सत्यमेव जयते

INDIA'S HYDROCARBON OUTLOOK

A Report on Exploration & Production Activities

DGH

DIRECTORATE GENERAL OF HYDROCARBONS

Ministry of Petroleum & Natural Gas, Government of India

Creation

Directorate General of Hydrocarbons was formed through a Government of India resolution dated 08.04.1993 under the administrative control of Ministry of Petroleum & Natural Gas.

Objective

To promote sound management of the oil and natural gas resources having a balanced regard for environment, safety, technological and economic aspects of the petroleum activity.

"MY VISION FOR INDIA'S ENERGY FUTURE HAS FOUR PILLARS- ENERGY ACCESS, ENERGY EFFICIENCY, ENERGY SUSTAINABILITY AND ENERGY SECURITY"

Key Highlights of Indian E&P Sector: 2019-20

32.17 MMT
Crude Oil Production

31.18 BCM
Natural Gas Production

125.4 MMToe
Accretion of Inplace

73.5 MMToe
Accretion of Reserves (2P)

12 Hydrocarbon Discoveries
10 in Nomination Regime (4 Oil & 6 Gas) and 2 in PSC Regime (1 Oil & 1 Gas)

4 Declaration of Commerciality
Reviewed by Management Committee in PSC Regime

26 Development Plans approved
19 PSCs, 6 RSCs and 1 CBM

77 Active PSCs
11 Pre-NELP Blocks, 21 Pre-NELP Fields, 45 NELP Blocks

147 Active RSCs and 10 Active CBM Blocks
94 HELP Blocks, 53 DSF Contract Areas and 10 CBM Blocks

387 Active Nomination Acreages
10 PEL and 377 PML Acreages

3,788 LKM (2,362 Onland and 1,426 Offshore)
2D Seismic Data

7,018 SKM (1,772 Onland and 5,246 Offshore)
3D Seismic Data

647 Wells Drilled
121 Exploratory and 526 Development Wells

91 New Licences/Leases in RSC Regime
72 PEL under HELP Regime, 19 PML under DSF Regime

18,115 Essentiality Certificates Issued
INR 45,141 Crore in Value

INR 4,480 Crore*
Profit Petroleum contribution to Central Exchequer

INR 5,625 Crore*
Royalty contribution to Central Exchequer

**provisional*
MMToe (Million Tonne Oil Equivalent)

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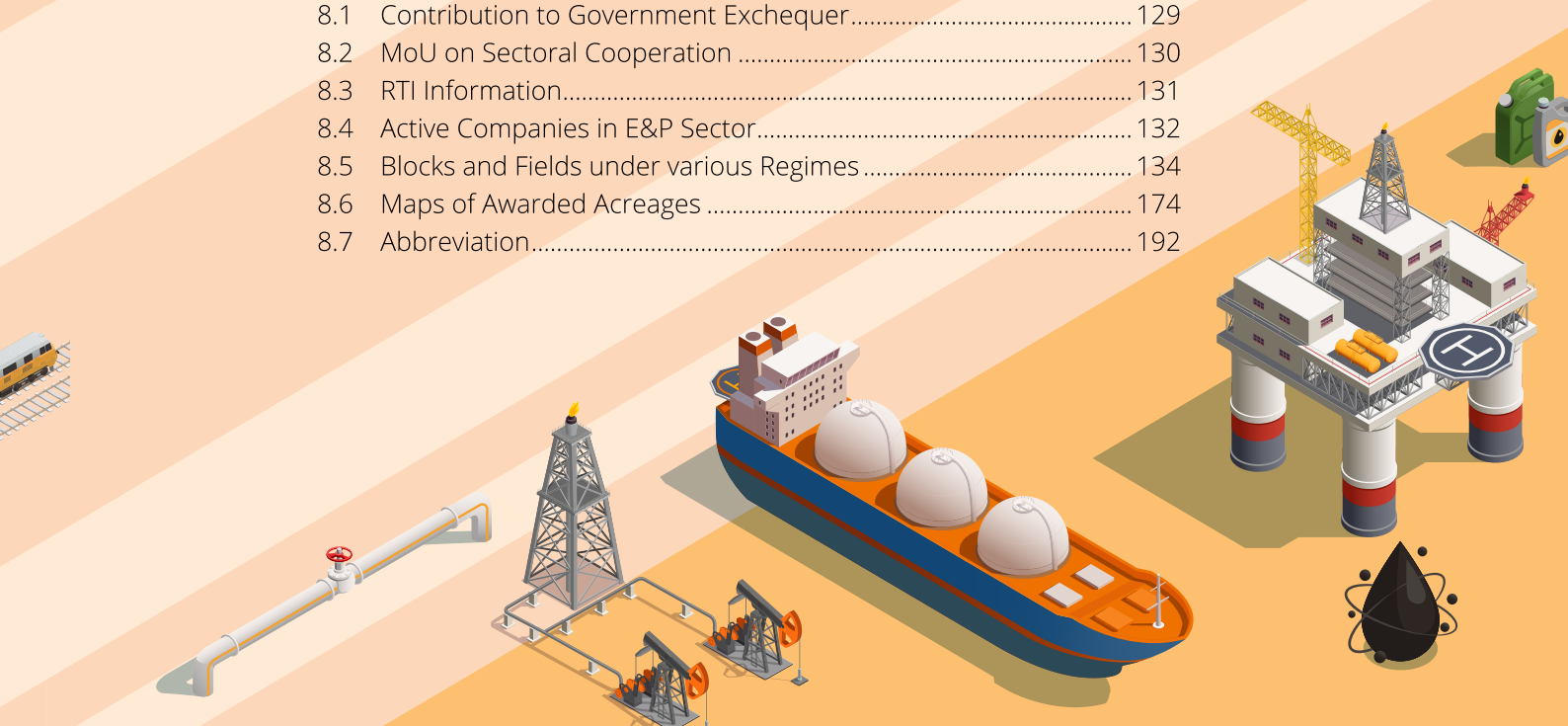

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धर्मेन्द्र प्रधान

ଧର୍ମେନ୍ଦ୍ର ପ୍ରଧାନ

DHARMENDRA PRADHAN

मंत्री
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इस्पात मंत्रालय
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India is currently third largest energy consumer in the world. Oil and gas will continue to remain important elements for India's energy security and its share in global energy demand is set to almost double to 11% by 2040. India is set to emerge as one of the primary drivers of growth in oil and gas demand in Asia, despite the pressing Covid-19 challenges.

In the E&P sector, government's attention has shifted to production enhancement as compared to revenue maximization, harnessing technological innovation, fostering collaboration and providing a stable and simplified policy and fiscal regime. The path breaking system in the Indian E&P sector clubbed with single window clearance system, strong institutional frameworks, attractive corporate taxes and revitalized regulatory regimes has generated phenomenal investment opportunities in India across the entire value chain of E&P, right from greenfield to brownfield.

Government has taken an ambitious target to increase the share of natural gas from existing 6% to 15% by 2030 to transform India into a gas-based economy. To give thrust in this mission, we have taken several policy measures and initiatives to enhance domestic production of gas.

Directorate General of Hydrocarbons has taken up a larger role as a facilitator and implementer of Government policies and is working cohesively with the industry to ensure seamless E&P operations in the country. The constructive and facilitative role undertaken by DGH in recent years is acknowledged by the Industry. I congratulate DGH on its Annual Publication "India's Hydrocarbon Outlook: 2019-20" that encapsulates the progress in E&P activities in our country.

Dharmendra Pradhan

सत्यमेव जयते

तरून कपूर
सचिव

Tarun Kapoor
Secretary
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India's energy demand expands with its economic progress. Oil and gas sector is pivotal in meeting the energy needs of the nation. To provide renewed impetus to India's upstream hydrocarbon sector and usher in favorable policies aligned with the challenging domestic and global energy landscape; government of India has introduced systemic reforms in the hydrocarbon sector, that have ushered consistency, certainty, and transparency in the E&P ecosystem.

As the fiscal year drew to a close, the world met with an unprecedented low demand-low price scenario arising out of COVID-19 pandemic, and issues pertaining to disruption in supply chain, restricted workforce, production operations continuing at lowered capacities came to the force. Such precarious low-crude scenarios require commensurate techno-economic measures by oil and gas companies to stay afloat while maintaining health and safety of workers. Impelled by the need to maintain production, Government has all hands-on deck to ensure seamless continuity of operations and to make concerted efforts to sail through these headwinds.

Government is continuing award of acreages through its flagship Open Acreage Licensing Policy under HELP. The success of OALP bid rounds is predicated in the investment friendly framework therein such as Marketing and Pricing freedom and doing away with revenue share commitment in category II and III basins, which will enable increase the viability of offered acreages and provide a thrust to exploration activities. Production Enhancement Contracts were introduced in nomination fields that will spur new investment and encourage induction of cutting-edge technology by forging technological collaboration to enhance the recovery of hydrocarbons.

Oil and gas being a data driven industry, government is keen on undertaking advanced data initiatives which shall further enable the investors in taking informed investment decisions. To facilitate Ease of Doing Business, GoI has taken major strides through simplification of procedures and processes for Production Sharing Contracts. Approval processes have been streamlined by digitization and standardization of contractual submissions on e-platform. Some other pro-industry reforms are on the anvil.

I compliment Directorate General of Hydrocarbons in its unwavering commitment to facilitate the E&P sector of India and congratulate on the release of its Annual Publication "India's Hydrocarbon Outlook: 2019-20" that captures all major developments in Indian E&P sector during the year.

Tarun Kapoor

From the Director General

Dear Stakeholders,

As India moves towards a 5 trillion-dollar economy, with commensurate energy needs, the criticality of hydrocarbons in meeting this growing energy requirement hardly needs emphasis. To meet India's energy security and to reduce the rising import dependence, landmark policy reforms were ushered by the Government in the last 5 years that have elicited universal acclaim and fostered a conducive investment ecosystem in the oil and gas sector. Time is now ripe to steadfastly build upon the policy reforms and work in tandem with the industry needs.

The year 2019-20 was eventful, it had its fair share of headwinds and tailwinds, risks and opportunities, uncertainties and foreseeable trends. While the year started off with a bullish sentiment with the Government ushering path breaking E&P reforms, the year end was marked with a pensive mode with the COVID-19 pandemic disrupting global energy markets. Today, the oil and gas industry is facing a test of resilience from the supply shock coupled with unprecedented demand drop amidst the global crisis. Government is making all possible efforts to address challenges arising from impact of COVID-19 on the E&P sector and to facilitate steady recovery in the months ahead. Along with the Government, DGH is resolutely committed to address the industry's concerns and extend all facilitation and cooperation.

With the successful roll out of HELP/OALP regime, the country was able to add more than 1,36,000 sq. km. of exploration acreage in 4 rounds of OALP. In FY 2019-20 itself, about 77,500 sq. km. was awarded for exploration in 3 bid rounds. The cumulative exploratory work commitment after 4 rounds of OALP comprise 29,270 LKM of 2D Seismic Survey, 43,272 sq. km of 3D Seismic Survey, 369 Exploratory Wells and 290 Core Analysis to establish Shale Resources. This will generate an investment of approx. US$ 2.32 billion over next 3 to 4 years in exploratory work alone. Success of OALP bid rounds was buttressed by the robust platform of National Data Repository and new data generated by the flagship National Seismic Program that reached 93% completion this year. Efforts to monetize earlier discoveries bore fruit when well D-1 of B-80 field near Mumbai coast DSF bid round successfully produced oil, making it the first discovered small field (DSF) to find oil and put on test production. B-80 field is at present under development stage. More such fields are scheduled to be put on production later in 2020.

In a significant move aimed at reducing delays in environmental clearance and simplify the process, the Union Ministry of Environment, Forest and Climate Change categorized onshore and offshore oil and gas exploration activities as B2 category from category A, thus enabling E&P operators to expedite exploration activities by obtaining single source approval from the State concerned without the need for an EIA report or conduct of Public Hearing.

The Empowered Coordination Committee (ECC), constituted last year, has been instrumental in fast tracking clearances and addressing policy issues. With crucial support from ECC, Island Development Authority, ISRO and Andaman & Nicobar Administration, a significant decision was taken to undertake acquisition of 2D seismic data in the offshore areas of the petroliferous Andaman basin in FY 2020, which will open up the island territories to E&P activities.

To give a brief glimpse of E&P activities in 2019-20: in all 3,788 LKM of 2D seismic data and 7,018 SKM of 3D seismic data were acquired, 121 exploratory wells and 526 development wells were drilled. Production level for oil and gas in FY 2019-20 was: 32.2 MMT crude oil (74% from nomination regime and 26% from PSC regime) and 31.2 BCM natural gas (85% from nomination regime and 15% from PSC+CBM regime). As on 31st March 2020, the Inplace volume of crude oil is 6,974 MMT and 3,974 BCM for gas, there has been a cumulative accretion of Inplace volume by 125 MMT.

Our focus, besides production enhancement and enabling investments in E&P, is to encourage collaboration among stakeholders, foster innovation, embrace new technology and practices, and enhance operational efficiency. IT initiatives were undertaken to create a seamless interface with operators, so as to facilitate contract management in an efficient and transparent manner. Streamlining and digitization of PEL/PML grant process was carried out in consultation with stakeholders, converging multiple application templates to a single format and applied centrally. Single-window portal has been created for filing applications for PEL-ML, Expat Clearance, Vessel Clearance, PSC Management System and Essentiality Certificates. Ensuring transparency, efficiency and ease of business continues to be our mantra which we are committed to pursue under the stewardship of Ministry of Petroleum & Natural Gas.

DGH Annual Publication – 'India's Hydrocarbon Outlook: 2019-20' provides a comprehensive review of E&P activities undertaken in India in last financial year. I am confident that all stakeholders will find this report an informative and valuable reference.

DGH remains committed to synergistically work with all stakeholders and discharge its responsibilities, as Government's upstream technical advisor, with utmost integrity.

Sincerely,

(S C L Das)

महानिदेशक का संदेश

प्रिय हितधारक,

आज भारत जिस प्रकार से 5 ट्रिलियन डॉलर की अर्थव्यवस्था की ओर अग्रसर हो रहा है, उसकी ऊर्जा आवश्यकता की पूर्ति में हाइड्रोकार्बन की भूमिका स्वतः स्पष्ट है। देश को ऊर्जा सुरक्षा प्रदान करने तथा बढ़ते हुए आयात पर निर्भरता को कम करने के लिए विगत 5 वर्षों के दौरान सरकार द्वारा तेल और गैस क्षेत्र को विनिवेश के अनुकूल बनाने हेतु किए गए उल्लेखनीय नीतिगत सुधारों की दुनियाभर में प्रशंसा हुई है। अब समय आ गया है जब नीतिगत सुधारों को दृढ़ता से लागू किया जाए और इस उद्योग की आवश्यकताओं के अनुरूप कार्य किए जाए।

2019 –20 का वर्ष घटनाक्रमों से परिपूर्ण रहा, इस अवधि में वातावरण कभी अनुकूल तो कभी प्रतिकूल, कभी जोखिमों तो कभी अवसरों से, कभी अनिश्चितताओं तो कभी अवसरों के अनुकूल बना रहा। जहाँ वर्ष का आरंभ सरकार द्वारा किये गए अन्वेषण एवं उत्पादन सम्बन्धी पथ प्रवर्तक सुधारों के साथ सकारात्मकता की भावना से भरा था, वहीं वर्ष का अंत आते–आते कोविड–19 महामारी के कारण विश्व स्तर पर ऊर्जा बाजारों में नकारात्मकता का माहौल बन गया। आज तेल और गैस उद्योग विश्वस्तरीय संकट के समक्ष आपूर्ति बाधा के साथ–साथ मांग में अप्रत्याशित कमी की भीषण चुनौतियों का सामना कर रहा है। सरकार आने वाले महीनों में कोविड–19 से अन्वेषण एवं उत्पादन (ईएंडपी) क्षेत्र में आई चुनौतियों से निपटने के हरसंभव प्रयास कर रही है। सरकार के साथ – साथ हाइड्रोकार्बन महानिदेशालय भी उद्योग की समस्याओं से निपटने के लिए तथा सभी सुविधाएं और सहयोग प्रदान करने के लिए कृत संकल्प है।

एचईएलपी/ओएएलपी दौर के सफल आरम्भ के साथ ही देश ने ओएएलपी के 4 राउंड में लगभग 1,36,000 वर्ग किलोमीटर से अधिक अन्वेषण क्षेत्र की वृद्धि की है। वित्त वर्ष 2019–20 में ही 3 बिड राउंड में लगभग 77,500 वर्ग किलोमीटर क्षेत्र अन्वेषण के लिए आवंटित किया गया था। ओएएलपी के चार राउंड के बाद संचयी अन्वेषण कार्य प्रतिबद्धता के कुल आंकड़े में 2डी भूकंपीय सर्वेक्षण के 29,270 एलकेएम, 3डी भूकंपीय सर्वेक्षण के 43,272 वर्ग किलोमीटर, 369 अन्वेषी कूपों का बेधन और शेल संसाधनों के स्थापन हेतु 290 कोर विश्लेषण शामिल हैं । इससे अगले 3 से 4 वर्षों के दौरान अन्वेषण कार्यों में 2.32 बिलियन डॉलर का निवेश होगा। ओएएलपी बिड राउंड की सफलता नेशनल डाटा रिपॉजिटरी के मजबूत प्लेटफार्म और फ्लैगशिप नेशनल सेसमिक प्रोग्राम द्वारा अर्जित नए डाटा जो इस वर्ष 93% की पूर्णता तक पहुंच गए हैं, के आधार स्तम्भ पर दृढ़ता से खड़ी है। पूर्व की खोजों को मौद्रीकृत करने के प्रयासों के फलस्वरूप मुंबई अपतट के निकट स्थित डीएसएफ बिड राउंड के क्षेत्र बी–80 के तेलकूप डी–1 में तेल की सफल खोज की गयी, जिससे यह तेल की खोज व परीक्षण उत्पादन आरंभ करने वाला पहला खोजित लघु क्षेत्र (डीएसएफ) बन गया है। वर्तमान में बी–80 क्षेत्र विकास चरण में है। वर्ष 2020 में अन्य कई ऐसे क्षेत्रों से उत्पादन नियत है।

पर्यावरणीय अनुमोदन प्राप्त करने में लगने वाले समय को कम करने और प्रक्रिया को सरल बनाने की उल्लेखनीय मुहिम को लक्ष्य करते हुए, पर्यावरण वन एवं जलवायु परिवर्तन मंत्रालय ने तटीय और अपतटीय तेल एवं गैस अन्वेषण गतिविधियों को ए–वर्ग से बी–2 वर्ग की गतिविधियों में वर्गीकृत कर दिया है ताकि ईएंडपी ऑपरेटर, ईआईए रिपोर्ट अथवा लोक सुनवाई की आवश्यकता के बिना संबंधित राज्य सरकारों से एकल स्रोत अनुमोदन प्राप्त कर अन्वेषण गतिविधियों में तेजी ला सकें।

पिछले वर्ष गठित शस्क्त सामन्वय समिति (ईसीसी) शीघ्र क्लीयरेंस मिलने और नीतिगत मुद्दों के निवारण में सहायक रही। ईसीसी, द्वीप विकास प्राधिकरण, इसरो और अंडमान निकोबार प्रशासन की सहायता से पैट्रोलीफिरियस अंडमान बेसिन के अपतटीय क्षेत्रों में वित्त वर्ष 2020 में 2डी भूकंपीय डाटा अर्जन करने का महत्त्वपूर्ण निर्णय लिया गया जिससे द्वीपीय क्षेत्रों के मार्ग अन्वेषण एवं उत्पादन गतिविधियों के लिए और खुल जायेंगे।

संक्षिप्त रूप में वर्ष 2019–20 में अन्वेषण एवं उत्पादन गतिविधियां इस प्रकार हैं: 2डी भूकंपीय डाटा के 3,788 एलकेएम और 3डी भूकंपीय डाटा के 7,018 एसकेएम अर्जित किया गया और 121 अन्वेषी कूप और 526 विकास कूप बेधित किए गए। वित्त वर्ष 2019–20 में तेल एवं गैस का उत्पादन स्तर 32.2 एमएमटी अपरिष्कृत तेल (नामांकन क्षेत्र से 74 प्रतिशत तथा पीएससी क्षेत्र से 26 प्रतिशत) और 31.2 बीसीएम प्राकृतिक गैस (नामांकन क्षेत्र से 85 प्रतिशत और पीएससी+सीबीएम क्षेत्र से 15 प्रतिशत) था। 31 मार्च, 2020 को अपरिष्कृत तेल का इन–प्लेस वॉल्यूम 6,974 एमएमटी और गैस का इन–प्लेस वॉल्यूम 3,974 बीसीएम हैं। इन–प्लेस वॉल्यूम में संचयी अभिवृद्धि 125 एमएमटी रही।

अन्वेषण एवं उत्पादन क्षेत्र में उत्पादन तथा निवेश में वृद्धि के साथ–साथ हमारा ध्यान हितधारकों को सहयोग के लिए प्रेरित करने, नवीनीकरण को प्रोत्साहन देने, नई तकनीक और पद्धतियों को अपनाने और प्रचालन–दक्षता में वृद्धि लाने की ओर केन्द्रित है। प्रचालकों के साथ निर्बाध संपर्क स्थापित करने के लिए सूचना प्रौद्योगिकी की अनेक नयी पहल की गयी ताकि कुशल एवं पारदर्शी तरीके से संविदा प्रबंधन का निष्पादन किया जा सके। हितधारकों के परामर्श से पीईएल/पीएमएल प्रदान करने की प्रक्रिया को सुव्यवस्थित और डिजिटाइज किया गया जिसमे बहु आवेदन टेम्पलेटस को एकीकृत कर एकल फॉर्मेट के रूप में केन्द्रित किया गया। पीईएल/पीएमएल आवेदन, एक्स्पट क्लीयरेंस, वेसल क्लीयरेंस, पीएससी प्रबंधन सिस्टम और अनिवार्यता प्रमाण पत्र के लिए आवेदन हेतु सिंगल विंडो पोर्टल बनाया गया। पारदर्शिता, दक्षता और सुगम व्यवसाय सुनिश्चित करना हमारा मूल मंत्र रहा है जिसके अनुसरण के लिए हम पेट्रोलियम और प्राकृतिक गैस मंत्रालय के अधीन वचनबद्ध हैं।

हाइड्रोकार्बन महानिदेशालय का वार्षिक प्रकाशन "भारत का हाइड्रोकार्बन परिदृश्यः 2019–20" गत वित्त वर्ष के दौरान भारत में की गयी अन्वेषण एवं उत्पादन संबंधी गतिविधियों की व्यापक समीक्षा प्रस्तुत करता है। मुझे विश्वास है कि सभी हितधारकों के लिए यह प्रकाशन सूचनाप्रद और लाभदायक होगा।

हाइड्रोकार्बन महानिदेशालय अपने सभी हितधारकों के साथ मिलकर कार्य करने और सरकार के अपस्ट्रीम तकनीकी सलाहकार के रूप में अपने कर्तव्यों के निष्ठा पूर्वक निर्वहन के लिए वचनबद्ध है।

भवदीय,

एस.सी.एल. दास

1 UPSTREAM OIL AND GAS INDUSTRY IN INDIA

1.1 History and Background

The story of oil exploration in India began in the north-eastern corner of the country, oil seepages were reported from the banks of river Dihing. Mr. C.A Bruce (1828) and Mr. H.B. Medicott (1865) of the Geological Survey of India (GSI) spotted oil seepages while prospecting for coal in Upper Assam.

Mr. Edwin L. Drake drilled the world's first oil well in 1859 at Titusville, Pennsylvania, USA and 7 years later, a hand- dug well of 102 feet was drilled by Stewart & Company, Calcutta at a place near Jeypore area of Upper Assam. The well, however failed to establish satisfactory production. In second attempt a year later, oil was struck at merely 118 feet in Asia's first mechanically drilled well at Makum near Margherita area of Upper Assam.

The Assam Railways and Trading Company Limited (AR&T Co. Ltd.), during Sept. 1889 to Nov. 1890 dug a well at Digboi field to a depth of 662 feet and commercially discovered oil with a rate of 200 gallons per day. AR&T subsequently acquired petroleum-rights concession in the Makum area of Assam. AR&T established Assam Oil Company (AOC) in 1899 to take over the petroleum interests of AR&T, including the Digboi and Makum concessions and set up a small refinery at Margherita (Upper Assam). Thereafter, systematic drilling began in 1899 and two years later in 1901, Asia's first oil refinery was set up at Digboi. It is still functional as the world's oldest operating refinery.

In 1911, UK-based Burma Oil Company (BOC) arrived in Upper Assam and in 1915, it acquired oil business interest from Budderpore Oil Co. Ltd. for exploration in the Surma valley (Upper Assam). Gradually by 1921, in a phase- wise manner, BOC acquired petroleum interests of AOC.

The Indian Co. "TATA Engineering Co." also drilled several wells in Jagatia, Gujarat and produced small

amount of gas in 1930s. In 1937, BOC jointly with British Petroleum (then Anglo-Iranian Oil Co.) and Shell proposed to Government of India (GoI) to carry out a geophysical survey of the important plain areas of India. The proposal was accepted, and a new form of grant known as 'Geophysical License' was issued by Assam Government.

In Assam, successful seismic survey was carried out in Naharkatiya during 1937-39, triggering new enthusiasm in oil search and it became forerunner of discoveries in Assam and other basins. The successful outcome at well NHK-1 in 1937 was evidence for geophysical method in oil exploration.

The world knew significance of oil and after Independence, Indian leaders realized its utility for rapid industrialization and security of nation.

The company rule which was earlier framed to satiate the raw material need of British Empire was re-framed. While formulating industrial policy 1948, the development of petroleum industry in the country was given top priority.

By 1948, Geological Survey of India started geophysical survey in Cambay area. The first oil discovery in independent India was made by AOC on 1953 in Naharkatiya and then in Moran in 1956 both in Upper Assam. The oil industry, after independence, remained operated by foreign company for a considerable period. BOC kept its position as largest company in India until it ended its operation.

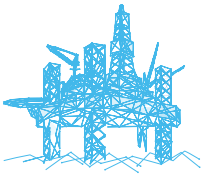
In 1955-56, a delegation led by Mr. K.D. Malviya, Minister of Natural Resources, visited several European countries to study the oil industries in those countries and train Indian professionals. Foreign experts also visited India to share their know-how. Erstwhile USSR helped draw a detail plan for geological and geophysical survey and drilling plan in second five-year plan (1956 to 1961).

With the intention of intensifying and spreading exploration to various parts of the country, a separate entity, **Oil and Natural Gas Directorate** was set up in **1955** as a subordinate office under the then Ministry of Natural Resources and Scientific Research.

The department was constituted with a nucleus of geoscientists from Geological Survey of India. But soon after its formation it was realized that the directorate cannot function efficiently with its limited financial and administrative freedom and in early 1956, its status was changed to a commission. In October 1959, Oil & Natural Gas commission was made a statutory body by an act of parliament delegating it more power but it remained under Ministry. The job of ONGC was defined as "to plan, promote, organize and implement programs for development of petroleum resources and the production and sale of petroleum and petroleum products produced by it, and to perform such other function as the central government may, from time to time, assign to it". ONGC systematically started its geophysical surveys on area considered prospective based on global analogy.

Further, thrust was given for survey in area of Himalayan foothills and adjoining Ganga plains, alluvial tracts of Gujarat, upper Assam and basins of Bengal. The exploratory drilling carried out in Himalayan foothill during 1957, remained unsuccessful. Within a year of being formed, ONGC discovered oil at Cambay. The fields were discovered in Gujarat namely Ankleshwar in 1960, Kalol in 1961 and those in Assam namely Lakwa in 1964, Geleki in 1968 including a gas discovery (Manhar Tibba) in Rajasthan in 1969.

In February 1959, for development and production of Naharkatiya and Moran fields and to increase the pace



of exploration in Assam, **Oil India Private Limited** was incorporated as a rupee company to take over BOC's affairs in Assam. The company was owned two-third by AOC/BOC and 1/3rd by Government of India and in 1961 they became equal partners by transforming OIL into a Joint-Venture (JV) company.

OIL discovered Kusijan oilfield in 1969 and Jorajan oilfield in 1972. Later, Eocene gas was discovered by OIL in Tengakhat field of Assam in 1973

Offshore exploration was initiated by ONGC in the form of experimental seismic survey in 1962 in Gulf of Cambay and later in western offshore. Detailed seismic surveys in western offshore resulted in a discovery of large structure in Bombay-offshore in 1972-73 and drilling lead to India's biggest commercial oil discovery – Bombay-High.

Encouraged by Bombay-High discovery, exploration was continued in other parts of offshore areas of both west and east coast. This had led to significant discovery of Bassein and Neelam in western offshore and PY-3 and Ravva in Eastern offshore.

In 1978, OIL ventured out of Assam into Orissa offshore and onshore. OIL also ventured into offshore Andamans in 1979-89 and onshore Rajasthan. By the end of 80s, ONGC and OIL have together drilled nearly 3,100 wells.

ONGC's geo scientific survey spread out to Uttar Pradesh, Bihar, Tamil Nadu, Rajasthan, Jammu & Kashmir, Kutch and Andhra Pradesh.

By mid 1980s, ONGC successfully discovered prospects in Cauvery and KG basin. Kharsang oilfield was discovered by OIL in 1976 and in the same year ONGC discovered one of India's biggest gas finds in the Bassein field off Mumbai's coast. Other gas fields discovered by ONGC were Mid-Tapti, South Tapti and B-55.

Till the end of 1970s, Indian E&P industry was dominated by the two National Oil Companies (NOCs)-ONGC and OIL, which were granted PELs on nomination basis. Exploration was primarily confined to onland and shallow offshore. The strategic initiative was taken by government in 1979 to attract foreign investment, technology and capital to deal with future commitment and challenges of Indian oil economy by offering 32 exploration blocks (17 offshore and 15 onshore). Government started offering block systematically through bidding. These bidding rounds are also known as Pre- NELP exploration rounds. The three rounds during 1980-86 were not very successful.

By 1981, Government took over Oil India Private Limited and it became full-fledged PSU. In 1982, ONGC made its biggest gas discovery in Gandhar, Cambay basin, Gujarat and by 1986; KG basin was placed on global map with several significant discoveries made. By the end of 1986, third round of international bidding for exploration block were offered. OIL and ONGC were offered 40% back-in rights in JV for development phase. Few foreign companies participated but there was no committed exploration or breakthrough discovery. However, OIL and ONGC's effort continued in several parts of India and by 1989 OIL discovered gas in Tanot in Rajasthan and ONGC discovered South Heera in Mumbai offshore.

In 1990, fourth Pre- NELP exploration bidding round was launched and for the first time, Indian companies could participate with foreign companies. However, no major discovery was made. A year later, GoI adopted a liberalized economic policy that led to de-licensing of core group including petroleum sector and partial disinvestment of government share including other measures. As a result, in February 1994 ONGC was reorganized as a limited company (under the Company's Act, 1956) from Oil and Natural Gas Commission to Oil and Natural Gas Corporation Limited.

To give momentum to petroleum sector in India, GoI came up with more attractive offers in 1994. However, this also led to general disagreement in Production Sharing Agreement. In couple of years,

ONGC ventured into CBM in Damodar valley and explored EOR options in heavy oil belt of North Gujarat. By 1996, GoI conducted 5 rounds of bidding and offered 126 blocks having area in the range of 1 sq. km. to 50,000 sq. km. Besides, NOCs and Indian Private Companies, some important companies like Shell, Enron, Aramco and Occidental participated in exploration and contracts were awarded to them.

The government efforts particularly during 1991-96 gave required thrust for opening up oil and gas sector to international and private entities. After this, the process of opening the sector became more streamlined.

Many private players also joined in development of this industry. Hindustan Oil Exploration Company (HOEC) which started its E&P venture in 1991, was among few such initial domestic private player.

In view of the liberalized policy adopted by GoI, a need for an independent upstream regulatory body called Directorate General of Hydrocarbons (DGH) was envisaged to oversee and review the oilfield development programs to ensure sound reservoir management practices in line with national interests. Thus, DGH was formed vide GoI resolution dated 08.04.1993. After the nomination era till late 1970s, Pre-NELP exploration era (1980-95) and Pre-NELP field rounds (1993-94), GoI formulated a policy, called New Exploration Licensing Policy (NELP) in 1997. The main objective was to attract significant risk capital from Indian and Foreign companies, state of art technologies, enhanced geological perception of Indian sedimentary basins and best management practices to explore oil and gas resources in the country to meet rising demands of oil and gas. NELP policy was approved in 1997 and became effective in February 1999. Since then licenses for exploration were awarded only through a competitive bidding system and NOCs were required to compete on an equal footing with Indian and foreign companies to secure Petroleum Exploration Licenses (PELs). Nine rounds of bidding were conducted under NELP, in which production sharing contracts for 254 exploration blocks were signed. Under the PSC regime, two major basins were opened commercially, these are Rajasthan and Krishna- Godavari Basin.

NELP regime saw Indian E&P sector opened to private and foreign players, however through investors' interaction; a perception was felt for some reformative changes in the existing policy framework. Taking cognizance of the issues arising out of the Production Sharing Contracts, Government made a paradigm shift towards Revenue Sharing Contracts by introducing the Discovered Small Field Policy (DSF, 2015) and Hydrocarbon Exploration and Licensing Policy (HELP, 2016). With recent impetus to the sector through policy interventions and facilitation of projects, Indian Oil and Gas industry is seeing a renewed global interest.

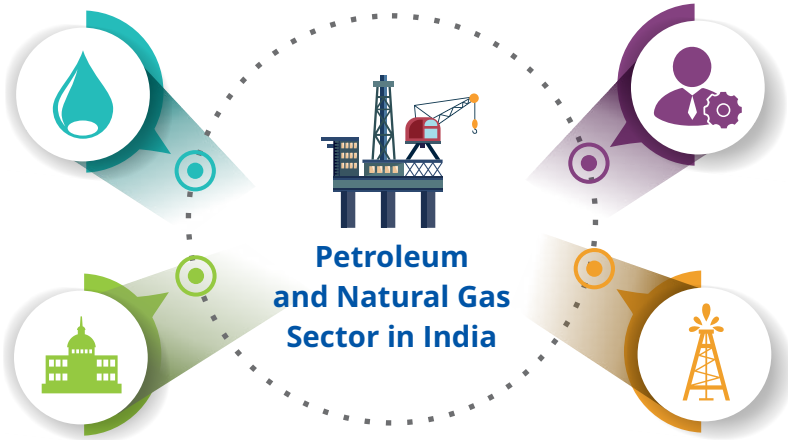
The participation of foreign companies in recent DSF and OALP bidding rounds is a testimony to this fact. With a huge scope of activities and government's continued thrust on development in oil and gas sector, expectation remains large on some big discoveries in future. With significant findings in recent resource reassessment studies and the fact that experts gave emergent views on new plays and exploration in new areas particularly Deepwater, Indian E&P sector is now poised for a definitive push to reveal subsurface insights and to bring out a realistic perception of hydrocarbon prospectivity.

1.2 Formation of Directorate General of Hydrocarbons (DGH)

During early nineties, Government of India, in the Ministry of Petroleum and Natural Gas had under consideration, the need to have an appropriate agency to regulate and oversee the upstream activities in the petroleum and natural gas sector and advise the Government in these areas. The Dasgupta committee, which had reviewed the management of the Bombay High reservoir, had recommended the creation of an autonomous conservation board to oversee and review that oilfield development which conforms to sound reservoir engineering practices in line with national interests. Subsequently, the Kaul committee, which examined ONGC's organizational structure, also recommended for establishment of an independent regulatory body called the Directorate General of Hydrocarbons. Moreover, the upstream petroleum sector was largely a monopoly of public sector companies till then and sector at that time was being increasingly opened to new operating companies in the private and joint sectors. Thus, a need was felt to establish an agency that could effectively supervise the activities of all these companies in the national interest. Taking all the above into consideration, Government of India, decided to set up a Directorate General of Hydrocarbons (DGH) under the administrative control of the Ministry of Petroleum and Natural Gas. DGH was set up through a Government Resolution No. O-20013/2/92/ ONG-III dated 8th April 1993.

DGH-Objective

To promote sound management of the Indian Petroleum and Natural Gas resources having a balanced regard for the environment, safety, technological and economic aspects of the petroleum activity.



Central Level

- Ministry of Petroleum and Natural Gas

Other Government Agencies

- Centre of High Technology
- Oil Industry Development Board
- Oil Industry Safety Directorate
- Petroleum Conservation and Research Association
- Petroleum Planning and Analysis Cell

Technical Advisor/ Regulators

- Directorate General of Hydrocarbons (Upstream)
- Petroleum & Natural Gas Regulatory Board (Downstream)

State Level

- Energy Directorates
- Department of Commerce and Industry

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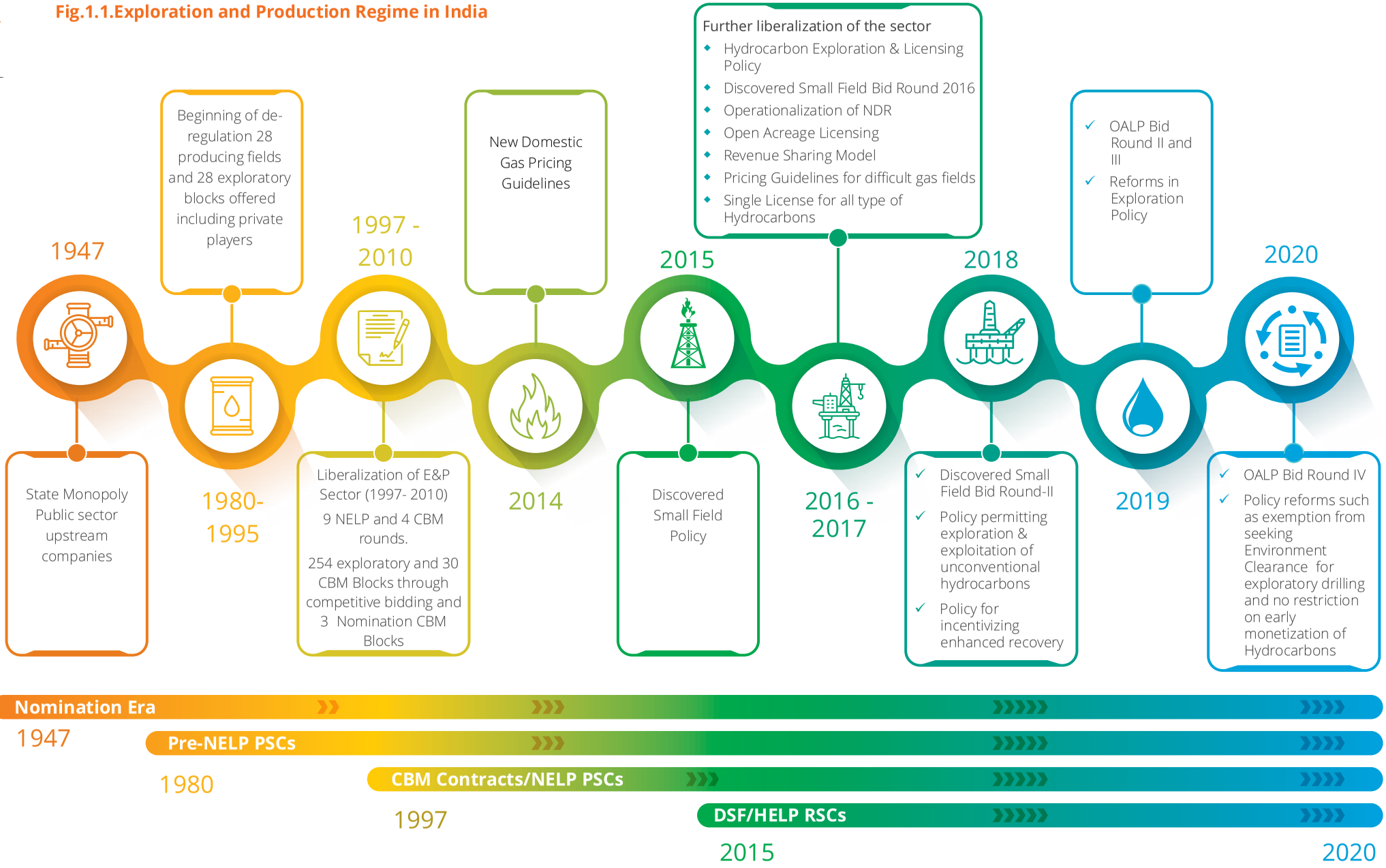
Fig.1.1.Exploration and Production Regime in India



1.2.1 Role and Functions of DGH

As an important statutory body in Indian E&P sector, DGH has following roles and functions:

I. A nodal agency for implementation of NELP and CBM policy on behalf of Ministry of Petroleum & Natural Gas (MoPNG)

II. To advise MoPNG on Exploration Strategies & Production Policies

III. 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

IV. 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 with a view to advising Government on the adequacy of these programs.

V. To evaluate the hydrocarbon reserves discovered and estimated by the operating companies

VI. To advise the Government on the offering of acreages for exploration to companies as well as matters relating to relinquishment of acreage by companies

VII. To review the development plans for commercial discoveries of hydrocarbon reserves proposed by the operating companies

VIII. Advise Government on the adequacy of such plans and the exploitation rates proposed and matters relating thereto

IX. 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

X. 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

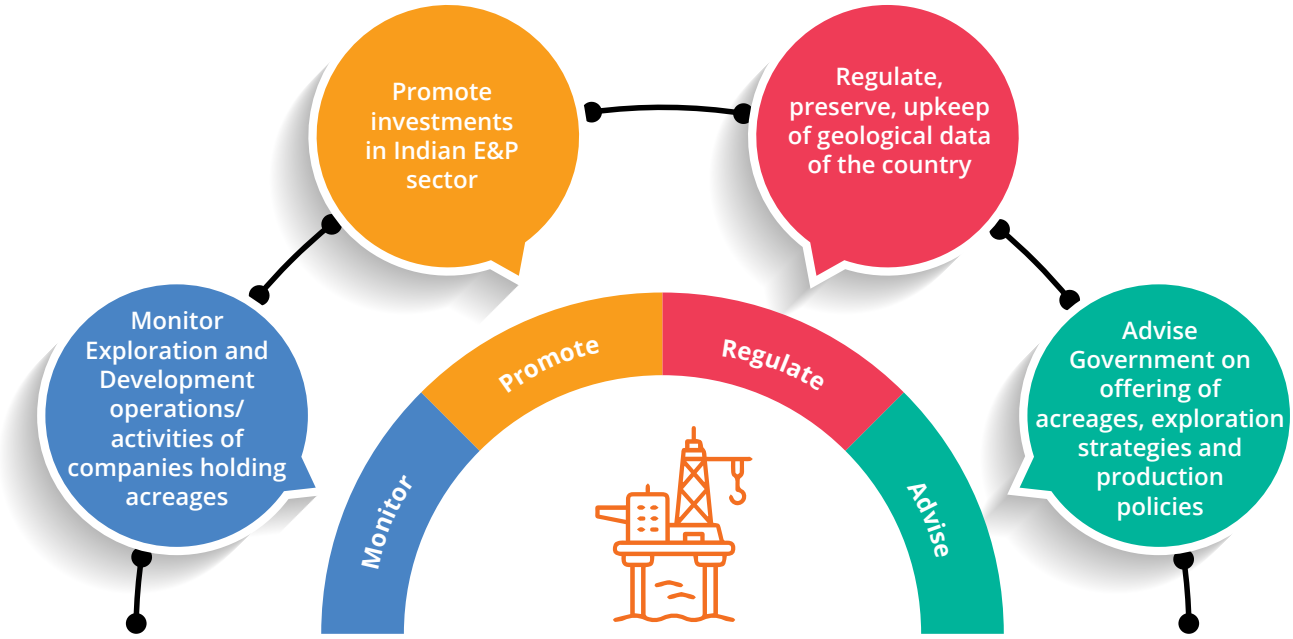
XI. All other matters incidental thereto and such other functions as may be assigned by Government from time to time

XII. Assist Government in contract management functions

XIII. Exploration & Development of unconventional hydrocarbon resources like Gas Hydrate, Shale Gas/Oil and Oil Shale

XIV. Issue Essentiality Certificate for importing goods and services used in E&P sector to avail custom duty concessions

XV. Codification of Good International Petroleum Industry Practices (GIPIP) and timely updation as per international industry best practices



1.2.2 Governance Mechanism

Advisory and Administrative Council of DGH:

Advisory Council

Directorate General of Hydrocarbons has an Advisory Council, which is appointed by the Government comprising of Chairman and members, who are eminent persons in the field of hydrocarbon exploration and production. The Advisory Council is serviced by the Directorate which is headed by a Director General who is also the Member Secretary to the Council.

Administrative Council

Government of India setup an Administrative Council to guide and to take care of all administrative aspects of the functioning of DGH, through Office Memorandum No. O-32012/1/95-ONG-III dated 02.02.2001. The Administrative Council takes decisions on various matters concerning establishment, budget and undertakes periodical review of the functioning of DGH. It is headed by Secretary(MoPNG) and has the following composition:

Table1.1. Composition of Administrative Council of DGH

Name	Designation
Secretary, MoP&NG	Chairman
Additional Secretary, P&NG	Member
AS&FA, MoPNG	Member
Joint Secretary(Expl.), MoPNG	Member
Secretary, OIDB	Member
Director General, DGH	Member- Convener

1.3. Acreages under various Regimes

Petroleum Exploration Licenses (PEL) for domestic exploration & production of crude oil and natural gas were/are being granted under various regimes.

1.3.1 Nomination Basis

Till the end of 1970s, Indian E&P industry was dominated by the two National Oil Companies(NOCs) ONGC and OIL to whom PELs were granted on nomination basis. Exploration was primarily confined to onland and shallow offshore areas.

1.3.2 Pre-NELP Exploration Blocks

28 Exploration blocks were awarded to private companies between 1980 and prior to implementation of NELP where ONGC and OIL had the rights for participation in the blocks after hydrocarbon discoveries. Brief details of the Pre-NELP Exploration blocks is provided below and details of blocks awarded is appended in Chapter-8.

Table1.2. Brief details of the Pre-NELP Exploration blocks

Year	Exploration Rounds	Contracts signed			
		Description	Offshore	Onshore	Total
1980	First round	PSC signed with Chevron, USA and 3 wells were drilled without success, block area was relinquished in 1985	1	-	1
1982	Second round	No PSC signed	-	-	-
1986	Third round	-	-	-	-
1991	Fourth round	5 PSCs signed	2	3	5
1992		First development round	-	-	-
1993	Fifth round	Second development round	4	2	6
	Sixth round	First speculative survey round	2	3	5
1994	Seventh round	-	2	3	5
	Eighth round	Second speculative survey round	1	3	4
1995	Ninth round	JV Exploration Program	1	1	2
Total			**13**	**15**	**28**

In 1993, GoI offered blocks for geophysical and other surveys to update the information on hydrocarbon potential of India's unexplored sedimentary basins. Once the surveys on these blocks were completed, they were to be offered in subsequent rounds of exploration. The Second speculative survey round was launched in 1994 and the third round in 1995. The third round was called as Joint Venture Speculative Survey Round (JVSSR) with a provision of risk participation/cost sharing by DGH upto 50%. Government of India has signed 28 contracts for blocks offered under Pre-NELP Exploration regime.

1.3.3 Pre-NELP Discovered Field or Development Rounds:

Government offered Petroleum Mining Lease(PML) of small/medium sized discovered fields (proven reserves were discovered by ONGC and OIL) to the private sector in August 1992. Production Sharing Contracts(PSCs) awarded during 1991-1993 had the distinctive feature of operators as private companies with ONGC/OIL as having participating interest. These rounds received overwhelming response from various private E&P operators. Government of India has signed 28 contracts (One PSC for Panna Mukta–PM) for 29 discovered fields under Pre-NELP Discovered (Small and Medium size fields) regime.

Table1.3. Pre-NELP Discovered Field or Development rounds

Month/Year of award	Round	Blocks offered in Medium sized field Round		Blocks offered in Small sized field Round		Contracts signed
		Offshore	Onshore	Offshore	Onshore	
August 1992	1	6	6	10	21	18
October 1993	2	2	6	4	29	10
Total Contracts signed						**28**

1.3.4 New Exploration Licensing Policy (NELP):

Government introduced healthy competition and public participation by introducing NELP for exploration & production of oil & gas in the country. Under NELP, blocks were awarded to Indian, private and foreign companies through International Competitive Bidding process where NOCs, viz. ONGC and OIL, were competing on equal footing.

NELP not only accelerated the quest for hydrocarbon exploration, but also brought state-of-the-art technology and efficiency of operations/management to the country.

The awarded 254 blocks under NELP regime are located in onland (114), offshore shallow water (59) and deepwater (81) areas. As a result of exploratory activities, several unexplored and poorly explored areas, in particular offshore and deepwater areas have been appraised through geophysical surveys and exploratory drilling. Till date, 251 discoveries have been made under PSC regimes and most of the gas discoveries have been made in offshore - shallow (52) and deepwater blocks (44).

NELP bidding rounds have attracted many Private and Foreign Companies in addition to PSUs. Before the NELP, a total of 35 E&P Companies (5 PSUs, 15 Private and 15 Foreign) were working in Nomination and Pre-NELP regime. After the conclusion of nine rounds of NELP bidding, the total number of companies had increased to 117 (11 PSUs, 58 Private and 48 Foreign Companies as Operators and Non- operators/ Consortium Partners). Major Private Companies were RIL, Jubilant and Essar. The major foreign companies were British Gas, British Petroleum, the then Cairn Energy (now Cairn India), ENI, Santos and BHP Billiton.

Public Sector Undertakings (PSUs) IOCL, GAIL, BPCL working under MoP&NG and their subsidiaries like Bharat Petro Resources Ltd. (Subsidiary of BPCL), Prize Petroleum Company Limited (Subsidiary of HPCL), have participated in various NELP bidding rounds and have been awarded exploration blocks in various NELP bidding rounds. In addition to central PSU, state PSU like GSPC have participated in various NELP bidding rounds and have been awarded exploration blocks.

The domestic crude oil/gas production in the country consists of oil production from Nomination Blocks/ Fields under ONGC and OIL and from the discovered fields and producing Pre-NELP and NELP blocks under the Production Sharing Contract (PSC) regime.

1.3.5 Discovered Small Field Policy

The Government of India brought out a new policy for small fields known as Discovered Small Field (DSF) policy, 2015. This policy offers improved fiscal terms viz.no oil cess applicable on crude oil production, moderate royalty rates, no upfront signature bonus, pricing and marketing freedom for oil and gas and no carried interest by NOCs. DSF provided a unique opportunity for Indian investors/companies for development of discovered hydrocarbon resources under revenue sharing contract mechanism wherein the terms are liberalized for providing maximum autonomy to contractor with minimum Government oversight. For the very first time in Indian E&P sector, fields were awarded under revenue sharing regime. With two DSF bidding rounds carried out till date, 53 Contract Areas have been awarded, resulting in entry of over 20 new players in Indian E&P sector. DSF fields which are awarded under DSF Bid Round 2016 are expected to come into production by 2020-21 onward.

1.3.6 Open Acreage Licensing Policy (OALP) under Hydrocarbon Exploration and Licensing Policy (HELP)

Government of India launched a new policy regime for E&P sector namely Hydrocarbon Exploration and Licensing Policy (HELP) in 2016.

The policy intends to open the E&P sector for new entrants and foreign players in a quest to enhance domestic oil and gas production, bring in substantial investment and new technologies in the sector and generate sizable employment. The policy would further enable transparency in the system and reduce regulatory discretion thereby improving the 'Ease of Doing Business" in Indian E&P Sector. Effective implementation of the policy was critical to realize the intended benefits of the policy and exploit huge potential of Indian sedimentary basin which presents a yet-to-find potential of over 230 billion barrels of oil and oil equivalent gas with over 70% of the area yet to be explored.

The HELP is implemented through innovative OAL Programme, where the continuous bidding rounds are conducted on the investor selected blocks. The maiden bidding round under OALP received an overwhelming response with 55 blocks getting awarded covering an area of ~60,000 Sq. Km.

As a further impetus to the sector the policy received a major overhaul in February 2019, wherein government decided to forego the revenue share commitment from the operators at time of bidding in case of Category II and Category III basins in India. Bid round IV carried out under invigorated policy regime was awarded in January 2020. A total of 94 blocks have been awarded under four bidding rounds of OALP.

