओए) के संबंध में, आईओसीएल वित्त वर्ष 2023 में 97.3% की तुलना में वित्त वर्ष 2024–25 में 98.1% पर है और विशिष्ट ऊर्जा खपत (एमबीएन) के संबंध में (कम एमबीएन उच्च ऊर्जा दक्षता को दर्शाता है), आईओसीएल रिफाइनरियों ने वित्त वर्ष 2024–25 में 68.9 एमबीएन हासिल किया है, जबकि वित्त वर्ष 2023–24 में यह 68.7 था।

इंडियन ऑयल के आरएंडडी केंद्र द्वारा विकसित तकनीक पर आधारित कैटेलिस्ट निर्माण यूनिट (सीएमयू) जनवरी 2024 में सफलतापूर्वक चालू हो गई। यह सीएमयू रिफाइनरी कैटेलिस्ट के तकनीकी रूप से महत्वपूर्ण क्षेत्र में आत्मनिर्भर बनने की दिशा में एक कदम है और "आत्मनिर्भर भारत" अभियान को सशक्त बनाती है। वित्त वर्ष 2024–25 में, पानीपत रिफाइनरी और पेट्रोकेमिकल कॉम्प्लेक्स स्थित इस कैटेलिस्ट निर्माण यूनिट (सीएमयू) ने निर्धारित मात्रा में कैटेलिस्ट का उत्पादन किया:

- एफसीसी एडिटिव (आईमैक्स अल्ट्रा): 127.1 मीट्रिक टन
- डीएचडीटी कैटेलिस्ट (इंडिकेट प्राइम): 145.6 मीट्रिक टन

12.1.4.4 पाइपलाइन निष्पादनः वित्त वर्ष 2024–25 के दौरान, कच्चे तेल की पाइपलाइनों ने वित्त वर्ष 2023–24 के तहत 51.80 एमएमटी की तुलना में 51.26 एमएमटी का थ्रूपुट हासिल किया, और उत्पाद पाइपलाइनों ने वित्त वर्ष 2023–24 के दौरान 43.99 एमएमटी की तुलना में वित्त वर्ष 2024–25 में 45.66 एमएमटी का उच्चतम वार्षिक थ्रूपुट हासिल किया। इसके अलावा, गैस पाइपलाइनों ने वित्त वर्ष 2024–25 में 4668 एमएमएससीएम का उच्चतम वार्षिक थ्रूपुट हासिल किया, जबकि वित्त वर्ष 2023–24 के दौरान यह 3717 एमएमएससीएम था। वित्त वर्ष 2024–25 के दौरान, आईओसीएल ने अपने क्रॉस–कंट्री पाइपलाइन नेटवर्क में 261 किलोमीटर की वृद्धि की और कुल नेटवर्क लंबाई 20,005 किलोमीटर तक पहुंच गई। इस नेटवर्क की थ्रूपुट क्षमता कच्चे तेल और उत्पाद पाइपलाइनों के लिए मिलियन मीट्रिक टन प्रति वर्ष (एमएमटीपीए) और गैस पाइपलाइनों के लिए 49.4 मिलियन मानक क्यूबिक मीटर प्रति दिन (एमएमएससीएमडी) है।

12.1.4.5 विपणन निष्पादनः वित्त वर्ष 2024–25 के दौरान 86.8 एमएमटी (एलएनजी और स्वयं के उपयोग को छोड़कर) की घरेलू पीओएल बिक्री दर्ज की गई, जबकि पिछले वर्ष वित्त वर्ष 2023–24 में 85.3 एमएमटी दर्ज की गई थी।

इंडियन ऑयल ने अपने खुदरा बिक्री केंद्र पर प्रतिदिन लगभग 3.2 करोड़ ग्राहकों को सेवा प्रदान की और वित्त वर्ष 2024–25 के दौरान भारत के नागरिकों की ऊर्जा आवश्यकताओं को पूरा करने के लिए प्रतिदिन 29 लाख से अधिक घरेलू एलपीजी सिलेंडर वितरित किए। वित्त वर्ष 2024–25 (अप्रैल–मार्च, 2025) के दौरान, इंडियन ऑयल ने 2,823 खुदरा बिक्री केंद्र (आरओ) की शुरुआत की, जो किसी भी तेल विपणन कंपनियों की तुलना में सबसे अधिक है। 31 मार्च तक, एक्स्ट्राग्रीन डीजल उत्पाद पूरे भारत में 7,808 आरओ के माध्यम से बेचा जा रहा है।

भारत का पहला सुपर प्रीमियम पेट्रोल एक्सपी100, जिसका ऑक्टेन मान 100 है, 31 मार्च 2025 तक 100 शहरों में 212 आरओ के माध्यम से बेचा जा रहा है। इसके अलावा, एक्सपी95 (95 ऑक्टेन प्रीमियम पेट्रोल) पूरे भारत में 12,237 आरओ के माध्यम से बेचा जा रहा है।

वैकल्पिक ईंधन को बढ़ावा देने के लिए, इंडियन ऑयल ने वित्त वर्ष 2024–25 के दौरान 350 नए सीएनजी, 4656 इलेक्ट्रिक वाहन (ईवी) चार्जिंग और 37 बैटरी स्वैपिंग स्टेशन जोड़े। इंडियन ऑयल वर्तमान में 31.03.25 तक देश में 2,437 सीएनजी, 13,614 ईवी चार्जिंग और 128 बैटरी स्वैपिंग स्टेशन प्रचालित कर रहा है।

इंडियन ऑयल ने अप्रैल–मार्च, 2025 की अवधि के दौरान 14.35 एमएमटी की कुल एलपीजी बिक्री हासिल की और 18 लाख से अधिक नए एलपीजी कनेक्शन जारी किए। ग्राहकों की पहुंच और सेवाओं में ग्राहक संतुष्टि में सुधार के लिए, इंडियन ऑयल ने 46 नए एलपीजी डिस्ट्रीब्यूटरशिप शुरू किए, जिससे 31.03.2025 तक उनकी कुल संख्या 12,919 हो गई। "छोटू" [5 किलोग्राम फ्री ट्रेड एलपीजी (एफटीएल) सिलेंडर, ने वित्त वर्ष 2024–25 के दौरान 66 लाख से अधिक सिलेंडरों की बिक्री के साथ 32.26% की वृद्धि दर्ज की है। इसके अलावा, वित्त वर्ष 2024–25 के दौरान] 7.3 लाख से अधिक इंडेन कम्पोजिट सिलेंडर भी ग्राहकों को बेचे गए, जिन्हें 5 किलोग्राम और 10 किलोग्राम की यूनिटों में लॉन्च किया गया ताकि ग्राहकों को नए जमाने का और हल्का एलपीजी सिलेंडर दिया जा सके और पिछले वर्ष की इसी अवधि की तुलना में 63% की मजबूत वृद्धि देखी गई।

विशेष एलपीजी सुरक्षा जांच अभियान (बुनियादी सुरक्षा अभियान), जो 5 मार्च 2024 को डोर–टू–डोर अभियान के रूप में शुरू हुआ, घरेलू एलपीजी प्रतिष्ठानों का निरीक्षण करने और ग्राहकों को उनके रसोई घर में एलपीजी के सुरक्षित उपयोग के बारे में जानकारी देने के लिए, विशेष रूप से कम आय वाले घरों और झुग्गी–झोंपड़ी में, आईओसीएल ने 31.12.2024 तक 6 करोड़ सुरक्षा जांच का अपना लक्ष्य पूरा कर लिया।

विमानन क्षेत्र में, इंडियन ऑयल ने वित्त वर्ष 2024–25 में 4.89 एमएमटी की बिक्री करके 54.5% बाजार हिस्सेदारी के साथ अपनी अग्रणी स्थिति बनाए रखी। इंडियन ऑयल ने वर्ष के दौरान अयोध्या में एक नया एएफएस चालू किया, जिससे 31.03.2025 तक देश में इंडियन ऑयल द्वारा स्थापित एएफएस की कुल संख्या 130 हो गई।

विनिर्माण केंद्र स्थापित करने की अपनी पहल के तहत, इंडियन ऑयल ने चेन्नई के अमुल्लावोयाल (एलबीपी मनाली) में दुनिया का दूसरा सबसे बड़ा एकीकृत ल्यूब परिसर विकसित किया है। यह अत्याधुनिक सुविधा घरेलू और अंतर्राष्ट्रीय दोनों ही माँगों को पूरा करने के लिए बनाया गया है।

12.1.4.6 अनुसंधान एवं विकास (आरएंडडी): इंडियन ऑयल आरएंडडी घरेलू तकनीकों का विकास कर आत्मनिर्भरता की ओर बढ़ रहा है, जिससे आयात पर निर्भरता कम हो रही है और एक स्थायी भविष्य की दिशा में काम हो रहा है। पारादीप रिफाइनरी में पीसीके के लिए 300 केटीपीए क्षमता वाली इंडडीएसके यूनिट चालू की गई। इसके साथ ही, पाइपलाइन ट्रांसफर के समर्थन और कम सल्फर एसकेओ की आवश्यकता पूरी करने के लिए पीजीटीआर को सफलतापूर्वक पूरा किया गया, जिसमें सभी गारंटीकृत मानदंड हासिल किए गए। आईओसीएल आरएंडडी ने विरडिस केमिकल्स के साथ मिलकर बोंगाईगांव रिफाइनरी के आईएसओएम कैटेलिस्ट के लिए गारंटीकृत मानदंड जैसे आरओएन और आइसोमरेट यील्ड प्राप्त किए और कमीशनिंग के साथ निष्पादन गारंटी टेस्ट रन (पीजीटीआर) सफलतापूर्वक पूरा किया। इसके अलावा, पीपी कैटेलिस्ट i–जेडएन22® भी विकसित किया गया, और पारादीप रिफाइनरी में किए गए परीक्षणों ने इसके बेहतर निष्पादन की पुष्टि की।

स्वदेशी घटक आधारित गैसोलीन और डीजल मल्टी–फंक्शनल एडिटिव (जीएमएफए और डीएमएफए) के अपने विकास ने प्रीमियम ईंधनों के विपणन को संभव बनाया है। इस साल, मद्रास इंटरनेशनल सर्किट में भारतीय राष्ट्रीय कार रेसिंग चौंपियनशिप के तीसरे राउंड में प्रीमियम रेसिंग ईंधन स्टॉर्म–एक्स का उपयोग किया गया।

इंडियन ऑयल के अनुसंधान एवं विकास द्वारा विकसित ईसीओ2सोर्ब, कार्बन अवशोषक तकनीक का प्रायोगिक संयंत्र में सत्यापन किया गया और इसे एक बड़े उर्वरक संयंत्र में लागू करने की प्रक्रिया चल रही है। इसके अलावा, सीबीजी संयंत्र से उच्च गुणवत्ता वाली खाद/जैव–उर्वरक उत्पादन हेतु एग्री–एलीट तकनीक और फसल अवशेषों के यथास्थान अपघटन हेतु माइक्रोबियल मिश्रण स्टबवोरसो का विकास किया गया और क्षेत्र परीक्षणों में सफलतापूर्वक परीक्षण किया गया।

इस वर्ष, दो स्व–विकसित नैनो–एडिटाइज्ड उत्पाद लॉन्च किए गए: प्रोपेन प्लस, जो औद्योगिक उपयोग के लिए एक हरित ईंधन है, और एक्स्ट्राबूस्ट, जो ऑटो–गैस का एक उन्नत संस्करण है। ये उत्पाद मौजूदा पोर्टफोलियो का विस्तार करते हैं, जिसमें पहले से ही एक्स्ट्रा–तेज और इंडेन नैनोकट जैसे

स्थापित उत्पाद शामिल हैं। स्व–विकसित सूर्य नूतन सौर चूल्हों का व्यावसायिक बिक्री सूचीबद्ध विक्रेताओं के माध्यम से शुरू किया गया है।

12.1.4.7 पेट्रोकेमिकल निष्पादन: भारत के पेट्रोकेमिकल उद्योग में दूसरी सबसे बड़ी कंपनी, इंडियन ऑयल, अपने पोर्टफोलियो में विविधता लाने का काम जारी रखे हुए है, जिसमें पॉलिमर (पॉलीइथाइलीन और पॉलीप्रोपाइलीन), एलएबी (लीनियर अल्काइल बेंजीन), पीटीए (शुद्ध टेरेफ्थेलिक एसिड), ग्लाइकॉल और ब्यूटाडाइन शामिल हैं। प्रोपेल ब्रांड भारतीय बाजार में एक प्रमुख नाम बना हुआ है। वर्ष 2024–25 के दौरान, इंडियन ऑयल ने 3.1 एमएमटी की पेट्रोकेमिकल बिक्री हासिल की, जो वित्त वर्ष 2024 की इसी अवधि के 2.9 एमएमटी से 7.3% अधिक है। इसके अतिरिक्त, कंपनी ने पारादीप में नए पॉलीप्रोपाइलीन ग्रेड, पी1750 एमएन और पानीपत में 5200 एमजी की शुरुआत के साथ अपने उत्पादों का विस्तार किया।

पेट्रोकेमिकल्स कारोबार में एक महत्वपूर्ण कदम के रूप में, इंडियन ऑयल बोर्ड ने एमसीपीआई प्राइवेट लिमिटेड के साथ समान संयुक्त उद्यम में ₹4,382 करोड़ की अनुमानित लागत से ओडिशा के भद्रक में 300 केटीपीए यार्न परियोजना स्थापित करने के लिए निवेश की मंजूरी दी है। यह परियोजना पूर्वी क्षेत्र में अद्वितीय है और इसमें ड्रॉ टेक्सचर्ड यार्न, पूरी तरह से ड्रॉ यार्न, पॉलिएस्टर चिप्स और संबंधित डाउनस्ट्रीम इकाइयों के साथ संधारणीय बहुलकीकरण इकाई शामिल है। बोर्ड ने पारादीप में मौजूदा पॉलीप्रोपाइलीन संयंत्र में एथिलीन शुद्धिकरण यूनिट और गैस चरण रिएक्टर की स्थापना को भी मंजूरी दी है। ₹305 करोड़ का यह निवेश पारादीप संयंत्र में पॉलीप्रोपाइलीन के बेहतर उत्पादन और मिश्रित सह–पॉलिमर ग्रेड बनाने में मदद करेगा। इसके अलावा, बोर्ड ने हल्दिया में 42 केटीपीए प्रोपाइलीन रिकवरी यूनिट के लिए चरण–I अनुमोदन ₹438 करोड़ की अनुमानित लागत से प्रदान किया है।

12.1.4.8 प्राकृतिक गैस का निष्पादन प्राकृतिक गैस क्षेत्र ने अपने रिकॉर्ड तोड़ निष्पादन को जारी रखते हुए वित्त वर्ष 2024–25 की अवधि मे 7.9 एमएमटी गैस का उत्पादन किया, जो साल–दर–साल 21% की वृद्धि है। एडीएनओसी, कतर एनर्जी और टोटलएनर्जीज के साथ 5 एमएमटी दीर्घकालिक एलएनजी के कार्यनीति समझौतों ने प्राकृतिक गैस क्षेत्र में एक प्रमुख कंपनी के रूप में इंडियन ऑयल की स्थिति को और मजबूत किया। इसके अतिरिक्त, 6 ऑटो–एलएनजी स्टेशनों के चालू होने से लघु–स्तरीय एलएनजी के उभरते बाजारों में नवाचार और विस्तार करने की इसकी क्षमता का निष्पादन हुआ। नवंबर 2024 को धामरा एलएनजी टर्मिनल से पहली 'एलएनजी एट डोरस्टेप' आपूर्ति शुरू होने के साथ एक महत्वपूर्ण उपलब्धि हासिल हुई। आईजीएक्स में एक रणनीतिक साझेदार और इक्विटी निवेशक के रूप में, इंडियन ऑयल ने 2024–25 में कुल 296 एमएमएससीएम प्राकृतिक गैस का व्यापार किया, जिससे एक ही वर्ष में आईजीएक्स पर व्यापार की मात्रा तीन गुना हो गई।

12.1.4.9 नगर गैस वितरण (सीजीडी): गैस आधारित अर्थव्यवस्था की ओर बढ़ने में इंडियन ऑयल का महत्वपूर्ण योगदान है। संयुक्त उद्यम कंपनियों (जेवीसी) के साथ, इंडियन ऑयल के पास 114 जिलों के कुल 49 भौगोलिक क्षेत्रों का प्राधिकार है, जिससे यह ओएमसी के बीच सबसे अधिक भौगोलिक क्षेत्रों के साथ देश की सबसे बड़ी सीजीडी कंपनी के रूप में स्थापित हुई है।

12.1.4.10 अन्वेषण एवं उत्पादन: इंडियन ऑयल भागीदारी हितों (पीआई), संयुक्त उद्यमों और अन्य गठबंधनों के माध्यम से ईएंडपी क्षेत्र में अवसरों की तलाश जारी रखे हुए है। मार्च 2025 तक, अपस्ट्रीम पोर्टफोलियो की कुल संख्या 14 घरेलू और 11 विदेशी परिसंपत्तियाँ हैं, जिनमें से 10 परिसंपत्तियाँ उत्पादक हैं (3 घरेलू और 7 विदेशी)। उत्पादक परिसंपत्तियों के अलावा, 5 परिसंपत्तियाँ विकासाधीन हैं, 3 परिसंपत्तियों की खोज चल रही है, 1 परिसंपत्ति का मूल्यांकन किया जा रहा है और 6 परिसंपत्तियाँ अन्वेषण के अधीन हैं। वित्त वर्ष 2024–25 के दौरान, इंडियन ऑयल की विदेशी और घरेलू दोनों उत्पादक परिसंपत्तियों से उत्पादन में हिस्सेदारी 4.45 एमएमटी तेल समतुल्य (एमएमटीओई) रही है, जबकि वित्त वर्ष 2023–24 के दौरान यह 4.26 एमएमटीओई थी।

12.1.4.11 वैकल्पिक ऊर्जा: इंडियन ऑयल हरित अर्थव्यवस्था के लिए कार्बन उत्सर्जन को कम करने हेतु नवीकरणीय ऊर्जा के दोहन की दिशा में निरंतर प्रगति कर रहा है।

31.03.2025 तक, इंडियन ऑयल की स्थापित क्षमता 252.10 मेगावाट नवीकरणीय ऊर्जा है, जिसमें 167.60 मेगावाट पवन ऊर्जा क्षमता और 84.50 मेगावाट सौर ऊर्जा क्षमता शामिल है। वित्त वर्ष 2024–25 के लिए, इंडियन ऑयल ने 365.72 गीगावाट घंटा नवीकरणीय ऊर्जा उत्पन्न की है, जिससे 276.85 टीएमटी (हजार मीट्रिक टन) की कमी आई है।

अप्रैल–मार्च 2025 के दौरान, 4227 खुदरा बिक्री केंद्र पर सौर ऊर्जा का उपयोग किया गया, जिससे कुल संख्या 35,874 हो गई। 31.03.2025 तक, इंडियन ऑयल 35,874 खुदरा बिक्री केंद्र को सौर ऊर्जा से सुसज्जित किया गया है, जिनकी कुल सौर ऊर्जा स्थापित क्षमता लगभग 175.75 मेगावाट है। वित्त वर्ष 2024–25 के लिए, इससे लगभग 224.42 गीगावाट घंटा बिजली उत्पादन हुआ, जिससे 170 हजार मीट्रिक टन कार्बन–डाइऑक्साइड समतुल्य (टीएमटीसीओ2ई) उत्सर्जन में कमी आई।

इंडियन ऑयल की योजना वर्ष 2030 तक 31 गीगावाट का नवीकरणीय पोर्टफोलियो बनाने की है। इस ऊर्जा पोर्टफोलियो का विस्तार करने के लिए, इंडियन ऑयल स्वच्छ ऊर्जा प्रौद्योगिकियों के क्षेत्र में काम करने वाली अन्य सार्वजनिक और निजी ऊर्जा कंपनियों के साथ सहयोग कर रही है।

इंडियन ऑयल, संधारणीय (सस्ते परिवहन के लिए संधारणीय विकल्प) की प्रमुख कार्यान्वयन एजेंसी है। इंडियन ऑयल समय–समय पर संपीड़ित बायोगैस (सीबीजी) के उत्पादन और आपूर्ति के लिए आशय–पत्र (एलओआई) जारी करता रहा है। 31.03.2025 तक, इंडियन ऑयल के पास संधारणीय पहल के तहत 714 सक्रिय एलओआई हैं। वित्त वर्ष 2024–25 के दौरान, 13 सीबीजी संयंत्र चालू किए जा चुके हैं, जिससे चालू सीबीजी संयंत्रों की कुल संख्या 44 हो गई है। सीबीजी का विपणन 125 खुदरा बिक्री केंद्र और 4 औद्योगिक उपभोक्ताओं के माध्यम से किया जा रहा है। उत्पादित सीबीजी की खुदरा बिक्री इंडियन ऑयल के 'इंडीग्रीन' ब्रांड नाम से सीबीजी रिटेल आउटलेट। वित्त वर्ष 2024–25 में, इंडियन ऑयल ने लगभग 8.9 हजार मीट्रिक टन (टीएमटी) सीबीजी बेचा, और सितंबर 2019 में सीबीजी बिक्री शुरू होने के बाद से संचयी बिक्री 27.8 टीएमटी को पार कर गई है।

इंडियन ऑयल अपने कंप्रेस्ड बायो–गैस (सीबीजी) प्रोजेक्ट्स के जरिए स्थिरता को बढ़ावा दे रहा है और स्वच्छ ऊर्जा व अपशिष्ट प्रबंधन में योगदान कर रहा है। इसमें 200 टीपीडी क्षमता वाला आधुनिक मिश्रित अपशिष्ट–आधारित सीबीजी संयंत्र शामिल है, जो धान के भूसे, प्रेस मड और गोबर से 20 टीपीडी सीबीजी का उत्पादन करता है। इसके अलावा, अपनी कॉर्पोरेट सामाजिक उत्तरदायित्व (सीएसआर) के तहत, इंडियन ऑयल ने दो और सीबीजी संयंत्र स्थापित किए हैं कृ एक आदर्श गौशाला, ग्वालियर में और दूसरा हिंगोनिया गौशाला में। ये संयंत्र प्रत्येक 100 टीपीडी गोबर को संसाधित करके लगभग 2 टीपीडी (700 टीपीए) सीबीजी पैदा करते हैं। ग्वालियर सीबीजी संयंत्र का उद्घाटन 2 अक्तूबर 2024 को माननीय प्रधानमंत्री द्वारा किया गया और यह शहर के कचरे से शहर परिवहन के वाहनों को ईंधन देगा। वहीं, हिंगोनिया संयंत्र में उत्पादित सीबीजी का उपयोग अक्षय पात्र फाउंडेशन द्वारा मध्याह्न भोजन तैयार करने में किया जाता है। इससे इंडियन ऑयल की स्थायी ऊर्जा समाधान और सामाजिक कल्याण के प्रति प्रतिबद्धता को और मजबूती मिली है।

12.1.4.12 **संधारणीय विकासः** भारत में तेल और गैस क्षेत्र की कंपनियों के बीच 2024 में डॉव जोन्स संधारणीयता सूचकांक (डीजेएसआई) में इंडियन ऑयल को नंबर 1 स्थान मिला।

12.1.5 भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल):

भारत पेट्रोलियम (फॉर्च्यून ग्लोबल 500 कंपनी) भारत की दूसरी सबसे बड़ी तेल विपणन कंपनी और एक प्रमुख एकीकृत ऊर्जा कंपनी है। यह कंपनी कच्चे तेल के शोधन और पेट्रोलियम उत्पादों के विपणन के साथ–साथ तेल और गैस उद्योग के अपस्ट्रीम और डाउनस्ट्रीम क्षेत्रों में भी सक्रिय है। कंपनी को प्रतिष्ठित महारत्न का दर्जा प्राप्त है, जिससे इसे अधिक प्रचालन और वित्तीय स्वायत्तता मिली है।

मुंबई, कोच्चि और बीना स्थित भारत पेट्रोलियम की रिफाइनरियों की संयुक्त रिफाइनिंग क्षमता लगभग 35.3 एमएमटीपीए है। इसके विपणन अवसंरचना में प्रतिष्ठानों, डिपो, ऊर्जा स्टेशनों, विमानन सेवा स्टेशनों, एलपीजी और ल्यूब वितरकों का एक नेटवर्क शामिल

है। दिनांक 31.03.2025 कि स्थिति के अनुसार, इसके वितरण नेटवर्क में 23,642 से अधिक ऊर्जा स्टेशन, 6,269 से अधिक एलपीजी वितरक, 500 से अधिक ल्यूब वितरक, 80 पीओएल भंडारण स्थान, 54 एलपीजी बॉटलिंग संयंत्र, 73 विमानन सेवा स्टेशन, ल्यूब मिश्रण संयंत्र और 5 क्रॉस कंट्री पाइपलाइन शामिल हैं।

भारत पेट्रोलियम संधारणीय विकास की दिशा में अपनी रणनीति, निवेश और पर्यावरण व सामाजिक लक्ष्यों को एक साथ जोड़ रहा है। कंपनी ने अगले 5 वर्षों में लगभग 7,000 ऊर्जा स्टेशनों पर इलेक्ट्रिक वाहन चार्जिंग स्टेशन लगाने की योजना बनाई है।

संधारणीय समाधानों पर ध्यान केंद्रित करते हुए, कंपनी 2040 तक स्कोप 1 और स्कोप 2 उत्सर्जन में नेट जीरो बनने के लिए रोडमैप और पारिस्थितिकी तंत्र तैयार कर रही है। भारत पेट्रोलियम शिक्षा, जल संरक्षण, कौशल विकास, स्वास्थ्य, सामुदायिक विकास, क्षमता निर्माण और कर्मचारी स्वयंसेवा जैसी पहलों के माध्यम से समुदायों के साथ सहयोग कर रहा है। 'जीवन को ऊर्जावान बनाना' के अपने उद्देश्य के साथ, कंपनी प्रतिभा, नवाचार और तकनीक का उपयोग करके एक सम्मानित वैश्विक ऊर्जा कंपनी बनने का लक्ष्य रखती है।

12.1.5.1 वित्तीय निष्पादन: बीपीसीएल का प्रचालन राजस्व अप्रैल–मार्च 25 में 1.27% घटकर 5,00,371 करोड़ रुपए हो गया, जो अप्रैल–मार्च 24 में 5,06,806 करोड़ रुपए था। यह कमी मुख्य रूप से कुछ पेट्रोलियम उत्पादों के विक्रय मूल्य में गिरावट के कारण हुई, जो इस अवधि के दौरान बिक्री की मात्रा में वृद्धि से आंशिक रूप से संतुलित हो गई। अप्रैल–मार्च 25 की अवधि के दौरान, बीपीसीएल ने 13,275 करोड़ रुपए का कर–पश्चात लाभ दर्ज किया, जबकि अप्रैल–मार्च 24 में यह 26,674 करोड़ रुपए था। पिछले वर्ष की तुलना में लाभ में कमी मुख्य रूप से कम जीआरएम और चालू अवधि में एलपीजी में अल्प वसूली के कारण है। अप्रैल–मार्च 25 में जीआरएम 6.82 अमेरिकी डॉलर प्रति बैरल रहा, जबकि अप्रैल–मार्च'24 में यह 14.14 अमेरिकी डॉलर/बैरल था।

12.1.5.2 राजकोष में योगदान: पिछले कुछ वर्षों में, बीपीसीएल ने शुल्कों, करों और लाभांश के रूप में सरकारी खजाने में योगदान दिया है। अप्रैल–मार्च 2025 की अवधि के दौरान, राजकोष को ₹1,48,348 करोड़ का भुगतान किया गया। अप्रैल–मार्च 2025 के दौरान, केंद्रीय राजकोष को ₹74,303 करोड़ और राज्य राजकोष को ₹74,045 करोड़ का भुगतान किया गया।

12.1.5.3 रिफाइनरी निष्पादन:

1) **मुंबई रिफाइनरी:** मुंबई रिफाइनरी की वर्तमान स्थापित क्षमता 12.00 एमएमटीपीए है। मुंबई रिफाइनरी ने वित्त वर्ष 24–25 (अप्रैल 2024 से मार्च 2025) के दौरान 129.42% क्षमता उपयोग के साथ 15.53 एमएमटी का कच्चा तेल उत्पादन हासिल किया। वित्त वर्ष 2023–24 (अप्रैल 2023 से मार्च 2024) के लिए 125.42% क्षमता उपयोग के साथ एमएमटी का कच्चा तेल उत्पादन हासिल किया।

2) **कोच्चि रिफाइनरी:** कोच्चि रिफाइनरी की वर्तमान स्थापित क्षमता 15.5 एमएमटीपीए है। मुंबई रिफाइनरी ने वित्त वर्ष 24–25 (अप्रैल 2024 से मार्च 2025) के दौरान 110.9% क्षमता उपयोग के साथ 17.22 एमएमटी का कच्चा तेल उत्पादन हासिल किया। वित्त वर्ष 2023–24 (अप्रैल 2023 से मार्च 2024) के लिए 111.7% क्षमता उपयोग के साथ 17.54 एमएमटी का कच्चा तेल उत्पादन हासिल किया।

3) **बीना रिफाइनरी:** बीना रिफाइनरी की वर्तमान स्थापित क्षमता 7.8 एमएमटीपीए है। बीना रिफाइनरी ने वित्त वर्ष 2024–25 के दौरान 98.8% क्षमता उपयोग के साथ 7.71 एमएमटी क्रूड थ्रूपुट हासिल किया। वित्त वर्ष 2023–24 के लिए, रखरखाव और निरीक्षण (एमएंडआई) के लिए रिफाइनरी टर्नअराउंड के मद्देनजर 91.4% क्षमता उपयोग के साथ 7.13 एमएमटी क्रूड थ्रूपुट हासिल किया गया।

12.1.5.4 पाइपलाइन निष्पादन: बीपीसीएल 3,537 किलोमीटर लंबे क्रॉस–कंट्री पाइपलाइन नेटवर्क का प्रचालन करती है, जिसकी डिजाइन क्षमता 29 एमएमटीपीए है। इसके अतिरिक्त, लगभग 1,000 किलोमीटर की पाइपलाइन परियोजनाएँ वर्तमान में निर्माणाधीन हैं।

बीपीसीएल ने अपने पाइपलाइन नेटवर्क में सुरक्षित और कुशल प्रचालन बनाए रखा। वित्त वर्ष 2024–25 में, पाइपलाइन थ्रूपुट 27.2 एमएमटी तक पहुँच गया, जो किसी भी वित्तीय वर्ष में अब तक का सर्वोच्च

रिकॉर्ड है। ढुलाई की मात्रा में भी साल–दर–साल 7% की वृद्धि देखी गई। सुरक्षा को और बेहतर बनाने के लिए, बीपीसीएल ने अपनी कच्चे तेल की पाइपलाइन पर एक पाइपलाइन घुसपैठ पहचान प्रणाली (पीआईडीएस) स्थापित की है, जिससे देश भर में सभी प्रमुख पाइपलाइनों में 100% पीआईडीएस कवरेज प्राप्त हुआ है। यह वास्तविक–समय निगरानी प्रणाली तीसरे पक्ष के नुकसान के जोखिम को काफी कम करती है। बीपीसीएल दक्षिणी राज्यों में अपने पाइपलाइन बुनियादी ढांचे का सक्रिय रूप से विस्तार कर रही है, और परियोजनाएँ लगातार प्रगति कर रही हैं।

12.1.5.5 विपणन अवसंरचना और निष्पादन

बीपीसीएल के पास एक मजबूत वितरण नेटवर्क है जिसमें 22 पीओएल टर्मिनल और 58 पीओएल डिपो, 23642 रिटेल आउटलेट, 927 एसकेओ एजेंसियां, 54 एलपीजी बॉटलिंग प्लांट, 6269 एलपीजी डिस्ट्रीब्यूटरशिप, 73 एविएशन सर्विस स्टेशन, 5 लुब्रिकेंट ब्लेंडिंग/फिलिंग प्लांट और 31.03.2025 तक 28.7 एमएमटीपीए की डिजाइन क्षमता के साथ 3537 किलोमीटर लंबी मल्टीप्रोडक्ट और क्रूड पाइपलाइन का पाइपलाइन नेटवर्क शामिल है। वित्त वर्ष 2024–25 में बीपीसीएल की बाजार बिक्री की: वृद्धि और 25.04% की बाजार हिस्सेदारी के साथ 52.44 एमएमटी थी। वित्त वर्ष 2023–24 के दौरान, बाजार बिक्री 51.03 एमएमटी थी।

बीपीसीएल के खुदरा व्यापार खंड ने 2.55% की वृद्धि हासिल की, 33.52 एमएमटी की मात्रा दर्ज की और पिछले 15 वर्षों में पीएसयू के बीच उच्चतम पूर्ण बाजार हिस्सेदारी हासिल की (2024–25 के दौरानः एमएस में 29.7% और एचएसडी में 30.0%)। बीपीसीएल की रुसाइलेंटवॉयस, एक समावेशी रोजगार पहल, ने वित्त वर्ष 2024–25 में उल्लेखनीय वृद्धि देखी है और अब 25 से अधिक शहरों को कवर करते हुए 400 से अधिक खुदरा बिक्री केंद्र में 560 एसएचआई (वाक् और श्रवण बाधित) को शामिल कर रही है।

बीपीसीएल 6269 वितरकों के एक मजबूत नेटवर्क के साथ 9.46 करोड़ से ज्यादा एलपीजी ग्राहकों को सेवा प्रदान कर रहा है। वर्ष के दौरान, उज्ज्वला योजना के तहत 0.33 लाख नए ग्राहकों को नामांकित किया गया और 11.08 लाख ग्राहकों को डबल बोतल कनेक्शन में अपग्रेड किया गया। बीपीसीएल ने एलपीजी सिलेंडर स्मार्ट वेंडिंग मशीन लगाने से संबंधित एक प्रायोगिक परियोजना शुरू की है। यह ग्राहकों की सुविधा सुनिश्चित करते हुए स्मार्ट, सुरक्षित और चौबीसों घंटे सेवा प्रदान करेगी। इस वेंडिंग समाधान को आवासीय परिसरों, खुदरा बिक्री केंद्र, औद्योगिक केंद्रों, दूरस्थ स्थानों, शॉपिंग मॉल और परिवहन केंद्रों पर लागू किया जा सकता है।

विमानन टरबाइन ईंधन की बिक्री 1968 टीएमटी रही, जिसमें 3.55% की वृद्धि दर्ज की गई तथा बाजार हिस्सेदारी 24.74% रही।

औद्योगिक एवं वाणिज्यिक इकाई (बीयू) ने अब तक की सर्वाधिक 7.32 मिलियन मीट्रिक टन की बिक्री दर्ज की। इसने मुंबई में उद्योग का पहला बायोफ्यूल हाई फ्लैश हाई–स्पीड डीजल (एचएफएचएसडी) बंकर सफलतापूर्वक लॉन्च किया। इसने ईपीए ग्रेड एचएसडी भी विकसित किया और प्रमुख ओईएम को आपूर्ति की।

लुब्रिकेंट्स व्यवसाय में अब तक सबसे अधिक 423.2 टीएमटी की बिक्री हुई। एमएके ने अफ्रीका सहित 8 देशों में अपनी उपस्थिति दर्ज कराई और केन्या, युगांडा, तंजानिया और श्रीलंका में लुब्रिकेंट्स के क्षेत्र में कदम रखा। एमएके लुब्रिकेंट्स को हेराल्ड ने ऑटोमोटिव लुब्रिकेंट्स श्रेणी में 'दशक का ब्रांड पुरस्कार 2024' और मार्क्समेन डेली ने 'सर्वाधिक पसंदीदा ब्रांड 2024–25' से सम्मानित किया। इसके अलावा, मार्क्समेन डेली ने एमएके लुब्रिकेंट्स को 'भारत का सबसे विश्वसनीय ब्रांड 2025–26' पुरस्कार से भी नवाजा। 'मेक इन इंडिया' पहल के तहत विकसित नया उत्पाद, एमएके एयरो स्मोक ऑयल, बीदर वायु सेना स्टेशन पर सफलतापूर्वक परीक्षण किया गया।

बीपीसीएल 52 भौगोलिक क्षेत्रों (जीए) में नगर गैस वितरण (सीजीडी) के क्षेत्र में तेजी से विस्तार कर रहा है, जिनमें 26 पूरी तरह से अपनी और 26 संयुक्त उद्यम कंपनियाँ शामिल हैं। कंपनी स्वच्छ ऊर्जा की पहुंच और कम कार्बन वाले भविष्य के लिए कुल

154 जिलों को कवर कर रही है। मार्च 2025 तक, बीपीसीएल ने 840 सीएनजी स्टेशन चालू किए हैं, 5.81 लाख से अधिक घरों को पाइप्ड प्राकृतिक गैस (पीएनजी) से जोड़ा है, और एक मजबूत पाइपलाइन नेटवर्क विकसित किया है जिसमें 2,350 कि.मी. से अधिक स्टील पाइपलाइन और 3,800 कि.मी. एमडीपीई पाइपलाइन शामिल हैं। प्राकृतिक गैस क्षेत्र में अपनी उपस्थिति को मजबूत करते हुए, बीपीसीएल ने पिछले वर्ष की तुलना में 1.83 एमएमटी कुल बिक्री (आंतरिक खपत सहित) दर्ज की। आगे की प्रतिबद्धता को देखते हुए, बीपीसीएल ने 2025 से शुरू होने वाली पाँच साल की अवधि में 2.5 एमएमटी एलएनजी की आपूर्ति के लिए एडीएनओसी ट्रेडिंग के साथ रणनीतिक समझौता किया है।

12.1.5.6 **अनुसंधान एवं विकासः** भारत पेट्रोलियम के ग्रेटर नोएडा (उत्तर प्रदेश) स्थित कॉर्पोरेट अनुसंधान एवं विकास केंद्र (सीआरडीसी) और मुंबई स्थित उत्पाद एवं अनुप्रयोग विकास केंद्र (पीएंडएडी) दो प्रमुख अनुसंधान प्रभाग हैं, जो अपने अनुसंधान कार्यों के माध्यम से व्यवसायों में मूल्य संवर्धन में सक्रिय भूमिका निभाते हैं।

''आत्मनिर्भर भारत'' के उद्देश्य के तहत आत्मनिर्भरता प्राप्त करने के लिए, सीआरडीसी ने अप्रैल 2024 से मार्च 2025 के दौरान कई महत्वपूर्ण तकनीकी प्रगति और व्यावसायिक सफलताएँ हासिल की हैं, जिनमें निम्नलिखित शामिल हैं:

आईईडब्ल्यू 2025 में बीपीसीएल आरएंडडीः भारत ऊर्जा सप्ताह 2025 में, बीपीसीएल आरएंडडी ने अभूतपूर्व नवाचारों का निष्पादन किया। इसमें नेट जीरो रिटेल आउटलेट प्रचालन (आरओ–असालवास में लागू), समुद्री लहरों से नवीकरणीय ऊर्जा उत्पादन और अभिनव परिवेश–स्थिति सीओ$_2$ संग्रहण एवं रूपांतरण तकनीक शामिल है। इन तकनीकों को उद्योग जगत और तेल एवं गैस क्षेत्र के विशेषज्ञों से व्यापक सराहना मिली। इसके परिणामस्वरूप, भारत ऊर्जा सप्ताह 2025 के दौरान, समुद्री लहरों से ऊर्जा उत्पादन के निष्पादन के लिए इजराइल की मैसर्स इको वेव पावर के साथ समझौता–ज्ञापन पर हस्ताक्षर किए गए।

हाइड्रोजन रिकवरीः ऑफ–गैस से हाइड्रोजन निकालने के लिए भारतएच2सेप मेम्ब्रेन तकनीक का सफलतापूर्वक क्षेत्र परीक्षण किया गया, जिसमें 98–99 मोलः हाइड्रोजन की शुद्धता और 75–80% रिकवरी हासिल की गई।

हाइड्रोजन ईंधन भरने वाले स्टेशनः कंपनी ने कोचीन अंतर्राष्ट्रीय हवाई अड्डा (सीआईएएल) पर बसों के लिए हाइड्रोजन ईंधन स्टेशन लगाने का काम आगे बढ़ाया है, जिसमें बीएआरसी तकनीक पर आधारित स्वदेशी इलेक्ट्रोलाइजर का मेगावाट स्तर पर विस्तार किया गया है। इसके अलावा, केरल सरकार के एएनईआरटी के साथ मिलकर त्रिवेंद्रम में एचआरएस स्टेशन स्थापित करने का संयुक्त प्रस्ताव ग्रीन हाइड्रोजन मोबिलिटी योजना के तहत एमएनआरई द्वारा समर्थित है।

उच्च दक्षता वाला पीएनजी चूल्हाः भारत हाई–स्टार पीएनजी चूल्हे ने 74% तापीय दक्षता हासिल की, जो सामान्य व्यावसायिक बर्नरों की तुलना में 15–20% अधिक है। व्यावसायिक उत्पादन के लिए निर्माताओं के साथ प्रौद्योगिकी लाइसेंसिंग समझौते किए गए हैं और उत्पाद लॉन्च की योजना बनाई गई है। पीएनजी बर्नर नोएडा स्थित बीपीसीएल हाउसिंग कॉम्प्लेक्स में बनाया गया।

सुपर अवशोषक पॉलिमर (एसएपी): सीआरडीसी ने एसएपी (सुपर एब्जॉर्बेंट पॉलीमर) प्रौद्योगिकी के व्यावसायीकरण में महत्वपूर्ण प्रगति की है, जिसमें केआर में 20 केटीपीए क्षमता वाले वाणिज्यिक एसएपी संयंत्र के लिए पीएफडी को अंतिम रूप देना और पीएंडआईडी की समीक्षा शामिल है। ग्लेशियल ऐक्रेलिक एसिड का उपयोग करके एसएपी उत्पादन में बेहतर परिणाम प्राप्त हुए हैं। इस स्वदेशी विकसित एसएपी प्रौद्योगिकी के लिए बीपीसीएल को सीएचटी इनोवेशन अवार्ड से सम्मानित किया गया।

हरित सिलिकाः बीपीसीएल के निर्माणाधीन बरगढ़ 2जी संयंत्र से निकलने वाली बॉयलर राख को उपयोगी बनाने के लिए, लगभग 70% दक्षता के साथ अवक्षेपित सिलिका बनाने की एक आंतरिक प्रक्रिया विकसित की गई है। इसे व्यावसायिक स्तर पर उत्पादन के लिए तैयार किया गया है।

बायो–प्लास्टिक उत्पादनः सीआरडीसी बायोरिफाइनरियों के अपशिष्ट का उपयोग बायोप्लास्टिक में करने पर

काम कर रहा है। बायोप्लास्टिक बैग का उत्पादन परीक्षण के रूप में किया गया है और अब बड़े पैमाने पर परीक्षण की योजना बनाई जा रही है।

सीओ$_2$ संग्रहण: प्रक्रिया गहनता सिद्धांत पर आधारित सीओ$_2$ संग्रहण की प्रक्रिया संबंधी जानकारी विकसित की जा रही है। इसके अलावा, सीओ$_2$ को मेथनॉल, फॉर्मिक एसिड जैसे मूल्यवान रसायनों में परिवर्तित करने हेतु प्रक्रिया रसायन विज्ञान का विकास किया जा रहा है।

विशिष्ट कैटेलिस्ट: इस विकास में हाइड्रोफॉर्माइलेशन प्रक्रिया, एफसीसी प्रचालन के लिए डीसॉक्स कैटेलिस्ट, और दूसरी पीढ़ी के डीवैक्सिंग कैटेलिस्ट जैसे कैटेलिस्ट शामिल हैं, जिनका सफलतापूर्वक विकास किया गया है। व्यावसायिक यूनिट में इनके निष्पादन को स्थापित करने के लिए इन्हें व्यावसायिक स्तर पर बढ़ाया जा रहा है।

एफसीसी कैटेलिस्ट प्रौद्योगिकी: स्वच्छ तेल (सीएलओ) को गैसोलीन में बदलने के लिए एक नया एफसीसी कैटेलिस्ट ''भारत–बीसीए'' विकसित किया गया और इसे संयंत्र परीक्षणों के लिए तैयार किया गया। एमआर में किए गए व्यावसायिक परीक्षण में एचसीओसीएलओ में 2% की कमी और गैसोलीन उत्पादन में 1.75% की वृद्धि देखी गई।

एलपीजी के लिए चोरी–रोधी स्लीव: एलपीजी चोरी को रोकने और आपूर्ति श्रृंखला प्रबंधन सुधारने के लिए ट्रैक–एंड–ट्रेस सुविधा वाली नई सुरक्षा स्लीव तैयार की गई है। यह स्लीव दो अलग गलनांक वाले पॉलीमर पदार्थों के मिश्रण से बनाई गई है, जिससे हॉट एयर सीलिंग मशीन से क्रिम्पिंग करते समय क्यूआर को सुरक्षित रखा जा सके। नई स्लीव 40% प्लास्टिक की बचत करती है और मौजूदा प्रणालियों के साथ आसानी से जुड़ जाती है। इसे फिलहाल रुड़की स्थित एलपीजी संयंत्र में पायलट परीक्षण के लिए इस्तेमाल किया जा रहा है।

एनोड ग्रेड कोक उत्पादन: आंतरिक प्रक्रिया तकनीक को सफलतापूर्वक विकसित किया गया है। कोच्चि रिफाइनरी में 4500 मीट्रिक टन एनोड ग्रेड कोक उत्पादन का परीक्षण सफलतापूर्वक किया गया।

बीपीमार्क® और के मॉडल®: के मॉडलो और बीपीमार्क® सॉफ्टवेयर उत्पादों का उपयोग करके सेवाएँ प्रदान करने हेतु अनुमोदन प्राप्त किए गए। बीपीमार्क के लिए एक वेब प्लेटफॉर्म विकसित किया गया और के मॉडलो सॉफ्टवेयर को नई सुविधाओं के साथ उन्नत किया गया। केआर में डिसाल्टर प्रचालन संबंधी समस्याओं के समाधान के लिए के मॉडल का उपयोग किया गया।

विशेष ग्रेड एलपीजी: उच्च ऊँचाई वाले क्षेत्रों के लिए एलपीजी का एक खास हाइड्रोकार्बन मिश्रण तैयार किया गया है। इसे विभिन्न स्थानों पर परखा जा रहा है।

हरित पहल: हरित ऊर्जा (सौर और पवन) का उपयोग करके एक रिटेल आउटलेट को बिजली देने के लिए बैटरी स्टोरेज के साथ एक हाइब्रिड प्रायोगिक परियोजना शुरू की गई है। इसके परीक्षण सफल रहे हैं और आगे विकास का काम जारी है।

पेटेंट और प्रकाशन: सीआरडीसी ने पूरे वर्ष में छह पेटेंट दायर किए, जिनमें कार्बनिक अम्ल उत्पादन, बायोमास से चीनी उत्पादन, चोरी–रोधी एलपीजी स्लीव्स और कार्बन अवशोषण के लिए विलायक शामिल हैं। कुल 16 पेटेंट प्रदान किए जा चुके हैं।

पीएंडएडी–सेवरी के आरएंडडी विभाग ने अप्रैल 2024 से मार्च 2025 के दौरान कई नए लुब्रिकेंट उत्पाद विकसित किए हैं। इनमें पर्यावरण के अनुकूल हाइड्रोलिक तेल, उच्च निष्पादन वाला नीट कटिंग तेल, निर्यात के लिए इंजन तेल, नई पीढ़ी के स्कूटरों के लिए इंजन तेल, ओईएम के लिए इंजन तेल, ट्रैक्टर तरल पदार्थ, ट्रांसमिशन और ड्राइवलाइन लुब्रिकेंट, तथा उच्च निष्पादन वाला इंसुलेटिंग तेल शामिल हैं।

वर्ष के दौरान कंपनी की अनुसंधान एवं विकास उपलब्धियों को कई प्रतिष्ठित पुरस्कारों से सम्मानित किया गया। उल्लेखनीय सम्मानों में आत्मनिर्भर भारत पहल में उत्कृष्टता के लिए भारतीय सार्वजनिक उपक्रम अचीवर्स पुरस्कार और हाइजीन–ग्रेड सुपर एब्जॉर्बेंट पॉलीमर (एसएपी) के लिए सीएचटी–ईटीएम पुरस्कारों में सर्वश्रेष्ठ स्वदेशी रूप से विकसित प्रौद्योगिकी पुरस्कार शामिल हैं। इसके अलावा, कंपनी

को इंजीनियर्स इंडिया लिमिटेड के साथ मिलकर डिसाल्टर तकनीक के संयुक्त विकास के लिए ओआईडीबी पुरस्कार मिला। इसके अतिरिक्त, कंपनी को "भारत में रसायन विज्ञान की शताब्दी'' पहल के तहत ब्रेकथ्रू अनुसंधान एवं विकास उत्कृष्टता पुरस्कार और रसायन उद्योग महारत्न पुरस्कार से सम्मानित किया गया।

12.1.5.7 पेट्रोकेमिकल निष्पादन ₹43,367 करोड़ की पूंजीगत व्यय वाली बीना पेट्रोकेमिकल और रिफाइनरी विस्तार परियोजना (बीपीआरईपी) में लगातार प्रगति हो रही है और अब तक 11% की कुल प्रगति हासिल की जा चुकी है। सभी तकनीकी लाइसेंसधारकों और सलाहकारों को शामिल कर लिया गया है और सभी इकाइयों के लिए प्रक्रिया पैकेज प्राप्त हो चुके हैं। विस्तृत इंजीनियरिंग कार्य प्रगति पर हैं। महत्वपूर्ण उपकरणों और ईपीसी पैकेजों के लिए निविदाएँ जारी की जा चुकी हैं और जल्द ही उन्हें उपलब्ध कराने की उम्मीद है। साइट सक्षमीकरण का कार्य लगभग पूरा हो चुका है।

साथ ही, कोच्चि रिफाइनरी में ₹5044 करोड़ की लागत से 400 केटीपीए पॉलीप्रोपाइलीन परियोजना स्थापित की जा रही है, जिसे वित्त वर्ष 2027–28 में चालू करने की योजना है।

12.1.5.8 प्राकृतिक गैस: बीपीसीएल ने वर्ष 2024–25 में अपने प्राकृतिक गैस कारोबार का विस्तार जारी रखा और 2023–24 के 1.693 एमएमटी की तुलना में 1.679 एमएमटी की बिक्री (आंतरिक खपत सहित) दर्ज की। बीपीसीएल के पास अब 107 ग्राहकों का ग्राहक आधार है, जिसमें वर्ष के दौरान कई नए ग्राहक जुड़े हैं, इसके अलावा मुंबई (महाराष्ट्र) और कोच्चि (केरल) स्थित अपनी रिफाइनरियों को भी आपूर्ति की जाती है।

12.1.5.9 सिटी गैस वितरण: बीपीसीएल को पेट्रोलियम एवं प्राकृतिक गैस विनियामक बोर्ड (पीएनजीआरबी) द्वारा 81 जिलों वाले 26 भौगोलिक क्षेत्रों के लिए नगर गैस वितरण (सीजीडी) नेटवर्क विकसित करने का अधिकार प्राप्त है। प्राकृतिक गैस की आपूर्ति जल्द से जल्द सुनिश्चित करने के लिए सीजीडी परियोजनाएँ पूरे जोर–शोर से चल रही हैं। दिसंबर, 2024 तक–

- 739 सीएनजी स्टेशन स्थापित किए गए हैं (अप्रैल–दिसंबर, 2024 के दौरान 68),
- 4.6 लाख पीएनजी ग्राहक (अप्रैल–दिसंबर, 2024 के दौरान 1.3) जुड़े हैं,
- 1618 कि.मी. (अप्रैल–दिसंबर, 2024 के दौरान 331 कि.मी.) स्टील पाइपलाइन और 4740 कि. मी. (अप्रैल–दिसंबर, 2024 के दौरान 1352 कि.मी.) एमडीपीई पाइपलाइन के साथ सीजीडी नेटवर्क बिछाया गया।

12.1.5.10 अन्वेषण एवं उत्पादन: भारत पेट्रो रिसोर्सेज लिमिटेड (बीपीआरएल) को अक्तूबर 2006 में भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल) की 100% सहायक कंपनी के रूप में स्थापित किया गया था, ताकि बीपीसीएल की अपस्ट्रीम गतिविधियों को संभाला जा सके।

भारत पेट्रो रिसोर्सेज लिमिटेड (बीपीआरएल) की पंद्रह ब्लॉकों में भागीदारी है, जिनमें से आठ भारत में और सात विदेश में हैं, साथ ही रूस में चार उत्पादक ब्लॉकों के लाइसेंस रखने वाली दो रूसी कंपनियों में इक्विटी हिस्सेदारी है। भारत में आठ में से पांच ब्लॉक नई अन्वेषण लाइसेंसिंग नीति (एनईएलपी) के विभिन्न दौरों के तहत अधिग्रहित किए गए थे, एक ब्लॉक खोजे गए छोटे क्षेत्रों (डीएसएफ) बोली दौर 1 के तहत प्रदान किया गया था और दो ब्लॉक खुला क्षेत्रफल लाइसेंस नीति (ओएएलपी) बोली दौर 1 के तहत प्रदान किए गए थे। सात विदेशी ब्लॉकों में से तीन ब्राजील में, दो संयुक्त अरब अमीरात में और एक–एक मोजाम्बिक और इंडोनेशिया में हैं। बीपीआरएल के पोर्टफोलियो में अन्वेषण, मूल्यांकन, विकास और उत्पादन के विभिन्न चरणों में ब्लॉक शामिल हैं। लगभग 19,824 वर्ग किलोमीटर क्षेत्र में फैले बीपीआरएल और उसकी सहायक कंपनियों के स्वामित्व वाले क्षेत्रफल का लगभग 46% हिस्सा अपतटीय क्षेत्र में है।

वित्त वर्ष 24–25 में तेल एवं गैस उत्पादन में बीपीसीएल की हिस्सेदारी 2.6 एमएमटीओई थी।

12.1.5.11 वैकल्पिक ऊर्जा:

नवीकरणीय ऊर्जा: वर्ष 2024–25 के लिए बीपीसीएल की कुल स्थापित नवीकरणीय क्षमता 102.50 मेगावाट है, जिसमें 90.7 मेगावाट सौर ऊर्जा और 11.8 मेगावाट पवन ऊर्जा शामिल है। इसके अतिरिक्त, कुल 171 मेगावाट क्षमता वाली तीन नवीकरणीय परियोजनाएँ विकास के विभिन्न चरणों में हैं। 2024–25 में, बीपीसीएल ने एनटीपीसी की सौर उपयोगिता निविदा के तहत प्रतिस्पर्धी बोली के माध्यम से 150 मेगावाट क्षमता हासिल की।

बीपीसीएल मध्य प्रदेश स्थित अपनी बीना रिफाइनरी में 5 मेगावाट क्षमता वाला इलेक्ट्रोलाइजर स्थापित करके हरित हाइड्रोजन उत्पादन की पहल को आगे बढ़ा रही है। इसके अलावा, परिवहन क्षेत्र में हरित हाइड्रोजन को बढ़ावा देने के लिए, बीपीसीएल कोचीन इंटरनेशनल एयरपोर्ट लिमिटेड के सहयोग से कोच्चि में एक हरित हाइड्रोजन ईंधन स्टेशन भी स्थापित कर रही है।