Table 1.4. Status of Blocks under various regimes (As on 31-03-2020)

Bidding Round	Launch Year	Signing Year	Offered	Awarded				Operational/Active			
				Deep/ Ultra-Deep Water	Shallow Water	Onland	Total	Deep/ Ultra-Deep Water	Shallow Water	Onland	Total
Pre-Nelp Exp. Blocks	1980	1980-1995	379	-	13	15	28	-	3	8	11
Pre-Nelp Field	1992	1992-1993	84	-	4	24	28	-	2	19	21
NELP I	1999	2000	48	7	16	1	24	2	1	-	3
NELP II	2000	2001	25	8	8	7	23	-	-	1	1
NELP III	2002	2003	27	9	6	8	23	-	1	3	4
NELP IV	2003	2004	24	10	-	10	20	-	-	3	3
NELP V	2005	2005	20	6	2	12	20	-	1	3	4
NELP VI	2006	2007	55	21	6	25	52	-	2	6	8
NELP VII	2007	2008	57	11	7	23	41	-	3	6	9
NELP VIII	2009	2010	70	8	11	13	32	-	2	1	3
NELP IX	2010	2012	34	1	3	15	19	-	1	9	10

Round	Launch Year	Signing Year	Offered	Awarded				Operational/Active			
				Deep/ Ultra-Deep Water	Shallow Water	Onland	Total	Deep/ Ultra-Deep Water	Shallow Water	Onland	Total
DSF I	2016	2017	46	-	7	23	30	-	7	23	30
OALP I	2018	2018	55	1	8	46	55	1	8	46	55
DSF II	2019	2019	25	-	9	14	23	-	9	14	23
OALP II	2019	2019	14	1	5	8	14	1	5	8	14
OALP III	2019	2019	23	1	3	14	18	1	3	14	18
OALP IV	2019	2020	7	-	-	7	7	-	-	7	7
Grand Total	**-**	**-**	**993**	**84**	**108**	**265**	**457**	**5**	**48**	**171**	**224**

Table 1.5. Investment made in NELP blocks in USD Million (As on 31-03-2020)

Bidding Round	Committed Investment		Actual Investment upto 2019-20*		
	Type	Value	Exploration	Development	Total
Pre-NELP Blocks	Exploration	NA	2,330	6,812	9,142
Pre-NELP Fields	Development	NA	526	5,761	6,287
Pre-NELP Total			**2,856**	**12,573**	**15,429**
NELP - I	Exploration	1,082	4,983	9,995	14,978
NELP - II	Exploration	775	910	34	944
NELP - III	Exploration	978	3,399	1,967	5,366
NELP - IV	Exploration	1,135	2,099	20	2,119
NELP - V	Exploration	3,570	1,028	31	1,059
NELP - VI	Exploration	1,505	2,801	13	2,814
NELP - VII	Exploration	1,102	904	1	905
NELP - VIII	Exploration	734	717	-	717
NELP - IX	Exploration	847	249	-	249
NELP Total		**11,728**	**17,090**	**12,061**	**29,151**
DSF-I	Development	268	-	38	38
DSF-II	Development	1,365	-	-	-
DSF Total		**1,633**	**-**	**38**	**38**
OALP-I	Exploration	815	46	-	46
OALP-II	Exploration	452	2	-	2
OALP-III	Exploration	709	21	-	21
OALP-IV	Exploration	341	6	-	6
OALP Total		**2,317**	**75**	**-**	**75**
Grand Total			**20,021**	**24,671**	**44,692**

**Rounded-Off*

Table 1.6. R/P Trend in Oil Production in last 5 decades (From FY 1970-71 to 2019-20) (in MMT)

FY	Production	Balance Recoverable Reserves	R/P
1970-71	6.82	128	19
1980-81	10.51	366	35
1990-91	33.02	739	22
2000-01	32.88	732	22
2010-11	37.66	660	18
2019-20	32.16	493	15

Figure 1.2 R/P Trend in Oil Production in last 5 decades (From FY 1970-71 to 2019-20)

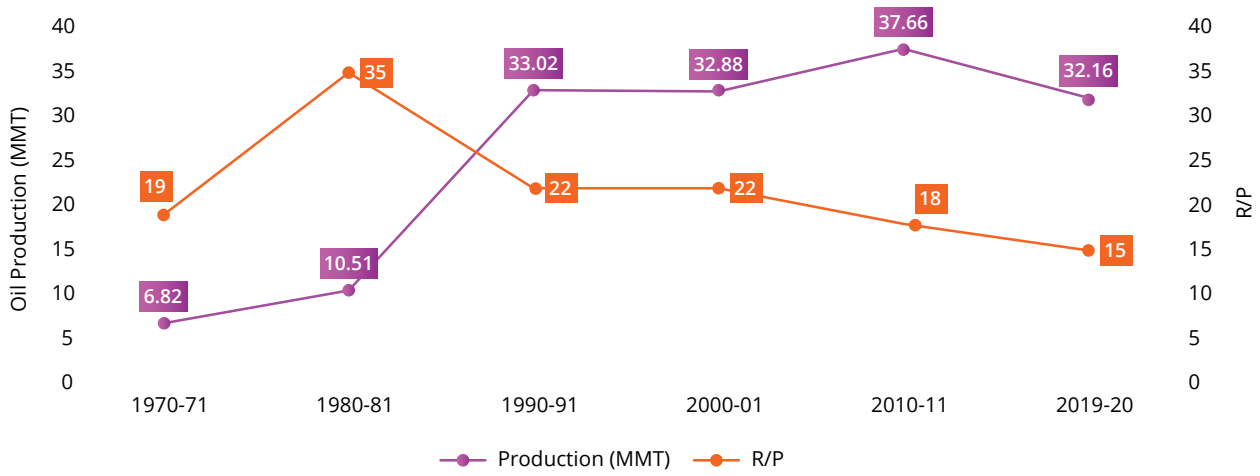
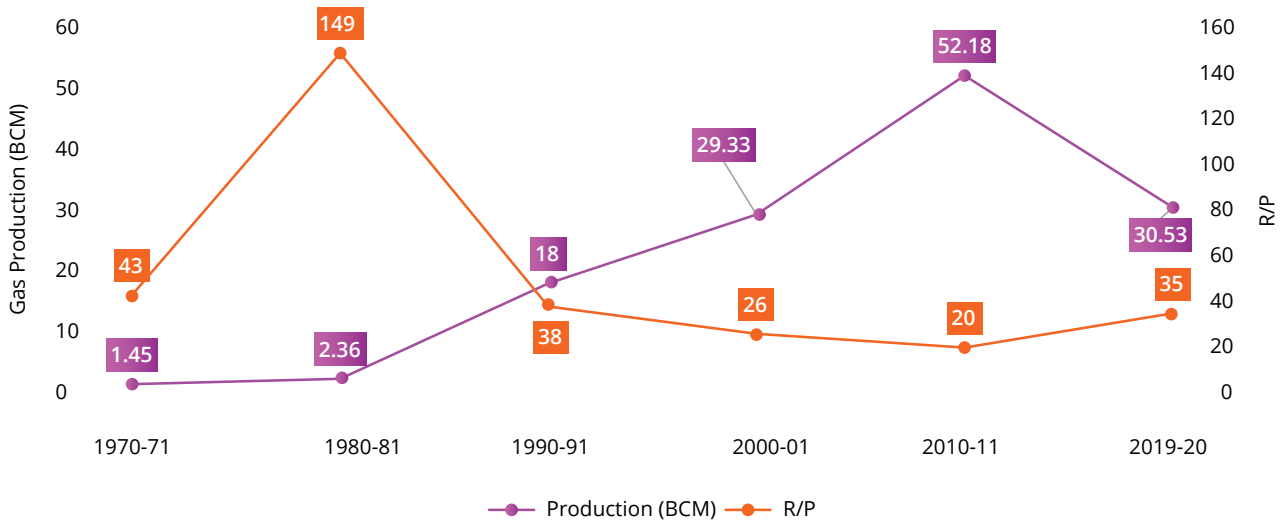


Table 1.7. R/P Trend in Gas Production in last 5 decades (From FY 1970-71 to 2019-20) (in BCM)

FY	Production (BCM)	Balance Recoverable Reserves	R/P
1970-71	1.45	62	43
1980-81	2.36	351	149
1990-91	18	686	38
2000-01	29.33	763	26
2010-11	52.18	1,043	20
2019-20	30.53	1,080	35

Figure 1.3 R/P Trend in Gas Production in last 5 decades (From FY 1970-71 to 2019-20)



Brief Timeline of Indian E&P Sector

1867
- Struck Oil in Jeypore Assam

1882
- Assam Railway Trading Company set up to explore oil

1890
- First Commercial Discovery at Digboi, Assam

1891
- Assam Oil syndicate set up a refinery at Margherita, Assam

1976
- Discoveries of Bassein Gas Field, Mumbai Offshore, Kharsang oil field, Arunachal Pradesh

1974
- Bombay High discovered

1961
- Oil India Pvt Ltd incorporated as 50% JV between GoI and BOC

1960
- Discovery of Ankleshwar oil field, Gujarat

1977
- Discovery of Heera oil field, Mumbai Offshore

1981
- Oil India Ltd became wholly owned GoI Enterprise

1983
- Discovery of Gandhar Oil field, Gujarat

1985
- GoI decision for participation of private companies in development of discovered oil and gas fields

2005
- Third Round of CBM bidding
- NELP-V launched offering 20 blocks

2004
- Mangala Oil Field discovered in Rajasthan

2003
- Second Round of CBM blocks bidding
- NELP-IV launched with 24 blocks on offer

2002
- NELP-III launched offering 27 blocks

2006
- NELP-VI launched offering 55 blocks
- MA Oil Field, KG Offshore Discovered

2007
- NELP-VIII launched with 57 blocks on offer
- CBM extension policy introduced
- Discovery of D1 & D3 Gas Fields, KG offshore

2008
- Fourth round of CBM bidding

2009
- NELP-VIII launched with 70 blocks on offer

2019-20
- Launch of OALP Bid Round II & III
- Reforms in Exploration Policy
- Launch of OALP Bid Round IV
- EIA Notification on exemption from seeking Environment Clearance for exploratory drilling for onland and offshore blocks
- Self-certification of PSC processes

2018
- Launch of OALP Bid Round-I
- Launch of DSF Bid Round-II
- Grant of exploration and exploitation rights to Coal India Limited (CIL) and its subsidiaries from coal bearing areas for which they possess mining lease for coal
- Exploration & exploitation of Unconventional hydrocarbons in existing acreages under PSC, CBM & Nomination Fields
- Enhanced Recovery Policy
- Policy for streamlining of PSCs

1895

- Assam Oil Company to take over petroleum interests from Assam Oil Syndicate

1901

- First Oil Refinery Set up at Digboi, Assam

1922

- Burmah Oil Company bought shares from ARTC, and appointed commercial and technical managers from AOC

1930

- Crude Oil Production plummeted upto 250000 tonnes per annum and exploration activities continued in Assam-Arakan range

1948

- Industrial Policy Resolution passed
- Oilfields (Regulation and Development) Act, 1948 came into existence

1953

- Discovery of Naharkatia Oil Field, Assam

1956

- Oil and Natural Gas Commission established
- Discovery of oil in Moran, Assam

1959

- ONGC became statutory body

1986

- Neelam Oil Field, Mumbai Offshore discovered

1987

- Ravva Oil Field discovered in Cauvery Offshore

1993

- DGH Established, New policy for ound-the-year bidding of exploratory block
- ONGC is re-organised as a corporation

1995

- GoI approved NELP

1997

- GoI formulated CBM Policy

1999

- NELP-I launched offering 48 blocks

2000

- NELP-II launched with 25 blocks on offer

2001

- First round of CBM bidding

2010

- NELP-IX launched with 34 blocks on offer

2014

- Domestic Natural Gas Pricing guidelines
- Approval and launch of Hydrocarbon Resource Reassessment Study

2015

- Discovered Small Field Policy

2016

- Approval of Hydrocarbon Exploration Licensing Policy (HELP)
- Marketing and Pricing freedom for new gas production from Deepwater, Ultra Deepwater and High Pressure-High Temperature Areas
- Launch of Discovered Small Fields Bid Round 2016
- Launch of National Seismic Programme
- GIPIP
- Policy for grant of extension to Production Sharing Contracts for Small and medium sized discovered fields

2017

- Launch of NDR
- Launch of HELP through OALP
- Early monetization of CBM
- Extension policy for Pre-NELP Contracts

2 INVESTORS' PICK

India is presently the 3rd largest consumer of primary energy and oil after USA and China. Energy consumption in India is projected to grow exponentially for next 20 years. India's projected oil demand is going to grow at CAGR of 4% during 2016 - 2030 against the world average of 1%, though the projected oil demand will be much lower as compared to the US and China as per globally acclaimed sources. India has set a target to raise the share of gas in its primary energy mix to 15% by 2030. Ever increasing energy demand in India coupled with pro-business environment creates huge investment opportunities for investors. Govt. of India has an unwavering commitment towards production maximization for the ever-increasing energy needs of the country. The sector, in the recent years has witnessed major policy and administrative reforms to encourage Ease of Doing Business in the sector.

2.1 Recent Policies

2019-20

1. Govt. of India categorizes onshore and offshore oil and gas exploration activities as Category B2 for green clearance

Date of Notification: 16-01-2020

- The Ministry of Environment, Forest and Climate Change (MoEF&CC) vide notification dated **16th January 2020 categorizes onshore and offshore oil and gas exploration activities as B2 category** for seeking prior Environmental Clearance (EC)
- In the original EIA Notification, 2006, "offshore and onshore oil & gas exploration, development and production" has been covered under

schedule 1(b) and being category A projects require preparation of an Environment Impact Assessment (EIA) report, conduct of public hearing and clearance from the Union MoEF&CC.

- As exploration activities in hydrocarbon sector have been moved from Category A to Category B2, will now require environmental clearance only from the States concerned and will not require preparation of an EIA report or conduct of Public Hearing. However, Development or Production, both on offshore /onshore fields as hydrocarbon blocks, will continue to merit assessment as "category A".

2. Self-certification of processes under Production Sharing Contracts (PSC)

Date of Notification: 28-02-2020

A review of the processes for various approvals and submission of documents for the same under Production Sharing Contracts (PSC) under NELP/Pre-NELP has been undertaken. The documents shall be submitted to Directorate General of Hydrocarbons (DGH) and/or Ministry of Petroleum and Natural Gas (MoPNG) The government has reviewed the processes and segregated 37 processes into three categories A) 22 Processes where documents shall be accepted on self-Certification basis and no approval is required; B) 3 Processes where approval will be deemed on expiry of 30 days of submission of self-certification of documents and C) 12 Processes where approvals shall be required under the Act/Rules or Contracts.

2018-19

1. Delegating powers to award contract areas to Minister of Petroleum & Natural Gas and Minister of Finance on the recommendations of Empowered Committee of Secretaries (ECS)

Date of Notification: 29-06-2018

In line with the Government initiative of ease of doing business, the approval for delegating the powers to Minister of Petroleum and Natural Gas and Finance Minister to award the Blocks/Contract Areas to successful bidders under Hydrocarbon Exploration and Licensing Policy (HELP) after International Competitive Bidding (ICB) based on the recommendations of Empowered Committee of Secretaries (ECS). Under HELP policy, this delegation of powers has expedited the decision-making process on awarding blocks and give a boost to the initiative of ease of doing business. Under HELP the competitive bidding will be continuous and blocks will be awarded thrice a year.

2. Exploration and Exploitation of Coal Bed Methane (CBM) from areas under Coal Mining Lease allotted to Coal India Limited (CIL) and its subsidiaries

Date of Notification: 08-05-2018

The decision is in line with the Government's initiatives of 'Ease of Doing Business' & reducing the hydrocarbon import. The amendment will expedite the exploration and exploitation of CBM, enhance the availability of natural gas and reduce the gap in demand and supply of natural gas. The increased development activities for exploration and exploitation of CBM gas reserves in-and-around the block will generate economic activities which in turn has potential to create employment opportunities in CBM operations and in the industries.

Status of Progress Made
(As on 31-03-2020)

- In pursuant to CCEA decision policy has been notified on 08.05.2018. Notification has been sent to Ministry of Coal for taking further action as per notification. CIL has come out with a tender for carrying out CBM operations in their Jharia and Raniganj Coal Fields.

3. Policy Framework for Streamlining working of Production Sharing Contracts in respect of Pre-NELP and NELP Blocks

Date of Notification: 14-08-2018

The policy framework includes:

i. **Special dispensation for E&P activities in North Eastern Region (NER).** Based on recommendations in 'Hydrocarbon Vision 2030 for North East', Government has extended timelines for exploration and appraisal period in operational blocks of North Eastern region of India considering geographical, environmental and logistical challenges. **The exploration period has been increased by two years and appraisal period by one year.** Further, to stimulate natural gas production in NER, **Government has also allowed marketing including pricing freedom for natural gas** to be produced from discoveries which are yet to commence production as on 1st July, 2018. PSC blocks in NER will be benefited from this special dispensation.

ii. **Sharing of Royalty and Cess in Pre-NELP Exploration Blocks.** Government has created an enabling framework for sharing of statutory levies including royalty & cess in proportion to the participating interest of the Contractor in Pre-NELP Exploration Blocks, and same has been made cost recoverable with prospective effect. This will benefit Pre-NELP Exploration Blocks in which fresh investment for additional development & production activities is expected as sharing of royalty and cess, and cost recoverability of same will help in making additional investment commercially viable for Licensee company; ONGC/OIL.

iii. **Extending tax benefits under Section 42 of Income Tax, 1961 prospectively to operational blocks under Pre-NELP discovered fields for the extended period of contract under PSC extension policy dated 28th March 2016.** Section 42 of Income Tax allows the companies to claim 100% of expenditure incurred under a PSC as tax deductible for computing taxable income in the same year. While signing PSC of Pre-NELP discovered fields, 13 contracts out of 28 contracts did not have provision for tax benefit under Section 42 of Income tax Act. Now, this will bring uniformity and consistency in PSCs and provide incentive to contractor to make additional investment during the extended period of PSC.

iv. **Relaxing the timeline from 7 days to 15 days for giving written notice to notify the occurrence of a Force Majeure event in the PSCs.**

Status of Progress Made
(As on 31-03-2020)

- Using this Policy Excusable Delay was granted in 5 blocks whereas 2 applications are under Consideration.

4. Policy Framework for Exploration and Exploitation of Unconventional Hydrocarbons under Existing Production Sharing Contracts (PSCs) Coal Bed Methane (CBM) Contracts and Nomination Fields

Date of Notification: 20-08-2018

This policy will enable the realization of prospective hydrocarbon reserves in the existing Contract Areas which otherwise would remain unexplored and unexploited. With this policy dispensation, new investment in Exploration and Production (E&P) activities and chances of finding new hydrocarbon discoveries and resultant increased domestic production thereof is expected. This will lead to induction of new, innovative and cutting-edge technology and forging new technological collaboration to exploit unconventional hydrocarbons."

Status of Progress Made
(As on 31-03-2020)

- NOC's are carrying out shale Oil/Gas Exploration work in their PEL/PML areas. Operators of blocks Raniganj (South) and RG(East)-CBM-2001/1 have evinced their interest to carry out shale operations in their blocks.

5. Policy framework to promote and incentivize enhanced recovery methods for Oil and Gas

Date of Notification: 10-10-2018

The objective of the ER Policy is to encourage and incentivize additional investments towards adoption of enhanced recovery techniques through fiscal waivers to increase domestic hydrocarbon production. The policy aims at building a supportive ecosystem through academic and research institutes, industry-academia collaboration and to support and encourage Exploration and Production (E&P) Contractors to deploy ER/IR/UHC Methods/ techniques.

Salient Features of policy are as follows:

- This ER Policy framework is to promote and incentivize Enhanced Recovery (ER)/ Improved Recovery (IR)/ Unconventional Hydrocarbon (UHC) production Methods/techniques to improve recovery factor of existing hydrocarbons reserves for augmenting domestic production of oil and gas.
- The ER includes Enhanced Oil Recovery (EOR) and Enhanced Gas Recovery (EGR), Unconventional Hydrocarbon (UHC) production methods include Shale oil and gas production, tight oil and gas production, production from oil shale, gas hydrates and heavy oil.
- The policy will be applicable to all contractual regimes and Nomination fields.
- The Policy, having a sunset clause, will be effective for 10 years from the date of its notification. However, the fiscal incentives will be available for a period of 120 months from the date of commencement of production in ER/UHC projects.
- In case of IR Projects, the incentives will be available from the date of achievement of the prescribed benchmark.
- The fiscal incentives are extended in form of partial waiver of applicable Cess/Royalty on incremental production resulting from the adoption of ER methods on designated wells.
- An Enhanced Recovery (ER) Committee comprising of representatives of Ministry of Petroleum & Natural Gas, Directorate General of Hydrocarbons (DGH), experts from upstream sector, and academia would monitor and implement the Policy.
- The Policy envisages systemic assessment of every field for its ER potential, appraisal of appropriate ER techniques and fiscal incentives to de-risk the cost involved in ER Projects to make the investment financially viable.
- Mandatory Screening of fields through designated institutions, to be notified by Government, and conducting Pilot before actual implementation of ER Project on commercial level.

Technological interventions have significant potential in stimulating the recovery of hydrocarbon reserves from the matured/aging fields. **An increase by 5% in recovery rate of original Inplace volume in oil production is envisaged producing 120 MMT additional oil in next 20 years. In case of gas, an increase of 3% recovery rate on original in-place volume is envisaged, leading to additional production of 52 BCM of gas in next 20 years**.

Status of Progress Made
(As on 31-03-2020)

The implementation of the policy broadly involves 3 major stages – screening studies, pilot phase and commercial implementation.

i. Stage I: The first stage is the screening of ER methods compatible with the field/reservoir under consideration and selection of the most appropriate ER method accordingly.

- A total of 215 commercial fields were screened under the policy. Out of these, 147 were ONGC nomination fields, 18 were OIL nomination fields and 50 were PSC fields. 64 nomination fields of ONGC which were to be bid-out were not considered.
- After the first stage of ER screening of different reservoirs in different fields, the ER screening reports were clubbed field-wise and a total of 72 fields have been deemed to be suitable ER candidate fields. These include 30 fields of ONGC (57 payzones), 15 fields of OIL (210 payzones) & 27 PSC fields.
- After comprehensive screening studies, a total number of 17 ER proposals have been received in 2019-20 (as on 31st March 2020). These proposals are furnished payzone-wise and include 9 proposals are of ONGC, 3 proposals of OIL & 5 proposals for PSC fields.

- Further screening studies for the remaining 43 ER candidate fields are underway, with most being delayed due to the COVID-19 lockdown.

ii. Stage-II: The second stage is the pilot phase of an ER project which commences after the approval of ER proposals/screening report by DGH.

- Of the 17 ER proposals submitted, 6 have been approved by DGH including 5 proposals for ONGC fields and 1 proposal for 1 PSC field.

iii. Stage III-The third stage is the commercial implementation of the ER method by the Operator post a successful pilot phase.

- After the completion of the pilot phase, which usually takes 2 to 3 years, an assessment based on the pilot performance is carried out by the Operator to formulate a commercial ER implementation plan for the field. Based on this plan for commercial ER implementation, The ER Committee decide upon the quantum of fiscal incentive to be made available to the Operator for the project under the ER Policy.

6. Reforms in Hydrocarbon Exploration and Licensing Policy for enhancing domestic exploration and production of oil and gas

Date of Notification: 28-02-2019

Government notified 'Reforms in Exploration and Licensing Policy' in February 2019, with the objective to intensify exploration activities, attract foreign and domestic investment and enhance domestic production. E&P companies under the Reformed Policy will get following exclusive benefits during Contract Period:

1. No Revenue Sharing with Government in Category- II & III sedimentary basins except in case of "Windfall Gain";
2. Royalty concessions for early monetization and commercial production;
3. In Category-I sedimentary basin Revenue share at HRP capped at 50%;
4. Simplified contractual terms with emphasis on cutting down approvals of Government/DGH/ Management Committee and expeditious grant of approvals;
5. Empowered Coordination Committee (ECC) under the chairmanship of Cabinet Secretary for expediting process of approvals;
6. New Dispute Resolution Mechanism for amicable and speedy redressal of contractual dispute.
7. Electronic Single Window mechanism based on IT workflow and processes for processing of approvals.

Status of Progress Made
(As on 31-03-2020)

- The benefits are applicable to OALP Bid Round IV onwards. Under OALP Bid Round IV, eight (8) bids were received from National Oil Companies (ONGC and OIL) for seven (7) blocks. The Bid Round was successfully concluded with award of 7 Blocks spread over an area of 18,510 Sq. Km. to ONGC. ONGC has committed 1400 LKM of 2D, 2450 SKM of 3D and 61 exploratory wells for an investment amount of USD 340.70 million.

- OALP Bid Round V with 11 Blocks on offer spread over an area of 19,800 Sq. Km, is under progress. Of the 11 blocks offered, nine (9) blocks were situated in Category-I Basin, seven (7) in Category-II Basin and remaining two (2) blocks were in Category-III Basin. Further, out of 11 blocks, 8 are Onland blocks, 1 is Ultra-Deep-Water block and 2 are Shallow Water blocks.

2016-17

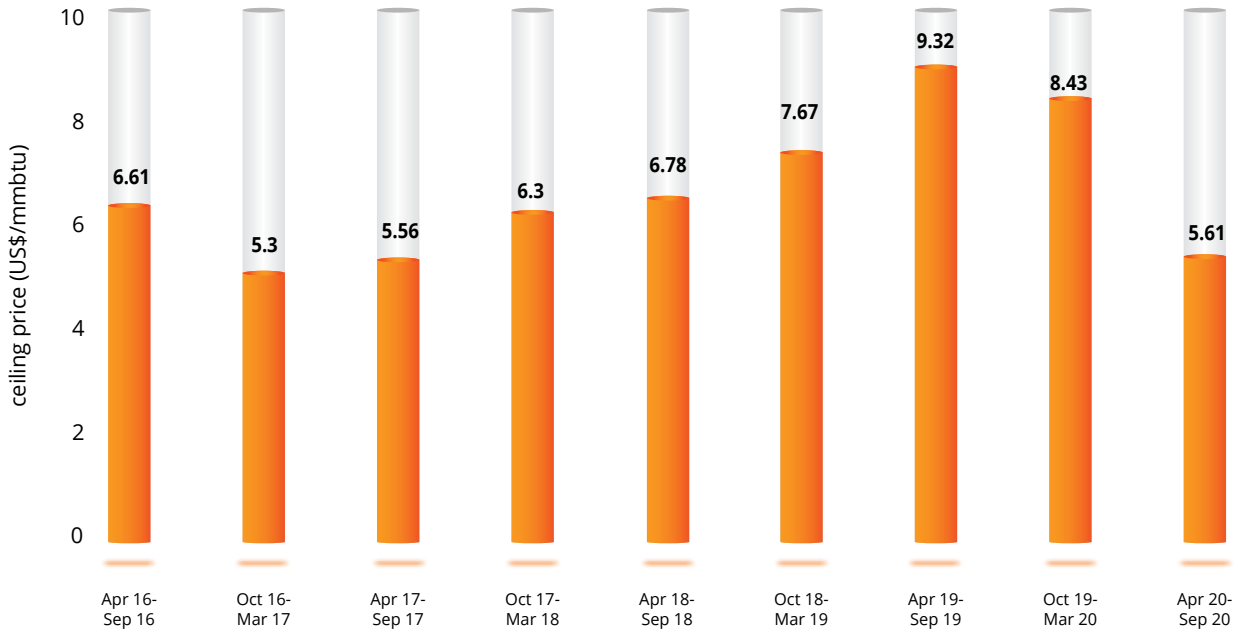
1. Marketing including pricing freedom for gas to be produced from Discoveries in Deepwater (DW), Ultra Deepwater (UDW) and High Pressure-High Temperature areas (HP-HT)

Date of Notification: 21-03-2016

On 10th March 2016, Government approved marketing and pricing freedom for Gas discoveries in HP-HT, DW and UDW Reservoirs. This shall incentivize exploration and production in DW/UDW/

HPHT areas and will unlock huge Hydrocarbon potential. The ceiling gas price is determined (based on alternative fuels) by the Government and notified till date (on GCV basis) are as under:

Figure 2.1: Applicable Ceiling Price (US$/MMBTU), GCV basis



Status of Progress Made (As on 31-03-2020)

- ONGC has started producing gas from Discoveries in Deepwater Ultra Deepwater, and High Pressure-High Temperature areas eligible under Notification dated 21.03.2016 from S1-VA field at East Coast from Aug'16. ONGC has also invited tenders for upcoming gas from KG-DWN-98/2. RIL has also invited tenders for upcoming gas from KG-DWN-98/3.

2. Policy for the Grant of Extension to the Production Sharing Contracts signed by Government awarding small, medium sized and discovered fields to private Joint Ventures

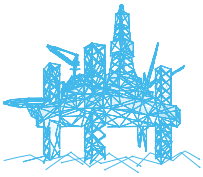
Date of Notification: 28-03-2016

On 10th March 2016, Government approved for grant of extension to the Production Sharing Contracts for 28 small, medium sized and discovered fields signed by GoI and Pvt. JVs. Policy allows extension for a period of 10 years for both for Oil and Gas fields.

The Government approved the policy to grant extension for 10 years or economic life of the field, whichever is earlier, to small and medium sized discovered fields in March, 2016. The Government share of Profit Petroleum during the extended period of contract would be 10% higher for these fields. This extension policy is applicable for 28 discovered fields, out of which extension for 12 fields have already been granted for fields.

Status of Progress Made (As on 31-03-2020)

- Under this policy 11 PSCs of Pre-Nelp Discovered Fields have been extended by 10 years and 1 PSC of Pre-Nelp Discovered Field (Hazira) has been extended by 5 years.



3. New Hydrocarbon Exploration Licensing Policy (HELP) along with Open Acreage Licensing Programme (OALP)

Date of Notification: 30-03-2016

Hydrocarbon Exploration and Licensing Policy (HELP) was launched with the clear objective of boosting the production of oil & gas in the Indian sedimentary basin. This policy is based on the new model of Revenue Sharing Contract (RSC) which has replaced the earlier model of Production Sharing Contract (PSC). Under HELP Open Acreage Licensing (OAL) mechanism has been launched which allows the investors to carve out blocks of their choice by assessing E&P data available at NDR & by submitting an Expression of Interest (EoI). EOI can be submitted throughout the year without waiting for a formal bid round from the government. These blocks would be subsequently offered through bi-annual formal bidding process. OALP would be manifested through National Data Repository which will provide rapid jumpstart to E&P activities by providing seamless access to the country's entire G&G data for interpretation and analysis.

Salient Features of HELP

- Unified license for all types of hydrocarbon viz. conventional oil and gas, coal-bed methane, shale oil, gas hydrates, etc.
- Revenue Sharing Model: Simple, easy to monitor; only two monitoring parameters for the government- revenue & production of the contractor, no cost recovery; no micro-management by the Government; operational freedom to the operator.
- Freedom to carve out blocks under OALP
- Reduced and graded royalty rates. Further to encourage exploration in deep water and ultra-deep-water areas, the royalty was exempted for first seven years (and subsequently royalty of 5% and 2% applicable in deep water and ultra-deep water areas respectively).
- Other fiscal incentives viz. exemption of cess on crude oil and custom duty applicable on equipment/ services for exploration and production activities, reduced rate of GST on specified goods being purchased for petroleum operations.
- Full marketing and pricing freedom of gas produced on arm's length basis.
- Extended period for exploration and production i.e. 8 years for onland/ shallow water and 10 years for deep water/ frontier areas.
- Pre-determined Liquidated Damages (LDs) for any shortfall in committed work program.

Status of Progress Made
(As on 31-03-2020)

- Since the inception of HELP, four (4) bid rounds have been concluded so far. Fifth Bid Round is ongoing and the timeline for submission of bids under OALP Bid Round V has been extended till 30th June 2020.
- Under four Bid Rounds, 99 blocks were on offer and 94 exploration blocks covering an area of 1, 36,790 sq. Km. were awarded. Five un-awarded blocks were part of OALP-Round-III and in all of them CBM was the focus; however, no bids were received for CBM blocks. 193 bids were received for remaining 94 blocks.

4. Early Monetization of CBM

Date of Notification: 11-04-2017

The policy is expected to boost CBM production and generate new avenues of employment and increased investment in CBM blocks. It is also envisaged that 14 CBM blocks which are under relinquishment will be provided an easy exit option under the policy.

Status of Progress Made
(As on 31-03-2020)

- After implementation of policy one GSA (Gas Sales Agreement) was signed as per clause 1.1 of the policy in Raniganj East CBM Block. Exit from 6 CBM Blocks was approved after notification of the policy. CBM production during 2019-20 was ~1.80 MMSCMD in the country.

5. Policy for the Grant of Extension to the Production Sharing Contracts signed by Government of India awarding Pre-New Exploration Licensing Policy (Pre-NELP) Exploration Blocks

Date of Notification: 22-03-2017

This policy enables the contractors to extract not only the remaining reserves but also plan to extract additional reserves by implementing new technologies. The policy will give boost to accelerate and supplement indigenous production of hydrocarbon from existing blocks and act as a progressive step towards achieving the target of 10% reduction in import of energy by 2021-22.

In certain fields, additional recovery of hydrocarbons can be obtained through Enhanced Oil Recovery / Improved Oil Recovery (EOR/IOR) Projects and as such the production would extend beyond the current duration of PSC. The recoverable reserve from these blocks is estimated to be more than 426 million barrel of oil equivalent. During the extension period, contractors are expected to make an additional investment of more than USD 5430 million.

The Government share of Profit Petroleum during the extended period of contract would be 10% higher for these fields, thus bringing additional revenues to Government.

In addition, the policy brings out detailed guidelines regarding grant of extension, criterion for evaluation of request, time frame for consideration of request, duration of extension etc. The extension of these contracts is expected to bring extra investments in the fields and would generate both direct and indirect employment. The policy aims at bringing out clear terms of extension in fair and transparent manner so that the resources can be expeditiously exploited in the interest of energy security of the country besides improving the investment climate."

Status of Progress Made
(As on 31-03-2020)

- 10 blocks are applicable under the policy. Out of which, extension of 10 years has been granted to Pre-Nelp Exploration block RJ-ON-90/1. 6 blocks have more than 2 years for expiry of PSC. One (1) block has been terminated. Remaining 2 blocks are under exploration in PSC.

6. Survey of Un-Appraised Areas of Sedimentary Basins of India

Date of Notification:12-09-2017

The project was sanctioned to acquire 48,243 Line Kilometer (LKM) 2D seismic data for appraisal of Indian sedimentary basins where limited data is available. The project will be implemented by NOCs, i.e. Oil India Limited (OIL) and Oil and Natural Gas Corporation (ONGC). OIL will conduct survey in North - Eastern States while remaining area will be covered by ONGC. Survey work will be carried out in 24 States over a period of 5 years. The timeline to complete the project was till June 2020.

DGH reviewed the progress of work and construed that reasons for shortfall in completing the project target are inevitable. The ideal weather window to conduct the survey is from October to June months. Some of the areas could not be covered due to hostile environment nationwide lockdowns due to Covid-19 and difficult terrain which considerably hampered the work progress. Due to the Covid-19 restrictions and lockdown, MoP&NG has been requested to extend the timeline till June 2021.

Status of Progress Made
(As on 31-03-2020)

- As on 31-03-2020, cumulative data acquisition by ONGC and OIL are 40137.40 LKM (98.29%) and 4637.28 LKM (76.10%) respectively. Processing of 35431.50 LKM data and interpretation of 22003.97 LKM data by ONGC is completed whereas 3559.68 LKM data is processed by OIL is completed.

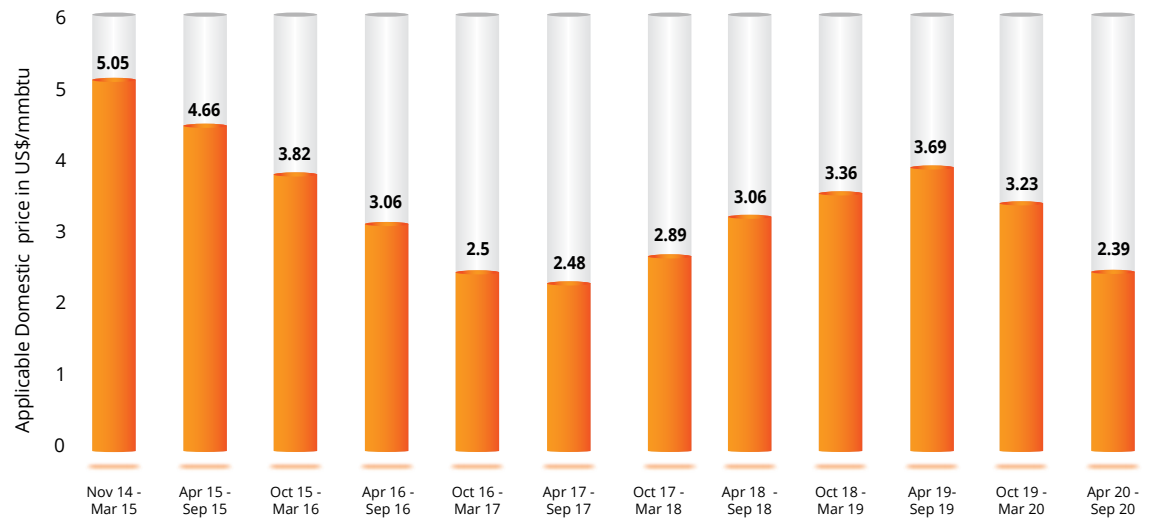
2014-15

1. New Domestic Natural Gas Pricing Guidelines, 2014

Date of Notification: 25-10-2014

In supersession of MoPNG's Gazette notification no. 22011/3/2012ONG.D.V dated 10-1-2014, the Government of India notified the New Domestic Natural Gas Pricing Guidelines, 2014. effective from 01-11-14. Domestic Natural Gas prices are being determined in accordance with the pricing formula dated 25-10-2014 and notified by MoPNG on half-yearly basis. In terms of these guidelines, domestic gas price is determined based on weighted average formula considering (a) annual average prices prevailing at Henry Hub, Alberta Hub, National Balancing Point (NBP) & Russia and (b) annual volume of natural gas consumed in USA & Mexico, Canada, European Union (EU) & Former Soviet Union (FSU) countries excluding Russia. Prices notified w.e.f. 01-11-2014 are as under;

Figure 2.2: Applicable Domestic Gas Price (US$/mmbtu), GCV basis



2. Policy framework for relaxations, extension and clarifications at the development and production stage for early monetization of Hydrocarbon discoveries under PSC regime

Date of Notification: 10-11-2014

The salient features of the policy initiative are as follows:

I. Extension of Appraisal period for submission of Declaration of Commerciality (DoC) in respect of Hydrocarbon discovery.

II. Extension of time period for submission of Field Development Plan (FDP) after review of DoC by the Management Committee.

III. Reduction in Minimum Work Program (MWP) in case a block or its part is not available for exploration activities consequent to denial of permission by Government Agencies.

IV. Swapping of 2D and 3D Seismic Minimum Work Programme, on the request of the operator.

V. In cases where the committed Minimum Work Programme of any exploration phase is not completed, entry into subsequent exploration phases, would be permitted after paying cost of unfinished MWP of previous phases.

VI. Condoning delays in submission of notice for entering next phase.

VII. Condoning delays in submission of Annual Work Programme and Budget and the Appraisal work programme.

VIII. Permission for drilling of Appraisal Wells after Submission of DoC.

IX. Probing additional reservoirs during appraisal programme.

X. Acceptance of discoveries for which notification to the Government has not been made are also notification for testing has not been provided as prescribed.

Status of Progress Made
(As on 31-03-2020)

- Over 40 cases have been resolved under this policy. Extension of time period for submission of DoC were granted in 8 Blocks, Extension of time period for submission of FDP were granted in 4 Blocks.
- Operator allowed to Exit in 14 Blocks whereas in 3 Blocks Minimum Work Programme (MWP) Reduction was granted and 2 applications are under consideration.
- Swapping of 2D and 3D seismic MWP were granted in 7 Blocks
- Entry into subsequent exploration phase, after paying cost of unfinished MWP of previous phases was granted in 1 Block
- One application was received for Condoning delays in submission of notice for entering next phase,
- Drilling of Appraisal Wells after submission DoC was granted in 1 Block
- Probing of additional reservoirs during appraisal programme was approved in 3 Blocks.

3. Policy on Testing Requirements for discoveries in NELP Blocks

Date of Notification: 13-05-2015

Government of India approved a clear policy on testing requirements for discoveries made under New Exploration and Licensing Policy (NELP) Blocks. The policy settled the long pending issue of about 13 discoveries in five blocks pertaining to ONGC (Seven discoveries) and Reliance Industries (six discoveries). The reform allows the contractors to choose one of the following three options for discoveries which are stuck on account of testing requirement:

1. Relinquish the blocks
2. Develop the discoveries after conducting Drill Stem Test (DST) with 50 percent cost of DST being disallowed as penalty for not conducting the test on time. The cost recovery for carrying out DST would be capped at US $ 15 million.
3. Develop the discoveries without conducting DST in a ring-fenced manner.

Status of Progress Made
(As on 31-03-2020)

- After availing this policy in block KG-DWN-98/3, the Contractor has submitted DOC and FDP for D-29 and D-30 discoveries which got reviewed/approved by MC and currently it is under development. Also under this policy, Contractor has relinquished D-31 and D-42 discoveries of block KG-DWN-98/3.

4. Discovered Small Field Policy (Earlier called as Marginal Field Policy)

Date of Notification: 14-10-2015

The Govt. approved the Marginal Field Policy (MFP) with the objective to bring marginal fields to production at the earliest to augment the domestic production of oil and natural gas. Government has attempted to include certain reforms in the hydrocarbon exploration and production management through this policy with sole intention to increase the production at the earliest. For early monetization of these fields, in September 2015, Cabinet approved 69 marginal fields for offer under Discovered Small Fields Policy. These contract areas have been awarded under the new regime of Revenue Sharing Model. Award of contract is expected to provide faster development of fields and facilitate production of oil and gas thereby increasing energy security of the country.

Bid Rounds launched under Discovered Small Field Policy

The objective of the policy is to bring discovered small fields to production at the earliest to augment the domestic production of oil and gas.

- Discovered Small Field Bid Round-I was launched on 25th May 2016 and concluded on 27th March 2017. Discovered Small Field Bid Round-II was launched on 9th August 2018 and was concluded with award of blocks on 07th Mar 2019.
- Under two DSF Bid Rounds, a total of 279 bids were received. 53 contract areas comprising 100 fields were awarded. Of which, 37 Contract Areas awarded were onland and 16 remaining Contract Areas were offshore.

Status of Progress Made
(As on 31-03-2020)

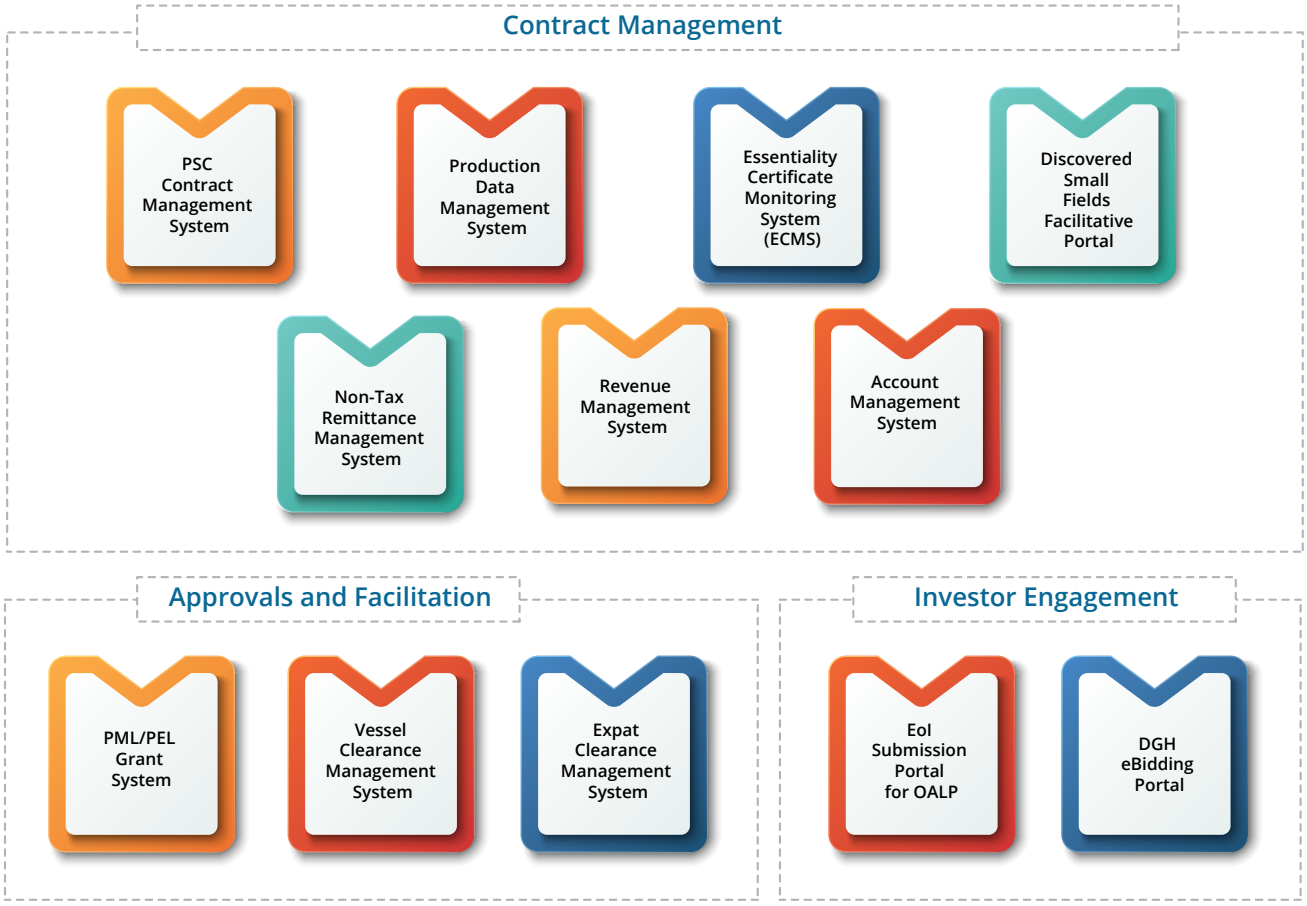
- Bid Work Programme: 111 wells and anticipated investment under FDPs 1600 Mn USD
- PML has been granted for 42 Contract Areas (27 Onland, 15 Shallow water)
- PML is pending for 08 Contract Areas (Andhra Pradesh-05, Tamil Nadu-02, Arunachal Pradesh-01)
- 23 FDPs approved with total Inplace of 154.5 MMtoe and Cumulative Production of 41.9 MMtoe contribution during field life.

2.2. Digitization Initiatives

Encouraging Ease of Doing Business in the sector, strengthening technological prowess and making governance electronic and automatic are some of the priorities for the government. Aligned to the vision, DGH has introduced host of applications and systems to assist the operators for hassle free operations, transparent contract management, expediting grant of approvals & clearances and engagement with the potential Investors.

An online system for internal work processes and approvals under PSC of Pre-NELP/NELP blocks has been implemented for effective contract management.

Considerable progress has been made for similar transition to online systems for CBM and Revenue Sharing Contracts. Further, online systems have been developed for grant of PEL/PML and Issuance of Essentiality Certificate for duty free import of goods. Environment, forest and wildlife clearances are one of the crucial clearances in the E&P operations. DGH in discussion with MoEF&CC has facilitated the links of PARIVESH under its single window clearance portal for viewing the status of online applications submitted by upstream hydrocarbon exploration companies in the country. As a step forward, government is mulling over ways to further enhance the features of single window clearance system for benefit of the operators. A brief about the digital initiatives at DGH is as follows:



1. Production Sharing Contract Management System (PSCMS)

Launched on 1st April 2019, PSCMS is a workflow-based contract management for PSC Blocks/ Fields. Ease of doing business is one of the focus areas of the Government in E&P sector with the objective to increase investment and production. Simplification of procedures and processes makes the system transparent and faster which facilitate investments in the sector. The GoI introduced Production Sharing Contract Management System in a bid to ensure hassle-free contractual submissions by the operator. Introduction of PSCMS aims at reducing the paperwork and expediting approval of processes necessitated under the contract. The GoI is further pruning various processes under PSCs and Rationalisaing them on self-certification basis. Simplification of procedures and processes shall reduce the regulatory burden on operators and allow them to focus on exploration and production activities. Till 31st March 2020, total of 1381

contractual submissions were made in PSCMS by 23 operators.

2. Production Database Management System (PDMS)

An online Production Database Management System (PDMS) has been implemented wherein all oil and gas production data on daily/monthly basis is uploaded by operators for Nomination and PSC regime. The portal enables to view, monitor and analyze block, field and asset wise production and preparation of reports.

3. Essentiality Certificate Management System (ECMS)

Essentiality Certificates are issued for import or indigenous procurement of goods required for petroleum operations. In addition to this, Essentiality Certificates commonly referred to as NOCs (No Objection Certificates), are also issued for private for transfer of material from one block to another. DGH has devised an online portal ECMS - Essentiality Certificate Management System wherein operators can apply for Essentiality Certificates online without sending any physical copy of documents for all import /indigenous/transfer cases. Digitally signed Essentiality Certificates for import cases are uploaded directly on the customs portal. For indigenous cases, Essentiality Certificates are issued in physical form till the time GST portal gets ready for integration with ECMS. This entire paperless process has saved considerable time and effort both for operators and DGH and Essentiality Certificates are expeditiously issued. On an average, 90 Essentiality Certificates are being issued every day and most of them are issued the same day. Further, in a bid to encourage Ease of Doing Business in the sector, the govt. is planning to simplify the procedure for ECMS application and make modifications in ECMS wherein the operators would be able to apply for Essentiality Certificate for multiple blocks across various regimes.

4. DSF Operator's Portal: Facilitating contractual process

DGH has created a dedicated DSF Operator's Portal for Contract monitoring of Revenue Sharing Contracts (RSC) awarded through DSF Bid Rounds. Portal is designed keeping in government objective to enhance ease of doing business and smoothen the process of Revenue Sharing Contract monitoring at DGH end. Additionally, portal provides easy access of information to DGH nodal officers as well as to Operator's representatives for contractual monitoring. Further, Govt. is planning to further rationalise the processes to strengthen Ease of Doing Business for the operators. The processes shall be rationalized on self-certification basis and will allow the operator to make contractual submissions in a pre-defined format through online through DSF operator portal.

5. Non-Tax Remittance Management System

To overcome the reconciliation the system is aimed to collate Details of remittance/payment made (towards Non-Tax Revenue) to Pay & Account office of MOP&NG/ State Government under PSC/CBM contracts under the following heads and interest thereon.

Royalty-Oil	Royalty-Gas
Profit Petroleum	Production Linked Payment
Government Share of Revenue	Petroleum Exploration License (PEL) Fees
Petroleum Mining License (PML) Fees	Liquidated Damages
Cost of Unfinished Work Programme	Dead Rent
Cess on Oil	Initial Licence Fee
Initial Lease Fee	Others

Details of all payments to central/state government w.e.f 1st March 2017 are being uploaded in Non-Tax Remittance Management System.

6. Revenue Management System

The system is aimed to collate the details of Revenue generated in respect of sale of oil, gas and condensates produced in the block. This also facilitates for royalty computation and monitoring. This Revenue information is further supplemented by uploading the details of invoices by operator. The web application is in place w.e.f 01/04/2015 for Revenue Management System.

7. Accounts Management System

The system is aimed to capture electronically and collate the details of audited accounts submitted to DGH. It also captures the contract cost and profit petroleum data for each quarter and annual basis. The web application is in place w.e.f 01/04/2015 for Accounts Management System.

8. Petroleum Exploration Lease/ Petroleum Mining Lease Data Management System

Launched on 5th November 2019, PEL/PML application is an online application for operators to apply for PEL/ PML under various contractual regimes(Nomination/ PSC/RSC/CBM). Operators can submit their PEL and PML application for both, onshore blocks for onward submission to states and offshore blocks for onward submission to MoPNG from this portal. The approval by MoPNG for onshore and Grant order by MoPNG for offshore , forwarding approved recommendation to State Nodal by DGH, forwarding application to state technical and state district officers for review , Issue of Grant order by State Nodal officer and view by all stakeholders are incorporated in the online system.

9. Vessel Clearance Portal

Rigs/ships/FPSOs/Vessels entering Indian maritime zone need prior approval from Ministry of Defence. To expedite approvals and facilitate movement of these vessels for E&P related activities in the fair-weather window, an online portal in DGH website has been created. Operators can submit applications for vessel clearance with DGH along with details of vessel, block in which activity is to be undertaken. The vessel clearance is processed and issued online.

10. Expat Clearance System

Expat Clearance System(ECS) is required for getting clearance of expats coming on vessel, from Ministry of Home Affairs (MHA). This application enables automation of expat clearance application processing between DGH and Operator. Clearance sought from Ministry of Home Affairs (MHA). DGH has created an online system for application of expat clearance. The operator can submit the application for seeking expat clearance. The operator can track the status of application online. After successful processing of application by MHA clearance, certificate is issued to operator.

11. EoI Submission Portal for OALP

EoI submission portal was launched in 2016 for the operators to submit Expression of Interest (EoI) for the identified blocks under OALP bid rounds.

12. E-bidding Portal

DGH has developed an online bidding portal for bidding of blocks under DSF. Bidders are required to submit both the envelopes through online e-bidding portal (https://ebidding.dghindia.gov.in). All bidders are required to get registered to the portal, which required a valid Digital Signature Certificate (DSC) to enter into the system and subsequently the bidders could submit their bids online only, by using their own Digital Signature Certificates thereby ensuring the security of the bids submitted.

This e-bidding portal is developed and maintained by M/s M-junction Services Ltd. The entire system of e-Procurement by M-junction has been certified by Standardization Testing and Quality Certification department under Department of Electronics, Ministry of Information Technology.

3 E & P ACTIVITIES

Government of India focus on increasing Ease of Doing Business in the sector is evident in pace of policy reforms taken in last few years. The impact of these reforms is seen through increased activity in Indian E&P sector. This will help in achieving Government's ambitious target of reducing hydrocarbon import. Increasing Oil & Gas production is one of the measures by which Oil & Gas import dependency can be reduced. Enhancing domestic Oil and Gas production by promoting Exploration and Production activities by providing more exploration and discovered acreages has always been among Government's highest priorities. Substantial E&P activities have been carried out in the country in 2019-20 and has set pace for the Indian E&P sector for years to come. This chapter incorporates all E&P activities executed in FY 2019-20. It also provides the detail of hydrocarbon discoveries made in 2019-20 and statistics of exploration, development & production activities of the country.

3.1 Exploration Activities

In FY 19-20, cumulative 3,787.71 LKM 2D seismic data was acquired. Majority of the Data acquisition was carried out under RSC regime (in OALP Blocks) which was approximately 3,599.50 LKM. Cumulative 3D seismic data acquired in FY 19-20 was 7,018.24 SKM out of which approximately 4,166.89 SKM data was acquired by NOCs/JVs/Pvt. Companies under OALP. This year the focus was on offshore basins which resulted in the data acquisition of 5,245.77 SKM (approximately 75 % of total 3D data acquisition), and 1,772.47 SKM 3D seismic data was acquired in Onland area. Total 121 exploratory wells (including Onland and offshore) amounting to a drilling meterage of 3,40,134 m were drilled.

Details of exploratory activities in Nomination, PSC regime & RSC regime in FY 2019-20 compiled in Table 3.1. In table 3.2 exploratory efforts of PSUs/Pvt. companies/Joint Ventures is provided in which all the 2D and 3D seismic data acquisition is carried out by ONGC, OIL and Vedanta.

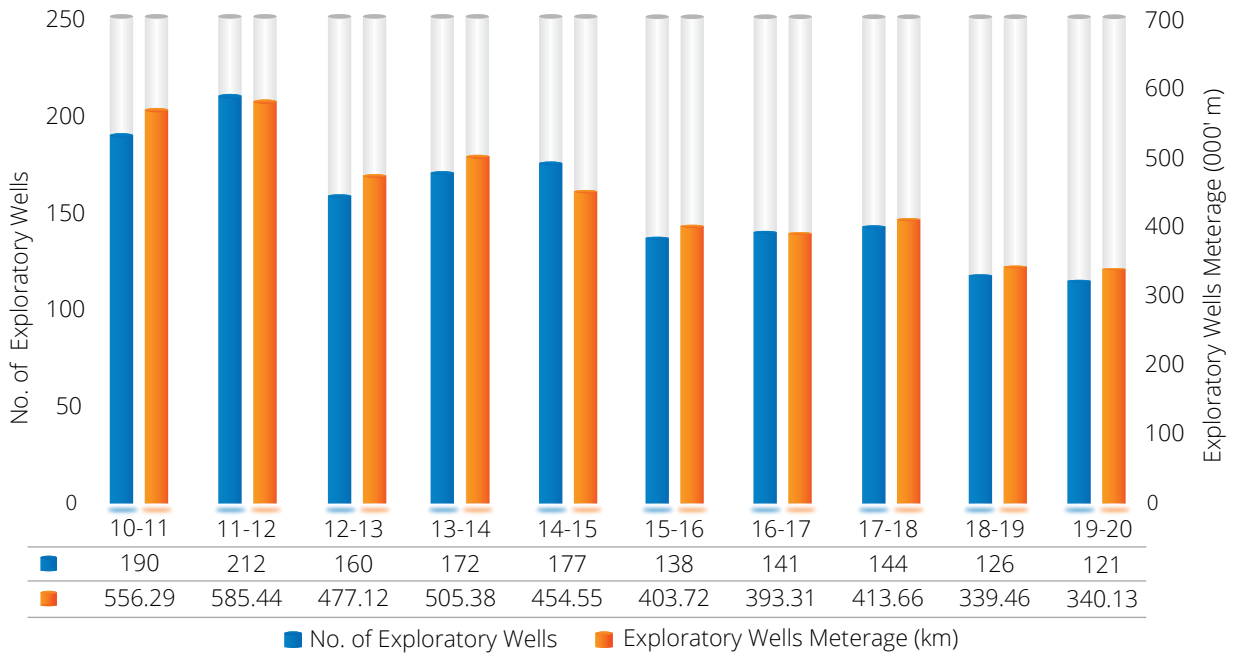
Table 3.1 Exploratory efforts in Nomination, PSC & RSC regime in FY 2019-20

Sl. No	Subject	Parameter	ONGC (Nomination)	OIL (Nomination)	PSC (Pre-NELP & NELP)	RSC (OALP+DSF)	Total
1	2D Seismic data acquired	Onland (GLKM)	152.43	33.68	2.10	2,174.10	2,362.31
		Offshore (GLKM)	-	-	-	1,425.40	1,425.40
Total 2D Seismic			**152.43**	**33.68**	**2.10**	**3,599.50**	**3,787.71**
2	3D Seismic data acquired	Onland (SKM)	978.49	122.10	6.35	665.53	1,772.47
		Offshore (SKM)	1,744.41	-	-	3,501.36	5,245.77
Total 3D Seismic			**2,722.90**	**122.10**	**6.35**	**4,166.89**	**7,018.24**
3	Exploratory wells drilled	Onland	71	11	2	-	84
		Offshore	27	-	10	-	37
Total Exploratory wells			**98**	**11**	**12**	**-**	**121**
4	Exploratory Meterage drilled	Onland (1000 m)	204.46	30.79	6.70	-	241.95
		Offshore (1000 m)	74.73	-	23.46	-	98.19
Total Exploratory Meterage drilled			**279.19**	**30.79**	**30.16**	**-**	**340.13**

Table 3.2 - Exploratory efforts by Companies under Nomination, PSC & RSC regime in FY 2019-20

Operator	2D (LKM)	3D (SKM)	Exploratory Wells
PSUs (Nomination + PSC + RSC)			
Oil and Natural Gas Corporation Ltd.	979.93	4,249.61	106
Oil India Limited	1,765.58	342.53	11
PSUs Total	**2,745.51**	**4,592.14**	**117**
Indian Private (PSC + RSC)			
Cairn / Vedanta Limited	1,042.20	2,426.10	2
Focus Energy Ltd.	-	-	1
Reliance Industries Ltd.	-	-	1
Indian Private Total	**1,042.20**	**2,426.10**	**4**
Grand Total	**3,787.71**	**7,018.24**	**121**

Figure 3.1: Year Wise Exploratory Wells Drilled in the Country



3.2 Development Activities

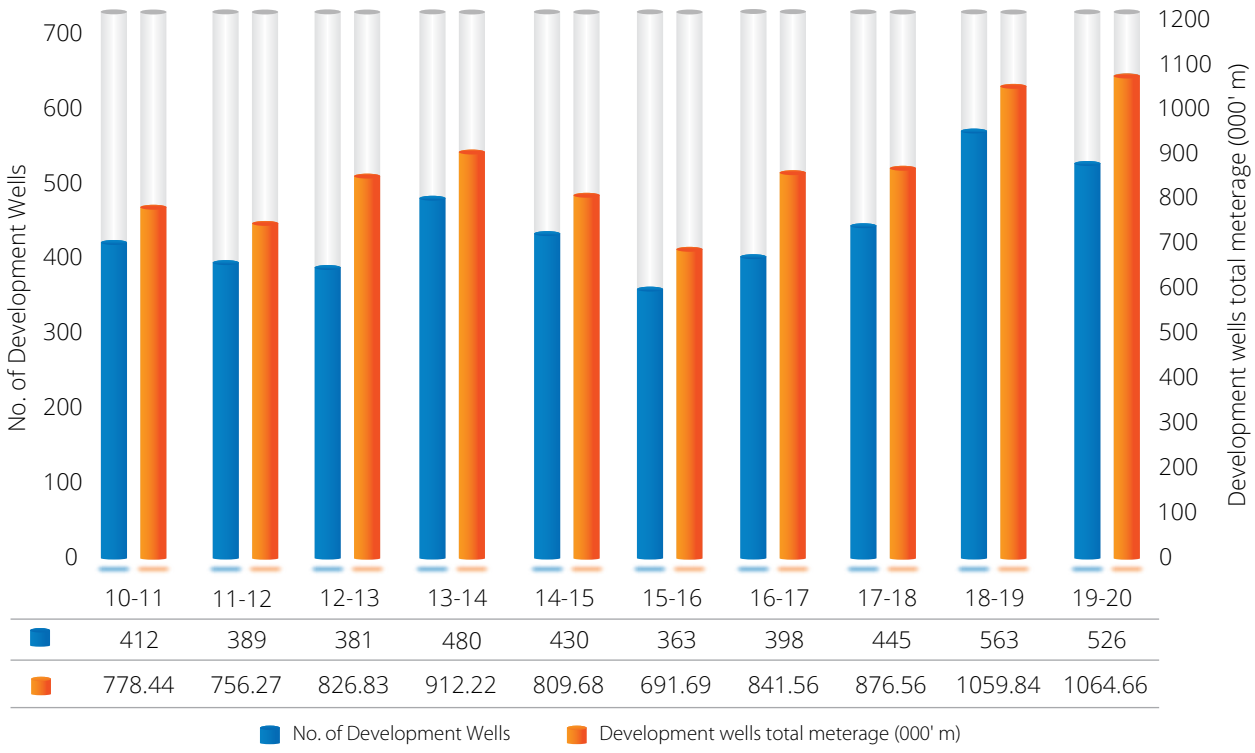
3.2.1. Development wells drilled and meterage in FY 2019-20

Total 526 development wells were drilled by NOCs and Pvt./JVs in FY 2019-20 with a cumulative development well meterage to 10,64,656.6 m. Majority of the wells were drilled by ONGC in its onland nomination areas.

Table 3.3: Development activities in FY 2019-20

Sl. No	Subject	Parameter	ONGC (Nomination)	OIL (Nomination)	PSC (Pre-NELP & NELP)	RSC (OALP+DSF)	Total
1	Development wells drilled	Onland	273	25	129	-	427
		Offshore	79	-	19	1	99
Total Development wells			**352**	**25**	**148**	**1**	**526**
2	Development Meterage drilled	Onland (1000 m)	515.76	65.04	253.12	-	833.93
		Offshore (1000 m)	176.82	-	51.18	2.73	230.73
Total Development Meterage drilled			**692.58**	**65.04**	**304.30**	**2.73**	**1,064.66**

Figure 3.2: Year Wise Development Wells Drilled in the Country



3.2.2. Discoveries in Development Phase

Total of twenty six Field Development Plans (FDPs) and Revised FDPs (RFDPs) were approved in FY 2019-20. Details of the approved FDPs are provided in table below:

Table 3.4: FDPs and RFDPs approved during the year 2019-20

Sl. No	Field/ Block	Oil/ Gas	Operator	FDP/RFDP
	FDPs approved during 2019-20 under PSC Regime			
1	GS-OSN-2004/1	Gas	ONGC Ltd.	FDP of GSS041NAA-2
	NELP VI block GS-OSN-2004/1 is located on the northern flank of E-W trending Saurashtra Arch in shallow water (~ 95m)of Saurashtra Offshore. Hydrocarbon accumulation is proved within sands of late Jurassic, Early Cretaceous and Deccan Trap. The Mesozoic reservoir is lying below 2400m thick Basaltic cover with HP/ HT conditions. 160m gross pays encountered at Early Cretaceous Level.			
2	KG-DWN-98/2	Gas	ONGC Ltd.	Standalone viability of E-1 (Cluster-I)
	Standalone Viability of E-1 Gas Discovery (Paleocene) of Cluster-I of the Deep water Block KG-DWN-98/2 approved by MC on 01.07.2019. The Development Plan envisages gas production from existing subsea Well E-1 Gas production expected to commence from FY 2021-2022 onwards.			
3	AA-ONN-2001/1	Gas	ONGC Ltd.	FDP of KHUBAL#4, #7
	The NELP-III block AA-ONN-2001/1 is located in the Eastern part of Tripura Fold Belt, India. Shale layers of Disang and Jenam formations of Palaeocene to oligocene age are considered as the main source rock for Tripura-Cachar fold belt. The main reservoirs in this area are the early Miocene sedimentary deposits e.g. Lower, Middle and Upper Bhuban Formations and the Late Miocene deposits e.g. Bokabil Formation. The sandstone reservoirs within these formations are usually discrete lenticular bodies which are differentially charged because of bounding longitudinal faults and complex fold geometry. Hydrocarbon traps in this area are largely controlled by structural developments and migration in the basin is vertical and occurs through basement-rooted faults			

Sl. No	Field/ Block	Oil/ Gas	Operator	FDP/RFDP
4	KG-DWN-98/2	Oil	ONGC Ltd.	Integrated FDP of F-1 (Oil, Cluster-I) & GS-29 Nomination Block
	Integrated Field Development Plan of F-1(Cluster-I of the Block KG-DWN-98/2) Oil Discovery & GS-29 Nomination Block approved by MC on 05.08.2019. The Development Plan envisages gas production from from FY 2021-2022 onwards.			
5	CB-ON/2	Oil	GSPC	FDP of CB-ON/2 (RFPSC)
	Block CB-ON/2 is located in the Cambay-Tarapur tectonic block in the central part of the Cambay sedimentary basin of Gujarat State. The tectonic trend in Tarapur block maintains a dominant NNW-SSE Dharwarian structural grain as in the North Cambay basin (Ahmedabad-Mehsana, Patan-Sanchor) and it tends to swing to NE-SW indicating tectonic influence of Aravalli structural grain. Cambay Basin is a commercial petroleum producer from Tertiary sediments resting on Deccan Trap. Reservoirs constitute sandstone/siltstone deposits within Kalol and Cambay Shale along with trapwash derivatives within the Olpad formation. The block CB-ON/2 has encountered all these facies in variable abundance.			
6	CB-ONN-2010/11	Oil	GAIL	FDP of Galiyana#1
	The block is in the Western flank of Cambay-Tarapur block of Cambay Basin. Galiyana prospect is essentially a structural closure. From drilling and testing of Galiyana#1 , MBS is found to be Oil bearing and Olpad or Kalol reservoir have not proved to be encouraging from Hydrocarbon point of view. Tarapurshale ,Kalol formation , Cambay shale and Olpad are four source rock unit in the Cambay basin. Miocene basalt sandstone (MBS) and siltstones of the Babaguru formation is the reservoir rock unit. Cambay shale of early Eocene acts as cap rocks for reservoirs within itself and for the underlying Olpad formation.			
	RFDPs approved during 2019-20 under PSC Regime			
7	Hazira	Gas	Sun Petro	RFDP of Hazira
	Hazira field, discovered by ONGC in 1969, is located about 25 km southwest of the Surat town in Gujarat. This field is located adjacent to one of India's largest industrial areas. Under Pre-NELP bidding the field was awarded to consortium of GSPC Gujarat and Niko Resources Ltd. The total field area is around 50 sq. km. It includes about 27 sq. km land area and about 23 sq. km offshore area in shallow waters of Arabian Sea. The field has produced gas and oil from the field till September 2017 from a series of Miocene sands within Babaguru, Kand, Jhagadia, Broach, Jambusar and Gujarat formation from a total of 36 wells spread over onshore and offshore part of the field.			
8	PY-1	Gas	HOEC	RFDP of PY1
	PY-1 offshore Field is located in Cauvery offshore basin in the Bay of Bengal. In PY-1 Field unconventional fractured granitic basement is the primary reservoir and has been one of the first offshore non-associated natural gas fields of its kind to be developed and put on commercial production in India. Primary reservoir in PY-1 Field is Fractured Granitic Basement of Precambrian age. It is a Type – I Naturally Fractured Reservoir (Nelson 2001). Type-I Fractured reservoir owe their porosity and permeability entirely to the hydrodynamic fracture network. Two major trends of Faults control the fracture network in Granitic Basement. Apart from the Fractured Basement Reservoir, Sandstone and Limestone reservoir of Eocene Age (Tertiary) holds hydrocarbon in PY-1 Field.			
9	AAP-ON-94/1	Gas	HOEC	RFDP of AAP-ON-94/1
	Pre-NELP block AAP-ON-94/1 is located in the Schuppen Fold Thrust Belt of Assam-Arakan Basin, in the Tea Estate of Margherita & Dirok of Tinsukia district near Margherita town. The field is present in between two main faults: the Marghereta thrust fault in the south and Kumsai thrust fault in the north. Dirok field is producing non associated gas from clastics reservoirs of Tertiary Period. The main trapping mechanisms are the anticlinal folds which are truncated by faults giving rise to a series of fault bounded structural closure. The major challenges faced are number of reservoir sands and limited well information in the area.			

Sl. No	Field/ Block	Oil/ Gas	Operator	FDP/RFDP
10	Modhera	Oil	Sun Petro	RFDP of Modhera
	The Modhera field, discovered in year 1982 by Oil & Natural Gas Corporation Ltd (ONGC), is situated about 30 km southwest of Mehsana city in Gujarat. The location of the field is on the western rising flank of Ahmadabad-Mehsana tectonic block of Cambay Basin. Modhera structure is an anticline having N-S axis. This field was awarded to Interlink Petroleum Limited (IPL) under production sharing contract by Government of India for expeditious exploitation of hydrocarbon. IPL transferred the field to M/s Sun Petrochemicals Pvt Ltd (SunPetro) with operatorship and 100 % PI of the field. The efforts of SunPetro, including use of deep penetrating charges (73" for perforation of reservoir) and implementation of a new chemical treatment technique, in the reservoir, for producing heavy oil resulted in flow of heavy oil to the surface from Modhera#1 and Modhera#2 by artificial lift methods with minimum interruption in production.			
11	RJ-ON-90/1	Oil	Cairn/Vedanta	RFDP of Mangala (Rev #5)
	The Mangala Field is located in the northern Barmer Basin of Rajasthan state, India. The basin is a Tertiary rift, predominantly consisting of Palaeocene-Eocene sediments. The main reservoir unit in the Mangala Field is the Fatehgarh Group, consisting of interbedded sands and shales. The group has been sub-divided into the Lower Fatehgarh Formation dominated by well-connected sheetflood and braided channel sands, and the Upper Fatehgarh Formation dominated by sinuous, meandering, fluvial channel sands. Five reservoir units are recognized in the Mangala Field, named FM1-FM5 from the top downwards.			
12	KG-OSN-2004/1	Gas	ONGC Ltd.	RFDP of Chandrika, Alankari,Saveri,NL#2, Sarangi, Malhar#1
	The block KG-OSN-2004/1 extends from coast to farthest point by 28 kms with a bathymetry ranging from 0-350m in the Krishna-Godavari basin. The stratigraphic frame work of the block consists of sequences ranging from Late Jurassic to Recent sediments overlying the Archaean basement. The NW part of the block falls in the inter-riverine area of the Godavari and Krishna rivers and forms the part of the Masulipatnam Bay. The various gas discoveries in age group from Eocene to Pliocene has proved that the Plio-Pleistocene sedimentation is dominated by slope shales and associated slope channel & fan systems.			
13	RJ-ON-90/1	Gas	Cairn/Vedanta	RFDP of RDG (Rev #2)
	The RDG Field is located within the southern Barmer basin at the northern culmination of the Central Basin High (CBH) in the Barmer Basin. The CBH is a ~40km long composite structural high with North- South oriented fault terraces, arranged en-echelon within the southern part of the basin. The field is contained within a horst block bounded by major N-S and NW-SE trending faults. The RDG tight gas-condensate reservoir comprises a fluvial-lacustrine Fatehgarh formation that overlies a thick volcanic complex consisting of mafic lava flows (Prithvi Member) and stacked silicic pyroclastic flows (felsic) interbedded with an older generation of basalts (Agni Member).			
14	RJ-ON-90/1	Oil	Cairn/Vedanta	RFDP of ABH (Rev #1)
	The Aishwariya Field is located in the north eastern part of Barmer Basin, which is a NNW-SSE trending tertiary rift basin. The Barmer Hill and Fatehgarh reservoirs are the main hydrocarbon reservoirs in the Aishwariya Field. Litho-stratigraphic and chrono-stratigraphic correlations in the Barmer Basin indicate that the Barmer Hill Formation conformably overlies the Fatehgarh Formation of sandstone reservoirs and underlies the shale unit of Dharvi Dungar that acts as a regional seal for both the underlying formations. Unlike Fatehgarh where the sandstone rich reservoirs been deposited through fluvial sedimentation, Barmer Hill sediments, in the Mangala and Aishwariya area are predominantly hemipelagic settlements forming fine intercalations of biogenic porcellanites and claystones in deep anoxic lacustrine environment.			
15	CY-OS-90/1	Oil	Hardy	RFDP of PY-3
	Block - CY-OS -90/1 (PY-3 field) is a NE-SW trending structure in Tranquebar depression, Cauvery Basin, offshore east coast of India produced 24.82 MMBBl till July 2011 from Nannilam formation dominated by debris flow deposits of upper cretaceous (Campanian) with Porto novo Shales (Maastrichtian) acting as regional cap rocks. As a part of full field development, a revised field development plan (RFDP) was approved for resumption of production and drilling of additional producers with Gas lift in a phased manner.			

Sl. No	Field/ Block	Oil/ Gas	Operator	FDP/RFDP
16	RJ-ON-90/1	Oil	Cairn/Vedanta	RFDP of Saraswati (Rev 2)
	The Barmer Basin is situated in north-western Rajasthan between the Cambay Basin and Jaisalmer Basins. It is essentially a continuation of the Tertiary Cambay rift system to which it is connected via the Sanchor Basin and has a Palaeogene (Palaeocene-Eocene) rift fill sequence. The present day fault system is dominated by NNW-SSE trending extensional faults and NE-SW faults which transfer and relay throw along the length of the rift system.The Saraswati terrace is a tilted normal fault block developed between two major faults. The extensional fault that forms the margin of the Barmer Basin also forms the eastern boundary of the Saraswati terrace. The Saraswati Field is situated in a crestal position on an easterly-dipping basement-controlled fault block. Based on well test results hydrocarbons in the Barmer Hill appear to spill below the mapped structural closure. The Fatehgarh reservoir however, consists of a three-way dip and fault closure at 1441m TVDSS and spills through a structural nose to the east of the Saraswati structure.			
17	RJ-ON-90/1	Oil	Cairn/Vedanta	RFDP of Kaameshwari
	The Kaameshwari structure is primarily a structural trap with three-way dipping closure against the main NNW-SSE trending fault to the west (Figure 2-1). This fault provides the lateral seal to the hydrocarbon column in the reservoir sections. Fatehgarh is the main reservoir in this structure, as proven in the drilled wells. Top seal is provided by the thick shale deposits in the Dharvi Dungar and Barmer Hill sections. The source is the Barmer Hill section located in the structural low, south of the Kaameshwari structure.			
18	RJ-ON-90/1	Oil	Cairn/Vedanta	RFDP of Tukaram
	The Tukaram structure is essentially a gently dipping fault block with an array of normal fault-sets running orthogonal/oblique to the structure-bounding major fault thereby creating multiple fault compartments within Tukaram field. Upper Thumbli, is the primary reservoir target in Tukaram field. Thumbli Formation is represented as fluvial channels, crevasse splays, thin lignites (swamp), and thin lacustrine mudstones in shallow lake and crevasse splays. Top of Thumbli Formation is a well-defined litho-stratigraphic event in the CBH wells marking the regional Flooding Surface. Based on the regional depositional understanding and the available core data (Tukaram-3 and Tukaram-2) the reservoir characterization studies for Thumbli Formation have been attempted. The lowermost member of Thumbli, i.e. Basal Thumbli (BT) is interpreted as diatomite rockdeposited in a low energy lacustrine environment, followed by Middle Thumbli (MT) being deposited as deep lake mudstones. The Upper Thumbli interval represents two primary cycles of sandstone deposition: UT-3 and UT-4.			
19	RJ-ON-90/1	Gas	Cairn/Vedanta	RFDP of GSV
	The GSV-1 Field lies ~10 km to the north-west of the Saraswati field, within a smaller, terrace downthrown from the Saraswati Field. The GSV-1 structure is a three-way dip closure at the Pre-Rift (Volcanic level) level. In GSV, the volcanic rocks constitute the major hydrocarbon bearing reservoirs. The volcanic interval constitutes Basalt and Felsic rocks. The Felsic volcanic rock is an igneous rock having light coloured minerals with a mineralogy dominated by feldspar and silica (usually quartz) and basalt is a dark coloured igneous rock, composed primarily of calcic plagioclase and pyroxene.			
	FDPs noted by MC during 2019-20 under RSC (DSF) Regime			
20	RJ/ONDSF/Chinnewala/2018	Gas	ONGC Ltd.	FDP of RJ/ONDSF/ Chinnewala/2018
	Chinnewala Tibba is an independent closure bounded by faults trending N-S to NNE-SSW and E-W faults. The sedimentary beds/ sequences have south to south west dip towards west and the Shahgarh low. The low has been considered as the major kitchen for the generation of hydrocarbons, which has been entrapped in Shahgarh, Chanwarwala Dara and Chinnewala Tibba structures in the migration pathways.			
21	MB/OSDSF/CA/2018	Oil+Gas	ONGC Ltd.	FDP of MB/OSDSF/ CA/2018
	CA contract area lies in the eastern part of the Tapti-daman Sector of Bombay Offshore Basin. Daman and Mahuva levels show CA is a north-west plunging nosal feature. An anticlinal closure is formed to the north of CA structure. A northsouth trending low running sub parallel to CA structure are mapped towards west of the structure. The major faults in CA structure trending in NW-SE direction with hade towards east or west.			

Sl. No	Field/ Block	Oil/ Gas	Operator	FDP/RFDP
22	MB/OSDSF/D33/2018	Oil+Gas	ONGC Ltd.	FDP of MB/OSDSF/ D33/2018
	The field is located on westerly dipping, gentle homoclinal part of Bombay High-Deep Continental Shelf (Bombay High-DCS) block and is located about 150 km WSW of Mumbai city. D-33 structure is a broad terrace feature situated to the north of D-18 field and south of WO-5 prospect.			
23	KG/ONDSF/ACHANTA/2016	Gas	PFH Oil and Gas Private Limited	FDP of KG/ONDSF/ ACHANTA/2016
	The Achanta field is a structural closure bounded by a NE-SW trending faults in north and south. Levels mapped are a level close to Tirupati top, Palakollu top and a level close to pay within Palakollu Formation. The field is situated 13.75 km in the NE direction from Palakollu town and 10 km North East of Amalapura m Town, in the West Godavari District of Andhra Pradesh State.			
24	KG/ONDSF/ BHIMANAPALLI/2016	Gas	PFH Oil and Gas Private Limited	FDP of KG/ONDSF/ BHIMANAPALLI/2016
	Bhimanapalli field is situated 10 km North East of Amalapuram Town, in the East Godavari District of Andhra Pradesh State. Uppidi Field is located in the East Godavari district in the Island Block of East Godavari sub-basin. The area is dissected by two regional NE-SW trending basement Highs comprising 'Tanuku High' to the North and Poduru-Yanam High to the South, separated by axial lows fringing the highs.			
25	AA/ONDSF/LAXMIJAN/2016	Oil+ Gas	Megha Engineering and Infrastructures Limited	FDP of AA/ONDSF/ LAXMIJAN/2016
	Laxmijan - Bihubar block is located within Assam - Arakana basin (Upper Assam Basin) which is situated in the northeastern India and located to the East of Geleki field. Block is situated to the south of Brahmaputra river and falls within Naga thrust area. Reservoir lithology is sands within Tipam and Barail formations trapped in structural setting on the southeastern limb of large anticline under the Naga Thrust.			
	RFDP approved during 2019-20 under CBM Regime			
26	Jharia	Gas	ONGC Ltd.	RFDP of Jharia CBM Block
	The Jharia CBM Block falls in Jharia Coalfield which is one of the important members of the Damodar Valley Coalfields lying between Raniganj coalfield to the east and Bokaro Coalfield to the west. The coal field is well known for its resources of coking coal. RFDP of the block envisages drilling of 51 new development wells and cumulative production of 2.73 SCM in 20 years with peak of 0.47 MMSCMD and plateau of >0.45 MMSCMD in around 59 sq. Km. area.			

3.2.3. New Oil and Gas Discoveries

Table 3.5: Oil and Gas Discoveries in 2019-20

Sl. No.	Well Name	Field/Block	Basin	Operator	Regime	Object Interval
1	Shakti-NE-1	RJ-ON-90/1	Rajasthan	Cairn India (Vedanta)	Pre-NELP	436-445m
2	Yedurulanka-1 (YLK-1)	KG-ONN-2004/1	Krishna Godavari (Onland)	OIL	NELP	4292-4319m Sand
3	Dinjan-1	Tinsukia PML	AS	OIL	Nomination	3614.6-3617.6 m
4	Vanjiyur-3	ML- L-II	Cauvery (Onland)	ONGC	Nomination	3683-3680m, 3677-3665m, 3664-3659m
5	Bilakurru-1	ML-Godavari Onland	Krishna Godavari (Onland)	ONGC	Nomination	3098- 3069.5m, 2525 - 2521m
6	YS-6-2 Sub	ML-Yanam	Krishna Godavari (Offshore)	ONGC	Nomination	5280 - 5284m, 5264 -5272.5m
7	R-12-6	ML-Ratna & R-Series	Mumbai Offshore	ONGC	Nomination	2605 -2578 m
8	Nandigama North-1	ML-West Godavarl	Krishna Godavari (Onland)	ONGC	Nomination	3699-3694m, 3688-3681m, 3672-3668m & 3644-3635m, 3630-3627m, 3624-3619, 3618-3616m
9	B-218-1	ML-Ext. NWMH	Mumbai Offshore	ONGC	Nomination	2604 -2625 m, 2554-2544m
10	B-219-1	ML- Ext. NWMH	Mumbai Offshore	ONGC	Nomination	2745 - 2742m
11	Sundulbari-12	ML-Sundulbari Agartala Dome	AAFB	ONGC	Nomination	3073 – 3076m
12	Sundulbari-15	ML- West Tripura	AAFB	ONGC	Nomination	2290-2296m

Total 16 discovery notifications were received by DGH during FY 2019-20, 2 from PSC regime blocks and rest 14 from Nomination regime blocks/fields. ONGC has submitted 12 discovery notifications, OIL has submitted 3 discovery notifications and Cairn has submitted 1 discovery notification during FY 2019-20.

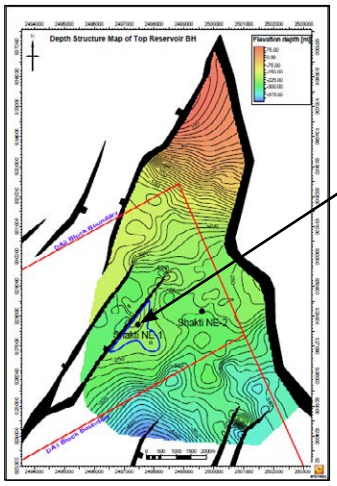
Total 12 discoveries of FY 19-20 have been accepted by DGH till date.

	Formation Name	Formation Age	Oil/Gas	Format A Date (As notified by Operator)	Testing Results
	Barmer Hill	Paleocene	Oil	23.04.2019	Q_o 131 BPD through 128/64" choke, FTHP 10 psi
	Gollapalli Formation	Late Jurassic to Early Cretaceous	Gas	10.04.2019	Q_g 6380 SCMD through 12/64" choke, FTHP 678 psi
	Lakadong+ Therria	Eocene	Gas	20.05.2020 (date of discovery - 06.03.2020)	Q_g 101424 SCMD through 4.5 mm bean, FTHP 3500 psi
	Andimadam Formation Eq. PDS-20	Albian (Early Cretaceous)	Oil	31.05.2019	Q_o 8.65 m3/day Q_g 41000 m3/day through 6mm choke, FTHP 1600 psi
	Golappali Formation / Raghavpuram Formation	Early Cretaceous	Gas	22.05.2019	Obj-I - Q_g 47193 m3/day FTHP 1220 psi through 16/64" choke Obj-II Q_g 117504 m3/day Qcon 30.14 m3/day through 16/64" choke, FTHP 3150 psi
	Lower Synrift Formation	Berremian Age (Lower Creataceous)	Gas	02.05.2019	Q_g 494986 m3/day through 20/64" Choke, FTHP 8900 psi
	Bassein Formation	Lower to Mid Eocene	Oil	18.02.2020	Q_o 364 bopd Q_g 8996 m3/day through 1/2" choke, FTHP 150-180 psi
	Nandigama Formation	Late Jurassic to Early Cretaceous	Gas	01.01.2020	Q_g 23309 m3/day Q_o 23.76 m3/d (light oil) FTHP 1941 psi through 6 mm bean
	Bassein Formation / Mukta Formation	Lower to Mid Eocene / Early Oligocene	Oil	01.01.2020	Obj-I - Qo 477 bpd Q_g 186936 m3/day through 1/2" Choke, FTHP 1540 psi Obj-II- Qo 776 bpd Q_g 15693 m3/day FTHP 317 psi through 1/2" choke
	Lower Bassein Formation	Middle Eocene	Oil	01.01.2020	Q_o 204 bpd, Q_g 49300 m3/day through 1/2" Choke, 350 psi
	Middle Bhuban Formation	Lower to Middle Miocene	Gas	17.06.2019	Q_{liq} 3.8 m3/day Q_g 98900 m3/day through 6mm bean, FTHP 204 Ksc
	Upper Bhuban Formation	Middle Miocene	Gas	13.02.2020	Q_g 117651 m3/day through 8mm bean, FTHP 133 Ksc

1. Rajasthan (Barmer Sub-basin)/ RJ-ON-90/1 (Shakti NE-1)

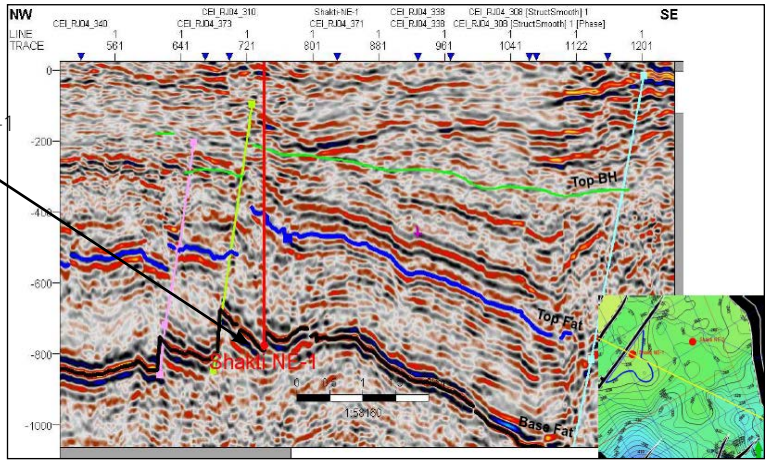
Operator: Cairn India (Vedanta)

Structure / Well No. / Location	Testing Result	Leads/Exploratory Efficacy
Shakti-NE/Shakti NE#1/ Well Depth 989 m MDBRT	**436 – 445 m, Barmer Hill Formation, Paleocene Age**:The well produced 131 bpd Oil of 13.5 API at 48% BS&W through 128/64" choke, FTHP 10 psi	The exploratory well drilled in Shakti North East structure, mid case (2C) volume estimated around 4.5 MmBbl for Shakti NE#1



Depth Contour on BH Top

Shakti NE-1

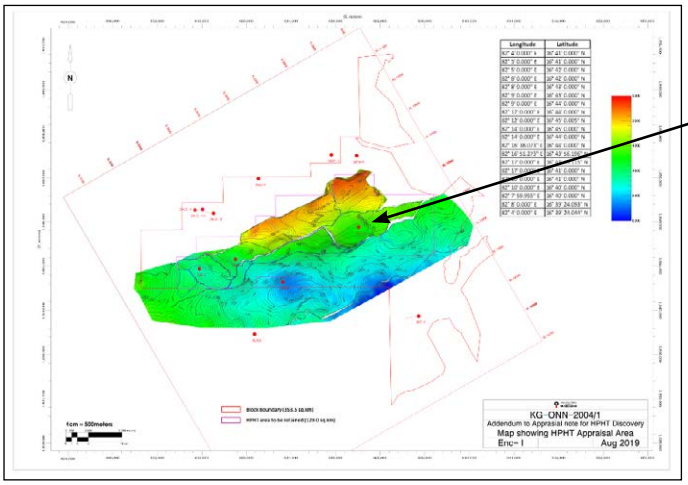


Seismic section through well Shakti NE-1

2. KG Basin/ KG-ONN-2004/1 (YLK#1)

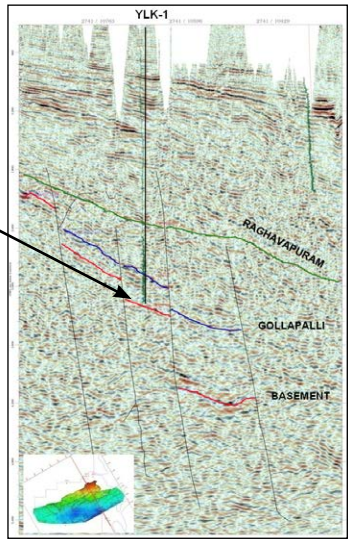
Operator: OIL

Structure / Well No. / Location	Testing Result	Leads/Exploratory Efficacy
Prospect G/Yedurlanka -1 (YLK#1)/ Well Depth 4781.5 m MD	**Object – II, 4292 – 4391 m, Golapalli Sand Formation, Late Jurassic to Early Cretaceous Age:** The well produced gas at 6380 SCMD through 128/64" choke, FTHP 678 psi	The exploratory well drilled on a fault bound structure and has produced gas.



Depth Contour Map Close to Gollapalli Top

YLK#1

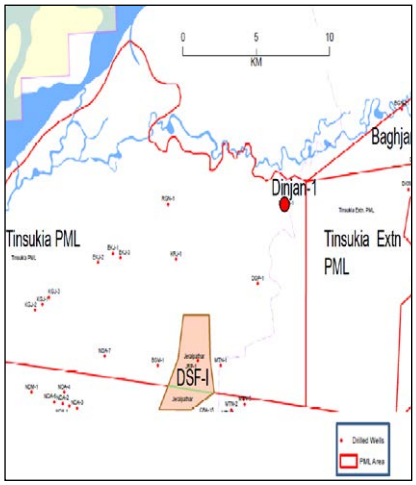


Seismic section through well YLK#1

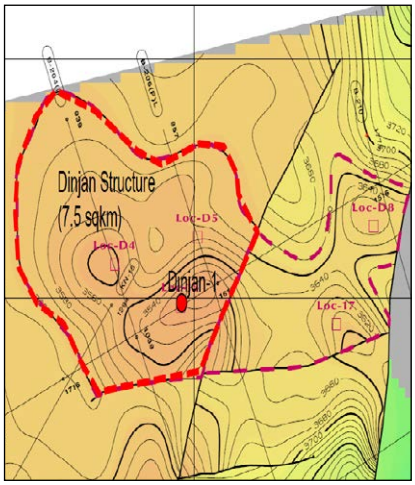
3. Assam Shelf Basin/ Tinsukia PML (Dinjan#1)

Operator: OIL

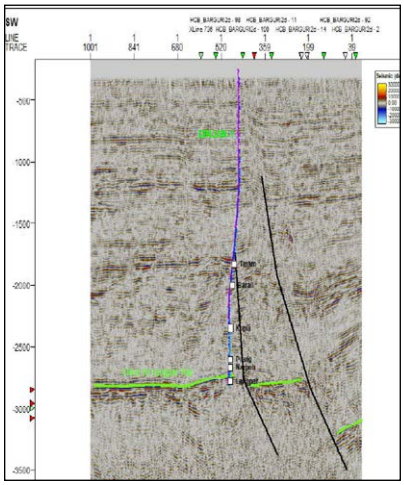
Structure / Well No. / Location	Testing Result	Leads/Exploratory Efficacy
Dinjan/ Dinjan-1/ TAF Well depth 3758 m	**Object-I (3614.6 – 3617.6 m, Lakadong Theria and Langpar Formation, Eocene Age:** The well produced 101424 SCMD gas through 4.5 mm bean at FTHP 3500 psi	The exploratory well is drilled within Dinjan Structure and targeted at Lakadong+Theria sand formations.



Location Map of Discovery Well Dinjan#1



Depth Contour on Langpar Top

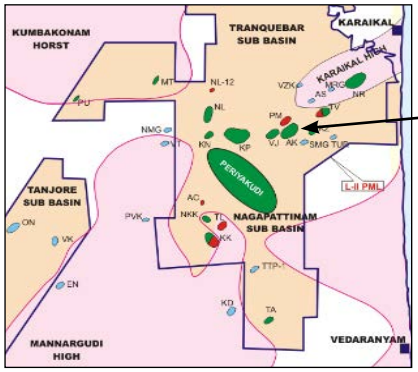


Seismic 2D line B-217 passing through well Dinjan-1

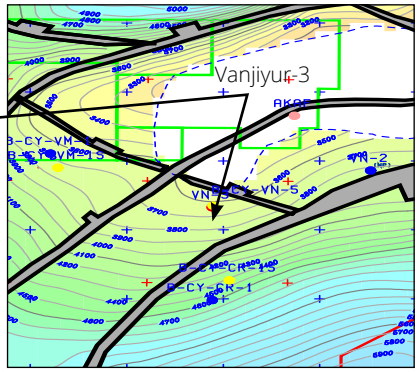
4. Cauvery Onland / L-II (7 Yrs) PML (Vanjiyur-3 (VNAC))

Operator: ONGC

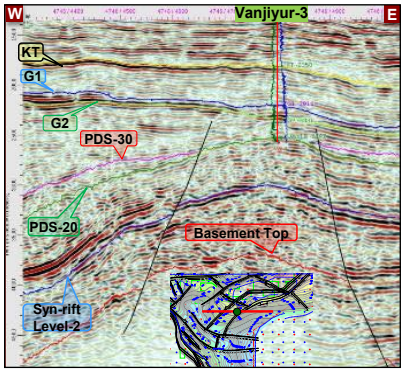
Structure / Well No. / Location	Testing Result	Leads/Exploratory Efficacy
Vanjiyur/ Vanjiyur-3 (VNAC)	**Object- II (3683-3680, 3677-3665, 3664-3659m, PDS-20 Equivalent):** Well flowed oil @ 8.65 m3/day and gas @ 41,000 m3/ day, with FTHP-1600 psi through 6.0 mm bean size.	This discovery has opened up a large area for exploration of the Early Synrift play (PDS-20) in Nagapattinam sub-basin and has established commercial potential in the corridor from Periyakudi in the west and towards Karaikal High in the north-east.



Map showing location of Well, Vanjiyur-3



Structure Map of PDS-20 equivalent

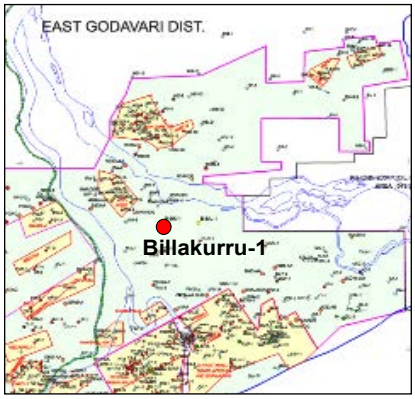


Inline-4746 passing through Well, Vanjiyur-3

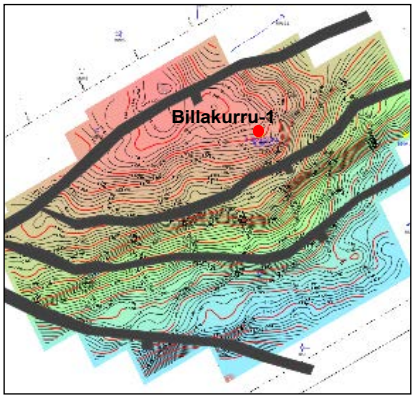
5. KG Onland/ Godavari Onland (7 Yrs) PML (Billakurru-1 (BKAA))

Operator: ONGC

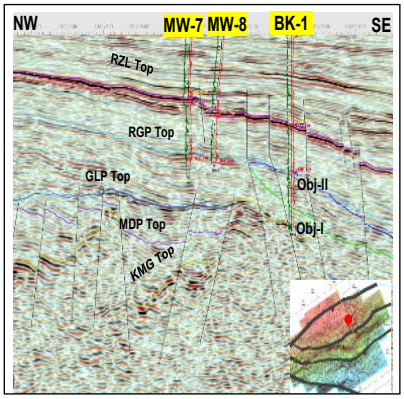
Structure / Well No. / Location	Testing Result	Leads/Exploratory Efficacy
Billakurru / Billakurru-1 (BKAA)	**Object-I (3098-3069.5m, Gollapalli Fm):** Well flowed gas @ 47,193 m³/day, with FTHP-1220psi through 16/64" choke size. **Object-II (2525-2521m, Raghavapuram Fm):** Well flowed gas @ 1,17,504 m³/day & Condensate @ 30.14 m3/day, with FTHP-3150 psi through 16/64" choke size.	Exploratory success in well Billakurru-1 has opened the corridor north of Vygreswaram and south of Mandapeta field for further exploration of plays developed within Gollapalli & Raghavapuram Formations.



Map showing the location of Well Billakurru-1



Time structure map on top of depositional pack within Raghavapuram Formation

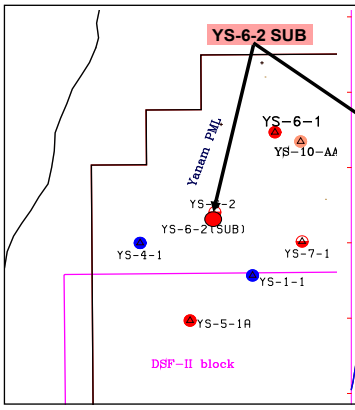


Inline-1922 passing through Well, Billakurru-1

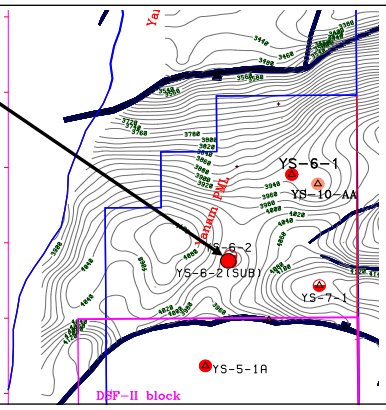
6. KG Offshore SW/ Yanam PML (YS-6-2-SUB)

Operator: ONGC

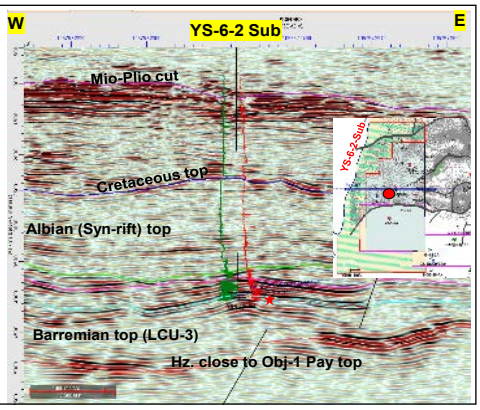
Structure / Well No. / Location	Testing Result	Leads/Exploratory Efficacy
Yanam/YS-6 / YS-6-2 Sub	**Object-I (5280-5284 & 5264-5272, Lower Synrift):** Well flowed gas @ 4,94,986 m³/day, with FTHP-8900 psi and FTHT-230oF, through 20/64" choke size. SBHP/SBHT at 4992.5 m: 11915 psi/420OF.	Exploratory success in the well YS-6-2 SUB under HT/HP has established the commercial potential of the Lower Syn-rift play corridor from Deen Dayal field located to the east to Yanam in the west in KG Shallow water.



Base Map of Yanam PML showing the discovery well YS-6-2-Sub



Time & Structure maps close to Pay top within Lower Synrift

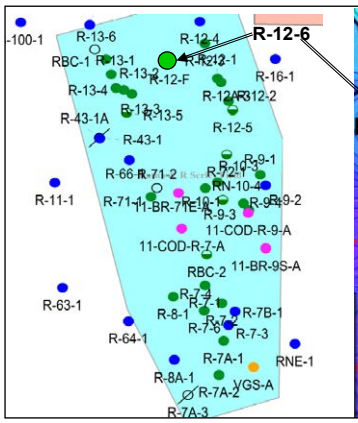


Inline-10575 passing through Well, YS-6-2 SUB

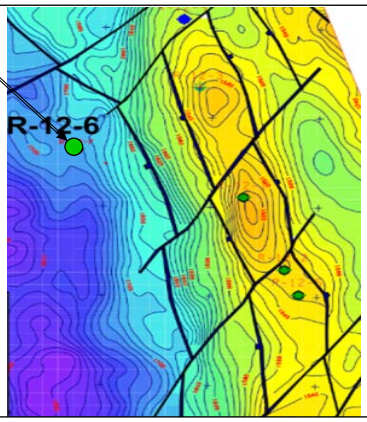
7. Mumbai Offshore/ Ratna & R-Series PML (R-12-6 (R-12-F))

Operator: ONGC

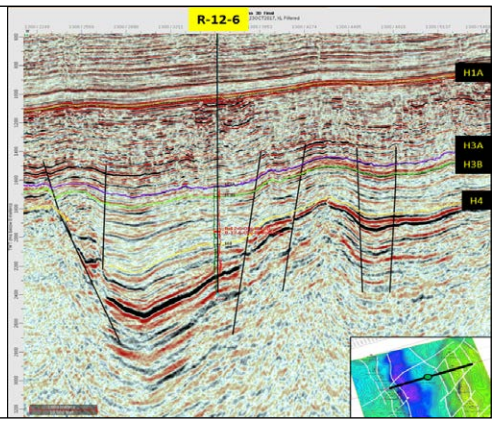
Structure / Well No. / Location	Testing Result	Leads/Exploratory Efficacy
Ratna-R-Series /R-12-F (R-12-6)	**Object-III (2605-2578m, Bassein Limestone):** Well flowed oil @ 364 BPD and gas @ 8996 m3/day with FTHP- 150-180 psi through 1/2"choke.	This lead has improved the prospectivity of the Vijaydurg Graben lying between the R-13 block and R-12 structure and opened up a promising corridor for further exploration of Bassein Play



Location Map showing well R-12-6



Time Structure Map at H3B Top

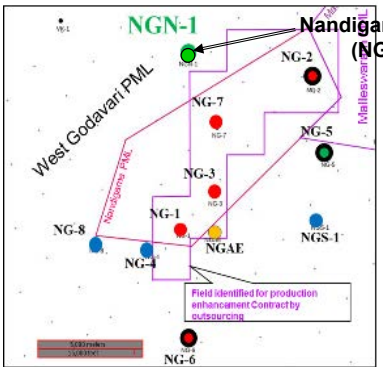


Inline-1300 passing through well R-12-6

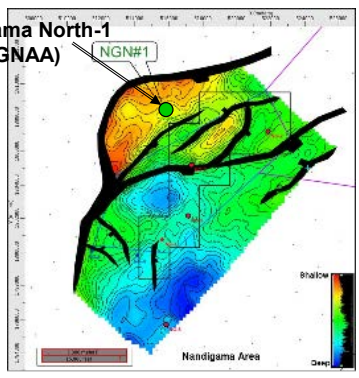
8. KG Onland/West Godavari PML (7 Year) (Nandigama North-1 (NGNAA))

Operator: ONGC

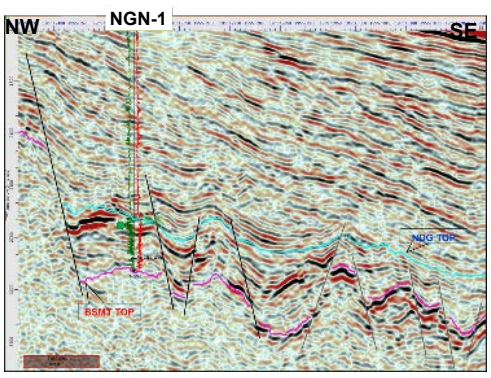
Structure / Well No. / Location	Testing Result	Leads/Exploratory Efficacy
Nandigama North/ Nandigama North-1 ((NGNAA)	**Object-II : 3699-3694,3688-3681 and 3672-3668m Nandigama Formation):** Well flowed Gas @ 23309 m3/day & 23.76 m3/d light oil with FTHP: 1941 psi, through 6 mm bean.	This lead has opened up the entire rising flank of Kaza-Kaikaluru high adjacent to Nandigama field for future exploration.