इसके अलावा, बीपीसीएल कोच्चि और बीना दोनों रिफाइनरियों में कैप्टिव उपयोग के लिए बायोमास मार्ग से हरित हाइड्रोजन उत्पादन पर काम कर रही है, जिसकी कुल क्षमता 2000 मीट्रिक टन है। ये परियोजनाएँ एसईसीआई मोड–ट्रेंच–1 साईट योजना के तहत प्रदान की गई हैं। बीपीसीएल रिफाइनरी उपयोग के लिए बिल्ड, ओन एंड ऑपरेट (बीओओ) आधार पर प्रति वर्ष 5 किलोटन हरित हाइड्रोजन उत्पादन की भी योजना बना रही है, जिसके लिए निविदा पहले ही जारी की जा चुकी है और परिणामों की प्रतीक्षा है।

बीपीसीएल ने हरित हाइड्रोजन–ईंधन वाले वर्टिकल टेक–ऑफ और लैंडिंग (वीटीओएल) विमान पारिस्थितिकी तंत्र विकसित करने के लिए मैसर्स ब्लूजे एयरोस्पेस, नवीन एवं नवीकरणीय ऊर्जा अनुसंधान एवं प्रौद्योगिकी एजेंसी (एएनईआरटी), केरल सरकार और कोचीन इंटरनेशनल एयरपोर्ट लिमिटेड (सीआईएएल) के साथ एक चार–पक्षीय समझौता–ज्ञापन (एमओयू) पर हस्ताक्षर किए हैं। इसके अलावा, बीपीसीएल ने हाइड्रोजन ईंधन सेल इलेक्ट्रिक बसों के लिए सहयोग हेतु केपीआईटी टेक्नोलॉजीज के साथ भी समझौता–ज्ञापन पर हस्ताक्षर किए हैं, जिससे टिकाऊ और सुरक्षित हाइड्रोजन–आधारित गतिशीलता समाधानों को बढ़ावा मिलेगा।

जैव–ईंधन: कंपनी की बारगढ़, ओडिशा में एकीकृत 1जी और 2जी बायो–एथेनॉल रिफाइनरी, जिनमें से प्रत्येक की उत्पादन क्षमता 100 कि.लीधदिवस है, निर्माण के अंतिम चरण में है और वित्त वर्ष 2025–26 में चालू होने की उम्मीद है।

सरकार के एथेनॉल ब्लेंडिंग पेट्रोल (ईबीपी) कार्यक्रम के अनुरूप, बीपीसीएल ने वित्त वर्ष 2024–25 में 14.5% के समझौता–ज्ञापन लक्ष्य को पार करते हुए 16.35% का अब तक का उच्चतम एथेनॉल ब्लेंडिंग प्रतिशत हासिल किया, जो पिछले वर्ष 11.7% था। बीपीसीएल ने मार्च 2025 में 19.47% की अब तक की सर्वोच्च मासिक ब्लेंडिंग दर भी हासिल कर ली है।

भारत में अपने सभी स्थानों पर, कंपनी गन्ने के रस, बी–हैवी मोलासेस, सी–हैवी मोलासेस, मक्का, खराब खाद्यान्नों और एफसीआई से प्राप्त अतिरिक्त चावल से उत्पादित मोटर स्पिरिट (एमएस) में 1जी एथेनॉल मिला रही है। बीपीसीएल ने वित्त वर्ष 2023–24 में 163 करोड़ लीटर एथेनॉल की तुलना में वित्त वर्ष 2024–25 में 241 करोड़ लीटर एथेनॉल की खरीद की है। इसने अपने आपूर्ति स्थानों पर एथेनॉल भंडारण क्षमता को भी पिछले वित्त वर्ष के 135 टीकेएल से बढ़ाकर 147 टीकेएल कर दिया है।

बीपीसीएल एथेनॉल खरीद के लिए एक उद्योग समन्वयक के रूप में कार्य कर रहा है और विभिन्न स्रोतों से 1जी एथेनॉल खरीदकर ईबीपी कार्यक्रम का नेतृत्व कर रहा है। संपूर्ण एथेनॉल मूल्य श्रृंखला की पूरी जानकारी प्रदान करने के लिए, आईईएमएस (एकीकृत एथेनॉल प्रबंधन प्रणाली) विकसित की गई है, जो सभी संबंधित एथेनॉल हितधारकों के लिए एकल खिड़की के रूप में काम करती है। यह मैन्युअल प्रक्रियाओं को स्वचालित करती है, जिससे व्यावसायिक उपयोगकर्ताओं की दक्षता बढ़ती है और व्यापार करना आसान होता है। तेल विपणन कंपनियों की ओर से, बीपीसीएल ने ईएसवाई 2023–24 और ईएसवाई 2024–25 के लिए लगभग एक लाख करोड़ रुपए मूल्य की 1384 करोड़ लीटर एथेनॉल खरीद पूरी की, जिसमें आईईएमएस ने महत्वपूर्ण भूमिका निभाई।

इसके अलावा, बीपीसीएल ने अन्य उद्योग हितधारकों के साथ मिलकर दीर्घकालिक उठान समझौतों (एलटीओए) पर हस्ताक्षर किए हैं, जिससे निकट भविष्य में 101 एथेनॉल संयंत्रों की स्थापना संभव होगी, जिनकी वार्षिक उठान मात्रा 361 करोड़ लीटर होगी।

वित्त वर्ष 2024–25 में, बीपीसीएल ने राष्ट्रीय शर्करा संस्थान (एनएसआई) के साथ एक समझौता–ज्ञापन पर हस्ताक्षर किए हैं ताकि मीठी ज्वार से एथेनॉल उत्पादन को एक स्थायी फीडस्टॉक के रूप में आगे बढ़ाने की संभावनाओं का पता लगाया जा सके। यह पहल बीपीसीएल की एक लचीला एथेनॉल पारिस्थितिकी तंत्र बनाने की प्रतिबद्धता को दर्शाती है जो भारत की ऊर्जा सुरक्षा में योगदान देता है, जिससे नवाचार को बढ़ावा मिलेगा और ऊर्जा क्षेत्र के लिए स्केलेबल, हरित समाधान तैयार होंगे।

टीकेएल बायोडीजल की खरीद और 1379 टीकेएल बायोडीजल–मिश्रित डीजल की बिक्री के साथ कंपनी ने बायोडीजल में अपनी प्रगति जारी रखी, जिससे कुल ईंधन में 0.33% का मिश्रण हासिल हुआ।

बीपीसीएल ने कृषि अवशेष, गन्ना प्रेस मड, नगर निगम के ठोस अपशिष्ट आदि जैसे बायोमास अपशिष्ट/बायोमास स्रोतों से कंप्रेस्ड बायोगैस (सीबीजी) के उत्पादन के क्षेत्र में पहल की है। बीपीसीएल संधारणीय एलओआई धारकों द्वारा लगभग 30 टीएमटीपीए की कुल स्थापित सीबीजी उत्पादन क्षमता वाले 10 सीबीजी संयंत्र चालू किए गए हैं। कंपनी ने सीबीजी की बिक्री शुरू करने वाले 62 और रिटेल आउटलेट भी जोड़े हैं, जिससे आरओ की संख्या बढ़कर 112 हो गई है और वित्त वर्ष 2024–25 तक कुल बिक्री 15.2 टीएमटी हो गई है।

बीपीसीएल अगले 2–3 वर्षों में लगभग 50 टीएमटीपीए सीबीजी उत्पादन क्षमता वाले 26 सीबीजी संयंत्र स्थापित करने की योजना बना रही है। इसके लिए, बीपीसीएल ने मैसर्स जीपीएस रिन्यूएबल्स प्राइवेट लिमिटेड के साथ एक संयुक्त उद्यम कंपनी बनाने का प्रस्ताव भी रखा है।

12.1.5.12 संधारणीय विकासः एक जिम्मेदार कंपनी के रूप में, बीपीसीएल ने अपने सभी कार्यों में पांच सिद्धांतों अर्थात् इंकार करना, कम करना, पुनः उपयोग करना, पुनः प्रयोजन करना और पुर्नःचक्रण करना, को अपनाया है। इसके माध्यम से कंपनी ने ऊर्जा संरक्षण, ऊर्जा दक्षता, नवीकरणीय ऊर्जा, कार्बन पृथक्करण, अपशिष्ट प्रबंधन, जल प्रबंधन, वर्षा जल संचयन, जल संतुलन अध्ययन और अन्य संधारणीय विकास पहलों पर ध्यान केंद्रित किया है। बीपीसीएल ताजे पानी पर निर्भरता कम करने के लिए वर्षा जल संचयन (आरडब्ल्यूएच) क्षमता बढ़ाने में लगातार सक्रिय है। इस प्रयास से कुल जलग्रहण क्षेत्र बढ़कर 13.50 लाख वर्गमीटर हो गया है, जिससे वित्त वर्ष 2024–25 के दौरान लगभग 700 टीकेएल पानी की बचत हुई है। कंपनी ने अपनी सभी रिफाइनरियों और चयनित विपणन स्थानों पर जल संतुलन अध्ययन करवाए हैं और जल बचाने तथा स्थान को जल तटस्थ बनाने के लिए पहलें लागू कर रही है।

बीपीसीएल ने वर्ष 2040 तक अपने स्कोप 1 और स्कोप 2 ग्रीनहाउस गैस (जीएचजी) उत्सर्जन को शून्य करने का लक्ष्य रखा है और इसके लिए एक रणनीतिक योजना तैयार की है। यह योजना सक्रिय है और 2035 तक अक्षय ऊर्जा पोर्टफोलियो को 10 गीगावाट तक बढ़ाने पर केंद्रित है। साथ ही, इसमें ग्रीन हाइड्रोजन, कार्बन अवशोषण और जैव ईंधन जैसे सीबीजी, एथेनॉल और बायोडीजल में रणनीतिक निवेश शामिल है। बीपीसीएल अपनी हरित पहल को आगे बढ़ाते हुए बीना रिफाइनरी में 2 टीपीडी क्षमता वाला ग्रीन हाइड्रोजन प्रायोगिक संयंत्र विकसित कर रहा है और कोच्चि रिफाइनरी में स्वदेशी बीएआरसी तकनीक का उपयोग करके ग्रीन हाइड्रोजन ईंधन भरने वाला स्टेशन स्थापित कर रहा है। यह व्यापक दृष्टिकोण कंपनी की संधारणीय ऊर्जा समाधान और नवाचार के प्रति प्रतिबद्धता को दर्शाता है।

बीपीसीएल बरगढ़ जिला, ओडिशा में एक संयंत्र का निर्माण कर रही है, जो प्रतिदिन 100 किलोलीटर द्वितीय पीढ़ी (2जी) और प्रथम पीढ़ी (1जी) बायोएथेनॉल का उत्पादन करने में सक्षम है और इसके वित्त वर्ष 2025–26 के दौरान चालू होने की उम्मीद है। बीपीसीएल ने टीपीडी के चरणबद्ध उठान के लिए 14 सीबीजी निर्माताओं के साथ संविदा किया है। वर्तमान उठान 17 टीपीडी है, जो पीएनजी–डी और सीएनजी की मात्रा का 4% है।

बीपीसीएल एक मजबूत, सुलभ चार्जिंग बुनियादी अवसंरचना के माध्यम से इलेक्ट्रिक मोबिलिटी में परिवर्तन का समर्थन करने के लिए प्रतिबद्ध है और 3,313 (कुल 6,563) चार्जिंग स्टेशन स्थापित किए हैं।

वित्त वर्ष 2024–25 के दौरान प्रचालन विपणन और रिफाइनरी स्थानों पर ऊर्जा कुशल प्रकाश व्यवस्था (ईईएल) क्षमता को बढ़ाकर 114.37 मेगावाट कर दिया गया है।

बीपीसीएल ने वित्त वर्ष 2024–25 के दौरान हरित आवरण और जैव विविधता को बढ़ावा देने के लिए मियावाकी तकनीक, सीड बॉम्बिंग और पारंपरिक तरीकों का उपयोग करते हुए 1,70,000 से अधिक पेड़ लगाए हैं, जिससे बीपीसीएल के सभी स्थलों पर कुल 1.22 मिलियन पेड़ लगाए जा चुके हैं। बीना रिफाइनरी ने मध्य प्रदेश राज्य वन विभाग के सहयोग से कंजिया रेंज, खुरई, वनमंडल उत्तर सागर में 90 हेक्टेयर वन भूमि पर ₹1.96 करोड़ के कुल निवेश से 1 लाख पेड़ लगाए हैं।

लैंडफिल (जेडडब्ल्यूएल) प्रमाणन प्राप्त करने हेतु एक अभियान शुरू किया है। जीरो वेस्ट–टू–लैंडफिल प्रमाण ान की उपलब्धि बीपीसीएल के जिम्मेदार अपशिष्ट प्रबंधन प्रथाओं और मृदा प्रदूषण की रोकथाम के प्रति प्रतिबद्धता का प्रमाण है। ब्रांड स्वामी के रूप में बीपीसीएल की लुब्रिकेंट्स व्यवसाय यूनिट ने वित्त वर्ष 2024–25 में ईपीआर के अंतर्गत 5,551 मीट्रिक टन प्लास्टिक कचरा एकत्रित और संसाधित किया है।

बीपीसीएल की संधारणीय विकास रणनीति का उद्देश्य पर्यावरण और समाज से जुड़े मुख्य चुनौतियों का समाधान करते हुए संधारणीय विकास और नवाचार को आगे बढ़ाना है। तकनीकी प्रगति में अग्रणी रहते हुए, बीपीसीएल अपनी प्रचालन क्षमता और लचीलेपन को लगातार बढ़ाता है और संधारणीय विकास प्रथाओं के पालन और प्रतिबद्धता के जरिए दूसरों के लिए उदाहरण पेश करता है।

12.1.5.13 कॉर्पोरेट सामाजिक उत्तरदायित्वः "जीवन को ऊर्जावान" बनाने के अपने दृष्टिकोण से प्रेरित होकर, भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल) अपने सशक्त कॉर्पोरेट सामाजिक उत्तरदायित्व (सीएसआर) कार्यक्रमों के माध्यम से व्यवसाय से परे भी सकारात्मक प्रभाव डालता है। बीपीसीएल की सीएसआर रणनीति का मुख्य उद्देश्य स्थानीय समुदायों को सशक्त बनाना और समावेशी, समान और संधारण ीय विकास को बढ़ावा देना है। राष्ट्र निर्माण के प्रति अपनी प्रतिबद्धता के तहत, बीपीसीएल अपने सीएसआर प्रयासों को राष्ट्रीय विकास एजेंडे के साथ जोड़ता है और मुख्य रूप से पाँच क्षेत्रों–स्वास्थ्य और स्वच्छता, शिक्षा, कौशल विकास, सामुदायिक विकास और पर्यावरणीय स्थिरता–पर ध्यान केंद्रित करता है। इसके साथ ही, कंपनी कंपनी अधिनियम, 2013 की अनुसूची VII में उल्लिखित अन्य क्षेत्रों पर भी काम करती है।

कॉर्पोरेशन सरकार की प्रमुख पहलों जैसे डीपीई विषयगत क्षेत्र, आकांक्षी जिले, स्वच्छ भारत, कौशल भारत आदि को भी बीपीसीएल प्राथमिकता देता है।

वित्त वर्ष 2024–25 की कुछ मुख्य विशेषताएं

- स्वास्थ्य सेवा के क्षेत्र में, कैंसर वैश्विक जन स्वास्थ्य के लिए एक गंभीर चुनौती बन गया है और मृत्यु का एक प्रमुख कारण बनता जा रहा है। अकेले 2020 में, विश्व स्तर पर 1.9 करोड़ से अधिक नए मामले सामने आए और लगभग 1 करोड़ लोग इसकी वजह से मरे, अर्थात् लगभग हर छह में से एक मौत। कैंसर देखभाल के क्षेत्र में, बीपीसीएल ने टाटा मेमोरियल सेंटर, होमी भाभा कैंसर हॉस्पिटल एंड रिसर्च सेंटर (एचबीसीएचएंडआरसी), विशाखापत्तनम (आकांक्षी जिला), आंध्र प्रदेश में रोगियों और उनके परिवारों के लिए एक आवास सुविधा स्थापित करने का महत्वपूर्ण कदम उठाया है। यह छात्रावास सुविधा 200 रोगियों/परिवार के सदस्यों को रहने की जगह प्रदान करेगी।
- कैंसर देखभाल पहल के तहत, स्तन और गर्भाशय ग्रीवा के कैंसर पर विशेष ध्यान देते हुए महिलाओं के स्वास्थ्य की देखभाल के लिए महाराष्ट्र के उस्मानाबाद (आकांक्षी जिला) में स्क्रीनिंग, निदान और रेफरल का कार्यक्रम चलाया गया है। इस पहल ने कैंसर और अन्य गैर–संचारी रोगों (एनसीडी) के प्रति जागरूकता बढ़ाने में महत्वपूर्ण योगदान दिया है। इसमें स्थानीय स्वास्थ्य कर्मियों के लिए शीघ्र पहचान, स्वास्थ्य शिक्षा और क्षमता निर्माण पर जोर दिया गया है,

ताकि लंबे समय तक असर बना रहे। सामुदायिक जुड़ाव को मजबूत करके और स्वास्थ्य सेवाओं तक पहुँच बढ़ाकर, इस परियोजना ने सार्वजनिक स्वास्थ्य परिणामों को सुधारने और क्षेत्र में कैंसर रोकथाम के प्रयासों को आगे बढ़ाने की क्षमता दिखाई है। पिछले वित्तीय वर्ष में 100 से अधिक समुदायों को इसका लाभ मिला।

- गढ़चिरौली (आकांक्षी जिला) के शोधग्राम में कर्मचारियों और विजिटिंग मेडिकल प्रोफेशनल्स के लिए 10 आवास इकाइयाँ स्थापित की गई हैं, जिससे लोगों को लगातार चिकित्सा देखभाल सेवाएँ प्रदान करने में मदद मिली है।
- पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के निर्देश के अनुसार, देश भर में तेल और गैस उद्योग में युवाओं की रोजगार क्षमता बढ़ाने के लिए, बीपीसीएल को कोच्चि में एसडीआई विकसित करने की जिम्मेदारी दी गई है। बीपीसीएल ने केरल में नए एसडीआई के निर्माण और प्रचालन के माध्यम से कौशल विकास गतिविधियों का विस्तार करने की मंजूरी प्राप्त कर ली है।
- "लाइफलाइन एक्सप्रेस" एक ट्रेन में मल्टीस्पेशलिटी अस्पताल है, जिसे पश्चिम बंगाल के नादिया, असम के लखीमपुर और त्रिपुरा के धलाई जैसे दूरदराज इलाकों में मरीजों के घर के पास ही सर्जिकल और चिकित्सा सुविधाएँ प्रदान करने के लिए सहायता दी गई है। यह अनुकूलित वातानुकूलित ट्रेन सात डिब्बों वाली है और इसमें उच्च गुणवत्ता वाली मल्टीस्पेशलिटी सर्जिकल, डायग्नोस्टिक्स और स्क्रीनिंग सुविधाओं के लिए अत्याधुनिक उपकरण लगे हैं। बीपीसीएल ने पिछले कुछ वर्षों में लाइफलाइन एक्सप्रेस के माध्यम से 12 स्थानों पर सहायता प्रदान की है, जिससे दो लाख से अधिक लाभार्थियों को चिकित्सा और सर्जिकल सेवाओं का लाभ मिला है।
- बीपीसीएल की खेल छात्रवृत्ति योजना तीन वर्षों में 100 खिलाड़ियों को शामिल करने के लिए बनाई गई है। यह योजना 13 से 25 वर्ष के एथलीटों के लिए है और उन्हें उचित प्रशिक्षण, कोचिंग और मार्गदर्शन के जरिए अपने कौशल को विकसित करने का अवसर देती है।
- एनीमिया और कुपोषण दुनिया भर के स्कूलों के बच्चों को प्रभावित करने वाली गंभीर स्वास्थ्य समस्याएँ हैं। ये न केवल बच्चों के शारीरिक स्वास्थ्य को प्रभावित करती हैं, बल्कि उनके मानसिक विकास, पढ़ाई और समग्र कल्याण में भी बाधा डालती हैं। बच्चों के सही विकास और शैक्षणिक सफलता के लिए इन समस्याओं का समाधान करना बेहद जरूरी है। इस लक्ष्य को पूरा करने के लिए, बीपीसीएल ने मध्य प्रदेश के आदिवासी बहुल झाबुआ जिले के सरकारी स्कूलों में सिकल सेल एनीमिया और कुपोषण की जांच के लिए प्राथमिक स्वास्थ्य जांच की पहल शुरू की है।
- सुभाष चंद्र बोस अकादमी, सिलवासा, दादरा और नगर हवेली, गुजरात में छात्रावास निर्माण में सहायता की गई है। इस परियोजना से 120 छात्रों को उनके घर से दूर रहते हुए आरामदायक आवास की सुविधा मिलेगी।
- शिक्षा के माध्यम से लड़कियों को सशक्त बनाने की बीपीसीएल की प्रतिबद्धता के तहत, मुम्मिघाटी, धारवाड़, कर्नाटक में एक गर्ल्स हॉस्टल का निर्माण किया जाएगा। यह हॉस्टल प्री–यूनिवर्सिटी कॉलेज (राज्य बोर्ड) और धारवाड़ के राष्ट्रोथाना स्थित एकीकृत बी.एड कॉलेज में पढ़ने वाली लगभग 250 लड़कियों को हर साल सुरक्षित आवास प्रदान करेगा, जिससे शिक्षा तक उनकी पहुँच बढ़ेगी और वंचित समुदायों की युवा महिलाओं के सामने आने वाली बाधाओं को कम किया जा सकेगा।
- निवारक स्वास्थ्य सेवा के क्षेत्र में, बीपीसीएल 1000 स्वास्थ्य पेशेवरों का प्रशिक्षण करेगा और 10 उपशामक देखभाल केंद्र विकसित करेगा। इस परियोजना का उद्देश्य रोगियों और उनके परिवारों के जीवन की गुणवत्ता को बेहतर बनाना है, जिसमें उनके शारीरिक, भावनात्मक और आध्यात्मिक आवश्यकताओं का समग्र प्रबंधन शामिल है।
- बाल कुपोषण की गंभीर चुनौती से निपटने के लिए, पोषण मुख भारत के तहत एक महत्वपूर्ण पहल बिहार के गया और किशनगंज जिलों में 7,000 से अधिक बच्चों को सहायता प्रदान करेगी। आवश्यक पोषण किट उपलब्ध कराकर, इस परियोजना का उद्देश्य बच्चों के स्वास्थ्य और विकास में सुधार लाना है।

गया में इसका कार्यान्वयन विशेष रूप से महत्वपूर्ण है, क्योंकि यह सबसे जरूरतमंद क्षेत्रों को लक्षित करके सार्थक और समावेशी प्रगति को बढ़ावा देता है।

- सुरक्षित और समावेशी आवास की जरूरत को समझते हुए, देहरादून के मंडुवाला में एक छात्रावास का निर्माण किया जा रहा है, जिसमें प्रतिवर्ष लगभग 120 बच्चों के रहने की सुविधा होगी। यह परियोजना अनुसूचित जाति, अनुसूचित जनजाति, अन्य पिछड़ा वर्ग और दिव्यांग छात्रों को रियायतें देकर समान अवसर और सुगम पहुँच सुनिश्चित करती है। शैक्षणिक सहायता के साथ सुरक्षित आवास प्रदान करके, यह पहल बच्चों के शिक्षा में समावेशन, सशक्तिकरण और सामाजिक विकास को बढ़ावा देती है।
- सरकारी स्कूलों में स्मार्ट क्लासरूम बच्चों के सीखने के अनुभव को बेहतर बनाएंगे। ये तकनीकी सुधार जानकारी तक पहुँच आसान बनाएंगे, जुड़ाव बढ़ाएँगे और बेहतर शिक्षण विधियों को बढ़ावा देंगे। बीपीसीएल महाराष्ट्र के वासम्बे, रोहा और श्रीवर्धन जिलों के सरकारी स्कूलों में स्मार्ट क्लासरूम स्थापित करेगा ताकि आधुनिक और प्रभावी शिक्षा का वातावरण तैयार हो सके।
- बीपीसीएल और इसके विस्तारित नेटवर्क द्वारा 1 से 15 जुलाई 2024 तक स्वच्छता पखवाड़ा मनाया गया। पर्यावरण को स्वच्छ बनाने के प्रयास के रूप में 95,500 से अधिक गतिविधियाँ आयोजित की गईं।
- बीपीसीएल और उसके विस्तारित नेटवर्क द्वारा 14 सितंबर से 1 अक्तूबर 2024 तक स्वच्छता ही सेवा मनाया गया और 790 से अधिक गतिविधियां आयोजित की गईं।
- वित्त वर्ष 2024–25 के लिए बीपीसीएल द्वारा सीएसआर व्यय 179.37 करोड़ रुपए है।

12.1.6 हिन्दुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड (एचपीसीएल):

हिन्दुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड (एचपीसीएल) एक महारत्न सार्वजनिक क्षेत्र की कंपनी है। वित्त वर्ष 2024–25 में इसकी वार्षिक सकल बिक्री ₹4,64,247 करोड़ रही। दिनांक 31 मार्च 2025 कि स्थिति के अनुसार, भारत में रिफाइनिंग और विपणन में लगभग 22.50% बाजार हिस्सेदारी के साथ एचपीसीएल की मजबूत उपस्थिति है।

मार्च, 2025 तक, एचपीसीएल मुंबई और विशाखापत्तनम में क्रमशः 9.5 एमएमटीपीए और 15.0 एमएमटीपीए की डिजाइन क्षमता वाली रिफाइनरियों का स्वामित्व और प्रचालन करती है। इसके अलावा, मुंबई में 428 टीएमटीपीए क्षमता वाली ल्यूब ऑयल बेस स्टॉक रिफाइनरी भी एचपीसीएल के पास है, जो देश की सबसे बड़ी ल्यूब रिफाइनरी है।

इसके अलावा, एचपीसीएल के पास संयुक्त उद्यम कंपनी, एचपीसीएल–मित्तल एनर्जी लिमिटेड (एचएमईएल) में 48.99% इक्विटी हिस्सेदारी है, जो बठिंडा, पंजाब में एमएमटीपीए क्षमता वाली रिफाइनरी का प्रचालन करती है और इसके पास मैंगलोर रिफाइनरी एंड पेट्रोकेमिकल्स लिमिटेड (एमआरपीएल) में 16.96: इक्विटी हिस्सेदारी भी है, जो मैंगलोर, कर्नाटक में 15 एमएमटीपीए क्षमता वाली रिफाइनरी का प्रचालन करती है।

एचपीसीएल के पास भारत में पेट्रोलियम उत्पादों के लिए दूसरा सबसे बड़ा पाइपलाइन नेटवर्क है, जिसकी लंबाई लगभग 5,134 किलोमीटर है। इसका विपणन नेटवर्क भी व्यापक है, जिसमें 19 क्षेत्रीय कार्यालय और 145 क्षेत्रीय कार्यालय शामिल हैं। यह नेटवर्क 43 टर्मिनल/स्थापनाओं/टैप ऑफ पॉइंट्स, 57 विमानन सेवा सुविधाओं, 55 एलपीजी बॉटलिंग संयंत्रों, 4 ल्यूब ब्लेंडिंग संयंत्रों, 37 डिपो और 32 विशेष ल्यूब डिपो के माध्यम से आपूर्ति और वितरण को सुगम बनाता है। ग्राहक संपर्क बिंदुओं में 23,747 खुदरा बिक्री केंद्र, 1,638 एसकेओ/एलडीओ डीलर, 395 बाजार ल्यूब वितरक, 156 औद्योगिक ल्यूब वितरक, खुदरा बिक्री केंद्र पर 2,038 सीएनजी सुविधाएँ, 875 डोर–टू–डोर डिलीवरी डिस्पेंसर, 5,976 ईवी चार्जिंग स्टेशन और 6,378 एलपीजी डिस्ट्रीब्यूटरशिप शामिल हैं। मार्च 2025 तक इसका ग्राहक आधार 9.7 करोड़ से अधिक एलपीजी उपभोक्ताओं का है।

एचपीसीएल का बेंगलुरु में 'एचपी ग्रीन आरएंडडी सेंटर' नामक अनुसंधान एवं विकास केंद्र है। यह केंद्र रिफाइनरियों और विपणन की प्रमुख व्यावसायिक इकाइयों (एसबीयू) को प्रचालन सुधार, नई तकनीक अपनाने, नवीन और उन्नत तकनीक विकसित करने,

तकनीकों का लाइसेंस देने और ज्ञान केंद्र बनने में तकनीकी सहायता प्रदान करता है। एचपीसीएल अपने व्यवसाय को 20 संयुक्त उद्यम और सहायक कंपनियों के माध्यम से भी प्रचालित करता है।

12.1.6.1 वित्तीय निष्पादनः वित्त वर्ष 2024–25 में एचपीसीएल की सकल बिक्री ₹4,64,247 करोड़ थी, जबकि वित्त वर्ष 2023–24 में यह ₹4,59,815 करोड़ थी। एचपीसीएल ने वित्त वर्ष 2024–25 के दौरान ₹7,365 करोड़ का कर–पश्चात लाभ (पीएटी) अर्जित किया है, जबकि वित्त वर्ष 2023–24 में यह ₹14,694 करोड़ था। एचपीसीएल का रिफाइनिंग मार्जिन वित्त वर्ष 2024–25 के लिए औसतन ₹5.74 प्रति बैरल रहा, जबकि वित्त वर्ष 2023–24 के लिए यह ₹9.08 प्रति बैरल (सकल निर्यात शुल्क) था।

12.1.6.2 राजकोष में योगदानः वित्त वर्ष 2024–25 के दौरान, एचपीसीएल ने राजकोष में ₹1,05,196 करोड़ की राशि का योगदान दिया है, जिसमें केंद्रीय राजकोष को ₹40,698 करोड़ और राज्य राजकोष को ₹64,497 करोड़ शामिल हैं।

12.1.6.3 रिफाइनरी का निष्पादनः वित्तीय वर्ष 2024–25 में, एचपीसीएल मुंबई और विशाख रिफाइनरियों ने रिफाइनिंग प्रचालन में असाधारण निष्पादन किया, जिससे एक प्रभावशाली सुधार हुआ। 25.27 मिलियन मीट्रिक टन (एमएमटी) का अब तक का सबसे अधिक क्रूड थ्रूपुट हासिल किया गया। दोनों रिफाइनरियों में थ्रूपुट डिजाइन क्षमता से अधिक था और 108.9% की औसत क्षमता उपयोग दर्ज किया गया। विशाखापत्तनम रिफाइनरी ने 15.31 एमएमटी का अपना उच्चतम वार्षिक क्रूड थ्रूपुट हासिल किया और मुंबई रिफाइनरी ने भी 9.96 एमएमटी का अपना उच्चतम वार्षिक क्रूड थ्रूपुट हासिल किया। वर्ष के दौरान एमएस (4208 टीएमटी), एचएसडी (11083 टीएमटी), एमएस (4208 टीएमटी दोनों रिफाइनरियों ने वर्ष के दौरान अब तक का सबसे कम एफएंडएल हासिल किया।

बालोतरा में चल रही 9 एमएमटीपीए एकीकृत जमीनी स्तर की रिफाइनरी–सह–पेट्रोकेमिकल परियोजना (एचआरआरएल) का निर्माण कार्य पूरा होने के अग्रिम चरणों में है।

12.1.6.4 पाइपलाइन निष्पादनः एचपीसीएल वर्तमान में 35.2 एमएमटीपीए की मुख्य लाइन क्षमता के साथ 5,134 किलोमीटर लंबे पेट्रोलियम उत्पाद पाइपलाइन नेटवर्क का प्रचालन कर रही है, जिसमें 19 एमएमटीपीए की शाखा लाइन क्षमता शामिल है। अप्रैल 2024 से मार्च 2025 की अवधि के दौरान, कुल एमएमटी पाइपलाइन थ्रूपुट प्राप्त किया गया।

पाइपलाइन नेटवर्क और क्षमताओं का और विस्तार करने के लिए, जिससे उन्नत लॉजिस्टिक दक्षताएँ और पर्यावरणीय लाभ बढ़ सकें, लगभग 1,407 करोड़ रुपए के अनुमानित निवेश के साथ बठिंडा–संगरूर पाइपलाइन परियोजना और हल्दिया–पानागढ़ एलपीजी पाइपलाइन परियोजना पर काम जारी है।

12.1.6.5 विपणन निष्पादनः अप्रैल–मार्च, 2025 की अवधि के दौरान, एचपीसीएल ने निर्यात और पेट्रोकेमिकल बिक्री सहित 49.82 एमएमटी की बिक्री मात्रा हासिल की है। घरेलू बिक्री खंड में, एचपीसीएल ने 47.29 एमएमटी (पेट्रोकेमिकल बिक्री सहित) की बिक्री मात्रा दर्ज की है और सार्वजनिक क्षेत्र की तेल विपणन कंपनियों (ओएमसी) के बीच लगभग 22.50% की बाजार हिस्सेदारी हासिल की है।

खुदरा क्षेत्र में, एचपीसीएल ने अप्रैल–मार्च, 2025 की अवधि में 29.98 एमएमटी की बिक्री मात्रा हासिल की, जिसमें 26.6% बाजार हिस्सेदारी (पीएसयू के बीच) थी। अप्रैल–मार्च, 2025 की अवधि में 1,725 नए खुदरा आउटलेट (कुल खुदरा बिक्री केंद्र की संख्या 23,747 तक) और 361 खुदरा बिक्री केंद्र पर सीएनजी सुविधाओं की शुरुआत हुई (ऐसे आउटलेट की कुल संख्या 2,038 है)। मार्च, 2025 तक, 875 डोर–टू–डोर मोबाइल डिस्पेंसर और 5,976 ईवी चार्जिंग स्टेशन चालू हैं। अप्रैल–मार्च, 2025 के दौरान, 4,735 आउटलेट्स पर सौर ऊर्जा का उपयोग किया गया, जिससे कुल आउटलेट्स की संख्या 22,353 हो गई।

अप्रैल–मार्च, 2025 के दौरान, एचपीसीएल के एलपीजी व्यवसाय ने पिछले वर्ष की तुलना में 4.5% की वृद्धि और 27.30% की बाजार हिस्सेदारी के साथ 8.95 एमएमटी की बिक्री दर्ज की। अप्रैल–मार्च, 2025 के दौरान, एचपीसीएल ने 12.85 लाख नए ग्राहक बनाए और 30 नए नियमित एलपीजी वितरक

बनाए (कुल वितरकों की संख्या 6,378 हो गई)। अप्रैल–मार्च, 2025 के दौरान, एचपीसीएल ने 31.6 लाख पीएमयूवाई ग्राहकों को नामांकित किया, जिससे कुल पीएमयूवाई ग्राहकों की संख्या 273 लाख हो गई। अप्रैल–मार्च 2025 तक, एचपीसीएल के पास 9.63 करोड़ एलपीजी उपभोक्ता हैं। कुल 55 एलपीजी संयंत्र 6,470 टीएमटीपीए की कुल क्षमता पर काम कर रहे हैं। एचपीसीएल मैंगलोर में भारत का सबसे बड़ा एलपीजी भंडारण केंद्र स्थापित कर रहा है, जिसकी भंडारण क्षमता 80 टीएमटी है।

अप्रैल–मार्च, 2025 की अवधि के दौरान एचपीसीएल 5.6 टीएमटी के निर्यात के साथ 704 टीएमटी ('000 मीट्रिक टन) की बिक्री मात्रा के साथ देश में अग्रणी ल्यूब बिक्रीकर्ता बना हुआ है।

औद्योगिक एवं उपभोक्ता (आईएंडसी) व्यवसाय क्षेत्र में, एचपीसीएल ने लगभग 6.04 एमएमटी की कुल बिक्री दर्ज की। विमानन व्यवसाय क्षेत्र में, एचपीसीएल ने 1.09 एमएमटी विमानन टरबाइन ईंधन की बिक्री हासिल की। कानपुर, सूरत, जलगाँव और मुरादाबाद में एएसएफ की शुरुआत करके विमानन सेवा सुविधा (एएसएफ) नेटवर्क का विस्तार किया गया, जिससे एएसएफ की कुल संख्या 57 हो गई।

जैव ईंधन और नवीकरणीय ऊर्जा में, एचपीसीएल ने अप्रैल–मार्च, 2025 के दौरान 14.32 करोड़ किलोवाट घंटे की नवीकरणीय ऊर्जा उत्पन्न की। बदायूं, उत्तर प्रदेश में कंपनी के पहले बायोमास–आधारित सीबीजी संयंत्र ने अप्रैल से मार्च 2025 के दौरान 426.69 मीट्रिक टन सीबीजी का उत्पादन किया है।

12.1.6.6 अनुसंधान एवं विकास (आरएंडडी): हिन्दुस्तान पेट्रोलियम का ग्रीन रिसर्च एंड डेवलपमेंट सेंटर (एचपीजीआरडीसी) मार्केटिंग एसबीयू और रिफाइनरियों को उन्नत तकनीकी सहायता देने के लिए स्थापित किया गया है। इसका उद्देश्य प्रचालन में उत्कृष्टता लाना, नई और अग्रणी तकनीकों का विकास और उपयोग करना, और एक ज्ञान केंद्र बनना है। इस अनुसंधान केंद्र में 5.6 लाख वर्ग फीट के निर्मित क्षेत्र के साथ ऊर्जा–कुशल हरित भवन जैसी अत्याधुनिक सुविधाएँ मौजूद हैं। अनुसंधान एवं विकास केंद्र में चरण–। और चरण–।। के तहत 20 प्रयोगशालाएं स्थापित की गई हैं जो अनुसंधान क्षेत्रों से संबंधित हैं जैसे एफसीसी, हाइड्रो–प्रोसेसिंग, कैटेलिसिस, बायोप्रोसेस, क्रूड इवैल्यूएशन और ईंधन अनुसंधान, मानक परीक्षण, विश्लेषणात्मक, प्रक्रिया मॉडलिंग और सिमुलेशन और नैनो प्रौद्योगिकी, पेट्रोकेमिकल्स और पॉलिमर, उत्कृष्टता केंद्र ल्यूब्स, संक्षारण अध्ययन, नवीन पृथक्करण, अवशेष उन्नयन, इंजन और बैटरी अनुसंधान।

अप्रैल 2024 से मार्च 2025 तक, 22 उत्पाद/प्रौद्योगिकियाँ विकसित और लॉन्च की गईं। इन रिफाइनरी उत्पादों/प्रौद्योगिकियों के अलावा, इस अवधि के दौरान 21 नए ल्यूब–आधारित फॉर्मूलेशन लॉन्च और व्यावसायीकरण किए गए हैं।

अप्रैल 2024 से मार्च 2025 के दौरान 114 पेटेंट दाखिल किए गए, जिससे संचयी भारतीय और अंतर्राष्ट्रीय पेटेंट आवेदनों की संख्या 661 हो गई तथा 36 पेटेंट प्रदान किए गए, जिससे मार्च 2025 तक संचयी पेटेंट अनुदान की संख्या 246 हो गई।

12.1.6.7 प्राकृतिक गैस: एचपीसीएल प्राकृतिक गैस व्यवसाय की संपूर्ण मूल्य श्रृंखला में भाग ले रही है। एचपीसीएल का गुजरात के छारा बंदरगाह (गिर सोमनाथ जिला) पर एक 100% स्वामित्व वाली सहायक कंपनी, एचपीसीएल एलएनजी लिमिटेड (एचपीएलएनजी) के माध्यम से 5 एमएमटीपीए एलएनजी पुनर्गैसीकरण टर्मिनल है। यह टर्मिनल जनवरी 2025 में चालू हो जाएगा।

संयुक्त उद्यम कंपनियों अर्थात जीएसपीएल इंडिया गैसनेट लिमिटेड (जीआईजीएल) और जीएसपीएल इंडिया ट्रांसको लिमिटेड (जीआईटीएल) के माध्यम से तीन क्रॉस–कंट्री प्राकृतिक गैस पाइपलाइनों (मेहसाणा से बठिंडा, बठिंडा से श्रीनगर और मल्लावरम से भीलवाड़ा) के विकास में भी भाग ले रही है।

साबरकांठा जिले के ओरण स्थित एचपीसीएल रिटेल आउटलेट में अपना पहला एलएनजी डिस्पेंसिंग स्टेशन सफलतापूर्वक चालू कर दिया है और इस स्टेशन से बिक्री शुरू हो गई है।

12.1.6.8 सिटी गैस वितरण: नगर गैस वितरण (सीजीडी) में एचपीसीएल की उपस्थिति बढ़ाने के लिए, एचपीसीएल

हरियाणा, उत्तर प्रदेश, उत्तराखंड, पश्चिम बंगाल, राजस्थान, बिहार, झारखंड और सिक्किम राज्यों के 134 भौगोलिक क्षेत्रों में एकल आधार पर सीजीडी नेटवर्क स्थापित कर रही है। एचपीसीएल अहमदाबाद में भी एकल आधार पर सीएनजी नेटवर्क का प्रचालन कर रही है।

एचपीओआईएल गैस प्राइवेट लिमिटेड (एचओजीपीएल) के माध्यम से अंबाला–कुरुक्षेत्र (हरियाणा) और कोल्हापुर (महाराष्ट्र) जिलों और नागालैंड के भौगोलिक क्षेत्रों में सीजीडी नेटवर्क स्थापित कर रही है।

एचपीसीएल संयुक्त उद्यम कंपनियों आवंतिका गैस लिमिटेड (एजीएल), भाग्यनगर गैस लिमिटेड (बीजीएल) और गोदावरी गैस प्राइवेट लिमिटेड (जीजीपीएल) के माध्यम से आंध्र प्रदेश, तेलंगाना और मध्य प्रदेश राज्यों में 7 भौगोलिक क्षेत्रों (जीए) में सिटी गैस वितरण (सीजीडी) नेटवर्क भी प्रचालित कर रही है।

12.1.6.9 अन्वेषण और उत्पादनः एचपीसीएल संपूर्ण मूल्य श्रृंखला में कार्बन उत्सर्जन और बिजली की लागत को कम करने के लिए नवीकरणीय ऊर्जा स्रोतों का लाभ उठा रहा है तथा पवन और सौर ऊर्जा उत्पादन क्षमताओं का निरंतर विस्तार कर रही है।

मार्च 2025 तक, एचपीसीएल की कुल स्थापित सौर ऊर्जा संयंत्र क्षमता लगभग 123.4 मेगावाट है। ये सौर संयंत्र देश भर में कंपनी के विभिन्न विपणनध्प्रचालन स्थानों पर स्थापित हैं।

एचपीसीएल रिन्यूएबल एंड ग्रीन एनर्जी लिमिटेड (एचपीआरजीई) का गठन एचपीसीएल की पूर्ण स्वामित्व वाली सहायक कंपनी के रूप में किया गया है, जिसका उद्देश्य हरित ऊर्जा व्यवसाय में प्रवेश करना और जैव ईंधन, नवीकरणीय ऊर्जा, हरित हाइड्रोजन, कार्बन अवशोषण, हरित गतिशीलता और वैकल्पिक ऊर्जा व्यवसायों जैसे हरित ऊर्जा व्यवसायों के पोर्टफोलियो का प्रबंधन करना है।

एचपीआरजीई वर्तमान में एचपीसीएल के विभिन्न विपणन स्थानों और रिफाइनरियों को कैप्टिव ग्रीन बनाने के उद्देश्य से कई नवीकरणीय ऊर्जा परियोजनाओं पर काम कर रहा है। एचपीआरजीई ने आंध्र प्रदेश के गलीवेडु में 100 मेगावाट की अपनी पहली मेगा स्केल यूटिलिटी सौर परियोजना पर भी काम शुरू कर दिया है।

एचपीसीएल के महाराष्ट्र और राजस्थान में 100.90 मेगावाट क्षमता के पवन ऊर्जा संयंत्र भी हैं। अप्रैल 2024 से मार्च 2025 तक, इन पवन ऊर्जा संयंत्रों से कुल 14.32 करोड़ किलोवाट घंटा नवीकरणीय ऊर्जा (आरई) का उत्पादन हुआ, जिससे संधारणीय ऊर्जा विकास में योगदान मिला। इसके अतिरिक्त, एचपीसीएल की पवन ऊर्जा पहलों ने महत्वपूर्ण ईएसजी प्रभाव उत्पन्न किया है, जिससे 0.118 मिलियन मीट्रिक टन सीओ2 उत्सर्जन में कमी आई है। राजस्थान स्थित तेजुवा पवन ऊर्जा फार्म (48.3 मेगावाट) इस क्षेत्र का पहला ऐसा फार्म बन गया है जिसे हरित ऊर्जा की खुली बिक्री की मंजूरी मिली है। इस व्यावसायीकरण से निगम को अतिरिक्त राजस्व प्राप्त करने में मदद मिलेगी।

12.1.6.10 वैकल्पिक ऊर्जा

नवीकरणीय ऊर्जाः एचपीसीएल संपूर्ण मूल्य श्रृंखला में कार्बन उत्सर्जन और बिजली की लागत को कम करने के लिए नवीकरणीय ऊर्जा स्रोतों का लाभ उठा रही है और पवन एवं सौर ऊर्जा उत्पादन क्षमताओं का निरंतर विस्तार कर रही है।

मार्च 2025 तक, एचपीसीएल की कुल स्थापित सौर ऊर्जा संयंत्र क्षमता लगभग 123.4 मेगावाट है। ये सौर संयंत्र देश भर में कंपनी के विभिन्न विपणन/प्रचालन स्थानों पर स्थापित हैं।

एचपीसीएल रिन्यूएबल एंड ग्रीन एनर्जी लिमिटेड (एचपीआरजीई) का गठन एचपीसीएल की पूर्ण स्वामित्व वाली सहायक कंपनी के रूप में किया गया है, जिसका उद्देश्य हरित ऊर्जा व्यवसाय में प्रवेश करना और जैव ईंधन, नवीकरणीय ऊर्जा, हरित हाइड्रोजन, कार्बन अवशोषण, हरित गतिशीलता और वैकल्पिक ऊर्जा व्यवसायों जैसे हरित ऊर्जा व्यवसायों के पोर्टफोलियो का प्रबंधन करना है।

एचपीआरजीई वर्तमान में एचपीसीएल के विभिन्न विपणन स्थानों और रिफाइनरियों को कैप्टिव

ग्रीन बनाने के उद्देश्य से कई नवीकरणीय ऊर्जा परियोजनाओं पर काम कर रहा है। एचपीआरजीई ने आंध्र प्रदेश के गलीवेडु में 100 मेगावाट की अपनी पहली मेगा स्केल यूटिलिटी सौर परियोजना पर भी काम शुरू कर दिया है।

एचपीसीएल के महाराष्ट्र और राजस्थान में 100.90 मेगावाट क्षमता के पवन ऊर्जा संयंत्र भी हैं। अप्रैल 2024 से मार्च 2025 तक, इन पवन ऊर्जा संयंत्रों से कुल 14.32 करोड़ किलोवाट घंटा नवीकरणीय ऊर्जा (आरई) का उत्पादन हुआ, जिससे संधारणीय ऊर्जा विकास में योगदान मिला। इसके अतिरिक्त, एचपीसीएल की पवन ऊर्जा पहलों ने महत्वपूर्ण ईएसजी प्रभाव उत्पन्न किया है, जिससे 0.118 मिलियन मीट्रिक टन सीओ2 उत्सर्जन में कमी आई है। राजस्थान स्थित तेजुवा पवन ऊर्जा फार्म (48.3 मेगावाट) इस क्षेत्र का पहला ऐसा फार्म बन गया है जिसे हरित ऊर्जा की खुली बिक्री की मंजूरी मिली है। इस व्यावसायीकरण से कॉर्पोरेशन को अतिरिक्त राजस्व प्राप्त करने में मदद मिलेगी।

जैव ईंधन: अप्रैल–मार्च 2025 की अवधि के दौरान, एचपीसीएल ने मोटर स्पिरिट (एमएस) में 208 करोड़ लीटर एथेनॉल मिलाकर 16.70% एथेनॉल मिश्रण प्राप्त किया। बठिंडा में एचपीसीएल की पहली 2जी एथेनॉल बायो रिफाइनरी परियोजना निर्माणाधीन है, जिसकी बायोमास से 100 केएलपीडी एथेनॉल उत्पादन क्षमता है। बदायूं, उत्तर प्रदेश में 14.2 टीपीडी क्षमता वाले अपने पहले बायोमास–आधारित सीबीजी संयंत्र की वाणिज्यिक बिक्री शुरू हो गई है।

एचपीसीएल भारत सरकार की संधारणीय पहल के तहत कंप्रेस्ड बायोगैस (सीबीजी) को बढ़ावा देने में सक्रिय रूप से सहयोग कर रहा है। विस्तार के लिए, एचपीसीएल ने सीबीजी संयंत्र लगाने और अपने रिटेल नेटवर्क के माध्यम से सीबीजी की आपूर्ति के लिए निवेशकों से रुचि की अभिव्यक्ति (ईओआई) आमंत्रित की है।

वित्त वर्ष 2024–25 में, एचपीसीएल ने 50 टीपीडी क्षमता वाले आठ नए सीबीजी संयंत्र शामिल किए, जिससे अब कुल 17 संयंत्रों की कुल क्षमता 104.65 टीपीडी हो गई है। इसके अतिरिक्त, 273.5 टीपीडी की संयुक्त क्षमता वाले सीबीजी संयंत्रों के लिए 38 नए आशय–पत्र (एलओआई) जारी किए गए, जिससे कुल सक्रिय एलओआई बढ़कर 108 हो गए जिनकी कुल क्षमता 684.5 टीपीडी हो गई। एचपीसीएल के समर्पित सीबीजी खुदरा बिक्री केंद्र के माध्यम से सीबीजी की बिक्री में उल्लेखनीय वृद्धि हुई है, जो वर्ष 2024–25 में 3342 मीट्रिक टन तक पहुँच गई, जो पिछली 484.3 मीट्रिक टन बिक्री से 590% अधिक है।

भारत सरकार के "ग्रामीण भारत में अपशिष्ट से ऊर्जा–गोबरधन" दृष्टिकोण के तहत, एचपीसीएल ने सीएसआर के माध्यम से पथमेड़ा, सांचौर (राजस्थान) में 1.6 टीपीडी क्षमता वाला गोबर आधारित सीबीजी संयंत्र स्थापित किया है।

12.1.6.11 संधारणीय विकास: एचपीसीएल ऊर्जा दक्षता बढ़ाने और पर्यावरण पर असर कम करने वाली पहलों के जरिए पर्यावरणीय संधारणीयता को बढ़ावा देता है। एचपीसीएल अपने प्रचालनों में सर्वोत्तम पर्यावरणीय प्रथाओं, प्रक्रियाओं और प्रणालियों को अपनाता है।

संगठन स्तर पर, अपने एसबीयू के एचएसई कार्यों में एकीकृत प्रबंधन प्रणाली (आईएमएस) लागू की गई है, जो आईएसओ 9001, 14001 और 45001 मानकों के अनुरूप है। एचपीसीएल की रिफाइनरियों और प्रमुख विपणन केंद्रों में आईएसओ–14001 आधारित अंतरराष्ट्रीय स्तर की 'पर्यावरण प्रबंधन प्रणाली' और आईएसओ–50001 आधारित 'ऊर्जा प्रबंधन प्रणाली' लागू की गई हैं।

पर्यावरण संरक्षण को सुनिश्चित करने के लिए प्रमुख स्थानों पर अपशिष्ट जल के उपचार और पुनः उपयोग के लिए आधुनिक अपशिष्ट उपचार संयंत्र लगाए गए हैं। खतरनाक अपशिष्ट के उपचार और निपटान के लिए विभिन्न स्थानों पर प्रणाली उपलब्ध हैं, जो केंद्रीय प्रदूषण नियंत्रण बोर्ड (सीपीसीबी) की आवश्यकताओं के अनुरूप हैं। मुख्य स्थानों पर वाष्पशील कार्बनिक यौगिक (वीओसी) के उत्सर्जन की निगरानी और नियंत्रण के लिए रिसाव का पता लगाने और मरम्मत (एलडीएउआर) कार्यक्रम जैसी नई तकनीकें अपनाई गई हैं। विभिन्न आपूर्ति केंद्रों और खुदरा बिक्री केंद्र पर वाष्प रिकवरी प्रणाली (वीआरएस) स्थापित की गई है। पर्यावरण और वायु गुणवत्ता पर गैसीय उत्सर्जन की निगरानी नियमित रूप से नवीनतम तकनीकों से की जाती है, जिसमें प्रमुख स्थानों पर नियामक

एजेंसियों को वास्तविक समय डेटा का हस्तांतरण भी शामिल है। उत्सर्जन और वायु गुणवत्ता में किसी भी विचलन का पता लगाने और सुधार के लिए अलर्ट प्रणाली लागू की गई है।

एचपीसीएल वर्ष 2040 तक अपने स्कोप–1 और स्कोप–2 उत्सर्जन को शून्य करने के लक्ष्य के अनुरूप अपने प्रचालनों का डी–कार्बोनाइजेशन करने के लिए अपनी पर्यावरण रणनीति लागू कर रहा है। इस रोडमैप का मुख्य उद्देश्य एक बहु–ऊर्जा, हरित और कम कार्बन वाला कॉर्पोरेशन बनाने पर केंद्रित है। एचपीसीएल अपने ग्राहक–केंद्रित दृष्टिकोण से ग्राहकों को सुलभ और किफायती स्वच्छ ऊर्जा प्रदान करने के लिए भी प्रतिबद्ध है।

एचपीसीएल ने नेट जीरो हासिल करने के लिए प्रमुख उपायों की पहचान की है, जैसे प्रचालन में ऊर्जा दक्षता बढ़ाना, नवीकरणीय ऊर्जा अपनाना, ग्रे हाइड्रोजन को ग्रीन हाइड्रोजन से बदलना और फ्लेयर गैस उत्सर्जन कम करना। उत्सर्जन की तीव्रता घटाने के लिए, कंपनी नवीकरणीय ऊर्जा और भंडारण, बायोगैस, जैव ईंधन, पेट्रोकेमिकल्स और ग्रीन हाइड्रोजन जैसे विभिन्न व्यावसायिक क्षेत्रों का विकास कर रही है।

ऊर्जा परिवर्तन की दिशा में तेजी लाने के लिए, एचपीसीएल ने एक 'ऊर्जा परिवर्तन प्रकोष्ठ' बनाया है, जो नेट–जीरो लक्ष्यों को पूरा करने के लिए समर्पित है। इसके अलावा, नवीकरणीय और हरित ऊर्जा पोर्टफोलियो के विकास के लिए एचपीसीएल रिन्यूएबल्स एंड ग्रीन एनर्जी (एचपीआरजीई) लिमिटेड नामक पूरी तरह से स्वामित्व वाली सहायक कंपनी भी स्थापित की गई है।

नेट जीरो प्रतिबद्धता पर प्रगति (अप्रैल 2024–मार्च 2025 अवधि):