Location Map showing well Nandigama North-1



Structure map on top of Obj-2

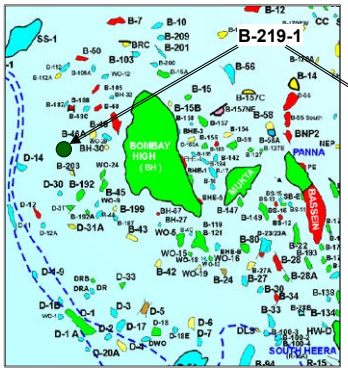


Inline-1955 passing through well NGN-1

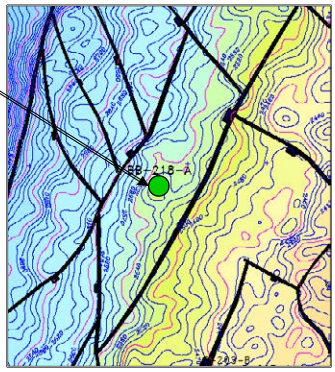
9. Mumbai Offshore/ Extn. of NWMH PML (7 Year) (B-218-1(B-218-A))

Operator: ONGC

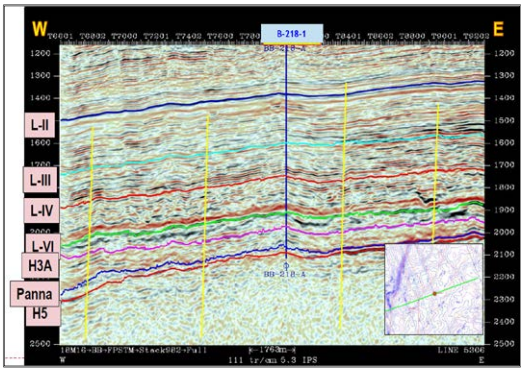
Structure / Well No. / Location	Testing Result	Leads/Exploratory Efficacy
B-218/ B-218-A/ B-218-1	**Object-I: (2604-2625m, Bassein Formation):** Well flowed gas @ 1,86,936 m3/day and oil @ 477 BPD and FTHP-1540 psi through ½"choke. **Object-II (2544-2554m, Mukta Formation):** Produced Oil @ 776 BPD and gas @ 15,693 m3/day and FTHP-317 psi through ½"choke.	The exploratory well drilled in Shakti North East structure, mid case (2C) volume estimated around 4.5 MmBbl for Shakti NE#1



Location Map showing well B-218-1



Structure map at H3A

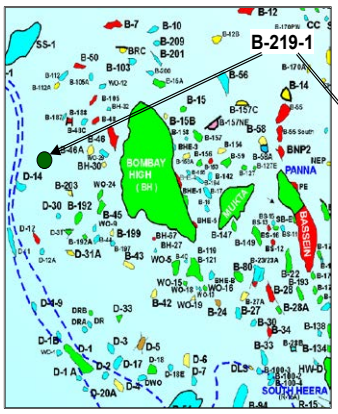


IL 5306 passing through well B-218-1

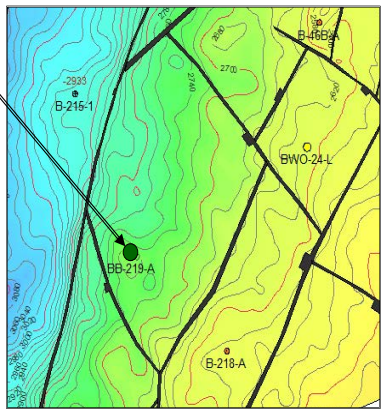
10. Mumbai Offshore/ Extn. of NWMH PML (7 Year) (B-219-1 (B-219-A))

Operator: ONGC

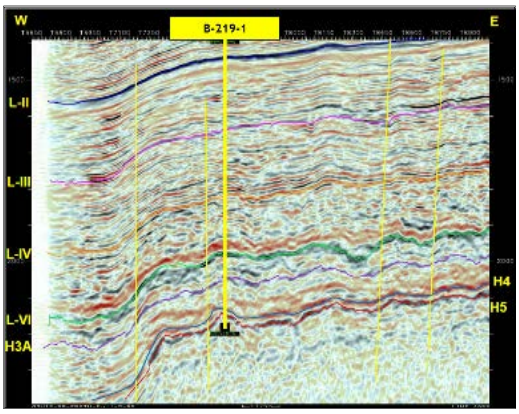
Structure / Well No. / Location	Testing Result	Leads/Exploratory Efficacy
B-219/B-219-A/ B-219-1	**Object-Ib (2742-2745m, Lower Bassein Formation):** Well flowed oil @ 204 BPD and gas @ 49,300 m3/day with FTHP-350 psi through ½" choke size.	The encouraging results of presence of commercial hydrocarbon within Bassein and Mukta Formations have opened up scope of further exploration in western periphery of Mumbai High.



Location Map showing well B-219-1



Structure map at H3 B

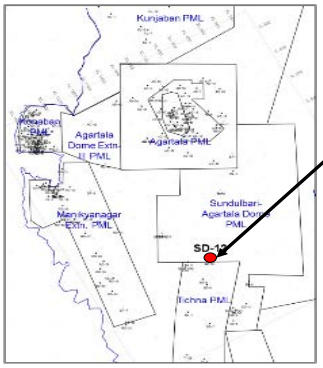


IL 4955 passing through well B-219-1

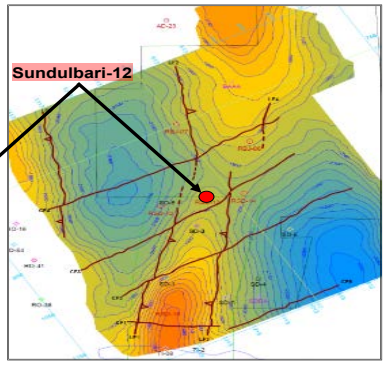
11. AAFB/ Sundulbari-Agartala Dome PML (Sundulbari-12 (SDAG))

Operator: ONGC

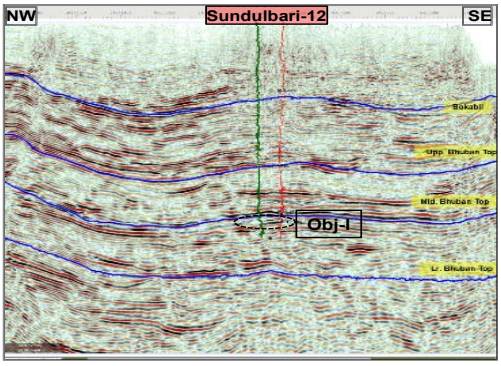
Structure / Well No. / Location	Testing Result	Leads/Exploratory Efficacy
Sundulbari/ Sundubari-12 (SDAG)	**Object-I (3073-3076m, Middle Bhuban Formation):** Well flowed gas @ 98,900 m3/day and liquid @ 3.8 m3/day with FTHP-204 kg/cm2 through 6.0 mm bean.	This discovery is made at the deepest level in the Sundulbari Field, below the established pay sands (SDP-20, SDP-35 & SDP-36). This new pool discovery will improved the prospectivity of Middle Bhuban formation and give exploration impetus in the area.



Map showing location of Well, Sundulbari-12



Time Structure Map close to Middle Bhuban Formation

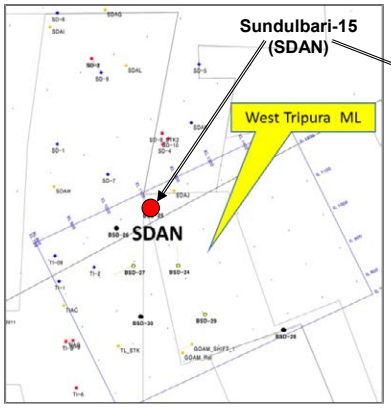


Inline-941 passing through Well, Sundulbari-12

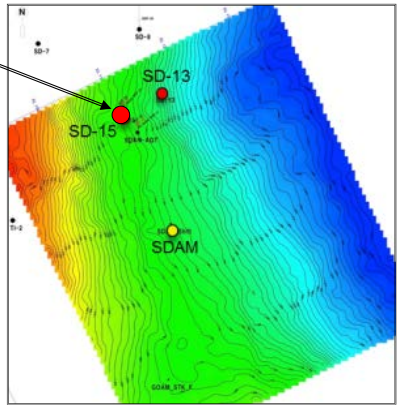
12. AAFB (Tripura)/ West Tripura PML (7 Year PML) (Sundulbari-15 (SDAN))

Operator: ONGC

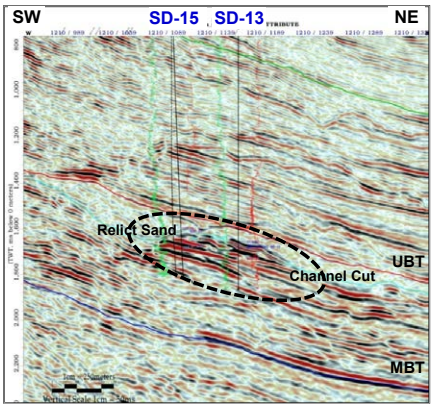
Structure / Well No. / Location	Testing Result	Leads/Exploratory Efficacy
Sundulbari/ Sundubari-15 (SDAN)	**Object-I (2290-2296m; SDP-22 pay sand in Upper Bhuban Formation):** Well flowed Qg @ 1,17,651 m3/day and Ql @ 0.64 m3/day with FBHP- 160.15 kg/cm2 and FTHP-133 kg/cm2 through 8.0 mm bean.	The well Sundulbari-15 falls in the West Tripura PML (7 Yr PML) area of the Sundulbari structure which is adjacent to the block boundary of Sundulbari–Agartala Dome PML. This discovered new pool of Sand SDP-22 will give exploration impetus in the area which may add hydrocarbon accretions.



Location Map of well Sundulbari-15



Time Structure Map of SDP-22 pay Top



Inline 1210 passing through well SD-13 & SD-15

In 2019-20, two discoveries (including one re-notified Discovery) were made in PSC regime taking total discoveries to 251 as on 31st March 2020

Till date 251 discoveries have been made in PSC regime, out of which 28% (71 discoveries) have been put on production, 35% (89 discoveries) are active and yet to be put on production. The details of these have been shared in table below:

Table 3.6: Status of discoveries under PSC regime

Status of Discovery/Evaluation Status	Oil	Gas	Total
Discoveries which have been put on Production	**52**	**19**	**71**
Discoveries which are under Development or on way to production	**24**	**26**	**50**
Commerciality established (DoC Reviewed)	**1**	**19**	**20**
DoC reviewed by MC and FDP to be submitted by Operator	1	15	16
FDP not approved by MC	-	2	2
FDP submitted under examination at DGH	-	2	2
Commerciality Proposal (DoC) submitted	**1**	**3**	**4**
DoC under examination at DGH	1	3	4
Discoveries in Early Stage, DoC to be submitted	**4**	**11**	**15**
New-Discoveries for which appraisal program is to be submitted by operator	2	7	9
Under appraisal by operator	2	4	6
Discoveries not pursued by Operator/relinquished/proposed for relinquishment	**27**	**44**	**71**
Discoveries which are part of Relinquished Area	-	4	4
Discoveries in Relinquished Block/in proposed Relinquished Block	13	23	36
Discoveries not pursued by Operator	13	14	27
Discoveries proposed for relinquishment by Operator (As per the DST circular)	-	3	3
Proposal for termination notice sent to MoPNG	1	-	1
Discoveries that may be monetised under policy for "Exploration in ML area"	**20**	-	**20**
Discoveries notified after expiry of the Exploration Period	18	-	18
Discoveries notified within the Exploration Period	2	-	2
Total	**129**	**122**	**251**

Table 3.7: Basin wise discoveries under PSC regime (As on 31-03-2020)

Basin	Oil	Gas	Total
Andaman-Nicobar	-	1	1
Assam Arakan	-	7	7
Bengal	-	1	1
Cambay	70	14	84
Cauvery	3	6	9
Gujarat Kutch	-	6	6
Gujarat Saurashtra	-	3	3
Krishna Godavari	20	58	78
Mahanadi-NEC	-	13	13
Mumbai Offshore	1	4	5
Rajasthan	35	7	42
Satpura-South Rewa-Damodar	-	1	1
Vindhyan	-	1	1
Total	**129**	**122**	**251**

Table 3.8: Region wise discoveries under PSC Regime (As on 31-03-2020)

Location	Oil			Oil Total	Gas			Gas Total	Grand Total
	NELP	Pre-NELP	PSC-Field Round		NELP	Pre-NELP	PSC-Field Round		
Deep Water	9	-	-	9	43	-	-	43	52
Onland	51	52	2	105	17	10	-	27	132
Shallow water	6	3	6	15	46	5	1	52	67
Grand Total	**66**	**55**	**8**	**129**	**106**	**15**	**1**	**122**	**251**

Table 3.9: Details of Oil and Gas Discoveries under Pre-NELP (As on 31-03-2020)

Operator	Block	NELP/Pre-NELP	Oil	Gas	Total
Cairn	CB-OS/2	Pre-NELP	2	3	5
	Ravva	PSC-Field Round	5	1	6
	RJ-ON-90/1	Pre-NELP	34	4	38
ESSAR	CB-ON/3	Pre-NELP	5		5
Focus	GK-ON/4	Pre-NELP	-	1	1
	RJ-ON/6	Pre-NELP	-	3	3
GSPC	CB-ON/2	Pre-NELP	11	1	12

Operator	Block	NELP/Pre-NELP	Oil	Gas	Total
HARDY	CY-OS-2	Pre-NELP	-	1	1
HOEC	AAP-ON-94/1	Pre-NELP	-	1	1
	CB-ON/7	Pre-NELP	2	-	2
ONGC	CB-OS/1	Pre-NELP	1	-	1
RIL	SR-OS-94/1	Pre-NELP	-	1	1
Selan Exploration Technology Limited	Karjisan	PSC-Field Round	1	-	1
Shell	Panna-Mukhta	PSC-Field Round	1	-	1
Sun Petrochemicals Pvt Ltd	Baola	PSC-Field Round	1	-	1
Total			**63**	**16**	**79**

Table 3.10: Details of Oil and Gas Discoveries under NELP (As on 31-03-2020)

Operator	Block	NELP/Pre-NELP	Oil	Gas	Total
BPRL	CB-ONN-2010/8	NELP-IX	2	-	2
Cairn/Vedanta	KG-OSN-2009/3	NELP-VIII	-	1	1
	KG-OSN-2009/3	NELP-VIII	1	-	1
Focus	CB-OSN-2004/1	NELP-VI	2	3	5
GAIL	CB-ONN-2010/11	NELP-IX	2	-	2
GSPC	CB-ONN-2000/1	NELP-II	4	-	4
	CB-ONN-2002/3	NELP-IV	8	-	8
	CB-ONN-2003/2	NELP-V	2	1	3
Jay polychem (India) Pvt. Ltd.	CB-ONN-2009/8	NELP-VIII	1	-	1
JOGPL	AA-ONN-2002/1	NELP-IV	-	3	3
	CB-ONN-2002/2	NELP-IV	2	-	2
	CY-ONN-2002/1	NELP-IV	-	1	1
MPL	CB-ONN-2005/9	NELP-VII	2	-	2
NAFTOGAS	CB-ONN-2004/5	NELP-VI	1	-	1
NIKO	CB-ONN-2000/2	NELP-II	-	2	2
NTPC	CB-ONN-2009/5	NELP-VIII	1	-	1
OIL	KG-ONN-2004/1	NELP-VI	-	3	3
	RJ-ONN-2004/2	NELP-VI	1	-	1
ONGC	AA-ONN-2001/1	NELP-III	-	2	2
	AA-ONN-2001/2	NELP-III	-	1	1
	AN-DWN-2002/1	NELP-IV	-	1	1
	CB-ONN-2001/1	NELP-III	2	-	2

Operator	Block	NELP/Pre-NELP	Oil	Gas	Total
ONGC	CB-ONN-2002/1	NELP-IV	1	-	1
	CB-ONN-2004/1	NELP-VI	1	-	1
	CB-ONN-2004/2	NELP-VI	5	-	5
	CB-ONN-2004/3	NELP-VI	-	1	1
	CB-ONN-2005/10	NELP-VII	1	-	1
	CB-ONN-2005/4	NELP-VII	1	-	1
	CB-OSN-2003/1	NELP-V	-	3	3
	CY-ONN-2002/2	NELP-IV	2	1	3
	CY-ONN-2004/2	NELP-VI	1	-	1
	GK-OSN-2009/1	NELP-VIII	-	2	2
	GK-OSN-2009/2	NELP-VIII	-	1	1
	GK-OSN-2010/1	NELP-IX	-	2	2
	GS-OSN-2004/1	NELP-VI	-	2	2
	KG-DWN-2005/1	NELP-VII	-	1	1
	KG-DWN-98/2	NELP-I	7	9	16
	KG-ONN-2003/1	NELP-V	2	-	2
	KG-OSN-2001/3	NELP-III	-	9	9
	KG-OSN-2004/1	NELP-VI	-	7	7
	KG-OSN-2009/2	NELP-VIII	1	-	1
	MB-OSN-2005/1	NELP-VII	-	3	3
	MB-OSN-2005/3	NELP-VII	-	1	1
	MN-DWN-98/3	NELP-I	-	2	2
	MN-OSN-2000/2	NELP-II	-	2	2
	NEC-DWN-2002/2	NELP-IV	-	1	1
	VN-ONN-2009/3	NELP-VIII	-	1	1
	WB-ONN-2005/4	NELP-VII	-	1	1
Pan India Consultants Pvt. Ltd	CB-ONN-2010/5	NELP-IX	1	-	1
RIL	CB-ONN-2003/1	NELP-V	1	-	1
	CY-DWN-2001/2	NELP-III	-	2	2
	CY-PR-DWN-2001/3	NELP-III	-	1	1
	GS-OSN-2000/1	NELP-II	-	1	1
	KG-DWN-2001/1	NELP-III	-	1	1
	KG-DWN-2003/1	NELP-V	-	4	4

Operator	Block	NELP/Pre-NELP	Oil	Gas	Total
RIL	KG-DWN-98/1	NELP-I	1	-	1
	KG-DWN-98/3	NELP-I	1	19	20
	KG-OSN-2001/1	NELP-III	-	3	3
	KG-OSN-2001/2	NELP-III	2	-	2
	NEC-OSN-97/2	NELP-I	-	8	8
Sun Petrochemicals Pvt Ltd	CB-ONN-2003/1	NELP-V	7	-	7
Total			**66**	**106**	**172**

3.3 Oil and Gas Production

In FY 2019-20 country has achieved 91.8 % of its crude oil production target by producing 32.17 MMT against crude production target of 35.04 MMT, while the domestic gas production stands at 31.18 BCM against target of 34.55 BCM.

There was a decline in crude oil production by 5.9% and the gas production by 5.1% compared to previous year.

Table 3.11: Oil and Gas production in the country in 2019-20 (As on 31-03-2020)

Operator (Regimes)	OIL TMT					Gas (MMSCM)				
	2018-19	2019-20		%, Ach w.r.t		2018-19	2019-20		%, Ach w.r.t	
	Actual	Target	Actual	Target	18-19	Actual	Target	Actual	Target	18-19
ONGC (N)	21,042	22,154	20,627	93.1%	98.0%	24,675	25,849	23,746	91.9%	96.2%
OIL (N)	3,293	3,425	3,107	90.7%	94.3%	2,722	3,310	2,668	80.6%	98.0%
PSC + CBM	9,868	9,463	8,436	89.1%	85.5%	5,477	5,395	4,770	88.4%	87.1%
Country	34,203	35,042	32,169	91.8%	94.1%	32,873	34,554	31,184	90.2%	94.9%

Fig 3.3: Oil Production of Country in 2019-20

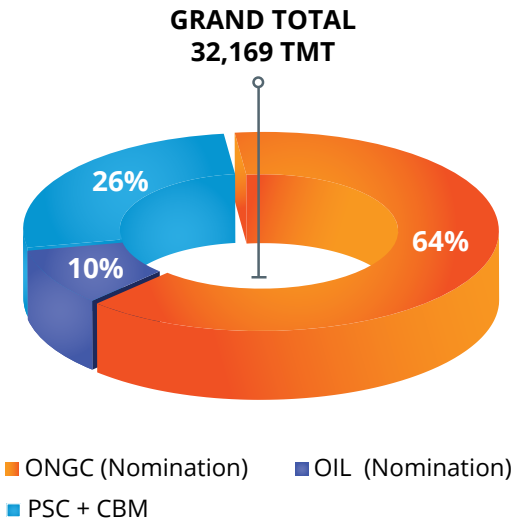


Fig 3.4: Gas Production of Country in 2019-20

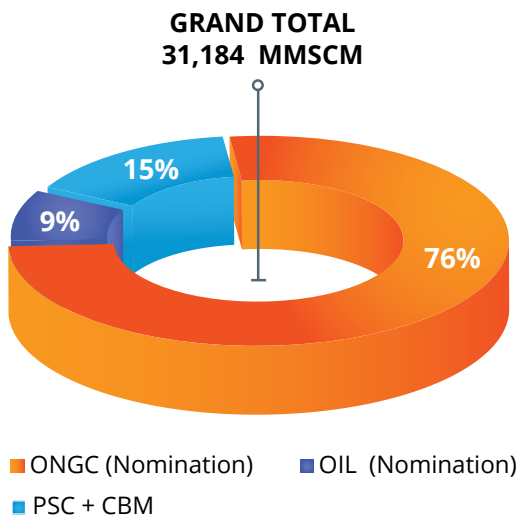


Table 3.12: Basin and Operator-wise production of country in FY 2019-20 (as on 31.03.2020)

Sl. No.	Operator	Basin	Oil (MMT)*	Gas (BCM)	O+OEG (MMT)
		National Oil Companies (NOCs) – Nomination			
1	**OIL Nomination**	Assam-Arakan Shelf	3.10	2.42	5.52
2		Rajasthan	0.01	0.25	0.26
Total (OIL Nomination)			**3.11**	**2.67**	**5.77**
1	**ONGC Nomination**	Assam-Arakan Fold Belt	0.003	1.47	1.48
2		Assam-Arakan Shelf	0.99	0.46	1.45
3		Cambay	4.57	1.28	5.85
4		Cauvery	0.33	1.07	1.39
5		Krishna Godavari	0.22	1.83	2.05
6		Mumbai	14.52	17.64	32.16
Total (ONGC Nomination)			**20.63**	**23.76**	**44.38**
Total NOCs			**23.73**	**26.42**	**50.15**
		NOCs/PVT/JV Companies (PSC)			
1	**CEIL**	Cambay	0.59	0.11	0.70
2		Krishna Godavari	0.54	0.28	0.81
3		Rajasthan	6.64	1.51	8.16
4	**ESSAR**	Cambay	0.002	0.00	0.002
5	**FOCUS**	Rajasthan	0.002	0.12	0.12
6	**GEOENPRO**	Assam-Arakan Shelf	0.03	0.01	0.04
7	**GNRL**	Cambay	0.003	0.01	0.01
8	**GSPC**	Cambay	0.03	0.01	0.04
9	**HOEC**	Assam-Arakan Shelf	0.03	0.30	0.33
10		Cambay	0.004	0.004	0.01
11		Cauvery	0.001	0.04	0.04
12	**JTI**	Cambay	0.04	0.01	0.05
13	**MERCATOR**	Cambay	0.00002	0.000004	0.000028
14	**OILEX**	Cambay	-	0.000011	0.000011
15	**ONGC**	Cambay	0.02	0.02	0.04
16		Cauvery	0.09	0.03	0.12
17		Krishna Godavari	0.04	0.09	0.13
18	**RIL**	Krishna Godavari	-	0.50	0.50
19	**SELAN**	Cambay	0.03	0.01	0.04

Sl. No.	Operator	Basin	Oil (MMT)*	Gas (BCM)	O+OEG (MMT)
20	**SHELL**	Mumbai	0.34	1.04	1.38
21	**SUNPETRO**	Cambay	0.02	0.02	0.03
Total NOCs/PVT/JV COMPANIES (PSC)			**8.44**	**4.11**	**12.55**
		COAL BED METHANE (CBM)			
1	**ESSAR**	Raniganj East	-	0.17	0.17
2	**GEECL**	Raniganj South	-	0.14	0.14
3	**ONGC**	Bokaro	-	0.00022	0.00022
4		Jharia	-	0.00443	0.00443
5	**RIL**	Sohagpur East	-	0.00003	0.00003
6		Sohagpur West	-	0.34	0.34
	Total CBM		-	**0.66**	**0.66**
India Grand Total			**32.17**	**31.18**	**63.35**

**NOTE : Figures inclusive of condensate (MMT); 1MMT = 1 BCM*

Overall there has been a decline of ~6% in oil production and ~5% in gas production in Country. Rajasthan continued to dominate the production with around 80% contribution to oil production and 40% under PSC regime. Gas production from Krishna-Godavari saw a significant decline under PSC regime. Under Nomination regime Mumbai offshore contributes significantly to both oil and gas production.

Table 3.13: Contribution by ONGC, OIL and NOCs/Pvt./JVs in country's Oil and Gas production in last 10 years

Year	Oil Production (MMT)				Gas Production (BCM)				
	Nomination		PSC	Total Oil (MMT)	Nomination		PSC	CBM	Total Gas (BCM)
	ONGC	OIL			ONGC	OIL			
2010-11	24.42	3.59	9.68	37.69	23.09	2.35	26.73	0.04	52.22
2011-12	23.71	3.85	10.53	38.09	23.32	2.63	21.52	0.08	47.56
2012-13	22.56	3.66	11.64	37.86	23.55	2.64	14.38	0.11	40.68
2013-14	22.24	3.47	12.08	37.79	23.28	2.63	9.33	0.17	35.41
2014-15	22.26	3.41	11.79	37.45	22.02	2.72	8.68	0.23	33.65
2015-16	22.37	3.23	11.36	36.96	21.18	2.84	7.84	0.39	32.25
2016-17	22.21	3.26	10.53	36.00	22.09	2.94	6.31	0.56	31.90
2017-18	22.25	3.38	10.06	35.68	23.43	2.88	5.60	0.73	32.65
2018-19	21.04	3.29	9.87	34.20	24.67	2.73	4.77	0.71	32.88
2019-20	20.63	3.11	8.44	32.17	23.75	2.67	4.11	0.66	31.18

Fig 3.5: Trend in Oil Production in the country (in MMT)

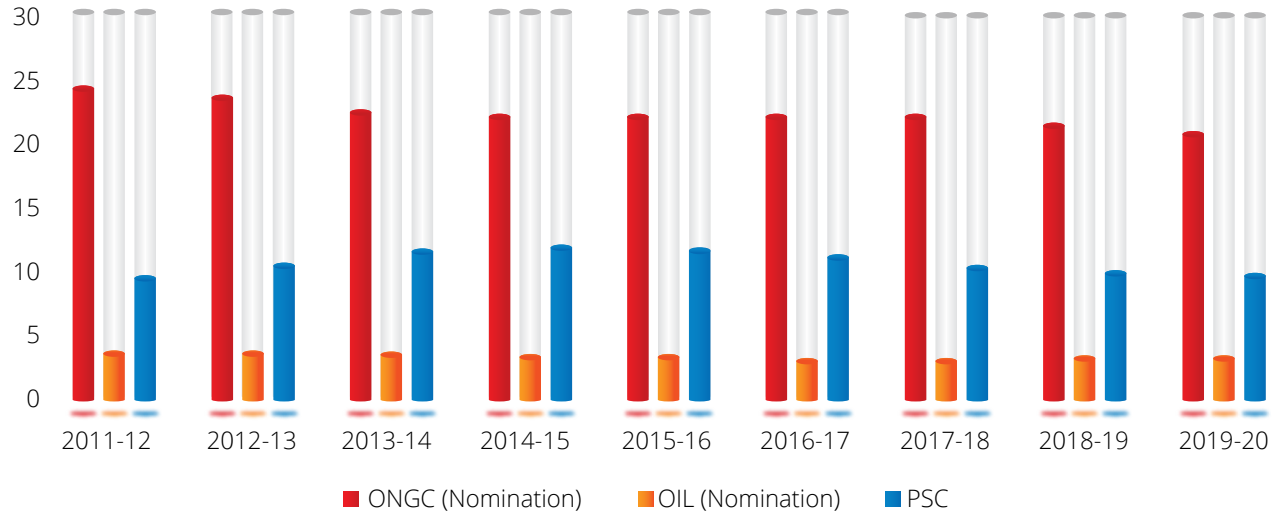


Fig 3.6: Trend in Gas Production in the country (in BCM)

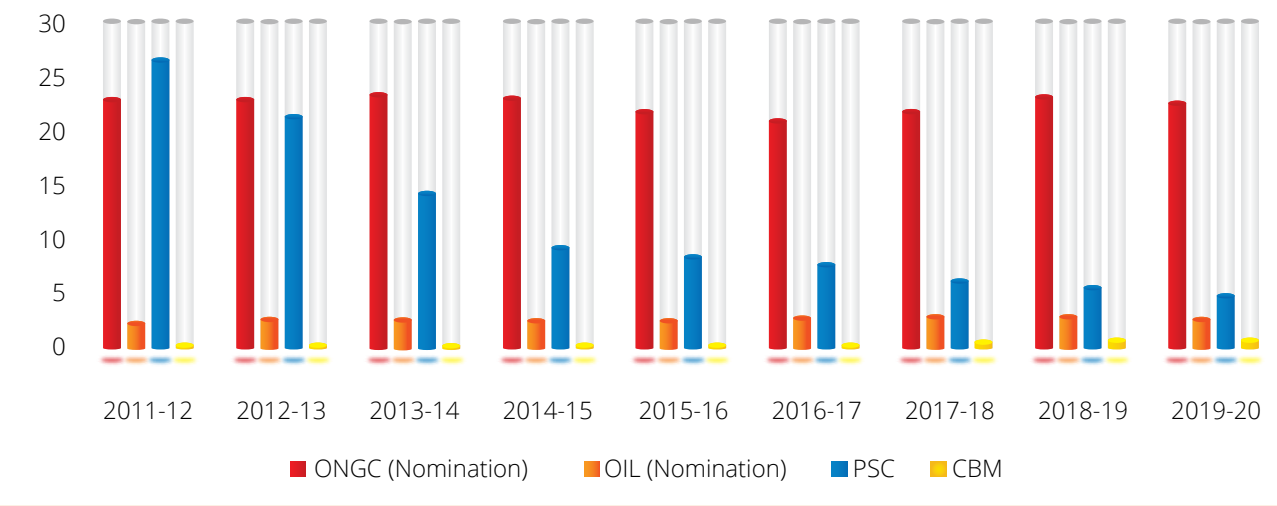


Fig 3.7: Country's Basin-Wise Oil Production in 2019-20 (MMT)

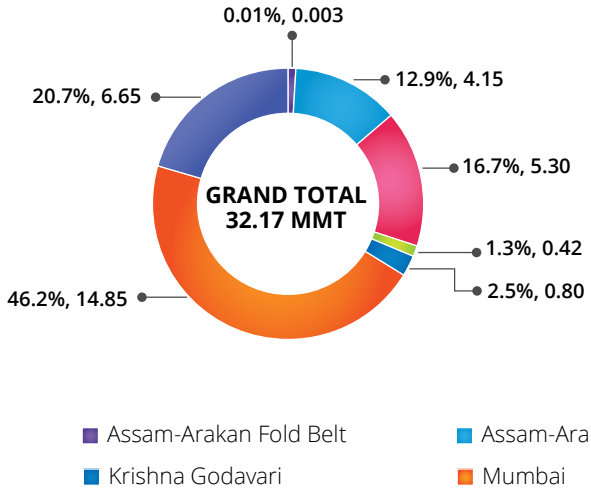


Fig 3.8: Country's Basin-Wise Gas Production in 2019-20 (BCM)

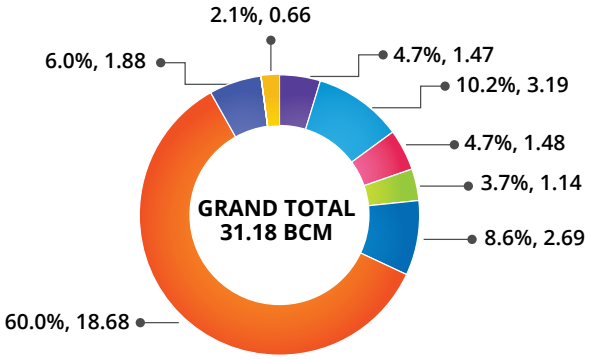


Fig 3.9: Country's Location-wise Oil Production in 2019-20 (MMT)

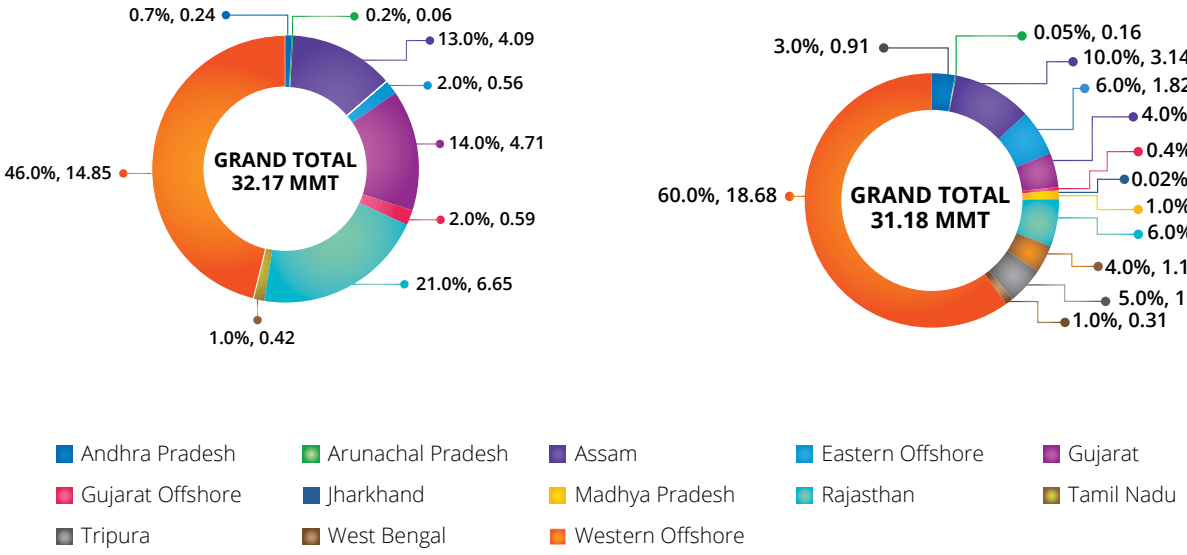
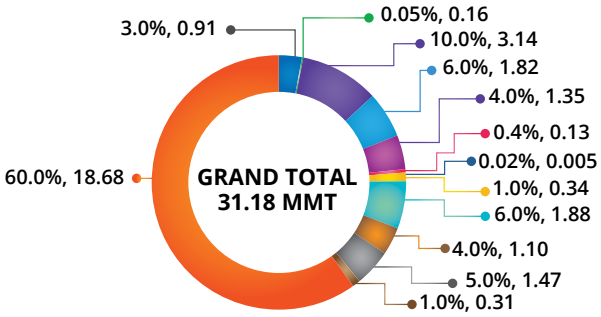


Fig 3.10: Country's Location-wise Gas Production in 2019-20 (BCM)



The Country oil and gas production has risen consistently under PSC regime starting from year 1994-95 with gas production hitting a peak level during 2010-11 at level of 26.77 BCM and oil production hitting a peak of 12.08 MMT in 2013-14. The Oil and Gas production level from PSC fields this year was at lowest in last 10 years, however with a renewed impetus to the sector through HELP, DSF bidding round and upcoming policies supporting enhance recovery from existing fields, the production figures are likely to hit peak again in near future.

The country oil production under PSC regime has declined moderately over past 5 years. There is slight variation in proportion from onshore and offshore areas for oil production, while gas production has seen shift from offshore to onshore area with CBM emerging as major contributor with significant growth over past 3-4 years.

Table 3.14: Location-wise Crude Oil and Natural Gas production under PSC+CBM regime from FY 1994-95 to 2019-20

Year	OIL (TMT)					GAS (MMSCM)						
	Off-shore	On-shore	Total	%age of off-shore with Total	%age of on-shore with Total	Off-shore	On-shore	CBM	Total	%age of off-shore with Total	%age of on-shore with Total	%age CBM of Total
1994-95	250	4	254	98%	2%	88	-	-	88	100%	0%	0%
1995-96	617	25	642	96%	4%	324	10	-	334	97%	3%	0%
1996-97	1,305	38	1,343	97%	3%	479	31	-	510	94%	6%	0%
1997-98	2,472	43	2,514	98%	2%	1,615	66	-	1,681	96%	4%	0%
1998-99	2,965	76	3,042	97%	3%	2,747	128	-	2,874	96%	4%	0%
1999-00	3,924	94	4,018	98%	2%	3,268	197	-	3,465	94%	6%	0%
2000-01	4,006	77	4,083	98%	2%	3,286	310	`	3,596	91%	9%	0%
2001-02	4,070	71	4,140	98%	2%	3,430	624	-	4,054	85%	15%	0%
2002-03	4,013	75	4,088	98%	2%	4,295	1,112	-	5,407	79%	21%	0%
2003-04	4,240	75	4,314	98%	2%	5,184	1,307	-	6,491	80%	20%	0%
2004-05	4,226	74	4,300	98%	2%	5,357	1,427	-	6,784	79%	21%	0%
2005-06	4,451	101	4,552	98%	2%	5,801	1,557	-	7,358	79%	21%	0%
2006-07	4,669	161	4,830	97%	3%	5,908	1,131	-	7,040	84%	16%	0%
2007-08	4,895	192	5,087	96%	4%	6,861	867		7,727	89%	11%	0%
2008-09	4,431	243	4,674	95%	5%	7,348	722	20	8,090	91%	9%	0%
2009-10	4,529	734	5,263	86%	14%	21,350	597	38	21,985	97%	3%	0%
2010-11	4,282	5,400	9,682	44%	56%	26,054	679	41	26,774	97%	3%	0%
2011-12	3,733	6,794	10,527	35%	65%	20,910	615	84	21,609	97%	3%	0%
2012-13	2,804	8,836	11,640	24%	76%	13,700	684	107	14,491	95%	5%	1%
2013-14	2,663	9,414	12,076	22%	78%	8,428	904	166	9,497	89%	10%	2%
2014-15	2,729	9,056	11,785	23%	77%	7,589	1,095	228	8,912	85%	12%	3%
2015-16	2,546	8,810	11,356	22%	78%	6,605	1,236	393	8,235	80%	15%	5%
2016-17	2,137	8,396	10,532	20%	80%	5,155	1,152	565	6,872	75%	17%	8%
2017-18	1,905	8,154	10,059	19%	81%	4,219	1,384	735	6,338	67%	22%	12%
2018-19	1,899	7,969	9,868	19%	81%	3,075	1,691	710	5,477	56%	31%	13%
2019-20	1,466	6,969	8,436	17%	83%	2,059	2,055	655	4,770	43%	43%	14%

Fig 3.11: Location-wise Oil Production in PSC Regime from 2007-08 to 2019-20 (TMT)

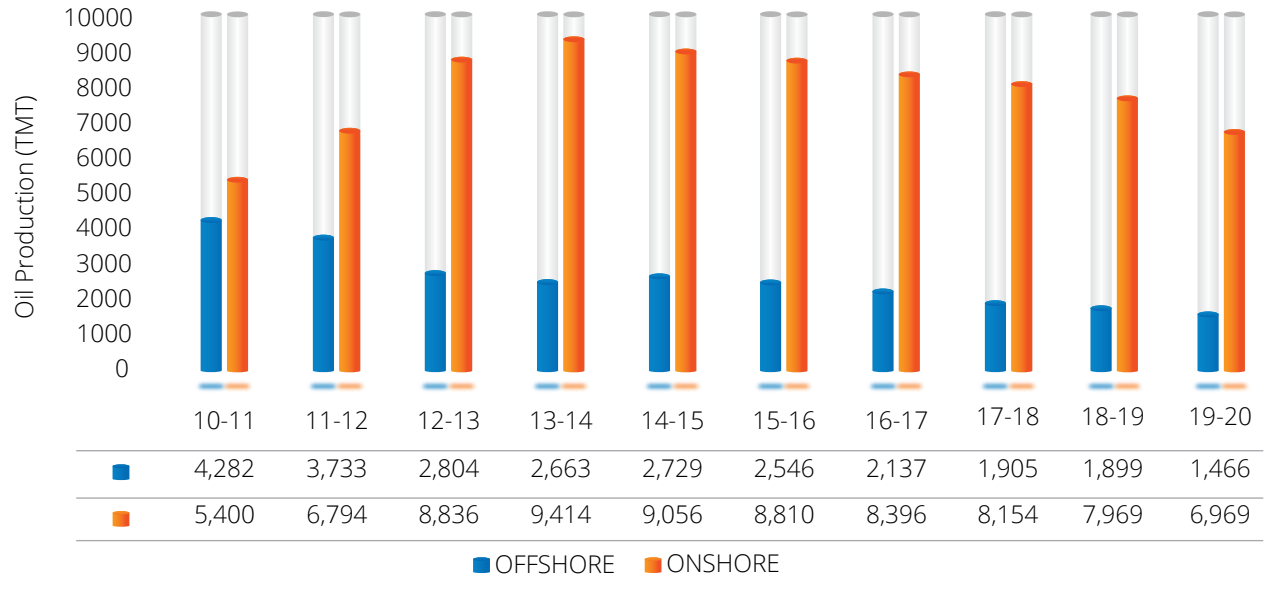
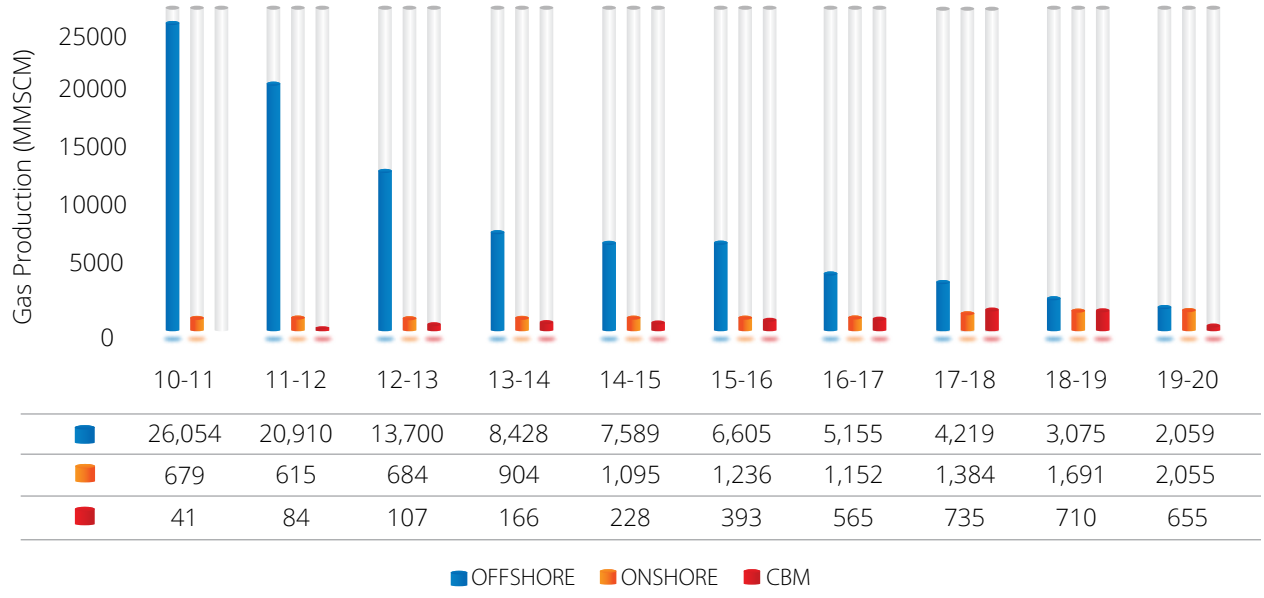
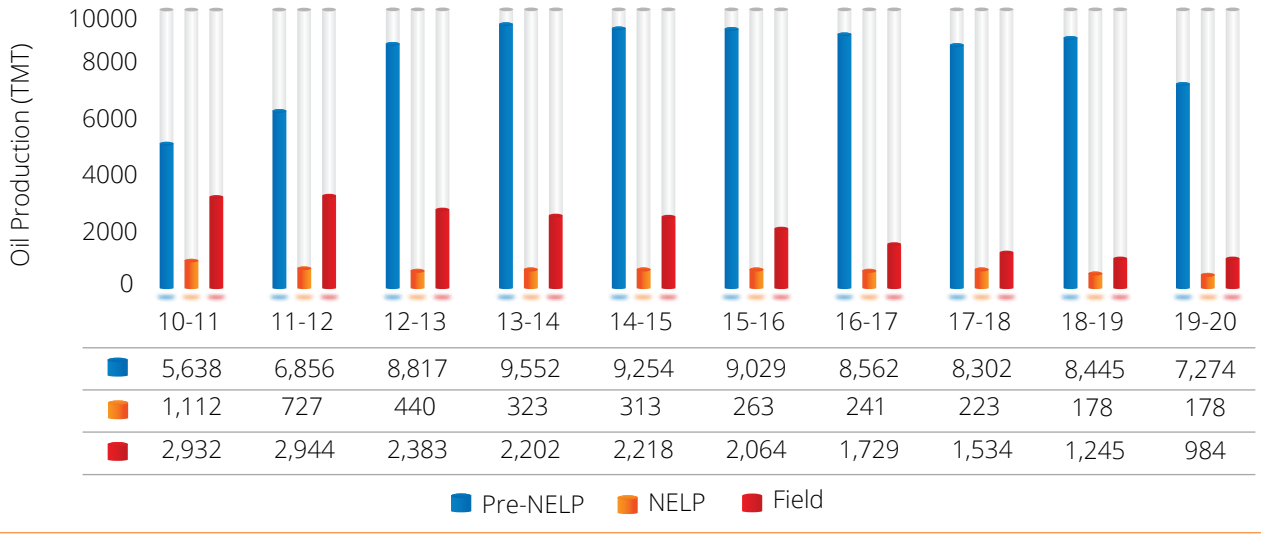


Fig 3.12: Location-wise Gas Production in PSC+CBM Regime from 2007-08 to 2019-20 (MMSCM)



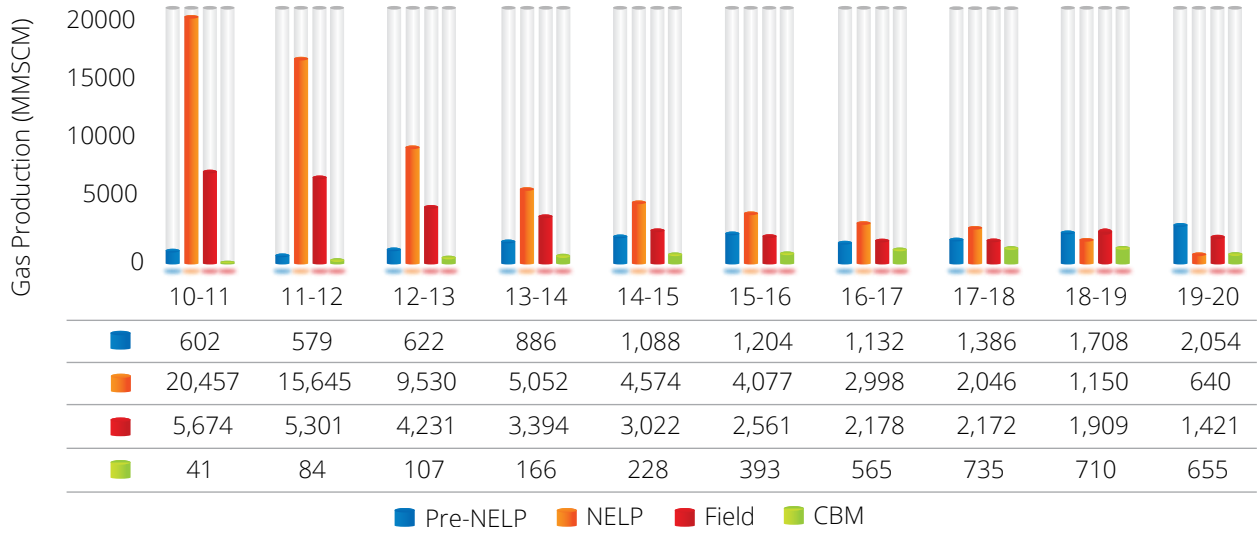
	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
OFFSHORE	26,054	20,910	13,700	8,428	7,589	6,605	5,155	4,219	3,075	2,059
ONSHORE	679	615	684	904	1,095	1,236	1,152	1,384	1,691	2,055
CBM	41	84	107	166	228	393	565	735	710	655

Fig 3.13: Crude oil production in PSC regimes in last 10 years (in TMT)



	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Pre-NELP	5,638	6,856	8,817	9,552	9,254	9,029	8,562	8,302	8,445	7,274
NELP	1,112	727	440	323	313	263	241	223	178	178
Field	2,932	2,944	2,383	2,202	2,218	2,064	1,729	1,534	1,245	984

Fig 3.14: Natural Gas production in PSC regimes in last 10 years (in MMSCM)



	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Pre-NELP	602	579	622	886	1,088	1,204	1,132	1,386	1,708	2,054
NELP	20,457	15,645	9,530	5,052	4,574	4,077	2,998	2,046	1,150	640
Field	5,674	5,301	4,231	3,394	3,022	2,561	2,178	2,172	1,909	1,421
CBM	41	84	107	166	228	393	565	735	710	655

Fig 3.15: Trend in Oil Production in PSC Regime from 2010-11 to 2019-20

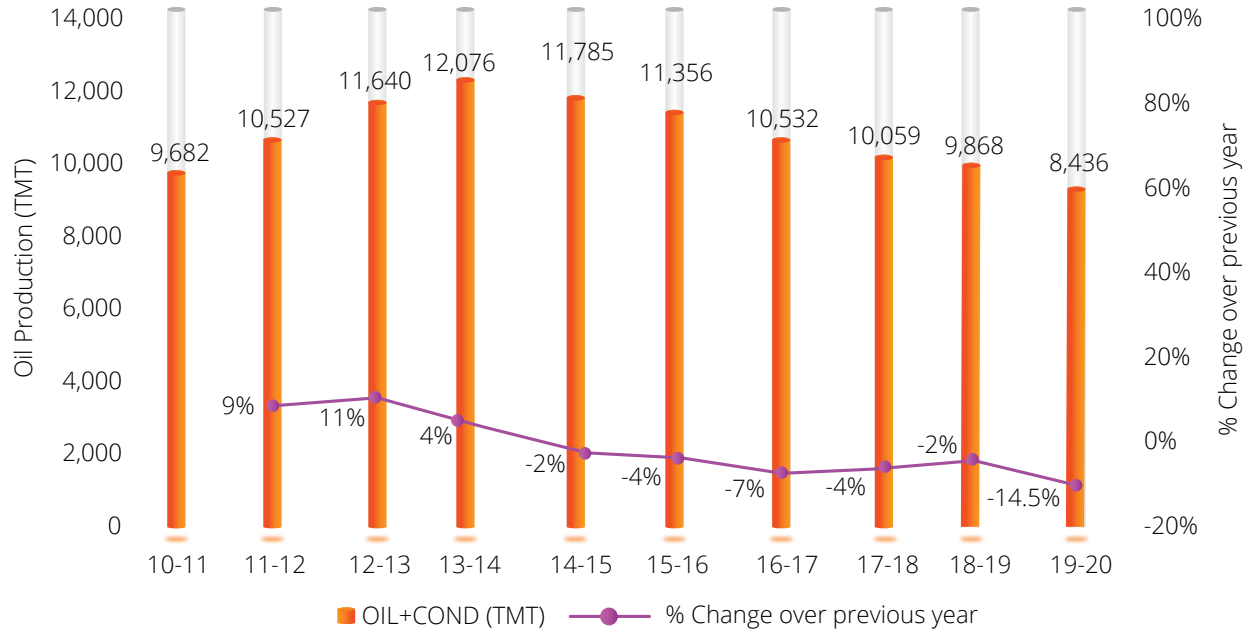
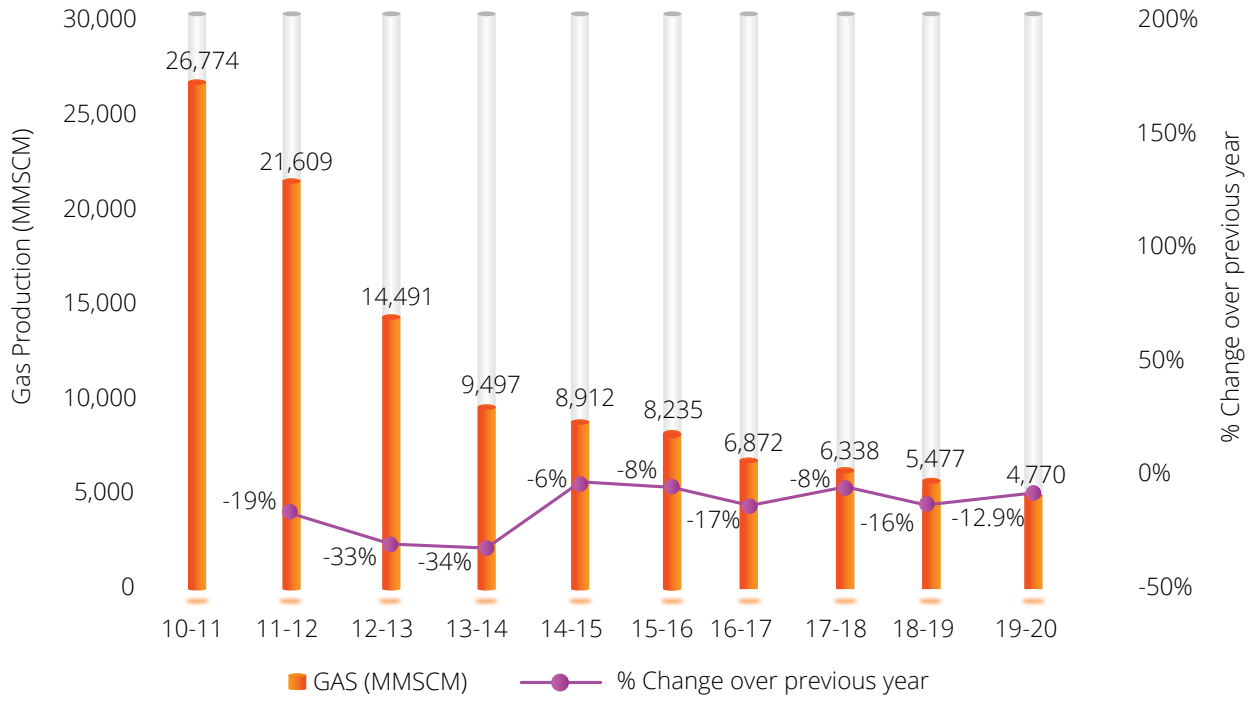


Fig 3.16: Trend in Gas Production in PSC Regime from 2010-11 to 2019-20



4 GEO-SCIENTIFIC STUDIES AND DATA MANAGEMENT

In order to achieve self-sufficiency in E&P sector & accelerate exploration activities in India, accessible, viable & good quality of E&P data is required. Sufficient knowledge of hydrocarbon potential of a basin is necessary for any meaningful attempt towards exploration of oil and gas which is a key aspect that attracts investments into exploration and production activities. Government of India has recognized how crucial quality E&P data is for making a project techno-economically viable which led to data driven reforms in the sector to enable investors to view, analyse E&P data and make sound investment decisions at any given point of time. In consideration of the same, Government of India (GoI) has unveiled a series of initiatives for enhancing exploration activities in the country, "Hydrocarbon Resource Assessment of Indian Sedimentary Basins" and "National Seismic Programme" are two major initiatives of GoI in this direction. These initiatives are a testament to the Government's vision to make quality data available, accessible and implementable.