- एचपीसीएल के डीकार्बोनाइजेशन प्रयासों के प्रमाण के रूप में, इसके सिकंदराबाद टर्मिनल को भारत में "प्रथम नेट जीरो ऑपरेशनल साइट'' के रूप में प्रमाणित किया गया है। इसके अतिरिक्त, रामागुंडम डिपो और मनमाड टर्मिनल के साथ–साथ 6 अतिरिक्त स्थान–मिराज आईआरडी, कोलकाता टर्मिनल, शोलापुर आईआरडी, दुर्गापुर आईआरडी, विशाखापत्तनम नया व्हाइट ऑयल टर्मिनल, हल्दिया टर्मिनल भी नेट जीरो अनुपालन वाले हैं।
- ऊर्जा परिवर्तन पहलों के माध्यम से वित्त वर्ष 2025 में कुल 77,486 एसआरएफटी (2.5 लाख टन सीओ2 कमी के बराबर) ऊर्जा बचत हासिल की।
- स्कोप 1 उत्सर्जन को कम करने के लिए, 109 विपणन स्थान बैकअप बिजली उत्पादन के लिए डीजी सेटों में 100% बायोडीजल का उपयोग करते हैं।
- कुल 76 स्थान पूरी तरह से हरित ऊर्जा से प्रचालित हैं, जिससे उनके स्कोप 2 उत्सर्जन समाप्त हो जाते हैं, जबकि 6 पाइपलाइन स्थान अपनी विद्युत ऊर्जा की कुछ जरूरत हरित ऊर्जा के माध्यम से पूरी कर रहे हैं।
- एचपीसीएल विशाख रिफाइनरी ने डिस्कॉम के माध्यम से 3 मेगावाट हरित ऊर्जा प्राप्त करना शुरू कर दिया है, जिससे उत्सर्जन में कमी आएगी।

अन्य जीएचजी उपशमन पहल:

- **ग्रीन हाइड्रोजन:** एचपी ग्रीन आरएंडडी सेंटर में अप्रैल 2024 से जून 2024 के दौरान 99.99% शुद्धता के साथ ग्रीन हाइड्रोजन के उत्पादन हेतु अपनी तरह का पहला ठोस ऑक्साइड आधारित इलेक्ट्रोलाइजर (एसओई) चालू किया गया। यह एसओई सिस्टम प्रोटॉन एक्सचेंज मेम्ब्रेन (पीईएम) और एल्कलाइन इलेक्ट्रोलाइजर की तुलना में लगभग 25% कम ऊर्जा की खपत करता है। विशाख रिफाइनरी ने किसी भी भारतीय रिफाइनरी में पहला ग्रीन हाइड्रोजन संयंत्र (370 टन प्रति वर्ष क्षमता) चालू किया। एचपीसीएल ने अपनी विशाख रिफाइनरी के लिए बीओओ आधार पर 5 केटीपीए ग्रीन हाइड्रोजन की खरीद हेतु निविदा आमंत्रित की है।
- **नवीकरणीय ऊर्जा स्थापित क्षमता:** पवन: 100.9 मेगावाटय सौर: मार्च 2025 तक 123 मेगावाट पावर। अप्रैल–मार्च 2025 के दौरान, 4,735 आउटलेट्स पर सौर ऊर्जा उत्पादन किया गया, जिससे कुल खुदरा बिक्री केंद्र की संख्या 22,353 हो गई (अर्थात् एचपीसीएल के खुदरा बिक्री केंद्र का 94%)।
- **ईवी अवसंरचना:** वित्त वर्ष 2024–25 के दौरान 2373 खुदरा बिक्री केंद्र पर इलेक्ट्रिक वाहन (ईवी) चार्जिंग सुविधाएं चालू की गईं, जिससे मार्च 2025 तक ईवी चार्जिंग सुविधाओं वाले खुदरा बिक्री केंद्र की कुल संख्या 5976 हो गई।

- **ऊर्जा दक्षता:** रिफाइनरी क्षमता विस्तार परियोजनाओं के भाग के रूप में, दोनों रिफाइनरियों के लिए कई ऊर्जा दक्षता उपाय डिजाइन में शामिल किए गए हैं। मुंबई और विशाख रिफाइनरियों ने ऊर्जा दक्षता पहलों के माध्यम से वित्त वर्ष 2024–25 के दौरान 77,486 मानक रिफाइनरी ईंधन टन (एसआरएफटी) की बचत हासिल की।

- **प्राकृतिक गैस:**

i. प्राकृतिक गैस व्यवसाय लाइन में, एचपीसीएल के नगर गैस वितरण नेटवर्क के माध्यम से खुदरा बिक्री के अलावा, कंपनी उर्वरक संयंत्रों, रिफाइनरियों, पेट्रोलियम रसायन संयंत्रों और सीजीडी कंपनियों सहित बड़ी औद्योगिक यूनिटों में भी अपने ग्राहक आधार का विस्तार कर रही है।

ii. एचपीसीएल एलएनजी लिमिटेड (एचपीसीएल की पूर्ण स्वामित्व वाली सहायक कंपनी) ने 12 जनवरी 2025 को छारा, गुजरात में अपने 5 एमएमटीपीए रीगैसिफिकेशन टर्मिनल के तटवर्ती टैंकों में एलएनजी कमीशनिंग कार्गो का निर्वहन सफलतापूर्वक पूरा कर लिया और 1 फरवरी 2025 से अपना वाणिज्यिक प्रचालन शुरू कर दिया।

iii. वित्त वर्ष 2024–25 के दौरान 237 खुदरा बिक्री केंद्र पर सीएनजी सुविधा प्रदान की गई, जिससे मार्च 2025 तक सीएनजी सुविधा वाले खुदरा बिक्री केंद्र की कुल संख्या 2,038 हो गई।

iv. दिनांक मार्च 2025 कि स्थिति के अनुसार, एचपीसीएल ने सिक्किम को छोड़कर अपने सभी भौगोलिक क्षेत्रों में सीएनजी की बिक्री शुरू कर दी है, 10 भौगोलिक क्षेत्रों में पीएनजी की बिक्री शुरू कर दी है। दक्षिण 24 परगना, जॉर्जिया में वाणिज्यिक और औद्योगिक बिक्री शुरू कर दी है।

एचपीसीएल ने अपने विपणन स्थानों के लिए भारतीय उद्योग परिसंघ (सीआईआई) द्वारा निर्धारित स्थिरता मानदंडों के आधार पर 'ग्रीनको' रेटिंग अपनाई है, जो जीवनचक्र दृष्टिकोण पर आधारित है। एचपीसीएल 2014 में स्वेच्छा से ग्रीनको रेटिंग चुनने वाली सार्वजनिक उपक्रमों में पहली कंपनी बनी। अपने प्रचालनों के 'ग्रीन कोशंट' में सुधार हेतु, एचपीसीएल ने अपने विपणन स्थानों पर ग्रीनको रेटिंग प्रणाली का कार्यान्वयन जारी रखा। वर्ष के दौरान, एचपीसीएल ने अपने प्रचालन स्थानों पर हरित प्रथाओं और उनके अपनाने, मूल्यांकन के माध्यम से एकीकरण, सहायता और परामर्शी मार्गदर्शन के माध्यम से परिवर्तनकारी दृष्टिकोण से संबंधित अपनी प्रणालियों और अवसंरचना की समीक्षा की। मार्च, 2025 तक, 84 स्थानों को 'ग्रीनको रेटिंग' से प्रमाणित किया जा चुका है।

मिशन लाइफ, पर्यावरण की सुरक्षा और संरक्षण के लिए व्यक्तिगत और सामुदायिक कार्रवाई को बढ़ावा देने वाला भारत प्रचालित एक वैश्विक जन आंदोलन है। एचपीसीएल ने मिशन लाइफ के तहत सुझाए गए 75 लाइफ एक्शन अपने आंतरिक और बाहरी हितधारकों को कार्यान्वयन के लिए साझा किए हैं और अपने प्रचालन तथा प्रभाव क्षेत्रों में सभी लागू व्यक्तिगत लाइफ एक्शन को लागू किया है।

वर्ष के दौरान, जागरूकता फैलाने की अपनी संधारणीय गतिविधि के तहत, एचपीसीएल ने अपने खुदरा बिक्री केंद्र पर मिशन लाइफ क्रिएटिव प्रदर्शित किए, लोगों को पर्यावरण के प्रति जागरूक किया, कचरा एकत्र किया, पेड़ लगाए और जनता में व्यापक संरक्षण और प्रचार गतिविधियाँ चलाईं। एचपीसीएल सोशल मीडिया अभियानों के माध्यम से हितधारकों को जोड़ रहा है और मेरी लाइफ पोर्टल पर की गई गतिविधियों का विवरण अपडेट कर रहा है।

वर्ष के दौरान, स्थिरता के प्रति जागरूकता बढ़ाने के लिए प्रशिक्षण कार्यक्रम, जागरूकता सत्र, स्थिरता प्रश्नोत्तरी, समाचार पत्र और तकनीकी बुलेटिन जैसी पहल जारी रहीं। एनएससी–एचपीसीएल सैट परीक्षा में स्थिरता पर एक विशेष मॉड्यूल शामिल किया गया है, जो सभी प्रवेश स्तर और मध्य प्रबंधकीय अधिकारियों के लिए लागू है। एचपीसीएल प्रमुख औद्योगिक ग्राहकों के साथ स्थिरता से जुड़ी सर्वोत्तम प्रथाओं के आदान–प्रदान के माध्यम से आपूर्ति श्रृंखला में ईएसजी प्रथाओं को अपनाने में भी सहयोग कर रहा है।

एचपीसीएल ने अपने प्रचालनों और अपने ग्राहकों के लिए सुरक्षा सुनिश्चित करने पर ध्यान केंद्रित करना जारी रखा। इस उद्देश्य से, कॉर्पोरेट स्तर

पर एचपीसीएल ने स्वास्थ्य, सुरक्षा, पर्यावरण और स्थायित्व प्रबंधन प्रणाली (एचएसईएसएमएस) मानक स्थापित किए हैं और सभी एसबीयू को इन मानकों के अनुरूप बनाया है। इसके तहत कार्य सुरक्षा विश्लेषण (जेएसए) के साथ एकीकृत कार्य परमिट प्रणाली, परिवर्तन प्रबंधन, एसएपी में घटना प्रबंधन प्रणाली, अधिकारियों के लिए लाइव फायरिंग और जीवन रक्षक प्रमुख नियमों का पालन, स्थानीय भाषाओं में एनिमेटेड एसओपी वीडियो, क्षेत्रीय, एसबीयू और कॉर्पोरेट स्तर पर सुरक्षा समितियों का प्रचालन, व्यक्तिगत सुरक्षा उपकरण (पीपीई) और मानक प्रचालन प्रक्रिया (एसओपी) के पालन को सुनिश्चित करने के लिए वीडियो विश्लेषण, अधिकारियों के लिए लैपटॉप पर दैनिक सुरक्षा क्षण, सुरक्षा जागरूकता प्रकाशन, अनुबंध कर्मचारियों के साथ व्यक्तिगत प्रबंधन बातचीत, "खतरे का पता लगाएँ और विचलन से आगे न जाएँ" अभियान और सुरक्षा भेद्यता सूचकांक जैसी कई पहल की गई हैं।

एचपीसीएल ने अपनी स्थिरता के निष्पादन को सार्वजनिक रूप से उजागर करना जारी रखा है। वर्ष के दौरान, एचपीसीएल ने 2023–24 के लिए अपनी पहली एकीकृत रिपोर्ट जारी की, जो आईएफआरएस फाउंडेशन के एकीकृत रिपोर्टिंग <आईआर> फ्रेमवर्क पर आधारित है। यह रिपोर्ट महत्वपूर्ण वित्तीय और गैर–वित्तीय जानकारी को एक ही दस्तावेज में समाहित करने का एक महत्वपूर्ण कदम है। रिपोर्ट एचपीसीएल की मूल्य निर्माण प्रक्रिया की समग्र तस्वीर प्रस्तुत करती है, जो इसके विजन, मिशन और बाहरी प्रचालन वातावरण के संदर्भ में 6 पूंजी के रूप में है। इसके अलावा, यह रिपोर्ट एचपीसीएल में शासन, जोखिम प्रबंधन और हितधारक जुड़ाव प्रक्रियाओं का भी खुलासा करती है। वर्ष के दौरान, एचपीसीएल ने सेबी–व्यावसायिक उत्तरदायित्व और स्थिरता रिपोर्टिंग (बीआरएसआर) और वैश्विक रिपोर्टिंग पहल (जीआरआई) आधारित स्थिरता रिपोर्ट जैसे बाहरी रूप से आश्वस्त किए गए खुलासे भी जारी रखे हैं।

12.1.6.12 **परियोजनाएं:** एचपीसीएल अपने संयुक्त उद्यमों के साथ मिलकर रिफाइनरियों और विपणन ढांचे को मजबूत और विस्तार करने के लिए कई परियोजनाओं पर काम कर रहा है।

पूर्ण परियोजनाएँ: विशाख रिफाइनरी में 3.55 एमएमटीपीए क्षमता वाली अवशेष उन्नयन सुविधा (आरयूएफ) का यांत्रिक कार्य पूरा हो गया है और प्री–कमीशनिंग गतिविधियाँ चल रही हैं। यह एलसी–मैक्स तकनीक का उपयोग करने वाली दुनिया की पहली यूनिट होगी, जो भारी अवशेषों को अधिक मूल्यवान उत्पादों में बदलकर रिफाइनरी की जीआरएम (ग्रॉस रिफाइनिंग मार्जिन) में सुधार करेगी।

आरयूएफ पिच लोडिंग गैन्ट्री का निर्माण पूरा हो गया है, जिससे विशाख रिफाइनरी में आरयूएफ के उप–उत्पाद पिच को पर्यावरण के अनुकूल तरीके से बाहर निकालना आसान हो गया है। भारत सरकार की ग्रीन हाइड्रोजन उपभोग दायित्व (जीएचसीओ) नीति के तहत, विशाख रिफाइनरी में 370 टन प्रति वर्ष क्षमता वाली ग्रीन हाइड्रोजन सुविधा स्थापित की गई है और इसे चालू कर दिया गया है।

विशाख रिफाइनरी का आधुनिकीकरण परियोजना पूरी हो चुकी है और प्री–कमीशनिंग गतिविधियाँ चल रही हैं। इस आधुनिकीकरण परियोजना से क्षमता 8.33 एमएमटीपीए से बढ़कर 15 एमएमटीपीए हो जाएगी और रिफाइनरी डिस्टिलेट उत्पादन 76% से बढ़कर 86% हो जाएगा।

विश्वसनीय कच्चे पानी की आपूर्ति सुनिश्चित करने के लिए, विशाख रिफाइनरी में एक नया समुद्री जल रिवर्स ऑस्मोसिस प्लांट (एसडब्ल्यूआरओ) और संबंधित पंपिंग सुविधाओं का निर्माण पूरा हो गया है। एसडब्ल्यूआरओ यूनिट को समुद्र के पानी से 584 घन मीटरध्घंटे की दर से शुद्ध कच्चा पानी तैयार करने के लिए बनाया गया है। यह शुद्ध पानी मौजूदा कच्चे पानी के भंडार में मेकअप वाटर (पूरक पानी) के रूप में इस्तेमाल किया जाएगा।

एसआरयू में एक नई सल्फर निर्माण यूनिट का निर्माण किया गया है जो प्रतिदिन 970 टन ठोस और तरल सल्फर का प्रबंधन कर सकेगी। इसमें ठोस सल्फर को छोटे कणों में बदलने की अतिरिक्त सुविधा भी शामिल है। यह नई इकाई मौजूदा रिफाइनरी के सल्फर उत्पादन को भी पूरा करेगी।

भारत सरकार के निर्देशों के अनुसार, अप्रैल 2025 तक एमएस (मोटर स्पिरिट) में 20% एथेनॉल मिश्रण

लागू करने के लिए संगरूर डिपो में एथेनॉल भंडारण टैंक और संबंधित सहायक सुविधाओं का निर्माण पूरा कर लिया गया है।

एचपीसीएल ने पालघाट–केरल, अनंतपुर और आंध्र प्रदेश के राजमुंदरी में एमएसवी (माउंडेड स्टोरेज वेसल) स्थापित करके अपने एलपीजी आपूर्ति ढांचे को मजबूत किया है। ये एमएसवी इस स्थान पर उपलब्ध मौजूदा भंडारण सुविधाओं के अतिरिक्त हैं, जो इस क्षेत्र और इसके आसपास की एलपीजी की बढ़ती मांग को पूरा करेंगे।

बिलासपुर डिपो के बंद होने के बाद रायपुर, छत्तीसगढ़ में एक नया डिपो विकसित किया गया है, ताकि खोई हुई बाजार हिस्सेदारी की भरपाई की जा सके और एचएसडी और एमएस के लिए 15 दिनों का कवरेज प्रदान करने के लिए मौजूदा रायपुर डिपो की भंडारण क्षमता का विस्तार किया जा सके।

महाराष्ट्र राज्य में वाशी व्हाइट ऑयल टर्मिनल पर मौजूदा सुविधाओं का पुनरुद्धार कार्य भी पूरा हो गया है, जिसमें 2ग8+1ग4 बे टीटी गैन्ट्री का निर्माण, टीटी पार्किंग क्षेत्र का विकास, टीटी भरने की क्षमता बढ़ाने के लिए टैंकों में संशोधन सहित पाइपलाइन और पंपिंग क्षमता को उन्नत करना, संबंधित सिविल, मैकेनिकल, इलेक्ट्रिकल और स्वचालन कार्य शामिल हैं।

ऊर्जा मिश्रण में प्राकृतिक गैस की भागीदारी बढ़ाने और अधिक कुशल, स्वच्छ एवं पर्यावरण–अनुकूल ईंधन विकल्प अपनाने की भारत सरकार (जीओआई) की योजना के अनुरूप, एचपीसीएल एलएनजी लिमिटेड (एचपीएलएनजी) ने छारा में एक एमएमटीपीए क्षमता वाला एलपीजी पुनर्गैसीकरण टर्मिनल बनाया है, जिसका भविष्य में 10 एमएमटीपीए तक विस्तार किया जा सकता है। इसमें जहाज उतारने के लिए समुद्री सुविधाएँ और एलएनजी भंडारण सुविधाओं के लिए 200000 घन मीटर क्षमता वाले 2 टैंक हैं।

चालू परियोजनाएं:

रिफाइनरी परियोजनाएँ: एचपीसीएल विशाख रिफाइनरी में कच्चे तेल से सीधे हल्के ओलेफिन और एरोमैटिक्स के उत्पादन के लिए एचपी–कोट (क्रूड टू ओलेफिन्स एंड एरोमैटिक्स टेक्नोलॉजी) डेमो यूनिट स्थापित कर रही है। इसके अतिरिक्त, एचपीसीएल विशाख रिफाइनरी में सिंथेटिक एविएशन फ्यूल (एसएएफ) के उत्पादन हेतु एचपी ट्राइग्लिसराइड से जेट ईंधन (ट्राईजेट) प्रक्रिया हेतु 7.4 केटीपीए (फीड के आधार पर–प्रयुक्त कुकिंग ऑयल (यूसीओ)) निष्पादन संयंत्र भी स्थापित कर रही है। इसके अलावा, एचपीसीएल मुंबई रिफाइनरी में एचपी ट्रीटेड डिस्टिलेट एरोमैटिक एक्सट्रैक्ट (टीडीएई) प्रक्रिया के लिए 24 केटीपीए निष्पादन संयंत्र भी स्थापित कर रही है, जो टीडीएई ग्रेड रबर प्रोसेसिंग ऑयल (आरपीओ) का उत्पादन करेगा।

इसके अतिरिक्त, एचपीसीएल एक संयुक्त उद्यम कंपनी, एचपीसीएल राजस्थान रिफाइनरी लिमिटेड (एचआरआरएल) के माध्यम से राजस्थान के बाड़मेर जिले में 9 एमएमटीपीए क्षमता का एक नया ग्रीनफील्ड रिफाइनरी–कम–पेट्रोकेमिकल कॉम्प्लेक्स स्थापित कर रही है, जो अच्छी तरह से प्रगति कर रहा है।

एचपीसीएल, मुंबई रिफाइनरी में ल्यूब आधुनिकीकरण और बॉटम उन्नयन (एलएमबीयू) परियोजना पर काम कर रही है ताकि बेहतर ग्रेड ग्रुप–।। और ग्रुप–।।। एलओबीएस के उत्पादन के साथ ल्यूब ऑयल बेस स्टॉक्स (एलओबीएस) का उत्पादन 475 केटीपीए से बढ़ाकर 764 केटीपीए किया जा सके। बिटुमेन उत्पादन 586 केटीपीए से बढ़कर 1073 केटीपीए हो जाएगा।

एचपीसीएल मुंबई पोर्ट ट्रस्ट (एमबीपीटी) के अधिकार क्षेत्र में ओल्ड पीर पाऊ (ओपीपीजे) और न्यू पीर पाऊ जेट्टी (एनपीपीजे) के माध्यम से मुंबई रिफाइनरी टैंकेज और तीसरे केमिकल बर्थ (टीसीबी) को जोड़ने वाली नई बिटुमेन निर्यात पाइपलाइन भी बिछा रही है।

भारत सरकार के उद्देश्य के अनुरूप, राष्ट्रीय जैव ईंधन नीति 2018 के माध्यम से, आने वाले दशकों में देश के ऊर्जा और परिवहन क्षेत्रों में जैव ईंधन के उपयोग को बढ़ाने के लिए, और 2025 तक एमएस में 20% एथेनॉल का लक्ष्य निर्धारित करने के लिए, एचपीसीएल बठिंडा, पंजाब में 2जी जैव रिफाइनरी स्थापित कर रही है, जो प्रति दिन 100 कि. ली. एथेनॉल का उत्पादन करेगी और बहु फीडस्टॉक अनाज के प्रोसेसिंग के लिए बिहार में सुगौली और

लौरिया में अनाज आधारित एथेनॉल के उत्पादन के लिए मौजूदा डिस्टिलरी का पुनरुद्धार और हिन्दुस्तान बायोफ्यूल लिमिटेड (एचबीएल) की मौजूदा सुविधाओं का विस्तार 60 कि.ली./दिन से 70 कि.ली/दिन तक किया जाएगा।

विपणन परियोजनाएँ: देश में पेट्रोलियम उत्पादों की बढ़ती माँग को किफायती और पर्यावरण अनुकूल तरीके से पूरा करने के लिए, एचपीसीएल ने कई पाइपलाइन परियोजनाएँ शुरू की हैं। एचपीसीएल की प्रमुख चालू पाइपलाइन अवसंरचना परियोजनाओं में निम्नलिखित शामिल हैं:

(i) बठिंडा संगरूर पाइपलाइन

(ii) हल्दिया पानागढ़ एलपीजी पाइपलाइन, और

(iii) विशाख रायपुर पाइपलाइन

देश में एलपीजी की बढ़ती आवश्यकता को पूरा करने और आयात क्षमता बढ़ाने के लिए, मैंगलोर में 80 टीएमटी एलपीजी कैवर्न का निर्माण कार्य प्रगति पर है। इसके अलावा, कमरदंगा (असम) में नई एलपीजी सुविधाओं, मदुरै एलपीजी संयंत्र (तमिलनाडु) में टैंक वैगन और रेलवे साइडिंग सुविधा का निर्माण कार्य प्रगति पर है, कमरदंगा (असम) में नई रेल से चलने वाली पीओएल सुविधा का भी निर्माण कार्य प्रगति पर है। एचपीसीएल ने आंध्र प्रदेश के भोगपुरम हवाई अड्डे पर विमानन ईंधन फार्म सुविधा का निर्माण भी शुरू कर दिया है। पश्चिम बंगाल, उत्तर प्रदेश/ब्रिटेन, राजस्थान, बिहार और झारखंड तथा जींद और सोनीपत में सीजीडी परियोजनाएँ भी अच्छी प्रगति पर हैं। बाड़मेर (राजस्थान) में एचपीसीएल का पहला पेट्रोकेमिकल निकासी विपणन टर्मिनल अपने निर्धारित कार्यक्रम के अनुसार भली–भांति चल रहा है।

12.1.6.13 प्रमुख पुरस्कार एवं सम्मान: वर्ष 2024 के अप्रैल–दिसंबर की अवधि के दौरान, एचपीसीएल को विभिन्न मंचों पर अनेक पुरस्कार एवं सम्मान प्राप्त हुए। एचपीसीएल द्वारा प्राप्त पुरस्कारों की सूची निम्नलिखित है:

क) भारतीय पेट्रोलियम उद्योग महासंघ (एफआईपीआई) द्वारा निम्नलिखित श्रेणियों के अंतर्गत 'एफआईपीआई तेल एवं गैस पुरस्कार 2023':

i. 'वर्ष का संधारणीय रूप से बढ़ता कॉर्पोरेट'

ii. 'वर्ष का सर्वश्रेष्ठ नवप्रवर्तक (टीम)'

ख) ग्लोबल रिफाइनिंग एंड पेट्रोकेमिकल्स कांग्रेस द्वारा 'डाउनस्ट्रीम इंडिया एक्सीलेंस अवार्ड्स 2024' श्रेणियों के अंतर्गत:

i. 'नेतृत्व उत्कृष्टता पुरस्कार परिशोधन'

ii. 'वर्ष का अनुसंधान एवं विकास उत्कृष्टता केंद्र'

iii. 'हरित पहल के माध्यम से कार्बन उत्सर्जन प्रबंधन'

ग) भारतीय उद्योग परिसंघ (सीआईआई) द्वारा सीआईआई डिजिटल एक्सीलेंस अवार्ड 2024 में 'ऑपरेशनल एक्सीलेंस' श्रेणी में 'सर्वाधिक नवीन सर्वोत्तम अभ्यास' पुरस्कार।

घ) सीआईआई डीएक्स अवार्ड्स में निम्नलिखित श्रेणियों के अंतर्गत 'पीएसयू परिवर्तन पुरस्कार':

i. 'राष्ट्रीय विकास में उत्कृष्ट योगदान'

ii. 'नवाचार और उद्यमिता को बढ़ावा देने में नेतृत्व पुरस्कार'

ड.) 'एसएचआरएम (सोसाइटी फॉर ह्यूमन रिसोर्स मैनेजमेंट) एचआर एक्सीलेंस अवार्ड्स 2024' श्रेणियों के अंतर्गत:

i. 'उभरते नेताओं के विकास में उत्कृष्टता'

ii. 'लाभ और कल्याण में उत्कृष्टता'

च) भारतीय चैंबर ऑफ कॉमर्स द्वारा 14वें पीएसई उत्कृष्टता पुरस्कारों में महारत्न श्रेणी के तहत 'कॉर्पोरेट गवर्नेंस और सीएसआर' (रजत) पुरस्कार

छ) थॉमसन रॉयटर्स द्वारा छठे वार्षिक एएलबी इंडिया लॉ अवार्ड्स 2024 में 'एनर्जी एंड रिसोर्सेज इन–हाउस टीम ऑफ द ईयर' पुरस्कार

ज) इंस्टीट्यूट ऑफ डायरेक्टर्स द्वारा निम्नलिखित श्रेणियों के अंतर्गत 'गोल्डन पीकॉक अवार्ड 2024':

i) मुंबई रिफाइनरी को 'ऊर्जा दक्षता'

ii) मुंबई पुणे शोलापुर पाइपलाइन को 'व्यावसायिक स्वास्थ्य और सुरक्षा' श्रेणियों के तहत भारतीय जनसंपर्क परिषद द्वारा 'पीआरसीआई उत्कृष्टता पुरस्कार':

झ) 'कॉर्पोरेट संचार' (स्वर्ण)

i. 'म्यूजिक वीडियो', 'हेल्थकेयर कम्युनिकेशन फिल्म्स', 'गवर्नमेंट कम्युनिकेशन फिल्म्स' और 'कॉर्पोरेट इवेंट' (सिल्वर)

ii. 'बाल देखभाल के लिए सीएसआर परियोजना', 'शिक्षा अभियान' और 'अद्वितीय मानव संसाधन पहल' (कांस्य)

ञ) निम्नलिखित श्रेणियों के अंतर्गत 'महात्मा पुरस्कार 2024':

i. 'कॉर्पोरेट सामाजिक उत्तरदायित्व उत्कृष्टता'

ii. 'ईएसजी उत्कृष्टता'

ट) सस्टेनेबल डेवलपमेंट फाउंडेशन द्वारा 15वें एक्सीड सेफ्टी एंड सिक्योरिटी अवार्ड्स में मुंबई रिफाइनरी को 'रिफाइनरी ऑफ द ईयर' (गोल्ड) पुरस्कार

ठ) स्कॉच ग्रुप द्वारा 97वें स्कॉच अवार्ड 2024 में 'सीएसआर शिक्षा' श्रेणी के अंतर्गत 'स्कॉच अवार्ड्स 2024'।

12.2 नवरत्न केंद्रीय सार्वजनिक क्षेत्र उद्यम (सीपीएसई)

12.2.1 ओएनजीसी विदेश लिमिटेड (ओवीएल):

ओएनजीसी विदेश लिमिटेड, देश की प्रमुख एनओसी, ऑयल एंड नेचुरल गैस कॉर्पोरेशन लिमिटेड (ओएनजीसी) की पूर्ण स्वामित्व वाली सहायक कंपनी और विदेशी शाखा है। इसकी स्थापना 1965 में हाइड्रोकार्बन्स इंडिया लिमिटेड के रूप में हुई थी और 1989 में इसका नाम बदलकर ओएनजीसी विदेश लिमिटेड कर दिया गया। ओएनजीसी विदेश, पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के प्रशासनिक नियंत्रण में एक अनुसूची "ए'' केंद्रीय सार्वजनिक क्षेत्र उद्यम 'नवरत्न' कंपनी है। ओएनजीसी विदेश का मुख्य व्यवसाय देश के बाहर तेल एवं गैस की खोज, विकास और उत्पादन करना है।

कंपनी ने 15 देशों में 32 परियोजनाओं में प्रत्यक्ष रूप से अथवा अपनी पूर्ण स्वामित्व वाली सहायक कंपनियों/संयुक्त उद्यम कंपनियों के माध्यम से भागीदारी की है, जिनमें से 16 प्रचालित/संयुक्त रूप से प्रचालित हैं तथा 16 गैर–प्रचालित हैं।

ओएनजीसी विदेश एक संतुलित नीति अपनाता है जिसमें उत्पादन, खोज, अन्वेषण और पाइपलाइन से जुड़ी परिसंपत्तियों का सही मिश्रण शामिल है। वर्तमान में, कंपनी 14 परिसंपत्तियों से तेल और गैस का उत्पादन कर रही है। इनमें से 4 परिसंपत्तियों में हाइड्रोकार्बन की खोज हो चुकी है और वे विकास के अलग–अलग चरणों में हैं। 11 परिसंपत्तियाँ अन्वेषण के विभिन्न चरणों में हैं, जबकि 3 पाइपलाइन परियोजनाएँ चल रही हैं।

ओएनजीसी विदेश भारत की ऊर्जा सुरक्षा में अहम भूमिका निभाता है। भंडार और उत्पादन के लिहाज से यह देश की दूसरी सबसे बड़ी तेल और गैस खोज और उत्पादन (ईएंडपी) कंपनी है, जो अपनी मूल कंपनी ओएनजीसी के बाद दूसरे स्थान पर आती है।

कंपनी के पास 474.140 एमएमटीओई का 2पी भंडार है। वित्त वर्ष 2024–25 के दौरान, ओएनजीसी विदेश ने 10.278 मिलियन मीट्रिक टन तेल समकक्ष (एमएमटीओई) तेल और गैस का उत्पादन किया, जो भारत के घरेलू तेल और गैस उत्पादन के लगभग 15.9% के बराबर है।

वित्त वर्ष 2024–25 के दौरान प्रमुख विशेषताएं:

- **एसीजी और बीटीसी पाइपलाइन, अजरबैजान:** ओएनजीसी विदेश ने नवंबर 2024 में अजेरी, चिराग और गुनाशली (एसीजी फील्ड) में 0.615% और अजरबैजान में बाकू–त्बिलिसी–सेहान (बीटीसी) पाइपलाइन कंपनी में 0.737% अतिरिक्त हिस्सेदारी खरीद ली। इसके अतिरिक्त, 21 सितंबर 2024 को, ओएनजीसी विदेश ने सभी भागीदारों के साथ एसीजी के मौजूदा पीएसए में एक परिशिष्ट पर हस्ताक्षर किए। इस समझौते से सभी कंपनियों को एसीजी क्षेत्र में गैर–संबद्ध गैस (एनएजी) के भंडारों की खोज, मूल्यांकन, विकास और उत्पादन करने की अनुमति मिलती है। यह समझौता 2049 तक लागू रहेगा, जो मौजूदा पीएसए की समाप्ति अवधि है।
- **ए1 और ए3, म्यांमार:** 25 जून 2024 को ओएनजीसी विदेश ने अपनी ए1 और ए3 परियोजनाओं के चौथे चरण के विस्तार को मंजूरी दी, जिनमें महार, श्वे और म्या क्षेत्र शामिल हैं। इस चरण में मुख्य काम चार नए कूपों की खुदाई करना है – दो महार क्षेत्र में और एक–एक श्वे और म्या में। इस विस्तार से 2032 तक अधिकतम उत्पादन बनाए रखने की उम्मीद है, जिसके लिए ओएनजीसी विदेश को लगभग 244.78 मिलियन

अमेरिकी डॉलर का अतिरिक्त निवेश करना होगा।

- **सीपीओ–5, कोलंबिया:** वित्त वर्ष 2024–25 में अन्वेषण कार्यों के दौरान, ला उर्राका क्षेत्र में दो कूपों की खुदाई के बाद एक नई खोज (एलएस–3) की गई। इसके अलावा, इंडिको–3 नाम का नया विकास कूप 10 अप्रैल 2024 को उत्पादन शुरू कर चुका है। इन सफलताओं, विशेष रूप से इंडिको–3 कूप और इंडिको–3, 4 और 5 में ईएसपी (इलेक्ट्रिक सबमर्सिबल पंप) लगाने से, परियोजना का औसत वार्षिक उत्पादन लगभग 25% बढ़ गया – अर्थात् 19,082 बैरल तेल प्रतिदिन से बढ़कर 23,881 बैरल तेल प्रतिदिन हो गया।

- **एमईसीएल, कोलंबिया:** ब्लॉक एलएलए–69 में वेलास्केज–2 से न्यूनतम वित्तीय प्रतिबद्धता (एमएफसी) के हस्तांतरण के बाद, परियोजना ने अपना पहला अन्वेषण कूप – वेल–365डब्ल्यू – सफलतापूर्वक खोदा। इनफिल ड्रिलिंग, कूपों की मरम्मत (वर्क ओवर) और रिग–लेस ऑप्टिमाइजेशन जैसे कार्यों के साथ मिलकर, इसने उत्पादन में 30% से ज्यादा की सालाना वृद्धि हासिल की। उत्पादन वित्त वर्ष 2023–24 में 3,201 बैरल तेल प्रति दिन (बीओपीडी) से बढ़कर वित्त वर्ष 2024–25 में 4,148 बीओपीडी हो गया, और मार्च 2025 में यह लगभग 4,600 बीओपीडी के उच्च स्तर पर पहुंच गया।

- **जीपीओसी, दक्षिण सूडान:** अपने पहले अन्वेषण कूप, डब्ल्यूजेडएनडब्ल्यू–01 (~970 बीओपीडी, 30% पानी की कटौती के साथ) से अच्छे प्रारंभिक नतीजे मिले, जिसके आधार पर दिसंबर 2024 में वाणिज्यिकता की घोषणा (डीओसी) की गई और इसे मंजूरी दी गई। इसके बाद यह कूप चालू किया गया और 18 फरवरी 2025 को उत्पादन शुरू हुआ। इन प्रयासों के साथ–साथ सफल इनफिल ड्रिलिंग और उत्पादन बढ़ाने वाले कार्यों ने लगभग 8% की वार्षिक औसत उत्पादन वृद्धि में योगदान दिया, जिससे उत्पादन वित्त वर्ष 2024 में 49,449 बीओपीडी से बढ़कर 50,404 बीओपीडी हो गया। इसके अलावा, दो मौजूदा विकास कूपों में एडवांस्ड इनफ्लो कंट्रोल डिवाइस (एआईसीडी) तकनीक लगाने से कूप के अंदर पानी के प्रवाह नियंत्रण में अच्छे परिणाम मिले हैं।

- **एसपीओसी, दक्षिण सूडान:** पिछले वित्तीय वर्ष की तुलना में 90% से अधिक की वार्षिक औसत उत्पादन वृद्धि (5,848 से 11,327 बीओपीडी तक) दर्ज की गई। यह 2021 में उत्पादन फिर से शुरू होने के बाद से अब तक का सबसे बड़ा स्तर है। यह महत्वपूर्ण सुधार माला क्षेत्र के कूपों से उत्पादन फिर से शुरू होने और कच्चे तेल के निर्यात से जुड़ी चुनौतियों का प्रभावी समाधान करने की वजह से संभव हुआ।

- **सखालिन–1, रूस:** ओएनजीसी विदेश इस समय रूबल में परित्याग निधि के हस्तांतरण और अधिकृत बैंक/बैंकों की विस्तारित सूची के लिए रूसी सरकार की अपेक्षित अनुमति का इंतजार कर रहा है।

- **पुनः वित्त–पोषण:** ओएनजीसी विदेश ने जुलाई 2024 में परिपक्व होने वाले 830 मिलियन अमेरिकी डॉलर के लंबी अवधि के ऋण को आंशिक रूप से पुनः वित्त–पोषित करने के लिए 800 मिलियन अमेरिकी डॉलर जुटाए। इसके लिए उन्होंने सिंडिकेटेड बैंक ऋण के तहत प्रतिस्पर्धी दरों पर 400 मिलियन अमेरिकी डॉलर के ग्रीन शू विकल्प का इस्तेमाल किया। कंपनी ने अपने आंतरिक स्रोतों से 30 मिलियन अमेरिकी डॉलर का भुगतान करके ऋण को कम किया।

- **महत्वपूर्ण खनिज:** ओएनजीसी विदेश लिमिटेड, ऑयल इंडिया लिमिटेड, और खनिज विदेश इंडिया लिमिटेड ने 10 सितंबर 2024 को संयुक्त अरब अमीरात स्थित इंटरनेशनल रिसोर्सेज होल्डिंग आरएससी लिमिटेड (और उसकी सहायक कंपनियों) के साथ एक समझौता–ज्ञापन पर हस्ताक्षर किए, जिसका उद्देश्य भारत सहित विश्व स्तर पर महत्वपूर्ण खनिज खनन परियोजनाओं की पहचान, अधिग्रहण और विकास करना है। यह समझौता–ज्ञापन पूरे मूल्य श्रृंखला में सहयोग का ढांचा तैयार करता है। इसमें कोई मौजूदा वित्तीय दायित्व नहीं है, और यह रणनीतिक लक्ष्यों से जुड़े आपसी लाभकारी परियोजनाओं के लिए तकनीकी और वित्तीय क्षमताओं का इस्तेमाल करेगा।

- कंपनी ने 12 दिसंबर 2024 को माननीय केंद्रीय वाणिज्य और उद्योग मंत्री से पीएसयू श्रेणी में "शिक्षण और विकास के माध्यम से व्यावसायिक उत्कृष्टता'' के लिए 17वां बीएमएल मुंजाल पुरस्कार जीता।

- कंपनी ने कॉर्पोरेट प्रशासन और जोखिम रणनीतियों में उत्कृष्टता को मान्यता देते हुए वर्ष 2023 के लिए जोखिम प्रबंधन हेतु गोल्डन पीकॉक पुरस्कार जीता।
- 27 जून 2024 को आईसीआईसीआई लोम्बार्ड और सीएनबीसीटीवी18 द्वारा आयोजित इंडिया रिस्क मैनेजमेंट अवार्ड्स के 10वें संस्करण में मास्टर्स ऑफ रिस्क–रिस्क टेक्नोलॉजी, लार्ज कैप श्रेणी के लिए पुरस्कार से सम्मानित किया गया।

12.2.2 इंजीनियर्स इंडिया लिमिटेड (ईआईएल):

ईआईएल एक आईएसओ 9001:2015 प्रमाणित नवरत्न कंपनी है, जिसकी स्थापना 1965 में हुई थी और इसका पंजीकृत कार्यालय नई दिल्ली में है। यह हाइड्रोकार्बन और अन्य अवसंरचना क्षेत्रों में डिजाइन, इंजीनियरिंग, परियोजना प्रबंधन और तकनीकी सेवाएं प्रदान करती है।

पिछले कुछ वर्षों में कंपनी ने अपनी सेवाओं का दायरा बढ़ाया है और विभिन्न क्षेत्रों में उत्कृष्टता हासिल की है, जैसे पेट्रोलियम रिफाइनिंग, पेट्रोकेमिकल्स, अपतटीय/तटीय तेल एवं गैस प्रोसेसिंग, रसायन एवं उर्वरक, कच्चा तेल, पेट्रोलियम उत्पाद एवं गैस पाइपलाइन, टर्मिनल एवं भंडारण, उप सतह सामरिक भंडारण, खनन एवं धातुकर्म, बंदरगाह एवं हवाई अड्डे, रक्षा और बुनियादी ढांचा एवं शहरी विकास आदि।

ओएनजीसी विदेश द्वारा अधिग्रहित संपत्तियों की सूची

क्र. सं.	देश	परिसंपत्ति का नाम	ओएनजीसी विदेश भागीदारी हित	भाग लेने वाली कंपनियाँ
1	अजरबेजान	एसीजी	2.925%	ओएनजीसी विदेश, बीपी (प्रचालक), एजएसीजी, एमओएल, इनपेक्स, एक्सॉनमोबिल, टीपीएओ, इटोचू
2		बीटीसी पाइपलाइन	3.097%	ओएनजीसी बीटीसी लिमिटेड, बीपी (प्रचालक), एजबीटीसी, एमओएल, आईएनपीईएक्स, टीपीएओ, इटोचू, टोटल, ईएनआई, एक्सॉनमोबिल
3	बांग्लादेश	एसएस–04	45%	ओएनजीसी विदेश (प्रचालक), ऑयल इंडिया लिमिटेड (ओआईएल), बापेक्स (प्रचालक)
4		एसएस–09	45%	ओएनजीसी विदेश (प्रचालक), ऑयल इंडिया लिमिटेड (ओआईएल), बापेक्स (प्रचालक)
5	ब्राजील	बीसी–10	27%	दिसंबर 2024 में हिस्सेदारी बेची
6		बीएम–सील–4	25%	ओएनजीसी विदेश, पेट्रोब्रास (प्रचालक)
7	कोलंबिया	एमईसीएल	50%	ओएनजीसी विदेश, पेट्रोब्रास (प्रचालक)
8		सीपीओ–5	70%	ओएनजीसी विदेश, एसआईपीसी
9		आर सी–10	50%	ओएनजीसी विदेश (प्रचालक), जियोपार्क
10		एसएसजेएन 7	50%	ओएनजीसी विदेश (प्रचालक), इकोपेट्रोल
11	ईरान	ब्लॉक फरजाद–बी	40%	ओएनजीसी विदेश, कैनाकोल एनर्जी लिमिटेड (प्रचालक)
12	इराक	ब्लॉक 20 (पूर्ववर्ती ब्लॉक 8)		ओएनजीसी विदेश (प्रचालक), आईओसी, ओआईएल
13	लीबिया	संविदा क्षेत्र–43	100%	ओएनजीसी विदेश

क्र. सं.	देश	परिसंपत्ति का नाम	ओएनजीसी विदेश भागीदारी हित	भाग लेने वाली कंपनियाँ
14	मोजाम्बिक	अपतटीय क्षेत्र 1, रोवुमा बेसिन	10%	टोटलएनर्जीज (प्रचालक), ओएनजीसी विदेश रोवुमा लिमिटेड, बीआरईएमएल (ओएनजीसी विदेश और ओआईएल का परिसंघ), ईएनएच, मित्सुई, बीपीआरएल, पीटीटीईपी
15	म्यांमार	ब्लॉक ए1		ओएनजीसी विदेश, एमओजीई, पॉस्को इंटरनेशनल (प्रचालक), कोगास, गेल
16		ब्लॉक ए3		
17		अपतटीय मिड स्ट्रीम गैस पाइपलाइन (पाइपको 1)	17%	ओएनजीसी विदेश, एमओजीई, पॉस्को इंटरनेशनल (प्रचालक), कोगास, गेल
18		तटीय गैस पाइपलाइन (एसईएजीपी) (पाइपको 2)	8.347%	ओएनजीसी विदेश, सीएनयूओसी (प्रचालक), एमओजीई, पॉस्को इंटरनेशनल, गेल, केजी–एसईएजीपी
19		ब्लॉक बी–2	97%	ओएनजीसी विदेश (प्रचालक), एमएंडएस (वाहक)
20		ब्लॉक ईपी–3	97%	ओएनजीसी विदेश (प्रचालक), एमएंडएस (वाहक)
21	रूस	सखालिन–1	20%	ओएनजीसी विदेश, सोडेको, रोसनेफ्ट सहायक कंपनियां (एसएमएनजी और आरएन एस्ट्रा)
22		वांकोर्नेफ्ट	26%	ओएनजीसी विदेश वैंकोरनेफ्ट प्राइवेट लिमिटेड, वैंकोर इंडिया प्राइवेट लिमिटेड (ओआईएल, आईओसीएल और बीपीआरएल का परिसंघ), वोस्तोक ऑयल एलएलसी (रोसनेफ्ट की एक सहयोगीय आरएन वैंकोर–प्रचालक)
23		इंपीरियल एनर्जी	100%	ओएनजीसी विदेश
24	दक्षिण सूडान	जीपीओसी	25%	ओएनजीसी विदेश, सीएनपीसी, नाइलपेट (पेट्रोनास अक्तूबर–2024 में बाहर हो गया)
25		एसपीओसी	24.125%	ओएनजीसी विदेश और नीलपेट (पेट्रोनास अक्तूबर 2024 में बाहर हो जाएगा)
26	सीरिया	एएफपीसी	33.33%	एसएसपीडी (प्रचालक), एचईएसबीवी (ओएनजीसी विदेश और सीएनपीसी का परिसंघ)
27		ब्लॉक 24	60%	ओएनजीसी विदेश, आईपीआरएमईएल (प्रचालक), त्रि–महासागर–भूमध्यसागरीय (टीओएम)
28	संयुक्त अरब अमीरात	निचला जकुम कंसेशन	4%	एसएसपीडी (प्रचालक), एचईएसबीवी (ओएनजीसी विदेश और सीएनपीसी का परिसंघ)
29	वेनेजुएला	सैन क्रिस्टोबल	40%	ओएनजीसी विदेश, आईपीआरएमईएल (प्रचालक), त्रि–महासागर–भूमध्यसागरीय (टीओएम)
30		कैराबोबो परियोजना–1	11%	ओएनजीसी विदेश, पीडीवीएसए, रेपसोल, आईओसी, ओआईएल
31	वियतनाम	ब्लॉक 06.1	45%	ओएनजीसी विदेश, जरुबेजनेफ्ट ईपी वियतनाम बीवी, पेट्रो वियतनाम
32		ब्लॉक 128	100%	ओएनजीसी विदेश

ईआईएल के चेन्नई, वडोदरा और कोलकाता में क्षेत्रीय कार्यालय हैं; मुंबई में एक शाखा कार्यालय और अबू धाबी में एक विदेशी इंजीनियरिंग/मार्केटिंग कार्यालय है। पूरे भारत में विभिन्न स्थानों पर निरीक्षण/खरीद कार्यालय हैं, साथ ही लंदन, मिलान और शंघाई में भी कार्यालय हैं, और भारत और विदेश में विभिन्न परियोजना स्थलों पर निर्माण कार्यालय हैं।

प्रमाणन और निरीक्षण सेवाएँ प्रदान करने के लिए ईआईएल की एक पूर्ण स्वामित्व वाली सहायक कंपनी, सर्टिफिकेशन इंजीनियर्स इंटरनेशनल लिमिटेड है। ईआईएल ने नेशनल फर्टिलाइजर लिमिटेड (एनएफएल) और फर्टिलाइजर कॉर्पोरेशन ऑफ इंडिया (एफसीआईएल) के साथ मिलकर रामागुंडम, तेलंगाना में 26% हिस्सेदारी के साथ एक संयुक्त उद्यम कंपनी के रूप में रामागुंडम फर्टिलाइजर्स एंड केमिकल्स लिमिटेड (आरएफसीएल) का गठन किया है। आरएफसीएल संयंत्र का वाणिज्यिक प्रचालन 22 मार्च, 2021 को पूरा हो गया। ईआईएल की नुमालीगढ़ रिफाइनरी लिमिटेड (एनआरएल) में भी 4.37% हिस्सेदारी है।

ईआईएल दो प्रमुख खंडों, अर्थात् परामर्श और टर्नकी के तहत परियोजनाओं का क्रियान्वयन करता है। ईआईएल परियोजना की अवधारणा से लेकर परियोजना की शुरुआत तक, परियोजना से संबंधित प्रौद्योगिकी और इंजीनियरिंग सेवाओं की एक व्यापक श्रृंखला प्रदान करता है, जिसमें संयंत्रों का पुनरुद्धार, क्षमता विस्तार और आधुनिकीकरण शामिल है। कंपनी द्वारा प्रदान की जाने वाली सेवाओं में निम्नलिखित शामिल हैं:

परियोजना–पूर्व सेवाएं जैसे व्यवहार्यता अध्ययन, पर्यावरण प्रभाव आकलन, प्रौद्योगिकी एवं प्रक्रिया लाइसेंसकर्ता चयन और लागत अनुमान।

परियोजना प्रबंधन सेवाओं में अवधारणा से लेकर संयंत्र चालू होने तक का पूरा काम शामिल है। इसमें प्रक्रिया डिजाइन और फ्रंट–एंड इंजीनियरिंग, बुनियादी और विस्तृत इंजीनियरिंग, खरीद, निरीक्षण और तृतीय–पक्ष प्रमाणन, निर्माण प्रबंधन, कमीशनिंग और संयंत्र स्टार्ट–अप में मदद शामिल है।

विशेषज्ञ सेवाओं में ऊष्मा और द्रव्यमान स्थानांतरण उपकरण का डिजाइन, पर्यावरण इंजीनियरिंग, सूचना प्रौद्योगिकी, विशेष सामग्री और रखरखाव, संयंत्र प्रचालन और सुरक्षा, हैजोप एवं जोखिम विश्लेषण, संक्षारण से सुरक्षा, संयंत्र अखंडता और अवशिष्ट जीवन का आकलन, रिफाइनरी अनुकूलन अध्ययन और उत्पादन तथा ऊर्जा अनुकूलन अध्ययन जैसे कार्य शामिल हैं।

कंपनी में सूचना का अधिकार अधिनियम, 2005 को क्रियान्वित किया गया है, तथा अधिनियम के तहत मुद्दों के समाधान के लिए एक लोक सूचना अधिकारी और एक अपीलीय प्राधिकारी को नामित किया गया है। जनता, ठेकेदारों, विक्रेताओं, आपूर्तिकर्ताओं आदि की शिकायतोंध्परिवादों के निपटान के लिए वेब–आधारित शिकायत प्रबंधन प्रणाली को क्रियान्वित किया गया है। कंपनी में महिलाओं के लिए भी एक समिति नामित की गई है।

12.2.2.1 वर्ष 2024–25 के निष्पादन की मुख्य विशेषताएं

व्यावसायिक निष्पादन: वित्त वर्ष 2024–25 के दौरान, ईआईएल ने ₹7,383 करोड़ मूल्य के नए व्यवसाय हासिल किए, जिसमें परामर्शी खंड में ₹3,383 करोड़ मूल्य का व्यवसाय (घरेलू ग्राहकों से ₹3,048 करोड़ और विदेशी ग्राहकों से ₹334 करोड़) और एलएसटीके/ओबीई खंड में ₹4,000 करोड़ मूल्य का व्यवसाय शामिल है।

कंपनी द्वारा अपने व्यावसायिक प्रचालन के घरेलू खंड में प्राप्त प्रमुख कार्यों में निम्नलिखित शामिल हैं:

क. बीना रिफाइनरी–एथिलीन क्रैकर यूनिट और यूएंडओ के साथ–साथ रिफाइनरी के लिए एमपीएमसी और इंजीनियरिंग, प्रापण और निर्माण प्रबंधन (ईपीसीएम) सेवाएँ। बीना रिफाइनरी में बीना पेट्रोकेमिकल और रिफाइनरी विस्तार परियोजना (बीपीआरईपी) से संबंधित सुविधाएँ। सीडीयू/वीडीयू, एनएसयू, एलपीजीटीयू और संबंधित सुविधाओं के लिए तकनीकी जानकारी/लाइसेंस, बेसिक इंजीनियरिंग डिजाइन पैकेज (बीईडीपी) और अन्य संबंधित सेवाएँ प्रदान करना। पॉलीप्रोपाइलीन (पीपी) यूनिट और पीएफसीसी परियोजना के पुनरुद्धार के लिए परियोजना प्रबंधन परामर्श (पीएमसी) और ईपीसीएम सेवाएँ।

ख. दहेज पेट्रोकेमिकल्स कॉम्प्लेक्स में इथेन और प्रोपेन भंडारण और हैंडलिंग सुविधा के साथ 750 केटीए पीडीएच और 500 केटीए पीपी प्लांट की स्थापना के लिए सेवाएं।

ग. एनएसईजेड नोएडा – विशेष आर्थिक क्षेत्र प्राधिकरण के लिए, एनएसईजेड नोएडा में बुनियादी ढांचे के विकास और उन्नयन के लिए व्यापक डिजाइन, इंजीनियरिंग और परियोजना प्रबंधन परामर्श प्रदान किया जा रहा है।

घ. खड़की में टीएनटी संयंत्र का निष्पादन।

ङ. एमआरपीएल की डेमो बायो एटीएफ यूनिट के लिए डिजाइन इंजीनियरिंग, खरीद, निर्माण, स्थापना, परीक्षण, कमीशनिंग और परियोजना प्रबंधन सेवाएं।

आधारभूत ढांचा

क. आईआईटी जम्मू चरण–बी का विकास (डिपोजिट आधार पर)।

ख. ओएनजीसी, गोवा में कन्वेंशन सेंटर ईपीसी प्रतिपूर्ति योग्य/ओबीई आधार पर।

अध्ययन कार्य

क. मैसर्स बीपीसीएल के लिए बीपीसीएल मुंबई रिफाइनरी पुनरुद्धार और मुंबई रिफाइनरी/रसायनी में पीआरएफसीसी–पीपी यूनिट (भाग–1 और भाग–2) के लिए व्यवहार्यता अध्ययन हेतु परामर्श सेवाएं।

ख. मैसर्स ओएनजीसी के लिए मंगलुरु में तेल से पेट्रोकेमिकल परियोजना के लिए व्यवहार्यता अध्ययन।

ग. मैसर्स ऑयल इंडिया लिमिटेड के लिए नुमालीगढ़–सिलीगुड़ी उत्पाद पाइपलाइन (एनएसपीएल) के 259 किलोमीटर पुराने पाइपलाइन खंड के प्रतिस्थापन के लिए विस्तृत व्यवहार्यता रिपोर्ट (डीएफआर)।

घ. मैसर्स एनटीपीसी द्वारा सिंगरौली (एसटीपीपी) चरण–।।। (2x800 मेगावाट) और सीपत (एसटीपीपी) चरण ।।। (1x800 मेगावाट) के लिए ईपीसी पैकेज के सिविल और स्ट्रक्चरल इंजीनियरिंग के लिए आईएस:18299 के अनुसार प्रूफ जांच परामर्शी सेवाएं।

ङ. मैसर्स भारतीय विमानपत्तन प्राधिकरण (एएआई) के लिए बीजू पटनायक अंतर्राष्ट्रीय हवाई अड्डा, भुवनेश्वर के लिए टर्मिनल भवन और संबद्ध बुनियादी ढांचे का संरचनात्मक लेखा–परीक्षा।

विविध खंड: लापंगा, संबलपुर, ओडिशा में आदित्य एल्युमीनियम स्मेल्टर विस्तार परियोजना के लिए विस्तृत इंजीनियरिंग परामर्श सेवाएँ। जेएसपीएल के अंगुल स्थित डीआरआई–2 इकाई में मुख्य रिएक्टर फर्नेस के लिए विस्तृत इंजीनियरिंग सेवाएँ।

परियोजना निष्पादन: वर्ष के दौरान पूरी की गई कुछ प्रमुख परियोजनाएं इस प्रकार हैं:

क. विजयपुर में ग्रीन हाइड्रोजन परियोजना का शुभारंभ।

ख. राजस्थान रिफाइनरी परियोजना में कंप्रेस्ड वायु एवं क्रायोजेनिक नाइट्रोजन संयंत्र का यांत्रिक निर्माण कार्य पूरा हो गया।

ग. छारा एलएनजी टर्मिनल परियोजना का शुभारंभ।

घ. पेट्रोनेट एलएनजी टर्मिनल, दाहेज में दो एलएनजी भंडारण टैंकों का शुभारंभ।

ङ. पीएनसीपीएल परियोजना के लिए रूप नारायण नदी पर 26 इंच–4.027 किलोमीटर लंबी दुनिया की सबसे लंबी एचडीडी क्रॉसिंग, डीडीएचपीएल परियोजना के लिए 24 इंच–2.742 किलोमीटर लंबी एचडीडी क्रॉसिंग बिछाने का कार्य पूरा हो गया है। चित्र में पीएनसीपीएल की 26 इंच–4.027 किलोमीटर लंबी एचडीडी क्रॉसिंग दिखाई गई है।

च. मंगोल रिफाइनरी परियोजना, मंगोलिया में जल पाइपलाइन, ओवरहेड ट्रांसमिशन लाइन और भवनों का निर्माण कार्य।

छ. नाइजीरिया के डांगोटे रिफाइनरी एवं पेट्रोकेमिकल प्रोजेक्ट (डीआरपीपी) की एचजीयू, एमएचसी, एमएस ब्लॉक और आरएफसीसी यूनिट की दोनों ट्रेनों की कमीशनिंग। चित्र 1 में डांगोटे रिफाइनरी में एचजीयू की 2 ट्रेनें और चित्र 2 में डांगोटे रिफाइनरी में आरएफसीसी दिखाई दे रही हैं।

ज. एमआरपीएल, मैंगलोर की बिटुमेन ब्लोइंग यूनिट (बीबीयू) का यांत्रिक समापन।

वित्तीय निष्पादन: वित्त वर्ष 2024–25 के दौरान, ईआईएल ने क्रमशः ₹3028 करोड़ और ₹617 करोड़ का कारोबार और कर–पूर्व लाभ हासिल किया।

12.2.2.2 मानव संसाधनः ईआईएल एक मानव संसाधन–प्रचालित संगठन है और अपने मुख्यालय, निर्माण स्थलों, गुरुग्राम कार्यालय और विदेशी कार्यालयों में बहु–विषयक इंजीनियरिंग कार्यबल के माध्यम से कार्य करता है। 31 मार्च 2025 तक ईआईएल की जनशक्ति 2639 थी।

12.2.2.3 प्रौद्योगिकी विकास और व्यावसायीकरणः वर्ष के दौरान, कई अनुसंधान एवं विकास परियोजनाएं शुरू की गईं, जैसे कि डाइमिथाइल ईथर में प्रत्यक्ष सीओ$_2$ रूपांतरण, हाईजी–डिएरेशन स्केल–अप, इजेक्टर सिस्टम अनुकूलन, नवीन हीट एक्सचेंजर बैफल्स, अमीन शुद्धिकरण और भारीधमिश्रित कच्चे तेल के लिए एसी–डीसी क्षेत्र–आधारित विलवणीकरण।

एलपीजीटीयू, कोच्चि रिफाइनरी में एसएपी उत्पादन और कोच्चि में हाईजी डीएरेशन परियोजना जैसी प्रौद्योगिकियों का व्यावसायीकरण किया गया।

कैटेलिस्ट हाइड्रोजनीकरण के माध्यम से सीओ$_2$ को डाइमिथाइल ईथर में सीधे रूपान्तरित करने के लिए संयुक्त रूप से प्रौद्योगिकी विकसित करने के लिए आईआईटी रुड़की के साथ एक समझौता–ज्ञापन (एमओए) पर हस्ताक्षर किए गए हैं।

आईआईटी रुड़की के साथ समझौता–ज्ञापन पर हस्ताक्षरः ईआईएल प्रोसेस साइंस एंड टेक्नोलॉजी सेंटर (पीएसटीसी) का सदस्य है, जो टेक्सास विश्वविद्यालय, अमेरिका द्वारा शुरू किए गए 'उद्योग–अकादमिक सहयोगात्मक अनुसंधान कार्यक्रम' का हिस्सा है। इसके अलावा, यह फ्रैक्शनेशन रिसर्च इनकॉर्पोरेटेड (एफआरआई), ओक्लाहोमा, अमेरिका, जो एक गैर–लाभकारी सहकारी अनुसंधान संगठन है, और प्रोसेस इंटीग्रेशन रिसर्च कंसोर्टियम (पीआईआरसी), मैनचेस्टर विश्वविद्यालय, यूके का भी सदस्य है।

12.2.2.4 स्टार्ट–अप पहल–इंगसूईः इंगसूई ईआईएल की एक पहल है जो भारत के भीतर स्टार्ट–अप इको–सिस्टम को पोषित करने के लिए स्टार्ट–अप को बौद्धिक, अवसंरचनात्मक और वित्तीय सहायता प्रदान करती है।

आईआईओटी, नवीकरणीय ऊर्जा और भंडारण, नैनो–सामग्री, अपशिष्ट से ऊर्जा, जैव ईंधन, नेट जीरो स्वास्थ्य सुरक्षा और पर्यावरण के क्षेत्र में काम करने वाली स्टार्ट–अप परियोजनाओं को वित्तपोषित करता है। 10 आईआईटी और 4 एनआईटी ने ईआईएल की स्टार्ट–अप इंडिया पहल के साथ पंजीकरण कराया है।

अब तक कुल 31 परियोजनाओं को वित्त–पोषित किया जा चुका है। ईआईएल बोर्ड ने चल रहे अनुदान वित्तपोषण के अलावा, ईआईएल के स्टार्ट–अप फंड के माध्यम से इक्विटी निवेश को भी मंजूरी दे दी है।

12.2.2.5 पेटेंट पोर्टफोलियोः पेटेंट दाखिल करना और प्रदान करना ईआईएल के लिए एक महत्वपूर्ण गतिविधि है जिसके माध्यम से वह अपनी बौद्धिक संपदा की रक्षा करता है। इस प्रयास में, ईआईएल ने वर्ष 2024–25 के दौरान 27 पेटेंट दाखिल किए, और 2024–25 के दौरान ईआईएल को 02 पेटेंट प्रदान किए गए।

12.3 मिनीरत्न केंद्रीय सार्वजनिक क्षेत्र उद्यम (सीपीएसई)

12.3.1 बामर लॉरी एंड कंपनी लिमिटेड (बीएल):

बामर लॉरी एंड कंपनी लिमिटेड (बीएल) एक बहु–प्रौद्योगिकी, बहु–स्थानीय कंपनी है जिसका मुख्यालय कोलकाता में है और जिसका प्रचालन पूरे भारत में फैला हुआ है। कंपनी का दुबई और इंडोनेशिया में संयुक्त उद्यमों के साथ महत्वपूर्ण अंतरराष्ट्रीय व्यावसायिक हित है। कंपनी की भारत में एक सहायक कंपनी और कई संयुक्त उद्यम भी हैं।

कंपनी का व्यावसायिक हित विनिर्माण और सेवा दोनों क्षेत्रों में फैला हुआ है। 31 मार्च, 2014 तक कंपनी की अधिकृत और चुकता पूँजी क्रमशः ₹300 करोड़ और ₹171 करोड़ थी। बामर लॉरी इन्वेस्टमेंट्स लिमिटेड, एक सरकारी कंपनी है, जिसके पास कंपनी के ₹10 प्रत्येक मूल्य के 10,56,79,350 इक्विटी शेयर हैं (जो कुल चुकता इक्विटी पूंजी का लगभग 61.80% है)।

कंपनी ने 2024–25 के दौरान ₹12577.63 करोड़ का शुद्ध कारोबार हासिल किया, जबकि 2023–24 के दौरान यह ₹12404.17 करोड़ था, जो पिछले वर्ष की तुलना में लगभग 7% की वृद्धि दर्ज करता है।

वर्ष 2024–25 में कर–पूर्व लाभ ₹1313.79 करोड़ होगा, जबकि 2023–24 में यह ₹278.65 करोड़ होगा, जो पिछले वर्ष की तुलना में लगभग 13% की वृद्धि है।

यह वृद्धि मुख्य रूप से यात्रा एवं अवकाश तथा लॉजिस्टिक्स सेवा व्यवसायों के उल्लेखनीय निष्पादन के कारण हुई है।

कंपनी का रिजर्व और अधिशेष 31 मार्च 2024 को ₹1256.21 करोड़ की तुलना में 31 मार्च 2025 को ₹1356.95 करोड़ हो गया।

12.3.2 बामर लॉरी इन्वेस्टमेंट्स लिमिटेड (बीएलआईएल):

भारत सरकार ने तेल के नियोजित विनियमन और अर्थव्यवस्था के वैश्वीकरण के मद्देनजर, आईबीपी कंपनी लिमिटेड (आईबीपी) में अपने कुल 59.58% इक्विटी धारिता में से 33.58% का विनिवेश प्रबंधन नियंत्रण वाले एक रणनीतिक साझेदार को करने का निर्णय लिया है। परिणामस्वरूप, आईबीपी की अपनी पूर्ववर्ती सहायक कंपनी बामर लॉरी एंड कंपनी लिमिटेड (बीएल) में शेयरधारिता का विनिवेश बामर लॉरी इन्वेस्टमेंट्स लिमिटेड (बीएलआईएल) के पक्ष में कर दिया गया, जिसे कंपनी अधिनियम, 1956 के तहत 20 सितंबर 2001 को शामिल किया गया था। भारत के राष्ट्रपति के पास कंपनी में 1 रुपए प्रति शेयर मूल्य के 13,24,60,980 इक्विटी शेयर (कुल चुकता इक्विटी पूंजी का 59.67%) हैं। बीएलआईएल पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के प्रशासनिक नियंत्रण में है और इसका पंजीकृत कार्यालय कोलकाता में है।

कंपनी अपनी सहायक कंपनी, बामर लॉरी एंड कंपनी लिमिटेड (बीएल) के इक्विटी शेयर रखने के अलावा कोई अन्य व्यावसायिक गतिविधि नहीं करती है। कंपनी की आय का मुख्य स्रोत बीएल से प्राप्त लाभांश आय है। लाभांश आय के अलावा, कंपनी अनुसूचित बैंकों की सावधि/सावधि जमा योजनाओं में निवेश की गई अपनी अधिशेष राशि पर ब्याज अर्जित करती है।

बीएलआईएल के संयुक्त उद्यम और सहायक कंपनियां:

- बीएलआईएल का किसी भी कॉर्पोरेट कंपनी के साथ कोई संयुक्त उद्यम नहीं है।
- बीएलआईएल की वर्तमान में दो सहायक कंपनियां हैं,

i. बामर लॉरी एंड कंपनी लिमिटेड (कंपनी अधिनियम, 2013 की धारा 2(87)(ii) के अनुसार) [जिसे यहां 'बीएल' के रूप में संदर्भित किया गया है] और बीएल की 1 सहायक कंपनी है, जैसा कि नीचे क्र.सं. पप में उल्लिखित है।

ii. विशाखापत्तनम पोर्ट लॉजिस्टिक्स पार्क लिमिटेड (कंपनी अधिनियम, 2013 की धारा 2(87) (ii) के अनुसार)।

12.3.3 चेन्नई पेट्रोलियम कॉर्पोरेशन लिमिटेड (सीपीसीएल):

चेन्नई पेट्रोलियम कॉर्पोरेशन लिमिटेड (सीपीसीएल), जिसे पहले मद्रास रिफाइनरीज लिमिटेड (एमआरएल) के नाम से जाना जाता था, की स्थापना 1965 में भारत सरकार (भारत सरकार), एएमओसीओ और नेशनल ईरानी ऑयल कंपनी (एनआईओसी) के बीच एक संयुक्त उद्यम के रूप में हुई थी। एएमओसीओ ने 1985 में भारत सरकार के पक्ष में सीपीसीएल की इक्विटी का विनिवेश किया। बाद में भारत सरकार ने अपनी इक्विटी आईओसीएल को हस्तांतरित कर दी और सीपीसीएल 2001 में आईओसीएल की सहायक कंपनी बन गई। मणलि रिफाइनरी की वर्तमान क्षमता 10.5 एमएमटीपीए है।

रिफाइनरी के मुख्य उत्पाद एलपीजी, मोटर स्पिरिट (एमएस), सुपीरियर केरोसीन, एविएशन टर्बाइन ईंधन, हाई स्पीड डीजल, नेफ्था, बिटुमेन, ल्यूब बेस स्टॉक, पैराफिन वैक्स, ईंधन तेल, हेक्सेन, पेट्रोकेमिकल फीड स्टॉक और पेट्रोलियम कोक हैं। सीपीसीएल, लीनियर एल्काइल बेंजीन के निर्माण हेतु एक डाउनस्ट्रीम यूनिट को लीनियर एल्काइल बेंजीन फीडस्टॉक (एलएबीएफएस) की भी आपूर्ति करता है।

सीपीसीएल के पास 30,000 मीट्रिक टन प्रति वर्ष क्षमता वाला एक वैक्स संयंत्र है, जो पैराफिन वैक्स,

वाटरप्रूफ फॉर्मूलेशन और मैच वैक्स बनाने के लिए पैराफिन मोम का उत्पादन करता है। 1988 में एक प्रोपिलीन संयंत्र चालू किया गया था, जिसकी प्रारंभिक क्षमता 17,000 मीट्रिक टन प्रति वर्ष थी, ताकि आसपास के डाउनस्ट्रीम उद्योगों को पेट्रोकेमिकल फीडस्टॉक उपलब्ध कराया जा सके। 2004 में इस यूनिट का नवीनीकरण किया गया और प्रोपिलीन उत्पादन क्षमता बढ़ाकर 30,000 मीट्रिक टन प्रति वर्ष कर दी गई।

सीपीसीएल 2046 तक नेट जीरो उत्सर्जन प्राप्त करने का लक्ष्य लेकर चल रहा है। सीपीसीएल संधारणीय विकास में सक्रिय रूप से एक उत्कृष्ट ट्रैक रिकॉर्ड स्थापित कर रहा है। सीपीसीएल भविष्य की पीढ़ियों के लिए हमारे पर्यावरण को संरक्षित करने के उद्देश्य से विविध 'पर्यावरण संरक्षण और परिरक्षण परियोजनाओं' के कार्यान्वयन के माध्यम से इसे प्राप्त करता है। सीपीसीएल ने 2024–25 में 75.7% कुल डिस्टीलेट का लक्ष्य हासिल कर लिया है।

ekunM	foÙkh; o"k 2023&24	foÙkh; o"k 2024&25
क्रूड थ्रूपुट (एमएमटी)	11.6	10.5
डिस्टीलेट उत्पाद (%)	76.2	75.7

12.3.3.1 वित्तीय निष्पादन:

ekunM	foÙkh; o"k 2023&24	foÙkh; o"k 2024&25
कारोबार	79,207	70,963
कर पूर्व लाभ	3,660	208
कर पश्चात् लाभ	2,711	173.53

12.3.4 मैंगलोर रिफाइनरी एंड पेट्रोकेमिकल्स लिमिटेड (एमआरपीएल):

मैंगलोर रिफाइनरी एंड पेट्रोकेमिकल्स लिमिटेड (एमआरपीएल) पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय (एमओपीएनजी) के अंतर्गत एक अनुसूची–ए मिनीरत्न कंपनी है। एमआरपीएल, ओएनजीसी की एक सहायक कंपनी है जिसकी वर्तमान स्थापित क्षमता 15 एमएमटीपीए है। भारत की रिफाइनिंग क्षमता में एमआरपीएल की लगभग 6% हिस्सेदारी है। उत्पाद स्लेट में एलपीजी, नेफ्था, पॉलीप्रोपाइलीन, एमएस, पैराक्सिलीन, बेंजीन, जाइलोल, एसकेओ, एटीएफ, एचएसडी, एमएफओ, बिटुमेन, सल्फर और पेटकोक शामिल हैं।

रिफाइनरी कर्नाटक राज्य के मंगलुरु में पश्चिमी तट पर स्थित है। वर्ष 1996 में चरण–1 के चालू होने के बाद से, रिफाइनरी का उत्तरोत्तर विस्तार हुआ है। चरण–2 1999 में और चरण–3 2012 में एक नई क्रूड यूनिट के साथ चालू हुआ। चरण–3 विस्तार परियोजना के अंतर्गत अंतिम प्रोसेस यूनिट, पॉलीप्रोपाइलीन यूनिट, वर्ष 2015 के मध्य में चालू हुई। कंपनी ने मंगलुरु विशेष आर्थिक क्षेत्र (एसईजेड) स्थित अपनी पूर्व सहायक कंपनी ओएनजीसी मंगलुरु पेट्रोकेमिकल्स लिमिटेड (''एरोमैटिक कॉम्प्लेक्स'') का 1 मई 2022 से अपने साथ विलय कर लिया है।

एमआरपीएल के पास कैप्टिव उपयोग के लिए अपनी स्वयं की विद्युत उत्पादन सुविधाएँ हैं जिनकी कुल क्षमता 311.6 मेगावाट (एमडब्ल्यू) है। इसके अतिरिक्त, रिफाइनरी स्थल पर 6.06 मेगावाट–पीक (एमडब्ल्यूपी) क्षमता का ग्रिड इंटरएक्टिव रूफटॉप सौर ऊर्जा संयंत्र और एरोमैटिक कॉम्प्लेक्स में 2.5 मेगावाट का फ्लोटिंग सौर ऊर्जा संयंत्र भी है।

नदी से कच्चे पानी के सेवन के अलावा, एमआरपीएल मैंगलोर शहर से लगभग 3 से 4 मिलियन गैलन प्रतिदिन (एमजीडी) उपचारित स्वच्छ जल का उपयोग करता है। दिसंबर 2021 में एक समुद्री जल विलवणीकरण संयंत्र चालू किया गया था, जिसकी वर्तमान क्षमता 8 एमजीडी है और जिसे बाद में 15 एमजीडी तक बढ़ाया जा सकता है, ताकि स्थायी प्रचालन के लिए नदी के मीठे पानी पर निर्भरता कम की जा सके।

कंपनी के पास न्यू मैंगलोर पोर्ट अथॉरिटी (एनएमपीए) में दो बर्थ हैं और एनएमपीए क्षेत्राधिकार में समुद्र के अंदर 17 किलोमीटर दूर सिंगल प्वाइंट मूरिंग सुविधा है।

12.3.4.1 परियोजनाएं

क. पीएमएचबीएल पाइपलाइन के माध्यम से एमआरपीएल से एमएस, एचएसडी और एटीएफ प्राप्त करने के लिए देवंगोंथी में मार्केटिंग टर्मिनल अगस्त 2024 में चालू किया गया था।

ख. विद्युत प्रणाली उन्नयन परियोजना का उद्देश्य ग्रिड कनेक्टिविटी (220/33केवी और 110/33केवी) को बढ़ाना और रिफाइनरी की विद्युत एवं शीतलन प्रणालियों का उन्नयन करना है। यांत्रिक कार्य वित्त वर्ष 2025–26 की तीसरी तिमाही में पूरा होने की उम्मीद है।

ग. पीएफसीसी रीजेनरेटर स्टैक वेट स्क्रबर सिस्टम का यांत्रिक कार्य दिसंबर 2024 में पूरा हो गया तथा यह चालू होने की स्थिति में है।

घ. वीजी–30 और वीजी–40 ग्रेड की मांग को पूरा करने के लिए 144 केटीपीए क्षमता वाली नई बिटुमेन ब्लोइंग ट्रेन नवंबर 2024 में चालू की गई।

ङ. एनसीएल के सहयोग से आईबीबी पायलट–कम–डेमो प्लांट 200 टन प्रति वर्ष क्षमता के लिए विकसित किया जा रहा है। इसका यांत्रिक निर्माण कार्य वित्त वर्ष 2025–26 की दूसरी तिमाही तक पूरा होने की उम्मीद है।

च. जल इलेक्ट्रोलिसिस का उपयोग करके 500 टन प्रति वर्ष क्षमता वाले हरित हाइड्रोजन संयंत्र की योजना बनाई गई है। यह निविदा चरण में है और वित्त वर्ष 2026–27 की दूसरी तिमाही तक पूरा होने का लक्ष्य है।

छ. केएलपीडी क्षमता का बायो–एटीएफ संयंत्र निर्माणाधीन है, जिसका यांत्रिक रूप से पूरा होना वित्त वर्ष 2026–27 की चौथी तिमाही में अपेक्षित है।

12.3.4.2 मानव संसाधनः 31 जनवरी तक कुल कर्मचारी संख्या 2540 थी, जिसमें 228 महिला कर्मचारी और 46 शारीरिक रूप से विकलांग कर्मचारी शामिल हैं। कुल 2540 कर्मचारियों में से 1166 कर्मचारी प्रबंधन संवर्ग के और 1374 कर्मचारी गैर–प्रबंधन संवर्ग के हैं।

12.3.4.3 सुरक्षा

क. ईआरडीएमपी प्रमाणन ऑडिट दिनांक 21.04.2024 से 25.04.2024 के दौरान मैसर्स ईआरडीएमपी अकादमी एलएलपी, भोपाल द्वारा आयोजित किया गया था।

ख. बीबीयू ट्रेन–2 परियोजना का प्री–कमीशनिंग सुरक्षा ऑडिट जुलाई, 2024 में तेल उद्योग सुरक्षा निदेशालय (ओआईएसडी) की तकनीकी टीम द्वारा किया गया।

ग. देवनागोंथी मार्केटिंग टर्मिनल, बेंगलुरु का प्री–कमीशनिंग सुरक्षा ऑडिट अगस्त, 2024 में ओआईएसडी के तकनीकी विशेषज्ञों की टीम द्वारा किया गया।

घ. डब्ल्यूएसएस परियोजना का प्री–कमीशनिंग सुरक्षा ऑडिट जनवरी, 2025 में ओआईएसडी की तकनीकी टीम द्वारा किया गया।

12.3.4.4 पर्यावरण प्रबंधन

क. वित्त वर्ष 23–24 के लिए 2167 मीट्रिक टन का विस्तारित उत्पादक उत्तरदायित्व (ईपीआर) सफलतापूर्वक प्राप्त कर लिया गया है।

ख. एसपीएम सुविधा के लिए तेल रिसाव आकस्मिक योजना (ओएससीपी) – ओएचए के ओएससीपी की जांच के लिए गठित समिति ने एमआरपीएल ओएससीपी योजना की जांच की और 22.10.2024 से 5 वर्षों के लिए इसकी जांच की।

ग. एसपीएम तेल रिसाव आकस्मिक योजना (ओएससीपी), ओआईएसडी और भारतीय तट रक्षक द्वारा 27.11.2024 से 28.11.2024 तक संयुक्त निरीक्षण किया गया।

घ. दिसंबर 2024 तक 42,50,790 घन मीटर (औसतन 3.41 एमजीडी) तृतीयक उपचारित नगरपालिका सीवेज जल का उपयोग किया गया। इसके अलावा, एमआरपीएल में इसी समय तक 9,39,829 घन मीटर (औसतन 1.55 एमजीडी) विलवणीकृत जल का उपयोग किया गया।

ङ. 3744 मीट्रिक टन ईटीपी तैलीय गाद को कंपनी के अंदर ही प्रोसेस किया गया। इसके अलावा, 24 दिसंबर तक एसपीसीबी द्वारा अधिकृत सीमेंट उद्योगों में 842 मीट्रिक टन तैलीय गाद और 1267 मीट्रिक टन पीएफसीसी व्यय कैटेलिस्ट की सह–प्रोसेसिंग की।

च. 24 अप्रैल से 25 जनवरी तक "एक पेड़, मां के नाम" वृक्षारोपण अभियान के तहत 5,332 पौधे लगाकर और

2,239 फलदार वृक्षों के पौधे वितरित करके हरित पट्टी विकास गतिविधि की गई।

12.3.4.5 नवाचार केंद्र: एमआरपीएल का नवाचार फोकस एआईध्एमएल, कैटेलिस्ट और प्रक्रिया विकास, विशिष्ट उत्पादों और एपीआई पर केंद्रित है, जो आंतरिक अनुसंधान एवं विकास और एनसीएल–पुणे, आईआईसीटी–हैदराबाद, एनआईटी–सूरथकल और सीआईपीईटी–चेन्नई जैसे संस्थानों के साथ सहयोग के माध्यम से प्रचालित होता है। 29 पेटेंट दायर करने और 12 पेटेंट प्रदान करने के साथ, एमआरपीएल को लगातार तीसरे वर्ष (2024–25) पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय से "विशेष नवाचार पुरस्कार'' प्राप्त हुआ। प्रमुख यूनिटों में वास्तविक समय अनुकूलन और पूर्वानुमानित रखरखाव के लिए एआईध्एमएल एल्गोरिदम तैनात किए गए हैं। पीईटी डिपॉलीमराइजेशन प्रायोगिक संयंत्र की स्थापना के लिए ₹6.67 करोड़ का ओआईडीबी अनुदान स्वीकृत किया गया।

एमआरपीएल ने आईबीबी प्रक्रिया प्रौद्योगिकी भी विकसित की है; एक पेटेंट प्राप्त फोटो–कैटेलिटिक डिओडोराइजेशन यूनिट, और प्लास्टिक अपशिष्ट अपसाइक्लिंग के लिए सर्कुलर इकोनॉमी परियोजनाओं को आगे बढ़ा रही है। वर्तमान में चल रहे अनुसंधान में एथिलीन की रिकवरी और रिफाइनरी अणुओं का मूल्य–निर्धारण शामिल है, जो संधारणीय नवाचार के प्रति एमआरपीएल की प्रतिबद्धता को पुष्ट करता है।

12.3.4.6 पुरस्कार एवं सम्मान वर्ष के दौरान, कंपनी को निम्नलिखित पुरस्कार एवं सम्मान प्रदान किए गए

क. इकोनॉमिक टाइम्स एचआर भविष्य के लिए तैयार संगठन

ख. एशियाई नेतृत्व पुरस्कार–2024 में अभिनव मानव संसाधन प्रथाओं वाला संगठन पुरस्कार

ग. एमआरपीएल को एशियाई नेतृत्व पुरस्कार 2024 में अभिनव मानव संसाधन प्रथाओं के लिए सम्मानित किया गया

घ. एमआरपीएल को ग्रीन मेपल फाउंडेशन (जीएमएफ) से 2024 के लिए जल संरक्षण पुरस्कार और बागवानी विकास पुरस्कार प्राप्त हुआ।

ङ. एमआरपीएल को स्थायी अपशिष्ट प्रबंधन के प्रति अपनी प्रतिबद्धता के लिए 'सर्कुलर इकोनॉमी लीडरशिप' श्रेणी में ग्रीन टेक पीसीडब्ल्यूआर पुरस्कार–2024 प्राप्त हुआ।

च. एमआरपीएल को कॉर्पोरेट पर्यावरण उत्तरदायित्व (सीईआर) के लिए महात्मा पुरस्कार–2024 प्राप्त हुआ।

छ. एमआरपीएल एरोमैटिक कॉम्प्लेक्स को ग्रुप ए (पेट्रोलियम रिफाइनरियां, गैस प्रोसेसिंग इकाइयां और पेट्रो–केमिकल कॉम्प्लेक्स) के तहत राष्ट्रीय सुरक्षा परिषद–सुरक्षा पुरस्कार 2024 में प्रशंसा–पत्र प्राप्त हुआ।

ज. एमआरपीएल को ऑयल रिफाइनरी और पेट्रोकेमिकल्स लिमिटेड उद्योग श्रेणी में प्रतिष्ठित" जीईईएफ वैश्विक पर्यावरण पुरस्कार 2025'' के लिए गोल्ड श्रेणी में चुना गया है।

वित्तीय निष्पादन की विशेषताएं

मानदंड	यूनिट	वित्त वर्ष	वित्त वर्ष 2023–24	वित्त वर्ष 2024–25 (दिसंबर–24 तक)
थ्रूपुट	एमएमटी	1,24,686	1,05,190	1,09,239
कारोबार (सकल)	₹ करोड़	6,711	7,893	2469
पीबीटी	₹ करोड़	4,239	5,521	113.2
पीएटी	₹ करोड़	2,638	3,596	50.5
सकल रिफाइनरी मार्जिन	$/बैरल	9.88	10.36	4.45

12.3.5 नुमालीगढ़ रिफाइनरी लिमिटेड (एनआरएल):

नुमालीगढ़ रिफाइनरी लिमिटेड (एनआरएल) की स्थापना 22 अप्रैल 1993 को हुई थी। एनआरएल की स्थापना 15 अगस्त 1985 को भारत सरकार द्वारा हस्ताक्षरित "असम समझौते" पर आधारित है। एनआरएल, ऑयल इंडिया लिमिटेड (ओआईएल) की एक सहायक कंपनी है और असम के गोलाघाट जिले के नुमालीगढ़ में एक पेट्रोलियम रिफाइनरी का प्रचालन करती है। एनआरएल एक श्रेणी–। मिनीरत्न सार्वजनिक क्षेत्र का उपक्रम है। एनआरएल का वाणिज्यिक प्रचालन 1 अक्टूबर 2000 से शुरू हुआ। दिनांक 31.03.2025 कि स्थिति के अनुसार, एनआरएल की शेयरधारिता इस प्रकार है: ऑयल इंडिया लिमिटेड (ओआईएल)–69.63%, असम सरकार–26% और इंजीनियर्स इंडिया लिमिटेड (ईआईएल)–4.37%।

नुमालीगढ़ में एक एलपीजी बॉटलिंग प्लांट (क्षमता 42 टीएमटीपीए) है, इसके अलावा नुमालीगढ़ और सिलीगुड़ी में दो मार्केटिंग टर्मिनल भी हैं। सफेद तेल उत्पादों, जैसे एमएस, एसकेओ और एचएसडी, को ऑयल इंडिया लिमिटेड की नुमालीगढ़–सिलीगुड़ी उत्पाद पाइपलाइन (एनएसपीएल) के माध्यम से नुमालीगढ़ से सिलीगुड़ी तक पहुँचाया जाता है।

एनआरएल की रिफाइनरी उन्नत द्वितीयक प्रोसेसिंग तकनीकों के कारण अत्यधिक जटिल है, जिससे उच्च आसवन उत्पादन प्राप्त करना संभव हुआ है। एनआरएल के उत्पादों में एलपीजी, नेफ्था, मोटर स्पिरिट, एविएशन टर्बाइन ईंधन, हाई स्पीड डीजल, उच्च–गुणवत्ता वाला केरोसीन तेल, पैराफिन वैक्स, कच्चा/कैल्साइन्ड पेट्रोलियम कोक और सल्फर शामिल हैं। एनआरएल देश की सबसे बड़ी वैक्स उत्पादक यूनिट है।

12.3.5.1 निष्पादन:

भौतिक निष्पादन:

मानदंड	2022-23	2023-24	2024-25
क्रूड प्राप्ति (टीएमटी)	2,934	2,457	3,033
क्रूड थ्रूपुट (टीएमटी)	3,091	2,510	3,066
क्षमता उपयोग (%)	103.03	83.67	102.20
डिस्टीलेट उत्पाद (%)	87.69	86.54	86.73
विशिष्ट ऊर्जा खपत (एमबीएन)	61.66	61.57	61.47
ऊर्जा तीव्रता सूचकांक (ईआईआई)	82.31	81.36	81.09

वित्तीय निष्पादन:

मानदंड	2022-23	2023-24	2024-25
बिक्री कारोबार (₹/करोड़)	29,785	23,731	25,147
पीबीटी (वीसीआर)	4,953	2,912	2,215
पीएटी (वीसीआर)	3,703	2,610	1,608
जीआरएम ($/बैरल)	19.86	13.17	5.14
निवल मूल्य	11,427	13,926	16,069

राजकोष में योगदानः

कोष	2022-23	2023-24	2024-25
केंद्रीय राजकोष	4,358	3,389	3,344
राज्य कोष	658	430	339
कुल	5,016	3,819	3,683

12.3.5.2 परियोजनाएँ

कार्यान्वयनाधीन परियोजनाएं

क) नुमालीगढ़ रिफाइनरी विस्तार परियोजना (एनआरईपी): विस्तार परियोजना के दो प्रमुख घटक हैं:

i. नुमालीगढ़ में 6 एमएमटीपीए रिफाइनरी–: 31.03.2025 तक, समग्र भौतिक प्रगति 83.8% और वित्तीय प्रगति 80.76% है।

ii. पारादीप नुमालीगढ़ क्रूड ऑयल पाइपलाइन (पीएनसीपीएल) और क्रूड ऑयल इम्पोर्ट टर्मिनल (सीओआईटी)–पाइपलाइन की लंबाई 1,635 किलोमीटर और क्षमता 9 एमएमटीपीए है। 31.03.2025 तक, कुल भौतिक प्रगति 83.8% और वित्तीय प्रगति 80.76% है।

एनआरईपी के अंतर्गत विस्तार परियोजना के अंतर्गत आने वाली प्रमुख यूनिटें हैं:

क. पेट्रोकेमिकल परियोजनाः नुमालीगढ़ में 360 केटीपीए पॉली प्रोपाइलीन यूनिट (पीपीयू) और उससे जुड़ी सुविधाओं की स्थापना शामिल है। परियोजना के कार्यान्वयन के बाद, एनआरएल का पेट्रोकेमिकल तीव्रता सूचकांक (पीआईआई) 3.88% होगा। परियोजना के लिए पर्यावरणीय मंजूरी प्राप्त हो चुकी है और ईआईएल को परियोजना के लिए ईपीसीएम के रूप में नियुक्त किया गया है। परियोजना को वित्त वर्ष 2027–28 में पूरा करने का लक्ष्य रखा गया है।

ख. डीसीयू का पुनरुद्धारः कोक ड्रम स्ट्रक्चरल पैकेज सहित आगामी अवशेष उन्नयन सुविधा से अपरिवर्तित तेल (यूसीओ) के प्रोसेसिंग हेतु मौजूदा डिलेड कोकर यूनिट (डीसीयू) की क्षमता 306 केटीपीए से बढ़ाकर 560 केटीपीए की जाएगी। डीसीयू की विश्वसनीयता और दक्षता में सुधार के लिए, यूनिट के स्थायी प्रचालन को सुनिश्चित करने हेतु अतिरिक्त सुविधाएँ जैसे ऑफ गैस कंप्रेसर की ओवरहालिंग, प्रक्रिया उपकरण, नया सबस्टेशन भवन और डीसीएस उन्नयन का निर्माण किया जा रहा है।

ग. दाबिदुबी एलपीजी सुविधाः असम के गोलाघाट जिले के दाबिदुबी में स्थापित की जा रही अपनी एलपीजी सुविधाओं को जोड़ने के लिए 15 किलोमीटर लंबी भूमिगत एलपीजी पाइपलाइन बिछाई जाएगी। चालू होने के बाद नई एलपीजी सुविधा की क्षमता 700 केटीपीए होगी।

घ. एसएमटी संवर्धनः इस परियोजना में रिफाइनरी विस्तार के बाद बढ़ी हुई उत्पाद निकासी आवश्यकताओं को पूरा करने के लिए सिलीगुड़ी मार्केटिंग टर्मिनल (एसएमटी) में नए टैंकेज, एथेनॉल मिश्रण सुविधाएं और रेलध्सड़क लोडिंग स्पर्स की स्थापना शामिल है।

ङ. पीएफसीसी यूनिट में पावर रिकवरी टर्बाइनः ऊर्जा बचत पहल के रूप में, पीएफसीसीयू के रिएक्टर–रीजेनरेटर सेक्शन के डाउनस्ट्रीम में फ्लू गैस सेक्शन में एक पावर रिकवरी टर्बाइन स्थापित किया जाएगा। इससे रीजेनरेटर फ्लू गैस से बिजली उत्पन्न होगी जिससे यूनिट की ऊर्जा दक्षता बढ़ेगी और परिसर से सीओ2 उत्सर्जन में कमी आएगी।

ख) 2जी बायो रिफाइनरी (संयुक्त उद्यम परियोजना): एनआरएल ने दो अन्य विदेशी निवेशकों के साथ मिलकर एक संयुक्त उद्यम कंपनी– 'असम बायो–रिफाइनरी प्राइवेट लिमिटेड (एबीआरपीएल)' बनाई है, जो गैर–खाद्य ग्रेड फीडस्टॉक बांस से एथेनॉल उत्पादन के लिए असम के नुमालीगढ़ में दूसरी पीढ़ी की बायो रिफाइनरी स्थापित कर रही है। बांस को अल्कोहल में परिवर्तित करने के लिए पहला परीक्षण सफलतापूर्वक किया जा चुका है।

ग) **उत्तर पूर्व गैस ग्रिड परियोजना (संयुक्त उद्यम परियोजना):** एनआरएल संयुक्त उद्यम कंपनी–इन्द्रधनुष गैस ग्रिड लिमिटेड (आईजीजीएल) में 20% हिस्सेदारी के साथ एक साझेदार है, जो 4.75 मिलियन मीट्रिक मानक क्यूबिक मीटर प्रति दिन (एमएमएससीएमडी) क्षमता की प्राकृतिक गैस पाइपलाइन बिछाने के लिए उत्तर पूर्व गैस ग्रिड परियोजना का क्रियान्वयन कर रही है।

घ) **हरित हाइड्रोजन संयंत्रः** राष्ट्रीय हरित हाइड्रोजन मिशन के अनुरूप और आने वाले वर्षों में जीएचसीओ (हरित हाइड्रोजन उपभोग दायित्व) को पूरा करने के लिए, एनआरएल ईपीसी आधार पर नुमालीगढ़ में 300 किलोग्राम/घंटा (2.4 केटीपीए) क्षमता का एक हरित हाइड्रोजन संयंत्र स्थापित कर रहा है। यह रिफाइनरी द्वारा उपयोग किए जा रहे वर्तमान ग्रे हाइड्रोजन के 5% की जगह लेगा, जिससे प्रति वर्ष लगभग 24,000 टन सीओ$_2$ उत्सर्जन में कमी आएगी।

12.3.5.3 **अनुसंधान एवं विकास गतिविधियाँः** एनआरएल, रिफाइनरी प्रचालन में तकनीकी उत्कृष्टता हासिल करने, नए मूल्यवर्धित उत्पाद विकसित करने और मौजूदा पेट्रोलियम उत्पादों की गुणवत्ता बढ़ाने के लिए अनुसंधान और विकास कार्य कर रहा है। इसके लिए कंपनी शैक्षणिक संस्थानों और अनुसंधान संगठनों के साथ मिलकर काम कर रही है। ऐसी कुछ साझेदारियों और सहयोगों के उदाहरण नीचे दिए गए हैं:

1) **आईआईटी गुवाहाटी में टिकाऊ सामग्री के विकास के लिए एनआरएल उत्कृष्टता केंद्र**

क. इको पैकेजिंग सामग्री का विकासः "तेल और जैव–रिफाइनरी धाराओं से जैव–निम्नीकरणीय प्लास्टिक का विकास" नाम की एक परियोजना शुरू की गई है। इसका उद्देश्य "फुरफुरल" नामक जैव–रिफाइनरी उप–उत्पाद को पॉलीकैप्रोलैक्टोन में बदलना है, जिसे पर्यावरण के अनुकूल पैकेजिंग सामग्री बनाने के लिए विभिन्न आकारों में ढाला जा सकता है।

ख. हरित सक्रिय कार्बन का विकासः बांस के चूरे से बाजार में बिकने योग्य गुणवत्ता वाला हरित सक्रिय कार्बन बनाने के लिए एक परियोजना शुरू की गई है। इस परियोजना का उद्देश्य अपशिष्ट बांस के चूरे को पायरोलिसिस प्रक्रिया से हरित सक्रिय कार्बन में बदलने के लिए एक औद्योगिक स्तर का संयंत्र बनाना है, जो हर बैच में 5 मी.टन/बैस बांस का चूरा प्रोसेस कर सकेगा।

ग. एच2 पृथक्करण और सीआ$_2$ अवशोषण के लिए प्रक्रिया विकसित करनाः एनआरएल रिफाइनरी के लिए यह अनुसंधान एवं विकास परियोजना भारतीय प्रौद्योगिकी संस्थान गुवाहाटी (आईआईटीजी) के सहयोग से लागू की जा रही है।

घ. **एआई आधारित खरीद आरएफएक्स स्वचालनः** ''नुमालीगढ़ रिफाइनरी लिमिटेड के लिए एआई आधारित खरीद आरएफएक्स स्वचालन'' नामक एक परियोजना भारतीय प्रौद्योगिकी संस्थान गुवाहाटी (आईआईटीजी) के सहयोग से कार्यान्वित की जाएगी।

2) **एनआरएल–एनईआईएसटी अनुसंधान एवं विकास केंद्र, जोरहाट, असमः** सीएसआईआर–एनईआईएसटी में चल रही अनुसंधान परियोजनाएं:

क. पीएसए गैस से सीओ$_2$–अवशोषण के लिए टिकाऊ नैनोकम्पोजिट मेम्ब्रेन का विकास।

ख. जल इलेक्ट्रोलिसिस हेतु हरित हाइड्रोजन उत्पादन हेतु हाइब्रिड नैनो–कैटेलिस्ट का विकास।

ग. पूर्वोत्तर क्षेत्र के पेट्रोलियम अपशिष्ट से उच्च गुणवत्ता वाले ग्राफीन जैसे नैनोमटेरियल का उत्पादन।

घ. बांस आधारित बायोरिफाइनरी के लिए लिग्नोसेल्यूलोलिटिक मल्टीएंजाइम उत्पादन प्रक्रिया का विकास।

3) **इंजीनियर्स इंडिया लिमिटेड द्वारा विकसित प्रौद्योगिकी के व्यावसायीकरण के लिए अनुसंधान सहयोगः** एनआरएल और ईआईएल ने 31.03.2022 को एक समझौता–ज्ञापन (''एमओयू'') पर हस्ताक्षर किए, जिसका उद्देश्य वैज्ञानिक ज्ञान का आदान–प्रदान करना, हाइड्रोकार्बन, पेट्रोकेमिकल और ऊर्जा तकनीक के क्षेत्र में संयुक्त अनुसंधान को बढ़ावा देना और मिलकर विकसित की गई तकनीकों का व्यावसायीकरण करना है। इस सहयोग के तहत, एनआरएल और ईआईएल ने ईआईएल की पेटेंट तकनीक के आधार पर 16 टीपीडी जलीय अमोनिया संयंत्र स्थापित करने के लिए समझौता किया है। यह संयंत्र एनएच$_3$ युक्त गैसों

से अमोनिया को पुनर्प्राप्त करेगा और उसे उपयोगी उत्पादों में बदलेगा। इस परियोजना में एनआरएल अपनी विस्तार इकाई की सल्फर रिकवरी यूनिट से निकलने वाली अमोनिया–समृद्ध अपशिष्ट धारा का उपयोग अमोनिया उत्पादन के लिए करेगा। इस तरह यह परियोजना अपशिष्ट को मूल्यवान उत्पाद में बदलने में मदद करेगी।

4) **वैकल्पिक ऊर्जा पर अनुसंधान सहयोग – पवन ऊर्जा परियोजना:** एनआरएल ने असम के काजीरंगा विश्वविद्यालय और सीमांत विज्ञान एवं अनुप्रयोग संस्थान के साथ एक समझौता किया है, ताकि पूर्वोत्तर भारत में पवन ऊर्जा की क्षमता का आकलन करने के लिए एक शोध अध्ययन किया जा सके। इस अध्ययन का उद्देश्य पवन ऊर्जा से जुड़े विश्वसनीय आँकड़े तैयार करना है, जो भविष्य में पवन ऊर्जा परियोजनाएँ लगाने में मदद करेंगे, यदि वे तकनीकी और आर्थिक रूप से संभव पाई जाती हैं। इसके लिए ब्रह्मपुत्र घाटी में दो अलग–अलग स्थानों पर आँकड़े इकट्ठा करने के लिए दो लिडार मशीनें लगाई गई हैं।

5) **अपशिष्ट से धन प्राप्ति हेतु अनुसंधान सहयोग:** एनआरएल ने प्रक्रिया सुधार और अपशिष्ट उत्पादों के बेहतर उपयोग के लिए सीएसआईआर–एनईआईएसटी, जोरहाट के साथ एक सहयोग समझौता किया है। इस परियोजना के तहत, 12.3.5.4 खोखले फाइबर मेम्ब्रेन मॉड्यूल की डिजाइन और विकास करके 50 लीटर बैच क्षमता वाले प्रयोगशाला स्तर के प्रयोग सफलतापूर्वक पूरे किए गए हैं। अब एनआरएल परिसर में 1 घन मीटर प्रति घंटा क्षमता वाली एक पायलट निष्पादन इकाई विकसित की जा रही है।

6) **सेंट एडमंड्स कॉलेज, शिलांग में परियोजना के लिए अनुसंधान सहयोग:** एनआरएल ने सेंट एडमंड्स कॉलेज, शिलांग को एक शोध अध्ययन के लिए चुना है, जिसका विषय है – कच्चे तेल, हाइड्रोकार्बन टैंक के तल में जमा गाद और ईटीपी हाइड्रोकार्बन गाद के जैव–उपचार (बायो–रिमेडिएशन) में साइनोबैक्टीरिया का उपयोग और इसके पर्यावरणीय लाभ। इस परियोजना का उद्देश्य इन अपशिष्ट पदार्थों को साइनोबैक्टीरिया की मदद से साफ और पर्यावरण के लिए सुरक्षित बनाना है। अब तक एनआरएल से लिए गए साइनोबैक्टीरिया नमूनों के संवर्धन (कल्चर) में अच्छी प्रगति हुई है, और संवर्धित जीवाणुओं का हाइड्रोकार्बन गाद पर प्रभाव जांचने के लिए अध्ययन चल रहा है।

7) **राजीव गांधी पेट्रोलियम प्रौद्योगिकी संस्थान (आरजीआईपीटी), अमेठी के साथ अनुसंधान एवं विकास गतिविधियाँ:** एनआरएल ने अनुसंधान गतिविधियों का विस्तार करने के अपने प्रयास में, निम्नलिखित अनुसंधान एवं विकास परियोजनाओं को पूरा करने के लिए 13.11.2024 को राजीव गांधी पेट्रोलियम प्रौद्योगिकी संस्थान, अमेठी के साथ समझौता–ज्ञापन (एमओए) पर हस्ताक्षर किए हैं।

क) खट्टे पानी में मौजूद एच2एस और अमोनिया को इलेक्ट्रोकैटलिटिक प्रक्रिया के माध्यम से सल्फर, एच$_2$ और अमोनियम सल्फेट में परिवर्तित करना।

ख) स्थिर मिश्रण प्राप्त करने के लिए मेथनॉल–डीजल सम्मिश्रण।

ग) लिग्निन आधारित जैव–चिपकने वाल विकास और निष्पादन के लिए प्रायोगिक पैमाने पर इसकी प्रक्रिया को अनुकूल बनाना।

घ) एथेनॉल–जल मिश्रण का एसिटिक एसिड और हाइड्रोजन में विद्युत रासायनिक रूपांतरण।

ङ) मेथनॉल मिश्रित डीजल के कारण लगने वाले जंग को कम करने के लिए जंग अवरोधक सूत्र का विकास।

12.3.5.4 एकीकृत सूचना प्रणाली (आईआईएस): एनआरएल ने किसी भी व्यवधान के दौरान लगातार प्रचालन बनाए रखने के लिए एक व्यापक व्यवसाय निरंतरता प्रबंधन (बीसीएम) प्रणाली लागू की है। इसके तहत, प्रचालन की लचीलापन सुनिश्चित करने के लिए 24x7 डेटा की प्रतिकृति के साथ एक भरोसेमंद क्लाउड प्लेटफॉर्म पर आपदा रिकवरी (डीआर) साइट स्थापित की गई है।

एनआरएल ने केंद्रीकृत निगरानी और त्वरित घटना प्रतिक्रिया के लिए एक क्लाउड–आधारित सुरक्षा प्रचालन केंद्र (एसओसी) स्थापित किया है, जो विश्व स्तर पर मान्यता प्राप्त एसआईईएम और यूईबीए समाधान से लैस है। यह केंद्र एंडपॉइंट डिटेक्शन एंड रिस्पांस (ईडीआर) और नेटवर्क डिटेक्शन एंड रिस्पांस (एनडीआर) प्रणालियों से समर्थित है, जो एंडपॉइंट

और नेटवर्क पर वास्तविक समय में खतरों का पता लगाते और उन्हें रोकते हैं। साथ ही, एआई–प्रचालित जोखिम खुफिया उपकरण डीप और डार्क वेब की निगरानी करके ब्रांड के गलत उपयोग और डेटा चोरी का पता लगाते हैं।

एनआरएल उत्पादकता और रचनात्मकता बढ़ाने के लिए माइक्रोसॉफ्ट कोपायलट के जरिए आर्टिफिशियल इंटेलिजेंस, खासकर जनरेटिव एआई का इस्तेमाल कर रहा है। माइक्रोसॉफ्ट 365 के साथ जुड़ा कोपायलट उपयोगकर्ताओं को दस्तावेज बनाने, डेटा का विश्लेषण करने और प्राकृतिक भाषा के जरिए कार्यों को स्वचालित करने में मदद करता है। ये प्रयास एनआरएल की डिजिटल परिवर्तन और साइबर लचीलापन सुनिश्चित करने की प्रतिबद्धता को दिखाते हैं।

12.3.5.5 पूर्वोत्तर क्षेत्र के विकास में एनआरएल का योगदान: एनआरएल की स्थापना सरकार द्वारा "असम समझौते" के प्रावधानों के तहत पूर्वोत्तर क्षेत्र के सामाजिक–आर्थिक विकास को आवश्यक प्रोत्साहन प्रदान करने के उद्देश्य से की गई थी। वर्षों से, कंपनी हितधारकों की अपेक्षाओं पर खरी उतरी है और आज इस क्षेत्र की सबसे बड़ी प्रचालन औद्योगिक इकाई है। पूर्वोत्तर क्षेत्रों के विकास में एनआरएल के योगदान का सारांश नीचे दिया गया है।

12.3.5.6 एनआरएल द्वारा मूल्यवर्धित परियोजनाएँ: रिफाइनरी के चालू होने के बाद से, एनआरएल अपनी जीविका और विकास सुनिश्चित करने के लिए कई मूल्यवर्धित परियोजनाएँ क्रियान्वित कर रहा है। उत्तर–पूर्वी सीमा पर सिलीगुड़ी में एक विपणन टर्मिनल की स्थापना को छोड़कर, ऐसी सभी परियोजनाएँ पूर्वोत्तर क्षेत्र में हैं।

क्र.सं.	परियोजना	टिप्पणी
1	संयुक्त उद्यम में निवेश: असम बायो रिफाइनरी प्राइवेट लिमिटेड	कार्यान्वयन के तहत (50% इक्विटी भागीदारी)
2	संयुक्त उद्यम में निवेश: इंद्रधनुष गैस ग्रिड लिमिटेड	कार्यान्वयन के तहत (20% इक्विटी भागीदारी)
3	एनआरईपी–नुमालीगढ़ में 6 एमएमटीपीए रिफाइनरी	कार्यान्वयन के तहत
4	पारादीप नुमालीगढ़ कच्चे तेल पाइपलाइन	कार्यान्वयन के तहत
5	हरित हाइड्रोजन संयंत्र–2.4 केटीपीए	कार्यान्वयन के तहत

12.4 अन्य केंद्रीय सार्वजनिक क्षेत्र उद्यम (सीपीएसई)

12.4.1 भारत पेट्रोरिसोर्सेज लिमिटेड (बीपीआरएल):

भारत पेट्रो रिसोर्सेज लिमिटेड (बीपीआरएल) को अक्तूबर 2006 में भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल) की 100% सहायक कंपनी के रूप में शामिल किया गया था, ताकि बीपीसीएल की अपस्ट्रीम गतिविधियों को अंजाम दिया जा सके। भारत पेट्रो रिसोर्सेज लिमिटेड (बीपीआरएल) के पास पंद्रह ब्लॉकों में भागीदारी हित (पीआई) है, जिनमें से आठ भारत में और सात विदेशों में हैं, साथ ही रूस में चार उत्पादक ब्लॉकों के लाइसेंस रखने वाली दो रूसी कंपनियों में इक्विटी हिस्सेदारी भी है। लगभग 19,824 वर्ग किलोमीटर को कवर करते हुए, बीपीआरएल और उसकी सहायक कंपनियों के स्वामित्व वाले लगभग 46% एकड़ क्षेत्र अपतटीय विस्तार में हैं। वित्त वर्ष 24–25 में तेल और गैस उत्पादन में बीपीआरएल की हिस्सेदारी 1.98 एमएमटीओई रही है।

(i) **रूस:** बीपीआरएल की ऑयल इंडिया लिमिटेड और इंडियन ऑयल कॉर्पोरेशन लिमिटेड के साथ संयुक्त उद्यम (जेएससी) में 23.9% हिस्सेदारी है। सिंगापुर में निगमित संयुक्त उद्यमों के जरिए वैंकोरनेफ्ट और एलएलसी टीवाईएनजीडी में बीपीआरएल की 29.9% हिस्सेदारी है। जेएससी वैंकोरनेफ्ट का स्वामित्व एलएलसी वोस्तोक और ओएनजीसी विदेश वैंकोरनेफ्ट प्राइवेट लिमिटेड के पास है, जबकि एलएलसी टीवाईएनजीडी का स्वामित्व आरएन अपस्ट्रीम एलएलसी और बीपी के पास है। वैंकोरनेफ्ट में बीपीआरएल की प्रभावी हिस्सेदारी 7.887% है, जिसमें 589 मिलियन अमेरिकी डॉलर का निवेश शामिल है। वित्त वर्ष 2024–25 के दौरान इस परिसंपत्ति से कुल उत्पादन 12.45 एमएमटीओई रहा, जिसमें बीपीआरएल

की हिस्सेदारी 0.98 एमएमटीओई थी। इसके अलावा, इस परिसंपत्ति से बीपीआरएल को 34.24 मिलियन अमेरिकी डॉलर का लाभांश भी मिला।

रोसनेफ्ट समूह की कंपनी एलएलसी टीवाईएनजीडी, पूर्वी साइबेरिया स्थित श्रेडनेबोटुओबिंस्कॉय क्षेत्र में हिस्सेदारी है। बीपीआरएल की इसमें 9.867% हिस्सेदारी है और उसने 430 मिलियन अमेरिकी डॉलर का निवेश किया है। वित्त वर्ष 2024–25 के दौरान, इस परिसंपत्ति से उत्पादन 10.71 मिलियन अमेरिकी डॉलर (बीपीआरएल शेयरः 1.06 मिलियन अमेरिकी डॉलर) रहा है। इसके अलावा, इस परिसंपत्ति ने वित्त वर्ष के दौरान बीपीआरएल के लिए 45.65 मिलियन अमेरिकी डॉलर का लाभांश भी अर्जित किया है।