4.1 Hydrocarbon Resource Assessment of Indian Sedimentary Basins

During the last two decades, geo-scientific data grew in volume due to activities pertaining to exploration, development and production. Use of new technologies furthered opening up of new hydrocarbon plays (petroleum habitat with favorable geological conditions, occupying specific stratigraphic levels) and improved assessment tools for estimating hydrocarbon potential. In order to realise the potentials of Indian sedimentary basins for bidding out oil and gas acreage, an idea was mooted for a comprehensive evaluation of all 26 sedimentary basins leading to an Inplace resource estimation.

The reassessment study & National Seismic Programme focused on a fact that future bidding should be strengthened with more realistic assessment of Indian sedimentary basins and the results could be readily available to the bidders.

With "Hydrocarbon Exploration and Licensing Policy" (HELP) and "Open Acreage Licensing Policy" (OALP) already launched and operational along with "National Data Repository" (NDR), the project outcome of hydrocarbon play information would significantly expand and enrich the geo-scientific database, essentially required for any meaningful and wiser foray into exploration business.

4.1.1. Hydrocarbon Resource Potential of Indian Sedimentary Basins

In India, a basin-wise assessment of conventional hydrocarbon resources was last carried out during 1995-96 and 15 sedimentary basins including deepwater areas were assessed with limited geoscientific-engineering data available at that point of time.

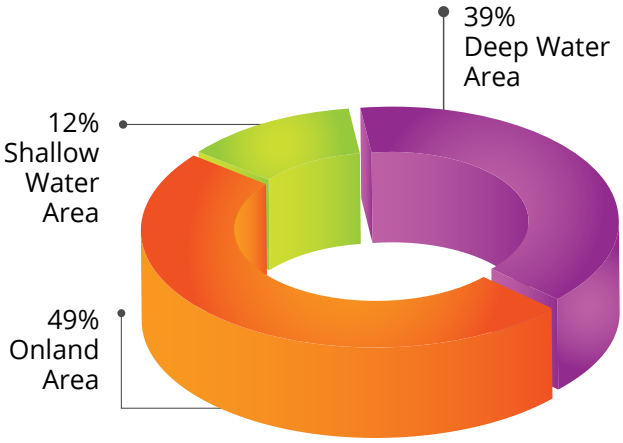
In 2017, after more than two decades, Hydrocarbon Resource Re-assessment Study was undertaken. The study was carried out for all 26 sedimentary basins with deepwater areas included with respective basins. Improvised assessment tools were used for basins with intensive datasets and the assessment extended into hydrocarbon play level for a more refined insight into stratigraphic make-up. The total 'un-risked' conventional hydrocarbon 'in place' rose up to ~42 Billion Ton Oil-Equivalent (BTOE) from earlier estimate of 28 BTOE - **a significant increase of 49.1% in conventional petroleum resources.**

Project Description and Key Outcomes

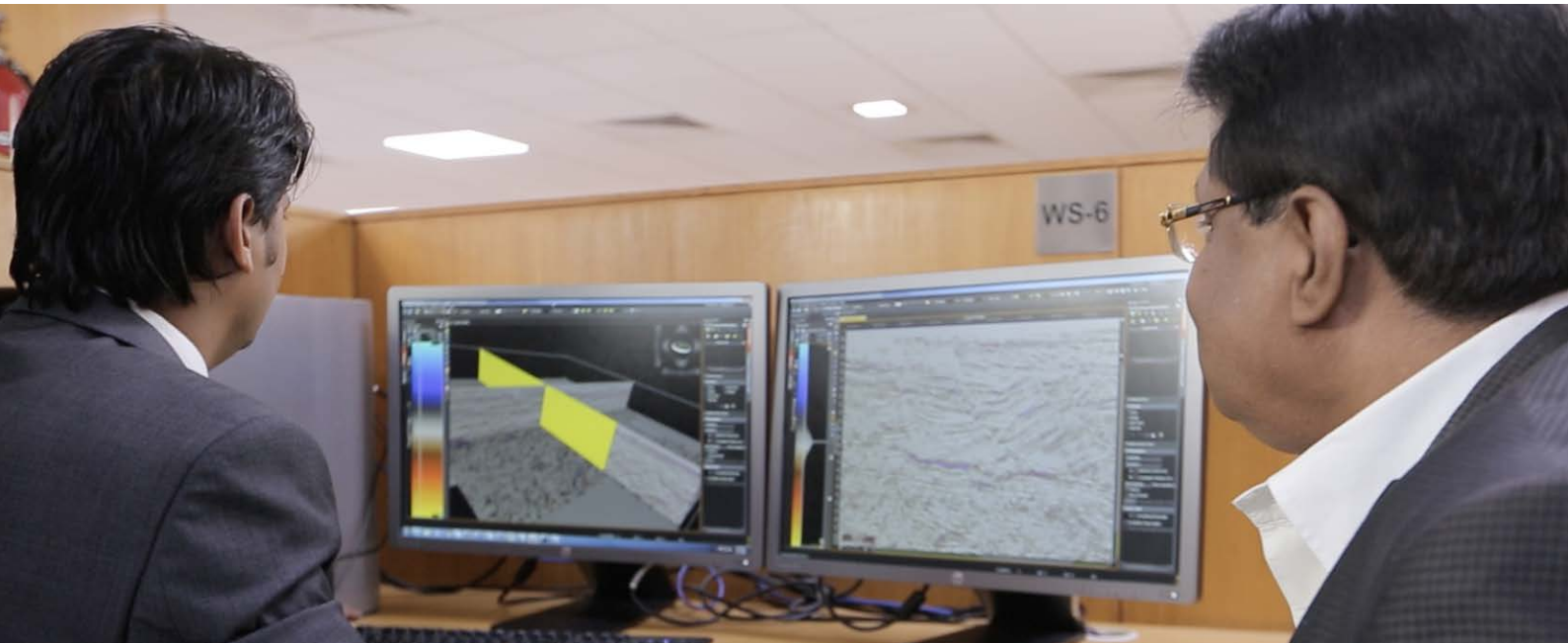
The project pooled in a huge amount of geo-scientific data, close to 4,500 wells, 150,000 LKM of 2D seismic and 750,000 SKM of 3D seismic data, along with vast amount of laboratory data of biostratigraphy, sedimentology and geochemical information – all adequate in building comprehensive geological models. In basins where limited data were present, the basic information was gathered from the public domains and analogous basins based on commonality of geological parameters.

Indian Sedimentary Basins

Territory Distribution



The new resource estimate of conventional hydrocarbons is a data-driven comprehensive assessment where the geological intricacies on hydrocarbon prospectivity have been mapped at 'play' level through adept use of industry-standard sophisticated petroleum system modeling tools. Continuous supervision by international domain specialists and Indian basin experts ensured data analysis and quality-check of the assessment methodologies, leading to accuracy, reliability and global benchmarking of the results.



The total basin area of the 26 sedimentary basins of India is close to 3.36 million sq. km with onland area of 1.63 million sq. km, shallow water of 0.41 million sq. km and deepwater of 1.32 million sq. km. During the 1995-96 exercise, deepwater areas were assessed between 200m bathymetry and EEZ limit and also separately without geological linkage to respective basin areas. In the 2017 study, deepwater areas were pushed deeper to 400m bathymetry and the same geologically linked to respective basins falling into deepwater.

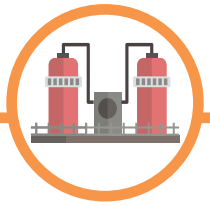
In terms of exploration potential, the re-assessment of all 26 Indian sedimentary basins has shown quite a large undiscovered in place, which is about 3/4th of total in place reassessed for entire sedimentary cover. Nearly half-of-the area admeasuring 1.59 million sq. km (47%) is subject to exploration for a discovery.

Potential Thrust Areas of Exploration

During the study, hydrocarbon has been assessed for the first time at play levels and Mesozoic sediments, which are found to be potential targets, have been identified in as many as 14 sedimentary basins. There are fields/ areas coming up now as excellent/ potential producers of oil and gas as in Rajasthan (Barmer and Jaisalmer sub-basins) and Kutch basins.

The unconventional basement rocks (both Archean and volcanics) are proved to be oil producers in fractures and vugs in areas of Rajasthan, Upper Assam, Cauvery and Cambay. Consequently, this particular hydrocarbon play has been separately assessed.

There are basins (like Deccan Syneclise) where volcanic rocks cover a large area. New improvised tools are in use for sub-basaltic imaging that focus on deep-seated inter-trappean sedimentary sequences for probable hydrocarbon content.



> **“AN OPEN ACREAGE LICENSING POLICY AND A NATIONAL DATA RESPOSITORY IS HELPING TO INCREASE EXPLORATION INTEREST IN INDIAN FIELDS”**
>
> **Shri Narendra Modi**
> Hon'ble Prime Minister of India

Value addition to Indian E&P Sector

The findings of Hydrocarbon Resource Reassessment Study (2017) have served as a guiding tool in re-aligning the exploration strategy for Indian sedimentary basins across areas that are not fully explored, less-to-poorly explored or even unexplored. As an immediate application, the existing 4-tier basin category has been simplified into 3-tier aligned with the principle of PRMS (Petroleum Resources Management System), a global standard of reporting hydrocarbon resources/reserves appropriately factoring the risk perception in basin prospectivity. Hydrocarbons present in Indian sedimentary basins are largely as ‘prospective resources’, which in the event of discovery are matured into ‘contingent resources’ and the latter upon commercial viability form into ‘reserves.

Renewed Categorization of Sedimentary Basins

Category I: These are the basins where, based on exploratory efforts, hydrocarbon discoveries are made, developed and put on commercial production. The basins, under this category have **discovered Inplace which is recoverable and commercial.** In other words, these basins are producing and have **reserves** which are potential to be exploited at increased recovery. Additionally, these basins have also contingent and prospective resources. There are 7 basins currently existing under this Category.

Category II: These are the basins where, based on exploratory efforts, hydrocarbon discoveries are made, but yet to be thoroughly appraised, developed and put on commercial production. The basins, under this category have **discovered in place which is recoverable but yet sub-commercial**. In other words, these basins have **contingent resources** which are to be developed and commercially produced. Additionally, these basins have also prospective resources, but no reserves. There are 5 basins currently existing under this Category.

Category III: These are the basins where hydrocarbon discovery is still elusive, requiring intensive exploratory efforts. The basins, under this category have entirely **undiscovered in place which is potentially recoverable** based on indicative prospectivity and global analogy. In other words, these basins have only **prospective resources** which are to be intensely explored and discovered. The remaining 14 basins currently exist under this Category.

Estimated Hydrocarbon Resources in India

The estimates of hydrocarbon resources have been recast into 3-tier category and the sedimentary basins are tabulated below in decreasing order of prospective resources.

Table 4.1: Hydrocarbon Resources in India

Basin Category	Hydrocarbon Resource Maturity	Area (Sq. Km.)	Sl. No.	Basin Name	Total Hydrocarbon In place# (MMtoe)	
					Estimate (1995-96)	Estimate (2017)
Category I	Basins with reserves being produced and potential to be exploited at increased recovery	9,98,325	1	Krishna-Godavari	1,130	9,555
			2	Mumbai Offshore	9,190	9,646
			3	Assam Shelf	3,180	6,001
			4	Rajasthan	380	4,126
			5	Cauvery	700	1,964
			6	Assam-Arakan Fold Belt	1,860	1,633
			7	Cambay	2,050	2,586
			SUB-TOTAL (Category I)		**18,490**	**35,511**
Category II	Basins with contingent resources to be developed and produced	7,80,974	8	Saurashtra	280	1,325
			9	Kutch	760	898
			10	Vindhyan	Un-assessed	632
			11	Mahanadi	145	651
			12	Andaman	180	371
			SUB-TOTAL (Category II)		**1,365**	**3,877**

Basin Category	Hydrocarbon Resource Maturity	Area (Sq. Km.)	Sl. No.	Basin Name	Total Hydrocarbon In place# (MMtoe)	
					Estimate (1995-96)	Estimate (2017)
			13	Kerala-Konkan	660	1,245
			14	Bengal-Purnea	190	828
			15	Ganga-Punjab	230	128
			16	Pranhita-Godavari	Un-assessed	95
			17	Satpura-South Rewa-Damodar		63
			18	Himalayan Foreland	150	44
			19	Chhattisgarh	Un-assessed	25
Category III	Basins with only prospective resources to be explored and discovered	15,86,150	20	Narmada		18
			21	Spiti-Zankskar		11
			22	Deccan Syneclise		11
			23	Cuddapah		5
			24	Karewa		4
			25	Bhima-Kaladgi		3
			26	Bastar		1
			SUB-TOTAL (Category III)		**1,230**	**2,481**
		33,65,449		Deepwater	7,000	Included with respective basins
BASIN TOTAL					**28,085**	**41,872**

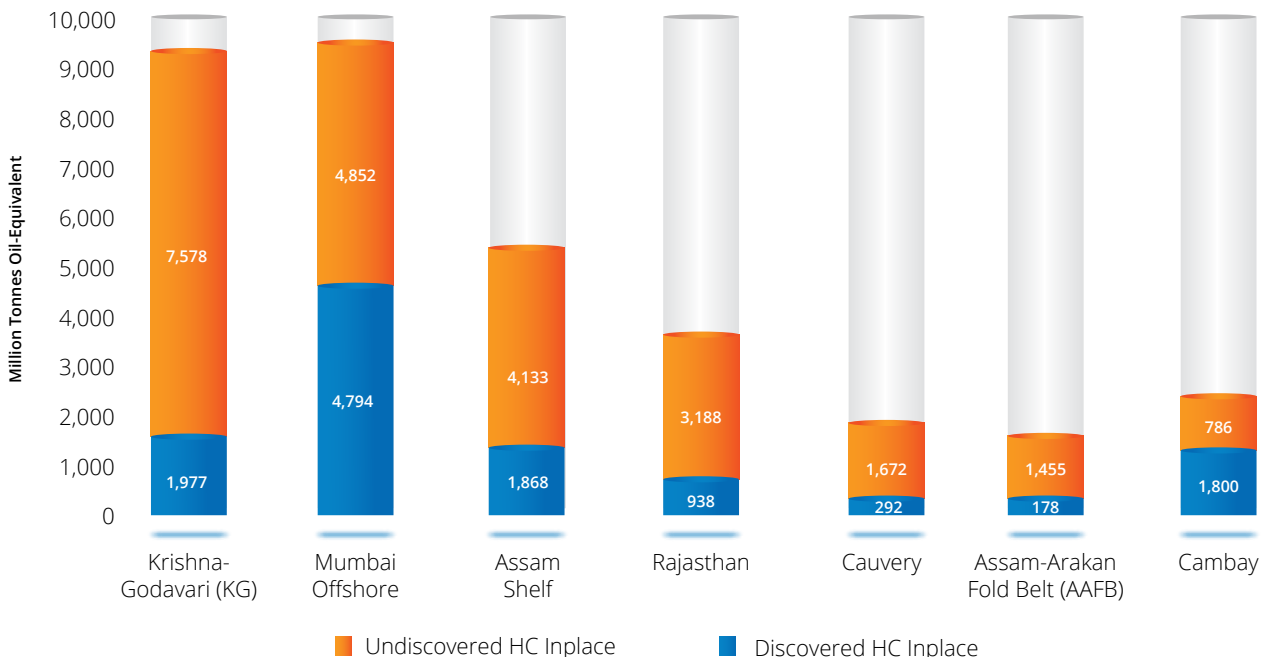
**MMtoe: Million Metric Tonne of Oil and Oil-equivalent of gas, multiplied by 7.33*

#Unrisked conventional

The foregoing table of conventional hydrocarbon resources for 26 sedimentary basins has the following findings summarized:

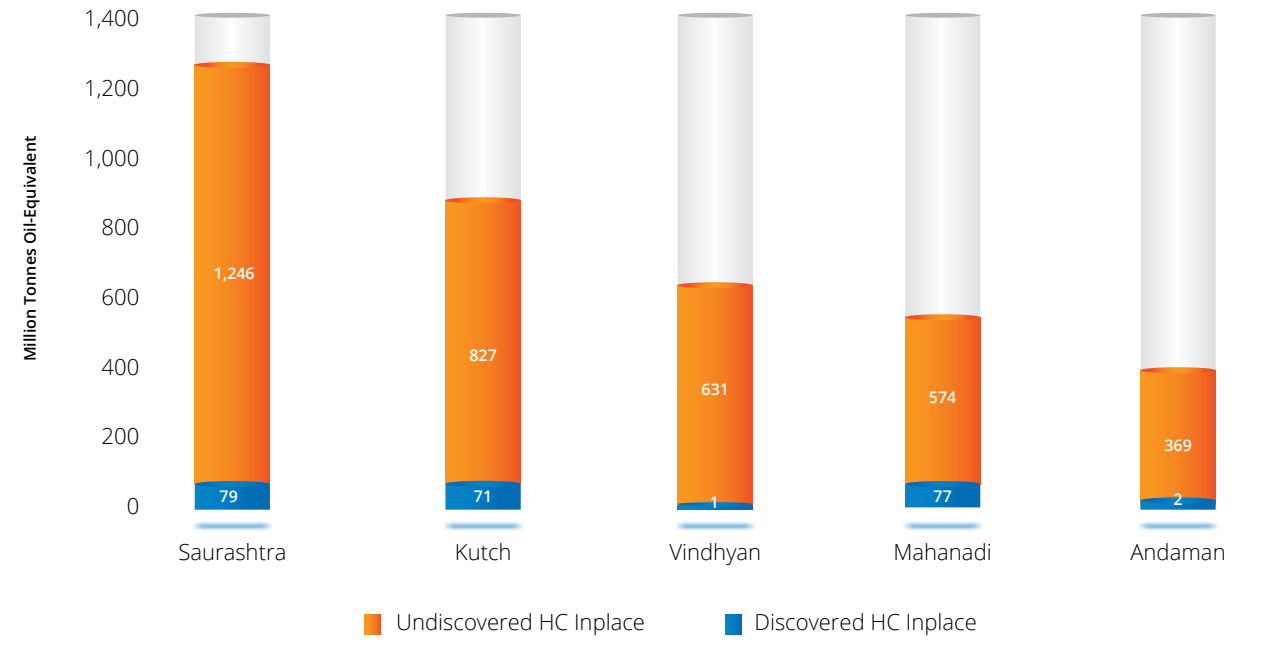
- 7 sedimentary basins, which are commercially producing conventional hydrocarbons, namely Krishna-Godavari, Mumbai offshore, Assam Shelf, Rajasthan, Cauvery, Assam-Arakan Fold-belt and Cambay account for 35,511 MMtoe, 85% of total hydrocarbon in place.

Fig 4.1: Conventional Hydrocarbons Assessment Result-2017 (Category-I)



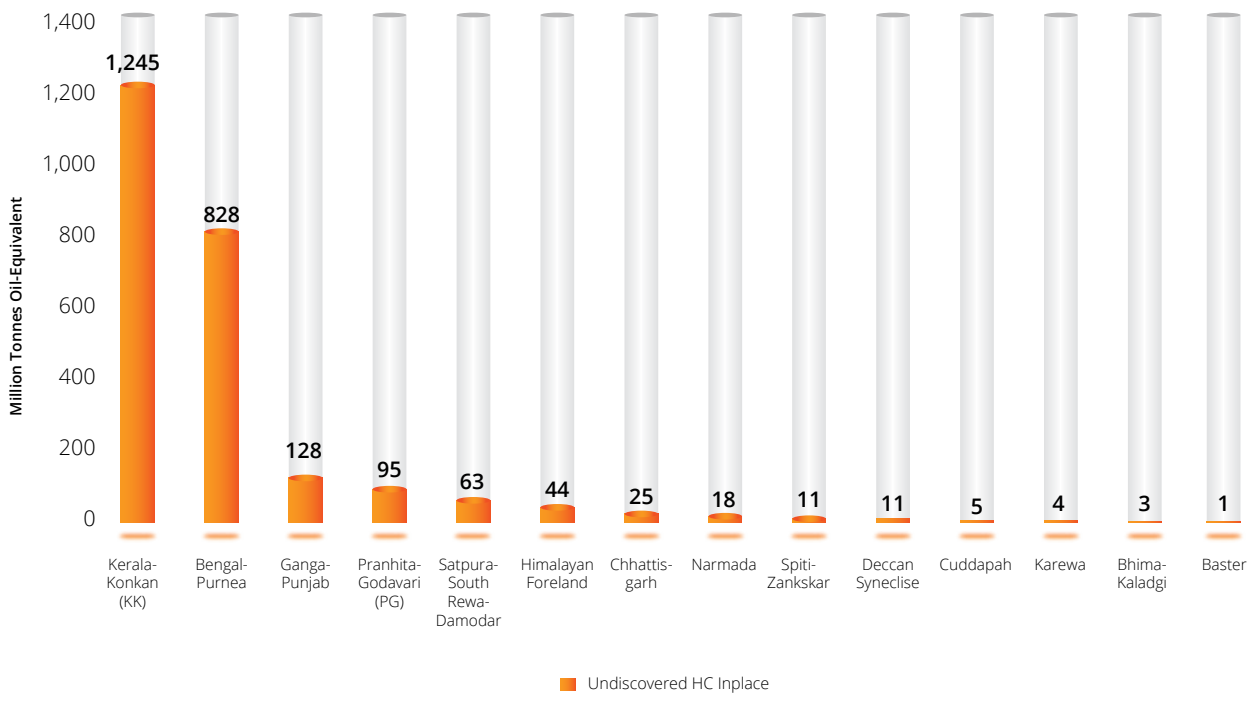
- 5 basins, which have discoveries but yet to produce commercially, namely Saurashtra, Kutch, Vindhyan, Mahanadi and Andaman account for 3,877 MMtoe, 9% of total hydrocarbon in place.

Fig 4.2: Conventional Hydrocarbons Assessment Result-2017 (Category-II)

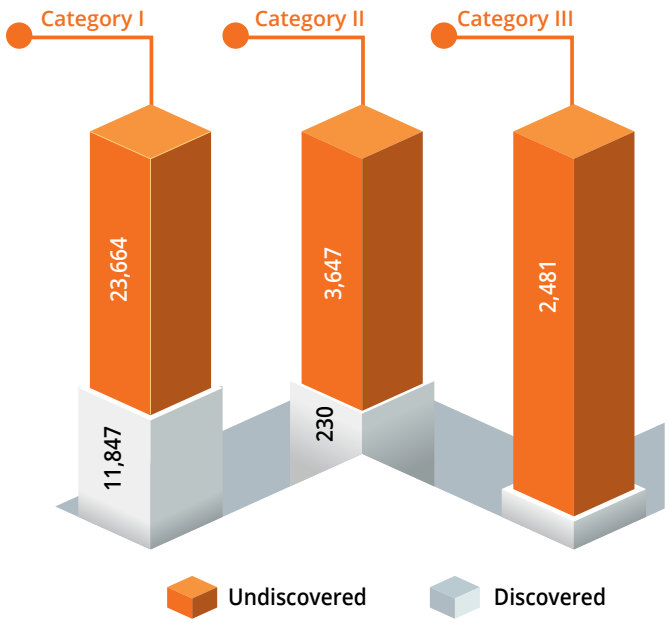


- The remaining 14 basins namely Kerala-Konkan, Ganga-Punjab, Pranhita-Godavari, Satpura-South Rewa-Damodar, Himalayan Foreland, Bengal Purnea, Chhattisgarh, Narmada, Spiti-Zanskar, Deccan Syneclise, Cuddapah, karewa, Bhima-Kaladgi, Bastar account for 2,481 MMtoe, 6% of total hydrocarbon inplace.

Fig 4.3: Conventional Hydrocarbons Assessment Results-2017 (Category-III)



- Out of total hydrocarbon in place (assessed by Re assessment study), 12,076 MMtoe (29%) has been established through discoveries. The commercially producing basins have a share of 11,847 MMtoe (98%) shown in figure below.



- Significant upsides are seen in basins such as Krishna-Godavari, Mumbai Offshore, Assam Shelf, Assam-Arakan Fold Belt, Cauvery, Rajasthan, Saurashtra and Kerala Konkan. On the basis of new discoveries reported, the basins like Vindhyan and Saurashtra have been upgraded to Category II. For Bengal-Purnea Basin, in wake of recent discovery in its onland part and moreover, reallocation of some of the offshore gas discoveries in erstwhile NEC area where Bengal offshore area was included with Mahanadi offshore, the basin has been lined up for necessary upgrade to Category II.

4.1.2 Sedimentary Basins in India*

Category I Basins

1. Assam Shelf and Assam-Arakan Fold Belt (AAFB)

Assam Shelf and Assam-Arakan Fold Belt Basins are part of genetically similar tectonics of basin evolution and both are producing basins.

Assam Shelf Basin is spread along the Brahmaputra River from Dhubri in the southwest to Dibrugarh in northeast with marginal ingress into Arunachal Pradesh with an area is 56,000 sq. km. The total unrisked conventional hydrocarbon inplace stands at 6,001 MMtoe, out of which 1,868 MMtoe is discovered.

Category based on Conventional Hydrocarbon resources

Assam- Arakan Fold Belt (AAFB) Basin covers the southern districts of Assam and the states of Tripura, Mizoram, Manipur and Nagaland and has an area of 80,825 sq. km. The total unrisked conventional hydrocarbon inplace stands at 1,633 MMtoe, out of which 178 MMtoe is established through discoveries.

The Assam Shelf Basin is comparatively more widely explored than AAFB Basin which is part of a complex geology accentuated by difficult logistics.

Oil and gas are established from clastic reservoirs of Tertiary plays including fractured basement reservoirs.

Fig 4.4: Play-wise Conventional Hydrocarbon Inplace (MMtoe)

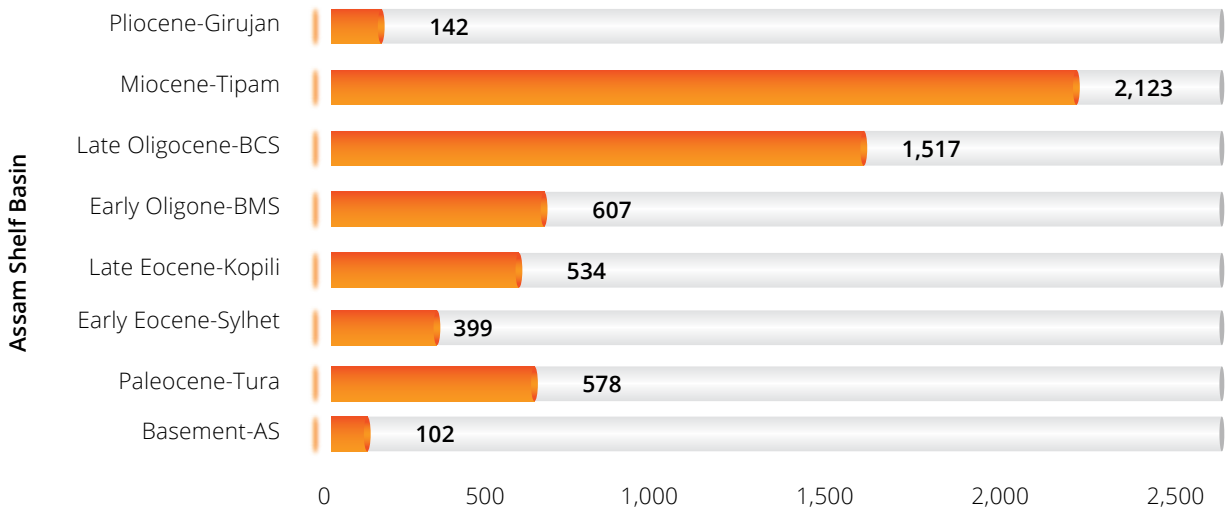
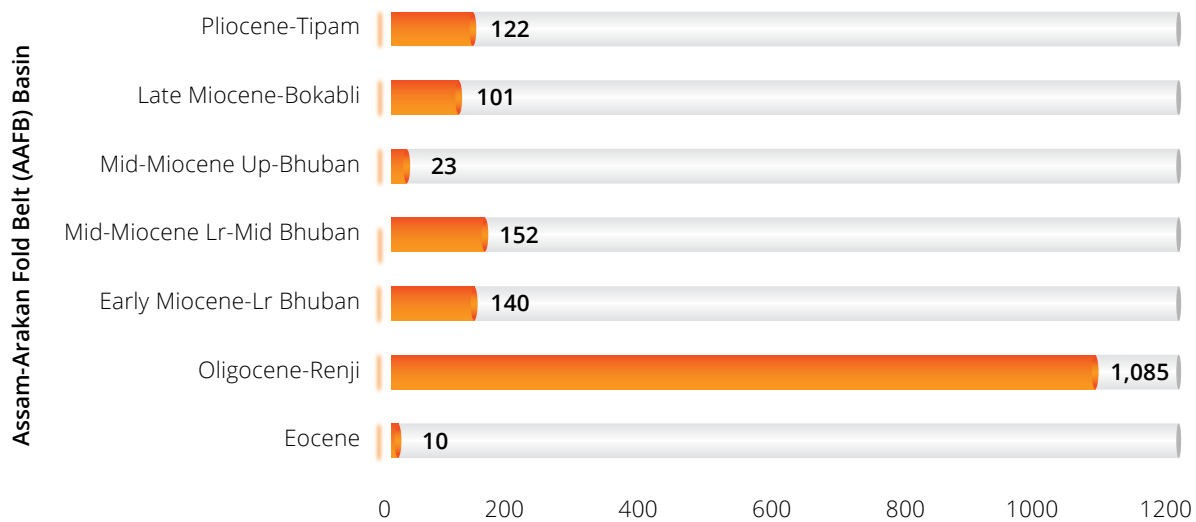


Fig 4.5: Play-wise Conventional Hydrocarbon Inplace (MMtoe)



As on 31st March 2020, Area under PEL~ 18% | Area under PML ~8% | 74% Area is open under HELP/ OALP

Average crude oil production ~11.37 tons per day (TPD)/ 4.15(MMT) Average rate of gas production is ~12.76 MMSCMD/4.66BCM

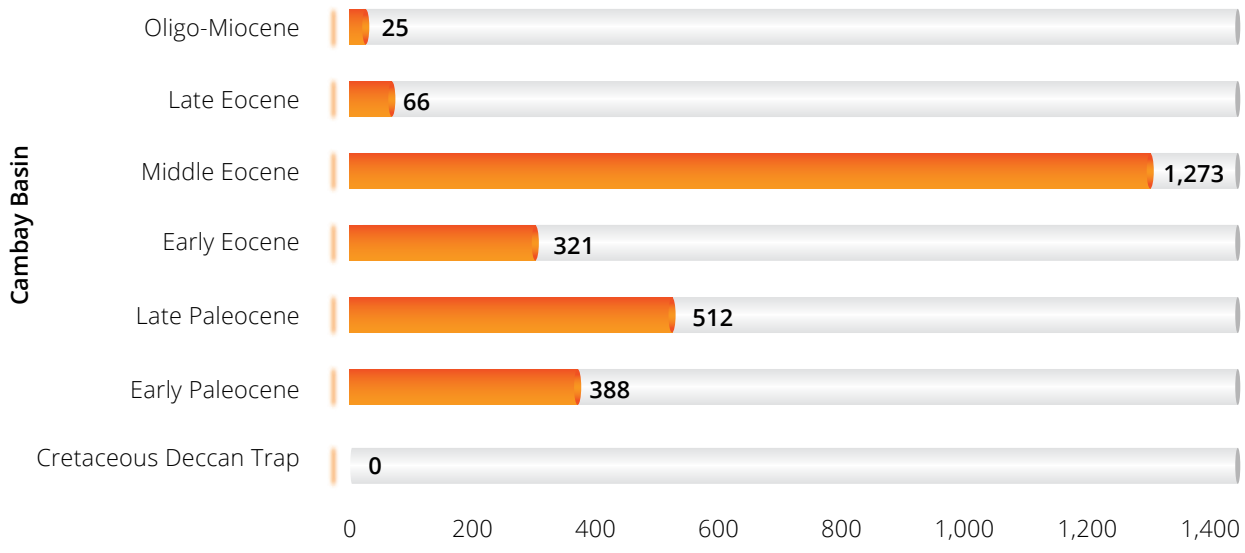
2. Cambay Basin

The Cambay Basin is an intra-cratonic Basin covering an area of 53,500 sq. km. and encompasses a narrow and elongated rift graben tectonic framework. The total unrisked conventional hydrocarbon inplace of the Basin is 2,586 MMtoe which is mostly established with 786 MMtoe remaining undiscovered.

In the north, the Basin narrows, but tectonically it is continued further north and merged beyond Sanchor into the Barmer Basin of Rajasthan. On the southern side, the Basin extends beyond Surat into shallow water (4,618 sq. km) and merges with the Mumbai Offshore Basin in the Arabian Sea. The first show of oil was seen in September 1958 from exploratory well at Lunej of Anand district. This oil discovery debunked the myth that there was no viable oil source in India, apart from some small ones in Assam.

The evolution of Cambay Basin from the petroleum point of view is well understood and hydrocarbon accumulations are known in all sequences ranging from Paleocene to Miocene, including technical basement of Cretaceous-Paleocene age.

Fig 4.6: Play-wise Conventional Hydrocarbon Inplace (MMtoe)



Major accumulations are known in Middle Eocene structural traps. There are several petroleum systems in this Basin; the most important one being the Cambay-Hazad Petroleum System.

Currently exploration of the Cambay Basin is in the matured stage and bears a good chance of probing and discovering subtle traps.

As on 31st March 2020, Area under PEL~24%| Area under PML ~14 % | 62% Area is open under HELP/ OALP

Average crude oil production~14.5 tons per day (TPD) /5.3 MMT, Average rate of gas production is around ~4.05 MMSCMD/1.48 BCM

3. Mumbai Offshore Basin

The Mumbai Offshore Basin is the most prolific hydrocarbon bearing province in India. Mumbai High field is approximately 160 km west of the Mumbai coast and was discovered in 1974 by the joint team of Russia and India from seismic exploration vessel, 'Academic Arkhangelsky', while mapping the Gulf of Cambay between 1964 and 1967. The discovery of Bombay (Mumbai as now named) High with subsequent other discoveries of oil and gas fields in western offshore changed the oil scenario of India. It is spread over the area of 212,000 sq.km.

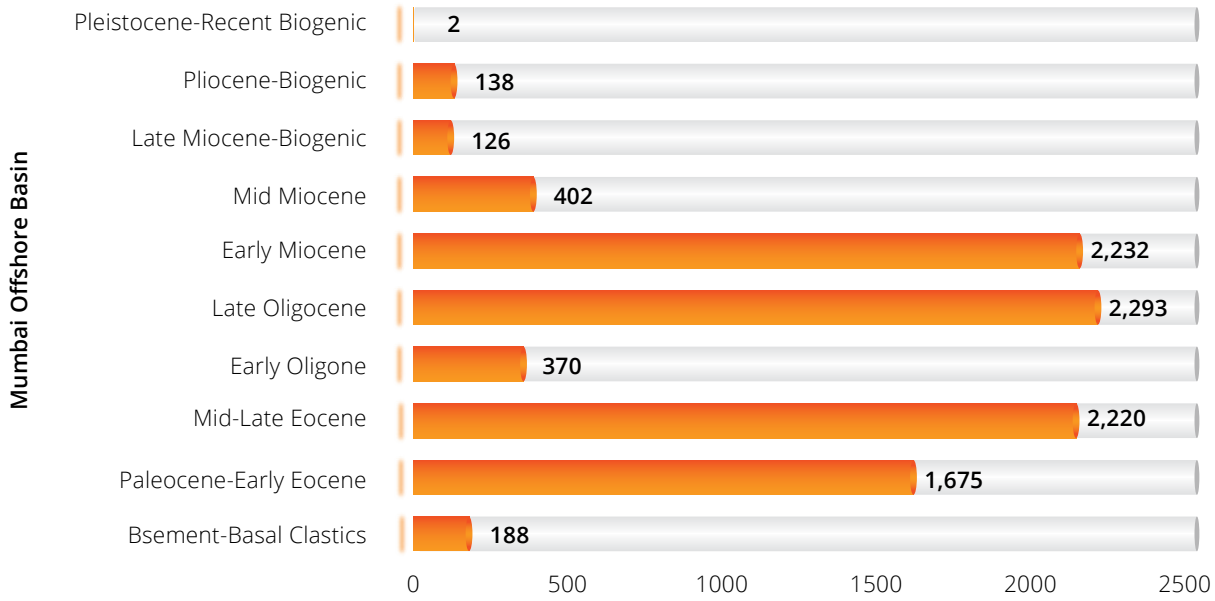
Bounded by Diu and Narmada faults with Deccan Trap outcrops to its north and east, the pericratonic Mumbai Offshore Basin extends towards west parallel to the western continental margin of India up to the Western Margin Basement Arch. NE-SW trending Vengurla Arch separates the Basin from the Kerala-Konkan Basin to its south.

Based on structural elements and the nature of sediment fills, having influenced the hydrocarbon generation and entrapment patterns in different sectors, the Basin is subdivided into a number of blocks, viz. Tapti-Daman block, Diu block, Heera-Panna-Bassein block, Mumbai High Deep Continental Shelf (DCS) block, Shelf Margin block and the Ratnagiri block.

Different oil and gas reservoirs (both carbonate and clastic) from shallower to deeper namely, L-I; L-II; L-III; L-IV; L-V; basal clastics and fractured basement are encountered. L-II and L-III are primarily the limestone oil reservoirs of Miocene age, further classified into several layers.

Continued and sustained exploratory and development efforts in Mumbai Offshore Basin since last four decades have shown remarkable results and led to conversion of nearly 50% of the unrisked conventional resource of 9,646MMTOE into discovered volume of hydrocarbons.

Fig 4.7: Play-wise Conventional Hydrocarbon Inplace (MMtoe)



As on 31st March 2020, Area under PEL ~10%| Area under PML ~16% | 74% Area is open under HELP/OALP

Average crude oil production ~40.68 tons per day (TPD)/14.85 MMT Average rate of gas production is ~51.18 MMSCMD/18.68 BCM

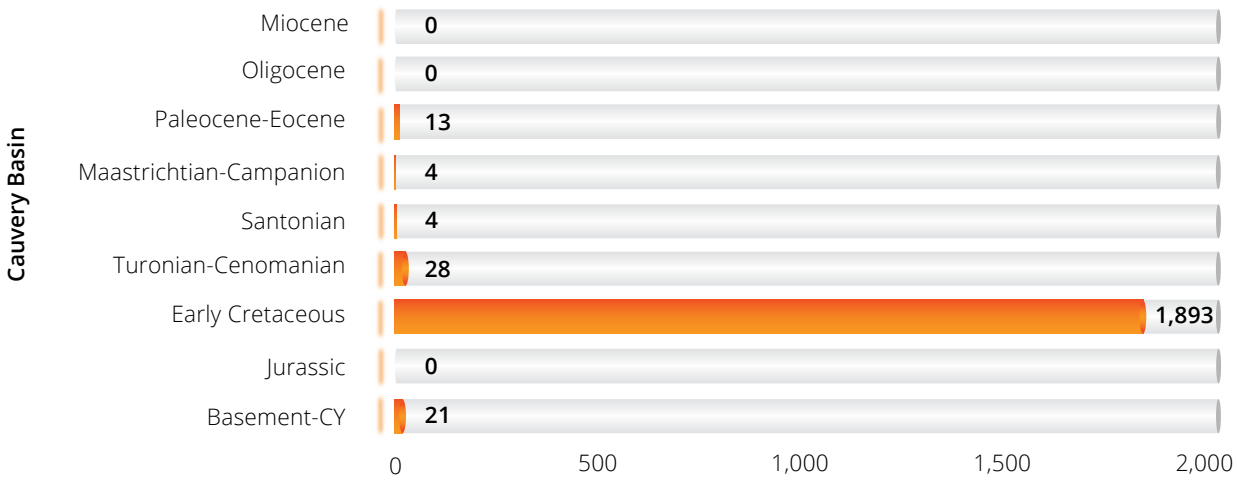
4. Cauvery Basin

Cauvery Basin is a peri-cratonic Basin, evolved through rifting of India from Sri Lanka during the break-up of Eastern Gondwana land (Katz, 1978) during Late Jurassic-Early Cretaceous and subsequent drifting (Late Aptian) of Indian plate from Gondwana land along NE-SW oriented Eastern Ghat trend. The rifting has created several horsts and grabens. The present-day horst and graben picture of Mesozoic-Cenozoic stratigraphic column have been related to two principal tectonic episodes namely, extension stage during Late Jurassic–Early Cretaceous and thermal subsidence stage during Late Cretaceous to Cenozoic. Cauvery Basin has been divided into sub-basinal areas, namely Ariyalur-Pondicherry, Tranquebar, Nagapattinam, Tanjore, and Ramnad-Palk Bay and basement ridges of Kumbakonam-Madanam, Pattukottai-Mannargudi and Mandapam-Delft.

Exploratory drilling in Madanam and Pandanallur areas established the commercial hydrocarbons from basement play in Cauvery Basin. The other important plays in Cauvery are Andimadam, Bhuvanagiri play, Nannilam and Kamalapuram play.

Discovery from syn-rift sequence gave a major impetus to synrift play exploration. Recent discoveries reported in Cauvery shallow water, deep waters and from Srilanka /Gulf of Mannar Basins have rekindled the exploration interest in the Cauvery Offshore. The basin area of 240,000 sq. km. is the largest in the Category I basins in India, with un-risked conventional petroleum inplace of 1,964 MMTOE, most of it (1,893 MMTOE) belonging to Early Cretaceous plays with 85% of basin's total inplace in the undiscovered category. Expert's reviews suggest continued exploration of basement plays.

Fig 4.8: Play-wise Conventional Hydrocarbon Inplace (MMtoe)



As on 31st March 2020, Area under PEL~2%|Area under PML ~1.49% | 96.5% Area is open under HELP/OALP

Average crude oil production ~1.16 tons per day (TPD)/0.42 (MMT) Average rate of gas production is around ~3.12 MMSCMD /1.14 BCM

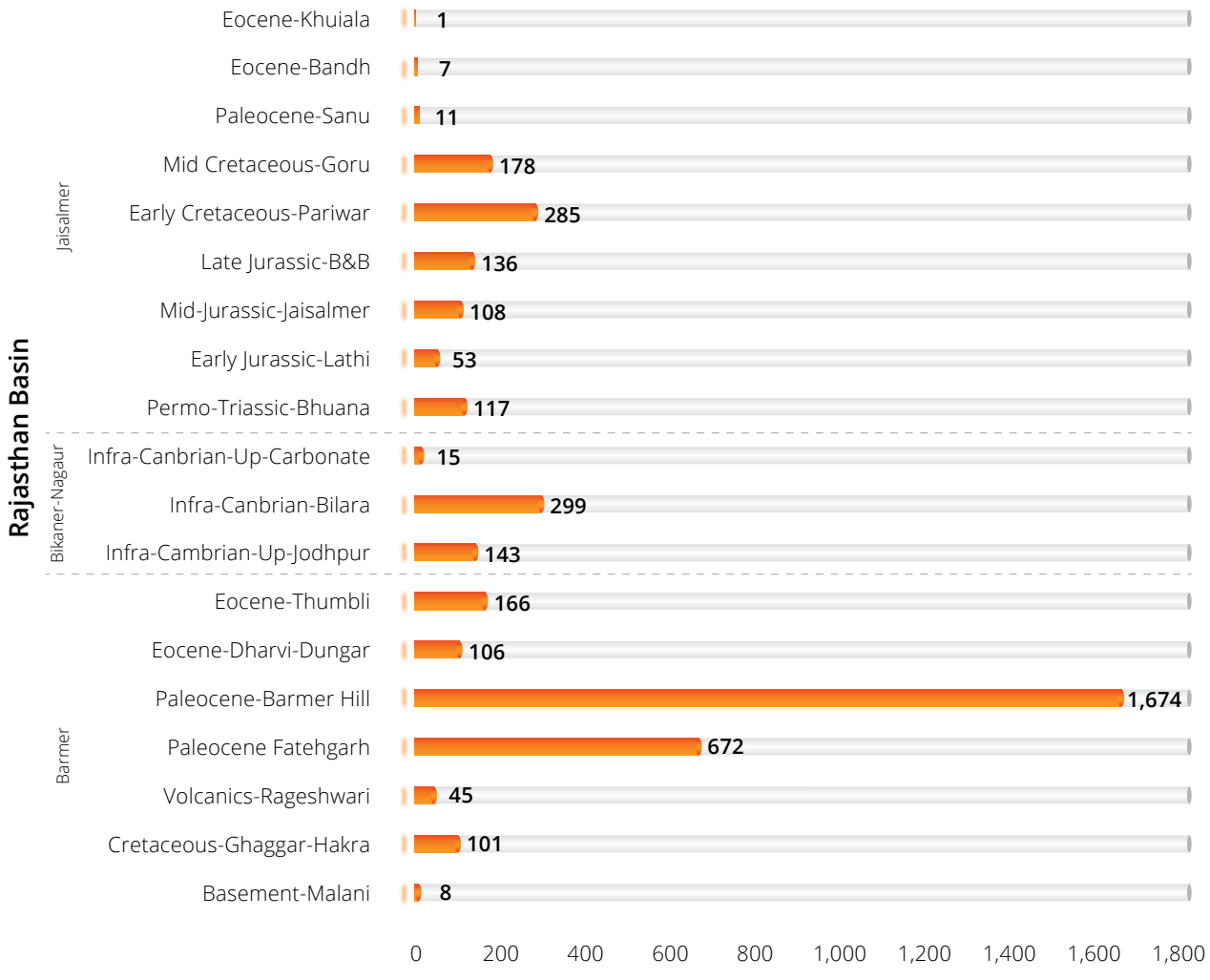
5. Rajasthan Basin:

The Basin is spread over 126,000 sq. km. area between Aravalli Mountains in the east and Pakistan in the west. It is divided into three sub-basins namely (i) Jaisalmer sub-basin on the north western slope of the Jaisalmer-Mari basement arch, (ii) Bikaner-Nagaur sub-basin on the northeast flank of the arch and (iii) Barmer sub-basin toward south of the arch and northern extension of Cambay Basin. String of discoveries of oil and gas had led to a deeper and wider perception of hydrocarbon potential of the Basin.

Barmer sub-basin comprises the sedimentary sequence ranging in age from Mesozoic to Cenozoic. High quality reservoirs are encountered in the Upper Cretaceous- Paleocene, syn rift deposits. Number of oil and gas discoveries like Saraswati, Rageshwari, Kameshwari, Mangala, Aishwarya, Shakti, Bhagyam are some of the significant fields in Barmer sub-basin. In Jaisalmer sub-basin, Pariwar Formation of Early Cretaceous is producing gas commercially while Bikaner-Nagaur has established oil in Pre-Cambrian sequence.

Rajasthan basin has total unrisked conventional petroleum inplace of 4,126 MMtoe, of which nearly 77% is undiscovered. As per expert's review, the Basin has potential in Permo-Triassic and Jurassic plays in Jaisalmer part and Cretaceous Ghaggar-Hakra plays in Barmer area.

Fig 4.9: Play-wise Conventional Hydrocarbon Inplace (MMtoe)



As on 31st March 2020, Area under PEL~9% | Area under PML ~4% | 89% Area is open under HELP/ OALP

Average crude oil production ~17.94 tons per day (TPD)/6.55 (MMT) Average rate of gas production is ~5.15 MMSCMD/1.88 BCM

6. Krishna Godavari (KG) Basin

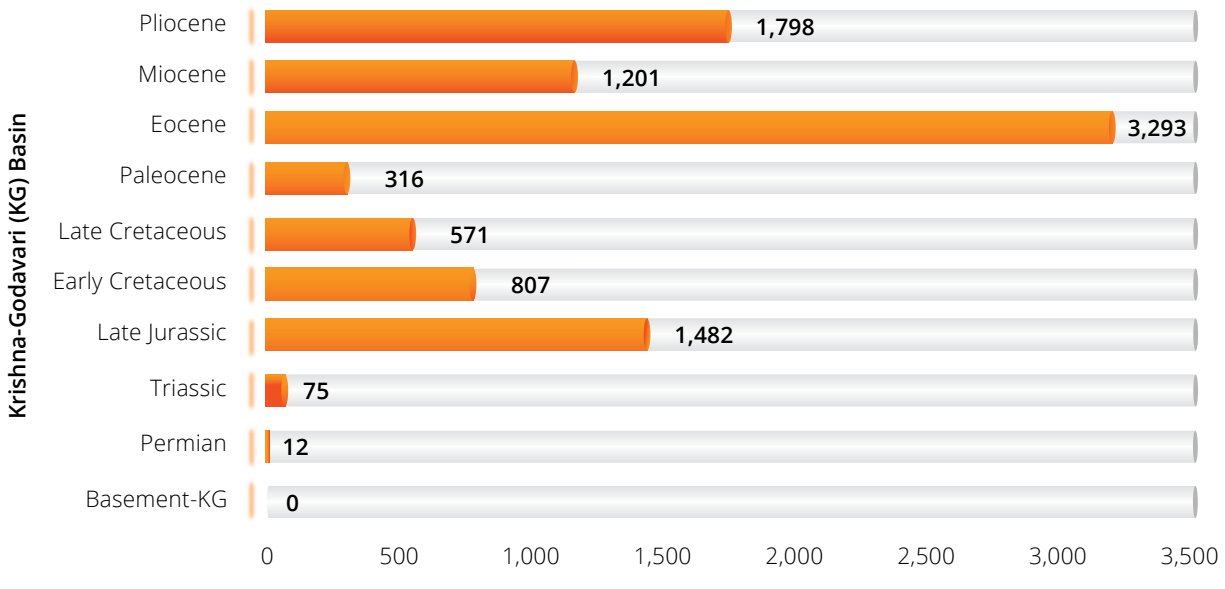
Krishna-Godavari Basin (KG), located in the east coast and spreading over an area of 230,000 sq. km. constitutes sedimentary sequences ranging in age from Early Permian through Cenozoic. The Basin has an area of 31,456 sq km lying onland, 25,649 sq. km. in shallow water up to 400 m water depth and significant area of 172,895 sq km in deepwater, limited to EEZ (Exclusive Economic Zone). The total un-risked conventional petroleum inplace of the Basin is 9,555 MMtoe, out of which 7,578 MMtoe (79% of basin's total petroleum inplace) undiscovered and this is the largest undiscovered potential among all sedimentary basins in India.