(ii) **लोअर जकुम रियायतः** अबू धाबी में लोअर जकुम क्षेत्र, जो 1967 से उत्पादन कर रहा है, बीपीआरएल, आईओसीएल और ओवीएल के स्वामित्व में है। भारतीय परिसंघ के पास कंसेशन में 10% हिस्सेदारी है, जबकि बीपीआरएल की अपनी सहायक कंपनी के माध्यम से 30% हिस्सेदारी है। वर्तमान में उत्पादन दास ब्लेंड क्रूड के कच्चे तेल का औसतन 410,000 बीओपीडी है और वित्त वर्ष 24–25 में कुल कच्चे तेल का उत्पादन 18.67 एमएमटी (बीपीआरएल शेयरः 0.56 एमएमटी) है। वित्तीय वर्ष के दौरान, बीपीसीएल समूह रिफाइनरियों ने लोअर जकुम से अपने इक्विटी तेल के रूप में 2.77 मिलियन बैरल कच्चे तेल का उपयोग किया है। बीपीआरएल को उपर्युक्त अवधि के दौरान 5.7 मिलियन अमरीकी डालर का लाभांश प्राप्त हुआ है।

(iii) **तटीय ब्लॉक 1 रियायतः** बीपीआरएल और आईओसीएल को मार्च 2019 में अबू धाबी 2018 ब्लॉक बिड राउंड के तहत तटीय ब्लॉक 1 रियायत प्रदान किया गया था। रियायत में अल धफरा क्षेत्र में 6,162 वर्ग कि.मी. शामिल हैं, जिसमें रुवैस शहर और रिफाइनिंग परिसर शामिल हैं। अन्वेषण चरण नौ साल का है, जिसमें प्रारंभिक, दूसरा और तीसरा दौर शामिल है। रियायत वर्तमान में अपनी दूसरी अन्वेषण अवधि में है, जिसमें यूबीपीएल दो मिरफा मूल्यांकन कूपों और एक अन्वेषण कूप की ड्रिलिंग के लिए प्रतिबद्ध है। रुवैस क्षेत्रीय विकास योजना को अप्रैल 2024 में मंजूरी दी गई थी, और उत्पादन रियायत समझौतों को सितंबर 2024 में निष्पादित किया गया था।

(iv) **मोजाम्बिकः** बीपीआरएल, अपनी नीदरलैंड स्थित स्टेप–डाउन सहायक कंपनी बीपीआरएल वेंचर्स मोजाम्बिक बीवी के माध्यम से, मोजाम्बिक में रोवुमा बेसिन कंसेशन के अपतटीय क्षेत्र 1 में 10% भागीदारी हित हैं। टोटल एनर्जीज एस.ए. की पूर्ण स्वामित्व वाली स्टेप–डाउन सहायक कंपनी टोटलएनर्जीज ईपी मोजाम्बिक एरिया 1 लिमिटेड, 26.5% भागीदारी हित के साथ प्रचालक है, और अन्य परिसंघ साझेदारों में एमआईटी रोवुमा अपतटीय एसयू एलडीए (20%), ईएनएच रोवुमा एरिया उम, एसए (15%), ओएनजीसी विदेश रोवुमा लिमिटेड (10%), ब्यास रोवुमा एनर्जी मोजाम्बिक लिमिटेड (10%) और पीटीटीईपी मोजाम्बिक एरिया 1 लिमिटेड (8.5%) शामिल हैं।

अपतटीय एरिया–1, मोजाम्बिक में पांच खोजे गए गैस क्षेत्र हैं, जिनके नाम गोल्फिन्हो–अतुम, प्रोस्पेरिडेड, ओर्का, टुबाराओ–टाइग्रे और टुबाराओ हैं। इन क्षेत्रों में पानी की गहराई 500 मीटर से 1800 मीटर तक है। गोल्फिन्हो–अतुम क्षेत्र में दो रिजर्वायर क्षेत्रों से 30.1 टीसीएफ गैस प्राप्त होने की संभावना है और यह वर्तमान में विकासाधीन है। इस क्षेत्र में कुल 17 अन्वेषण और मूल्यांकन कूप खोदे गए हैं। यहां से पठार उत्पादन प्रति दिन लगभग 2 बीसीएफ तक पहुँचने की उम्मीद है। प्रोस्पेरिडेड क्षेत्र में तीन रिजर्वायर क्षेत्रों से 34.9 टीसीएफ गैस उपलब्ध है। शेष तीन खोज क्षेत्र–ओर्का, टुबाराओ और टुबाराओ–टाइग्रे–तीन रिजर्वायर क्षेत्रों से मिलकर कुल 5 टीसीएफ गैस का योगदान देते हैं। उत्तरी मोजाम्बिक के तट से दूर रोवुमा अपतटीय क्षेत्र 1 में बड़ी मात्रा में प्राकृतिक गैस की खोज के बाद, क्षेत्र के कंसोर्टियम भागीदारों ने 18 जून, 2019 को अंतिम निवेश निर्णय (एफआईडी) की घोषणा की। इसके तहत प्रारंभिक रूप से 2x6.56 एमएमटीपीए की तटवर्ती एलएनजी परियोजना विकसित की जाएगी, जो गोल्फिन्हो–अतुम खोज क्षेत्र से प्राप्त गैस को मुद्रीकृत करेगी।

एफआईडी के बाद, परियोजना मार्च 2021 तक निर्धारित समय और बजट के भीतर थी। लेकिन मार्च 2021 के अंत में अफुंगी परियोजना स्थल के आसपास

हुई सुरक्षा घटनाओं के कारण, इसे अप्रत्याशित घटना घोषित कर दिया गया। मोजाम्बिक सरकार शांति बहाली और सुरक्षा स्थिति के सुधार के लिए काम कर रही है। मोजाम्बिक सेना रवांडा की सेनाओं के साथ मिलकर इस क्षेत्र में अभियान चला रही है। वर्ष 2024–25 के दौरान, उत्तरी काबो डेलगाडो में समुदायों की आजीविका को स्थिर करने के लिए परियोजना ने पामोजा टुनावेजा के तहत कृषि, जल और स्वच्छता, स्वास्थ्य, शिक्षा और सौरकरण जैसे क्षेत्रों में विभिन्न सामाजिक–आर्थिक पहलों को लागू किया। इन पहलों का उद्देश्य समुदायों के लिए आय उत्पन्न करना, स्थानीय अर्थव्यवस्था का विकास करना, जैव विविधता का संरक्षण करना और मानवाधिकारों को बढ़ावा देना है। परियोजना वर्तमान में हाइब्रिड मोड में चल रही है, जिसमें प्रचालन जारी है और संरक्षण उपाय भी लागू हैं। एचएसएसई टीम नियमित अंतराल पर स्थिति की निगरानी कर रही है। सुरक्षा की स्थिति में सुधार हुआ है और प्रचालक ने बताया है कि कैबो डेलगाडो प्रांत में सुरक्षा के बारे में संतोषजनक आश्वासन मिलने के बाद परियोजना को फिर से शुरू करने की उम्मीद है। साइट पर उपकरण और बुनियादी ढांचे सुरक्षित और अच्छी स्थिति में हैं।

(v) **ब्राजील:** आईबीवी ब्राजील में निगमित ब्रासिल पेट्रोलियो लिमिटेड (आईबीवी), बीपीआरएल वेंचर्स बीवी की एक संयुक्त उद्यम कंपनी है, जिसमें बीपीआरएल की हिस्सेदारी 64.35% है और शेष हिस्सेदारी वीडियोकॉन एनर्जी ब्राजील लिमिटेड (वीईबीएल) के पास है। वीईबीएल क्रमशः बीपीआरएल और वीडियोकॉन इंडस्ट्रीज लिमिटेड की सहायक कंपनी है। वर्तमान में, आईबीवी की दो रियायतों में तीन गहरे पानी वाले ब्लॉकों में हिस्सेदारी है। बीएम–सील–11 रियायत में आईबीवी की 40% हिस्सेदारी है और शेष 60% प्रचालक पेट्रोब्रास के पास है। इस रियायत में दो ब्लॉक शामिल हैं, सील–एम–426 और सील–एम–349। वाणिज्यिकता की घोषणा (डीओसी) दिसंबर 2021 में नियामक को प्रस्तुत की गई थी। बीएम–सील–11 रियायत के कैवाला और अगुलहिन्हा क्षेत्रों को बीएम–सील–10 रियायत में आसन्न क्षेत्र के साथ मिलाकर 'सर्जिपे अलागोस प्रोफंडास । (एसईएपी– ।)' नामक संयुक्त विकास परियोजना के रूप में विकसित किया जाएगा। वर्तमान में फ्लोटिंग प्रोडक्शन स्टोरेज एंड ऑफलोडिंग (एफपीएसओ) के लिए निविदा प्रकाशित हो चुकी है और खरीद गतिविधियाँ जारी हैं। बीएम–सी–30 रियायत में आईबीवी की 35.71% हिस्सेदारी है और प्रचालक पेट्रोरियो जगुआर पेट्रोलियो लिमिटेड है, जिसकी हिस्सेदारी 64.29% है।

(vi) **इंडोनेशिया:** बीपीआरएल की इस परियोजना में 16.2% हिस्सेदारी है, जो उसकी स्टेप–डाउन सहायक कंपनी बीपीआरएल वेंचर्स इंडोनेशिया बीवी के माध्यम से है। शेष 83.8% हिस्सेदारी इंडोनेशिया की राष्ट्रीय तेल कंपनी पर्टामिना की पूरी तरह से स्वामित्व वाली सहायक कंपनी, पीटी पर्टामिनाहुलु एनर्जी नुनुकन कंपनी (पीएचईएनसी) के पास है, जो इस परियोजना का प्रचालक भी है। उत्पादन साझाकरण अनुबंध (पीएससी) पर 12 दिसंबर 2004 को हस्ताक्षर किए गए थे और यह 30 वर्षों के लिए वैध है, अर्थात् 2034 तक। यह ब्लॉक उत्तर कालीमंतन प्रांत के तारकान बेसिन में बन्यू द्वीप के उथले पानी में स्थित है। अन्वेषण चरण के दौरान पीएससी के अनुसार निर्धारित न्यूनतम कार्य कार्यक्रम पूरे कर लिए गए हैं। प्रचालक इस परियोजना के लिए एफईईडी (फीड) प्रक्रिया पूरी करने का प्रस्ताव रखता है, जिसे दिसंबर 2025 तक पूरा करने की उम्मीद है। परियोजना की योजना में गैस खरीदार मैसर्स पीटीकेएमजे द्वारा एक मिनी एलएनजी संयंत्र स्थापित करना शामिल है, जिसके लिए गैस आवंटन हेतु प्राधिकारियों को आवेदन किया गया है। जीएसए को अंतिम रूप देने के लिए बातचीत चल रही है।

(vii) **सीवाई–ओएनएन–2002/2 (मदनम फील्ड, तटवर्ती कावेरी बेसिन, तमिलनाडु):** कावेरी बेसिन में एक तटीय ब्लॉक सीवाई–ओएनएन–2002/2 में बीपीआरएल का भागीदारी हित 40% है, जिसमें ओएनजीसी 60% भागीदारी हित के साथ प्रचालक है। वित्त वर्ष 2024–25 के दौरान, इस ब्लॉक से 63,337 मीट्रिक टन तेल (बीपीआरएल का हिस्साः 25,335 मीट्रिक टन) और 29.25 एमएमएससीएम गैस (बीपीआरएल का हिस्साः 11.70 एमएमएससीएम) का उत्पादन किया गया है। तिरुनगरी गैस क्षेत्र में, वित्त वर्ष 2024 में 40,000 एससीएम/दिन की प्रवाह दर के साथ एक कूप चालू किया गया है।

(viii) **सीबी–ओएनएन–2010/11 (तटीय कैम्बे बेसिन, गुजरात):** सीबी–ओएनएन–2010/11, तटीय ब्लॉक भारत सरकार द्वारा गेल (प्रचालक), बीपीआरएल, इंजीनियर्स इंडिया लिमिटेड (ईआईएल), बीएफ इंफ्रास्ट्रक्चर लिमिटेड (बीएफआईएल) और मोनेट इस्पात एंड एनर्जी लिमिटेड (एमआईईएल) के एक परिसंघ को एनईएलपी IX बोली दौर के तहत प्रदान किया गया था। संयुक्त प्रचालन समझौते (जेओए) के तहत एमआईईएल के नकद कॉल भुगतान डिफॉल्ट के कारण, अन्य गैर–डिफॉल्ट करने वाले पक्ष अपने मौजूदा हिस्से के अनुपात में एमआईईएल के 15% भागीदारी हित को वितरित करने के लिए सहमत हुए हैं। इसके अलावा, ब्लॉक के विकास चरण में बीएफआईएल की गैर–भागीदारी के कारण, ब्लॉक के लिए संशोधित भागीदारी हित गेल 47.06%, बीपीआरएल 29.41% और ईआईएल 23.52% है। गलियाना की क्षेत्रीय विकास योजना को 10 फरवरी 2020 को मंजूरी दी गई थी। क्षेत्र का विकास 2023 में पूरा हुआ और कच्चे तेल का उत्पादन 18 मार्च 2023 को शुरू हुआ। वित्त वर्ष 2024–25 में कुल कच्चे तेल का उत्पादन परिसंघ स्तर पर 5382 बैरल (724 मीट्रिक टन) रहा है (बीपीआरएल शेयरः 213 मीट्रिक टन)।

(ix) **सीबी–ओएनएचपी–2017/9 (तटीय कैम्बे बेसिन, गुजरात):** कैम्बे बेसिन, गुजरात में ब्लॉक सीबी–ओएनएचपी–2017/9 को ओपन एकरेज लाइसेंसिंग पॉलिसी (ओएएलपी) बोली राउंड–I के तहत बीपीआरएल को प्रदान किया गया था, और ब्लॉक के राजस्व हिस्सेदारी संविदा (आरएससी) पर 1 अक्टूबर, 2018 को भारत सरकार के साथ हस्ताक्षर किए गए थे। बीपीआरएल 60% पीआई के साथ ब्लॉक में प्रमुख प्रचालक है और ओएनजीसी 40% भागीदारी हित के साथ भागीदार है।

ब्लॉक में मौजूद कूपों के भूकंपीय और कूप डेटा की संयुक्त व्याख्या के आधार पर, तीन कूपों की ड्रिलिंग पूरी हो चुकी है। इसमें न्यूनतम कार्य कार्यक्रम भी पूरा किया गया है, लेकिन अभी तक वाणिज्यिक हाइड्रोकार्बन की खोज या उत्पादन स्थापित नहीं किया गया है।

(x) **एए–ओएनएन–2010/3 (असम अराकान बेसिन, असम):** एए–ओएनएन–2010/3, एक तटीय ब्लॉक, भारत सरकार ने ओआईएल, ओएनजीसी और बीपीआरएल के एक परिसंघ को एनईएलपी IX बोली दौर के तहत प्रदान किया था। इस ब्लॉक में ओआईएल 40% हिस्सेदारी के साथ प्रचालक है। बीपीआरएल की हिस्सेदारी 20% और ओएनजीसी की 40% है। इस ब्लॉक में संघ द्वारा तय न्यूनतम कार्य कार्यक्रम (एमडब्ल्यूपी) पूरा हो चुका है। हालांकि, कूप एसडीवाईए–1 की ड्रिलिंग के दौरान जटिलताओं के कारण एमडब्ल्यूपी को रोक दिया गया और कूप छोड़ दिया गया। प्रचालक ने ब्लॉक में प्रतिस्थापन कूप ड्रिल करने के लिए डीजीएच/एमओपीएनजी से तीन साल के विस्तार का अनुरोध किया है।

(xi) **एए–ओएनएचपी–2017/12 (असम अराकान बेसिन, असम और अरुणाचल प्रदेश):** भारत सरकार ने ओएएलपी–I बोली दौर के तहत ऑयल इंडिया को ब्लॉक एएओएनएचपी–2017/12 प्रदान किया। बीपीआरएल ने दिसंबर 2019 में इस ब्लॉक में 10% भागीदारी हित के साथ प्रवेश किया। ब्लॉक के अन्य परिसंघ साझेदार प्रचालक के रूप में ओआईएल (60% भागीदारी हित), आईओसीएल (20% भागीदारी हित) और नुमालीगढ़ रिफाइनरीज लिमिटेड (10% भागीदारी हित) हैं। अन्वेषण अवधि को 8 फरवरी, 2026 तक बढ़ा दिया गया है। प्रतिबद्ध कार्य कार्यक्रम में 2डी (200 एलकेएम) और 3डी (100 वर्ग कि.मी.) भूकंपीय एपीआई और 2 कूप शामिल हैं। एक एमडब्ल्यूपी कूप के लिए एनओसी एविएशन रिसर्च सेंटर द्वारा नहीं दी गई थी, इसलिए डीजीएच ने ब्लॉक को आनुपातिक रूप से कम करने की अनुमति दी है। एक कूप की ड्रिलिंग को छोड़कर, 2डी और 3डी भूकंपीय डेटा अधिग्रहण, प्रोसेसिंग और व्याख्या का कार्य पूरा हो चुका है। प्रचालक विस्तारित पहुंच ड्रिलिंग (ईआरडी) द्वारा एमडब्ल्यूपी कूप को पूरा करने की योजना बना रहा है क्योंकि यह स्थान घने जंगल के तहत आता है।

12.4.2 **ब्रह्मपुत्र क्रैकर एंड पॉलिमर लिमिटेड (बीसीपीएल):** असम गैस क्रैकर परियोजना (एजीसीपी) की शुरुआत 15 अगस्त 1985 को केंद्र सरकार

और ऑल असम स्टूडेंट यूनियन (एएएसयू) तथा ऑल असम गण संग्राम परिषद (एएजीएसपी) के बीच समझौता–ज्ञापन के बाद की गई थी। असम के डिब्रूगढ़ जिले में एजीसीपी परियोजना को लागू करने के लिए 8 जनवरी 2007 को एक संयुक्त उद्यम कंपनी, ब्रह्मपुत्र क्रैकर एंड पॉलिमर लिमिटेड (बीसीपीएल) बनाई गई। बीसीपीएल में 70% इक्विटी हिस्सेदारी के साथ गेल (इंडिया) लिमिटेड मुख्य प्रमोटर है और शेष 30% इक्विटी ऑयल इंडिया लिमिटेड (ओआईएल), नुमालीगढ़ रिफाइनरी लिमिटेड (एनआरएल) और असम सरकार के बीच समान रूप से साझा की जाती है। परिसर के लिए कच्चा माल (फीडस्टॉक) प्राकृतिक गैस मैसर्स ऑयल और मैसर्स ओएनजीसी से और नेफ्था मैसर्स एनआरएल से आता है। इस परिसर को प्राकृतिक गैस और नेफ्था को प्रोसेस करने के लिए डिजाइन किया गया है, जिससे 2,20,000 टन प्रति वर्ष (टीपीए) एलएलडीपीई/एचडीपीई (रैखिक कम घनत्व पॉलीइथिलीन/उच्च घनत्व पॉलीइथिलीन) और 60,000 टन प्रति वर्ष (टीपीए) पीपी (पॉलीप्रोपाइलीन) का उत्पादन किया जा सके। बीसीपीएल की संबद्ध इकाइयाँ दुलियाजान, जिला, डिब्रूगढ़ और लकवा, जिला, शिवसागर में हैं और इसका पंजीकृत कार्यालय गुवाहाटी में है। यह परियोजना 2 जनवरी 2016 को चालू हुई और 5 फरवरी 2016 को माननीय प्रधानमंत्री द्वारा राष्ट्र को समर्पित की गई।

आर्थिक कार्यों संबंधी मंत्रिमंडलीय समिति ने 24 दिसंबर 2019 को बीसीपीएल को 15 वर्षों तक संयंत्र प्रचालन के लिए लगभग 4600 करोड़ रुपए की अनुमानित लागत पर फीडस्टॉक सब्सिडी देने और रसायन एवं पेट्रोरसायन विभाग से बीसीपीएल का प्रशासनिक नियंत्रण पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय को हस्तांतरित करने की मंजूरी दी।

बीसीपीएल वित्त वर्ष 2024–25 (31 मार्च 2025 तक) में 113: क्षमता पर प्रचालित हुई। गेल (इंडिया) लिमिटेड बीसीपीएल उत्पादों का मुख्य विपणक है। कंपनी ने बांग्लादेश के अलावा भूटान में भी अपने उत्पादों की बिक्री बढ़ाई है। वित्त वर्ष 2024–25 में कंपनी का राजस्व ₹3579.20 करोड़ और शुद्ध लाभ ₹15.64 करोड़ रहा। 31 मार्च 2025 तक कंपनी की कुल संपत्ति ₹3018. 24 करोड़ थी। वर्तमान में दो परियोजनाएँ–ब्यूटेन–1 और द्वितीय चरण हाइड्रोजनीकृत पायरो गैसोलीन–निर्माणाधीन हैं, जिनकी संशोधित लागत ₹817.92 करोड़ है और ये यांत्रिक रूप से अगस्त 2025 तक पूरी हो जाएँगी।

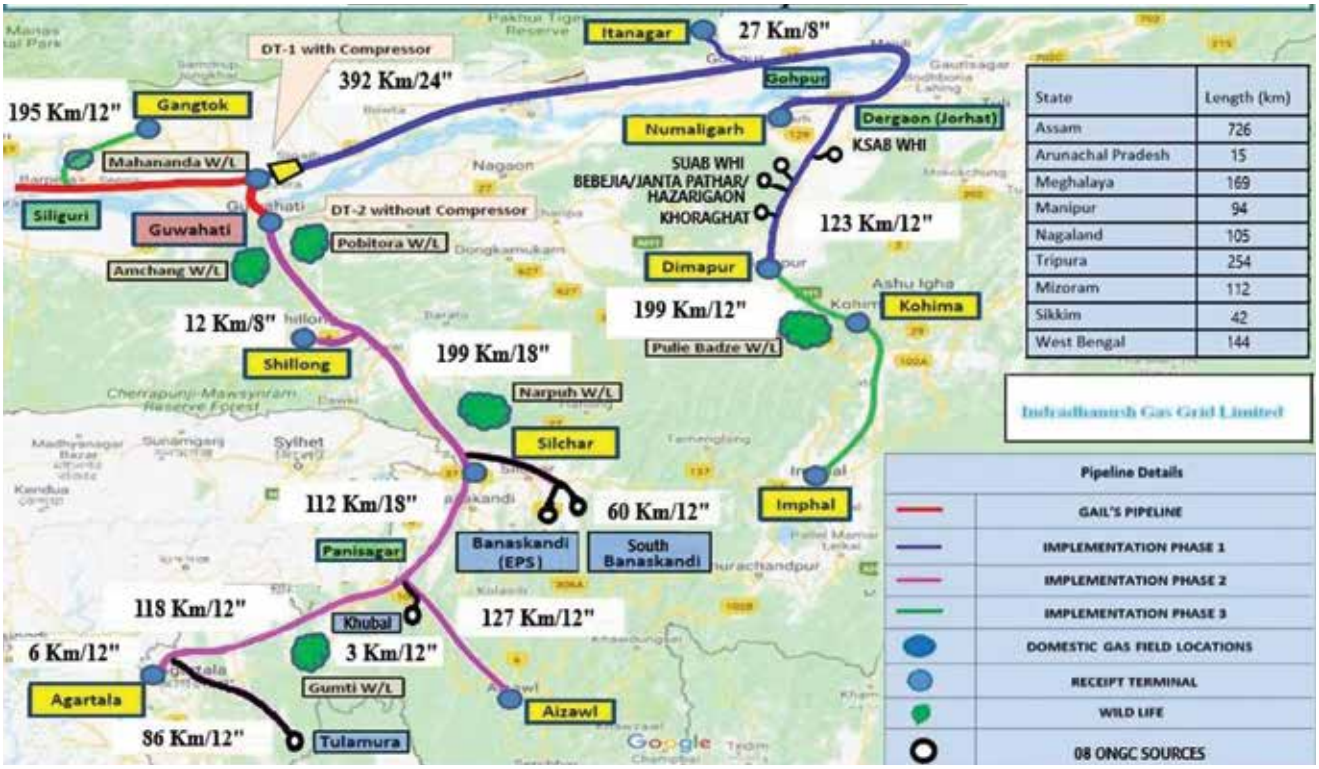
12.4.3 इंद्रधनुष गैस ग्रिड लिमिटेड (आईजीजीएल):

आईओसीएल, ओएनजीसी, गेल, ओआईएल और एनआरएल के संयुक्त उद्यम इन्द्रधनुष गैस ग्रिड लिमिटेड (आईजीजीएल) को 10 अगस्त 2018 को पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय (एमओपीएंडएनजी) द्वारा वर्ष 2016 में जारी किए गए पूर्वोत्तर भारत के लिए हाइड्रोकार्बन विजन 2030 के अनुरूप उत्तर पूर्व गैस ग्रिड (एनईजीजी) परियोजना के कार्यान्वयन के लिए 20% के बराबर इक्विटी योगदान के साथ शामिल किया गया था।

पूर्वोत्तर भारत के लिए हाइड्रोकार्बन विजन 2030 के अनुसार, एनईजीजी की स्थापना आठ पूर्वोत्तर राज्यों–असम, अरुणाचल प्रदेश, मेघालय, मणिपुर, मिजोरम, नागालैंड, त्रिपुरा और सिक्किम–के राजधानियों और प्रमुख मांग केंद्रों के साथ–साथ पूर्वोत्तर के क्षेत्रीय गैस स्रोतों को गेल की बरौनी–गुवाहाटी गैस पाइपलाइन के माध्यम से राष्ट्रीय गैस ग्रिड से जोड़ने के लिए की जा रही है।

एमएमएससीएमडी क्षमता वाली 1670 किलोमीटर लंबी प्राकृतिक गैस पाइपलाइन ग्रिड, एनईजीजी, ₹9265 करोड़ की अनुमानित परियोजना लागत से क्रियान्वित की जा रही है। दिनांक 31.03.2025 की स्थिति के अनुसार, एनईजीजी ने 84.39% की भौतिक प्रगति हासिल कर ली है। पूर्वोत्तर भारत में गैस आधारित अर्थव्यवस्था के विकास हेतु कार्य निष्पादन में आने वाली कठिनाइयों के आधार पर इस परियोजना को तीन चरणों में क्रियान्वित किया जा रहा है।

चित्रः उत्तर पूर्व गैस ग्रिड (एनईजीजी) का रूट मानचित्र



24'' x 392 किलोमीटर गुवाहाटी–नुमालीगढ़ खंड (मैदानी कृषि भूभाग वाले खंड) चालू होने के लिए तैयार है और इस खंड के 200 किलोमीटर हिस्से को चालू करने के लिए पीईएसओ की मंजूरी का इंतजार है। चरण–। के शेष खंडों के जुलाई 2025 तक पूरा होने की उम्मीद है। चरण–।। (पहाड़ी इलाकों में खंड) और चरण–।।। (पहाड़ी इलाकों में खंड और राजमार्ग की चौड़ाई बढ़ाने से जुड़ी पाइपलाइन बिछाने की व्यवहार्यता) क्रमशः मार्च 2026 और मार्च 2027 तक पूरा होने की उम्मीद है।

एनईजीजी परियोजना रणनीतिक रूप से महत्वपूर्ण है। इसके कार्यान्वयन से पूर्वोत्तर क्षेत्र के उपभोक्ताओं, जैसे औद्योगिक और शहरी गैस वितरण नेटवर्क, को विश्वसनीय और लगातार प्राकृतिक गैस की आपूर्ति सुनिश्चित होगी। एनईजीजी से क्षेत्र के औद्योगिक और आर्थिक विकास को बढ़ावा मिलने की उम्मीद है और साथ ही यह पर्यावरण संरक्षण और पूर्वोत्तर में गैस आधारित अर्थव्यवस्था के विकास के लिए सरकार के प्रयासों को भी मजबूत करेगा।

12.5 पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के अधीन संगठनः

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय (एमओपीएनजी) के अंतर्गत स्वायत्त निकाय तेल एवं गैस क्षेत्र के विशिष्ट पहलुओं, जैसे अन्वेषण, उत्पादन, शोधन और वितरण, के विनियमन और निगरानी में महत्वपूर्ण भूमिका निभाते हैं। वे इन गतिविधियों से संबंधित नीतियों और नियमों पर सरकार को सलाह भी देते हैं। हाइड्रोकार्बन महानिदेशालय (डीजीएच) जैसे निकायों की जिम्मेदारी होती है कि वे पेट्रोलियम क्षेत्र के विभिन्न पहलुओं की निगरानी करें और सरकार को उचित सुझाव दें।

12.5.1 तेल उद्योग विकास बोर्ड (ओआईडीबी):

तेल उद्योग विकास बोर्ड (ओआईडीबी) की स्थापना 13 जनवरी 1975 को तेल उद्योग (विकास) अधिनियम, 1974 के तहत की गई थी। इसका उद्देश्य तेल उद्योग के विकास के लिए वित्तीय और अन्य सहायता प्रदान करना है। अधिनियम की धारा 6 के अनुसार, बोर्ड का कार्य तेल उद्योग के विकास से

जुड़ी सभी गतिविधियों को बढ़ावा देने के लिए ऋण और अनुदान जैसी वित्तीय मदद देना है।

12.5.1.1 संगठनात्मक अवसंरचना: तेल उद्योग विकास बोर्ड में सचिव, पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय, अध्यक्ष के रूप में और अन्य सदस्य अर्थात सचिव, रसायन और पेट्रोरसायन विभाग, अपर सचिव एवं वित्तीय सलाहकार, पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय, संयुक्त सचिव (पीएफसी–I), व्यय विभाग, वित्त मंत्रालय, संयुक्त सचिव (अन्वेषण), पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय, अध्यक्ष–आईओसीएल, अध्यक्ष एवं प्रबंध निदेशक–ओएनजीसी लिमिटेड, गेल, बीपीसीएल, ईआईएल, महानिदेशक, हाइड्रोकार्बन महानिदेशालय, निदेशक (आरएंडडी), आईओसीएल और सचिव, तेल उद्योग विकास बोर्ड सदस्य सचिव के रूप में शामिल हैं।

12.5.1.2 बोर्ड के संसाधन: अधिनियम के तहत निर्धारित विभिन्न गतिविधियों के लिए आवश्यक धनराशि केंद्र सरकार द्वारा संसद की मंजूरी के बाद स्वदेशी कच्चे तेल पर लगाए गए उपकर की आय से दी गई थी। अब तक तेल उद्योग विकास बोर्ड (ओआईडीबी) को केंद्र सरकार से 1991–92 तक ₹902.40 करोड़ की राशि प्राप्त हुई है, जो दिनांक 31.03.2025 तक आंतरिक आय के माध्यम से बढ़कर लगभग ₹12,184.50 करोड़ (अनुमानित) हो गई है।

12.5.1.3 निधियों का उपयोग

i) **अनुदान:** वित्त वर्ष 2024–25 के दौरान, ओआईडीबी ने नियमित अनुदान प्राप्त करने वाले संस्थानों – जैसे हाइड्रोकार्बन महानिदेशालय (डीजीएच), उच्च प्रौद्योगिकी केंद्र (सीएचटी), तेल उद्योग सुरक्षा निदेशालय (ओआईएसडी) और पेट्रोलियम योजना और विश्लेषण प्रकोष्ठ (पीपीएसी) को सहायता दी। इसके अलावा, ओआईडीबी ने अपनी पूर्ण स्वामित्व वाली सहायक कंपनी, इंडियन स्ट्रैटेजिक पेट्रोलियम रिजर्व लिमिटेड (आईएसपीआरएल) को एसपीआर के चरण–II से पहले की गतिविधियों के लिए भी सहायता प्रदान की। कुल मिलाकर, 31 मार्च 2025 तक ₹264.13 करोड़ का अनुदान जारी किया गया।

ii) **ऋण:** वित्त वर्ष 2024–25 में, 31 मार्च 2025 तक, ओआईडीबी ने इंद्रधनुष गैस ग्रिड लिमिटेड (आईजीजीएल), ब्रह्मपुत्र क्रैकर एंड पॉलिमर लिमिटेड (बीसीपीएल) और हिंदुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड (एचपीसीएल) को ऋण के रूप में ₹685 करोड़ की वित्तीय सहायता दी गई। सार्वजनिक क्षेत्र के तेल उपक्रमों को ऋण के लिए ओआईडीबी का बजट आवंटन 2024–25 (संशोधित अनुमान) में ₹785 करोड़ तय किया गया है।

iii) **इक्विटी:** ओआईडीबी की पूर्ण स्वामित्व वाली सहायक कंपनी, इंडियन स्ट्रेटेजिक पेट्रोलियम रिज़र्व्स लिमिटेड (आईएसपीआरएल) को तीन स्थानों पर कच्चे तेल के लिए रणनीतिक भंडारण के निर्माण का कार्य सौंपा गया है। ओआईडीबी ने अब तक चरण–I के तहत विशाखापत्तनम, मैंगलोर और पादुर में क्रूड कैवर्न परियोजनाओं की स्थापना हेतु पूंजीगत लागत के लिए आईएसपीआरएल में इक्विटी निवेश के रूप में ₹3790.05 करोड़ की राशि जारी की है। इसके अतिरिक्त, चरण–II एसपीआर के लिए परियोजना–पूर्व गतिविधियों हेतु अनुदान के रूप में आईएसपीआरएल को अब तक ₹22.42 करोड़ की राशि भी प्रदान की गई है।

iv) **अग्रिम:** ओआईडीबी ने अंडमान के अपतटीय क्षेत्रों में भूकंपीय सर्वेक्षण और ईईजेड के मूल्यांकित न किए गए – अपतटीय बेसिन क्षेत्रों के मूल्यांकन हेतु हाइड्रोकार्बन महानिदेशालय (डीजीएच) को ₹965.69 करोड़ का कुल ब्याज–मुक्त वापसी योग्य अग्रिम प्रदान किया था। इसके अतिरिक्त, ओआईडीबी ने आरजीआईपीटी को ₹50 करोड़ और आईएसपीआरएल को ₹121.46 करोड़ का वसूली योग्य अग्रिम भी प्रदान किया है। ओआईडीबी ने अंडमान के अपतटीय क्षेत्रों में भूकंपीय सर्वेक्षण और देश के मूल्यांकित न किए गए अपतटीय बेसिन क्षेत्रों के अध्ययन के लिए हाइड्रोकार्बन महानिदेशालय (डीजीएच) को ₹965.69 करोड़ ब्याज–मुक्त अग्रिम ऋण के रूप में प्रदान किया था। इसके अलावा, ओआईडीबी ने आरजीआईपीटी को ₹50 करोड़ और आईएसपीआरएल को ₹121.46 करोड़ का अग्रिम ऋण भी प्रदान किया है।

12.5.1.4 तेल उद्योग विकास बोर्ड की स्वर्ण जयंती: 13 जनवरी को, तेल उद्योग विकास बोर्ड (ओआईडीबी) ने अपने 50 वर्ष पूरे कर लिए हैं। अपने स्वर्ण जयंती समारोह के उपलक्ष्य में, ओआईडीबी ने विभिन्न गतिविधियों

का आयोजन किया, जैसे वृक्षारोपण, आईसीएमएआई के सहयोग से दो दिवसीय प्रशिक्षण कार्यक्रम, हाइड्रोकार्बन क्षेत्र कौशल परिषद के सहयोग से कौशल विकास एवं ध्यान कार्यशाला और स्वास्थ्य जागरूकता कार्यक्रम। 13 जनवरी 2025 को अपने स्थापना दिवस पर, ऑयल इंडिया लिमिटेड के सहयोग से" फ्यूलिंग फ्यूचर एनर्जी" नामक कार्यशाला का आयोजन किया गया।

12.5.2 तेल उद्योग सुरक्षा निदेशालय (ओआईएसडी):

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के अंतर्गत तकनीकी निदेशालय, तेल उद्योग सुरक्षा निदेशालय (ओआईएसडी) को मानक तैयार करने और सुरक्षा ऑडिट के माध्यम से उनके कार्यान्वयन की निगरानी की ज़िम्मेदारी सौंपी गई है ताकि सुरक्षा स्तर को बढ़ाया जा सके और इस उद्योग में निहित जोखिम को कम किया जा सके। ओआईएसडी मानकों को तेल एवं गैस कंपनियों द्वारा स्व–नियामक आधार पर लागू किया जाता है।

पेट्रोलियम और प्राकृतिक गैस (अपतटीय प्रचालन में सुरक्षा) नियम, 2008 को भारत के राजपत्र में अधिसूचित किया गया था; और ओआईएसडी को जून 2008 में जारी राजपत्र अधिसूचना के अनुसार इन नियमों, 2008 में निर्धारित शक्तियों और कार्यों का प्रयोग करने के लिए सक्षम प्राधिकारी के रूप में नामित किया गया है। निदेशालय, इन नियमों के तहत, अंतरराष्ट्रीय मानकों और लक्ष्य निर्धारण के तरीके के अनुसार अपतटीय प्रतिष्ठानों के प्रचालन की अनुमति देता है।

12.5.2.1 वित्त वर्ष 2024–25 के दौरान ओआईएसडी की मुख्य विशेषताएं और पहल:

क. ओआईडीबी के 'स्वर्ण जयंती'समारोह के दौरान माननीय पेट्रोलियम और प्राकृतिक गैस मंत्री द्वारा ओआईएसडी की नई वेबसाइट को 13 जनवरी 2025 को लॉन्च किया गया था।

ख. दीर्घकालिक सहयोग और रचनात्मक कार्य संबंध स्थापित करने और बढ़ाने के लिए 12 फरवरी 2025 को ओआईएसडी और एपीआई के बीच एक समझौता–ज्ञापन पर हस्ताक्षर किए गए।

ग. 41वीं सुरक्षा परिषद की बैठक में "हाइड्रोजन" पर नए मानक सहित 13 मानकों को संशोधित और अनुमोदित किया गया।

घ. आरआईएल, एचपीसीएल–विशाख रिफाइनरी, ओएनजीसी विदेश लिमिटेड, आईओसीएल रिफाइनरी और नयारा एनर्जी लिमिटेड के लिए संगठन/एसबीयू स्तर की सुरक्षा प्रणाली लेखा परीक्षा आयोजित की गई।

ङ. ओआईएसडी ने 11 कार्यक्रमों के माध्यम से आंतरिक लेखा परीक्षकों के लिए प्रमाणन प्रशिक्षण शुरू किया। इस प्रशिक्षण में 252 प्रतिभागियों ने भाग लिया, जिससे 63 लाख रुपए का राजस्व प्राप्त हुआ।

च. ओआईएसडी द्वारा बीपीसीएल के सहयोग से गोवा में दूसरा सुरक्षा सम्मेलन आयोजित किया गया जिसमें कंपनियों के 140 प्रतिनिधियों ने भाग लिया।

छ. ओआईएसडी ने 9001 और 14001 (19), 45001 (12), हैजोप और क्यूआरए (30) का आयोजन किया है। इन प्रशिक्षण कार्यक्रमों के दौरान 61 अधिकारियों को शामिल किया गया।

ज. आईएमडी से प्राप्त जानकारी का उपयोग करते हुए चक्रवात जैसी प्राकृतिक आपदाओं की निगरानी की। पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय और अन्य हितधारकों को प्रतिदिन दो बार 67 एसआईटीआरईपी जारी किए।

झ. संसदीय राजभाषा समिति की प्रथम उप–समिति के समन्वयन एवं राजभाषा निष्पादन के लिए "उत्कृष्ट" प्रमाण–पत्र प्रदान किया गया।

12.5.2.2 वित्त वर्ष 2024–25 में ओआईएसडी द्वारा सुरक्षा ऑडिट:

ओआईएसडी समय–समय पर तटीय और अपतटीय ईएंडपी प्रतिष्ठानों, रिफाइनरी, गैस प्रोसेसिंग संयंत्र, केंद्रीय टैंक फार्म, एलएनजी टर्मिनल, पेट्रोकेमिकल संयंत्र, क्रॉस कंट्री पाइपलाइन, एलपीजी बॉटलिंग संयंत्र, एलपीजी आयात सुविधा, डिपो, टर्मिनल, विमानन ईंधन स्टेशन और ल्यूब ब्लेंडिंग संयंत्र के लिए बाह्य सुरक्षा ऑडिट (ईएसए) करता है ताकि ओआईएसडी मानकों और सांविधिक नियमों के साथ उनके अनुपालन स्तर की निगरानी की जा सके। वित्त वर्ष 2024–25 में ओआईएसडी सुरक्षा ऑडिट का लेखा–जोखा नीचे दिया गया है:

प्रकार/स्थापना	यूनिट	वित्तीय वर्ष 2023–24	वित्त वर्ष 2024–25	
			योजना	वास्तविक
रिफाइनरी/पेट्रोकेमिकल/जीपीपी/सीटीएफ/ एलएनजी टर्मिनल	सं.	29	26	28
विपणन स्थापना (पीओएल)	सं.	80	79	80
विपणन स्थापना (एलपीजी)	सं.	48	46	48
ईएंडपी तटीय	सं.	115	110	130
ईएंडपी अपतटीय	सं.	28	25	36
कॉर्पोरेट/एसबीयू स्तर पर सुरक्षा ऑडिट	सं.	05	05	05
निर्माण (पीएल)/ बंदरगाह/एसपीएम लेखा परीक्षा	सं.	11	03	04
आईसीजी के साथ तेल रिसाव आपातकालीन तैयारी का संयुक्त निरीक्षण	सं.	06	06	08
कुल योग	सं.	322	300	339
क्रॉस कंट्री पाइपलाइन	कि.मी.	12362	12000	13373

12.5.2.3 कमीशनिंग–पूर्व सुरक्षा ऑडिट:

ओआईएसडी, निर्माण चरण में ही सांविधिक आवश्यकताओं और ओआईएसडी मानकों का अनुपालन सुनिश्चित करने के लिए, ग्रीन–फील्ड विकास परियोजनाओं और मौजूदा स्थानों पर प्रमुख अतिरिक्त सुविधाओं के लिए प्री–कमीशनिंग सुरक्षा ऑडिट करता है। वित्त वर्ष 2024–25 के दौरान किए गए पीसीएसए की स्थिति इस प्रकार है:

प्री–कमीशनिंग सुरक्षा ऑडिट (पीसीएसए)	यूनिट	2023-24	2024-25
रिफाइनरी/पेट्रोकेमिकल/जीपीपी/सीटीएफ /एलएनजी टर्मिनल	सं.	18	16
विपणन स्थापना (पीओएल)	सं.	17	23
विपणन स्थापना (एलपीजी)	सं.	10	06
ईएंड पी क्षेत्र	सं.	01	00
पाइपलाइन स्थान (पाइपलाइन की लंबाई कि.मी. में)	सं. (कि.मी.)	17 (1701.7)	10 (1180.92 कि.मी.)
कुल	सं.	63	55

12.5.2.4 अपतटीय प्रतिष्ठानों के लिए 'प्रचालन की सहमति':

पेट्रोलियम एवं प्राकृतिक गैस (अपतटीय प्रचालनों में सुरक्षा) नियम, 2008 के पालन की निगरानी करने के लिए, ओआईएसडी सक्षम प्राधिकारी के रूप में अपतटीय प्रतिष्ठानों को 'प्रचालन की सहमति' प्रदान करता है। वित्त वर्ष 2024–25 की स्थिति इस प्रकार है:

प्रचालन हेतु सहमति प्रदान करना (सीटीओ)–अपतटीय	यूनिट	2023-24	2024-25
निश्चित अपतटीय स्थापना	सं.	04	02
अस्थायी अपतटीय स्थापना	सं.	15	04
कुल	सं.	19	06

12.5.2.5 ओआईएसडी सुरक्षा मानकों में संशोधनः ओआईएसडी, समिति के सदस्यों के अनुभव और अंतर्राष्ट्रीय मानकों का उपयोग करते हुए, सभी हितधारकों को शामिल करके तेल और गैस उद्योग के लिए मानक तैयार करता है। ये मानक उद्योग में डिज़ाइन सुरक्षा, परिसंपत्ति अखंडता और सर्वोत्तम प्रचालन प्रथाओं को कवर करते हैं। नए मानक बनाने और वर्तमान मानकों को अद्यतन/संशोधित करने के लिए ओआईएसडी समय–समय पर अपने मानकों की समीक्षा करता है, ताकि नवीनतम तकनीकी विकास और जमीनी अनुभवों को शामिल किया जा सके।

ओआईएसडी ने तेल एवं गैस उद्योग के लिए 109 तकनीकी सुरक्षा मानक विकसित किए हैं। इनमें से 23 मानक पेट्रोलियम नियम, 2002, गैस सिलेंडर नियम, 2016, स्थैतिक एवं मोबाइल प्रेशर वेसल्स (अनफायर्ड) नियम, 2016, तेल खनिक विनियम (ओएमआर) 2017 और पीएनजीआरबी विनियमों के सांविधिक प्रावधानों में शामिल हैं।

संशोधन के बाद ओआईएसडी मानकों और 'हाइड्रोजन सुरक्षा' पर एक नए मानक को 41वीं सुरक्षा परिषद द्वारा 21 मई 2024 को अनुमोदित कर उद्योग के लिए जारी कर दिया गया। इसके अलावा, उद्योग द्वारा कार्यान्वयन में आसानी के लिए मानकों के विलय के कारण 11 ओआईएसडी मानकों को वापस ले लिया गया।

12.5.2.6 प्रशिक्षण/तकनीकी सेमिनार/सम्मेलन/कार्यशालाएं: नवीनतम तकनीकी विकास, केस स्टडी आदि पर चर्चा करने के लिए ओआईएसडी द्वारा तेल एवं गैस उद्योग के लिए प्रशिक्षण/तकनीकी सेमिनार/सम्मेलन/कार्यशालाएं आयोजित की जाती हैं।

ओआईएसडी ने वित्त वर्ष 2024–25 के दौरान 11 'आंतरिक लेखा परीक्षक प्रशिक्षण', 12 सुरक्षा संवाद, एक सुरक्षा सम्मेलन और अन्य प्रशिक्षण, कार्यशालाएँ आयोजित कीं। इन कार्यक्रमों में कुल 5132 प्रतिभागियों ने भाग लिया।

उद्योग जगत के अधिकारियों के 'लेखा परीक्षा कौशल' को बढ़ाने के लिए ओआईएसडी द्वारा वित्त वर्ष 2024–25 के दौरान आंतरिक लेखा परीक्षकों के लिए प्रमाणन प्रशिक्षण शुरू किया गया। वित्त वर्ष 2024–25 के दौरान ऐसे 11 प्रशिक्षण आयोजित किए गए। विभिन्न तेल एवं गैस उद्योगों के कुल 252 आंतरिक लेखा परीक्षकों को प्रशिक्षित किया गया।

वित्त वर्ष 2024–25 के दौरान, ओआईएसडी ने 12 'सुरक्षा संवाद' वेबिनार आयोजित किए, जिनमें ओआईएसडी द्वारा जांच की गई दुर्घटनाओं के केस स्टडी, अंतर्राष्ट्रीय केस स्टडी, सर्वोत्तम प्रथाओं और संशोधित ओआईएसडी मानकों की मुख्य विशेषताओं आदि सहित विभिन्न विषयों पर 4270 प्रतिभागियों को शामिल किया गया।

23 से 24 अक्टूबर 2024 तक गोवा में बीपीसीएल के सहयोग से दूसरा सुरक्षा सम्मेलन आयोजित किया, जिसमें 18 कंपनियों के 140 प्रतिनिधियों ने भाग लिया।

आईआईटी (आईएसएम), धनबाद के सहयोग से 'तेल एवं गैस उद्योग में सुरक्षा' विषय पर कार्यशाला का आयोजन किया। ओएनजीसी, मुंबई में 'पेट्रोलियम एवं प्राकृतिक गैस नियम' विषय पर एक कार्यशाला का भी आयोजन किया गया।

2024–25 के दौरान ओआईएसडी अधिकारियों के लिए 5 आंतरिक ज्ञान साझा सत्र आयोजित किए गए और 2 सुरक्षा चेतना पत्रिका प्रकाशित की गईं।

12.5.2.7 सुरक्षा परिषदः सुरक्षा पर सर्वोच्च निकाय, सुरक्षा परिषद ने 21 मई 2024 को सचिव, पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय की अध्यक्षता में अपनी 41वीं बैठक में सुरक्षा निष्पादन की समीक्षा की। बैठक के दौरान स्वीकृत और/या विचार–विमर्श किए गए प्रमुख मुद्दे निम्नलिखित हैं:

- 2023–24 में ओआईएसडी की प्रमुख गतिविधियाँ और 2024–25 के लिए गतिविधियों की योजना
- दो वर्षों से अधिक समय से लंबित ओआईएसडी सुरक्षा लेखा परीक्षा सिफारिशों की अनुपालन स्थिति और उसकी समस्या वाले क्षेत्रों की समीक्षा।
- 12 संशोधित एवं 1 नए ओआईएसडी मानक को मंजूरी दी गई तथा 11 मानकों को वापस लिया गया।
- असम में बाघजान विस्फोट घटना से संबंधित एचएलसी की सिफारिशों का अनुपालन।

- तौकते घटना से संबंधित एचएलसी की सिफारिशों का अनुपालन।
- आंतरिक लेखा परीक्षक प्रशिक्षण के लिए उपयोगकर्ता शुल्क का अनुमोदन।
- वित्त वर्ष 23–24 के लिए संशोधित बजट अनुमान और वित्त वर्ष 24–25 के लिए बजट अनुमान को अनुमोदन।
- वित्त वर्ष 2023–24 के लिए बजट बनाम वास्तविक व्यय।
- वित्त वर्ष 2023–24 के लिए ओआईएसडी के वार्षिक लेखापरीक्षित खातों को अपनाना।
- 2024–25, 2025–26 और 2026–27 (तीन वर्ष) के लिए लेखा परीक्षक की नियुक्ति
- मई 2025 से 3 वर्ष के लिए राजभाषा अधिकारी की नियुक्ति को मंजूरी।
- दुर्घटना/घटना विश्लेषण।

12.5.2.8 घटना की जांच और विश्लेषण: ओआईएसडी प्रमुख घटनाओं की जाँच कर उनके मूल कारणों का विश्लेषण करता है। तेल और गैस उद्योग की महत्वपूर्ण घटनाओं का एक डेटाबैंक रखा जाता है, जिसे रुझानों, चिंता के क्षेत्रों और आवश्यक सुधारात्मक कार्रवाई का आकलन करने के लिए विश्लेषित किया जाता है। इसके बाद, इस जानकारी को आवधिक बुलेटिन 'सुरक्षा चेतना', सुरक्षा चेतावनियाँ, केस स्टडीज़, सेमिनार और कार्यशालाओं के माध्यम से उद्योग तक पहुँचाया जाता है।

वित्त वर्ष 2024–25 में, ओआईएसडी ने 19 प्रमुख घटनाओं की जाँच की और उनके मूल कारणों का विश्लेषण कर सिफारिशों सहित रिपोर्ट जारी की। इसके अलावा, ओआईएसडी ने तेल और गैस उद्योग के लिए 8 सुरक्षा अलर्ट और 17 केस स्टडीज़ अपनी वेबसाइट पर अपलोड की हैं।

12.5.3 हाइड्रोकार्बन महानिदेशालय (डीजीएच):

हाइड्रोकार्बन महानिदेशालय (डीजीएच) की स्थापना 8 अप्रैल, 1993 को भारत में पेट्रोलियम और प्राकृतिक गैस संसाधनों के प्रभावी और संतुलित प्रबंधन को बढ़ावा देने के लिए की गई थी। इसका उद्देश्य पर्यावरण के संरक्षण के साथ–साथ पेट्रोलियम गतिविधियों के तकनीकी और आर्थिक पहलुओं का संतुलित ध्यान रखना है। डीजीएच की भूमिका और कार्यों में मुख्य रूप से निम्नलिखित शामिल हैं:

- पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय की ओर से अन्वेषण एवं उत्पादन गतिविधियों के कार्यान्वयन के लिए एक नोडल एजेंसी।
- अन्वेषण रणनीतियों और उत्पादन नीतियों पर पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय को सलाह देना।
- देश में हाइड्रोकार्बन के अन्वेषण और इष्टतम दोहन से संबंधित मुद्दों पर पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय को तकनीकी सलाह प्रदान करना।
- तेल क्षेत्र (विनियमन और विकास) अधिनियम, 1948 और पेट्रोलियम एवं प्राकृतिक गैस नियम, 1959 के तहत प्रदत्त पेट्रोलियम अन्वेषण लाइसेंस के अंतर्गत कार्यरत कम्पनियों के अन्वेषण कार्यक्रमों की समीक्षा करना तथा इन कार्यक्रमों की पर्याप्तता के संबंध में सरकार को सलाह देना।
- प्रचालन कम्पनियों द्वारा खोजे गए और अनुमानित हाइड्रोकार्बन भंडार का मूल्यांकन करना।
- कम्पनियों को अन्वेषण के लिए भूमि की पेशकश के साथ–साथ कम्पनियों द्वारा भूमि को छोड़ने से संबंधित मामलों पर सरकार को सलाह देना।
- प्रचालन कंपनियों द्वारा प्रस्तावित हाइड्रोकार्बन भंडारों की वाणिज्यिक खोजों के लिए विकास योजनाओं की समीक्षा करना तथा ऐसी योजनाओं की पर्याप्तता और प्रस्तावित दोहन दरों तथा उससे संबंधित मामलों पर सरकार को सलाह देना।
- प्रचालन कंपनियों द्वारा पेट्रोलियम भंडारों के प्रबंधन की नियमित समीक्षा और लेखा–परीक्षा करना, तथा भंडारों का अधिकतम उपयोग और संसाधनों के संरक्षण के लिए मजबूत भंडार प्रबंधन प्रथाओं को लागू करने हेतु आवश्यक सुधारों पर सलाह देना।
- पेट्रोलियम अन्वेषण, ड्रिलिंग, रिजर्वायरों के उत्पादन आदि से संबंधित डेटा और नमूनों के संरक्षण, रखरखाव और भंडारण को विनियमित करना तथा कंपनियों को

प्रस्तावित क्षेत्रफल के लिए डेटा पैकेज तैयार करना।

- इससे संबंधित सभी अन्य मामले तथा ऐसे अन्य कार्य जो सरकार द्वारा समय–समय पर सौंपे जाएं।
- अनुबंध प्रबंधन कार्यों में सरकार की सहायता करना।
- गैस हाइड्रेट, शेल गैस/तेल और ऑयल शेल जैसे अपरंपरागत हाइड्रोकार्बन संसाधनों की खोज और विकास करना।

12.5.3.1 भारत के ईएण्डपी क्षेत्र में सरकारी पहलः सरकार ने खोजे गए छोटे क्षेत्र (डीएसएफ) नीति, कोल बेड मीथेन (सीबीएम) नीति, तथा हाइड्रोकार्बन अन्वेषण लाइसेंसिंग नीति (एचईएलपी) आदि जैसी पहलों के माध्यम से ईएण्डपी क्षेत्र को छोटे और नए प्रवेशकों सहित व्यापक श्रेणी के लोगों के लिए खोल दिया है।

बढ़ी हुई अन्वेषण गतिविधियाँ नए हाइड्रोकार्बन भंडार खोजने की संभावनाओं को बढ़ाती हैं, जिससे उत्पादन क्षमता में वृद्धि होती है। पहले से अनदेखे या कम अन्वेषित क्षेत्रों में प्रयास करने से महत्वपूर्ण तेल और गैस भंडार मिलने की संभावना बढ़ जाती है। यह न केवल ईएंडपी उद्योग के विकास में मदद करता है, बल्कि देश की ऊर्जा आवश्यकताओं को अधिक प्रभावी ढंग से पूरा करने में भी सहायक होता है। देश में अन्वेषण गतिविधियों को बढ़ावा देने के लिए सरकार ने 3 जनवरी 2024 को ओएएलपी बोली राउंड–IX लॉन्च किया। इस राउंड में अंतरराष्ट्रीय प्रतिस्पर्धी बोली के माध्यम से लगभग 1,36,596 वर्ग कि.मी. क्षेत्र में 28 ब्लॉकों की पेशकश की गई थी। इनमें कुल 9 (नौ) तटीय ब्लॉक, 8 (आठ) उथले पानी के ब्लॉक और 11 (ग्यारह) अत्यधिक गहरे–पानी के ब्लॉक शामिल थे। बोली दौर में तीन (3) सार्वजनिक और चार (4) निजी पक्षों सहित कुल सात (7) बोलीदाताओं ने भाग लिया। बोली का मूल्यांकन पूरा हो चुका है और जल्द ही ब्लॉक आवंटित किए जाएंगे। इससे देश में अन्वेषण गतिविधियों को महत्वपूर्ण बढ़ावा मिलने की उम्मीद है।

भारत के अन्वेषण एवं उत्पादन (ईएंडपी) क्षेत्र का विस्तार करने की दिशा में एक महत्वपूर्ण कदम के तहत, माननीय पेट्रोलियम एवं प्राकृतिक गैस मंत्री ने 11 फ़रवरी, 2025 को नई दिल्ली में। भारत ऊर्जा सप्ताह शिखर सम्मेलन में ओएएलपी–एक्स बोली दौर का शुभारंभ किया। इस दौर में 13 तलछटी घाटियों में फैले 25 ब्लॉक, जिनका कुल क्षेत्रफल 1,91,986.21 वर्ग किलोमीटर है, प्रस्तावित हैं। इनमें अपतटीय क्षेत्रों पर विशेष ध्यान दिया गया है (19 ब्लॉक जिनका क्षेत्रफल 1,75,115 वर्ग किलोमीटर है) और साथ ही 6 तटीय ब्लॉक (16,871 वर्ग कि.मी.) भी शामिल हैं। इसके अलावा, उल्लेखनीय रूप से, 16 ब्लॉक, जिनका क्षेत्रफल 97,919 वर्ग कि.मी. (51%) है, उन क्षेत्रों में आते हैं जिन्हें पहले "निषेध" क्षेत्र के रूप में नामित किया गया था।

इसके अतिरिक्त, ओएएलपी चरण X के लिए, पारदर्शिता और सुरक्षा बढ़ाने हेतु एक नया ई–बोली पोर्टल शुरू किया गया है, साथ ही निवेशकों के लिए व्यापार करने में आसानी को बेहतर बनाने के लिए डिज़ाइन की गई विशेषताएं भी शामिल की गई हैं।

सरकारी प्रोत्साहन, जैसे कर में छूट और श्रेणी–II एवं III के लिए कोई राजस्व नहीं, घरेलू उत्पादन को अधिक व्यवहार्य और किफायती बनाएंगे। इसके अलावा, एचईएलपी के तहत सुव्यवस्थित नियमन और एकल लाइसेंस प्रणाली लागू करने से प्रक्रियाओं में देरी कम होगी और खोजे गए संसाधनों के उपयोग (मुद्रीकरण) की गति बढ़ेगी।

शीघ्र मुद्रीकरण योजना खोज के तुरंत लाभ उठाने में मदद करेगी और घरेलू तेल व गैस उत्पादन बढ़ाएगी।

इसके अलावा, ईआर (संवर्धित रिकवरी) नीति मौजूदा क्षेत्रों से तेल की अधिकतम रिकवरी सुनिश्चित करने के लिए ईओआर (संवर्धित तेल रिकवरी) और आईओआर (उन्नत तेल रिकवरी) तकनीकों के इस्तेमाल को बढ़ावा देगी।

अपतटीय क्षेत्र में लगभग 10 लाख वर्ग किलोमीटर 'निषेध' क्षेत्र को मुक्त किया गया है जो दशकों से अन्वेषण के लिए बंद थे। इन पूर्ववर्ती 'निषेध' क्षेत्रों में, अब तक (प्रदान किए गए, प्रदान किए जाने वाले और अभिरुचि की अभिव्यक्ति के तहत प्राप्त क्षेत्रों सहित) 1,62,389 वर्ग किलोमीटर क्षेत्र को मुक्त किया गया है। हाल ही में ओएनजीसी ने महानदी अपतटीय क्षेत्र में दो गैस खोजें की हैं, जिनमें से एक ब्लॉक

का 94% क्षेत्र पहले 'निषेध' क्षेत्र में था। अंडमान अपतटीय क्षेत्र को भी लंबे समय बाद अन्वेषण और उत्पादन गतिविधियों के लिए खोल दिया गया है। अब तक ओएएलपी के तहत आवंटित ब्लॉकों में 14 हाइड्रोकार्बन खोजें हुई हैं, जिनमें से गुजरात का जया ब्लॉक पहले से ही 0.48 एमएमएससीएम/दिन प्राकृतिक गैस और 780 बैरल/दिन कंडेनसेट का उत्पादन कर रहा है।

सरकार भूमि और अपतटीय क्षेत्रों में भूकंपीय डेटा के अधिग्रहण और स्ट्रेटीग्राफिक कूपों की ड्रिलिंग के लिए लगभग 7500 करोड़ रुपए खर्च कर रही है, ताकि बोलीदाताओं को भारतीय तलछटी बेसिनों के गुणवत्ता वाले डेटा उपलब्ध कराए जा सकें।

भूमि पर 20,000 एलकेएम के 2डी भूकंपीय डेटा के अधिग्रहण के लिए मिशन अन्वेषण परियोजना और भारत के विशिष्ट आर्थिक क्षेत्र (ईईजेड) से परे अपतटीय में 30,000 एलकेएम भूकंपीय डेटा प्राप्त करने के लिए विस्तारित महाद्वीपीय शेल्फ सर्वेक्षण पहले ही शुरू हो चुका है और यह प्रगति पर है।

12.5.3.2 व्यापार में आसानी के लिए पहल: सरकार ने निवेश और उत्पादन को बढ़ावा देने के लक्ष्य के साथ, अन्वेषण और उत्पादन (ईएंडपी) क्षेत्र में व्यवसाय करने में आसानी को प्राथमिकता दी है। प्रक्रियाओं को सरल बनाने से एक पारदर्शी और कुशल प्रणाली बनती है, जो इस क्षेत्र में निवेश को बढ़ावा देती है।

डिजिटल क्रांति के इस युग में, सरकार सरकारी सेवाओं को तेज़ और प्रभावी बनाने के लिए प्रयास कर रही है। ईएंडपी क्षेत्र की पूरी कार्यप्रणाली को सरल और डिजिटल बनाने के लिए कई कदम उठाए गए हैं। पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय (एमओपीएनजी) के तहत डीजीएच ने 'स्व–प्रमाणन' जैसी पहल की है, जिससे प्रमुख प्रक्रियाओं और अनुमोदनों को जल्दी पूरा किया जा सके। इसके अलावा, उत्पादन हिस्सेदारी संविदा प्रबंधन प्रणाली, पेट्रोलियम अन्वेषण/ पेट्रोलियम खनन पट्टा डेटा प्रबंधन प्रणाली, उत्पादन डेटाबेस प्रबंधन प्रणाली, ई–बोली पोर्टल जैसे डिजिटल उपकरण भी शुरू किए गए हैं। ये उपकरण प्रचालकों को प्रचालन में सुविधा, पारदर्शी संविदा प्रबंधन, त्वरित अनुमोदन और निवेशकों से जुड़ने में मदद करते हैं।

12.5.4 उच्च प्रौद्योगिकी केंद्र (सीएचटी):

वर्ष 1987 में स्थापित, उच्च प्रौद्योगिकी केंद्र (सीएचटी) भारत सरकार के वैज्ञानिक और तकनीकी कार्यक्रमों के कार्यान्वयन के लिए पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के तकनीकी विंग के रूप में कार्य करता है। सीएचटी के प्रमुख कार्यों में निम्नलिखित शामिल हैं:

क. रिफाइनरियों, पेट्रोकेमिकल्स और पाइपलाइनों का निष्पादन बेंचमार्किंग।

ख. सर्वोत्तम प्रथाओं, विशेष अध्ययन, प्रचालन सुधार और प्रक्रिया प्रौद्योगिकी के माध्यम से रिफाइनरियों में निष्पादन सुधार।

ग. डाउनस्ट्रीम हाइड्रोकार्बन क्षेत्र में ऊर्जा दक्षता में सुधार।

घ. पेट्रोलियम उत्पाद गुणवत्ता सुधार।

ङ. भावी स्थिरता के लिए वैकल्पिक ऊर्जा के साथ एकीकरण और डाउनस्ट्रीम क्षेत्र में नई पहल।

च. हाइड्रोजन अनुसंधान सहित डाउनस्ट्रीम हाइड्रोकार्बन क्षेत्र में नवाचारों और अनुसंधान एवं विकास को बढ़ावा देना। पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय की हाइड्रोकार्बन पर वैज्ञानिक सलाहकार समिति (एसएसी) की गतिविधियों का समन्वय।

छ. आयात विकल्प ईंधन, रसायन और कैटेलिस्ट का विकास।

ज. प्रधानमंत्री जी–वन योजना और साईट–2बी के कार्यान्वयन के लिए नोडल एजेंसी।

झ. बायोमास एकत्रीकरण मशीनरी (बीएएम) की खरीद के लिए कंप्रेस्ड बायो गैस (सीबीजी) उत्पादकों को वित्तीय सहायता योजना के लिए नोडल एजेंसी।

ञ. सीबीजी संवर्धन के लिए प्रत्यक्ष पाइपलाइन अवसंरचना (डीपीआई) योजना के कार्यान्वयन के लिए नोडल एजेंसी।

ट. भारत के साथ भूमि सीमा साझा करने वाले देश से बोलीदाताओं के पंजीकरण के संबंध में डीपीआईआईटी से प्राप्त प्रस्तावों (अपस्ट्रीम के साथ–साथ मिडस्ट्रीम/ डाउनस्ट्रीम तेल पीएसयू से संबंधित) की जांच करने

और टिप्पणियां/सिफारिशें प्रस्तुत करने के लिए नोडल एजेंसी।

ठ. पेट्रोलियम और प्राकृतिक गैस मंत्रालय द्वारा अनुमोदन के लिए रिफाइनरियों द्वारा प्रस्तुत जीटीई आवेदनों की समीक्षा और सिफारिश।

ड. सर्वोत्तम प्रथाओं और सूचना एवं प्रसार को साझा करना।

12.5.4.1 निष्पादन बेंचमार्किंग:

1) **रिफ़ाइनरी बेंचमार्किंग:** सार्वजनिक क्षेत्र की रिफ़ाइनरियों की कार्यनिष्पादन बेंचमार्किंग, मैसर्स सोलोमन एसोसिएट्स (एसए), अमेरिका के माध्यम से सीएचटी द्वारा नियमित रूप से की जाती है। रिफ़ाइनरियों ने सुधार के विभिन्न क्षेत्रों की पहचान हेतु प्रत्येक 2 वर्ष में बेंचमार्किंग करने हेतु सोलोमन के साथ एक दीर्घकालिक समझौता किया है।

अध्ययन चक्र 2020 और 2022 के लिए सार्वजनिक क्षेत्र की रिफाइनरियों की निष्पादन बेंचमार्किंग पूरी हो चुकी है। चक्र 2024 के लिए रिफाइनरी निष्पादन बेंचमार्किंग अध्ययन प्रगति पर है। अध्ययन का पहला पड़ाव, अर्थात् डेटा समन्वयक संगोष्ठी, अक्तूबर 2024 में पूरी हुई।

2) **पाइपलाइन बेंचमार्किंग:** पाइपलाइनों (तरल, गैस, एलपीजी और एसपीएम) चक्र के लिए निष्पादन बेंचमार्किंग अध्ययन, 2020 चक्र के लिए पहली बार शुरू किया गया और 2022 चक्र के लिए अध्ययन पूरा हो गया है। अध्ययन के परिणाम भाग लेने वाले उद्योगों के साथ साझा किए गए हैं।

3) **पेट्रोकेमिकल बेंचमार्किंग:** पेट्रोकेमिकल (क्रैकर और पॉलिमर) बेंचमार्किंग इकाइयों के लिए वैश्विक निविदा गतिविधियां चल रही हैं।

12.5.4.2 रिफाइनरी निष्पादन सुधार: भारतीय रिफाइनरियों के निष्पादन को वैश्विक स्तर पर सर्वश्रेष्ठ रिफाइनरियों के बराबर लाने के लिए, ऊर्जा दक्षता सुधार, प्रचालन उपलब्धता, ओपेक्स में कमी आदि को लक्ष्य करके विभिन्न पहल की जा रही हैं, जिनका विवरण नीचे दिया गया है:

1) **पीएटी (निष्पादन, उपलब्धि और व्यापार):** पीएटी चक्र–2 में रिफाइनिंग क्षेत्र के लिए ऊर्जा बचत का लक्ष्य 5.49% तय किया गया था, जो लगभग 1.01 मिलियन टन तेल समतुल्य (टीओई) के बराबर है। इस लक्ष्य की तुलना में, रिफाइनरियों ने 8.05% ऊर्जा बचत हासिल की, जो 1.48 मिलियन टीओई के बराबर है। वर्तमान पीएटी चक्र–6 (2020–21 से 2022–23) के लिए भी 5.49% का क्षेत्रीय ऊर्जा बचत लक्ष्य रखा गया है, जो 1.17 मिलियन टीओई के बराबर है। इस चक्र के अंतर्गत रिफाइनरियों द्वारा प्राप्त ऊर्जा बचत को ऊर्जा दक्षता ब्यूरो (बीईई) द्वारा सत्यापित किया जा रहा है।

2) **पीएसयू रिफाइनरियों में वर्ष 2030 तक मिशन की पहली तिमाही:** ऊर्जा खपत में सुधार के लिए सार्वजनिक क्षेत्र की रिफाइनरियों के लिए एक रोडमैप तैयार किया गया है। इसका उद्देश्य सभी रिफाइनरियों को सोलोमन बेंचमार्किंग के पहले चतुर्थक (पहली तिमाही) में लाना है। यह लक्ष्य भारत की राष्ट्रीय योगदान योजना (एनडीसी) के अनुरूप भी है, जिसके तहत 2005 के आधार वर्ष की तुलना में 2030 तक विशिष्ट ऊर्जा खपत में 45% की कमी करने का लक्ष्य रखा गया है।

3) **भट्ठी दक्षता और भाप रिसाव पर वार्षिक लेखा परीक्षा:** ऊर्जा दक्षता में सुधार और ऊर्जा खपत को कम करने के लिए, सीएचटी, रिफाइनरियों के सहयोग से, हर साल i) भट्ठी/बॉयलर दक्षता और पप) भाप रिसाव के क्षेत्रों में सर्वेक्षण आयोजित करता है। इन दोनों क्षेत्रों में हर दूसरे वर्ष सर्वेक्षण किया जाता है। भट्ठी/बॉयलर दक्षता के क्षेत्र में सर्वेक्षण जनवरी, 2023 के दौरान और सभी रिफाइनरियों में भाप रिसाव सर्वेक्षण जनवरी, 2024 में किया गया। इसके अलावा, वर्ष 2025 के लिए भट्ठी दक्षता/बॉयलर सर्वेक्षण फरवरी 2025 में किया गया।

4) **रिफ़ाइनरियों के लिए पानी की खपत संबंधी मानदंड विकसित करना और पानी की खपत में कमी: वर्ष** 2019–2022 में 2901 घन मीटर/घंटा के लक्ष्य के मुकाबले 2369 घन मीटर/घंटा पानी की बचत प्राप्त की गई है। 2025 तक पानी की खपत में 3435 घन मीटर/घंटा की और कमी लाने की दिशा में कार्य प्रगति पर है।

5) **पीएसयू रिफाइनरियों का रिफाइनरी निष्पादन सुधार कार्यक्रम (आरपीआईपी):** सीएचटी ने रिफाइनरी

निष्पादन सुधार अध्ययन के लिए रिफाइनरी–वार वैश्विक सलाहकारों के चयन और अंतिम रूप देने में समन्वय किया। इस अध्ययन का मुख्य उद्देश्य रिफाइनरियों में उत्पादन और ऊर्जा अनुकूलन सुनिश्चित करना है। इसके पहले चरण में यह कार्यक्रम 7 रिफाइनरियों अर्थात् एचपीसीएल (मुंबई और विशाख), बीपीसीएल (मुंबई और कोच्चि), आईओसीएल (पानीपत, पारादीप और मथुरा) में लागू किया गया। पहला चरण 2024 में सभी 7 रिफाइनरियों द्वारा पूरा कर लिया गया और इस अध्ययन से कुल 1080 करोड़ यूरो का लाभ हुआ।

6) **2.6 हरित हाइड्रोजन परिवर्तन के लिए रणनीतिक हस्तक्षेप (साईट–2बी):** साईट 2बी भारत में नवीन एवं नवीकरणीय ऊर्जा मंत्रालय (एमएनआरई) द्वारा हरित हाइड्रोजन परिवर्तन (साईट) कार्यक्रम के लिए रणनीतिक हस्तक्षेप के एक भाग के रूप में शुरू की गई एक योजना है। इसका उद्देश्य निर्माताओं को वित्तीय प्रोत्साहन प्रदान करके हरित हाइड्रोजन के उत्पादन को बढ़ावा देना है।

साईट 2बी योजना के तहत, कार्यान्वयन एजेंसी/एजेंसियाँ एकल या कई रिफाइनरियों के लिए न्यूनतम लागत पर ग्रीन हाइड्रोजन के उत्पादन और आपूर्ति की मांग एकत्र करेंगी और बोलियाँ आमंत्रित करेंगी। मोड 2बी के पहले चरण में प्रति वर्ष 2,00,000 मीट्रिक टन की बोली क्षमता उपलब्ध है। नवीन एवं नवीकरणीय ऊर्जा मंत्रालय ने 16 जनवरी 2024 को अपने पत्र के माध्यम से सूचित किया कि मोड 2बी योजना का कार्यान्वयन तेल एवं गैस कंपनियों और उच्च प्रौद्योगिकी केंद्र (सीएचटी) द्वारा किया जाएगा। सीएचटी सचिवीय, प्रबंधकीय और कार्यान्वयन सहायता प्रदान करेगा और समय–समय पर पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय द्वारा सौंपी गई अन्य जिम्मेदारियों को निभाने के लिए ज़िम्मेदार होगा। सीएचटी की जिम्मेदारियों में निम्नलिखित शामिल हैं–

क. लाभार्थियों द्वारा किए गए दावों की जाँच करना ताकि प्रोत्साहन दिया जा सके।

ख. सभी जरूरी दस्तावेजों के साथ दावों का मिलान और सत्यापन करना।

ग. त्रैमासिक समीक्षा रिपोर्ट और अन्य दस्तावेजों के माध्यम से योजना की प्रगति और निष्पादन के संबंध में डेटा इकट्ठा करना।

घ. पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के माध्यम से एमएनआरई को तिमाही प्रगति रिपोर्ट भेजना, जिसमें प्रोत्साहन वितरण के लिए प्राप्त दावों, वितरित राशियों तथा प्रोत्साहन वितरण में देरी के कारणों (यदि कोई हो) का विवरण शामिल होगा।

योजना प्रोत्साहन: उत्पादन और आपूर्ति के पहले वर्ष में ग्रीन हाइड्रोजन के लिए प्रोत्साहन राशि 50 रुपए/कि.ग्रा., उत्पादन और आपूर्ति के दूसरे वर्ष के दौरान 40 रुपए/कि.ग्रा. तथा उत्पादन और आपूर्ति के तीसरे वर्ष के दौरान 30 रुपए/कि.ग्रा. होगी।

12.5.4.3 स्वदेशी प्रौद्योगिकी के नवाचार और विकास को बढ़ावा देना: सीएचटी, एमओपीएंडएनजी की हाइड्रोकार्बन पर वैज्ञानिक सलाहकार समिति (एसएसी) की गतिविधियों का समन्वय करता है। यह समिति राष्ट्रीय महत्व की परियोजनाओं सहित डाउनस्ट्रीम हाइड्रोकार्बन क्षेत्र के लिए अनुसंधान परियोजनाओं की पहचान करती है और उन्हें वित्तीय सहायता प्रदान करती है। साथ ही, यह ऊर्जा परिवर्तन को आगे बढ़ाने में मदद करती है।

हाइड्रोजन अनुसंधान: सीएचटी ने हाइड्रोजन से जुड़ी कई परियोजनाओं को वित्तीय सहायता दी है। इनमें अलग–अलग तरीकों से हाइड्रोजन का उत्पादन, वाहन कंपनियों और परिवहन प्रचालकों के साथ मिलकर ईंधन सेल बसों का विकास और परीक्षण, हाइड्रोजन का भंडारण और वितरण, एचसीएनजी का उत्पादन और उसका निष्पादन शामिल है। दिल्ली में ईंधन से चलने वाली कुछ बसों में आग लगने की घटनाएँ हुईं।

12.5.4.4 पीएम जीवन योजना का कार्यान्वयन: 2जी एथेनॉल तकनीकों को बढ़ावा देने और ग्रामीण अर्थव्यवस्था को मजबूत करने के लिए मार्च 2019 में प्रधानमंत्री जी–वन योजना शुरू की गई थी। इस योजना का वित्तीय परिव्यय ₹1969.5 करोड़ है। इस योजना को लागू करने की जिम्मेदारी सीएचटी को दी गई है। सीएचटी की प्रचालन समिति ने अब तक 6 वाणिज्यिक परियोजनाओं और 4 निष्पादन परियोजनाओं के लिए वित्तीय सहायता मंजूर की है।

अगस्त 2024 में इस योजना में संशोधन किया गया ताकि फीडस्टॉक (कच्चे माल) और उत्पादों के दायरे को बढ़ाया जा सके। अब बोल्ट–ऑन संयंत्रों को भी प्रोत्साहन दिया जा रहा है। इस योजना की अवधि मार्च 2029 तक बढ़ा दी गई है, और शेष 6 वाणिज्यिक तथा 6 निष्पादन उन्नत जैव ईंधन परियोजनाओं के लिए आरएफएस जारी किया जाएगा।

12.5.4.5 बायोमास एकत्रीकरण मशीनरी (बीएएम) की खरीद के लिए कंप्रेस्ड बायो गैस (सीबीजी) उत्पादकों को वित्तीय सहायता: भारत सरकार ने 2 फरवरी 2024 की अधिसूचना फा. सं. एल–16020/02/2023–जीपी–1 (ई–45833), के माध्यम से एक नई योजना मंजूर की है। इस योजना के तहत वित्त वर्ष 2023–24 से 2026–27 तक की अवधि में ₹564.75 करोड़ खर्च किए जाएंगे। इस योजना का उद्देश्य बायोमास को इकट्ठा करने में मदद करना है। इसके लिए कंप्रेस्ड बायो गैस (सीबीजी) उत्पादकों को बायोमास एकत्र करने वाली मशीनें खरीदने के लिए वित्तीय सहायता दी जाएगी। सीएचटी को इस योजना की परियोजना निगरानी एजेंसी (पीएमए) बनाया गया है। इसके साथ ही, सीएचटी ने योजना के कार्यान्वयन के लिए एक विशेष ऑनलाइन पोर्टल भी तैयार किया है। योजना के अंतर्गत आवेदन 1 अप्रैल 2024 से प्रस्तुत किया जा सकता है।

12.5.4.6 पेट्रोलियम और प्राकृतिक गैस मंत्रालय को अंतरराष्ट्रीय निविदा प्रस्तावों की जाँच, प्रक्रिया पूरी करना और अपनी सिफारिश भेजना: सामान्य वित्तीय नियम (जीएफआर) 2017 के नियम 161 (iv) के तहत ₹200 करोड़ तक की आयातित वस्तुओं की खरीद केवल सक्षम प्राधिकारी (मंत्रिमंडल सचिवालय/प्रशासनिक मंत्रालय) से आवश्यक अनुमोदन प्राप्त करने के बाद ही की जा सकती है।

इस संबंध में, सीएचटी को मंत्रालय के संबंधित प्रशासनिक प्रभाग को प्रस्तुत करने से पहले डाउनस्ट्रीम और मिडस्ट्रीम क्षेत्र से संबंधित प्रस्तावों की जाँच और तकनीकी रूप से सिफारिश करने का कार्य सौंपा गया है। वित्तीय वर्ष 2024–2025 के दौरान, मार्च 2025 तक कुल 103 प्रस्तावों (88 छूट प्राप्त और 15 गैर–छूट प्राप्त) पर कार्रवाई की गई है।

12.5.4.7 पीसीआरए से सीएचटी को हस्तांतरित गतिविधियां: पीसीआरए के समाप्त होने के बाद, सीएचटी को हस्तांतरित नौ अनुसंधान एवं विकास परियोजनाएं पूरी/बंद हो चुकी हैं।

12.5.4.8 भारत के साथ भूमि सीमा साझा करने वाले देश के बोलीदाताओं के पंजीकरण के संबंध में डीपीआईआईटी प्रस्ताव: सीएचटी को उद्योग संवर्धन एवं आंतरिक व्यापार विभाग (डीपीआईआईटी) से प्राप्त उद्योग आधार पर प्रस्तावों की जाँच करने और भारत के साथ भूमि सीमा साझा करने वाले देशों के बोलीदाताओं के पंजीकरण के संबंध में अपनी टिप्पणियाँ/सिफारिशें प्रस्तुत करने का कार्य सौंपा गया है। उद्योगों से प्राप्त इनपुट के आधार पर 18 में से 16 प्रस्तावों के लिए सिफारिशें प्रदान की गई हैं।

12.5.4.9 ऊर्जा प्रौद्योगिकी सम्मेलन (ईटीएम): 27वीं ईटीएम, जिसे पहले रिफाइनिंग एवं पेट्रोकेमिकल्स प्रौद्योगिकी सम्मेलन (आरपीटीएम) के नाम से जाना जाता था, 12 से 14 नवंबर, 2024 के दौरान बेंगलुरु में आयोजित की गई। इस सम्मेलन का विषय "हरित ऊर्जा की दिशा: संधारणीय रिफाइनिंग और पेट्रोकेमिकल्स को बढ़ावा देना" रखा गया था। इस कार्यक्रम में 15 तकनीकी सत्रों में 58 विदेशी वक्ताओं द्वारा लिखित मौखिक पत्रों सहित 68 मौखिक पत्र प्रस्तुत किए गए, पैनल चर्चा हुई और पोस्टर सत्रों में 60 डिजिटल पत्र प्रस्तुत किए गए। इसके साथ ही 28 निष्पादनी स्टॉल भी लगाए गए। इसमें भारत और विदेश से 1250 से अधिक प्रतिनिधियों/आमंत्रितों ने भाग लिया।

12.5.4.10 गतिविधि समिति बैठकें (एसीएम)/वेबिनार: सर्वोत्तम प्रचालन पद्धतियों और सुधारों को साझा करने तथा नवीनतम विकासों पर जानकारी के प्रचार–प्रसार के उद्देश्य से, सीएचटी ने रिफाइनिंग क्षेत्र और पाइपलाइन प्रचालन के महत्वपूर्ण क्षेत्रों/प्रौद्योगिकियों पर 9 एसीएम और वेबिनार आयोजित किए। वर्ष के दौरान नेट ज़ीरो और टर्नअराउंड प्रबंधन पर कार्यशालाएँ भी आयोजित की गईं। इन बैठकों में उद्योग, लाइसेंसधारकों और आपूर्तिकर्ताओं से बड़ी संख्या में प्रतिभागी शामिल होते हैं।

12.5.4.11 पुरस्कार: सीएचटी भारत सरकार के पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय द्वारा स्थापित निम्नलिखित वार्षिक पुरस्कारों से सक्रिय रूप से जुड़ा हुआ है

- सर्वश्रेष्ठ निष्पादन करने वाली रिफाइनरी का पुरस्कार
- विशिष्ट कार्बन उत्सर्जन में सर्वाधिक कमी का पुरस्कार
- अनुसंधान एवं विकास में नवाचार का पुरस्कार

12.5.5 राजीव गांधी पेट्रोलियम प्रौद्योगिकी संस्थान (आरजीआईपीटी):

आरजीआईपीटी (आरजीआईपीटी) एक राष्ट्रीय महत्व का संस्थान है, जिसे संसद के एक अधिनियम के तहत स्थापित किया गया और भारत की प्रमुख सार्वजनिक तेल कंपनियों तथा तेल उद्योग विकास बोर्ड ने इसे सह–स्थापित किया। आरजीआईपीटी की स्थापना का उद्देश्य पेट्रोलियम और ऊर्जा क्षेत्रों में शिक्षा, अनुसंधान और नवाचार में उत्कृष्टता लाना है। 2008 में अपनी स्थापना के बाद से, यह संस्थान अपस्ट्रीम और डाउनस्ट्रीम दोनों क्षेत्रों में ऊर्जा क्षेत्र की बढ़ती मांग के अनुसार आधुनिक शिक्षा और उच्च–स्तरीय अनुसंधान प्रदान करने के लिए प्रतिबद्ध रहा है। कठोर शैक्षणिक कार्यक्रमों और अनुसंधान परियोजनाओं के माध्यम से, आरजीआईपीटी विश्वस्तरीय इंजीनियरों, तकनीशियनों और विचारकों को तैयार करता है, जो टिकाऊ और किफायती ऊर्जा समाधान ला सकें। इसके कार्यक्रम स्नातक, स्नातकोत्तर, डॉक्टरेट और कार्यकारी शिक्षा तक फैले हैं और उनका मुख्य फोकस पेट्रोलियम विज्ञान, इंजीनियरिंग और ऊर्जा प्रबंधन पर है।

आरजीआईपीटी के जैस परिसर में 78, ऊर्जा संस्थान बेंगलुरु में 9 और असम ऊर्जा संस्थान में 24 संकाय सदस्य हैं। आरजीआईपीटी ने हाल ही में संस्थान की शैक्षणिक और अनुसंधान गतिविधियों को सुदृढ़ करने के लिए आरजीआईपीटी, जैस में 14 नए संकाय सदस्यों की भर्ती की है। ये संकाय सदस्य आरजीआईपीटी के सभी विभागों में नियुक्त किए गए हैं और इनके शैक्षणिक प्रमाण शीर्ष संस्थानों से प्राप्त हैं।

12.5.5.1 नए शैक्षणिक कार्यक्रम: संस्थान ने शैक्षणिक सत्र 2024–25 के दौरान दो बी.टेक. कार्यक्रम शुरू किए हैं, अर्थात् केमिकल इंजीनियरिंग में बी.टेक. (प्रमुख: पेट्रोकेमिकल और पॉलिमर इंजीनियरिंग) और पेट्रोलियम इंजीनियरिंग में बी.टेक. (प्रमुख: एप्लाइड पेट्रोलियम जियोसाइंस)।

12.5.5.2 राष्ट्रीय संस्थान रैंकिंग फ्रेमवर्क और फिक्की से सर्वश्रेष्ठ उभरते विश्वविद्यालय (सार्वजनिक श्रेणी) पुरस्कार: आरजीआईपीटी ने एनआईआरएफ 2024 में इंजीनियरिंग श्रेणी में 80वीं रैंक हासिल की है। आरजीआईपीटी ने अपनी रैंकिंग बरकरार रखी है और राष्ट्रीय महत्व के कई अन्य संस्थानों से आगे है। संस्थान को प्रतिष्ठित फिक्की उच्च शिक्षा उत्कृष्टता पुरस्कार 2024 में प्रतिष्ठित "विशेष जूरी मान्यता के साथ सर्वश्रेष्ठ उभरते विश्वविद्यालय" पुरस्कार से भी सम्मानित किया गया है। यह सम्मान नवाचार, अनुसंधान और शैक्षणिक उत्कृष्टता के माध्यम से उच्च शिक्षा में आरजीआईपीटी के असाधारण योगदान को मान्यता देता है, जिससे इसे भारत के उभरते विश्वविद्यालयों में अग्रणी स्थान प्राप्त हुआ है।

12.5.5.3 अनुसंधान एवं विकास: संस्थान ने औद्योगिक और सरकारी दोनों तरह की वित्त–पोषण एजेंसियों द्वारा वित्तपोषित ₹2500 करोड़ मूल्य की 63 बाह्य परियोजनाएँ लागू की हैं। संकाय सदस्यों ने पिछले एक वर्ष में अंतरराष्ट्रीय ख्याति प्राप्त पत्रिकाओं में 300 से अधिक लेख प्रकाशित किए हैं। स्नातक छात्रों के बीच नवाचार और अनुसंधान के वातावरण को पोषित और बढ़ावा देने के लिए, संस्थान ने स्नातक अनुसंधान फेलोशिप (यूआरएफ) योजना शुरू की है, जो ₹3,000 की मासिक फेलोशिप है। उद्योग से संबंधित अनुसंधान समस्याओं पर संकाय के साथ काम करने वाले स्नातक छात्रों को ये फेलोशिप प्रदान की जाएँगी। यूआरएफ दो साल की अवधि के लिए होगा, लेकिन एक वर्ष के अंत में इसका नवीनीकरण किया जाएगा।

12.5.5.4 समझौता–ज्ञापन (एमओयू): संस्थान (आरजीआईपीटी) ने आईटी उद्योग और आईटी–समर्थित सेवाओं का समर्थन करने हेतु नए नवाचारों को बढ़ावा देने और छात्रों के डिजिटल कौशल में सुधार के लिए नैसकॉम फाउंडेशन के साथ एक समझौता–ज्ञापन पर हस्ताक्षर किए। एचएएल और आरजीआईपीटी ने एक समझौता–ज्ञापन पर हस्ताक्षर किए हैं। इसका उद्देश्य दोनों संस्थानों के बीच सहयोग

बढ़ाना है ताकि एवियोनिक्स–आधारित एआई/एमएल, सॉफ्टवेयर इंजीनियरिंग, आईओटी, नियंत्रण इंजीनियरिंग, ऑप्टोइलेक्ट्रॉनिक्स और संचार इंजीनियरिंग के क्षेत्रों में स्वदेशी समाधान तैयार और विकसित किए जा सकें।

संस्थान ने शैक्षणिक और अनुसंधान सहयोग दोनों के लिए आईआईटी पटना और जापान में क्यूशू इंस्टीट्यूट ऑफ टेक्नोलॉजी (क्युटेक) के साथ समझौता–ज्ञापन पर हस्ताक्षर किए।

12.5.5.5 एंड–टू–एंड एच2 ऊर्जा प्रयोगशाला: संस्थान (आरजीआईपीटी) और कंपनी (योकोगावा टेक्नोलॉजी सॉल्यूशंस इंडिया प्राइवेट लिमिटेड) ने ऊर्जा संस्थान बेंगलुरु में एक अग्रणी उत्कृष्टता केंद्र (सीओई) की संयुक्त रूप से स्थापना के लिए एक समझौता–ज्ञापन पर हस्ताक्षर किए हैं। यह आरजीआईपीटी का एक केंद्र है और एक विश्व स्तरीय सुविधा है। यह केंद्र भारतीय जरूरतों के अनुसार हरित वैकल्पिक ऊर्जा के उत्पादन, भंडारण, परिवहन, बिजली उत्पादन और गतिशीलता में उपयोग के लिए काम करता है। यहाँ ऑफ–ग्रिड सौर पीवी सिस्टम के जरिए अंत तक स्वायत्त कुल ऊर्जा समाधान विकसित किए जाते हैं।

12.5.5.6 औद्योगिक पीएच.डी. अनुसंधान फैलोशिप: आरजीआईपीटी ने कुशल मानव संसाधन, अनुसंधान और नवाचार की शिक्षा को बढ़ावा देने हेतु सहयोग हेतु बीपीसीएल और सीपीसीएल के साथ अलग–अलग समझौता–ज्ञापनों पर हस्ताक्षर किए हैं। इसके अंतर्गत, दोनों पक्षों ने सीएसआईआर–नेट और/या गेट उत्तीर्ण छात्रों को आरजीआईपीटी और बीपीसीएल/सीपीसीएल के अधिकारियों के संयुक्त पर्यवेक्षण में बीपीसीएल–आरजीआईपीटी अनुसंधान फेलोशिप (3) और सीपीसीएल–आरजीआईपीटी फेलोशिप (2) के अंतर्गत आपसी हितों के विषयों पर पीएचडी करने के अवसर प्रदान करने पर सहमति व्यक्त की है। भागीदार उद्योग नियमित फेलोशिप के साथ–साथ 25% अधिक फेलोशिप राशि (टॉप–अप राशि) भी प्रदान करते हैं।

12.5.5.7 आरजीआईपीटी इनोवेशन एंड इनक्यूबेशन फाउंडेशन (आरजीआईपीटी आईआईएफ): आरजीआईपीटी आईआईएफ को भारत सरकार के विज्ञान एवं प्रौद्योगिकी विभाग (डीएसटी) से "भारत के संधारणीय विकास हेतु ऊर्जा, स्वास्थ्य सेवा और कृषि क्षेत्रों में नवाचार और उद्यमिता" नामक एक परियोजना प्राप्त हुई है। इस परियोजना का उद्देश्य आरजीआईपीटी में एक समावेशी प्रौद्योगिकी व्यवसाय इनक्यूबेटर (आई–टीबीआई) स्थापित करना है। राष्ट्रीय विशेषज्ञ सलाहकार समिति ने सिफारिश की है कि इस परियोजना को निधि आई–टीबीआई कार्यक्रम के अंतर्गत सहायता प्रदान करने पर विचार किया जाना चाहिए। समिति ने ₹5 करोड़ का अनंतिम बजट स्वीकृत किया है और प्रस्तावित आई–टीबीआई के लिए "ऊर्जा, स्वच्छ ईंधन, स्वास्थ्य सेवा, कृषि" को प्राथमिक प्राथमिकता क्षेत्र के रूप में अनुशंसित किया है।

12.5.5.8 उड़ान: उड़ान एक व्यावसायिक योजना प्रतियोगिता (बीपीसी) है, जिसका उद्देश्य अमेठी और आसपास के जिलों के लोगों को अपने नवोन्मेषी विचारों के साथ आगे आने के लिए प्रोत्साहित करना है। इस प्रतियोगिता में प्रतिभागियों को नवोन्मेषी उत्पाद या सेवा बनाने के लिए व्यावसायिक योजना तैयार करने और उस पर काम करने का अवसर मिलता है। इस वर्ष 87 प्रस्ताव प्राप्त हुए। कई राउंड के मूल्यांकन के बाद 4 टीमों का चयन किया गया। विजेता टीम को ₹25,000 और उपविजेता टीम को ₹15,000 का नकद पुरस्कार दिया गया, साथ ही सभी को उत्कृष्टता प्रमाण–पत्र भी प्रदान किए गए।

आरजीआईपीटी केंद्र, जायस, अमेठी): ऊर्जा संस्थान, बेंगलुरु (ईआईबी), आरजीआईपीटी जायस केंद्र, ऊर्जा के क्षेत्र में प्रौद्योगिकी–प्रचालित शैक्षणिक और अनुसंधान कार्यक्रमों को बढ़ावा देने के लिए एक प्रतिष्ठित शैक्षणिक और अनुसंधान केंद्र है। यह कंबालीपुरा, होसाकोटे, बेंगलुरु, कर्नाटक, भारत में अपने स्थायी परिसर में स्थानांतरित हो गया है और 1 अक्तूबर, 2024 से अपने शैक्षणिक कार्यों और अनुसंधान गतिविधियों की शुरुआत की है। यह संस्थान के विकास और विस्तार में एक महत्वपूर्ण मील का पत्थर है। केंद्र का उद्देश्य ऊर्जा के क्षेत्र में अग्रणी औद्योगिक, तकनीकी और मौलिक अनुसंधान करना; छात्रों को गुणवत्तापूर्ण शिक्षा देना; ऊर्जा के क्षेत्र में औद्योगिक पेशेवरों को अल्पकालिक प्रशिक्षण पाठ्यक्रम प्रदान करना है।

शैक्षणिक कार्यक्रम: ईआईबी वर्तमान में इलेक्ट्रिकल और इलेक्ट्रॉनिक्स इंजीनियरिंग, मैटेरियल साइंस एंड इंजीनियरिंग और कंप्यूटर साइंस एंड इंजीनियरिंग के अनुशासन में पीएचडी कार्यक्रमों के साथ–साथ अक्षय ऊर्जा और इलेक्ट्रिक वाहन प्रौद्योगिकी नामक दो एम.टेक

कार्यक्रम प्रदान करता है। केंद्र वर्तमान में ग्रीन एनर्जी, इलेक्ट्रिक वाहन प्रौद्योगिकी और ऊर्जा प्रणालियों के डिजिटलीकरण के क्षेत्र में काम कर रहे कुल 14 एम.टेक छात्रों और 14 पीएचडी छात्रों की मेजबानी करता है। 2024–25 के दीक्षांत समारोह में 7 छात्रों के स्नातक होने की उम्मीद है। उपर्युक्त के अलावा, केंद्र कंप्यूटर विज्ञान और इंजीनियरिंग, सूचना प्रौद्योगिकी, इलेक्ट्रॉनिक्स इंजीनियरिंग और गणित और कंप्यूटिंग विभाग के आरजीआईपीटी जैस परिसर में कुल 138 अंतिम यूजी छात्रों की मेजबानी भी करता है।

पाठ्यक्रम आधारित प्रयोगशालाएँ और अनुसंधान सुविधाएँ: स्थायी परिसर में दो प्रयोगशालाएँ स्थापित हैं: नवीकरणीय ऊर्जा प्रयोगशाला और इलेक्ट्रिक वाहन प्रौद्योगिकी प्रयोगशाला। केंद्र में तापीय ऊर्जा भंडारण प्रणाली, सौर पीवी, ब्रीथ सेंसर विकास, सौर सेल, हाइब्रिड इलेक्ट्रिक वाहन और बायोगैस जैसे क्षेत्रों में अनुसंधान प्रयोगशालाएँ हैं।

ईआईबी में आयोजित कार्यक्रम:

- ऊर्जा क्षेत्र में डिजिटल तकनीकों के उपयोग पर एक दो–दिवसीय संगोष्ठी का आयोजन 16–17 अप्रैल 2024 को किया गया, जिसका विषय था विघटनकारी प्रौद्योगिकियों में डिजिटलीकरण।
- एसईआरबी ने 16–17 मई 2024 के दौरान सौर पीवी/फ्लोटिंग सोलर में विकास और नवाचारों पर दो दिवसीय कार्यशाला प्रायोजित की, जिसमें ग्रीन हाइड्रोजन उत्पादन और ईवी में इसके अनुप्रयोग शामिल थे। इसका उद्देश्य सौर पीवी, ग्रीन हाइड्रोजन उत्पादन और ईवी मॉडलिंग के पहलुओं पर चर्चा करना था।

ईआईबी परिसर का निर्माण: कर्नाटक सरकार ने ईआईबी परिसर के निर्माण के लिए कम्बलिपुरा, होसकोटे में 150 एकड़ जमीन आवंटित की है। चारदीवारी का काम पूरा हो गया है। शैक्षणिक ब्लॉक सहित परिसर निर्माण का पहला चरण–एक जी+2 मंजिला इमारत, 150 बिस्तरों की क्षमता वाला एक लड़कों का छात्रावास ब्लॉक (जी+3), 126 बिस्तरों की क्षमता वाला लड़कियों का छात्रावास ब्लॉक (जी+2) भवन, और एक डाइनिंग हॉल भवन के साथ–साथ अन्य आवश्यक बुनियादी ढाँचे जैसे सड़कें, मुख्य द्वार, स्ट्रीट लाइट आदि का काम पूरा हो गया है और अक्टूबर 2024 से परिसर में शैक्षणिक कार्य शुरू हो गए हैं। एक अन्य लड़कों का छात्रावास (जी+4) और लड़कियों के छात्रावास का एक हिस्सा निर्माणाधीन है।

12.5.5.10 असम ऊर्जा संस्थान (एईआई), शिवसागर (आरजीआईपीटी केंद्र, जायस, अमेठी): 500 से अधिक छात्रों के लिए 100 एकड़ भूमि पर एक अत्याधुनिक नया परिसर विकसित किया जा रहा है। वर्तमान में, परिसर में शैक्षणिक भवन, कार्यशाला हॉल, व्याख्यान कक्ष, सम्मेलन कक्ष, बड़ी क्षमता वाले व्याख्यान कक्षों में ध्वनि प्रणालियाँ और प्रयोगशालाएँ शामिल हैं। वर्तमान में लड़कों के लिए दो छात्रावास और लड़कियों के लिए एक छात्रावास कार्यशील हैं। एक अन्य लड़कों का छात्रावास और लड़कियों का छात्रावास निर्माणाधीन है। इसके अलावा, आगामी नए शैक्षणिक ब्लॉक में अतिरिक्त प्रयोगशालाएँ, पुस्तकालय, सम्मेलन कक्ष और कंप्यूटर लैब शामिल होंगे। संकाय क्वार्टरों का निर्माण कार्य चल रहा है और संस्थान के गेट सहित चारदीवारी का काम लगभग पूरा हो चुका है।

शैक्षणिक कार्यक्रम: असम ऊर्जा संस्थान (एईआई), शिवसागर (आरजीआईपीटी जायस, अमेठी का केंद्र) में वर्तमान में केमिकल इंजीनियरिंग, कंप्यूटर साइंस इंजीनियरिंग, इलेक्ट्रिकल इंजीनियरिंग, इलेक्ट्रॉनिक्स और इंस्ट्रूमेंटेशन इंजीनियरिंग, फायर एंड सेफ्टी इंजीनियरिंग, मैकेनिकल इंजीनियरिंग और पेट्रोलियम इंजीनियरिंग में तीन वर्षीय डिप्लोमा पाठ्यक्रमों और आईडीडी पाठ्यक्रमों में छात्र नामांकित किए जाते हैं। सभी डिप्लोमा कार्यक्रमों में प्रवेश प्रत्येक सत्र के विषम सेमेस्टर की शुरुआत में, अर्थात प्रत्येक वर्ष जुलाई–अगस्त में किए जाते हैं। इस शैक्षणिक वर्ष में सभी सात धाराओं में कुल 310 छात्रों ने डिप्लोमा में प्रवेश लिया, और यह प्रक्रिया सफलतापूर्वक पूरी हुई। संस्थान में वर्तमान में स्नातक स्तर पर 577 छात्र और पीएचडी स्तर पर 18 छात्र अध्ययनरत हैं।

एईआई में निर्माण कार्य: परिसर में अधिक छात्रों के रहने की सुविधा के लिए, जी+4 में 192 छात्र क्षमता वाले एक नए लड़कों के छात्रावास और जी+4 में 100 छात्र क्षमता वाले एक लड़कियों के छात्रावास का निर्माण किया जा रहा है। एक बार पूरा हो जाने पर, परिसर में छात्रों की कुल आवास क्षमता तीन

छात्रावासों में लड़कों के लिए 504 और दो छात्रावासों में लड़कियों के लिए 190 होगी। संस्थान का नया जी+1 शैक्षणिक भवन अपने प्रत्येक डोमेन के लिए उचित बुनियादी ढाँचा प्रदान करेगा, जिससे संस्थान को बड़ी क्षमता वाले कक्षाओं और प्रयोगशालाओं में अपने स्नातक कक्षाओं को अधिक कुशल तरीके से प्रचालित करने में मदद मिलेगी। इसमें संकाय कार्यालय, एक पुस्तकालय, सम्मेलन कक्ष, कंप्यूटर लैब आदि के लिए कमरे भी होंगे।

सीबीजी संयंत्र का शिलान्यासः भारत के माननीय प्रधानमंत्री ने 02 अक्तूबर, 2024 को एईआई शिवसागर के परिसर में सीबीजी संयंत्र की आधारशिला रखी। ओआईएल और एईआई–आरजीआईपीटी ने सस्ते परिवहन के लिए स्थायी विकल्प (संधारणीय) योजना के तहत सीबीजी संयंत्र की स्थापना में एक–दूसरे के साथ सहयोग करने के लिए एक समझौता–ज्ञापन पर हस्ताक्षर किए, जो बायोगैस और इसके डेरिवेटिव के क्षेत्र में तकनीकी और प्रशासनिक सहायता और अनुसंधान एवं विकास पहल प्रदान करेगा। एमओयू सौंपे जाने के बाद, ओआईएल आरजीआईपीटी के एक केंद्र, शिवसागर में असम ऊर्जा संस्थान (एईआई) में एक अत्याधुनिक सीबीजी संयंत्र स्थापित करने के लिए प्रतिबद्ध है। यह संयंत्र कंप्रेस्ड बायोगैस (सीबीजी) के उत्पादन के लिए आधुनिक तकनीक से भी लैस होगा।

12.5.6 भारतीय पेट्रोलियम एवं ऊर्जा संस्थान (आईआईपीई):

भारत सरकार ने आंध्र प्रदेश पुनर्गठन अधिनियम, 2014 के प्रावधानों के अनुसार, वर्ष 2016 में विशाखापत्तनम में पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय (एमओपीएनजी) के तत्वावधान में एक विशिष्ट क्षेत्र–विशिष्ट संस्थान, भारतीय पेट्रोलियम एवं ऊर्जा संस्थान (आईआईपीई) की स्थापना की। संसद द्व ारा पारित भारतीय पेट्रोलियम एवं ऊर्जा संस्थान अधिनियम, 2017 ने इसे 'राष्ट्रीय महत्व का संस्थान' घोषित किया है। इस संस्थान की स्थापना का मुख्य उद्देश्य पेट्रोलियम एवं ऊर्जा क्षेत्रों के लिए कुशल इंजीनियरों की आपूर्ति में मात्रात्मक और गुणात्मक अंतर को पूरा करना और इन क्षेत्रों के विकास हेतु आवश्यक अनुसंधान गतिविधियों को बढ़ावा देना है।

कार्यक्रम/पाठ्यक्रमः आईआईपीई, पेट्रोलियम इंजीनियरिंग, केमिकल इंजीनियरिंग और मैकेनिकल इंजीनियरिंग में 4 वर्षीय बी.टेक. कार्यक्रमों के साथ–साथ एप्लाइड जियोलॉजी में एम.एससी., डेटा साइंस और मशीन लर्निंग में वेब–आधारित एम.टेक. और पीएचडी की पेशकश कर रहा है। 31.03.2025 तक, संस्थान में कुल 468 छात्र विभिन्न पाठ्यक्रमों में अध्ययन कर रहे हैं, जिनमें 105 पीएचडी शोधार्थी शामिल हैं, जिनमें से 41 उद्योग–प्रायोजित उम्मीदवार हैं। संस्थान ने अन्य प्रमुख शैक्षणिक गतिविधियाँ भी शुरू की हैं जैसे अंतर्राष्ट्रीय ऐच्छिक पाठ्यक्रम, वैश्विक इंटर्नशिप कार्यक्रम, ह्यूस्टन विश्वविद्यालय, अमेरिका के साथ बी.टेक.–एमएस कार्यक्रम और आईआईएम विशाखापत्तनम के साथ संयुक्त बी.टेक.–एमबीए।

प्लेसमेंटः 31.03.2025 तक, शैक्षणिक वर्ष 2024–25 के लिए बी.टेक. प्लेसमेंट दर 87.87% है और 2025 बैच के शेष पात्र छात्रों के लिए प्लेसमेंट जारी है। कुल 26 कंपनियों ने छात्रों के लिए ऑन–कैंपस/ऑफ–कैंपस साक्षात्कार आयोजित किए और इस वर्ष अब तक का उच्चतम सीटीसी 25.57 एलपीए रहा है।

अनुसंधान एवं विकासः 31.03.2025 तक, संस्थान में ₹53.03 करोड़ के कुल परिव्यय वाली 26 अनुसंधान परियोजनाएँ कार्यरत थीं, जिनमें समुद्री जल से 1 टीपीडी हाइड्रोजन उत्पादन हेतु हरित हाइड्रोजन संयंत्र स्थापित करने हेतु एनटीपीसी की एक अनुसंधान परियोजना भी शामिल है। शैक्षणिक वर्ष 2024–25 के दौरान ₹1.94 करोड़ की राशि वाली 06 परियोजनाएँ स्वीकृत की गईं। 2024 में, संकाय सदस्यों द्वारा शोध लेख, पुस्तक अध्याय, पुस्तकें और सम्मेलन पत्रों के रूप में कुल 44 प्रकाशन किए गए।

पेटेंटः वर्ष 2024–25 के दौरान, आवेदन संख्या 202141057434 के तहत 'बढ़ी हुई तेल प्राप्ति के लिए बायोचार–सेरिया नैनोकंपोजिट संरचना' शीर्षक से 02 पेटेंट; और आवेदन सं. 202441097538 के तहत 'बांस से प्राप्त निकल ऑक्साइड नैनोकण और उनकी तैयारी की प्रक्रिया' शीर्षक से 02 पेटेंट दायर किए गए हैं। आवेदन सं. 413189–001 के तहत अभिनव 'फ्लैट प्लेट हीट सिंक' के लिए 01 डिजाइन पेटेंट प्रदान किया गया है।