The prospective area for oil and gas exploration in onland covers three coastal districts of East Godavari, West Godavari and Krishna and in offshore till 85o east ridge. Efforts by both NOC's and private oil companies have unlocked huge hydrocarbon reserves in the basin. The major plays established in KG Basin are Mandapeta (Permo-Triassic), Syn-Rift Gollapalli/ Nandigama/ Kanukollu (Late Jurassic to Lower Cretaceous), Raghavapuram (Early-Late Cretaceous), Pasarlapudi/Vadaparru (Late Palaeocene to Eocene), Matsyapuri/Ravva (Oligocene to Miocene) and Godavari (Pliocene). Both biogenic and thermogenic petroleum systems are present in the Basin.

The Basin has distinction of reporting maximum number of discoveries in the last decade. As such, this Basin has shown high potential of hydrocarbon, particularly in deep waters off the Godavari river mouth, essentially from Mio-Pliocene and Pleistocene Formations. Similarly, recent discoveries of gas from Eocene–Pliocene Formations from shallow waters encouraged offshore exploration.

In KG deep waters mainly slope-channel-levee-complex, debris flows, low stand wedge and basin floor fan complexes remain major targets. In shallow water growth-fault related structures, channel fills combination traps, upper slope fans remain as attractive. In onland, the deeper syn-rift plays remain as major plays. As per expert's review, the Basin has excellent subsurface database and exploration should focus on syn-rift and Eocene plays.

Fig 4.10: Play-wise Conventional Hydrocarbon Inplace (MMtoe)



As on 31st March 2020, Area under PEL ~5% | Area under PML ~5% | 90% Area is open under HELP/ OALP

Average crude oil production ~2.19 tons per day (TPD) / 0.8 (MMT) Average rate of gas production is around ~7.37 MMSCMD/2.69 BCM

Category II Basins

Category II has five basins namely Saurashtra, Kutch, Mahanadi, Vindhyan and Andaman where there are established resources to be put on commercial production. With recent spurt in activities in Saurashtra and Kutch area, field development plans were approved for commercial production of gas from Tertiary and Mesozoic reservoirs. Similarly, there were discovered small fields contemplated for production from Tertiary sediments in Mahanadi offshore. In Vindhyan, recent discovery in Proterozoic sediments is currently under active appraisal ahead of firm development planning. In Andaman, new area is now identified for extensive exploration for maturing leads from earlier discovery. These Category II basins have cumulative unrisked conventional inplace of 3,877 MMtoe, out of which 230 MMtoe is established through discoveries.

Category III Basins

Category III basins has 14 basins with cumulative undiscovered risked conventional inplace of 2,481 MMtoe. Out of these basins, Bengal-Purnea Basin has made both oil and a gas discovery in Bengal onland part and consequently, the basin is poised for upgrade to Category II. The remaining 13 basins have no potential discovery made till date. However, there were evidences of hydrocarbon leads in some of the basins like Kerala-Konkan, Himalayan Foreland, Ganga-Punjab and Pranhita-Godavari basin. The fact that these basins have mostly scanty-to-no seismic/ well data, the recent assessment of conventional hydrocarbons was carried out on analogue studies using simplistic aerial yield approach.

4.2 National Seismic Programme (NSP)

Quality geophysical data of acquisition, processing & interpretation (API) is one of the most important aspects in considering a field to be technologically & commercially viable. It assists in giving the initial insight into the prospectivity assessment and also assist in inducing confidence in drilling plans which is a capital-intensive project. In order to assist the operators in making sound decision regarding bidding for the new contractual regime of revenue sharing contract appraisal of unapprised areas was considered an important task which led to the introduction of NSP.

To achieve this, MoP&NG formulated a plan to conduct 2D seismic surveys within timeframe of five years at an estimated cost of INR 2932.99 Crores in all sedimentary basins of India where no/scanty data is available. Directorate General of Hydrocarbons (DGH) identified the need of about 48,243 Line kiloMeter (LKM) 2D seismic data for appraisal of these areas. The project was introduced under the broad policy framework of Geo-Scientific Data Generation for Hydrocarbons in Indian Sedimentary Basins to appraise the un- appraised onland areas in 26 sedimentary basins and was notified on 20th May 2014.

For hiring services of 2D seismic API through international competitive bidding process, the entire unappraised areas are classified into various sectors (11 Sectors by ONGC and 6 Sectors by OIL respectively) for operational convenience by both the implementing agencies.

ONGC has commenced data acquisition work in ten sectors whereas in remaining one sector (Sector-4: Andaman), mobilization of crew is in progress. OIL has commenced data acquisition work in five sectors except Nagaland. Processing & Interpretation of acquired data is also in progress.

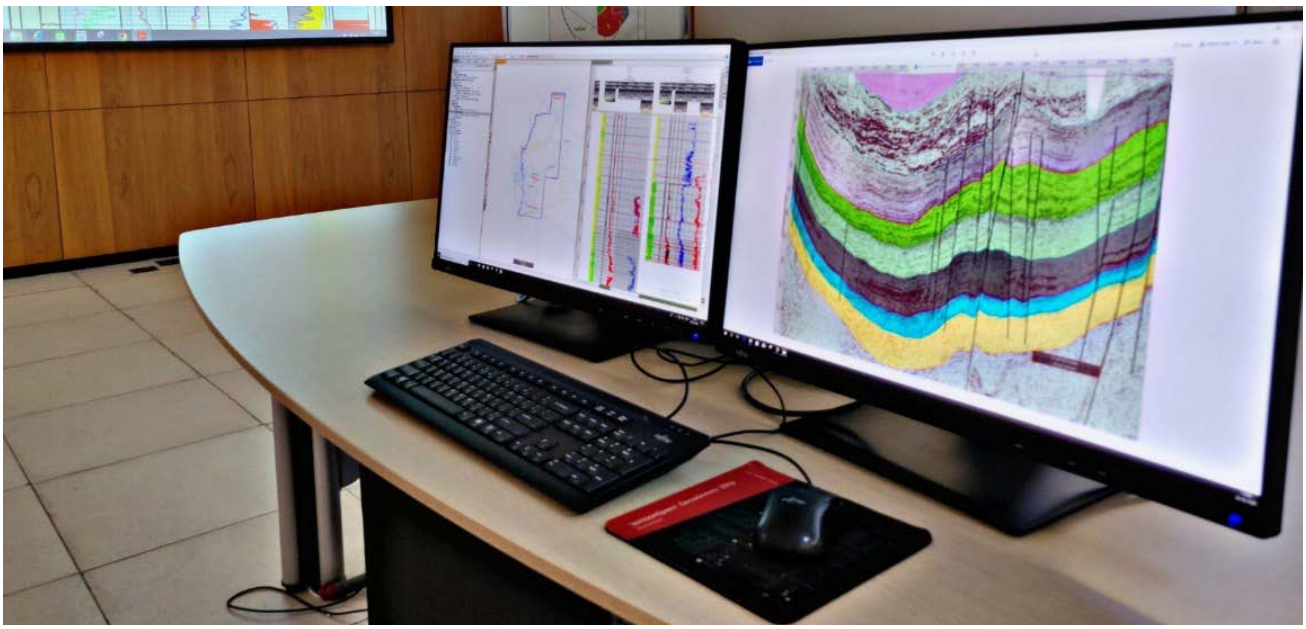
The project is being implemented through National Oil Companies (NOCs) OIL and ONGC through service providers in north- eastern states and rest of India respectively. **OIL has been assigned to carry out 2D seismic API of 6,032 LKM falling in North eastern part of India covering states of Assam, Arunachal Pradesh, Nagaland, Manipur, Tripura and Mizoram and ONGC has been assigned to carry out 2D seismic API of approx. 42,211 LKM seismic data in onland part of 22 sedimentary basins of India.** Two more states are added making it total of 26 states, out of which all state governments in-principal approval taken and forest permissions from 23 states have been obtained. **As on 31st March 2020, approx. 45,244.1 LKM (cumulative) of data has been acquired, ~ 93% of total target of 48,243 LKM under NSP programme.**

Table 4.2: Sector wise progress (Seismic Data Acquisition) (As on 31-03-2020)*

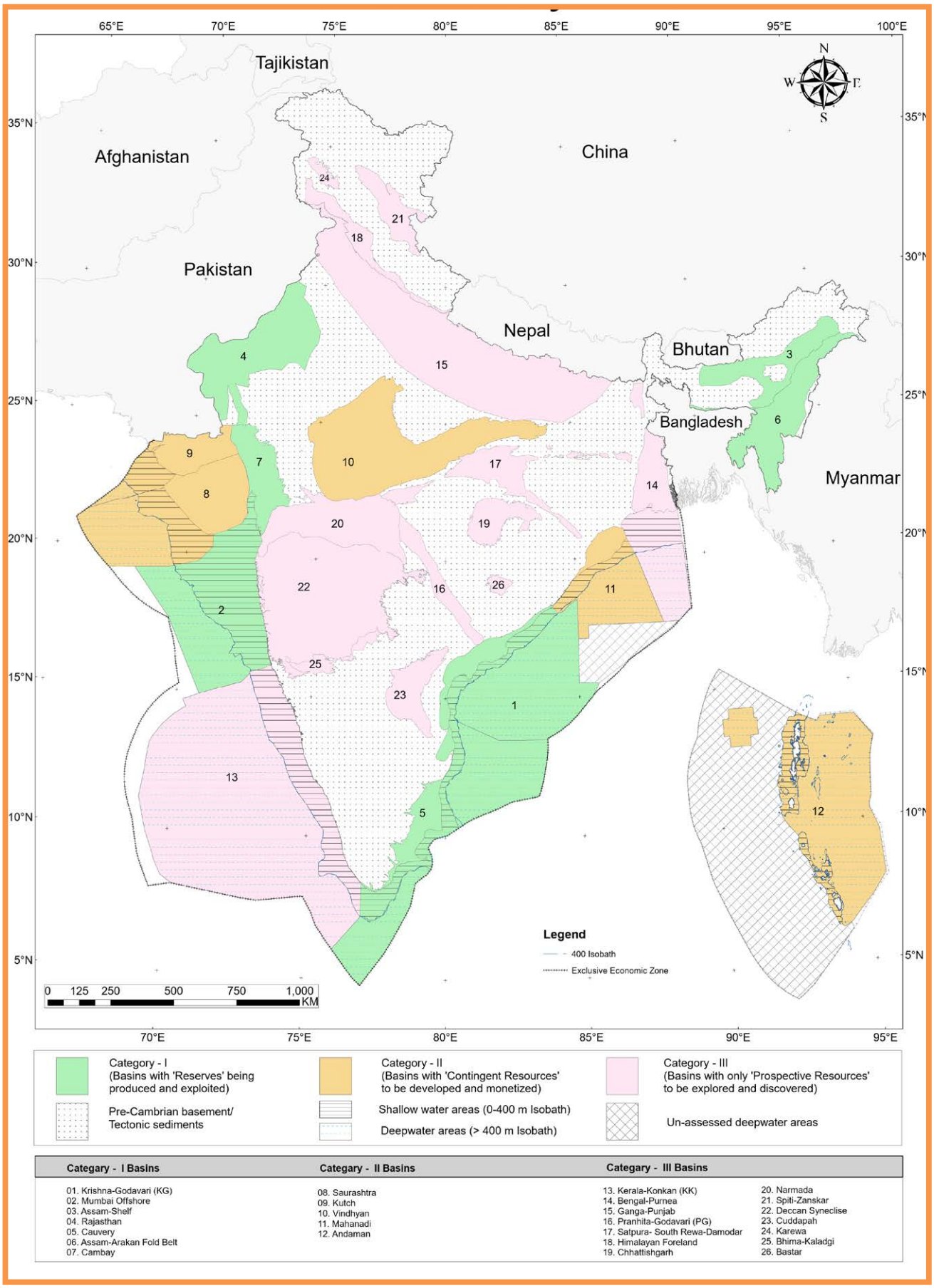
Sector	Area	Area Name	Revised Target (In LKM)	Coverage in FY 2016-17 (LKM)	Coverage in FY 2017-18 (LKM)	Coverage in FY 2018-19 (LKM)	Coverage coverage in FY 2019-20 (LKM)	Cumulative coverage since inception (LKM)
ONGC								
1	1	Cambay	1,487	658.2	1,214.22	895	737.72	3,505.14
	2	Saurashta	2,280					
2	1	Kutch	1,760	830.28	1,782.54	661.74	981.61	4,256.17
	2	Rajasthan	2,793					
3	1	KG	1,065	-	901.86	1,335.96	740.62	2,978.44
	2	PG	877					
	3	Cauvery	850					
	4	Cudappah	308					
4	1	Andaman	255	-	-	-	77.76	77.76
5	1	Bengal	358	1,072.86	12,53.22	850.5	384.12	3,560.7
	2	Mahanadi	3,029					
6	1	Ganga	2,642	-	886.5	1,781.04	3.96	2,671.5
6A	2	Ganga-Punjab	1,200	-	-	320.28	865.86	1,186.14
7	1	DSN	5,318	1,119.3	2143.32	1,856.76	407.45	5,,526.83
8	1	DSS	4,833	444.66	2,341.5	2,386.02	748	5,920.18
	2	Bhima	663					
	3	Kaladgi	310					
9	1	Vindhyan-A	4,413	797.4	2,546.16	1,731.78	1,570.74	6,646.08
	2	Narmada	1,844					
	3	Satpura	245					

Sector	Area	Area Name	Revised Target (In LKM)	Coverage in FY 2016-17 (LKM)	Coverage in FY 2017-18 (LKM)	Coverage in FY 2018-19 (LKM)	Coverage coverage in FY 2019-20 (LKM)	Cumulative coverage since inception (LKM)
10	1	Vindhyan-B	774	-	1,292.1	1,087.08	561.2	2,940.38
	2	SRD	1,595					
	3	Chhattisgarh	1,581					
	4	Bastar	161					
11	1	Himalayan Foreland	886	110.82	259.56	222.96	373.44	966.78
	2	Spiti-Zanskar	197					
	3	Karewa	107					
11A	4	HF(New)	380	-	-	5.16	365.52	370.68
Total (ONGC)			**42,211**	**5,033.52**	**14,620.98**	**13,134.28**	**7,818**	**40,606.78**
OIL								
Assam-Arunachal Pradesh (Area-1 Sector-I)			2,414	584.88	1,150.02	681.3	-	2,416.2
Arunachal Pradesh-Assam (Area-1 Sector-II)			738	4.08	94.62	405.24	239.76	743.7
Nagaland (Area-2 Sector–I)			-	Govt. of Nagaland denied permission for undertaking seismic survey in the state				
Manipur (Area-2 Sector – II)			870	-	4.74	-	-	4.74
(North Cachar Hills) Area-2 Sector - III			885	-	103.68	225.48	-	329.16
Mizoram-Tripura (Area-2 Sector – IV)			1,125	48.96	161.22	904.2	29.1	1,143.48
Total (OIL)			**6,032**	**637.92**	**1,514.28**	**2,216.22**	**268.86**	**4,637.28**
Grand Total (ONGC+OIL)			**48,243**	**5,671.44**	**16,135.26**	**15,350.5**	**8,086.86**	**45,244.06**

**The data acquisition LKM figures may change after reconciliation (receiving of invoices). In month of December 2018, an amount of 469.38 LKM (surface coverage) and further in month of December 2019 an amount of (-)108.38 LKM has been reconciled by ONGC on account of data gaps in respective areas.*



Indian Sedimentary Basins



Category - I Basins	Category - II Basins	Category - III Basins	
01. Krishna-Godavari (KG)	08. Saurashtra	13. Kerala-Konkan (KK)	20. Narmada
02. Mumbai Offshore	09. Kutch	14. Bengal-Purnea	21. Spiti-Zanskar
03. Assam-Shelf	10. Vindhyan	15. Ganga-Punjab	22. Deccan Syneclise
04. Rajasthan	11. Mahanadi	16. Pranhita-Godavari (PG)	23. Cuddapah
05. Cauvery	12. Andaman	17. Satpura- South Rewa-Damodar	24. Karewa
06. Assam-Arakan Fold Belt		18. Himalayan Foreland	25. Bhima-Kaladgi
07. Cambay		19. Chhattishgarh	26. Bastar

NSP Data loaded in NDR (As on 31.03.2020)

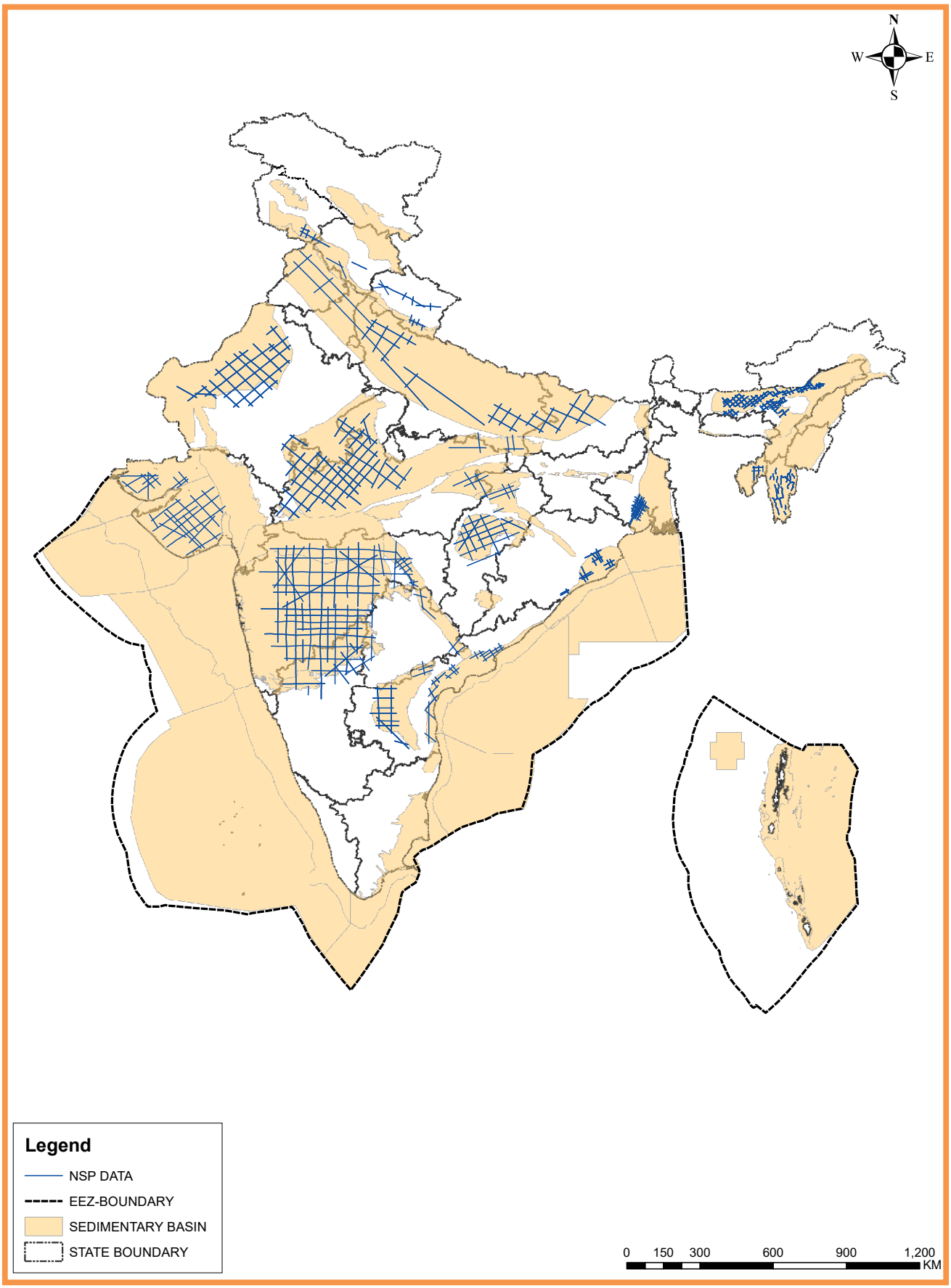
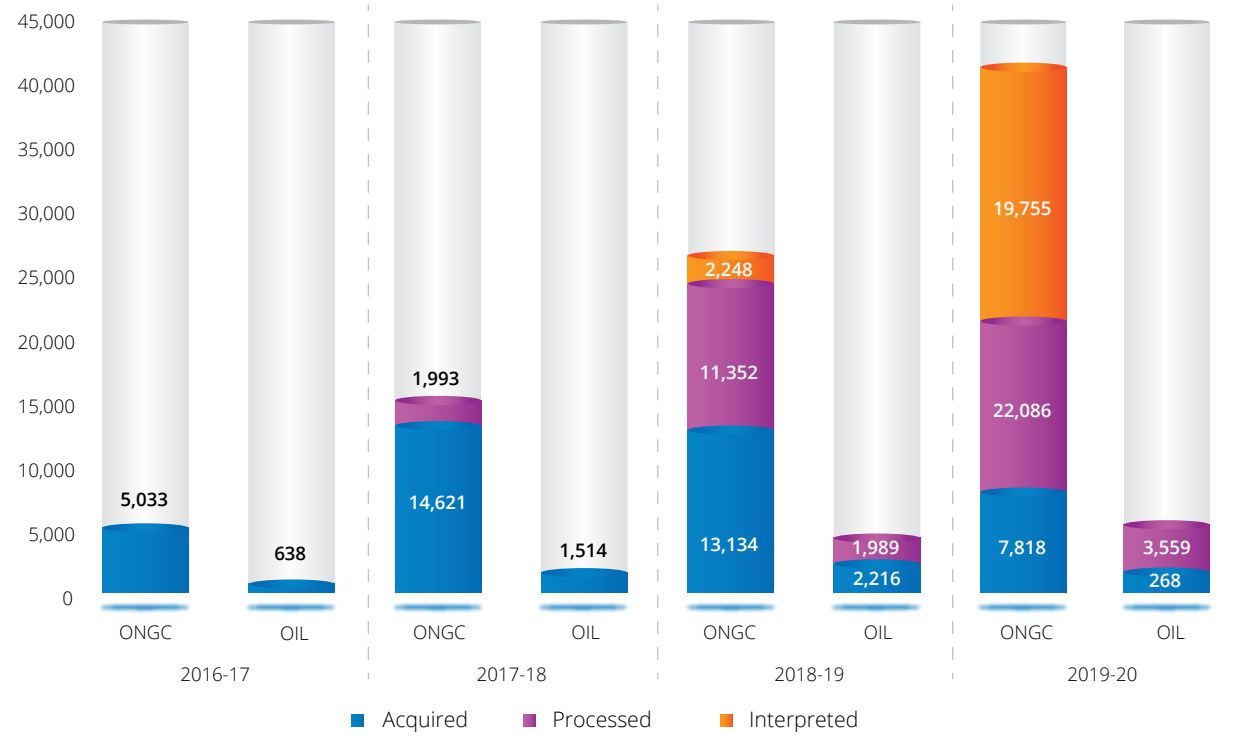


Table 4.3: Sector wise progress of Processing, Interpretation and Submission of data to NDR (As on 31-03-2020)

Sector	Area	Target (LKM)	Cumulative Field data acquired (LKM)	Cumulative Raw data submitted to NDR (LKM)	Cumulative Processed data submitted to NDR (LKM)	Cumulative Interpreted data submitted to NDR (LKM)
1	Cambay	1,487	3,505.14	901.12	502.76	-
	Saurashtra	2,280		2,306.12	2,230.64	-
2	Kutch	1,760	4,256.17	997.98	395.04	-
	Rajasthan	2,793		2,752.44	2,752.44	2,752.44
3	Krishna-Godavari	1,065	2978.44	980.80	980.80	980.8
	Pranhita-Godavari	877		651.30	554.40	-
	Cudappah	850		1,128.12	1,081.74	-
	Cauvery	308		-	-	-
4	Andaman	255	77.76	-	-	
5	Mahanadi-NEC	3,029	3,560.7	2,480.62	2,480.62	2,480.62
	Bengal	358		911.40	782.88	-
6	Ganga	2,642	3,857.64	2,671.50	2,671.50	2,671.5
6A	Ganga-Punjab	1,200		1,186.14	668.52	-
7	Deccan North	5,318	5,526.83	5,471.09	5,471.09	5,471.09
8	Deccan South	4,833	5,920.18	4,964.50	4,982.50	4,982.50
	Bhima	663		611.64	611.64	611.64
	Kaladgi	310		257.22	275.22	275.22
9	Vindhyan-A	4,413	6,646.08	4,904.46	4,812.07	-
	Narmada	1,844		1,476.90	660.54	-
	Satpura	245		-	-	-
10	Vindhyan-B	774	2,940.38	393.36	393.3	-
	South Rewa-Damodar	1,595		684.32	684.32	-
	Chhattisgarh	1,581		1,778.16	1,778.16	1,778.16
	Bastar	161		-	-	-
11	Himalayan Foreland	886	966.78	871.14	653.40	-
	Spiti-Zanskar	197		7.74	7.74	-
	Karewa	107		-	-	-
11A	Himalayan Foreland (New)	380	370.68	226.26	-	-
Total (ONGC)		**42,211**	**40,606.78**	**38,614.33**	**35,431.50**	**22,003.97**
A1S1	Assam-Arunachal	2,414	2,416.20	2,416.20	2,416.20	-
A1S2	Arunachal -Assam	738	743.70	597.60	-	-
A2S2	Manipur	870	4.74	-	-	-
A2S3	North Cachar Hills	885	329.16	329.16	-	-
A2S4	Mizoram-Tripura	1,125	1,143.48	1,143.48	1,143.48	-
Total (OIL)		**6,032**	**4,637.28**	**4,486.44**	**3,559.68**	**-**
GRAND TOTAL (ONC+OIL)		**48,243**	**45,244.06**	**43,100.77**	**38,991.18**	**22,003.97**

Fig 4.11: Year Wise trend of NSP data acquired, processed & interpreted

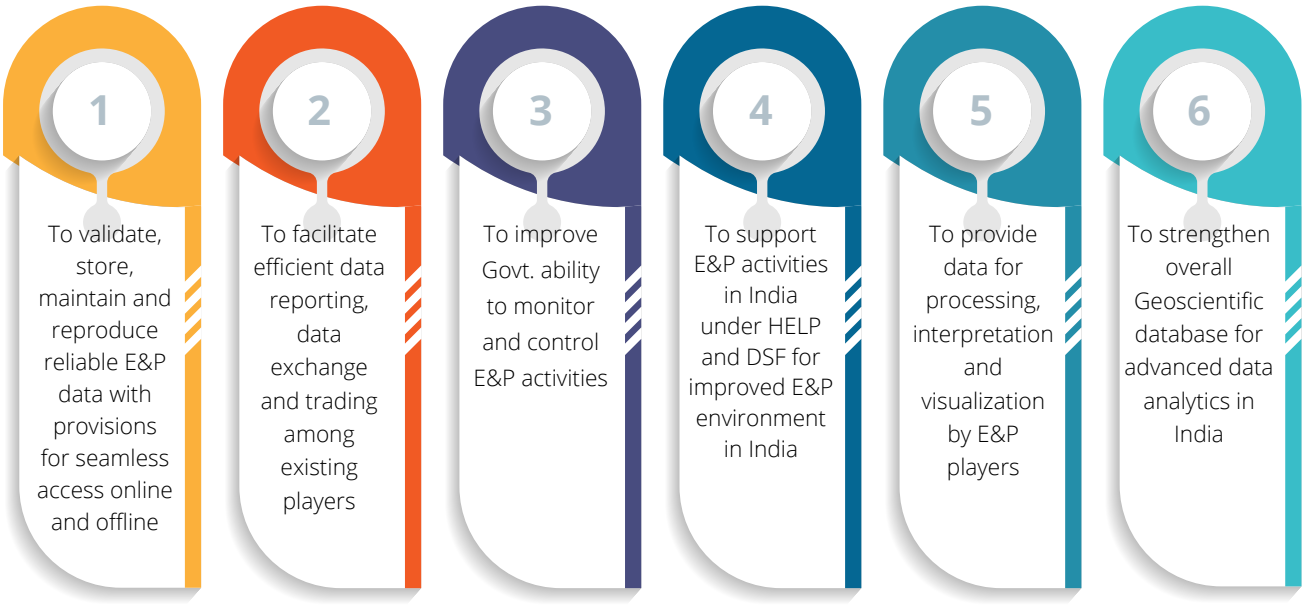


(data in LKM)

4.3 National Data Repository

A huge volume of data collected by Public & Private E&P companies and other agencies over more than six decades of activities was hitherto lying scattered at different work centres of ONGC, OIL and DGH or held by the operating companies. This necessitated an establishment of a system at national level that could assimilate, preserve and upkeep the vast amount of data that could be organized and regulated for use in future exploration & development, besides use by R&D and other educational Institutes. With this objective, Govt. of India by an order dated 28.02.2014 initiated the establishment of National Data Repository (NDR), which has been set up under the aegis of Directorate General of Hydrocarbons (DGH) in Noida. National Data Repository (NDR) is a government-sponsored project with state-of-the-art facilities and infrastructure to create E&P data bank for preservation, upkeep and dissemination of data to enable its systematic use for future exploration and development. It has been operational since 28th July 2017.

NDR being a national database is one stop solution for all the E&P data requirements. NDR is entrusted with the responsibility of Data Assimilation, Disclosure, Sharing, Accessibility & Dissemination for commercial exploitation, research & development through its policy. The broad objectives of NDR are as follows:



NDR is key enabler of Open Acreage Licensing Programme (OALP) & Discovered Small Fields (DSF) rounds under the Hydrocarbon Exploration and Licensing Policy (HELP) regime and it is for this reason, NDR was launched on 28th June 2017 alongwith OALP Round-I. The freedom of E&P operators to carve out blocks of their interest and size is facilitated by the E&P data provided by National Data Repository (NDR) under new OALP/HELP policy regime.

Objective of NDR

The main objective of setting-up NDR is to create a digital platform for reliable exploration and production data for India with provisions for seamless access and on-line data management. Specific goals are:

- To validate, store, maintain and reproduce high quality and reliable geoscientific data
- To facilitate efficient data reporting, data exchange, and data trading with existing players including all geoscientific agencies and academia
- To improve DGH's ability to monitor and control the E&P activities and reporting
- To encourage new E & P activities by providing high quality and reliable data
- To strengthen overall geoscientific activities in India
- To support an open acreage system for an improved Global E & P Business environment in India
- To provide quality E & P data for Interpretation and Visualization in Centres at DGH

Key features

- State of the art Primary Data Centre (PDC) equipped for data storage capacity of 236TB of hard disk to store processed data& 720TB robotic tape library
- Secondary Data Centre (SDC) with a facility of 140TB Capacity for Disaster Recovery and Business Continuity.
- Real time data replication between PDC & SDC
- Online portal (Team Work Space-TWS) showcasing E&P data of 26 sedimentary Basins along-with the Capability for online data viewing, selecting and ordering.

Secondary Data Centre:

Secondary Data Centre Bhubaneswar is located at a reasonable distance and lies in a different seismic zone than PDC, NOIDA . DGH established Secondary Data Centre (SDC) in high-tech Software Technology Parks of India Building, at Bhubaneswar. SDC Bhubaneswar is Tier-III data centre built under the Ministry of Electronics and Information Technology, which would work as Business Continuity/ Disaster Recovery Centre of Primary Data Centre (PDC) of National Data Repository of DGH, Noida. The Secondary Data Centre (SDC) is fully operational since 4th August 2018. SDC will be able to resume business operations in case of disaster at PDC.

Envisaged Advancement

A. Cloud based solution and Expansion of storage

The quantum of data to be stored in NDR is increasing rapidly as the new data is perpetually being generated with ongoing E&P activities in country. Additionally, NDR has huge volume of raw and pre-stack seismic data in offline mode in cartridges. In order to cope up with burgeoning data and improved efficiency in access of such data with low latency, it is essential to expand existing storage of NDR to the order of several petabytes with 100% redundancy from disaster recovery point of view.

The National Data Repository (NDR) at DGH is aiming to expand its E&P Data Visualization and Interpretation (DVI) facilities available in physical Data Viewing Rooms to online/anywhere/anytime data visualization and interpretation facility globally. For achieving this NDR-DGH is planning to set up a private cloud facility at its premises in the PDC, Noida & SDC Bhubaneshwar. This Private Cloud will host software(s) primarily related to Geology and Geophysics (G&G) fields of E&P industry on associated hardware for anytime and anywhere usage for promoting exploration blocks identified under various OALP/ DSF rounds for bidding. This facility of private cloud will help people located in remote locations to work on India's G&G data without the requirement to travel to DGH to access its DVI facilities. This will also empower different category of users viz E&P companies and academia to collaborate and innovate based upon the ready availability of the data, software and hardware.

The implementation of a Cloud infrastructure at NDR-DGH will be the first of its kind in the E&P industry in India and will provide a stepping stone for showcasing prospectivity of Indian Sedimentary Basins to global & domestic E&P companies and flexibility of evaluation of Indian acreages. The Hyper Converged Infrastructure will be having state-of the-art hardware along with the best available software used in the G&G domain. With good planning and a well laid out future roadmap, DGH would be able to implement this solution effectively making data accessible to all locations in India, thereby contributing to ease of doing business in Exploration & production sector.

B. Data Analytics

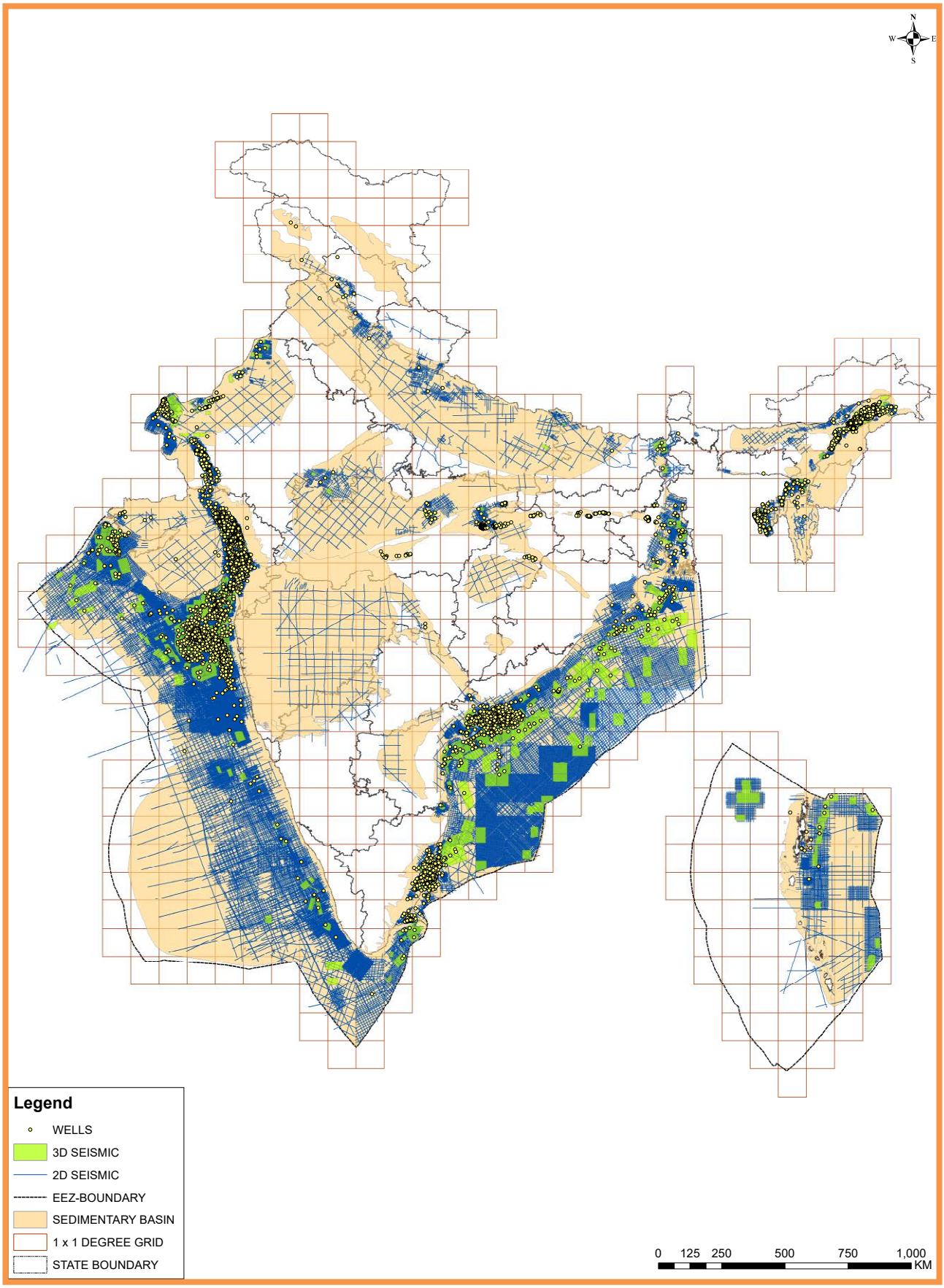
Going forward, NDR envisages leveraging existing E&P data of NDR to gain understanding of potential occurrence of or delineation and development of oil and gas in the subsurface of a basin. It aims to create a database platform to be able to apply data science methods including Big data analytics with AI and Machine Learning to extract knowledge and insights from various structured or unstructured E&P data. Incorporating data analytics, AI and automation to NDR system and processes will enhance end user experience and automate most of the repetitive work processes thereby reducing the risk of human errors and saving on time. It will also help in improving upon key areas in NDR processes- reduced data order processing time- while eliminating manual intervention at each step, efficient QC of data, faster user query resolution using cognitive technologies etc.

Data Available in NDR*

- **2D Seismic Data:** 2.404 Million LKM
- **3D Seismic Data:** 0.812 Million SKM
- **Well and Log Data:** 18,136 Nos. of wells
- **Well Reports:** 37,068 Nos. of reports

**As on 31st March 2020*

Map showing coverage of 2D/3D Seismic and Well data in NDR



5 PETROLEUM RESOURCES AND RESERVES FOR CONVENTIONAL HYDROCARBONS

5.1 Sedimentary Basins in India

India has 26 sedimentary basins covering an area of 3.36 million square kilometres. The sedimentary basins of India, onland have an aerial extent of about 1.63 million sq. km. and offshore up to the 400-m isobath, have an areal extent of about 0.41 million sq. km. In the deepwater beyond the 400-m isobath, the sedimentary area has been estimated to be about 1.32 million sq. km. Major basins where hydrocarbon potential has been established under the PSC regime are Assam- Arakan, Bengal-Purnea ,Cambay, Cauvery, Krishna Godavari, Mahanadi, Mumbai, Rajasthan and Saurashtra.

The conventional hydrocarbon resources in India are currently estimated at approx. 41.87 billion metric tonnes of Oil & Oil Equivalent of Gas (O+OEG). This is a significant increase of 49% over previous estimate of 28.09 billion metric tonnes of O+OEG. However, India's hydrocarbon resources still remain highly underdeveloped and the Governments new liberal approach is nudging companies to invest in tapping them.

The resource potential revealed with the recent re-assessment study presents true potential of the Indian sedimentary basins, and proved to be useful in ongoing projects, including OALP, DSF rounds, and NSP (National Seismic Programme).

In accordance with the best practices of Oil & Gas industry globally, the basin categories are simplified into three categories in line with PRMS (Petroleum Resources Management System) as Reserves, to be produced (Category I, 7 basins), Contingent Resources to be monetized (Category II, 5 basins) and Prospective Resources, to be explored (Category III, 14 basins).

Categorization of Sedimentary basins of India*

CATEGORY I

Commercially established & producing basins

- Assam Shelf
- Assam-Arakan Fold Belt
- Cambay
- Cauvery
- Krishna-Godavari
- Mumbai Offshore
- Rajasthan

07

Total No. of Basins

CATEGORY II

Prospectivity identified

- Andaman
- Kutch
- Mahanadi
- Saurashtra
- Vindhyan

05

Total No. of Basins

CATEGORY III

Prospective

- Bastar
- Bengal-Purnea
- Bhima-Kaladgi
- Chhattisgarh
- Cuddapah
- Deccan Syneclise
- Ganga-Punjab
- Himalayan Foreland
- Karewa
- Kerala-Konkan (KK)
- Narmada
- Pranhita-Godavari (PG)
- Satpura-South Rewa-Damodar
- Spiti-Zanskar

14

Total No. of Basins

*Categories based on conventional hydrocarbon resources

Table 5.1: Assessment Result Comparison 1995-96 VS 2017 (Excluding unconventional hydrocarbons) (All figures in MMtoe)

No.	Basin	Un-risked Conventional Hydrocarbon Inplace (1995-96)	Un-risked Conventional Hydrocarbon Inplace (2017 Study)			Discovered Conventional Hydrocarbon Inplace	Un-risked Undiscovered Hydrocarbon Inplace
			3D PSM	Areal Yield	Total		
1	Krishna-Godavari (KG)	1,130	9,555	.....	9,555	1,977	7,578
2	Mumbai Offshore	9,190	9,646	.....	9,646	4,794	4,852
3	Assam-Shelf	3,180	6,001	.....	6,001	1,868	4,133
4	Rajasthan	380	4,126	.....	4,126	938	3,188
5	Cauvery	700	1,964	.....	1,964	292	1,672
6	Assam-Arakan Fold Belt	1,860	1,233	400	1,633	178	1,455
7	Cambay	2,050	2,586	.....	2,586	1,800	786
8	Saurashtra	280	1,294	31	1,325	79	1,246
9	Kutch	760	862	36	898	71	827
10	Vindhyan	Not Studied	.....	633	633	1	632

No.	Basin	Un-risked Conventional Hydrocarbon Inplace (1995-96)	Un-risked Conventional Hydrocarbon Inplace (2017 Study)			Discovered Conventional Hydrocarbon Inplace	Un-risked Undiscovered Hydrocarbon Inplace
			3D PSM	Areal Yield	Total		
11	Mahanadi	145	651	.....	651	77	574
12	Andaman	180	359	12	371	2	370
13	Kerala-Konkan (KK)	660	1,245	.....	1,245	-	1,245
14	Bengal-Purnea	190	828	.....	828	-	828
15	Ganga-Punjab	230	.....	128	128	-	128
16	Pranhita-Godavari (PG)	Not Studied	.....	95	95	-	95
17	Satpura-South Rewa-Damodar	Not Studied	.....	63	63	-	63
18	Himalayan Foreland	150	.....	44	44	-	44
19	Chhattisgarh	Not Studied	.....	25	25	-	25
20	Narmada	Not Studied	.....	18	18	-	19
21	Spiti-Zanskar	Not Studied	.....	11	11	-	11
22	Deccan Syneclise	Not Studied	.....	11	11	-	11
23	Cuddapah	Not Studied	.....	5	5	-	5
24	Karewa	Not Studied	.....	4	4	-	4
25	Bhima-Kaladgi	Not Studied	.....	3	3	-	3
26	Bastar	Not Studied	.....	1	1	-	1
-	Deep Water Areas	7,000	Deepwater area estimated basin-wise & resources added to respective basins				
Total (MMtoe)		**28,085**	**40,350**	**1,522**	**41,872**	**12,076**	**29,796**

5.2 Hydrocarbon Reserves of India

Inplace hydrocarbon volume of **10,898.5** MMT O+OEG and Ultimate reserves of **4,237.1** MMT O+OEG have been established by ONGC, OIL, Private Companies and JVs.

Table 5.2: 2P Reserves status during the year 2019-20 (As on 01.04.2020)

No.	Subject	Parameter	ONGC (Nomination)*	OIL (Nomination)**	PSC/RSC/DSF regime	Total
1	**Established Initial Inplace volume**	Oil + Cond. (MMT)	5,329.2	798.6	846.1	6,973.9
		Gas (BCM)	2,331.8	385.2	1,257.4	3,974.4
		O+OEG (MMT)	**7,661.1**	**1,134.0****	**2,103.5**	**10,898.5**
2	**Accretion of Inplace volume**	Oil + Cond. (MMT)	60.5	2.4	18.7	81.6
		Gas (BCM)	30.6	3.4	10.2	44.2
		O+OEG (MMT)	**91.2**	**5.4****	**28.8**	**125.4**
3	**Ultimate Reserves**	Oil + Cond. (MMT)	1,474.8	254.8	237.8	1,967.3
		Gas (BCM)	1,296.9	226.3	776.5	2,299.7
		O+OEG (MMT)	**2,771.6**	**451.2****	**1,014.3**	**4,237.1**
4	**Accretion of Ultimate Reserves**	Oil + Cond. (MMT)	23.3	2.0	8.4	33.7
		Gas (BCM)	26.1	4.9	9.4	40.3
		O+OEG (MMT)	**49.4**	**6.3****	**17.8**	**73.5**
5	**Reserves**	Oil + Cond. (MMT)	318.1	74.6	100.6	493.3
		Gas (BCM)	336.5	129.2	614.7	1,080.4
		O+OEG (MMT)	**654.7**	**187.0****	**715.3**	**1,557.0**

** As provided by ONGC & OIL*

Conversion Factor
Fr Oil India Nomination Data
*** For Assam: 1 BCM of Gas = 0.8868 MMToE;*
***For Rajasthan: 1 BCM of Gas = 0.3846 MMToE;*
For ONGC, PSC/RSC/CBM: 1 BCM of Gas =1 MMToE

5.3 Established Inplace volume and Reserves under Contractual Regime

The government has taken several steps in the recent past to enhance E&P activities under PSC+RSC regime and Inplace reserves have steadily increased over the years. The trend of Inplace volume and Ultimate reserves of crude oil and natural gas under the PSC+RSC regime during the period 2008-09 to 2019-20 along with the growth with base year as 2008-09 is provided. Inplace has recorded growth of 42% and Ultimate reserves have recorded growth of 48%. Details are as below:

Table 5.3 : Established Inplace Volume Trend (PSC+RSC Regime)

As on	OIL+COND (MMT)	Gas (BCM)	O + OEG (MMT)	% Growth Rate with Base year 2008
01.04.2008	638.82	837.97	1,476.79	-
01.04.2009	658.36	839.27	1,497.62	1%
01.04.2010	814.19	918.42	1,732.61	17%
01.04.2011	820.67	944.66	1,765.34	20%
01.04.2012	816.56	991.26	1,807.82	22%
01.04.2013	829.92	1,010.69	1,840.62	25%
01.04.2014	972.36	1,036.82	2,009.18	36%
01.04.2015	975.35	1,179.19	2,154.54	46%
01.04.2016	995.45	1,077.75	2,073.20	40%
01.04.2017	1,008.34	1,187.26	2,195.59	49%
01.04.2018	1,080.89	1,245.97	2,326.87	58%
01.04.2019	1,129.39	1,364.50	2,493.89	69%
01.04.2020	846.05	1,257.41	2,103.46	42%

Fig 5.1 - Established Inplace Volume Trend (PSC+RSC Regime)

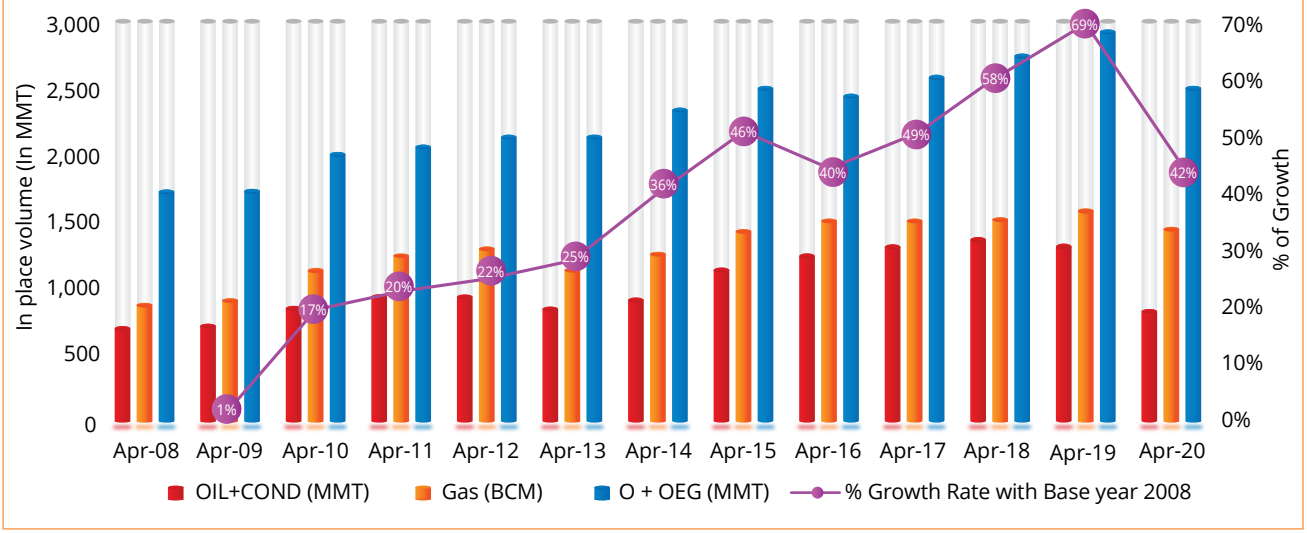
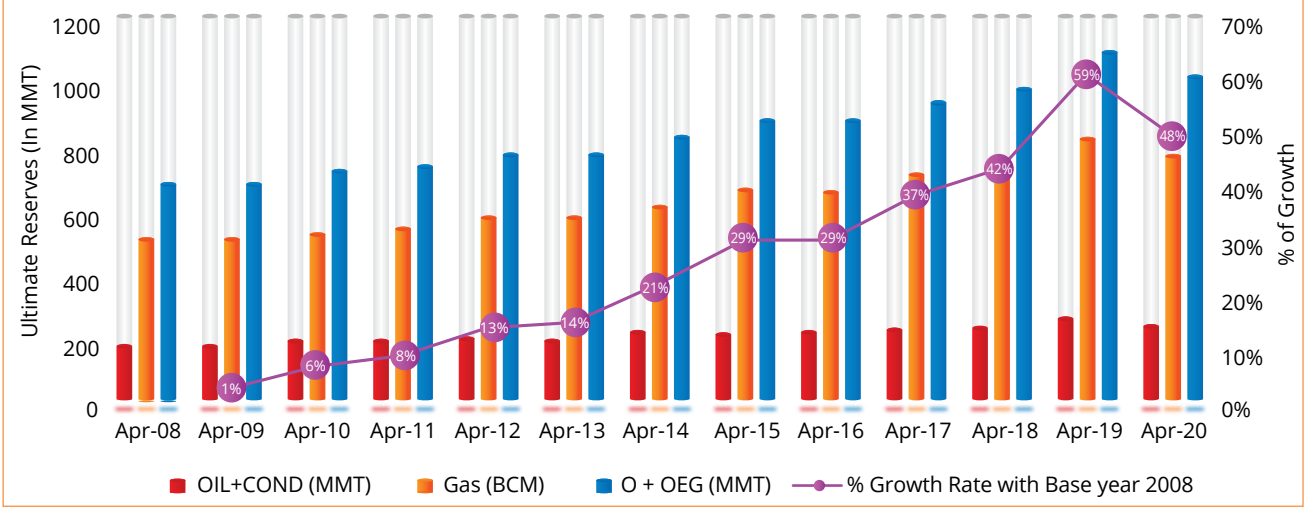


Table 5.4: Ultimate Reserves Trend (PSC+RSC Regime)

As on	OIL+COND (MMT)	Gas (BCM)	O + OEG (MMT)	% Growth Rate with Base year 2008
01.04.2008	172.36	511.15	683.50	-
01.04.2009	178.12	510.44	688.55	1%
01.04.2010	194.31	526.88	721.20	6%
01.04.2011	194.89	542.93	737.82	8%
01.04.2012	194.89	578.85	773.74	13%
01.04.2013	197.21	579.00	776.21	14%
01.04.2014	214.58	614.50	829.08	21%
01.04.2015	215.38	666.22	881.60	29%
01.04.2016	225.20	658.38	883.58	29%
01.04.2017	227.63	710.36	938.00	37%
01.04.2018	234.04	738.38	972.42	42%
01.04.2019	270.85	815.39	1,086.24	59%
01.04.2020	237.80	776.52	1,014.32	48%

Fig 5.2 - Ultimate Reserves Trend (PSC+RSC Regime)



Basin wise Established Inplace volume and Ultimate reserves (PSC+RSC regime):

Inplace volume and ultimate reserves, as on 31.03.2020, in the prospective sedimentary basins of India established through development plan submitted in bidding rounds under PSC & RSC regime are provided below.