12.5.6.1 कार्यशालाएँ और सेमिनारः

i. भारत–अमेरिका कार्यशालाः संस्थान ने स्टोनी ब्रुक विश्वविद्यालय, न्यूयॉर्क के सहयोग से 21 से 23 मई, 2024 तक हाइड्रोजन और वैश्विक डीकार्बोनाइजेशन पर भारत–अमेरिका कार्यशाला का आयोजन किया।

ii. इंडो–पोलिश कार्यशालाः संस्थान ने पोलैंड के ग्दांस्क प्रौद्योगिकी विश्वविद्यालय के साथ संयुक्त रूप से 30 जुलाई–3 अगस्त, 2024 के दौरान "आणविक नोड्स के साथ इलेक्ट्रॉनिक संरचना गणना और विजुअलाइज़ेशन" पर एक कार्यशाला का आयोजन किया।

iii. त्वरित विज्ञान योजना के तहत एसईआरबी–डीएसटी द्वारा प्रायोजित कार्यशाला का आयोजन 1 से 7 जुलाई 2024 तक किया गया। कार्यशाला का विषय थाः "मैग्नेटोटेल्यूरिक डेटा के बारे में जानकारी प्राप्त करनाः डेटा तैयारी, विश्लेषण, प्रोसेसिंग और 3डी इनवर्ज़न रणनीतियाँ"।

iv. 08–14 जुलाई, 2024 की अवधि के दौरान 'सीओ2 पृथक्करण के लिए रिजर्वायर सक्रियता' विषय पर एसईआरबी–डीएसटी द्वारा प्रायोजित कार्यशाला के लिए त्वरित विज्ञान योजना के तहत एक उच्च स्तरीय कार्यशाला।

v. 02.11.2024 से 12 सप्ताह के लिए 'कार्बन अवशोषण और उपयोग' पर प्रमाणन पाठ्यक्रम।

vi. उद्योग–अकादमिक सम्मेलन 2024: 28 नवंबर, 2024 को एक स्थायी विश्व के लिए शिक्षा और उद्योग को जोड़ना।

vii. 11–13 दिसंबर, 2024 के दौरान 'संक्षारण रोकथाम और उपचार रणनीतियों' पर एक कार्यशाला।

viii. 16–27 दिसंबर, 2024 तक 'राष्ट्रीय गणित केंद्र (एनसीएम), गणित में उन्नत प्रशिक्षण (एटीएम) स्कूल ऑन न्यूमेरिकल मेथड्स फॉर आंशिक अंतर समीकरण (एनएमपीडीई)' पर एक कार्यशाला।

ix. 20 दिसंबर 2024 से 2 जनवरी 2025 तक 'पेट्रोलियम इंजीनियरिंग में हाल की प्रगति पर विसर्जन कार्यक्रम' पर एक कार्यशाला।

x. संस्थान ने भारत सरकार द्वारा शुरू की गई जिज्ञासा योजना के अनुरूप स्कूली बच्चों और शिक्षकों को प्रशिक्षण प्रदान करने के लिए दिसंबर, 2025 के दौरान स्थानीय कॉलेज और स्कूल–छात्र फेलोशिप कार्यक्रम (एलसीएस–एसएफपी) और कॉलेज और स्कूल शिक्षक शिक्षा और शैक्षणिक सलाह (सीएस–टीम) कार्यक्रम आयोजित किया।

xi. 23–25 जनवरी, 2025 के दौरान 'ऊर्जा क्षेत्र में कम्प्यूटेशनल द्रव गतिशीलता का उपयोगः तकनीक और अनुप्रयोग (एच–सीएफडी–2025)' पर एक कार्यशाला आयोजित की गई।

xii. विशाखापत्तनम और आसपास के जिलों के कॉलेजों और विश्वविद्यालयों के विद्वानों और संकाय सदस्यों के लिए आई–एसटीईएम पोर्टल के उपयोग से परिचित कराने हेतु आई–एसटीईएम के सहयोग से दिनांक 11.02.2025 को एक दिवसीय कार्यशाला" समावेश (एपिसोड–10)" का आयोजन किया। आईआईपीई, आई–एसटीईएम का सैटेलाइट कैंपस होगा।

xiii. 18–20 फरवरी 2025 के दौरान 'क्रिस्टलीकरण प्रणाली इंजीनियरिंग' पर एक कार्यशाला आयोजित की गई।

xiv. 03–08 मार्च, 2025 के दौरान 'हाइड्रोजन ऊर्जा और पर्यावरण अनुप्रयोग के लिए अगली पीढ़ी के समग्र मेम्ब्रेन' पर इस्तांबुल तकनीकी संस्थान के अंतर्राष्ट्रीय समन्वयक प्रो. वाहिद वतनपुर के साथ एक जीआईएएन पाठ्यक्रम आयोजित किया गया।

xv. वेस्ट वर्जीनिया विश्वविद्यालय, अमेरिका के अंतर्राष्ट्रीय समन्वयक प्रो. देबांगसु भट्टाचार्य के साथ 'सीओ2 अवशोषण के लिए अवशोषण तकनीकः मॉडलिंग और सक्रियता की समझ' पर एक ज्ञान पाठ्यक्रम 24–28 मार्च, 2025 तक आयोजित किया गया।

12.5.6.2 पुरस्कारः प्रो. शालिवाहन को सोसाइटी ऑफ एक्सप्लोरेशन जियोफिजिसिस्ट, अमेरिका द्वारा पहली तिमाही/दूसरी तिमाही के लिए दक्षिण और पूर्वी एशिया मानद व्याख्याता के रूप में सम्मानित किया गया। शैक्षणिक उत्कृष्टता के प्रति संस्थान की प्रतिबद्धता को मान्यता देते हुए, आईआईपीई को केमटेक फाउंडेशन द्वारा ऊर्जा उत्कृष्टता पुरस्कार (शिक्षा में उत्कृष्ट उपलब्धि 2025) से सम्मानित किया गया है।

12.5.6.3 स्थायी परिसरः आंध्र प्रदेश सरकार ने आईआईपीई के स्थायी परिसर के निर्माण हेतु अनकापल्ली जिले (पूर्व में विशाखापत्तनम जिला) के सब्बावरम मंडल के वंगाली गाँव में 201.80 एकड़ भूमि निःशुल्क आवंटित की है। आंध्र प्रदेश सरकार ने मार्च, 2023 में संस्थान के नाम पर हस्तांतरित भूमि हस्तांतरित कर दी है। भारत सरकार ने संस्थान के स्थायी परिसर की स्थापना के लिए ₹655.46 करोड़ का आवंटन किया है।

आंध्र प्रदेश इंडस्ट्रीयल इंफ्रास्ट्रक्चर लिमिटेड (एपीआईआईसी) द्वारा हस्तांतरित भूमि के चारों ओर चारदीवारी का निर्माण कार्य पूरा कर लिया गया है। स्थायी परिसर में भवनों के निर्माण का कार्य केंद्रीय लोक निर्माण विभाग (सीपीडब्ल्यूडी) को सौंपा गया है। पूर्वी शैक्षणिक खंड, बालक छात्रावास (02), अतिथि गृह, भोजनालय एवं भोजन कक्ष, विद्युत एवं रखरखाव कार्यशाला और कर्मचारी आवासों का निर्माण कार्य प्रगति पर है। पूर्वी शैक्षणिक ब्लॉक, बालक छात्रावास (02), अतिथि गृह, भोजनालय एवं भोजन कक्ष, विद्युत एवं तापन कार्यशाला और कर्मचारी आवासों का निर्माण कार्य चल रहा है।

दिनांक 31.03.2025 की स्थिति के अनुसार स्थायी परिसर में कुल 53% निर्माण कार्य पूरे हो चुके हैं। एक भवन को छोड़कर, निर्माण गतिविधियों के पूरा होने की अपेक्षित तिथि अगस्त, 2025 है।

12.5.6.4 जनशक्ति एवं महिला कर्मचारीः आईआईपीई में 34 संकाय सदस्य हैं, जिनमें 04 विजिटिंग संकाय सदस्य और 17 गैर–शिक्षण कर्मचारी नियमित आधार पर कार्यरत हैं, जिनमें से 07 महिला कर्मचारी हैं।

12.5.6.5 भविष्य की योजनाः संस्थान को आगामी शैक्षणिक वर्ष 2025–26, जो जुलाई, 2025 से शुरू होगा, की शुरुआत तक स्थायी परिसर में स्थानांतरित करने की योजना है। संस्थान शैक्षणिक वर्ष 2025–26 से नागरिकों के लिए गणित और कंप्यूटिंग में बी. टेक कार्यक्रम और विदेशी नागरिकों और प्रायोजित उम्मीदवारों के लिए पेट्रोलियम इंजीनियरिंग में एम.टेक कार्यक्रम शुरू करने जा रहा है।

12.5.7 पेट्रोलियम योजना एवं विश्लेषण सेल (पीपीएसी):

पेट्रोलियम योजना एवं विश्लेषण प्रकोष्ठ (पीपीएसी) की स्थापना 1 अप्रैल 2002 को पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के एक संबद्ध कार्यालय के रूप में की गई थी, जो पूर्ववर्ती तेल समन्वय समिति (ओसीसी) के समाप्त होने के बाद हुआ था। पेट्रोलियम एवं प्राकृतिक गैस सचिव पीपीएसी के शासी निकाय (जीबी) के अध्यक्ष हैं और पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के वरिष्ठ अधिकारी तथा प्रमुख तेल एवं गैस सार्वजनिक उपक्रमों के मुख्य कार्यकारी इसके सदस्य हैं। जीबी पीपीएसी के कामकाज के लिए आवश्यक पर्यवेक्षण और दिशानिर्देश प्रदान करता है। पीपीएसी निम्नलिखित कार्य करता हैः

क. तेल एवं गैस क्षेत्र पर डेटाबेस का रखरखाव करना।

ख. अंतर्राष्ट्रीय तेल बाजार और घरेलू कीमतों में रुझान का विश्लेषण करना।

ग. पीओएल की मांग का पूर्वानुमान लगाना।

घ. तेल एवं गैस तथा ऊर्जा क्षेत्र में अध्ययन आयोजित करना।

ङ. पेट्रोलियम आयात और निर्यात प्रवृत्तियों का पूर्वानुमान और मूल्यांकन।

च. सरकार को विशेष रूप से पेट्रोलियम उत्पादों के मूल्य निर्धारण और पीएमयूवाई सहित सब्सिडी योजनाओं के प्रशासन पर जानकारी प्रदान करना।

छ. सरकारी दिशानिर्देशों के अनुसार अर्ध–मासिक आधार पर प्राकृतिक गैस और एचटी एचपी गैस मूल्य सीमा के लिए एपीएम मूल्य का निर्धारण और अधिसूचना जारी करना।

12.5.7.1 तेल एवं गैस क्षेत्र पर महत्वपूर्ण डेटाबेस और नियमित एमआईएस रिपोर्टों का प्रसारः पीपीएसी कच्चे तेल और पेट्रोलियम उत्पादों के उत्पादन, खपत, आयात और निर्यात तथा तेल अवसंरचना से संबंधित आँकड़ों का रखरखाव करता है। यह प्राकृतिक गैस के उत्पादन, एलएनजी के आयात, प्राकृतिक गैस की खपत और सीजीडी क्षेत्र से संबंधित आँकड़ों का भी रखरखाव करता है। पीपीएसी के अधिदेश के अंतर्गत, पीपीएसी की वेबसाइट **http://ppac.gov.in** के साथ–साथ गूगल प्ले स्टोर पर उपलब्ध मोबाइल ऐप "पीपीएसीई" पर

कई दैनिक, पाक्षिक, मासिक, अर्ध–मासिक और वार्षिक रिपोर्ट प्रकाशित की जाती हैं। ये रिपोर्ट कच्चे तेल और पेट्रोलियम उत्पादों की दैनिक कीमतों, पीओएल उत्पादों की खपत और उद्योग बिक्री समीक्षा, एलपीजी बिक्री, कच्चे तेल के प्रोसेसिंग और उत्पादन, पीओएल उत्पादों के आयात और निर्यात, प्राकृतिक गैस की खपत और आयात आदि से संबंधित हैं। पेट्रोलियम उत्पादों पर नियमित रिपोर्टों और इनपुट के अलावा, पीपीएसी एमएस, एचएसडी, एलपीजी, गैस आदि की मांग, आपूर्ति, परिवहन और मूल्य निर्धारण पर कई अध्ययन भी करता है। पीपीएसी की रिपोर्ट नीति निर्माताओं, शोधकर्ताओं, छात्रों और शिक्षाविदों को समान रूप से सहायता करती है।

12.5.7.2 महत्वपूर्ण गतिविधियाँ: पीपीएसी द्वारा वर्ष 2024–25 के दौरान की गई कुछ महत्वपूर्ण गतिविधियाँ इस प्रकार थीं:

(क) ऊर्जा मांग अनुमान मॉडल (ईडीपीएम): 2040 तक रिफाइनिंग क्षमता बढ़ाने के कार्य समूह के तहत, पेट्रोलियम योजना और विश्लेषण प्रकोष्ठ (पीपीएसी) ने पेट्रोलियम उत्पादों की खपत का दीर्घकालिक अनुमान तैयार किया। यह अनुमान छह प्रमुख अंतिम उपयोग क्षेत्रों अर्थात् परिवहन, खाना पकाने, उद्योग, कृषि, दूरसंचार और भवनों के लिए बनाया गया। इन अनुमानों को तीन परिदृश्यों अर्थात् बेसलाइन, परिवर्तन, और परिवर्तन के अनुसार तैयार किया गया, जो ऊर्जा परिवर्तन के अलग–अलग स्तरों को दर्शाते हैं। साथ ही एक सर्वोत्तम परिदृश्य भी है, जो समय के साथ संभावित क्षेत्रीय बदलावों को पकड़ने के लिए इन तीनों परिदृश्यों के तत्वों को मिलाता है। मॉडल की शुरुआत 2020 के आधार पर हुई थी, जिसे बाद में 2022 में अपडेट किया गया और भारत की विकसित ऊर्जा नीतियों के अनुरूप पुनर्गणना की गई।

इसी के अनुसार, '2025 के बाद एथेनॉल मिश्रण के लिए रोडमैप तैयार करने' हेतु बनाई गई अंतर–मंत्रालयी समिति (आईएमसी) ने पीपीएसी को अगले 5–7 वर्षों के लिए पेट्रोल की मांग का नया अनुमान लगाने का काम दिया। इसके तहत पीपीएसी ने ऊर्जा मांग प्रक्षेपण मॉडल (ईडीपीएम) का उपयोग करके एक विस्तृत क्षेत्रीय अध्ययन किया, जो विशेष रूप से यात्री परिवहन क्षेत्र पर केंद्रित था, ताकि मोटर स्पिरिट (एमएस) की मांग का आकलन किया जा सके। वर्ष 2032 तक के अनुमान में चार परिदृश्यों का विश्लेषण शामिल था। इनमें सर्वोत्तम परिदृश्य सबसे यथार्थवादी और संतुलित माना गया, जिसमें एथेनॉल मिश्रण के रुझान और वाहन ईंधन मिश्रण में होने वाले संभावित बदलाव को शामिल किया गया।

(ख) हाइड्रोकार्बन क्षेत्र में डेटा और नीति विश्लेषण को आगे बढ़ाना: पीपीएसी का उद्देश्य भारत के हाइड्रोकार्बन क्षेत्र में डेटा और नीति विश्लेषण के लिए सबसे प्रामाणिक आधिकारिक स्रोत के रूप में कार्य करना है। यह तेल विपणन कंपनियों (ओएमसी), सरकारी विभागों और मंत्रालयों से डेटा एकत्र करके विश्लेषणात्मक रिपोर्ट तैयार करता है जो सूचित निर्णय लेने और नीति निर्माण में सहायक होती हैं।

दक्षता और सटीकता बढ़ाने के लिए, पीपीएसी ने आधुनिक तकनीक और कार्यप्रणालियों को अपनाया है। इसमें एसएएस विजुअल एनालिटिक्स प्लेटफ़ॉर्म भी शामिल है, जो दृश्यात्मक रिपोर्ट बनाने और जल्दी जानकारी हासिल करने में मदद करता है।डेटा को इकट्ठा करने, सत्यापित करने, संग्रह करने और वितरित करने की पूरी प्रक्रिया को मानकीकृत किया गया है, जिससे कहीं भी और कभी भी साफ़ और भरोसेमंद डेटा तक पहुँच सुनिश्चित होती है। खास बात यह है कि एपीआई एकीकरण लागू किया गया है, जिसके तीन मॉड्यूल पूरे हो चुके हैं, जो कुल डेटा संग्रहण का 65% संभालते हैं। इसके परिणामस्वरूप डेटा प्रचालन समय पर और सुव्यवस्थित हो गया है। साथ ही, कच्चे और उत्पाद कोड के मानकीकरण के लिए मानक प्रचालन प्रक्रियाएँ (एसओपी) शुरू की गई हैं, जो पीपीएसी के डेटा सिस्टम को अंतरराष्ट्रीय मानकों के अनुसार बनाती हैं और समग्र डेटा प्रबंधन और विश्लेषण की क्षमता को बढ़ाती हैं।

12.5.7.3 तेल एवं गैस क्षेत्र के लिए विभिन्न अध्ययन/कार्य समूहों की सदस्यता: पीपीएसी को पेट्रोलियम और प्राकृतिक गैस क्षेत्रों में कई प्रमुख अध्ययन और कार्य समूह सौंपे गए हैं। पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय द्वारा सौंपा गया और पीपीएसी के महानिदेशक की अध्यक्षता में प्राकृतिक गैस उत्पादन लागत विश्लेषण, भारतीय भौगोलिक क्षेत्रों में उत्पादन लागत की तुलना वैश्विक मानदंडों से करता है,

अंतरराष्ट्रीय सर्वोत्तम प्रक्रियाओं की जांच करता है और 2035 तक एनजी मांग–आपूर्ति परिदृश्य का आकलन करता है। एलपीजी डोमेन में, महानिदेशक–पीपीएसी ने एलपीजी भंडारण की पर्याप्तता पर अतिरिक्त सचिव–पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय की अध्यक्षता में एक अध्ययन में सदस्य सचिव के रूप में कार्य किया, जिसमें आपूर्ति श्रृंखला कमजोरियों, भंडारण बेंचमार्किंग, आयात विविधीकरण और घरेलू उत्पादन वृद्धि को शामिल किया गया। महानिदेशक–पीपीएसी ने सीबीजी पारिस्थितिकी तंत्र को मजबूत करने और एलएनजी आयात निर्भरता को कम करने के उपायों की सिफारिश करने के लिए सीबीजी मूल्य निर्धारण उप–समूह की भी अध्यक्षता की।

12.5.8 पेट्रोलियम और प्राकृतिक गैस विनियामक बोर्ड:

पेट्रोलियम और प्राकृतिक गैस विनियामक बोर्ड (पीएनजीआरबी) का गठन पीएनजीआरबी अधिनियम, 2006 के तहत किया गया था, जिसे 31 मार्च, 2006 के राजपत्र अधिसूचना के माध्यम से अधिसूचित किया गया था। यह अधिनियम उपभोक्ताओं और पेट्रोलियम, पेट्रोलियम उत्पादों और प्राकृतिक गैस से संबंधित निर्दिष्ट गतिविधियों में लगी कंपनियों के हितों की रक्षा करने और प्रतिस्पर्धी बाजारों को बढ़ावा देने और इससे जुड़े या उसके आनुषंगिक मामलों के लिए पीएनजीआरबी की स्थापना का प्रावधान करता है। अधिनियम के तहत बोर्ड को कच्चे तेल और प्राकृतिक गैस के उत्पादन को छोड़कर पेट्रोलियम, पेट्रोलियम उत्पादों और प्राकृतिक गैस की रिफाइनिंग, प्रोसेसिंग, भंडारण, परिवहन, वितरण, विपणन और बिक्री को नियंत्रित करना है ताकि देश के सभी हिस्सों में पेट्रोलियम, पेट्रोलियम उत्पादों और प्राकृतिक गैस की निर्बाध और पर्याप्त आपूर्ति सुनिश्चित की जा सके। पीएनजीआरबी का विजन इस प्रकार है:

"पेट्रोलियम, पेट्रोलियम उत्पादों और प्राकृतिक गैस को कम लागत में कुशलतापूर्वक पहुँचाने और वितरित करने के लिए बुनियादी ढांचे में निवेश को आसान बनाना, ताकि तेज़ और व्यवस्थित विकास के साथ एक मजबूत ऊर्जा बाजार बन सके। इसके साथ ही, निष्पक्ष व्यापार और प्रतिस्पर्धा के जरिए उपभोक्ताओं के हितों की सुरक्षा करना, ताकि भारतीय अर्थव्यवस्था की प्रतिस्पर्धात्मकता और ग्राहक संतुष्टि बढ़ सके।"

पीएनजीआरबी ने दिनांक 31 मार्च, 2025 तक देश भर में 34,233 किलोमीटर प्राकृतिक गैस पाइपलाइन नेटवर्क को अधिकृत किया है। 25,429 किलोमीटर पाइपलाइन चालू हैं, जिनमें सामान्य वाहक अनुबंध कनेक्टिविटी, समर्पित पाइपलाइन और सब ट्रांसमिशन पाइपलाइन शामिल हैं और शेष निर्माणाधीन हैं।

पीएनजीआरबी ने 31 मार्च, 2025 तक देश भर में 13,652.5 किलोमीटर पेट्रोलियम और पेट्रोलियम उत्पाद पाइपलाइनों को भी अधिकृत किया है, इसमें से 9,301 किलोमीटर पाइपलाइनें चालू हैं और शेष निर्माणाधीन हैं।

सीजीडी नेटवर्क के कवरेज का विस्तार करने के लिए, पीएनजीआरबी ने 12वें और 12ए सीजीडी बोली दौर के तहत 7 भौगोलिक क्षेत्रों को प्राधिकरण प्रदान किया है। अब तक देश भर में सीजीडी नेटवर्क के विकास के लिए 307 भौगोलिक क्षेत्रों को अधिकृत किया जा चुका है। पाइप्ड प्राकृतिक गैस कनेक्शन प्रदान करना नगर गैस वितरण (सीजीडी) नेटवर्क के विकास का एक हिस्सा है और यह कार्य पीएनजीआरबी द्वारा अधिकृत कंपनियों द्वारा किया जाता है। 31 मार्च, 2025 तक, इन संस्थाओं ने 1.50 करोड़ घरेलू पीएनजी कनेक्शन प्रदान किए हैं और देश भर में 8,067 सीएनजी स्टेशन स्थापित किए हैं।

पीएनजीआरबी ने एक हाइड्रोजन प्रकोष्ठ बनाया है और नियामक ढाँचों, तकनीकी मानकों, सुरक्षा दिशानिर्देशों और परीक्षण प्रयोगशालाओं जैसे प्रमुख क्षेत्रों में हाइड्रोजन अवसंरचना के कार्यान्वयन हेतु विस्तृत रोडमैप और कार्ययोजना तैयार करने के लिए आईसीएफ को भी नियुक्त किया है। पीएनजीआरबी ने वैश्विक सर्वोत्तम प्रथाओं के साथ सामंजस्य स्थापित करने और उद्योग में क्षमता निर्माण को बढ़ावा देने के लिए अमेरिकन सोसाइटी ऑफ मैकेनिकल इंजीनियर्स (एएसएमई), अमेरिकन पेट्रोलियम इंस्टीट्यूट (एपीआई) और राष्ट्रीय सुरक्षा परिषद (एनएससी) के साथ समझौता–ज्ञापनों पर हस्ताक्षर किए हैं।

पीएनजीआरबी भारत में नगर गैस वितरण नेटवर्क के तकनीकी और सुरक्षा पहलुओं को मजबूत करने के

लिए गुवाहाटी, असम में एक व्यापक ज्ञान साझाकरण कार्यशाला का आयोजन किया गया।

पीएनजीआरबी ने अप्रैल 2024 में विजाग में पहला प्राकृतिक गैस अवसंरचना सम्मेलन आयोजित किया है। इस सम्मेलन में तेल और गैस क्षेत्र में चल रहे विभिन्न मुद्दों पर विस्तृत पैनल चर्चा की गई।

पीएनजीआरबी ने शहरी या स्थानीय प्राकृतिक गैस वितरण नेटवर्क के लिए टी4एस विनियमों में संशोधनों को भी अधिसूचित किया है।

कैप्टिव पाइपलाइनें: पिछले कुछ वर्षों में, बोर्ड ने कई पाइपलाइनों, जिन्हें कंपनियों द्वारा कैप्टिव माना जाता है, को सामान्य वाहक या संविदा वाहक घोषित करने की प्रक्रिया शुरू की है, ताकि विभिन्न हितधारकों के लिए बेहतर पहुँच सुनिश्चित की जा सके, प्रतिस्पर्धी प्रथाओं को बढ़ावा दिया जा सके और यह सुनिश्चित किया जा सके कि बाज़ार की माँगें अधिक कुशलता से पूरी हों। सामान्य वाहक क्षमता तक पहुँच देने से अनावश्यक निवेश और अतिरेक से बचा जा सकेगा, प्रचालन सुगम और व्यवस्थित होगा, और सड़क व रेल जैसे कम कुशल परिवहन साधनों पर निर्भरता कम होगी। इससे बाज़ार की जवाबदेही बढ़ेगी, परिवहन लागत घटेगी, और पूरे क्षेत्र में संतुलित आपूर्ति श्रृंखला को बढ़ावा मिलेगा।

12.5.9 भारतीय स्ट्रेटेजिक पेट्रोलियम रिजर्व लिमिटेड:

भारत सरकार ने 7 जनवरी 2004 को देश की ऊर्जा सुरक्षा सुनिश्चित करने के लिए रणनीतिक पेट्रोलियम रिजर्व (एसपीआर) बनाने का निर्णय लिया। भारत अपनी आर्थिक गतिविधियों और विकास को समर्थन देने और नागरिकों की ऊर्जा जरूरतों को पूरा करने के लिए कच्चे तेल के आयात पर काफी हद तक निर्भर है। ऐसे में ये एसपीआर सुविधाएँ आपूर्ति श्रृंखला में किसी भी व्यवधान की स्थिति में, विशेषकर बाहरी कारणों से उत्पन्न समस्याओं में एक बफर का काम करेंगी। ये आपातकालीन भंडार भारत को यह सुनिश्चित करने में मदद करेंगे कि रिफाइनरियों को कच्चे तेल की आपूर्ति बनी रहे और पूरे देश में पेट्रोलियम उत्पादों की निर्बाध आपूर्ति जारी रहे। असाधारण परिस्थितियों में, इन बफर स्टॉक्स का उपयोग वैश्विक तेल की कीमतों में असामान्य वृद्धि को कुछ हद तक कम करने के लिए भी किया जा सकता है।

एसपीआर सुविधाओं के निर्माण के भारत सरकार के निर्णय को लागू करने के लिए, 16 जून 2004 को इंडियन ऑयल कॉर्पोरेशन लिमिटेड की एक सहायक कंपनी के रूप में एक विशेष प्रयोजन वाहन (एसपीवी) इंडियन स्ट्रेटेजिक पेट्रोलियम रिज़र्व लिमिटेड (आईएसपीआरएल) की स्थापना की गई। इसके बाद, जनवरी 2006 में, आईएसपीआरएल तेल उद्योग विकास बोर्ड (ओआईडीबी) की पूर्ण स्वामित्व वाली सहायक कंपनी बन गई।

12.5.9.1 आईएसपीआरएल चरण–I: एसपीआर कार्यक्रम के चरण–I के अंतर्गत, आईएसपीआरएल ने तीन स्थानों पर 5.33 एमएमटी क्षमता के साथ भूमिगत चट्टान गुफाओं में कच्चे तेल का निर्माण पूरा किया, जिनमें आंध्र प्रदेश में विशाखापत्तनम (1.33 एमएमटी) और कर्नाटक में मैंगलोर (1.5 एमएमटी) और पादुर (2.5 एमएमटी) शामिल हैं।

तीनों सुविधाएं अर्थात विशाखापत्तनम, मैंगलोर और पादुर को क्रमशः जून 2015, अक्तूबर 2016 और दिसंबर 2018 में चालू किया गया और 10 फरवरी 2019 को माननीय प्रधान मंत्री द्वारा राष्ट्र को समर्पित किया गया।

रणनीतिक कच्चे तेल की रिहाई/बिक्री एक अंतर–मंत्रालयी अधिकार प्राप्त समिति के माध्यम से की जाती है, जिसकी अध्यक्षता पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के सचिव करते हैं तथा वित्त मंत्रालय के व्यय विभाग के सचिव और शिपिंग मंत्रालय के सचिव इसके सदस्य होते हैं।

आईएसपीआरएल प्रमुख महत्वपूर्ण सरकारी कच्चे तेल भंडारों के संरक्षक के रूप में भंडारण सुविधाओं का प्रचालन करता है। यह आपूर्ति में किसी भी व्यवधान के दौरान रणनीतिक कच्चे तेल के भंडार को जारी करने और पुनःपूर्ति करने का समन्वय भी करता है।

अबू धाबी नेशनल ऑयल कंपनी (एडीएनओसी) के साथ समझौता: 10 फ़रवरी 2018 को एडीएनओसी और आईएसपीआरएल के बीच एक समझौते पर हस्ताक्षर किए गए, जिससे एडीएनओसी को मैंगलोर

स्थित एक कैवर्न का उपयोग करने की अनुमति मिली। समझौते के अनुसार, एडीएनओसी ने वर्ष 2018 में आईएसपीआरएल के मैंगलोर कैवर्न में लगभग 5.8 मिलियन बैरल कच्चा तेल भरा। एडीएनओसी इस तेल के 50% हिस्से का उपयोग भारत में अपने ग्राहकों को वाणिज्यिक आपूर्ति के रूप में कर सकता है, जबकि शेष तेल रणनीतिक भंडारण के रूप में रहेगा, जिसे प्राकृतिक आपदा या भू–राजनीतिक कारकों के कारण आपूर्ति में व्यवधान जैसी आपात स्थितियों से निपटने के लिए भारत सरकार के निर्देश पर जारी किया जाएगा।

आईएसपीआरएल के बीच हुए समझौते की शर्तों के अनुसार, एडीएनओसी ने दिसंबर 2019 में एचपीसीएल, विशाखापत्तनम को अपनी पहली वाणिज्यिक खेप सफलतापूर्वक भेजी। इसके बाद से, एडीएनओसी नियमित रूप से मैंगलोर एसपीआर से विभिन्न भारतीय रिफाइनरियों को कच्चे तेल की खेप बेच रहा है और अनुबंध की शर्तों के अनुसार पुनःपूर्ति कर रहा है।

डीजीएफटी की एक अधिसूचना जारी की गई है, जिसमें आईएसपीआरएल मैंगलोर कैवर्न–ए से कच्चे तेल के पुनर्निर्यात की अनुमति दी गई है। अधिसूचना के अनुसार, एएमआई (एडीएनओसी मार्केटिंग इंटरनेशनल (इंडिया) आरएससी लिमिटेड इंडिया) को एसटीई शर्तों से छूट दी गई है और उसे मैंगलोर एसपीआर स्थित अपने वाणिज्यिक भंडार से अपने खर्च पर कच्चे तेल का पुनर्निर्यात करने की अनुमति है। इसके बाद, मैसर्स एडीएनओसी को पुनर्निर्यात की अनुमति देने के लिए मैसर्स एडीएनओसी के साथ एक साइड लेटर समझौते पर हस्ताक्षर किए गए।

आईएसपीआरएल ने आपसी बातचीत के बाद, मंगलौर के लिए मौजूदा समझौते को अगले 7 वर्षों (3+2+) के लिए बढ़ाने हेतु सितंबर 2024 में एडीएनओसी के साथ एक समझौता–ज्ञापन पर हस्ताक्षर किए हैं। इसके अलावा, एडीएनओसी विशाखापत्तनम में कच्चे तेल का भंडारण करने का इरादा रखता है। इस पर बातचीत जारी है।

व्यावसायीकरण: मंत्रिमंडल ने 8 जुलाई 2021 को स्ट्रेटेजिक पेट्रोलियम रिजर्व (एसपीआर) के चरण–I के तहत बनाए गए पेट्रोलियम भंडार के एक भाग का व्यावसायीकरण कार्यों के लिए उपयोग करने के प्रस्तावों को मंजूरी दी।

आईएसपीआरएल ने किराए के लिए जगह बनाने हेतु अगस्त 2021 से जून 2023 तक सरकारी रिफाइनरियों एचपीसीएल और एमआरपीएल को कच्चा तेल जारी किया। आईएसपीआरएल ने कच्चे तेल की बिक्री से प्राप्त राजस्व के रूप में भारत सरकार के भारत–कोष खाते में 5372 करोड़ रुपए की संचयी राशि जमा की।

आंशिक व्यावसायीकरण की दिशा में पहले कदम के रूप में, आईएसपीआरएल ने 19 जनवरी, 2024 से विशाखापत्तनम में एचपीसीएल को 300 टीएमटी (2.17 मिलियन बैरल) कैवर्न क्षमता किराए पर देने के लिए एचपीसीएल के साथ एक समझौता किया है। 7 फरवरी, 2024 को गोवा में आईईडब्ल्यू 2024 की पृष्ठभूमि में आईएसपीआरएल के सीईओ और एमडी और एचपीसीएल के ईडी (आईटी) द्वारा अपर सचिव, एमओपीएनजी, सचिव ओआईडीबी, सीएमडी, एचपीसीएल और आईएसपीआरएल और एचपीसीएल के अन्य वरिष्ठ अधिकारियों की उपस्थिति में एक औपचारिक समझौते पर हस्ताक्षर किए गए। पट्टे पर दी गई क्षमता का उपयोग एचपीसीएल द्वारा बसरा मीडियम क्रूड ऑयल के भंडारण के लिए किया जाएगा। किसी आपात स्थिति में, भारत सरकार के पास इस कच्चे तेल के उपयोग का पहला अधिकार होगा। इसके साथ ही आईएसपीआरएल ने आत्मनिर्भरता की दिशा में पहले कदम के रूप में राजस्व उत्पन्न करना शुरू कर दिया है।

आईएसपीआरएल ने 10 जनवरी 2025 को एमआरपीएल को 760 टीएमटी कैवर्न स्थान किराए पर देने के लिए एलओए रखा है। हालाँकि, एमआरपीएल ने अभी तक आईएसपीआरएल के कैवर्न 'बी' में कच्चे तेल का भंडारण शुरू नहीं किया है क्योंकि आईएसपीआरएल एसईजेड अधिकारियों से आवश्यक अनुमोदन प्राप्त करने की प्रक्रिया में है।

12.5.9.2 आईएसपीआरएल चरण–II: मंत्रिमंडल ने 08 जुलाई 2021 को पीपीएम मोड पर समर्पित एसपीएम और संबंधित पाइपलाइनों के साथ चांदीखोल (4एमएमटी) और पादुर (2.5 एमएमटी) में चरण II के तहत वाणिज्यिक सह रणनीतिक भंडार के विकास के प्रस्ताव को मंजूरी दी।

मैसर्स डेलोइट को आरएफपी तैयार करने के लिए लेनदेन सलाहकार और मैसर्स एजेडबी एंड पार्टनर को पीपीपी मॉडल के लिए आवश्यक चरण ।। के रियायतकर्ता समझौते की तैयारी के लिए कानूनी सलाहकार नियुक्त किया गया है।

1) **कर्नाटक के उडुपी जिले के पादुर में चरण–।। के अंतर्गत 2.5 एमएमटी रणनीतिक पेट्रोलियम भंडार:** पादुर परियोजना हेतु भूमि अधिग्रहण हेतु, आईएसपीआरएल ने नवंबर 2020 में केआईएडीबी को 210 एकड़ भूमि अधिग्रहण की आवश्यकता प्रस्तुत की थी। केआईएडीबी ने 22 फरवरी 2023 को 214.79 एकड़ पादुर भूमि के लिए अंतिम राजपत्र अधिसूचना जारी की। आईएसपीआरएल ने मांग के अनुसार भूमि के लिए केआईएडीबी को 160.5 करोड़ रुपए और वन क्षेत्र भूमि, बागवानी और मुआवजे के लिए ₹15. 59 करोड़ का भुगतान किया है। आईएसपीआरएल ने 01.01.2025 तक केआईएडीबी से प्राप्त आरएंडआर पैकेज की मांग के अनुसार ₹30.0 करोड़ की राशि का भुगतान किया है।

रियायतग्राही समझौते के लिए भार–मुक्त भूमि उपलब्ध कराना एक पूर्व शर्त है। भूमि को यथाशीघ्र सौंपने के लिए सक्षम प्राधिकारी के साथ नियमित अनुवर्ती कार्रवाई की जा रही है।

पादुर–।। में परियोजना के विकास के लिए आरएफपी 19 दिसंबर 2024 को फिर से जारी किया गया था, जिसकी अंतिम तिथि 3 फरवरी 2025 थी, जिसे 27 फरवरी 2025 तक बढ़ा दिया गया था।

दिनांक 27.02.2025 को प्राप्त बोलियों का मूल्यांकन किया जा रहा है।

2) **जाजपुर जिले के चंदीखोल में चरण–।। के अंतर्गत 4.0 मिलियन मीट्रिक टन रणनीतिक पेट्रोलियम भंडार:** ओडिशा के जाजपुर जिले के चंदीखोल में 400 एकड़ भूमि के लिए आवेदन दिनांक 30.09.2019 को ओडिशा सरकार को प्रस्तुत किया गया। ओडिशा सरकार ने चंदीखोल परियोजना के लिए भूमि आवंटन हेतु आवेदन का मूल्यांकन करते हुए आईएसपीआरएल को एसपीआर के निर्माण हेतु वैकल्पिक स्थलों की खोज करने की सलाह दी है।

वैकल्पिक भूमि की तलाश में संभावित देरी और एक बार फिर व्यवहार्यता अध्ययन करने की आवश्यकता को देखते हुए, आईएसपीआरएल ने जुलाई 2024 में ओडिशा सरकार से चांदीखोल में भूमि आवंटित करने का अनुरोध किया, जिसके लिए आईएसपीआरएल ने पहले ही आवेदन प्रस्तुत कर दिया था और व्यवहार्यता अध्ययन पूरा कर लिया था।

ओडिशा सरकार ने 06.01.2025 को आयोजित 38वीं उच्च स्तरीय मंजूरी प्राधिकरण (एचएलसीए) बैठक में चांदीखोल में 4.0 एमएमटी क्षमता वाली एसपीआर स्थापित करने के लिए"सैद्धांतिक" स्वीकृति प्रदान की। इसके अलावा, 28 जनवरी 2025 को ओडिशा सरकार और आईएसपीआरएल के बीच एक समझौता–ज्ञापन पर हस्ताक्षर किए गए।

ओड़िशा सरकार द्वारा आवंटन के लिए चिह्नित क्षेत्र की पहचान करने के लिए 31 जनवरी 2025 को मैसर्स ईआईएल, आईएसपीआरएल और राजस्व अधिकारी का संयुक्त दौरा चंडीखोल स्थल पर किया गया।

28 फ़रवरी 2025 के पत्र के माध्यम से, आईएसपीआरएल ने ओडिशा सरकार द्वारा दनकरी गाँव में एचएएल को भूखंड संख्या आवंटित किए जाने की पुष्टि की है। आईएसपीआरएल ने प्रस्तावित भूमि पर उत्खनन गतिविधियों को रोकने का भी अनुरोध किया है।

3) **चरण–1 विस्तार:** प्रत्यायोजित निवेश बोर्ड (डीआईबी) ने 17.02.2023 को इंडियन स्ट्रेटेजिक पेट्रोलियम रिज़र्व लिमिटेड (आईएसपीआरएल) द्वारा मैंगलोर एमएसईजेडएल में एसपीआर और संबंधित सुविधाओं के निर्माण हेतु मैंगलोर विशेष आर्थिक क्षेत्र लिमिटेड (एमएसईजेडएल) से भूमि (154.9 एकड़) के अधिग्रहण के प्रस्ताव को मंजूरी दी। आईएसपीआरएल ने 17 मार्च 2023 को एमएसईजेडएल क्षेत्र मैंगलोर में भूमि (154.90 एकड़) के अधिग्रहण के लिए एमएसईजेडएल के साथ एक समझौता–ज्ञापन पर हस्ताक्षर किए हैं। आईएसपीआरएल ने समझौता–ज्ञापन की शर्तों के अनुसार भूमि के लिए कुल लीज़ प्रीमियम राशि के 10% के रूप में 112.69 करोड़ रुपए का भुगतान किया है।

उपर्युक्त स्थल के लिए विस्तृत व्यवहार्यता रिपोर्ट तैयार करने का कार्य ईआईएल को सौंपा गया था।

मैंगलोर में 1.55 एमएमटी क्षमता वाले गुफाओं के चरण–I विस्तार की स्थापना हेतु स्थलाकृति और जल–भूवैज्ञानिक सर्वेक्षण पूरा हो चुका है और डीएफआर हेतु आँकड़े एकत्र कर लिए गए हैं। ईआईएल द्वारा अंतिम डीएफआर प्रस्तुत कर दिया गया है।

ईआईएल द्वारा अंतिम डीएफआर और परियोजना लागत अनुमान जनवरी 2025 में प्रस्तुत कर दिया गया है। इसकी समीक्षा की जा रही है और इसे आवश्यक अनुमोदन के लिए सक्षम प्राधिकारी के समक्ष रखा जाएगा।

12.5.9.3 ओमान टैंक टर्मिनल कंपनी (ओटीटीसीओ) के साथ जुड़ाव

i. ओमान वर्तमान में दुक़म बंदरगाह के पास रास मरकज़ में एक संधारणीय ऊर्जा सुरक्षा परियोजना का निर्माण कर रहा है। 2014 में स्थापित ओमान टैंकिंग टर्मिनल कंपनी (ओटीटीसीओ), जो ओमान सल्तनत सरकार के पूर्ण स्वामित्व वाली एक वाणिज्यिक कंपनी, ओक्यू की पूर्ण स्वामित्व वाली सहायक कंपनी है, उपर्युक्त परियोजना के विकास में शामिल प्रमुख कंपनी है।

ii. ओटीटीसीओ ने मस्कट स्थित भारतीय दूतावास के माध्यम से आईएसपीआरएल को रास मरकज़ परियोजना में भाग लेने का अवसर प्रदान किया है। ओटीटीसीओ ने रास मरकज़ स्थित अपनी रिफ़ाइनरी के लिए 5.2 मिलियन बैरल क्षमता के ज़मीन के ऊपर कच्चे तेल के भंडारण टैंक पहले ही बना लिए हैं और 2022 में उन्हें चालू कर दिया जाएगा। समर्पित एसपीएम और संबंधित पाइपलाइनें भी चालू कर दी गई हैं।

iii. आईएसपीआरएल के सीईओ, एमडी और डिप्टी सीईओ की टीम ने भारतीय दूतावास के अधिकारी श्री अनूप बिजली के साथ 21 फरवरी, 2023 को टैंक भंडारण (5.2 मिलियन बैरल) और एसपीएम की हाल ही में चालू की गई सुविधाओं को देखने के लिए रज मरकज में ओटीटीसीओ टर्मिनल का दौरा किया। साइट विजिट के बाद, रस मरकज परियोजना के दूसरे चरण में आईएसपीआरएल की भागीदारी के लिए ओटीटीसीओ के सीईओ, श्री आर्ड वान हूफ के साथ चर्चा हुई। ओटीटीसीओ ने आईएसपीआरएल को इक्विटी के माध्यम से परियोजना में भाग लेने या चरण 2 के विस्तार में 5.2/10 मिलियन बैरल के लिए भंडारण स्थान लेने की पेशकश की। चर्चा के दौरान, आईएसपीआरएल ने दो मॉडलों के लिए सांकेतिक प्रस्तावों का अनुरोध किया:

1) विभिन्न व्यावसायिक मामलों पर विचार करते हुए टैंकों को पट्टे पर देना।

2) प्रस्तावित टैंक फार्म में इक्विटी शेयरिंग (25/50/90%), जिसमें 5.2 मिलियन बीबीएल क्षमता के लिए रास मरकज में पहले से निर्मित समान क्षमता के 8 टैंकों को शामिल किया गया है।

iv. जमीन के ऊपर भंडारण टैंकों के निर्माण के लिए व्यवहार्यता अध्ययन करने हेतु, ओटीटीसीओ ने दिनांक 25.06.2023 को आईएसपीआरएल के साथ एक समझौता–ज्ञापन पर हस्ताक्षर किए थे।

v. विभिन्न दौर की चर्चाओं के बाद, मैसर्स ओक्यू (ओटीटीसीओ की मूल कंपनी) ने 19.11.2024 के ईमेल के माध्यम से दिनांक 20.01.2025 को आईएसपीआरएल को विस्तृत पूंजीगत व्यय अनुमान (+/–30%) के साथ अपनी तकनीकी व्यवहार्यता रिपोर्ट (टीएफआर) प्रस्तुत की।

vi. अंतिम समीक्षा और मामूली सुधारों के बाद, 20 फरवरी 2025 को टीएफआर पर संयुक्त रूप से हस्ताक्षर किए गए। ओक्यू ने आगे बताया कि वे आईएसपीआरएल को एक गैर–बाध्यकारी प्रस्ताव ("एनबीओ") प्रस्तुत करने के लिए आंतरिक अनुमोदन प्राप्त करने की प्रक्रिया में हैं और सूचित किया कि वे अपेक्षित प्रस्तुति तिथि पर यथासमय अद्यतन करेंगे। एनबीओ +/–30% पूंजीगत व्यय अनुमान पर आधारित होगा।

vii. टीएफआर पर चर्चा के दौरान, ओक्यू ने आईएसपीआरएल को सूचित किया कि वे परियोजना के लिए आईएसपीआरएल द्वारा सैद्धांतिक रूप से मंजूरी दिए जाने तथा एफईईडी अध्ययन किए जाने के बाद +/–10% के साथ पूंजीगत व्यय अनुमानों के आधार पर अपना अंतिम फर्म वाणिज्यिक प्रस्ताव प्रस्तुत करेंगे।

12.5.9.4 अन्य परियोजनाएँ: भारत में बढ़ते आयात को देखते हुए, रणनीतिक भंडारण क्षमता को और बढ़ाने के लिए, आईएसपीआरएल ने निम्नलिखित के लिए व्यवहार्यता अध्ययन करने हेतु ईआईएल को नियुक्त किया है:

i. राजस्थान के बीकानेर में 5.625 एमएमटी क्षमता की साल्ट कैवर्न बनाने के लिए डीएफआर की तैयारी, साथ ही गैस भंडारण की व्यवहार्यता पर भी विचार किया जा रहा है। डीएफआर जुलाई 2025 के अंत तक अपेक्षित है।

ii. आईएसपीआरएल मैंगलोर में अतिरिक्त भूमि–उपर कच्चे तेल भंडारण टैंकों का निर्माण (चरण–I)। पीएफआर के जून, 2025 तक पूरा होने की उम्मीद है।

iii. एसपीआर के लिए पीएफआर अध्ययन। डेस्कटॉप अध्ययन प्रगति पर हैं। पीएफआर जून, 2025 तक पूरा होने की उम्मीद है।



सीपीसीएल को जेपी–7 और इसरोसीन ईंधन में सफलता के लिए एफआईपीआई पुरस्कारों में 'वर्ष का सर्वश्रेष्ठ नवप्रवर्तक–विशेष प्रशंसा' पुरस्कार प्राप्त हुआ



आईओसीएल और वाईएचपीएल, नेपाल के बीच समझौते का आदान–प्रदान



बेंगलुरु में 27वें ऊर्जा प्रौद्योगिकी शिखर सम्मेलन का उद्घाटन



आईईडब्ल्यू में माननीय मंत्री



पेट्रोलियम एवं प्राकृतिक गैस मंत्री और राजस्थान के माननीय मुख्यमंत्री द्वारा एचआरआरएल की बाड़मेर रिफाइनरी का दौरा



मैंगलोर में पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के सचिव के दौरे के दौरान आईटीबीपी बल गार्ड ऑफ ऑनर देते हुए



पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय द्वारा 21 मई 2024 को आयोजित 41वीं सुरक्षा परिषद की बैठक



मैंगलोर साइट के दौरे पर एमओपीएंडएनजी के अपर सचिव, और संयुक्त सचिव (एमएंडओआर)



इंजीनियर्स इंडिया लिमिटेड (ईआईएल) मुख्यालय में एक आधिकारिक बैठक के दौरान नेतृत्व टीम



आईटीसी (रूस)



इंडियन ऑयल (मॉरीशस) लिमिटेडः भंडारण टैंक



भारत के पश्चिमी तट पर ओएनजीसी प्लेटफार्म परिसर



ओएनजीसी विदेश मोजाम्बिक



कोव पॉइंट, मैरीलैंड, अमेरिका से गेल सागर को हरी झंडी दिखाकर रवाना करते हुए



बीपीसीएल विमानन ईंधन



आरजीआईपीटी का 8वां दीक्षांत समारोह



एचपीसीएल की छारा एलएनजी टर्मिनल परियोजना



पेट्रोनेट एलएनजी टर्मिनल, दहेज में एलएनजी भंडारण टैंक





अध्याय 13

एकीकृत वित्त प्रभाग (आईएफडी)

13 एकीकृत वित्त प्रभाग (आईएफडी)

अपर सचिव और वित्तीय सलाहकार (एएस एंड एफए) की अध्यक्षता वाला एकीकृत वित्त प्रभाग (आईएफडी) प्रशासनिक मंत्रालय/विभाग के सचिव को सहयोग देने के साथ–साथ वित्त मंत्रालय का प्रतिनिधित्व भी करता है। वित्तीय सलाहकार प्रशासनिक सचिवों को निम्नलिखित मामलों में सलाह देते हैं:–

i) नीति बनाते समय उसके वित्तीय प्रभाव पर ध्यान देना, और

ii) वित्त मंत्रालय द्वारा निर्धारित समग्र व्यापक ढाँचे के भीतर विभागीय लक्ष्यों और उद्देश्यों के अनुसार सिफारिशें करना।

आईएफडी मंत्रालय/विभाग की नीतियों और प्राथमिकताओं को समझते हुए, वित्त मंत्रालय द्वारा तय किए गए वित्तीय नियमों और सीमाओं के भीतर सचिव को रोजमर्रा के वित्तीय निर्णयों में मार्गदर्शन देता है। आईएफडी यह सुनिश्चित करता है कि बजट की सटीकता और सत्यनिष्ठा से समझौता किए बिना, विभाग की क्षेत्रीय प्राथमिकताओं, लक्ष्यों, उद्देश्यों और अपेक्षित परिणामों का ध्यान रखा जाए।

बजट अनुमान

(करोड़ में)

	वास्तविक 2023–24	बजट अनुमान 2024–25	संशोधित अनुमान 2024–25	वास्तविक 2024–25	बजट अनुमान 2025–26
राजस्व खंड					
सचिवालय–आर्थिक सेवाएँ	43.84	61.29	59.08	47.42	63.49
राज्य सरकारों को रॉयल्टी के अंतर का भुगतान	20.31	0.01	25.00	20.99	16.36
रणनीतिक कच्चे तेल भंडार (ओएंडएम) के लिए आईएसपीआरएल को भुगतान	152.93	220.04	100.00	100.00	179.00
प्रधानमंत्री जी–वन योजना	75.75	117.41	30.00	7.58	117.41
प्रत्यक्ष लाभ अंतरण–एलपीजी	1460.00	1500.00	500.00	375.27	1500.00
गरीब परिवारों को एलपीजी कनेक्शन	8500.00	9094.00	12700.00	12700	9100.00
पूर्वोत्तर क्षेत्र (घरेलू प्राकृतिक गैस) सहित देय अन्य सब्सिडी	1633.00	1200.00	1200.00	1103.73	1200.00
बीसीपीएल/असम गैस क्रैकर कॉम्प्लेक्स को फीडस्टॉक सब्सिडी	563.00	131.00	300.00	300.00	300.00
परियोजना प्रबंधन व्यय	84.00	0.01	0.01	0.01	0.01
इंद्रधनुष गैस ग्रिड लिमिटेड (आईजीजीएल) – उत्तर पूर्व प्राकृतिक गैस पाइपलाइन ग्रिड का एक भाग (कार्यक्रम घटक)	1043.38	1000.00	611.92	611.92	700.00
नुमालीगढ़ रिफाइनरी विस्तार परियोजना	475.5	275.00	275.00	275.00	24.50
भारत में व्यापारिक जहाजों के फ्लैगिंग को बढ़ावा देने की योजना	87.75	387.26	87.75	78.21	100.00
वैश्विक जैव ईंधन गठबंधन	60.00	0.01	0.00	0.00	0.00
बायोमास संग्रह के लिए वित्तीय सहायता प्रदान करने की योजना	0.00	150.00	20.00	1.72	150.00

नगर गैस वितरण (सीजीडी) नेटवर्क में संपीडित जैव गैस (सीबीजी) के अंतःक्षेपण हेतु पाइपलाइन अवसंरचना विकास योजना	0.00	497.25	30.00	0.00	250.00
पेट्रोलियम प्रयोगशाला समिति	0.00	0.01	0.00	0.00	0.00
भारतीय पेट्रोलियम ऊर्जा संस्थान	90.00	168.00	88.08	0.00	0.00
आरक्षित निधि, ओआईडीएफ में अतिरिक्त अंतरण'	0.00	0.00	1000.00	0.00	679.03
कुल (राजस्व)	**14289.46**	**14801.29**	**17026.84**	**15621.84**	**14379.80**
पूंजी खंड					
भूमि खरीद के लिए आईएसपीआरएल को भुगतान (चरण–I रणनीतिक पेट्रोलियम भंडार का विस्तार)	40.00	0.01	50.00	50.00	235.00
इंडियन स्ट्रेटेजिक पेट्रोलियम रिजर्व लिमिटेड (आईएसपीआरएल) चरण II (कंदराओं का निर्माण)	0.00	408.00	30.00	17.25	100.00
कच्चे तेल भंडार के लिए इंडियन स्ट्रेटेजिक पेट्रोलियम रिजर्व लिमिटेड (आईएसपीआरएल) को भुगतान	0.00	0.00	0.00	0.00	5597.00
तेल विपणन कंपनियों को पूंजी सहायता	0.00	0.01	0.00	0.00	0.00
मिशन अन्वेषण	0.00	332.00	50.00	50.00	592.00
भारत के विस्तारित महाद्वीपीय शेल्फ (ईसीएस) में क्षेत्रों का मूल्यांकन	0.00	388.00	50.00	50.00	100.00
सचिवालय–आर्थिक सेवाएँ	0.76	0.95	160.86	160.55	2.13
ओआईडीएफ को अंतरण	0.00	0.00	0.00	0.00	5697.00
कुल (पूंजी)	**40.76**	**1128.97**	**340.86**	**327.8026**	**12323.13**
कुल योग (राजस्व पूंजी)	**14330.22**	**15930.26**	**17367.70**	**15949.64**	**26702.93**

*वित्त वर्ष 2025–26 में उपयोग के लिए ₹1000.00 करोड़।

राजस्व/पूंजीगत प्राप्तियाँ **(₹ हजार में)**

		प्रथम छमाही		दूसरी छमाही		कुल
लेखा	**शीर्ष**	**अप्रैल–जून**	**जुलाई–सितंबर**	**अक्तूबर–दिसंबर**	**जनवरी–मार्च**	**अप्रैल–मार्च**
2021–22	पेट्रोलियम लाभ	19809074	22820128	21413773	22706597	86749572
	रॉयल्टी	12325810	13556057	14647537	16665494	57194898
	पीईएल शुल्क	17172	74432	91914	21082	204600
	पीएलपी	5111	7685	10598	2806	26200
	कुल	32157167	36458302	36163822	39395979	144175270
2022–23	पेट्रोलियम लाभ	34161199	16794202	13945031	12427731	77328163
	रॉयल्टी	24409904	25623592	25660334	24946170	100640000
	पीईएल शुल्क	20800	90347	113901	32053	257101
	पीएलपी	8080	8444	12224	10144	38892
	कुल	**58599983**	**42516585**	**39731490**	**37416098**	**178264156**
2023–24	पेट्रोलियम लाभ	15288113	11561854	10919356	13848771	51618094
	रॉयल्टी	24267398	24339541	25643683	23792580	98043202
	पीईएल शुल्क	48327	143125	99490	71526	362468
	पीएलपी	1242021	46228	148043	253551	1689843
	कुल	**40845859**	**36090748**	**36810572**	**37966428**	**151713607**

विस्तृत शीर्षक	6 महीने की कुल प्राप्तियां		कुल प्राप्तियां			24–25		25–26
	अप्रैल–सितंबर	अप्रैल–सितंबर*	21–22	22–23	23–24	बजट अनुमान	संशोधित अनुमान	बजट अनुमान
	23–24	24–25						
पेट्रोलियम लाभ	26849967	11848220	86749572	77328163	51618094	65119445	49534749	70998705
रॉयल्टी	48606939	49363981	57194897	100640000	98043202	91634023	84470003	88877706
पीईएल/एमएल शुल्क	191452	166589	204600	257100	362469	217277	333178	499767
पीएलपी और जीओएल–एसओआर	1288248	904383	26200	38900	1689842	222846	2170520	2170520
कुल	**76936606**	**62283173**	**144175269**	**178264163**	**151713607**	**157193591**	**136508450**	**162546698**