Table 5.5: Distribution of Inplace volume and Ultimate reserves in sedimentary basin of India in contractual regimes (PSC+RSC) (as on 31-03.2020)

Basin	Inplace MMT (O+OEG)	Ultimate MMT (O+OEG)
Assam-Arakan	100.64	20.43
Bengal-Purnea	5.96	4.42
Cambay	166.31	44.81
Cauvery	88.86	26.15
Krishna Godavari	1,038.48	633.19
Mahanadi	37.07	26.22
Mumbai	136.19	68.02
Rajasthan	512.64	181.46
Saurashtra	17.30	9.63
Total	**2,103.46**	**1,014.32**

Fig. 5.3 Basin-wise Inplace volume (O + OEG (MMT)) Distribution under PSC & RSC Regime (as on 31-03-2020)

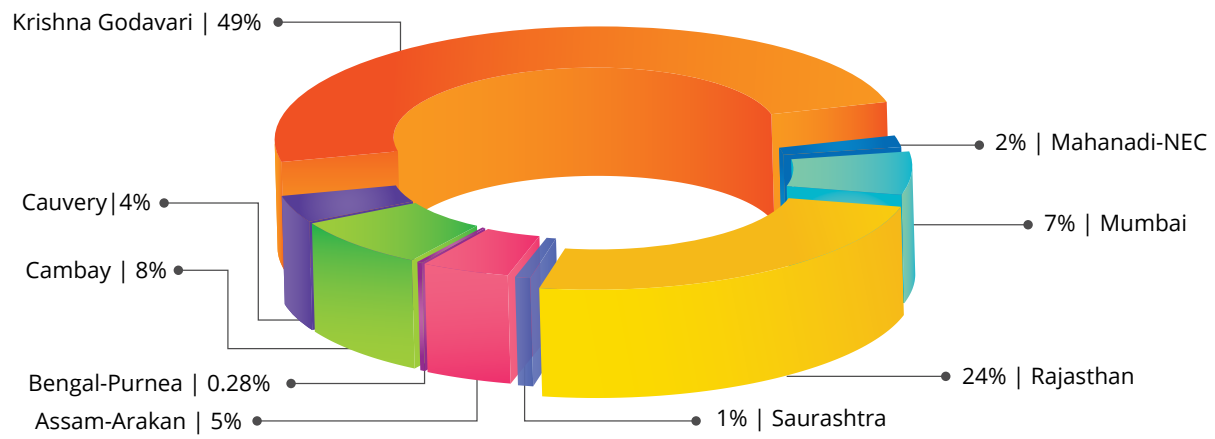


Fig. 5.4 Basin-wise Ultimate Reserves (O + OEG (MMT)) Distribution under PSC& RSC Regime (as on 31-03-2020)

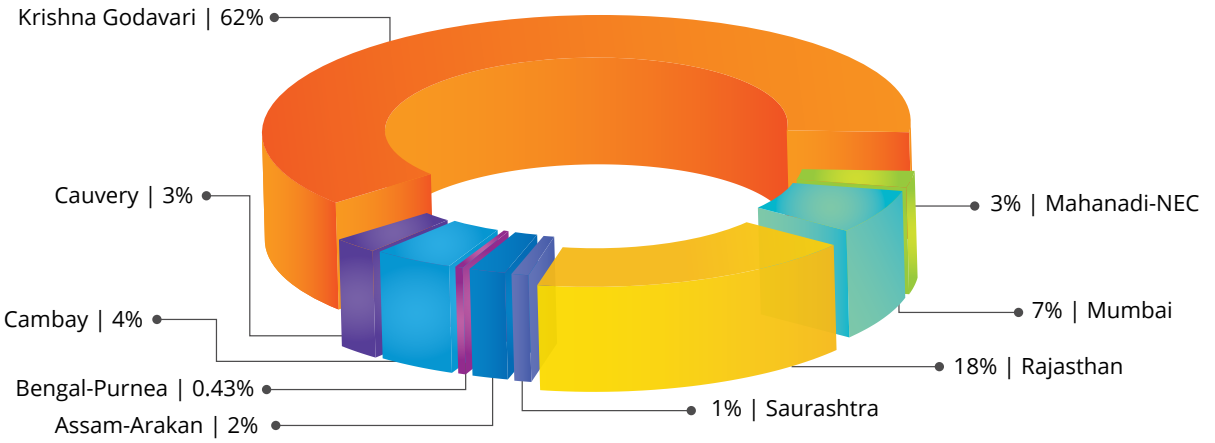


Fig 5.5: Reserves established in Assam-Arakan (O+OEG) under PSC+RSC Regime

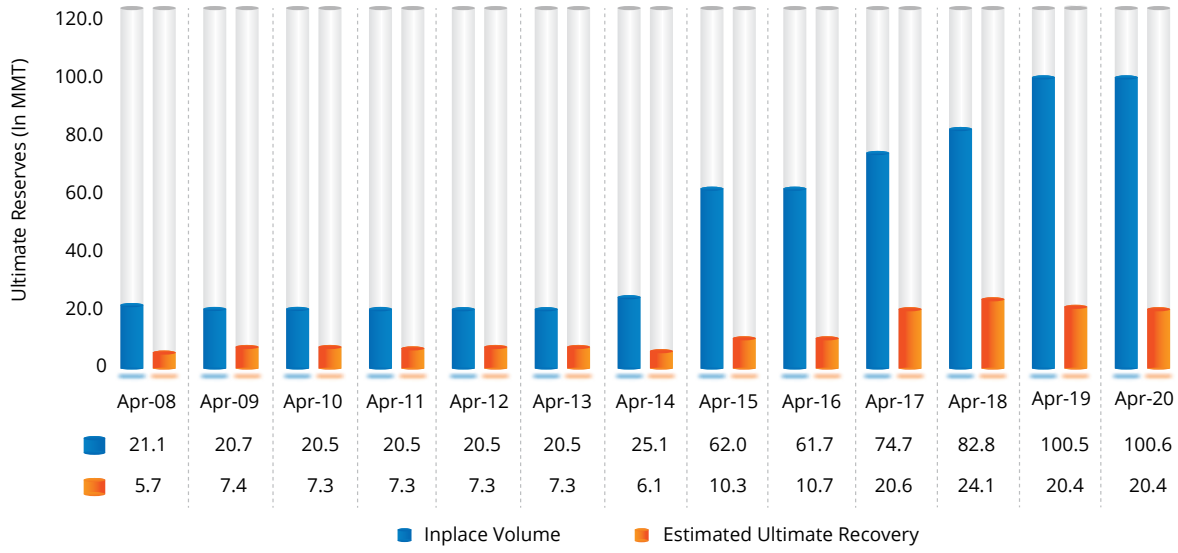


Fig 5.6: Reserves established in Cambay (O+OEG) under PSC+RSC Regime

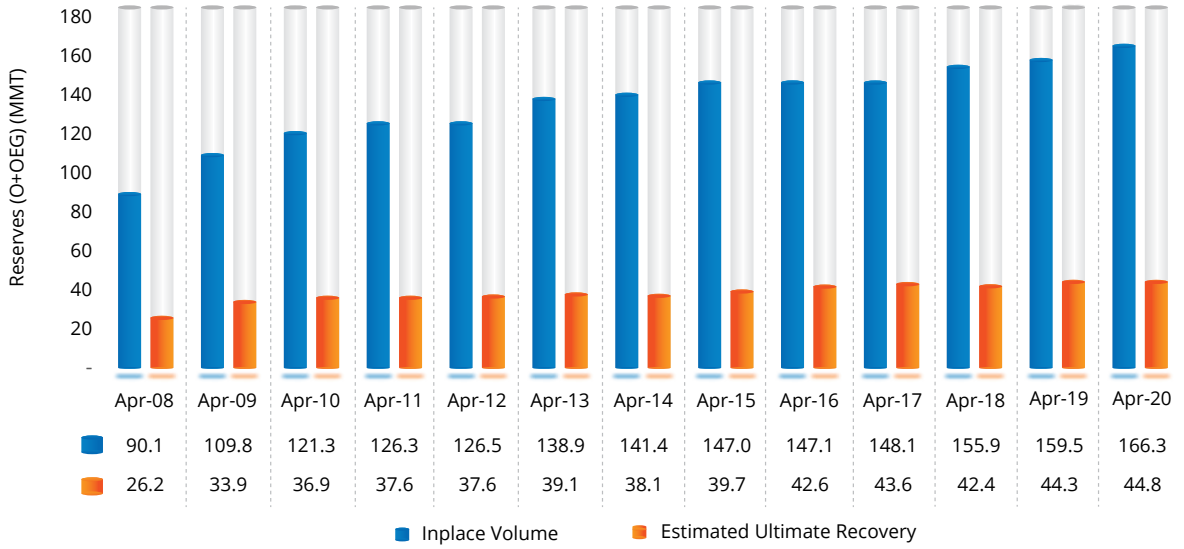


Fig 5.7: Reserves established in Cauvery (O+OEG) under PSC+RSC Regime

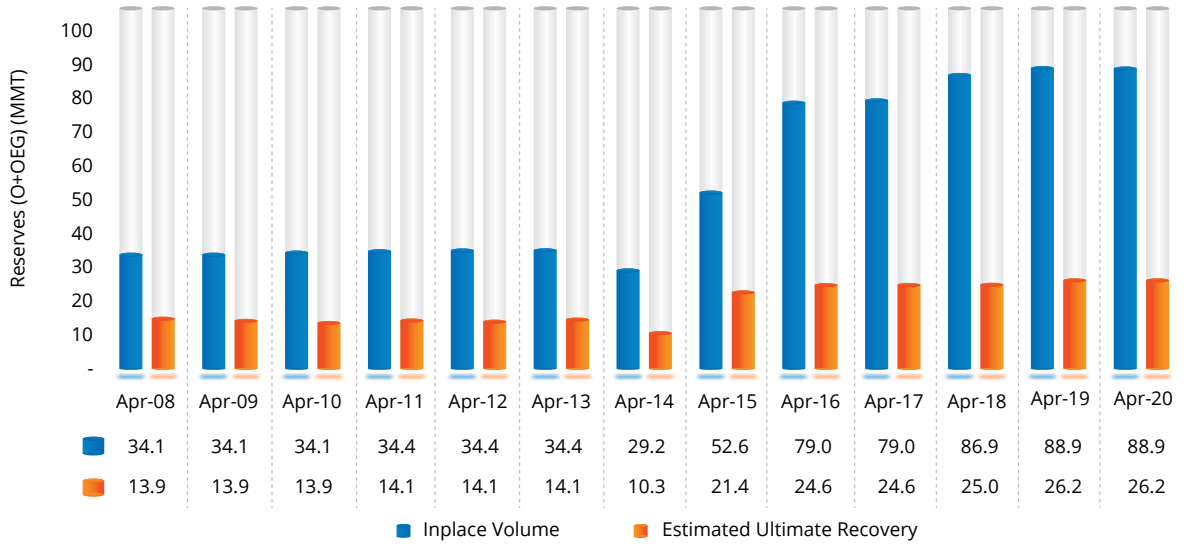


Fig 5.8: Reserves established in Krishna Godavari (O+OEG) under PSC+RSC Regime

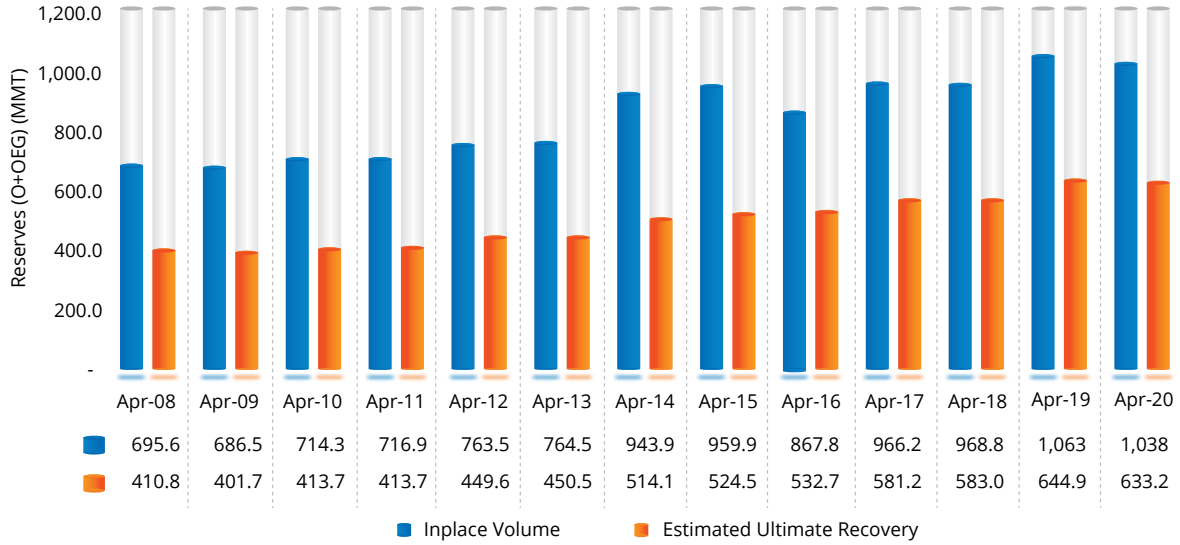


Fig 5.9: Reserves Established in Mahanadi-NEC (O+OEG) under PSC+RSC Regime

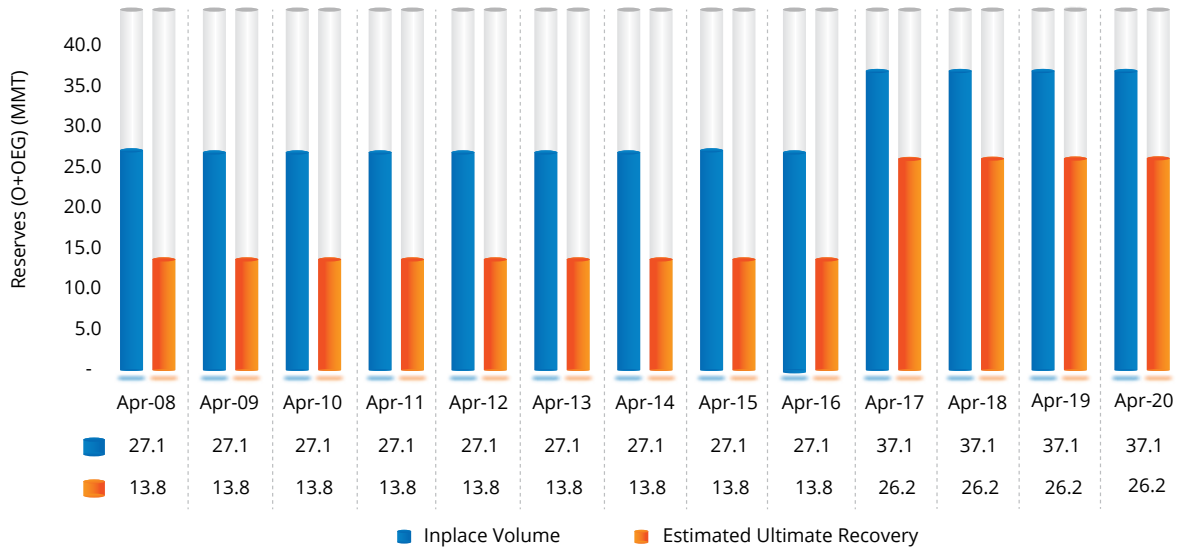


Fig 5.10: Reserves established in Mumbai (O+OEG) under PSC+RSC Regime

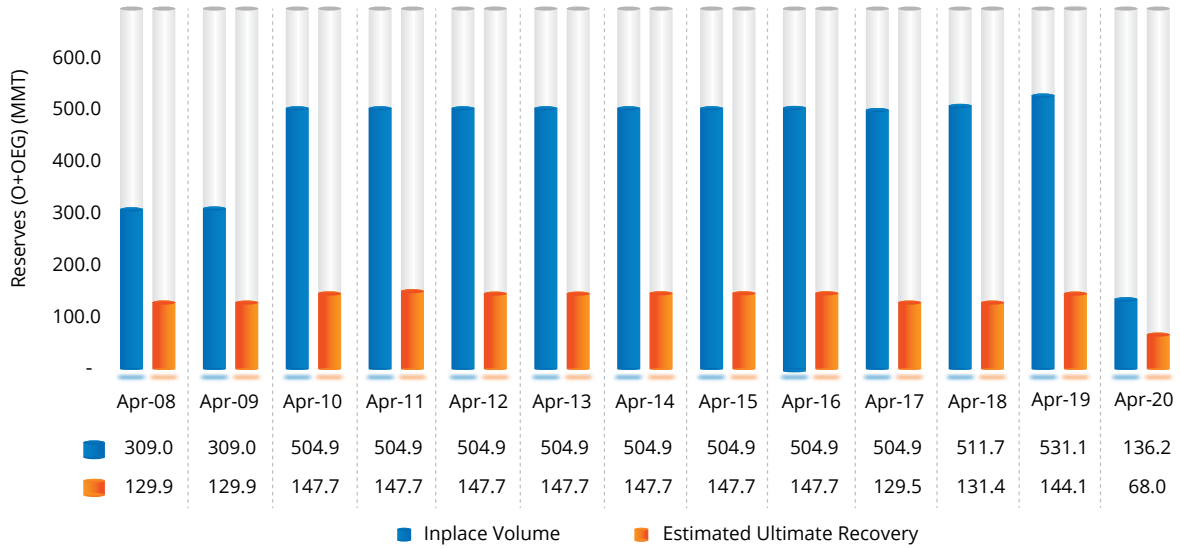


Fig 5.11: Reserves established in Rajasthan (O+OEG) under PSC+RSC Regime

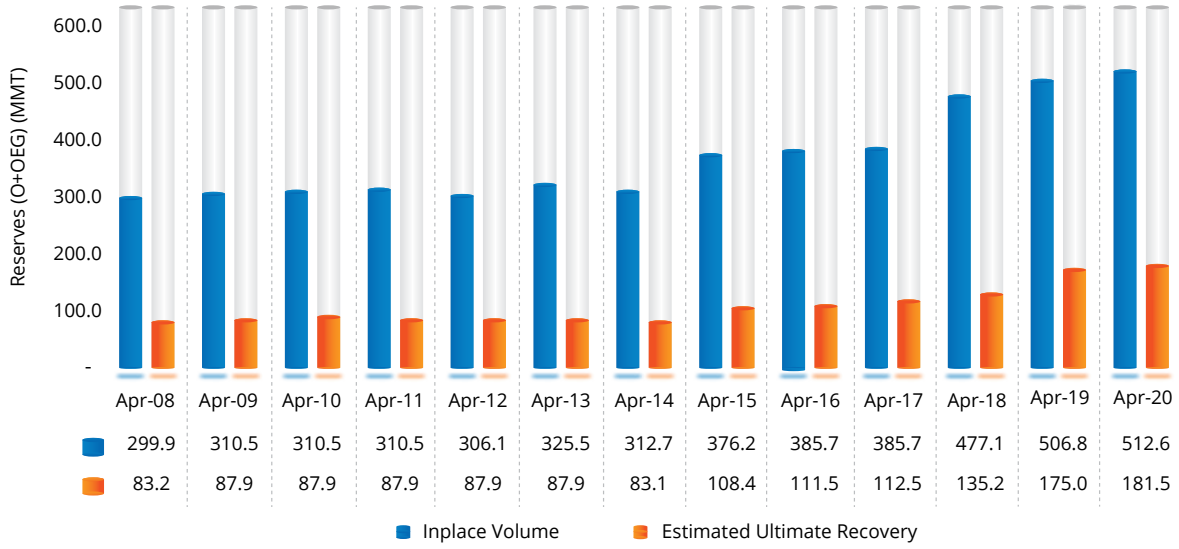


Fig 5.12: Reserves established in Saurashtra (O+OEG) under PSC+RSC Regime

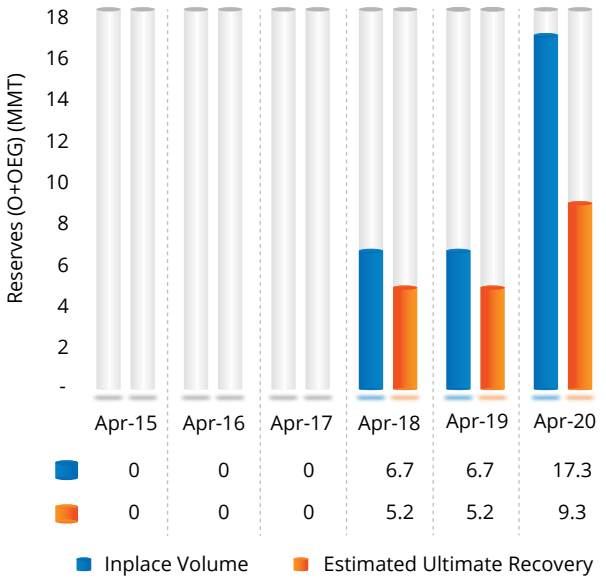


Fig 5.13: Reserves established in Bengal-Purnea (O+OEG) under PSC+RSC Regime

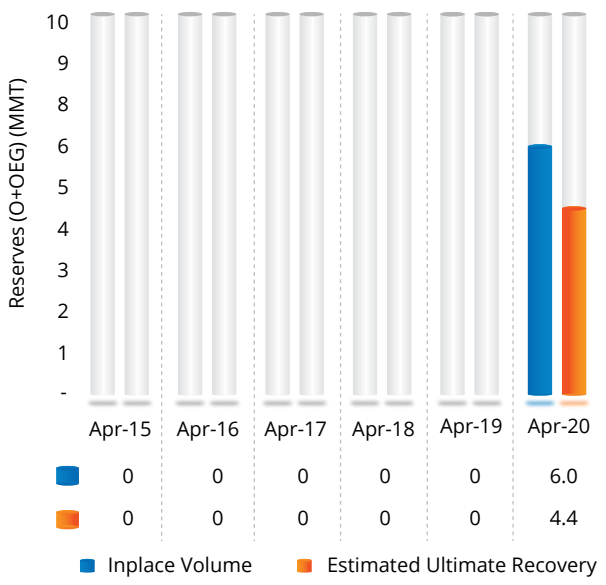


Table 5.6: Distribution of Inplace volume and Ultimate reserves in various regime (O+OEG in MMT) excluding CBM (As on 01-04-2020)

Bidding Round	Inplace MMT (O+OEG)	Ultimate MMT (O+OEG)
Field	300.70	122.80
NELP	1,163.50	661.30
Pre-NELP	581.10	202.70
RSC (DSF)	58.10	27.50
Grand Total	**2,103.50**	**1,014.30**

Fig 5.14: Established Inplace volume Distribution under PSC & RSC Regime (As on 01-04-2020)

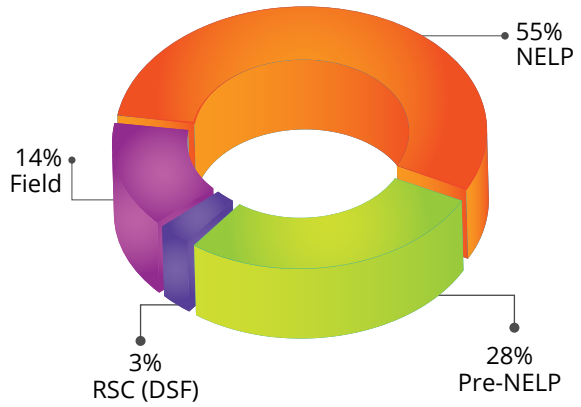
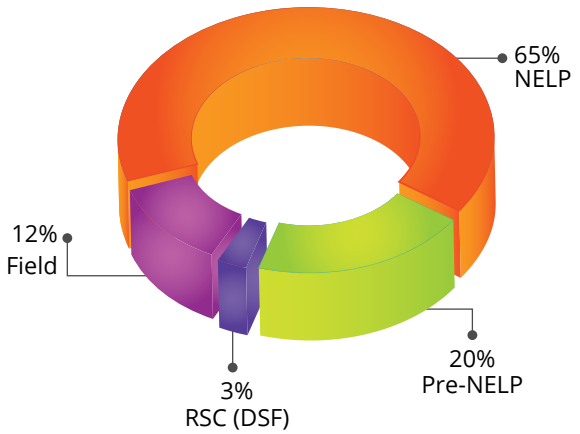


Fig 5.15: Ultimate Reserves Distribution under PSC & RSC Regime (As on 01-04-2020)



5.4. Reserve Replacement Ratio (RRR)

The RRR (Reserve Replacement Ratio) is a metric to assess the operating performance of an oil and gas exploration and production company. It is the amount added to its reserves divided by the amount extracted. As discoveries are made and reserve estimates are revised every year it is a practice to calculate RRR over several years.

A reserve replacement ratio if greater than 1 indicates stable demand condition environments and suggest that reserves are added up along with simultaneous draining out of reserves through continued production.

The trend of Reserve Replacement Ratio (RRR) of overall country's producing fields under all the regimes during the period as on 01.04.2010 to 31-03-2020 is provided in Table below:

Table 5.7: Oil R/P and RRR Ratios in the Last 10 years

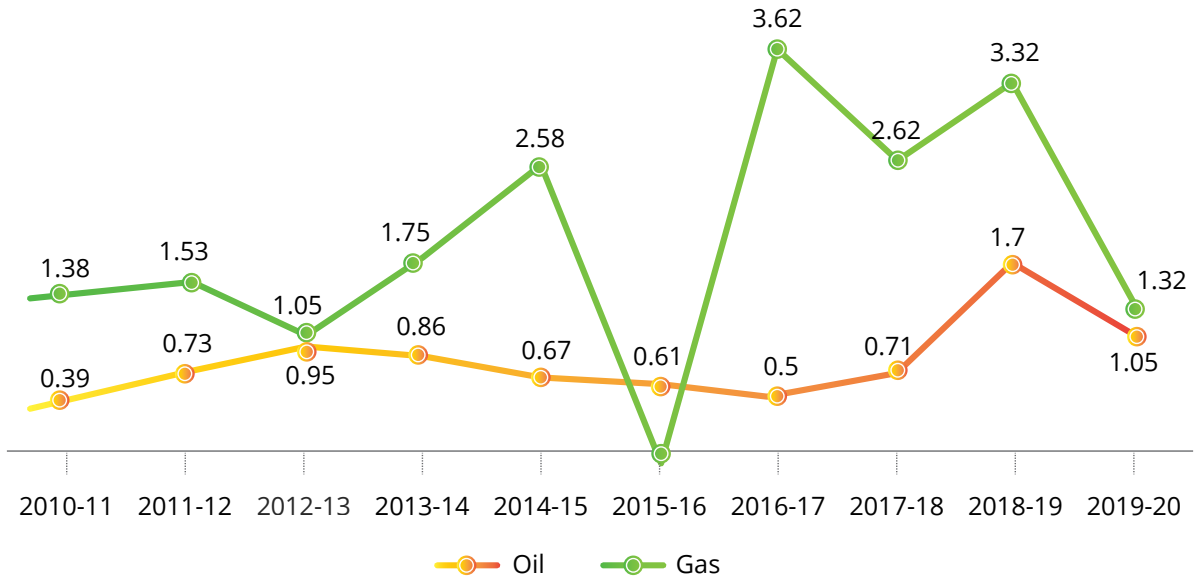
FY	ONGC Nomination		OIL Nomination		Contract Regime		Country	
	R/P	RRR	R/P	RRR	R/P	RRR	R/P	RRR
2010-11	18.64	0.41	22.97	1.18	12.71	0.06	17.53	0.39
2011-12	19.15	0.91	22.01	1.58	10.83	-	17.14	0.73
2012-13	20.54	1.37	22.91	0.94	8.94	0.15	17.21	0.95
2013-14	20.32	0.44	25.00	1.56	9.06	1.44	17.14	0.86
2014-15	20.39	1.05	24.55	0.21	8.35	0.07	16.98	0.67
2015-16	19.89	0.55	25.83	0.10	8.44	0.86	16.86	0.61
2016-17	19.68	0.63	25.23	0.40	8.37	0.26	16.84	0.50
2017-18	19.39	0.71	23.42	0.98	8.40	0.64	16.67	0.71
2018-19	15.09	0.97	23.22	0.27	11.29	3.73	14.77	1.70
2019-20	15.42	1.13	24.13	0.63	11.91	1.00	15.34	1.05

Table 5.8: Gas (Except CBM) R/P and RRR Ratios in the Last 10 years

FY	ONGC Nomination		OIL Nomination		Contract Regime		Country	
	R/P	RRR	R/P	RRR	R/P	RRR	R/P	RRR
2010-11	22.16	2.21	44.40	2.03	15.96	0.60	19.99	1.38
2011-12	22.42	1.46	40.16	1.02	20.49	1.67	22.52	1.53
2012-13	23.09	1.50	41.50	2.72	29.65	-0.01	26.62	1.05
2013-14	23.02	1.03	41.51	0.85	48.59	3.80	31.17	1.75
2014-15	24.55	1.20	42.10	2.96	57.17	5.96	34.45	2.58
2015-16	24.46	-0.08	42.06	2.74	59.07	-1.00	34.55	-0.05
2016-17	24.15	1.68	42.06	2.43	83.38	10.93	37.75	3.62
2017-18	23.92	2.20	43.40	1.46	97.85	5.00	38.66	2.62
2018-19	13.48	0.99	46.71	2.01	130.20	16.08	33.59	3.32
2019-20	14.17	1.10	48.38	1.82	149.57	2.28	35.39	1.32

#Contingent Resources introduced in reporting system owing to adoption of PRMS by ONGC w.e.f 01.04.2019
ONGC & OIL Nomination - as Provided by ONGC & OIL

Fig 5.16: Country's Trend of Reserve Replacement Ratio (RRR) – Oil and Gas



6 REVENUE SHARING CONTRACTS REGIME

6.1 Discovered Small Field (DSF) Policy

In 2015, the Government of India brought out a new policy for small fields known as Discovered Small Field (DSF) Policy, 2015. This policy offers Revenue Sharing Contract model with improved fiscal terms viz.no oil cess applicable on crude oil production, moderate royalty rates same as in NELP regime, no upfront signature bonus and unified licence to explore and exploit conventional and unconventional Hydrocarbons This round has substantially removed regulatory burden on the operators and comes after 6 years of NELP IX round.

Salient features of DSF Small Field Policy

- **Revenue Sharing Contract (RSC):** In line with the vision of "ease of doing business" a simple and easy way to administer contractual model of revenue sharing is introduced wherein the government's take is based on bid revenue share.
- **Single license for Conventional & Non-conventional hydrocarbon:** Single license to explore and extract all hydrocarbon resources, including CBM, Shale gas/oil, tight gas, gas hydrates and other resources to be identified in future.
- **No restriction on exploration activity during contract period:** Contractor will be allowed to carry out exploration during entire contract duration.

- **Eligibility for Bidding:** Up to 100% participation by foreign companies, Joint ventures will be allowed. No mandatory state participation and no carried interest by ONGC and OIL are envisaged.
- **Marketing and Pricing freedom:** Contractor will be free to sell the crude oil and Natural Gas exclusively in domestic market through a transparent bidding process at arm's length.
- **Oil Cess & Royalty:** No Oil Cess will be applicable on crude oil production
- Reduced Royalty rates.
- **Custom duty:** Customs duty exemptions for specified goods and services will be available for contract areas.

a. Launch of Bid Rounds under Discovered Small Field Policy under Revenue Sharing Contract Regime

i. Discovered Small Field Bid Round-I (2016)

The DSF bid round was launched in May 2016 under the overarching vision of Hon'ble Prime Minister's vision for reducing import dependency on Oil and Gas. Launched on 25th May 2016, the bid round offered 46 Contract Areas consisting of 67 fields across nine sedimentary basins for extraction and exploration of oil and gas, which is estimated to hold Inplace Oil and Oil equivalent reserves of 86 Million Metric Tonnes.

Government of India signed the Revenue Sharing Contracts (RSC) of the fields awarded under the DSF Bid Round 2016 with the successful awardees at New Delhi on 27th March 2017 for 30 Contract Areas (23 Onland and 07 Shallow Offshore) comprising of 43 discoveries having cumulative area of 776.8 SKM and Inplace of 44.66 MMT (O+OEG).

Key Highlights of DSF Bid Round-I

- Prior technical experience not a pre-qualification criteria
- Total of 134 bids were received for 34 contract areas
- 22 companies (single or in consortium) were shortlisted for 31 Contract Areas. Of these 22 companies, 15 companies are new entrants to the E&P sector
- 30 Contracts (23 Onshore and 07 Offshore) were successfully awarded
- 20 Companies (single or in consortium) signed contracts
- 13 companies are new entrant to Indian E&P industry

ii. Discovered Small Field Bid Round-II (2018)

Following success of DSF Bid Round I-2016, Government extended the DSF Policy of 2015 for future DSF Bid Rounds in April'2018. Extended policy offers all the benefits of original DSF Policy and additionally applicable Royalties rates were further reduced and aligned to Hydrocarbon Exploration & Licensing Policy (HELP).

DSF Bid Round-II was launched on 9th August 2018, under International Competitive Bidding offering 25 Contract Areas covering 59 discovered oil and gas fields with an area of 3,042 Sq.kms and prospective resource base of 190 MMT (O+OEG. The bid submission process under DSF Bid Round – II was successfully completed on January 30, 2019. The DSF round-II process was made entirely digital which offered a transparent, secure and easy bidding process through state of art e-bidding portal.

Key highlights of DSF Bid Round-II

- 145 bids were received for 24 Contract Areas; no bid was received for 01 contract area. Out of the total 145 e-bids received, 103 e-bids were received for onland contract areas and 42 e-bids were received for offshore contract areas.
- As many as 40 companies (Individually or as member of the bidding consortium) have participated in the bid round. 6 foreign companies also participated in the bidding round. This bid round saw more than anticipated participation from new entrants from India and foreign countries like USA, UK, Australia, Singapore and UAE.
- 14 Companies (singly or in Consortium) were shortlisted for award in 23 Contract Areas. Out of there 14 Companies, eight are new entrants in the E&P Sector.
- Total 23 Revenue Sharing Contracts (comprising of 57 discoveries) were signed on March 7, 2019

Figure 6.1: Blocks awarded under DSF I and II

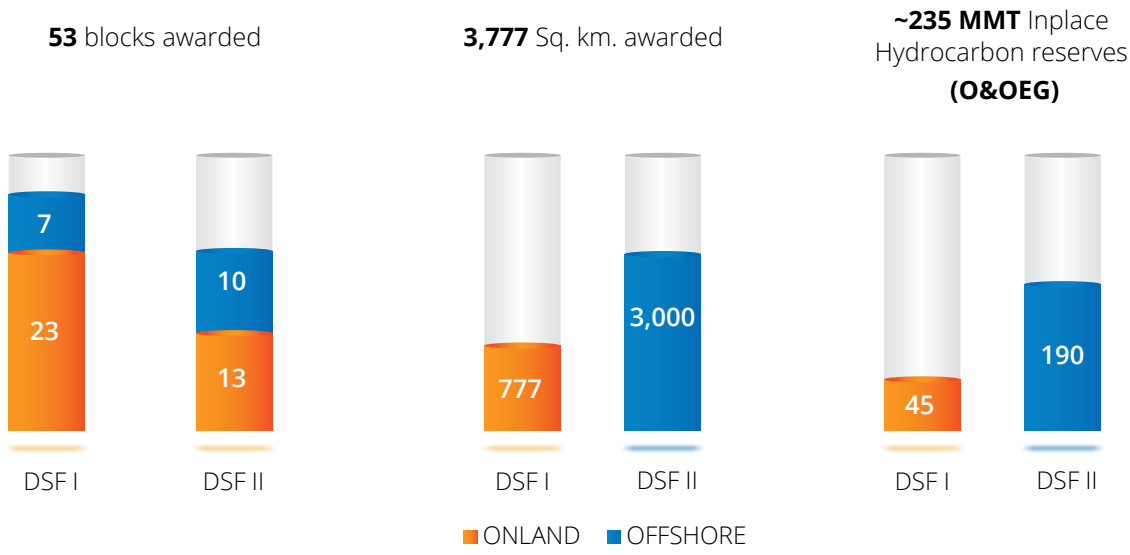
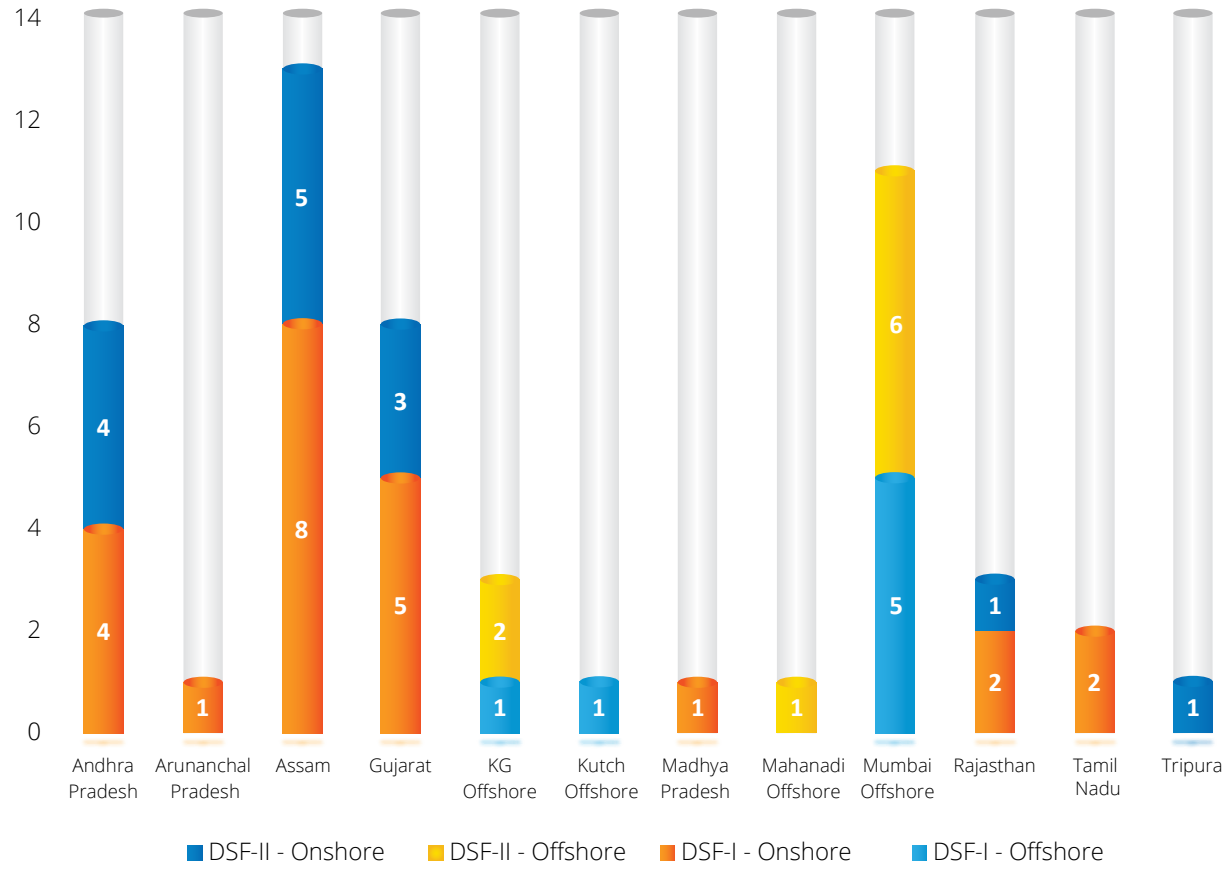


Figure 6.2: State-wise segregation of awarded blocks under DSF Round I & II



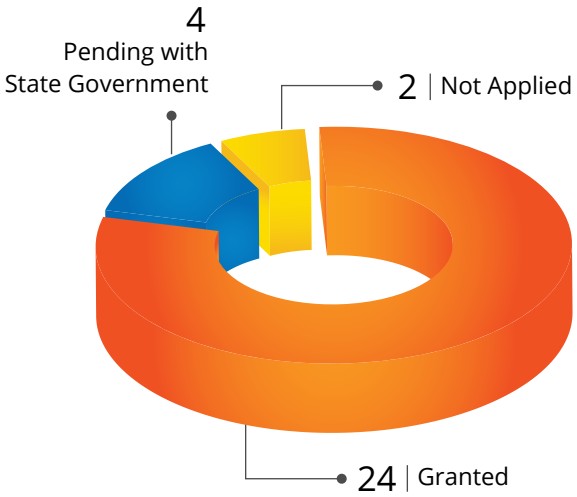
b. Overview of Petroleum Operations of Contract Areas awarded under DSF Bid Rounds

i. Status of awarded Contract Areas under DSF-I

Sl. No	Description	Status
1	Contract Areas with PML Granted	24
2	Contract Areas where PML not obtained	06
3	FDP Submitted	23
4	Committed Investment under FDP	USD 268 Million

PML of ~711.04 Sq. Km out of total awarded area of 776.75 Sq. Km, has been approved

Figure 6.3: Status of PML in awarded Contract Areas under DSF Bid Round I



ii. Status of awarded Contract Areas under DSF Bid Round II

Sl. No	Description	Status
1	Contract Areas with PML Granted	18
2	Contract Areas where PML not obtained	05
3	FDP Submitted	08
4	Committed Investment under FDP	USD 1,329 Million

Envisaged production from Contract Areas under DSF I and II

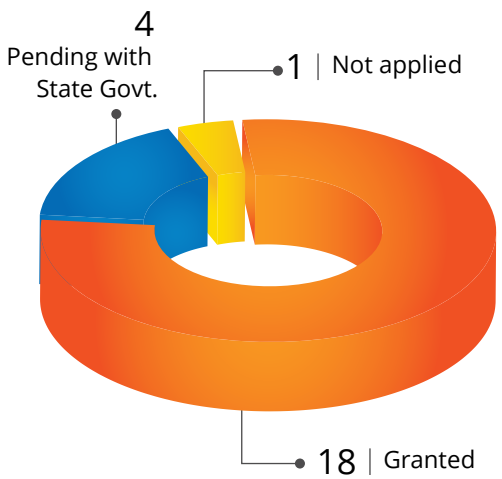
- 23 FDPs approved with total Inplace of 154.5 MMTOE and Cumulative Production of 41.9 MMTOE contribution during field life.
- 3 Contracts Areas of DSF-I likely to come on production in 2020-21 are B-80 (Mumbai Offshore), Achanta & Bhimanpalli (Andhra Pradesh) with approximately 5,000 BoPD & 0.38 MMSCMD by Dec 202

6.2 Hydrocarbon Exploration and Licensing Policy (HELP)

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. Contractor quotes Revenue Share percentage at LRP and HRP at the time of bid submission. It was a giant step towards improving the 'Ease of Doing Business' in the Indian Exploration and Production (E&P) sector as Government does not require to interfere in day to day business activities of Contractor. The Government of India introduced the Open Acreage Licensing (OAL) mechanism as a part of the HELP 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.

PML of ~2,542.39 Sq. Km out of total awarded area of 3000 Sq. Km, has been approved

Figure 6.4: Status of PML in awarded Contract Areas under DSF Round II



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 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
- Liberalised entry and exit barriers
- Complete transparency and time bound process
- Level playing field for global private companies as well as National Oil Companies
- Marketing and pricing freedom
- 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. To further increase exploration acreage of India, Expression of Interest (EoI) cycles increased from two (2) to three (3) in a year with the revised dates of April 1 to July 31, August 1 to November 30 and December 1 to March 31.

Launch of Open Acreage Licensing Policy (OALP) Bid Rounds under HELP

The first OALP Bid Round was launched by the Government in January 2018 under HELP. The govt. launched state-of-art National Data Repository, a database of all the geo-scientific data of hydrocarbon resources in the country, in 2017 to enable potential investors to take informed decisions.

With successful roll out of HELP/OALP regime, based on the world-class National Data Repository (NDR), the Government has achieved massive enhancement of exploration acreage in India. The exploration acreage which stood at approximately 80,000 sq. km. in 2019 from earlier regimes has now been enhanced to approx. 2,20,000 sq. km. after 4 rounds of OALP and is expected to rise to approx. 2,40,000 with the award of eleven (11) blocks under OALP-V.

a. Summary of Participation

In five rounds of bid under OALP, 110 blocks were on offer and 94 exploration blocks covering an area of 1, 36,790 sq. Km. were awarded to successful bidders (11 blocks with an area of 19,789 yet to be awarded under OALP-V). Five (5) un-awarded blocks were offered under OALP-Round-III and in all of them CBM was focus; however, no bids were received for those CBM blocks. **205** bids were received for remaining **105** blocks that are spread over 16 Sedimentary Basins.

Summary of participation in OALP rounds is as under:

Table 6.1: Summary of participation in OALP 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	23#	5	42	31,722	29,765
OALP-IV	7	2	8	18,510	18,510
Total	**99**	**24**	**193**	**1,38,747**	**1,36,790**
OALP-V*	11	-	-	19,789	-
Total	**110**	**24**	**193**	**1,58,536**	**1,36,790**

** Award of 11 blocks for an area of 19,789 under OALP V is in progress.*
#No bid received for five CBM Blocks.

Overall awarded area of 1,36,790 sq. km is split in to three categories of sedimentary basins as follows:

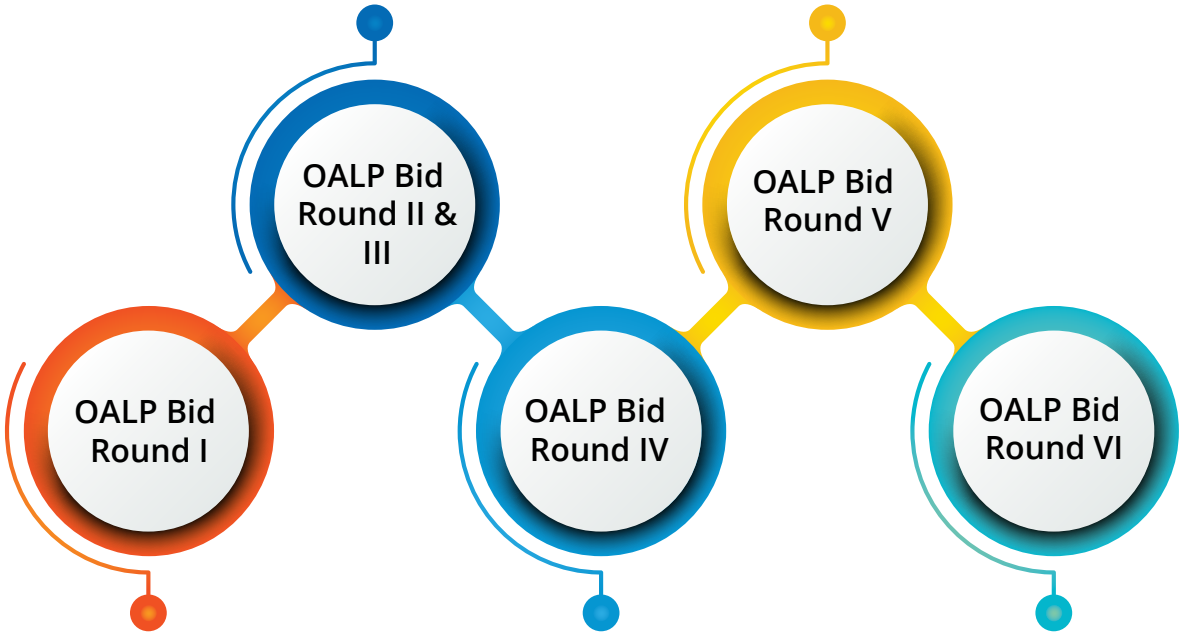
Table 6.2: Basin-wise area awarded under OALP rounds

Category of Basin	Number of Blocks	Area (Sq. km.)	% of area
Category-I	69	72,391	52.92%
Category-II	20	52,797	38.60%
Category-III	5	11,602	8.48%
Grand Total	**94**	**1,36,790**	**100%**

Journey of OALP Bid Rounds (I-V)

Launch: Jan/Feb 2019
Bid Closing: May 2019
Award of Blocks: July 2019

Launch: Jan 2020
Bid Closing: June 2020



Launch: Jan 2018
Bid Closing: May 2018
Award of Blocks: Oct 2018

Launch: Aug 2019
Bid Closing: Oct 2019
Award of Blocks: Jan 2020

EOI window is open till 30th Nov 2020

Figure 6.5: Basin Category- wise blocks awarded under OALP Bid Rounds

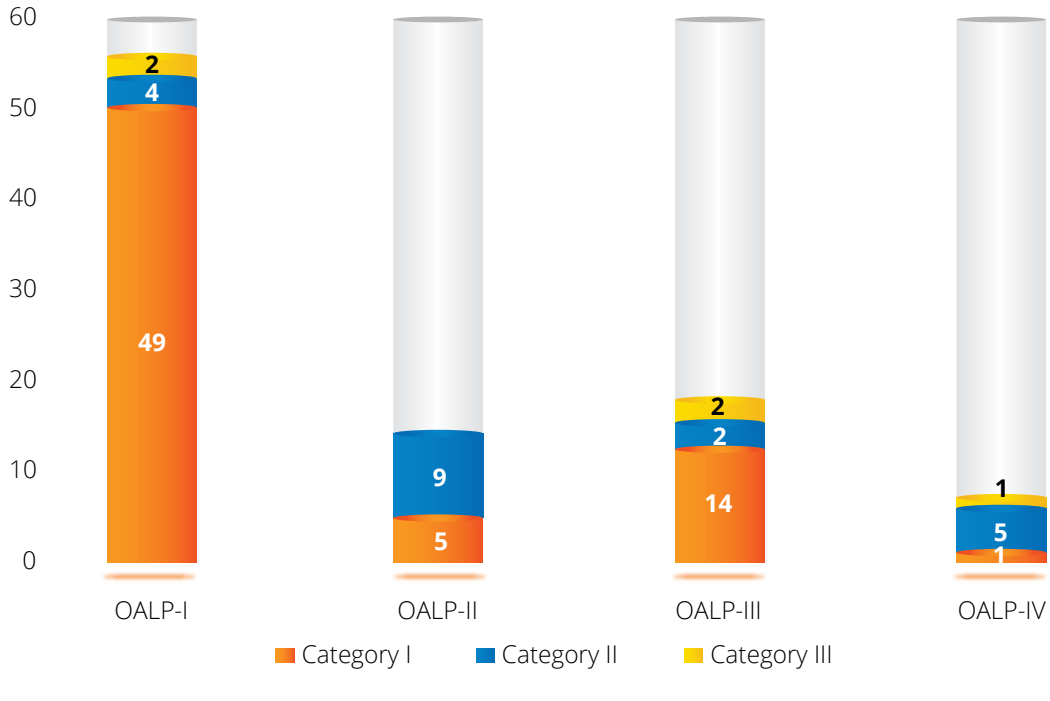


Figure 6.6: Basin Category- wise area awarded under OALP Bid Rounds (I-IV)

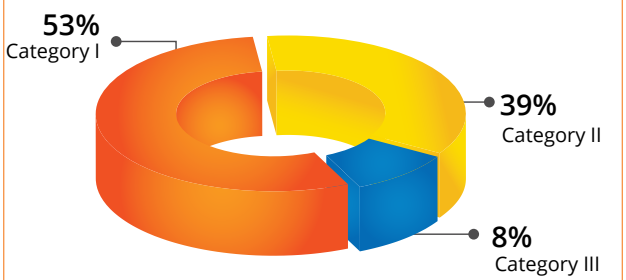


Figure 6.7: Segregation of blocks awarded under OALP Bid Rounds

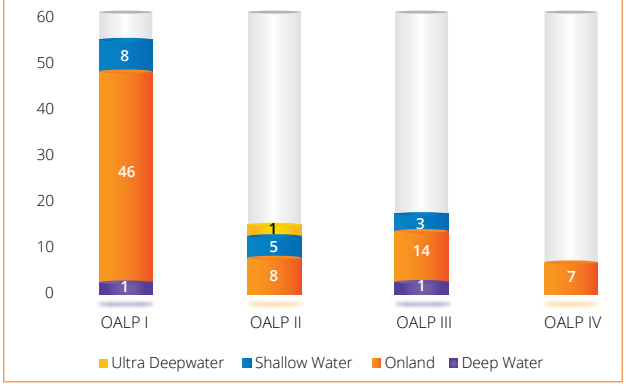
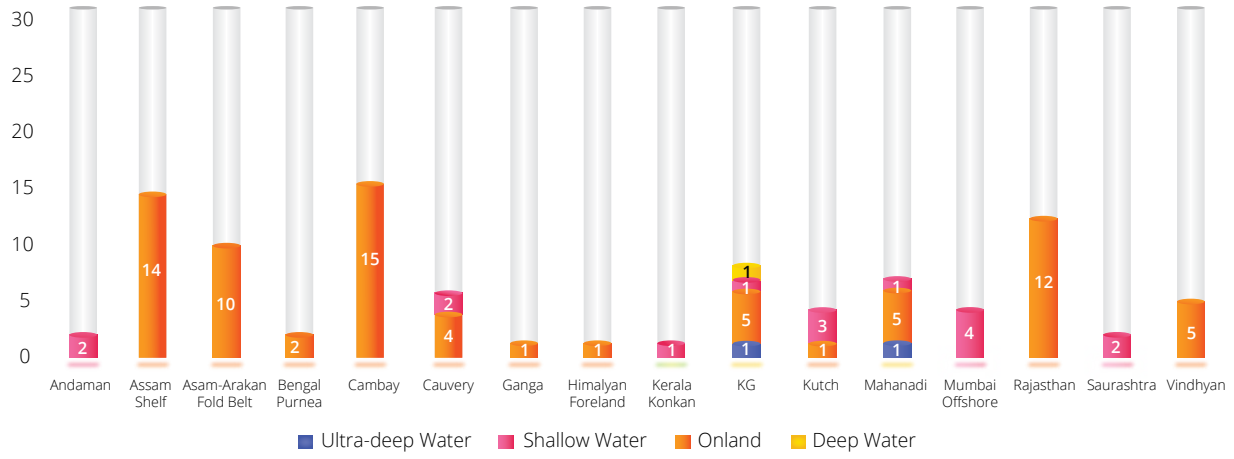


Figure 6.8: Basin wise segregation of Awarded blocks (OALP I-IV)



b. Committed Exploration Work Programme and Committed Investment

Investors of the **94** blocks in four rounds of OALP have committed **29,270** LKM of 2D Seismic Survey and **43,272** sq. km of 3D Seismic survey, **369** number of Exploratory wells, **290** core analysis to establish shale resources. This will generate an investment of approximately **US$ 2317 million** over next **3/4** years. Summary of Committed Work Programme and Investment (As on 31st March 2020) is as under-

Table 6.3: Summary of Committed Work Programme and Investments

OALP Bid Round I, II, III & IV (Combined)

Company	2D (LKM)	3D (SKM)	Expl. Wells	Core Analysis	Investment (mn usd)
Vedanta	10,620	22,971	192	190	786.26
OIL	7,970	5,629	66	53	697.03
ONGC	5,670	12,224	97	35	755.48
RIL+BP	5,000	1,514	2	3	32.02
IOCL	10	469	6	5	23.77
BPRL	-	174	3	1	14.71
GAIL	-	212	1	1	4.83
HOEC	-	79	2	2	2.90
Total	**29,270**	**43,272**	**369**	**290**	**2,317**

c. Status of current Expression of Interest (EoI) Window

The 6th cycle of submitting Expression of Interest is currently active as on 31st March 2020. Bids for the EoIs received during 6th cycle shall put to offer for International Competitive Bidding (ICB).

d. Monitoring of OALP Blocks

Nodal Officers have been designated for each Block to monitor the Petroleum Operations in the Blocks. Management Committee Meetings are being conducted regularly in every six (6) months. Management Committee comprising representatives from the Government and the Contractor closely review and monitor the Exploration activities in the Blocks. Grievances of the Contractors are also resolved during the MC Meetings. Furthermore, other tools to monitor Petroleum Operations are Quarterly Progress Report (QPR), Quarterly **Gantt Chart** and Annual Investment Report.