*foÙk o"k 2024&25 vçy l vxLr 2024 rd dh vof/k d fy, gA

मंत्रालय/विभाग/संघ राज्य क्षेत्र

प्रमुख शीर्षः 0050–लाभांश एवं लाभ

(रुपए हजार में)

क्र.सं. सीपीएसई/बैंक का नाम		दिनांक 31/3/24 की स्थिति के अनुसार दीर्घकालिक उधारी	31/3/24 को ऋण–इक्विटी अनुपात	23–24 के लिए सरकार को भुगतान किया गया लाभांश		23–24 के लिए भुगतान किया गया कुल लाभांश (कॉलम (क+ख) का योग)	24–25 में भुगतान किया जाने वाला अंतरिम लाभांश	24–25 के दौरान भुगतान किया गया कुल लाभांश (कॉलम (ख+घ) का योग)	31/03/24 को नकद/नकद समतुल्य	31/03/24 को सामान्य आरक्षित निधि	24–25 के दौरान पूंजीगत व्यय	25–26 के दौरान अनुमानित पूंजीगत व्यय
				2023–24 में अंतरिम लाभांश	2024–25 में भुगतान किया जाने वाला अंतिम लाभांश							
				क	ख	ग=क + ख	घ	ड.				
1	इंजीनियर्स इंडिया लिमिटेड	-	-	576917	288459	865376	576917	865376	11434600	20302576	500000	500000
2	गेल (इंडिया) लिमिटेड	115647500	0.29	18631673	-	18631673	13013758	13013758	5885942	-	101000000	84800000
3	आईओसीएल	577443000	0.66:1	36360999	50905398	87266397	21551978	72457377	8322000	1006568100	309090000	352938500
4	ओएनजीसी	39882480	0.02:1	72236454	18522168	90758622	84072505	102594673	300313000	2672342010	347250000	349000000
5	ओआईएल	71418300	0.26	7372500	2303900	9676400	8539795	18216195	30701700	430380400	68800000	78600000
6	बीपीसीएल	84898334	0.25:1	24132855	24132855	48265710	17513288	41646143	5163323	381606500	130000000	185000000
7	बॉमर लॉरी इन्वेस्टमेंट लिमिटेड			-	503352	503352			13075	531603	लागू नहीं	लागू नहीं
	कुल	**889289614**		**159311398**	**96656132**	**255967530**	**145268241**	**248793522**	**361833640**	**4511731189**	**956640000**	**1050838500**

l;'kkf/kr vuqeku 2024&25 vkj ctV vuqeku 2025&26 d vkdMs ctV d vuqlkj vufre gS D;kfd ih,l;w }kjk vHkh vfre :i fn;k tkuk ckdh gS

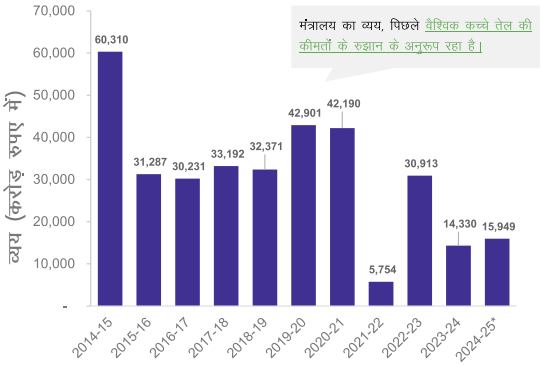
पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय

सीएस बजट आवंटन एवं रुझान विश्लेषण

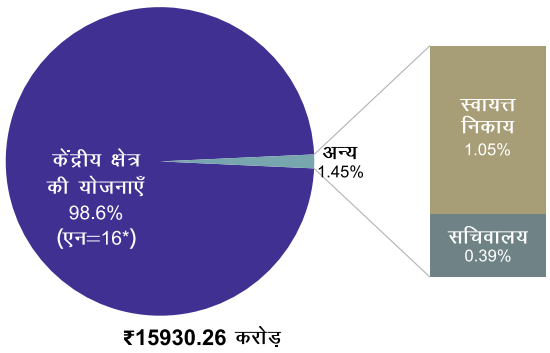
वित्त वर्ष 23–24 में, पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय का वास्तविक व्यय भारत सरकार के वास्तविक व्यय का 0.29% था।
वित्त वर्ष 24–25 में, पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के बजट का 98.5%, 22 केंद्रीय क्षेत्र की योजनाओं को आवंटित किया गया है।

वित्त वर्ष 2014–15 से 2024–25 तक मंत्रालय का व्यय
पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय

करोड़ रुपए में



अनुदान मांग 2024–25
पेट्रोलियम और प्राकृतिक गैस मंत्रालय



₹15930.26 करोड़

टिप्पणी: ' वित्त मंत्रालय द्वारा 2024–25 के आंकड़ों की पुष्टि अभी बाकी है।
स्रोत: केंद्रीय बजट 2023–24; पीआरएस

*शून्य बजट वाली योजनाओं को योजनाओं की गणना से बाहर रखा गया है
स्रोत: अनुदान मांग, बजट (2024–25)

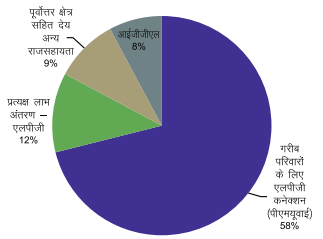
पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय

सीएस बजट आवंटन एवं रुझान विश्लेषण

शीर्ष 4 योजनाएँ पेट्रोलियम और प्राकृतिक गैस मंत्रालय के 2024–25 के सीएस बजट आवंटन में 80% से अधिक का योगदान देती हैं

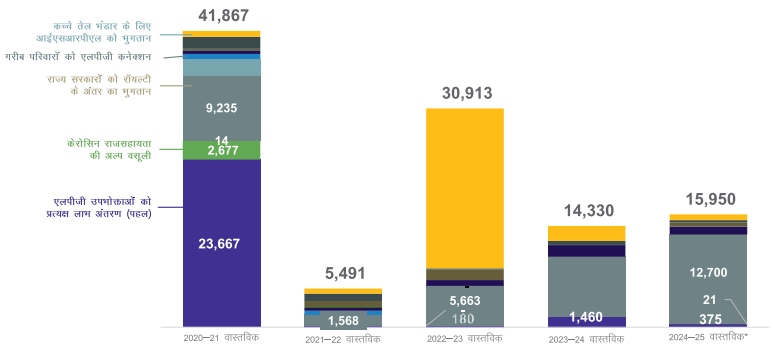
करोड़ रुपए में

अनुदान मांग 2024–25
पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय । योजना के अनुसार



₹15930.26 करोड़

सीएस बजट रुझान (वित्त वर्ष 2020–21 से वित्त वर्ष 2024–25)
एमओपीएनजी । 5 वार्षिक रुझान। योजनाओं के अनुसार



- **शीर्ष 4 योजनाएँ: गरीब परिवारों के लिए एलपीजी कनेक्शन (पीएमयूवाई), प्रत्यक्ष लाभ अंतरण–एलपीजी, इंद्रधनुष गैस ग्रिड लिमिटेड (आईजीजीएल), देय अन्य राजसहायता सहित पूर्वोत्तर क्षेत्र सीएस 2024–25 के बजट आवंटन में 80% का योगदान देता है।**
- अन्य में आईएसपीआरएल चरण II (कंदरा का निर्माण), रणनीतिक कच्चे तेल भंडार (ओएंडएम) के लिए आईएसपीआरएल को भुगतान, पीएम जी–वन योजना, बीसीपीएल/असम गैस क्रैकर कॉम्प्लेक्स को फीडस्टॉक सब्सिडी, एनआरईपी, मिशन अन्वेषण, भारत के विस्तारित महाद्वीपीय शेल्फ में क्षेत्रों का मूल्यांकन, सीजीडी नेटवर्क में सीबीजी के अंतःक्षेपण के लिए पाइपलाइन बुनियादी ढांचे के विकास की योजना और भारत में व्यापारी जहाजों के फ्लैगिंग को बढ़ावा देने की योजना शामिल है।

- प्रत्यक्ष लाभ अंतरण–एलपीजी का बजट अनुमान 2024–25, वित्त वर्ष 2023–24 के वास्तविक आंकड़ों की तुलना में बढ़ा है।
- गरीब परिवारों को एलपीजी कनेक्शन का बजट अनुमान 2024–25, वित्त वर्ष 2023–24 के वास्तविक आंकड़ों की तुलना में बढ़ा है।
- पूर्वोत्तर क्षेत्र सहित देय अन्य राजसहायता का बजट अनुमान 2024–25, वित्त वर्ष 2022–23 के वास्तविक आंकड़ों की तुलना में काफी कम हुआ है।
- बीसीपीएल/असम जीसीसी को फीडस्टॉक राजसहायता का बजट अनुमान 2024–25, वित्त वर्ष 22–23 के वास्तविक आंकड़ों की तुलना में काफी कम रहा।
- इंद्रधनुष गैस ग्रिड लिमिटेड का बजट अनुमान 2024–25, वित्त वर्ष 22–23 के वास्तविक आंकड़ों की तुलना में कम रहा।

स्रोत: अनुदान की मांग, बजट (2020–21, 21–22, 22–23, 23–24, 24–25) । *वित्त मंत्रालय द्वारा 2024–25 के आंकड़ों की पुष्टि अभी बाकी है।



परिशिष्ट

परिशिष्ट

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय

1. प्राकृतिक गैस, कोल बेड मीथेन, गैस हाइड्रेट्स और शेल गैस जैसे पेट्रोलियम संसाधनों की खोज और उत्पादन करना।
2. प्राकृतिक गैस, कोल बेड मीथेन और पेट्रोलियम उत्पादों का उत्पादन, आपूर्ति, वितरण, विपणन और मूल्य निर्धारण।
3. तेल रिफाइनरी और ल्यूब संयंत्रों का प्रचालन।
4. पेट्रोलियम और उसके उत्पादों में मिलाए जाने वाले योजकों से जुड़े कार्य।
5. जैव–ईंधन को मिलाने और उसके मिश्रण के लिए दिशा–निर्देश बनाना और मानक निर्धारित करना।
6. जैव–ईंधन और उसके मिश्रित उत्पादों का विपणन, वितरण और खुदरा बिक्री करना।
7. जैव–ईंधन से संबंधित समग्र समन्वय, राष्ट्रीय जैव–ईंधन नीति, जैव–ईंधन विकास बोर्ड के निर्माण को समर्थन देने हेतु नीति/योजना और मौजूदा संस्थागत तंत्र को सुदृढ़ बनाना तथा जैव–ईंधन के परिवहन, स्थिर और अन्य अनुप्रयोगों पर अनुसंधान, विकास और निष्पादन को बढ़ावा देना।
8. ल्यूब्रिकेंट्स और ग्रीस का निर्माण और मिश्रण करना।
9. पेट्रोलियम उत्पादों का संरक्षण।
10. मंत्रालय द्वारा प्रचालित सभी उद्योगों की योजना, विकास, नियंत्रण और सहायता करना।
11. विदेशों में तेल और गैस के हिस्सेदारी खरीदकर और अंतरराष्ट्रीय तेल व गैस पाइपलाइन परियोजनाओं में भाग लेकर देश की ऊर्जा सुरक्षा को मजबूत करना।
12. भारतीय सामरिक पेट्रोलियम रिजर्व लिमिटेड (आईएसपीआरआईएल) के जरिए रणनीतिक पेट्रोलियम भंडार का निर्माण और प्रबंधन करना।
13. सूची में निर्दिष्ट किसी भी विषय से संबंधित सभी संबद्ध या अधीनस्थ कार्यालय या अन्य संगठन, जिनमें हाइड्रोकार्बन महानिदेशालय (डीजीएच), उच्च प्रौद्योगिकी केंद्र (सीएचटी), तेल उद्योग विकास बोर्ड (ओआईडीबी), पेट्रोलियम संरक्षण अनुसंधान संघ (पीसीआरए), और पीपीएसी आदि शामिल हैं।
14. तेल क्षेत्र की सेवाओं की योजना, विकास और नियमों का प्रबंधन।
15. सूची में बताए गए विषय से जुड़ी सार्वजनिक क्षेत्र की परियोजनाएँ, सिवाय उन परियोजनाओं के जो विशेष रूप से किसी अन्य मंत्रालय या विभाग को दी गई हों।
16. तेल क्षेत्र (विनियमन और विकास) अधिनियम, 1948 (1948 का 53)
17. तेल एवं प्राकृतिक गैस आयोग (उपक्रम का अंतरण एवं निरसन) अधिनियम, 1993 (1993 का 65)
18. पेट्रोलियम पाइपलाइन (भूमि में उपयोगकर्ता के अधिकार का अर्जन) अधिनियम, 1962 (1962 का 50)
19. ईएसएसएसओ (भारत में उपक्रम का अधिग्रहण) अधिनियम, 1974 (1974 का 4)
20. तेल उद्योग (तैनाती अधिनियम, 1974 (1974 का 47)।
21. बर्मा–शेल (भारत में उपक्रम का अधिग्रहण) अधिनियम, 1976 (1976 का 2)।
22. कैल्टेक्स (कैल्टेक्स ऑयल रिफाइनिंग (इंडिया) लिमिटेड के शेयरों का अधिग्रहण अधिनियम, 1977
23. पेट्रोलियम अधिनियम, 1934 (1934 का 30) और उसके तहत बनाए गए नियमों का प्रशासन।
24. पेट्रोलियम और प्राकृतिक गैस विनियामक बोर्ड अधिनियम, 2006
25. ब्रह्मपुत्र क्रैकर एंड पॉलिमर लिमिटेड से संबंधित मामले।
26. एसएटीएटी पहल से संबंधित मामले।
27. प्राकृतिक गैस पाइपलाइनों से संबंधित मामले।
28. एलएनजी टर्मिनलों से संबंधित मामले।
29. राजीव गांधी पेट्रोलियम प्रौद्योगिकी संस्थान (आरजीआईपीटी) अधिनियम, 2007
30. तरलीकृत पेट्रोलियम गैस (आपूर्ति एवं वितरण विनियमन) आदेश, 2000
31. एलपीजी (डीबीटीएल) पहल के प्रत्यक्ष लाभ अंतरण से संबंधित मामला।
32. केरोसिन (डीबीटीके) में प्रत्यक्ष लाभ अंतरण से संबंधित मामला।
33. प्रधानमंत्री उज्ज्वला योजना (पीएमयूवाई) से संबंधित मामला।
34. सीपीएसई का प्रशासन, जिसमें उनकी सहायक कंपनियां और संयुक्त उद्यम शामिल हैं।

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के प्रशासनिक नियंत्रणधीन सार्वजनिक क्षेत्र के उपक्रमों और अन्य संगठनों की सूची।

I दिनांक 31.03.2025 की स्थिति के अनुसार भारत सरकार की हिस्सेदारी वाली तेल कंपनियाँ

1) ऑयल एंड नेचुरल गैस कॉर्पोरेशन लिमिटेड 58.89%

2) ऑयल इंडिया लिमिटेड 56.66%

3) गेल (इंडिया) लिमिटेड 51.52%

4) इंडियन ऑयल कॉर्पोरेशन लिमिटेड (आईओसीएल) 51.50%

5) भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड (बीपीसीएल) 52.98%

6) इंजीनियर्स इंडिया लिमिटेड 51.32%

II सहायक कंपनियाँ और अन्य कंपनियाँ

1. ओएनजीसी विदेश लिमिटेड – ओएनजीसी के पूर्ण स्वामित्व कंपनी
2. मैंगलोर रिफाइनरी एंड पेट्रोकेमिकल्स लिमिटेड – ओएनजीसी की सहायक कंपनी
3. हिन्दुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड (एचपीसीएल) – ओएनजीसी की सहायक कंपनी
4. पेट्रोनेट एमएचबी लिमिटेड (पीएमएनबीएल) – ओएनजीसी की सहायक कंपनी
5. ओएनजीसी ग्रीन लिमिटेड – ओएनजीसी के पूर्ण स्वामित्व कंपनी
6. भारत पेट्रो रिसोर्सेज लिमिटेड – बीपीसीएल की सहायक कंपनी
7. बीपीसीएल–केआईएएल फ्यूल फार्म फैसिलिटी प्रा. लिमिटेड – बीपीसीएल की सहायक कंपनी
8. नुमालीगढ़ रिफाइनरीज लिमिटेड – ऑयल इंडिया लिमिटेड की सहायक कंपनी
9. चेन्नई पेट्रोलियम कॉर्पोरेशन लिमिटेड – आईओसीएल की सहायक कंपनी
10. आईओसी ग्लोबल कैपिटल मैनेजमेंट आईएफएससी लिमिटेड – आईओसीएल की सहायक कंपनी
11. सर्टिफाइड कैटीऑन इंजीनियर्स इंटरनेशनल लिमिटेड – ईआईएल की पूर्ण स्वामित्व वाली सहायक कंपनी
12. गेल गैस लिमिटेड – गेल की पूर्ण स्वामित्व कंपनी
13. ब्रह्मपुत्र क्रैकर एंड पॉलीमर लिमिटेड – गेल की सहायक कंपनी
14. कोंकण एलएनजी लिमिटेड – गेल की सहायक कंपनी
15. त्रिपुरा नेचुरल गैस कंपनी लिमिटेड – गेल की सहायक कंपनी
16. बंगाल गैस कंपनी लिमिटेड – गेल की सहायक कंपनी
17. गेल मैंगलोर पेट्रोकेमिकल्स लिमिटेड – गेल की पूर्ण स्वामित्व वाली सहायक कंपनी।

III अन्य संगठन

18. तेल उद्योग विकास बोर्ड
19. तेल उद्योग सुरक्षा निदेशालय
20. उच्च प्रौद्योगिकी केंद्र
21. पेट्रोलियम योजना एवं विश्लेषण प्रकोष्ठ
22. हाइड्रोकार्बन महानिदेशालय
23. राजीव गांधी पेट्रोलियम एवं प्रौद्योगिकी संस्थान
24. पेट्रोलियम एवं प्राकृतिक गैस विनियामक बोर्ड
25. भारतीय पेट्रोलियम ऊर्जा संस्थान
26. इंडियन स्ट्रेटेजिक पेट्रोलियम रिजर्व्स लिमिटेड

	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25 ¼ih½
(1)	(2)	(3)	(4)	(5)	(6)	(7)
I. कच्चे तेल का उत्पादन (टीएमटी)						
आंध्र प्रदेश	243	195	202	236	250	284
अरुणाचल प्रदेश	56	53	48	47	52	50
असम	4093	3902	3988	4164	4359	4452
गुजरात	4707	4651	4627	4850	4950	5135
राजस्थान	6653	5891	5887	5074	4421	3429
तमिलनाडु	415	410	367	324	294	263
त्रिपुरा	-	-	3	3	2	2
पश्चिम बंगाल	-	-	0.05	0.01	0.00	0.00
अपतटीय	16003	15391	14569	14480	15027	15087
कुल कच्चा तेल उत्पादन	**32170**	**30494**	**29691**	**29179**	**29357**	**28702**
जिनमें से						
ओएनजीसी–नामांकन	20627	20183	19451	19493	19210	18466
ओआईएल–नामांकन	3107	2937	2987	3156	3344	3443
निजी/संयुक्त उद्यम–पीएससी आरएससी/सीबीएम	8436	7374	7253	6530	6803	6793
II. प्राकृतिक गैस उत्पादन (एमएमएससीएम)						
आंध्र प्रदेश	912	827	809	710	722	753
अरुणाचल प्रदेश	46	55	58	53	40	42
असम	3141	2995	3371	3557	3489	3551
गुजरात	1342	1138	1017	923	926	1053
झारखंड (सीबीएम)	5	2	4	10	5	47
मध्य प्रदेश (सीबीएम)	345	334	290	264	234	294
राजस्थान	1883	2040	2619	2340	2199	1786
तमिलनाडु	1097	911	1067	1109	1016	1013
त्रिपुरा	1473	1634	1531	1675	1525	1224
पश्चिम बंगाल (सीबीएम)	306	307	389	399	411	415
अपतटीय	20635	18429	22869	23409	25871	25928
कुल प्राकृतिक गैस उत्पादन	**31184**	**28673**	**34024**	**34450**	**36438**	**36106**
जिनमें से						
ओएनजीसी–नामांकन	23746	21872	20629	19969	19316	18792
ओआईएल–नामांकन	2668	2480	2893	3041	3090	3171
पीएससी व्यवस्था	4770	4321	10502	11440	14032	14143

पीः अनंतिम

टिप्पणीः 1. कच्चे तेल के उत्पादन में संघनित तेल शामिल है।

2. पूर्णांकन के कारण आंकड़े मेल नहीं खा सकते हैं।

स्रोतः ऊर्जा एवं आपूर्ति विभाग, पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय

स्थापित क्षमता और रिफाइनरी क्रूड थ्रूपुट (प्रोसेस किया गया कच्चा तेल)

(आंकड़े टीएमटी में)

रिफाइनरी	स्थापित क्षमता	रिफाइनरी क्रूड थ्रूपुट					
	01.04.2025	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25 ¼ih½
(क) सार्वजनिक क्षेत्र	157316	156958	137575	145491	161499	165886	168900
1. आईओसीएल, गुवाहाटी, असम – 1962	1200	892.40	849.24	730.22	1079.67	1000.49	1178.20
2. आईओसीएल, बरौनी, बिहार – 1964	6000	6515.53	5469.22	5619.66	6785.39	6617.70	6513.26
3. आईओसीएल, कोयली, गुजरात – 1965	13700	13075	11603	13474	15567	15202	15283
4. आईओसीएल, हल्दिया, पश्चिम बंगाल – 1975	8000	6463.29	6758.51	7305.46	8506.48	8059.59	6934.50
5. आईओसीएलमथुरा, उत्तर प्रदेश – 1982	8000	8948	8926	9123	9573	9191	8054
6. आईओसीएल, डिगबोई, असम – 1901	650	664.23	605.11	707.83	712.92	710.21	774.11
7. आईओसीएल, पानीपत, हरियाणा – 1998	15000	15038.10	13181.32	14848.85	13810.14	14304.74	15398.27
8. आईओसीएल, बोंगाईगांव, असम – 1974	2700	2044.82	2450.46	2638.50	2775.04	3008.86	2772.08
9. आईओसीएल, पारादीप, ओडिशा – 2016	15000	15778.20	12507.94	13217.40	13598.53	15213.43	14657.09
कुल आईओसीएल	**70250**	**69419**	**62351**	**67665**	**72408**	**73308**	**71564**
10. बीपीसीएल, मुंबई, महाराष्ट्र – 1955	12000	15017	12941	14437	14546	15052	15529
11. बीपीसीएल, कोच्चि, केरल – 1963	15500	16515	13282	15402	16017	17314	17193
12. बीओआरएल, बीना, मध्य प्रदेश – 2011	7800	12242	10072	7410	7841	7133	7709
कुल बीपीसीएल	**35300**	**43774**	**36294**	**37248**	**38404**	**39499**	**40431**
13. एचपीसीएल, मुंबई, महाराष्ट्र – 1954	9500	8065	7374	5558	9804	9640	9958
14. एचपीसीएल, विशाख, आंध्र प्रदेश – 1957	13700	9115	9050	8410	9287	12689	15310
कुल एचपीसीएल	**23200**	**17180**	**16425**	**13968**	**19091**	**22329**	**25268**
15. सीपीसीएल, मनाली, तमिलनाडु – 1965	10500	10161	8243	9040	11316	11642	10454
16. सीपीसीएल– सीबीआर, नरीमनम तमिलनाडु – 1993	0	-	-	-	-	-	-
कुल सीपीसीएल	**10500**	**10161**	**8243**	**9040**	**11316**	**11642**	**10454**
17. एनआरएल, नुमालीगढ़, असम–1999	3000	2383	2707	2624	3091	2510	3066
18. एमआरपीएल, मैंगलोर, कर्नाटक– 1996	15000	13953	11475	14871	17116	16533	18044
19. ओएनजीसी, ततिपका, आंध्र प्रदेश – 2001	66	87	81	75	73	65	74
(ख) निजी और जेवी क्षेत्र	**99500**	**101757**	**88080**	**96213**	**93733**	**95660**	**99714**
20. आरआईएल, जामनगर, गुजरात – 1999	33000	33019	34100	34757	34433	34390	34990
21. आरआईएल, जामनगर (एसईजेड), गुजरात – 2008	35200	35876	26841	28264	27872	28300	31192
कुल आरआईएल	**68200**	**68895**	**60941**	**63021**	**62305**	**62690**	**66182**
22. एनईएल, वाडिनार, गुजरात – 2006	20000	20620	17067	20164	18692	20322	20487
23. एचएमईएल, भटिंडा, पंजाब – 2012	11300	12242	10072	13027	12735	12648	13045
कुल योग (क+ख)	**256816**	**258715**	**225656**	**241704**	**255232**	**261546**	**268613**

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पेट्रोलियम उत्पादों का उत्पादन

(आंकड़े टीएमटी में)

उत्पाद	2019-20	2020-21	2021-22	2022-23	2023-24 ¼i h½	2024-25 ¼i h½
	(2)	(3)	(4)	(5)	(6)	(7)
एलपीजी	12823	12072	12238	12831	12779	12788
मोटर स्पिरिट	38616	35779	40238	42817	45081	48265
नेफ्था	20577	19381	19994	17036	18274	18308
एटीएफ	15238	7092	10294	15039	17124	17752
केरोसिन	3211	2393	1913	941	983	1008
एचएसडी	111120	100441	107176	113776	115943	118221
एलडीओ	620	729	805	646	657	632
कुल ईंधन तेल	**9253**	**7431**	**8921**	**10263**	**10442**	**10859**
जिनमें से						
क) भट्ठी तेल	8858	7071	8509	9590	9698	10326
ख) एलएसएचएस/ एचएचएस/आरएफओ	395	360	412	673	744	533
ल्यूब ऑयल	932	1069	1173	1445	1352	1300
बिटुमेन	4892	4902	5111	4914	5240	5303
अन्य	31008	30185	30934	31444	33129	49335
पेट्रोलियम उत्पादों का कुल उत्पादन	**262940**	**233513**	**254306**	**266539**	**276058**	**283771**
जिनमें से						
रिफाइनरीज	258181	229301	250254	263047	272576	280452
अंशांकन	4760	4212	4051	3492	3482	3318

नोटः आंकडों को पूर्णांकित किए जाने के कारण योग का मिलान नहीं हो सकता है। पीः अनंतिम

'अन्य उत्पादों में प्रोपिलीन, सॉल्वैंट्स (हेक्सेन, बेंजीन, टोल्यूनि, जाइलीन और विशेष सॉल्वैंट्स), रिफॉर्मेट, खनिज तारपीन तेल, कार्बन ब्लैक फीड स्टॉक, मोम, सल्फर और पेटकोक आदि शामिल हैं।

स्रोतः पीपीएसी

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पेट्रोलियम उत्पादों की खपत

(आंकड़े टीएमटी में)

उत्पाद	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25 ¼i h½
	(2)	(3)	(4)	(5)	(6)	(7)
एलपीजी	26330	27558	28330	28504	29664	31320
मोटर स्पिरिट	29975	27969	30849	34976	37219	40005
नेफ्था	14268	14100	14277	12127	13812	13153
एसकेओ	2397	1798	1494	490	479	408
एटीएफ	7999	3698	5008	7378	8247	8985
एचएसडीओ	82602	72713	76687	85900	89626	91407
एलडीओ	628	855	1020	726	782	838
ईंधन तेल (एफओएलएसएचएस)	6302	5586	6255	6958	6520	6459
ल्यूब/ग्रीस	3833	4097	4570	3737	4087	4589
बिटुमेन	6720	7524	7874	8041	8807	8330
पेट्रोलियम कोक	21708	15605	15772	18343	20319	22063
अन्य	11365	12791	12099	15842	14696	11614
कुल खपत	**214127**	**194295**	**204233**	**223022**	**234259**	**239171**

नोटः उपभोग में तेल कंपनियों की बिक्री, स्व–उपभोग और सीधे निजी आयात शामिल हैं। पीः अनंतिम आंकड़े

स्रोतः पीपीएसी

कच्चे तेल और पेट्रोलियम उत्पादों का आयात/निर्यात

मद	2020-21			2021-22			2022-23			2023-24			2024-25 (P)		
	टीएमटी	₹ करोड़	मिलियन यूएसडी	टीएमटी	₹ करोड़	मिलियन यूएसडी	टीएमटी	₹ करोड़	मिलियन यूएसडी	टीएमटी	₹ करोड़	मिलियन यूएसडी	टीएमटी	₹ करोड़	मिलियन यूएसडी
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
आयात															
1. कच्चे तेल का आयात	196461	459779	62248	212382	901262	120675	232700	1260372	157531	234262	1105176	133366	243225	1160618	137174
2. एलएनजी आयात	25055	58329	7881	23417	100521	13472	19852	137210	17114	23996	110994	13405	26959	125953	14908
3. पेट्रोलियम उत्पाद आयात	43248	109430	14770	39017	176835	23656	44598	215854	26912	48693	190069	22933	50903	200183	23673
पेट्रोलियम उत्पाद आयात															
एलपीजी	16476	53752	7242	17043	91468	12235	18335	107191	13344	18514	86361	10412	20667	105679	12479
एमएस	1351	4950	674	671	3895	519	1069	8846	1094	717	5500	663	235	1573	188
नेफ्था	1199	3844	518	237	1499	199	897	4781	593	1211	6627	800	941	5347	636
एटीएफ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
एसकेओ	3	12	2	0	0	0	0	0	0	0	0	0	0	0	0
एचएसडी	648	1960	265	43	253	34	322	3584	454	42	312	38	42	276	33
एलओबीएस/ल्यूब ऑयल	2693	12170	1647	3058	19704	2642	2152	18449	2301	2412	19129	2310	2864	21894	2591
ईंधन तेल	6454	14312	1936	8980	32815	4379	8563	33474	4202	9053	33669	4061	7674	29049	3444
बिटुमेन	2055	4325	586	2581	7678	1029	2797	9945	1237	3244	10875	1314	2900	9326	1100
पेटकोक	8256	6410	861	4213	8203	1097	8664	18157	2263	10956	14310	1729	13153	13625	1611
अन्य (1)	4112	7695	1038	2189	11319	1521	1799	11425	1425	2544	13286	1606	2428	13414	1592
कुल आयात (123)	264763	627537	84899	274815	1178618	157803	297151	1613435	201557	306951	1406238	169704	321087	1486754	175755
निर्यात															
एलपीजी	452	1797	241	513	3214	430	540	3891	486	525	3215	389	551	3611	427
एमएस	11606	36530	4977	13482	81649	10879	13127	102800	12868	13472	92957	11249	15830	98379	11613
नेफ्था	6509	18643	2530	6861	37231	4984	5714	33357	4184	5275	27019	3262	5169	28633	3385
विमानन टरबाइन ईंधन	3544	9377	1287	5186	27112	3661	7264	58598	7285	8579	57959	6994	8554	51267	6075
केरोसिन	15	48	7	14	77	10	11	100	13	11	82	10	12	84	10
डीजल	30576	81611	11132	32407	164741	22088	28496	230826	28861	28204	182400	22062	28027	161826	19106
ल्यूब	15	93	12	10	114	15	14	205	26	15	200	24	17	306	36
ईंधन तेल	1177	2318	313	1757	6633	890	1841	7834	973	2103	7961	959	2413	9050	1069
बिटुमेन	7	23	3	6	28	4	9	42	5	18	72	9	23	98	12
पेटकोक/सीबीएफएस	577	292	39	187	553	74	284	648	81	28	23	3	692	3231	386
अन्य (2)	2290	6436	865	2330	10449	1402	3717	20427	2542	4362	22835	2756	3786	19284	2288
पेट्रोलियम उत्पादों का निर्यात	56769	157168	21406	62755	331801	44438	61015	458729	57323	62593	394723	47717	65076	375769	44407
शुद्ध आयात	207995	470369	63493	212061	846817	113365	236136	1154707	144234	244358	1011515	121986	256011	1110986	131348
शुद्ध पेट्रोलियम उत्पाद निर्यात	13521	47738	6636	23738	154966	20782	16417	242875	30411	13900	204655	24785	14173	175586	20733

पीः अनंतिम स्रोतः पेट्रोलियम योजना एवं विश्लेषण प्रकोष्ठ (1) आयात में अन्य के तहत वीजीओ, पैराफिन वैक्स, पेट्रोलियम जेली, एविएशन गैस, एमटीबीई, रिफॉर्मेट आदि शामिल हैं। (2) निर्यात में अन्य के तहत वीजीओ, बेंजीन, हेक्सेन, एमटीओ, सल्फर आदि शामिल हैं।

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(आंकड़े करोड़ रुपए में)

आंतरिक एवं बाह्य बजटीय संसाधन

lhih, lb	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
	वास्तविक	वास्तविक	वास्तविक	वास्तविक	वास्तविक	वास्तविक
(1)	(2)	(3)	(4)	(5)	(6)	(7)
ओएनजीसी	29538	26859	27741	30208	37494	61110
ओवीएल	5435	5734	4681	2704	3259	5023
ओआईएल	4247	13332	4367	5534	5907	7624
गेल	4562	6253	7148	9099	11426	10258
आईओसीएल	31421	28684	30391	37287	42236	37557
बीपीसीएल	11064	11064	11860	12120	11702	16508
एचपीसीएल	16311	14700	16771	14084	14412	13630
एमआरपीएल	1318	2179	674	625	1600	1006
सीपीसीएल	961	583	636	654	611	660
एनआरएल	529	1029	3605	6596	7984	9038
बीएल	46	43	22	52	59	50
ईआईएल	171	733	70	62	132	72
कुल (आईएंडईबीआर)	**105603**	**111194**	**107968**	**119027**	**136821**	**162537**

स्रोतः केंद्रीय सार्वजनिक क्षेत्र उद्यम

पीएसयू–वार भिन्नता: कर–पूर्व लाभ (पीबीटी) और कर–पश्चात लाभ (पीएटी) 2024–25 बनाम 2023–24

ओएनजीसी: ओएनजीसी का 12 महीने का वित्त वर्ष 2024–25 के लिए पीबीटी ₹53,016 करोड़ की तुलना में ₹46,760 करोड़ है। 12 महीने के वित्तीय वर्ष 2023–24 के लिए। इसी प्रकार, 12 महीने के वित्तीय वर्ष 2024–25 के लिए ओएनजीसी का कर पश्चात लाभ ₹35,610 करोड़ है, जबकि 12 महीने के वित्तीय वर्ष 2023–24 के लिए यह ₹40,526 करोड़ था। 12 महीने के वित्तीय वर्ष 2024–25 के दौरान कर पश्चात लाभ और कर पश्चात लाभ में कमी के कारण ₹4,257 करोड़ की खोज लागत में वृद्धि, मूल्यह्रास, ह्रास और हानि (डीडीएंडआई लागत) में ₹3,858 करोड़ की वृद्धि, स्टॉक में भिन्नता में ₹1,389 करोड़ की वृद्धि, प्रचालन व्यय में ₹753 करोड़ की वृद्धि, वित्त लागत में ₹523 करोड़ की वृद्धि और विनिमय हानि में ₹460 करोड़ की वृद्धि हुई। हालाँकि, व्यय में उपर्युक्त वृद्धि ₹5,830 करोड़ की वैधानिक शुल्कों में कमी के कारण आंशिक रूप से संतुलित हो गई।

ओवीएल: ओएनजीसी विदेश का वित्त वर्ष 2024–25 के लिए पीबीटी ₹1,726 करोड़, वित्त वर्ष 2023–24 (पुनर्घोषित) के ₹1,580 करोड़ की तुलना में ₹147 करोड़ (9.3%) अधिक है। यह वृद्धि मुख्य रूप से कम व्यय, हानि शुल्क और ₹2,057 करोड़ के विदेशी मुद्रा लाभ के कारण है, जिसकी आंशिक भरपाई इक्विटी–लेखा वाली संस्थाओं से ₹1,911 करोड़ के कम लाभ से होती है। हालाँकि, कंपनी के मालिकों को दिया जाने वाला कर–पश्चात लाभ ₹85 करोड़ कम है, जो वित्त वर्ष 2023–24 में ₹541 करोड़ से वित्त वर्ष 2024–25 में ₹456 करोड़ हो गया। उच्च कर व्यय और गैर–नियंत्रित हित के व्यय के कम हिस्से ₹232 करोड़ ने वित्त वर्ष 2024–25 में कर–पश्चात लाभ को कम कर दिया है।

गेल: गेल का कर–पूर्व लाभ (पीबीटी) वित्त वर्ष 2024–25 में बढ़कर ₹14,825 करोड़ हो गया, जबकि वित्त वर्ष 2023–24 में यह ₹11,555 करोड़ था। कर–पश्चात लाभ (पीएटी) वित्त वर्ष 2023–24 में ₹8,836 करोड़ के मुकाबले वित्त वर्ष 2024–25 में बढ़कर ₹11,312 करोड़ हो गया। वित्त वर्ष 2024–25 के दौरान मजबूत निष्पादन मुख्य रूप से सभी प्रमुख क्षेत्रों में बेहतर भौतिक निष्पादन से प्रेरित है।

आईओसीएल: आईओसीएल का कर–पूर्व लाभ (पीबीटी) 2024–25 में ₹15,882 करोड़ था, जबकि 2023–24 में यह ₹52,344 करोड़ था और कर–पश्चात लाभ (पीएटी) ₹12,962 करोड़ था, जबकि पिछले वित्त वर्ष में यह ₹39,619 करोड़ था। वित्त वर्ष 2023–24 की तुलना में 2024–25 के लिए पीबीटी और पीएटी में कमी मुख्य रूप से पिछले वर्ष की तुलना में अंतरराष्ट्रीय बाजार में उत्पाद क्रैक में गिरावट के कारण कोर रिफाइनिंग मार्जिन में कमी और पिछले वर्ष की तुलना में कुछ पेट्रोलियम उत्पादों की खुदरा बिक्री पर विपणन लाभ में कमी के कारण है। इसके अलावा, चालू वर्ष में इन्वेंट्री घाटे और पिछले वर्ष की तुलना में विनिमय घाटे में वृद्धि ने भी लाभप्रदता में कमी में योगदान दिया है। कृपया आईओसीएल के एकल वित्तीय विवरणों के संबंध में पीबीटी और पीएटी की स्थिति नीचे देखें:

(राशि ₹ करोड़ में)

विवरण	2024–25	2023–24
कर–पूर्व लाभ	15,882.34	52,344.21
कर पश्चात् लाभ	12,961.57	39,618.84

बीपीसीएल का कर–पूर्व लाभ (पीबीटी) ₹13,402 करोड़ था। 2024–25 (अप्रैल–दिसंबर) में ₹29,905 करोड़ की तुलना में 2023–24 (अप्रैल–दिसंबर) में ₹10,061 करोड़ का कर–पश्चात लाभ (पीएटी) हुआ, जबकि पिछले वित्तीय वर्ष की इसी अवधि में ₹22,449 करोड़ था। बीपीसीएल के लिए 2023–24 की तुलना में 2024–25 में कर–पश्चात लाभ (पीबीटी) और कर–पश्चात लाभ (पीएटी) में अंतर।

(राशि ₹ करोड़ में)

विवरण	2024–25	2023–24
कर–पश्चात लाभ / (हानि)	17,664	35,548
कर–पश्चात लाभ / (हानि)	13,275	26,674

वर्तमान अवधि में एलपीजी में कम जीआरएम और अल्प–वसूली के कारण वर्ष 2024–25 का लाभ पिछले वर्ष की तुलना में कम है।

एचपीसीएल: एचपीसीएल का कर–पूर्व लाभ (पीबीटी) वित्त वर्ष 2024–25 में ₹9,621 करोड़ था, जबकि वित्त वर्ष 2023–24 में यह ₹19,153 करोड़ था और कर–पश्चात लाभ (पीएटी) वित्त वर्ष 2024–25 में ₹7,365 करोड़ था, जबकि वित्त वर्ष 2023–24 में यह ₹14,694 करोड़ था।

एमआरपीएल: वित्त वर्ष 2024–25 के दौरान कर–पूर्व लाभ ₹113.26 करोड़ और कर–पश्चात लाभ ₹51.58 करोड़ है।

सीपीसीएल: सीपीसीएल ने वित्त वर्ष 2024–25 में ₹70,963 करोड़ का कारोबार, ₹208 करोड़ का कर–पूर्व लाभ और ₹174 करोड़ का कर–पश्चात लाभ दर्ज

किया, जबकि वित्त वर्ष 2023–24 में ₹79,207 करोड़ का कारोबार, ₹3660 करोड़ का कर–पश्चात लाभ और ₹2711 करोड़ का कर–पश्चात लाभ होगा। सीपीसीएल ने एक क्रूड यूनिट और सेकेंडरी उपचार सुविधाओं के बंद होने (एमएंडए) के बावजूद 10.454 एमएमटी क्रूड थ्रूपुट के साथ अपना बेहतर प्रचालन निष्पादन जारी रखा। वित्त वर्ष 2024–25 के लिए, कुल रिफाइनरी मार्जिन (जीआरएम) 4.22 अमेरिकी डॉलर प्रति बैरल दर्ज किया गया, जबकि सिंगापुर का जीआरएम 3.8 अमेरिकी डॉलर प्रति बैरल था। सीपीसीएल ने लगातार सिंगापुर जीआरएम से बेहतर निष्पादन किया, क्योंकि उसने रिफाइनरी उत्पादन को अनुकूलित किया, उत्पाद वितरण को सुधारा, कच्चे तेल की खरीद रणनीतियों को बेहतर बनाया और सेकेंडरी यूनिटों की प्रोसेसिंग क्षमता का कुशल उपयोग किया।

एनआरएलः 31 मार्च 2025 को समाप्त वर्ष के लिए कर–पूर्व लाभ (पीबीटी) वित्त वर्ष 2023–24 में ₹2,912.37 करोड़ की तुलना में 23.94% कम होकर ₹2,215.28 करोड़ रहा। 31 मार्च 2025 को समाप्त वित्त वर्ष के लिए कर–पश्चात लाभ (पीएटी) ₹1,607.77 करोड़ रहा, जो पिछले वित्त वर्ष के इसी अवधि में ₹2,160.11 करोड़ की तुलना में ₹552.34 करोड़ कम है। कम लाभ मुख्य रूप से चालू वित्त वर्ष के दौरान उत्पाद के मार्जिन में कमी के कारण है।

बीएलसीएलः कंपनी ने वित्त वर्ष 2024–25 में ₹2577.63 करोड़ का शुद्ध कारोबार हासिल किया, जबकि 2023–24 के दौरान यह ₹2404.17 करोड़ था, जो पिछले वर्ष की तुलना में लगभग 7% की वृद्धि दर्ज करता है। वित्त वर्ष 2024–25 में कर पूर्व लाभ ₹313.79 करोड़ रहा, जो वर्ष 2023–24 के ₹278.65 करोड़ की तुलना में लगभग 13% की वृद्धि दर्शाता है।

ईआईएलः 31 मार्च 2025 को समाप्त अवधि के लिए कर–पूर्व लाभ और कर–पश्चात लाभ क्रमशः ₹616.73 करोड़ और ₹465.24 करोड़ था।

सीएजी लेखापरीक्षा पैरा/पैराओं की स्थिति

वित्त वर्ष 2024–25 तक 113 सीएजी लेखापरीक्षा पैरा थे। वित्त वर्ष 2024–25 के दौरान 9 सीएजी लेखापरीक्षा पैरा के निपटारे के बाद, 31.03.2025 तक मंत्रालय में 104 सीएजी लेखापरीक्षा पैरा लंबित हैं। इन 104 सीएजी लेखापरीक्षा पैरा में से 68 लेखापरीक्षा पैरा के उत्तर सीएजी को प्रस्तुत किए जा चुके हैं। 68 सीएजी लेखा–परीक्षा पैरा में से 28 पर पुनरीक्षण टिप्पणियाँ प्राप्त हुई हैं जिन पर आगे की कार्रवाई की जा रही है। इसके अलावा, पीएसी पैरा के मामले में, कुल 59 पीएसी पैरा थे, जिनमें से 53 पीएसी पैरा का निपटारा वित्त वर्ष 2024–25 में कर दिया गया। शेष 6 पीएसी पैरा के उत्तर भी पीएसी को भेज दिए गए हैं जिन पर पुनरीक्षण टिप्पणियाँ अभी प्रतीक्षित हैं।

वित्त वर्ष 2024–25 तक प्राप्त सीएजी और पीएसी लेखा–परीक्षा पैरा के एटीएन/एआरटी की वर्ष–वार स्थिति

(दिनांक 31.03.2025 की स्थिति के अनुसार)

वर्ष	सीएजी पैरा की संख्या जिन पर निपटान के लिए सीएजी को एटीएन प्रस्तुत किए जाने हैं	उन सीएजी पैरा का विवरण जिन पर एटीएन लंबित हैं		
		सीएजी के उन पैरा की संख्या जिन पर पहली एटीएन अभी ली जानी है	भेजे गए एटीएन की संख्या, लेकिन सीएजी द्वारा टिप्पणियों के साथ वापस कर दिए गए	मंत्रालय द्वारा भेजे गए एटीएन की संख्या, लेकिन सीएजी से जांच संबंधी टिप्पणियां अभी प्राप्त नहीं हुई हैं
(i)	(ii)	(iii)	(iv)	(v)
2014	1	-	1	-
2015	3	-	1	2
2016	7	-	2	5
2017	5	-	2	3
2018	4	-	2	2
2019	9	-	3	6
2020	4	-	-	4
2021	8	-	3	5
2022	15	9	1	5
2023	11	-	5	6
2024	33	27	-	6

विदेशों में भारतीय सार्वजनिक उपक्रमों द्वारा अधिग्रहीत परिसंपत्तियों की सूची

क्र.सं.	देश	परिसंपत्ति का नाम	कंपनी	भाग लेने वाली कंपनियाँ
1	अजरबैजान	सीजी	ओवीएल	ओएनजीसी विदेश, बीपी (प्रचालक), एजएसीजी, एमओएल, इनपेक्स, एक्सॉनमोबिल, टीपीएओ, इटोचू
2		बीटीसी पाइपलाइन	ओवीएल	ओएनजीसी बीटीसी लिमिटेड, बीपी (प्रचालक), एजबीटीसी, एमओएल, इनपेक्स, टीपीएओ, इटोचू, टोटल, ईएनआई, एक्सॉनमोबिल
3	बांग्लादेश	एसएस–04	ओवीएल ओआईएल	ओएनजीसी विदेश लिमिटेड (प्रचालक), ऑयल इंडिया लिमिटेड, बीएपीईएक्स (वहन)
4		एसएस–09	ओवीएल ओआईएल	ओवीएल ओएनजीसी विदेश लिमिटेड (प्रचालक), ऑयल इंडिया लिमिटेड, बीएपीईएक्स (वहन)
5	ब्राजील	बीसी–10	ओवीएल	ओएनजीसी विदेश, शेल (प्रचालक), ब्रावा एनर्जिया
6		बीएम–सील–4	ओवीएल	ओएनजीसी विदेश, पेट्रोब्रास (प्रचालक)
7		बीएम–सील–11 (2 ब्लॉक)	बीपीआरएल	पेट्रोब्रास, आईबीवी (बीपीआरएल का संयुक्त उद्यम)
8		बीएम–सी–30 (1 ब्लॉक)	बीपीआरएल	पेट्रोब्रास, आईबीवी (बीपीआरएल का संयुक्त उद्यम)
9	कनाडा	पीएनडब्ल्यू परियोजना	आईओसीएल	पेट्रोनास एनर्जी कनाडा लिमिटेड (पीईसीएल) (प्रचालक), आईओसी, सिनोपेक हुआडियन, पेट्रोलियम ब्रूनेई मोंटनी होल्डिंग्स लिमिटेड
10	कोलंबिया	एमईसीएल	ओवीएल	ओएनजीसी विदेश, एसआईपीसी
11		सीपीओ–5	ओवीएल	ओएनजीसी विदेश (प्रचालक), जियोपार्क
12		आरसी–10	ओवीएल	ओएनजीसी विदेश (प्रचालक), इकोपेट्रोल
13		एसएसजेएन 7	ओवीएल	ओएनजीसी विदेश, कैनाकोल एनर्जी लिमिटेड (प्रचालक)
14	गैबॉन	ब्लॉक शक्ति–।।	आईओसीएल ओआईएल	ओआईएल (प्रचालक), आईओसीएल
15	इंडोनेशिया	नुनुकन	बीपीआरएल	पर्टैमिना (प्रचालक), बीपीआरएल
16	ईरान	ब्लॉक फरजाद–बी	ओवीएल	ओएनजीसी विदेश लिमिटेड (प्रचालक), आईओसी, ओआईएल
17	इराक	ब्लॉक 20 (पूर्ववर्ती ब्लॉक 8)	ओवीएल	ओएनजीसी विदेश लिमिटेड
18	लीबिया	अनुबंध क्षेत्र 43	ओवीएल	ओएनजीसी विदेश लिमिटेड
19		क्षेत्र 95/96	ओआईएल आईओसीएल	ओआईएल, आईओसीएल, सिपेक्स (प्रचालक)
20	मोजाम्बिक	अपतटीय क्षेत्र 1, रोवुमा बेसिन	ओवीएल ओआईएल बीपीआरएल	ओएनजीसी विदेश रोवुमा लिमिटेड, बीआरईएमएल (ओएनजीसी विदेश लिमिटेड, ओआईएल का संघ), टोटल एनर्जीज (प्रचालक), ईएनएच, मित्सुई, बीपीआरएल, पीटीटीईपी ओएनजीसी विदेश, एमओजीई, पॉस्को इंटरनेशनल (प्रचालक), कोगास, गेल
21	म्यांमार	ब्लॉक ए–1	ओवीएल	ओएनजीसी विदेश, एमओजीई, पॉस्को इंटरनेशनल (प्रचालक), कोगास, गेल
		ब्लॉक ए–3	ओवीएल	
22		ब्लॉक ए–1 और ए–3	गेल (इंडिया)	
23		अपतटीय मिड–स्ट्रीम गैस पाइपलाइन (पाइपेको 1)	ओवीएल गेल (इंडिया)	ओएनजीसी विदेश, एमओजीई, पॉस्को इंटरनेशनल (प्रचालक), कोगास, गेल

24		तटीय गैस पाइपलाइन (एसईएजीपी) (पाइपको 2)	ओवीएल गेल (इंडिया) लिमिटेड	ओएनजीसी नाइल गंगा बी.वी., सीएनपीसी–एसईएपी, एमओजीई, पॉस्को इंटरनेशनल, गेल, केजी–एसईएजीपी
25		ब्लॉक बी–2	ओवीएल	ओएनजीसी विदेश (प्रचालक), एम एंड एस (प्रचालक)
26		ब्लॉक ईपी–3	ओवीएल	ओएनजीसी विदेश (प्रचालक), एम एंड एस (प्रचालक)
27	नाइजीरिया	ओएमएल 142	आईओसीएल ओआईएल	आईओसीएल समिट ऑयल (प्रचालक), सनटेरा नाइजीरिया लिमिटेड, (संयुक्त उद्यम भागीदाररू सनटेरा, इंडियन ऑयल, ओआईएल)
28	ओमान	मुखाइजाना	आईओसीएल	आईओसीएल आईओसीएल, ऑक्सिडेंटल मुखाइजाना एलएलसी, ओमान ऑयल, लीवा एनर्जी लिमिटेड (मुबाडाला), पीटीटीईपी (पार्टेक्स (ओमान) कॉर्पोरेशन)
29	रूस	सखालिन –1	ओवीएल	ओएनजीसी विदेश, सोडेको, रोसनेफ्ट की सहायक कंपनियाँ (एसएमएनजी और आरएन एस्ट्रा)
30		वैंकोरनेफ्ट	ओवीएल ओआईएल आईओसीएल बीपीआरएल	ओवीएल ओएनजीसी विदेश, वैंकोरनेफ्ट प्राइवेट लिमिटेड, वैंकोर इंडिया प्राइवेट लिमिटेड (आईओसीएल, ऑयल और बीपीआरएल का संघ), वोस्तोक ऑयल एलएलसी (रोसनेफ्ट की एक सहयोगीय आरएन वैंकोर – प्रचालक)
31		इंपीरियल एनर्जी	ओवीएल	ओएनजीसी विदेश
32		तास युरयाख	आईओसीएल ओआईएल बीपीआरएल	रोसनेफ्ट, तास इंडिया प्राइवेट लिमिटेड (टीआईपीएल – आईओसीएल, ऑयल और बीपीआरएल का संघ), बीपी रशियन इन्वेस्टमेंट लिमिटेड
33		लाइसेंस–61	ओआईएल	ओआईएल, पेट्रोनेफ्ट रिसोर्सेज (प्रचालक)
34	दक्षिण सूडान	जीपीओसी	ओवीएल	जीपीओसी
35		एसपीओसी	ओवीएल	ओएनजीसी विदेश और नीलपेट
36	सीरिया	एएफपीसी	ओवीएल	एसएसपीडी (प्रचालक), एचईएसबीवी (ओएनजीसी विदेश और सीएनपीसी का संघ)
37		ब्लॉक 24	ओवीएल	ओएनजीसी विदेश, आईपीआरएमईएल (प्रचालक), ट्राइओसियन–मेडिटेरेनियन (टीओएम)
38	यूएई	लोअर जैकम कंसेशन	ओवीएल आईओसीएल बीपीआरएल	एफओजीबीवी– फाल्कन ऑयल एंड गैस बी.वी. (ओएनजीसी विदेश, आईओसीएल, बीपीआरएल का संघ), एडीएनओसी (प्रचालक), आईएनपीईएक्स, सीएनपीसी, टोटल, ईएनआई
39		तटवर्ती ब्लॉक 1	आईओसीएल बीपीआरएल	यूबीपीएल (बीपीआरएल और आईओसीएल का एक संयुक्त उद्यम)
40	अमेरिका	निओब्रारा शेल प्रोजेक्ट	आईओसीएल	आईओसीएल यूएसए इंक., वर्दाद रिसोर्सेज एलएलसीय हाइमो ऑयल एंड गैस एलएलसी
41		ईगल फोर्ड संयुक्त उद्यम (जेवी)	गेल इंडिया	टेक्सास अमेरिकन रिसोर्सेज ।।, एलएलसी, ('टीएआर'), रिजमार, गेल ग्लोबल (यूएसए) इंक
42	वेनेजुएला	सैन क्रिस्टोबल	ओवीएल	ओएनजीसी विदेश, सीवीपी–पीडीवीएसए, पीडीवीएसए सोशल
43		कैराबोबो प्रोजेक्ट–1	ओवीएल ओआईएल आईओसीएल	ओएनजीसी विदेश लिमिटेड, पीडीवीएसए, रेपसोल, आईओसीएल, ओआईएल, ओआईएल
44	वियतनाम	ब्लॉक 06.1	ओवीएल	ओएनजीसी विदेश, जरुबेजनेफ्ट ईपी वियतनाम बी.वी., पेट्रो वियतनाम
45		ब्लॉक 128	ओवीएल	ओएनजीसी विदेश

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भारत ऊर्जा
सप्ताह 2025

BIOGAS

SATAT
पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय
(एमओपीएनजी) की एक पहल

प्रधानमंत्री उज्ज्वला योजना

सत्यमेव जयते

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय

भारत सरकार