Quarterly Progress Report comprises the actual number of Exploration Work Programme completed during the relevant quarter against Committed Work Programme. Operators also provide planned work programme for upcoming quarter and for current Financial Year.

Contractors **submit Gantt** chart for monitoring overall activities carried out during the relevant quarter to accomplish Exploratory Work Programme. It comprises comprehensive list of activities mandatory to complete Exploration Work in the Blocks.

Government reviews the Investment made in the awarded blocks from the annual **Investment statement** submitted by the Contractors. All three statements are being submitted by the Contractors for each block separately.

e. Overview of Petroleum Operations in Blocks awarded under OALP

i. Status of grant of Petroleum Exploration Licence (PELs)

Total **123*** Petroleum Exploration License (PEL) were involved in **94** blocks awarded in four rounds of bid, out of which 83 PELs for an area of **85,100.77** sq.km have been granted till 31st March 2020. Remaining **39** PELs for an area of **51,689** sq. km. are pending from various State Governments. Summary of status of PELs is as under:

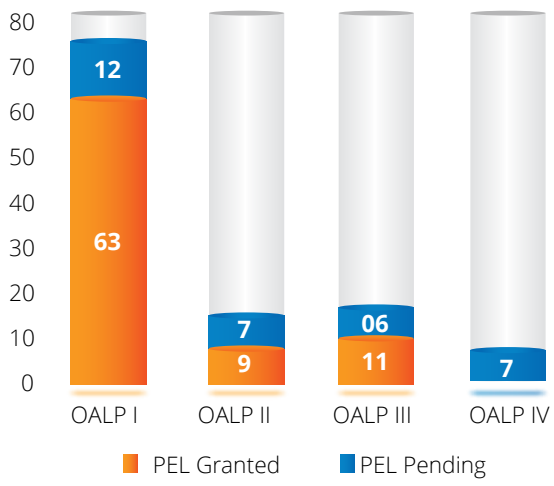
> **"THE INTRODUCTION OF THE CONCEPT OF REVENUE SHARING IS A MAJOR STEP IN THE DIRECTION OF 'MINIMUM GOVERNMENT MAXIMUM GOVERNANCE'"**
>
> **Shri Narendra Modi**
> Hon'ble Prime Minister of India

Table 6.4: Bid Round wise status of PEL under OALP (As on 31-03-2020)

OALP Bid Round	PEL Granted	PEL Pending
OALP I	63	12
OALP II	9	7
OALP III	11	6
OALP IV	-	7

**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. Govt. waived off PEL for Mumbai offshore block awarded under OALP Bid Round III, reducing the number of PEL from 123 to 122*

Figure 6.9: Status of PEL in OALP Bid Rounds



ii. FTG Survey

As on 31st March 2020, 20,000 LKM of Full Tensor Gradiometry (FTG) data has been acquired in Assam and Kutch Blocks.

iii. Actual Exploration Work Programme

As on 31st March 2020, contractors of the blocks have acquired **3599.50** LKM of 2D Seismic data and **4166.90** Sq. km. of 3D Seismic data.

7 UNCONVENTIONAL HYDROCARBONS

Unconventional resources exist in petroleum accumulations that are pervasive throughout a large area and are not significantly affected by hydrodynamic influences (also called "continuous-type deposit"). Usually there is not an obvious structural or stratigraphic trap.

These include deposits like Coal Bed Methane (CBM), Shale Gas/Oil, Gas Hydrates etc. that lack the porosity and permeability of conventional reservoirs required to flow without stimulation at economic rates. Such accumulations require specialized extraction technology (e.g., dewatering of CBM, hydraulic fracturing, horizontal drilling etc.). The target volumes are larger. Huge number of wells are required to exploit the resources, leading to expensive development per unit of energy, making it a highly capital intensive project.

Government of India has mooted an array of policies since 1997 for effective extraction and utilization of these resources. A background of the activities carried out in CBM, Shale Gas/Oil and Gas Hydrates in India along with the government-formulated reforms shall be discussed in the subsequent sections.

7.1 Coal Bed Methane

CBM is a form of natural gas generated during the process of coalification and absorbed into solid matrix of the coal. It is classified as unconventional source of natural gas owing to its nature of occurrence.

India, having the fifth largest proven coal reserve in the world, presents a significant opportunity for considering CBM as an alternative source for

augmenting India's energy resource, keeping in line with the vision of reducing hydrocarbon import and making India gas economic.

CBM Policy Reforms

In order to harness CBM potential in the country, the Government of India formulated CBM Policy in 1997, wherein CBM being Natural Gas is explored and exploited under the provisions of Oil Fields (Regulation and Development) Act 1948 (ORD Act 1948) and Petroleum & Natural Gas Rules 1959 (P&NG Rules 1959) administered by Ministry of Petroleum & Natural Gas (MoPNG).

2018

The Government of India notified a Policy framework for Exploration and Exploitation of Unconventional hydrocarbons in existing acreages under existing Production Sharing Contracts (PSC), Coal Bed Methane (CBM) Contracts and Nomination fields.

2017

A Policy framework for Early Monetization of CBM was introduced to develop alternate sources of natural gas including CBM and promote gas economy. This policy was formulated to provide marketing and pricing freedom for Coal Bed Methane (CBM) and streamline the operational issues in the existing blocks.

2016

Unified Licensing Policy under Hydrocarbon Exploration and Licensing Policy (HELP) was introduced wherein all types of hydrocarbon resources, both conventional and unconventional were allowed to be explored and exploited. The Open Acreage Licensing Policy (OALP) to carry out Exploration and Production from areas which are either, free or relinquished and Discovered Small Field (DSF) Policy to exploit resources from already discovered fields are two such policies within the HELP regime.

2015

The Government of India, granted permission to Coal India Limited (CIL) and its subsidiaries to explore and produce CBM from its areas under Coal Mining Lease allotted to them, thereby, dispensing the requirement of having additional License from Ministry of Petroleum and Natural Gas. This was formulated to increase the area under CBM exploration and to enhance and accelerate the CBM production in the country from Coal mining areas, (Re-notified in 2018).

2007

CBM Phases & Extensions Policy was framed to provide a transparent and consistent framework for granting extension in exploration phases, under CBM Contracts.

Summary of CBM Bid Rounds

A Memorandum of Understanding (MoU) was signed between the Ministry of Coal and the Ministry of Petroleum and Natural Gas, to act in a co-operative manner for development of CBM. As per the policy, Ministry of Petroleum & Natural Gas (MoPNG) became the administrative Ministry and Directorate General of Hydrocarbons (DGH) was made the nodal agency for development of CBM in the country.

About 26,000 sq. km. was identified for CBM exploration in the country. The first bidding round commenced in 2001. Subsequently, there were 3 other bidding rounds in the years 2003, 2005 and 2008, respectively. 30 CBM blocks were awarded under these rounds, 2 blocks were awarded on nomination basis and 1 under Foreign Investment Promotion Board Route. Around 16,613 sq. km. of the total prospective area has been awarded till date. These CBM blocks are in the states of Andhra Pradesh, Assam, Chhattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu and West Bengal.

The total prognosticated CBM resource for the awarded 33 CBM blocks, is about 62.4 TCF (1,767 BCM), of which, 10.48 TCF (296.9 BCM) has been established as Gas-Inplace (GIP).

Status of the awarded CBM blocks

At present, out of the 33 CBM blocks, 10 are active, 4 of which are in production phase, 4 in development phase and 2 in exploration phase.

The first commercial production from the CBM blocks commenced in the year 2007 from Raniganj (South) block operated by M/s. Great Eastern Energy Corp. Ltd. (GEECL). Raniganj (East) Block Operated by M/s. Essar Oil & Gas Exploration & Production Ltd (EOGEPL) started its commercial production from July 2016, Sohagpur (West) operated by M/s. Reliance Industries ltd. (RIL) started producing from March 2017 and Bokaro operated by M/s. Oil and Natural Gas Ltd. (ONGC) from August 2019. In addition to this incidental CBM gas is being produced during testing of CBM wells in Jharia block operated by ONGC and Sohagpur (East), operated by RIL.

The cumulative CBM production from these blocks as of FY 2019-20 is 3.7 BCM. The average gas production rate during FY 2019-20 was 1.79 MMSCMD.

To date, most of the CBM exploration and production activities in India are pursued by domestic Indian companies.

Major activities in CBM Blocks in FY 2019-20

- Start of Commercial Production from Bokaro block.
- Approval of RFDP for Jharia block

CBM Resources and Block Performances

The Gondwana sediments of eastern India host the bulk of India's coal reserves and all the current CBM producing blocks. Majority of the best prospective areas for CBM development are found to be in eastern India, situated in the belt of Damodar-Koel valley and Son valley.

A drastic increase in the production of Sohagpur west block can be attributed to the commissioning of Shahdol – Phulpur Gas Pipeline (SHPPL), operating from Shahdol in Madhya Pradesh to Phulpur in Uttar Pradesh where it hooks up with Gas Authority of India (GAIL)'s existing Hazira-Vijaipur-Jagdishpur (HVJ) pipeline network, laid by Reliance Gas Pipelines (RGPL), a subsidiary of RIL.

CBM's initial reserve & ultimate reserve has increased drastically since last 10 years. Taking 2008 as base year the initial reserve has increased approximately by 108% and ultimate reserve has increased approximately by 90%.

Table 7.1: Status of blocks under CBM

CBM Round*	Launch year	Signing year	Offered	Awarded	Operational
I	2001	2002	7	5	5
II	2003	2004	9	8	0
III	2005	2006	10	10	1
IV	2008	2010	10	7	1

**3 CBM Blocks were awarded on nomination basis. All of them are operational*

Table 7.2: Snapshot of CBM resources in India

Total CBM rounds conducted	4
No. of CBM Blocks awarded in 4 rounds	33
Coal bearing Area for CBM	26,000 Sq. Km.
Area covered under 33 blocks	16,613 Sq. Km. (64%)
CBM Resources in the 26,000 sq. km area	2,600 BCM (91.8 TCF)
CBM Resources (from 33 Blocks)	1,767.06 BCM (62.4 TCF)
Established CBM Reserves (GIP)	296.9 BCM (10.48 TCF)
Commercial Production commenced	Jul-07
Total No. of Wells drilled	980
Investment made (till FY-2019-20)*	Around US$ 2.1 Billion
Avg. Gas Production (FY 2019-20)	1.79 MMSCMD from 4 CBM Blocks
No. of CBM Blocks in Development/Production Phase	8
No. of CBM Blocks in Exploration Phase	2
No. of CBM Blocks Under Relinquishment	12
No. of CBM Blocks Relinquished	10
No.of CBM Blocks Terminated (under arbitration)	1
Annual CBM Production in FY 2019-20	655.41 MMSCM
Cumulative Production till Mar-2020	3,735 MMSCM
Expected cumulative production in next 5 years (FY 20-21 till FY 25-26)	12.89 MMSCM

**Investments made in 2019-20 are yet to be audited*

Table 7.3: State-wise distribution of CBM Resources in India

No.	STATE	Estimated CBM resources (IN BCM)	Estimated CBM resources (IN TCF)	GIIP (in TCF)
1	Jharkhand	722.08	25.5	1.99
2	Rajasthan	359.62	12.7	-
3	Gujarat	351.13	12.4	-
4	Odisha	243.52	8.6	-
5	Chhattisgarh	240.69	8.5	-
6	Madhya Pradesh	218.04	7.7	3.64
7	West Bengal	218.04	7.7	4.85
8	Tamil Nadu	104.77	3.7	-
9	Telangana & Andhra Pradesh	99.11	3.5	-
10	Maharashtra	33.98	1.2	-
11	North east	8.50	0.3	-
Total CBM Resource		**2599.48**	**91.8**	**10.48**

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

Table 7.4: Status of CBM Blocks

No.	Block	State	Present Area (SKM)	Contractor (PI%)	Contract signed on	Present Status
CBM BLOCKS OFFERED ON NOMINATION/FIPB ROUTE						
1	Raniganj (South)	West Bengal	210	GEECL (100)	31.05.2001	Production
2	Raniganj (North)	West Bengal	311.8	ONGC (74), CIL (26)	06.02.2003	Development
3	Jharia	Jharkhand	67.1	ONGC (74), CIL (26)	06.02.2003	Development/ incidental production
CBM ROUND-I						
4	RG(East)-CBM-2001/I	West Bengal	500	EOGEPL (100)	26.07.2002	Production
5	SP(East)-CBM-2001/I	Madhya Pradesh	495	RIL (100)	26.07.2002	Development
6	SP(West)-CBM-2001/I	Madhya Pradesh	500	RIL (100)	26.07.2002	Production
7	BK-CBM-2001/I	Jharkhand	75	ONGC (80), IOC (20)	26.07.2002	Production
8	NK-CBM-2001/I	Jharkhand	271.5	ONGC (55), IOC (20), PEPL (25)	26.07.2002	Development
CBM ROUND-II						
9	SH(N)-CBM-2003/II	Chhattisgarh	825	RIL (100)	06.02.2004	Relinquished
10	BS (1)-CBM-2003/II	Rajasthan	1045	RIL (100)	06.02.2004	Under Relinquishment
11	BS (2)-CBM-2003/II	Rajasthan	1020	RIL (100)	06.02.2004	Under Relinquishment
12	SK-CBM-2003/II	Jharkhand	70	ONGC (100)	06.02.2004	Under Relinquishment
13	NK(W)-CBM-2003/II	Jharkhand	267	ONGC (100)	06.02.2004	Relinquished
14	ST-CBM-2003/II	Madhya Pradesh	714	ONGC (100)	06.02.2004	Relinquished
15	WD-CBM-2003/II	Maharashtra	503	ONGC (100)	06.02.2004	Relinquished
16	BS (3)-CBM-2003/II	Rajasthan	790	ONGC (70), GSPC (30)	06.02.2004	Relinquished
CBM ROUND-III						
17	SP(N)-CBM-2005/III	Madhya Pradesh	609	R-Infra (55), RNRL (45)	07.11.2006	Exploration
18	SR-CBM-2005/III	Madhya Pradesh	330	DIL (90), Coal Gas (10)	07.11.2006	Under Relinquishment
19	RM-CBM-2005/III	Jharkhand	469	Dart Energy (35), GAIL (35)-EIG (15), TATA Power (15)	07.11.2006	Under Relinquishment
20	GV(N)-CBM-2005/III	Telangana	386	Coal Gas (10), DIL (40), Adinath (50)	07.11.2006	Relinquished

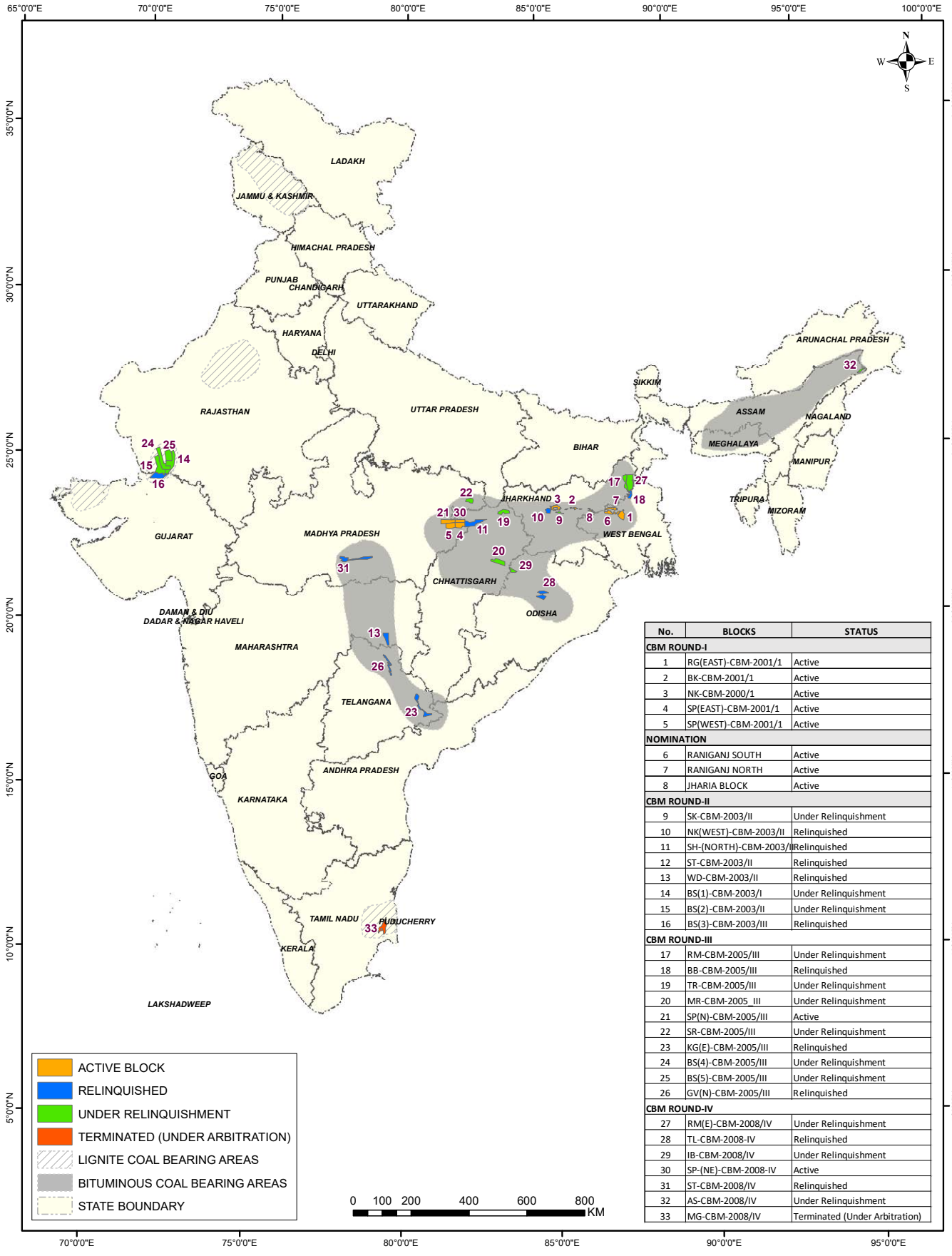
No.	Block	State	Present Area (SKM)	Contractor (PI%)	Contract signed on	Present Status
21	BB-CBM-2005/III	West Bengal	248	British Petroleum (100)	16.11.2006	Relinquished
22	MR-CBM-2005/III	Chhattisgarh	634	Dart Energy (35), GAIL (35), EIG (15), TATA Power (15)	07.11.2006	Under Relinquishment
23	TR-CBM-2005/III	Chhattisgarh	458	Dart Energy (35), GAIL (35), EIG (15), TATA Power (15)	07.11.2006	Under relinquishment
24	BS (4)-CBM-2005/III	Rajasthan	1168	REL (45), RNRL (45), Geopetrol (10)	07.11.2006	Under Relinquishment
25	BS (5)-CBM-2005/III	Rajasthan	739	REL (45), RNRL (45), Geopetrol (10)	07.11.2006	Under Relinquishment
26	KG (E)-CBM-2005/III	Andhra Pra-desh	750	REL (45), RNRL(45), Geo-petrol (10)	07.11.2006	Relinquished
			CBM ROUND-IV			
27	AS-CBM-2008/IV	Assam	113	Dart Energy (10), OIL (90)	29.07.2010	Under Relinquishment
28	MG-CBM-2008/IV	Tamil Nadu	667	GEECL (100)	29.07.2010	Under Arbitration
29	RM(E)-CBM-2008/IV	Jharkhand	1128	EOGEPL (100)	29.07.2010	Under Relinquishment
30	TL-CBM-2008/IV	Odisha	557	EOGEPL (100)	29.07.2010	Relinquished
31	IB-CBM-2008/IV	Odisha	209	EOGEPL (100)	29.07.2010	Under Relinquishment
32	SP(NE)-CBM-2008/IV	Madhya Pradesh & Chhattisgarh	339	EOGEPL (100)	29.07.2010	Exploration
33	ST-CBM-2008/IV	Madhya Pradesh	714	Dart Energy (80), TATA Power (20)	29.07.2010	Relinquished

Table 7.5: Gas Initially In Place (GIIP) and CBM Reserves of the Active Blocks

No.	Block Name	Put on Production	GIIP (BCM)	GIIP (TCF)	Rec. Reserves (BCM)	Rec. Reserves (TCF)	Cum. Production (MMSCM)	Cum. Production (BCF)	Total wells drilled
1	RG(E)-CBM-2001/I	Jul-2016	60.77	2.15	28.12	0.99	1463.6	51.69	348
2	SP(W)-CBM-2001/I	Mar-2017	55.50	1.96	15.44	0.55	914.0	32.28	305
3	BK-CBM-2001/I	Aug-2019	30.18	1.07	3.68	0.13	0.22	0.01	66
4	Raniganj (South)	Jul-2007	69.09	2.44	5.29	0.19	1,327.80	46.89	156
5	SP(E)-CBM-2001/I	-	47.70	1.68	16.70	0.59	-	-	37
6	Jharia*	Jan-2012	16.70	0.59	2.73	0.10	29.50	1.04	16
7	Raniganj (North)	-	7.43	0.26	1.86	0.07	-	-	3
8	NK-CBM-2001/I	-	9.53	0.34	1.46	0.05	-	-	49
Total			**296.9**	**10.48**	**75.28**	**2.66**	**3,735**	**131.90**	**980**

**On incidental production; Inplace and recoverable based on the RFDP (approved on 09.09.2019)*

Map showing CBM Blocks alongwith Coal Bearing Areas



No.	BLOCKS	STATUS
CBM ROUND-I		
1	RG(EAST)-CBM-2001/1	Active
2	BK-CBM-2001/1	Active
3	NK-CBM-2000/1	Active
4	SP(EAST)-CBM-2001/1	Active
5	SP(WEST)-CBM-2001/1	Active
NOMINATION		
6	RANIGANJ SOUTH	Active
7	RANIGANJ NORTH	Active
8	JHARIA BLOCK	Active
CBM ROUND-II		
9	SK-CBM-2003/II	Under Relinquishment
10	NK(WEST)-CBM-2003/II	Relinquished
11	SH-(NORTH)-CBM-2003/II	Relinquished
12	ST-CBM-2003/II	Relinquished
13	WD-CBM-2003/II	Relinquished
14	BS(1)-CBM-2003/I	Under Relinquishment
15	BS(2)-CBM-2003/II	Under Relinquishment
16	BS(3)-CBM-2003/III	Relinquished
CBM ROUND-III		
17	RM-CBM-2005/III	Under Relinquishment
18	BB-CBM-2005/III	Relinquished
19	TR-CBM-2005/III	Under Relinquishment
20	MR-CBM-2005_III	Under Relinquishment
21	SP(N)-CBM-2005/III	Active
22	SR-CBM-2005/III	Under Relinquishment
23	KG(E)-CBM-2005/III	Relinquished
24	BS(4)-CBM-2005/III	Under Relinquishment
25	BS(5)-CBM-2005/III	Under Relinquishment
26	GV(N)-CBM-2005/III	Relinquished
CBM ROUND-IV		
27	RM(E)-CBM-2008/IV	Under Relinquishment
28	TL-CBM-2008-IV	Relinquished
29	IB-CBM-2008/IV	Under Relinquishment
30	SP-(NE)-CBM-2008-IV	Active
31	ST-CBM-2008/IV	Relinquished
32	AS-CBM-2008/IV	Under Relinquishment
33	MG-CBM-2008/IV	Terminated (Under Arbitration)

Figure 7.1: CBM Production trend for last 10 years (in MMSCM)

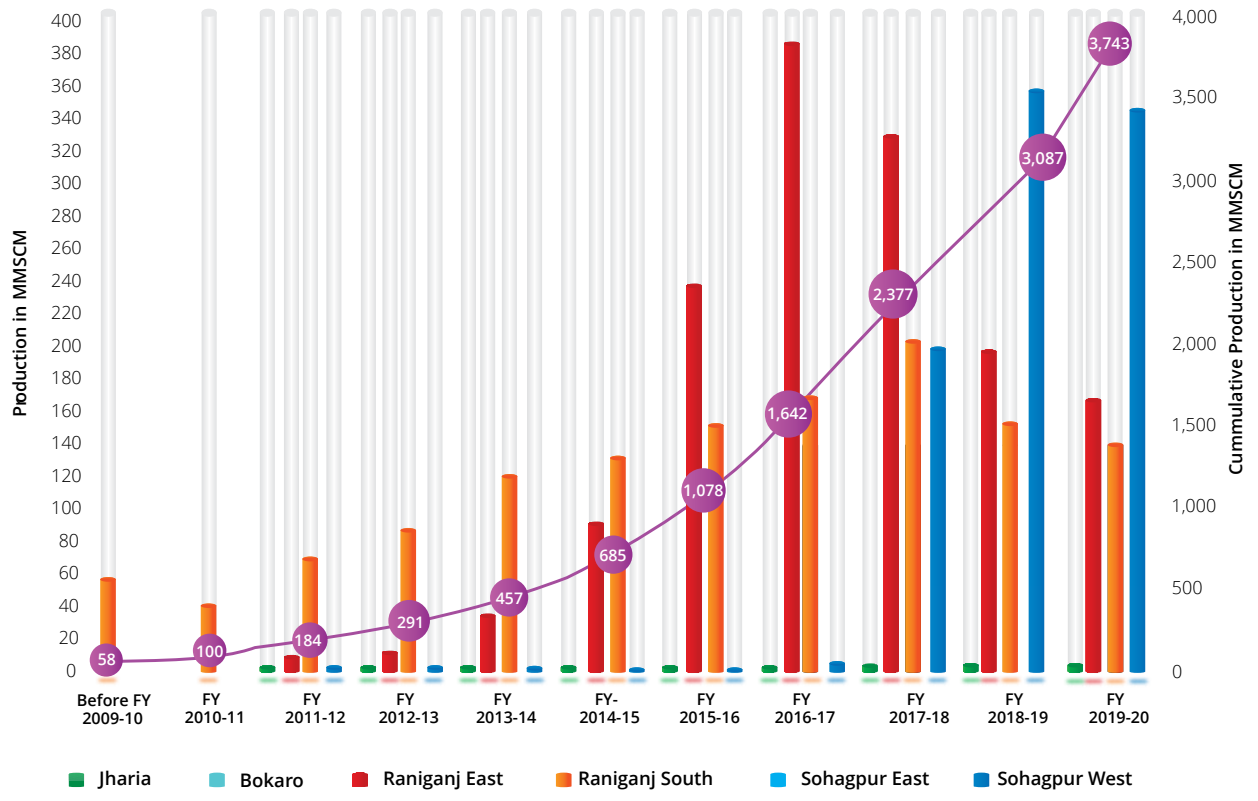
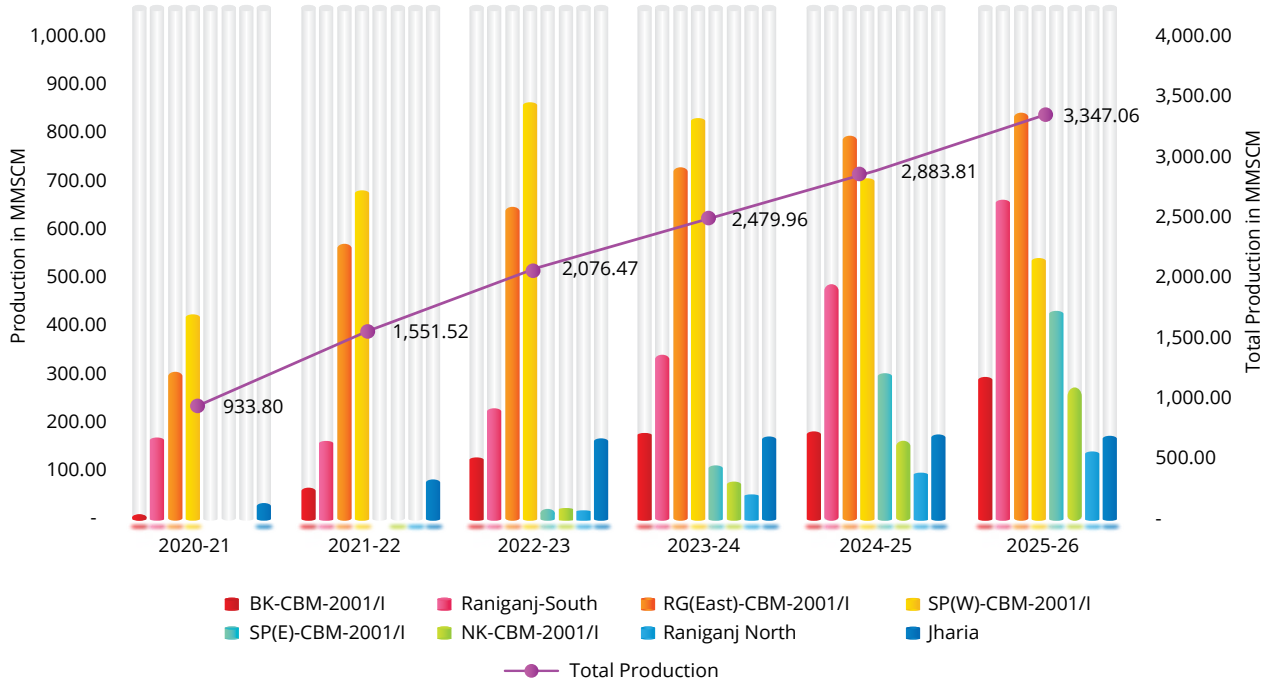


Figure 7.2: CBM future production trend (next 5 years)



7.2 Shale Gas/Oil

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 unconventional resource due to their nature of occurrence and method of extraction. In general, shales have insufficient permeability (usually in Nano Darcy i.e. 10^{-9} D) for fluid flow to a well bore.

The shale gas/oil is produced commercially when sufficient fracture conductivity is induced by hydraulic fracturing.

In contrast to the conventional play exploration where the risk profile is governed by the presence and effectiveness of source, reservoir, trap, timing and migration of hydrocarbon, shale gas/oil exploration has a much different and usually more predictable risk profile. The gas shale itself contains all of the elements of petroleum risk as mentioned.

The producibility of shale gas is not just limited to a single prospect but to a larger geographic region. Thus, in a proven shale play, the challenge is to develop the proper drilling and completion techniques to optimize the gas production rate versus capital employed and operating costs.

In India, a preliminary resource assessment of Shale gas/oil was carried out by three different organisations.

In 2011, the United States Geological Survey (USGS) estimated the technically recoverable Shale gas/oil as 6.1 TCF for 3 basins: Cambay, Krishna-Godavari (KG) and Cauvery. Again in 2014, it estimated a technical recoverable volume of 62 million barrels of shale oil in Cambay Basin alone.

In 2013, the National Oil Company, ONGC estimated Shale Gas resources of 187.5 TCF from 5 sedimentary basins; Cambay, KG, Cauvery, Ganga and Assam.

CMPDI in July 2013 had estimated around 45.8 TCF in the Gondwana basin.

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. The companies were required to carry out exploration in their PML and ML areas in three phases.

Shale Gas/Oil Policy Reforms

In addition to the policies notified in 2016 (HELP) and 2018 (Unconventional), in Oct 2018, a policy framework to promote and incentivize Enhanced Recovery Methods for Oil and Gas was notified by the Ministry of Petroleum and Natural Gas, Government of India.

Under this policy, fiscal incentives are provided from the first day of the entire production from future discoveries of unconventional hydrocarbons (Shale Gas/Oil and Gas Hydrate). Many CBM operators have shown interests for exploiting the Shale Gas Resources in their region.

Summary of Shale Gas/Oil Activities in India

Under the Shale Gas Policy - 2013, 50 blocks in 4 basins; Assam, Krishna Godavari, Cauvery & Cambay were identified by ONGC and 6 blocks in 2 basins; Jaisalmer and Assam were identified by OIL in the Phase-I of exploration which ended in April-2017.

Till FY 2019-20, ONGC had drilled a total of 29 wells in 4 basins and OIL has drilled 4 shale wells in 2 basins.

Activities carried in FY 2019-20

Activities carried out during the year 2019-20 are as follows:

ONGC

During the FY 2019-20, two exclusive shale wells (NJSGA in Cambay Basin and MDSGA in KG Basin) and one dual objective well PGAE were drilled. At present, a dual objective well, LKEAA in KG Basin is under drilling.

Out of the 29 wells completed so far, across four basins viz. Cambay, KG, Cauvery and A&AA Basins, 10 are exclusive wells and 19 are dual objective wells. Indications of presence of shale oil have been recorded in some wells namely JMSGA, NSGB and NJSGA in Cambay Basin and WGSGA in KG Basin during activation after hydro-fracturing. In the shale well, NGSGA (Cambay Basin), a zone encountered within the Nawagam Middle Pay (Tight Reservoir) was hydro-fractured and on activation, produced oil.

The shale well WGSGA in KG Basin requires further activation whereas another well GNSGC in Cambay Basin is awaiting hydro-fracturing.

OIL

Conventional core analysis of wells of 5 wells namely Dandewala-26, Sologuri-2, Matimekhena-5 and South Tinali-5 have been completed.

Final evaluation reports of Jaisalmer PML in Rajasthan and Dibrugarh Extn. PML, Chabua PML, Dumduma PML in Assam incorporating the above conventional core results have been submitted to DGH.

Around 17 m of conventional core from well Balimara-6 of Dumduma PML was acquired for prospectivity evaluation of Barail shales. Basic Geochemical analysis have been carried out at OIL's own Laboratories.

Detail laboratory analysis is currently in progress at M/s Weatherford Laboratories. Two review meetings were held, one at Centre of Excellence for Energy Studies, OIL, Guwahati with DGH officials on 21.11.2019 and another was at DGH, Noida with OIL officials on 14.02.2020 to review shale gas activities carried out by OIL.

Two locations are identified in Jairampur Extn. PEL and Deomali PEL for acquiring conventional core against the target shale of Upper Tikak Parbat and Disang shales for evaluation. Environmental Clearance (EC) is awaited.

7.3 Gas Hydrates

National Gas Hydrate Programme (NGHP):

National Gas Hydrate Programme in the country is steered by the Ministry of Petroleum and Natural Gas and technically coordinated by Directorate General of Hydrocarbons (DGH). Two expeditions 01 & 02 have been completed under NGHP. Under Expedition-01 carried out on 2006, 39 holes at 21 sites were drilled and established physical presence of Gas Hydrates in Krishna Godavari, Mahanadi and Andaman but were non exploitable with available technologies. Expedition-02 was conducted in 2015 drilled 42 holes in 25 sites. Two distinct Gas hydrate bearing sand reservoir areas B & C were identified in KG basin and Area A sand-rich reservoir systems having limited formation of concentrated gas hydrate accumulations. Area-E drilled wells indicated the presence of gas hydrate, with a combination of fracture/displacement and pore-filling type gas hydrate.

NGHP Expedition-02 results are encouraging and further extensive studies are being carried out to assess the gas hydrate resource potential, reservoir characterization, reservoir delineation and geo-mechanical modelling for seafloor and wellbore stability and identification of sites for pilot production for testing. KG deep offshore Area B' & C' contain gas hydrate accumulations may be suitable sites for gas hydrate production testing under NGHP Expedition-03.

Technology for production of gas from gas hydrate is not yet matured and is at R & D stage world over. The planning and execution of NGHP Expedition-03 to test the technology and assess the commerciality of Gas Hydrates exploitation in Indian offshore. At present, Collation and interpretation of all data is being done to identify sites for pilot production testing. The objective of NGHP Expedition-03 is to carry out pilot production testing at a suitable site identified during the NGHP Expedition-02.

Way Forward

Efforts are in place to narrow down the area/ sites of interest for pilot production tests for pilot production test, comprehensive assessment of the Nation's Unconventional Resource potential and reservoir characterisation studies. The production technology is to be proved before venturing into the pilot production testing. NGHP member organizations are working on projects for the development of feasible Production technology. The various jobs being carried out by member organisation will envisage the potential resource and firm up strategy for the execution of Gas Hydrate pilot production testing in Indian offshore.

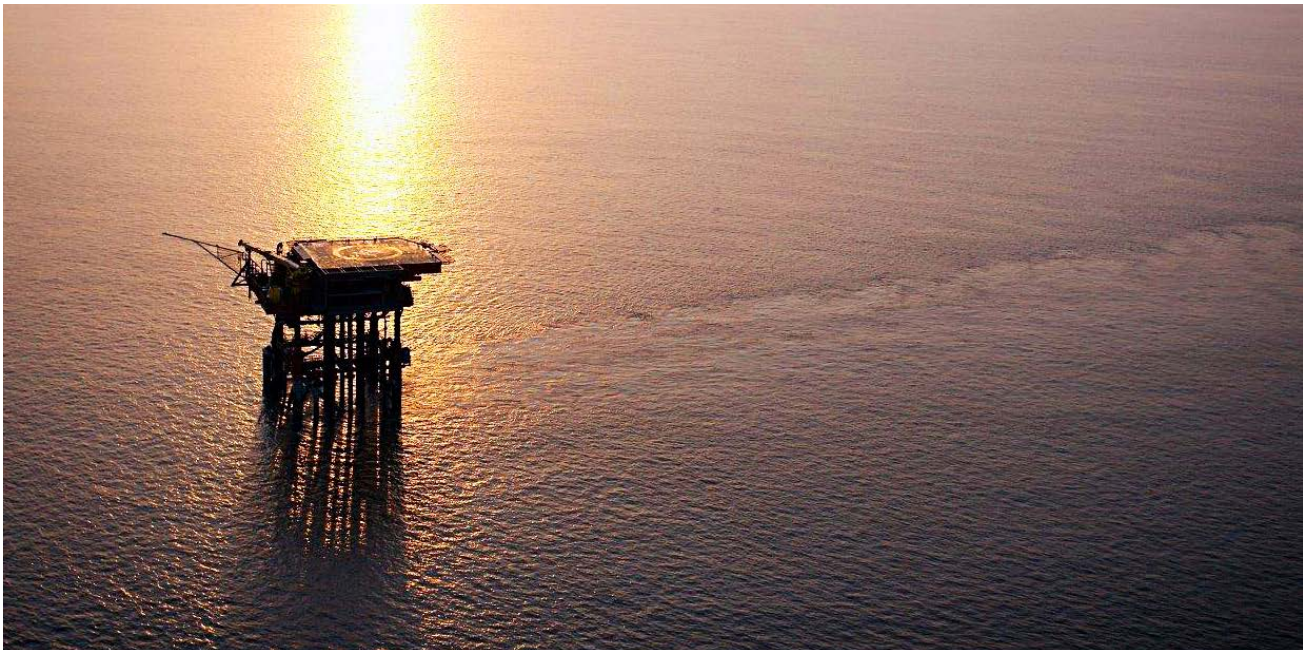


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TABLE 8.21: PML AREAS UNDER OPERATION IN DSF BID ROUND I - 2016 (RSC REGIME)

TABLE 8.22: PML AREAS UNDER OPERATION IN DSF BID ROUND II - 2018 (RSC REGIME)

TABLE 8.23: REGIME WISE PML AREA

TABLE 8.24: PEL/PML AREA TREND OVER LAST 10 YEARS

TABLE 8.25: DETAILS OF FISCAL TERMS UNDER WHICH BLOCKS WERE OFFERED UNDER VARIOUS PRE-NELP EXPLORATION ROUNDS IN INDIA

TABLE 8.26: FISCAL TERMS OF UPSTREAM OIL AND GAS BID ROUNDS - UPTO NELP ROUNDS

TABLE 8.27: PROGRESSIVE MODIFICATIONS OF TERMS & CONDITIONS IN DIFFERENT NELP ROUNDS

TABLE 8.28: PROGRESSIVE MODIFICATIONS OF TERMS & CONDITIONS IN DIFFERENT DSF AND OALP BIDDING ROUNDS

Conversion Factor

For Oil India Nomination Data

- For Assam: 1 BCM of Gas = 0.8868 MMToE;
- For Rajasthan: 1 BCM of Gas = 0.3846 MMToE;

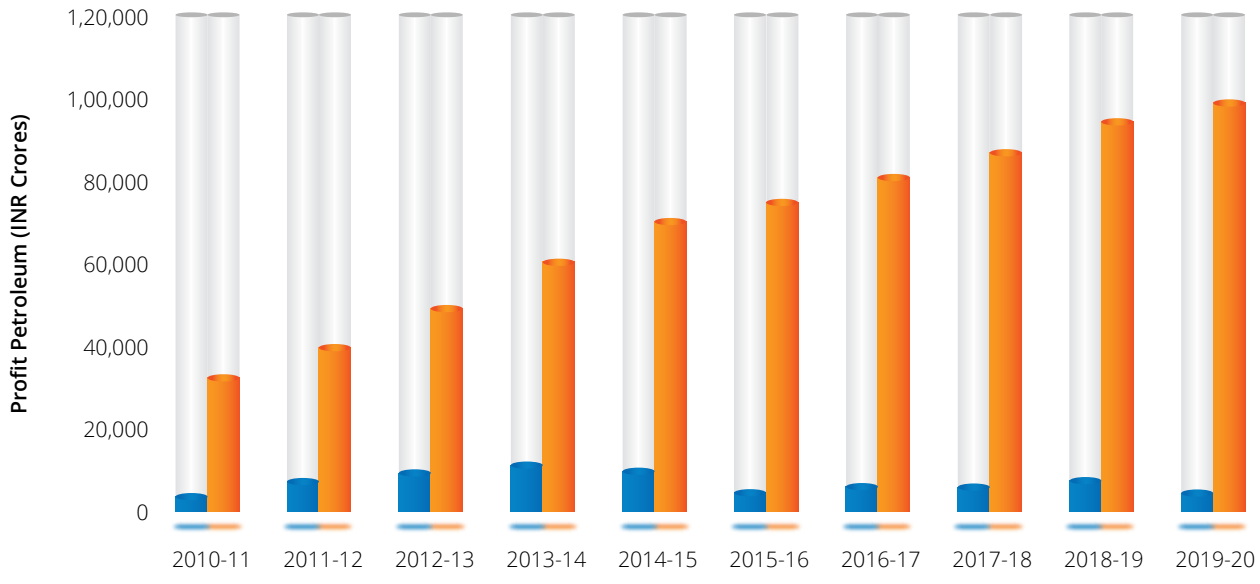
For ONGC, PSC/RSC/CBM: 1 BCM of Gas = 1 MMT of Oil

8.1 Contribution to Government Exchequer

8.1.1 Profit Petroleum

During the Financial Year 2019-20, Profit Petroleum of INR 4,480 Crores was contributed to Government Exchequer from the E&P operations under PSC regime. The cumulative profit petroleum earned up to 31st March 2020 was of the order of INR 99,061 Crores.

Fig 8.1 - Year-Wise Earned Profit Petroleum in last 10 years (in INR Crores)

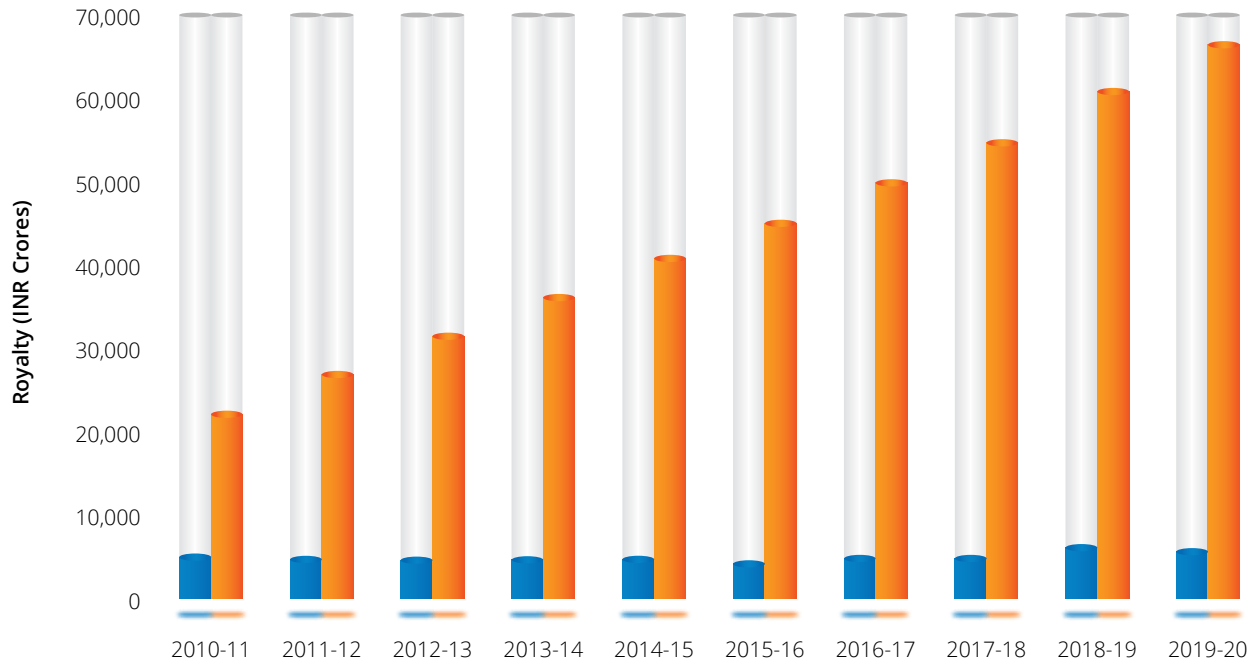


	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Annual	3,634	7,384	9,360	11,346	9,833	4,624	6,075	5,969	7,549	4,480
Cumulative	32,441	39,825	49,185	60,531	70,364	74,988	81,063	87,032	94,581	99,061

8.1.2 Royalty

During the Financial Year 2019-20, The Total Royalty received by central Exchequer was of the order of INR 5,625 Crores. The cumulative Royalty contributing to central exchequer till 31st March 2020 amounted to be INR 66,453 Crores.

Fig 8.2 - Year-wise Earned Profit Petroleum in last 10 years (in INR Crores)



	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Annual	4,975	4,725	4,596	4,652	4,706	4,208	4,824	4,837	6,129	5,625
Cumulative	22,150	26,875	31,471	36,123	40,829	45,037	49,862	54,699	60,828	66,453

8.2 MoU on Sectoral Cooperation

Table 8.1: Status of active MOUs signed between MOPNG/DGH & National and International Organisations in the area of upstream E&P sector

S. No.	MoU signed between	Agency, Country	MoU signed on	Valid upto	Objectives
1	Japan Oil, Gas Metals National Corporation (JOGMEC) & DGH	JOGMEC, Japan	16th February 2007	15th February 2023	⊙ Cooperation on methane hydrate technology. ⊙ Representatives of the parties shall seek to develop a plan of action to provide direction and coordination for collaboration on methane hydrate technology to be undertaken by JOGMEC and DGH pursuant to the MOU. ⊙ Collaborative activities under the MOU may include exchanges of technical knowledge and information, visits and holding meetings/ workshops by staff members engaged in research of mutual interest.
2	U.S. Geological Survey (USGS) of the Department of Interior of the United States of America & DGH	USGS, USA	16th December 2008	Open ended	Resource exploration hazards and environmental issues associated with Gas Hydrates, Field studies & research for Gas hydrate.

S. No.	MoU signed between	Agency, Country	MoU signed on	Valid upto	Objectives
3	Department of Energy of United States of America & MOPNG India	USDOE, USA	renewed on 6th June 2016	5th June 2021	Enhance & Accelerate Gas Hydrate exploration.
4	Department of State (DOS), USA & MOPNG GOI	DOS, USA	6th November 2010	Open ended	Exchange of knowledge and expertise in the areas concerning Shale Gas resource characterization and assessment in India.
5	Indian Space Research Organisation, India & MOPNG GOI	ISRO, India	1st June 2017	Open ended	To explore and identify potential opportunities of applications of space technologies and earth observation data sets inactivities related to exploration and production of conventional and unconventional petroleum and/or natural gas in India and in other regions. Mainly for ONGC projects.

8.3 RTI Information

Table 8.2: RTI for FY 2019-20

Ministry/ Department/ Organization	Quarter	Opening balance of Requests (as on start of Quarter)	No. of Requests Received during Quarter	Total no. of Requests (Column 3+4)	No. of Requests Transferred to other PAs	Decisions where Applications for Information rejected	Number of cases where disciplinary action taken against any officer in respect of administration of RTI Act
Directorate General of Hydrocarbons	1st Quarter	4	19	23	1	1 (4.34%)	-
	2nd Quarter	2	13	15	-	0 (0%)	-
	3rd Quarter	4	12	16	2	1 (6.25%)	-
	4th Quarter	-	16	16	1	1 (6.25%)	-

8.4 Active Companies in E&P Sector

Table 8.3: Companies in E&P Sector

Sl. No.	Company Name	Company Abbreviation	Pre-NELP Exploration	Pre-NELP Field	NELP	CBM	HELP	DSF
		PSU Companies						
1	Bharat Petro Resources Limited	BPRL			✓		✓	✓
2	Bharat Petroleum Corporation Limited	BPCL			✓			
3	Coal India Limited	CIL				✓		
4	Engineers India Limited	EIL			✓			
5	GAIL (India) Limited	GAIL			✓			
6	Gujarat State Petroleum Corporation Limited	GSPC	✓	✓	✓			
7	Hindustan Petroleum Corporation Limited	HPCL			✓			
8	Indian Oil Corporation Limited	IOCL	✓		✓	✓		✓
9	Oil and Natural Gas Corporation Limited	ONGC	✓		✓	✓	✓	✓
10	Oil India Limited	OIL	✓	✓	✓		✓	✓
11	Prize Petroleum Company Limited	PPCL			✓			✓
		Private Companies						
1	Adani Welspun Exploration Ltd.	AWEL			✓			✓
2	Adbhoot Estates Private Limited	ADBHOOT						✓
3	Arch Softwares Private Limited	ARCH						✓
4	ARSH Corporate Services Private Limited	ARSH						✓
5	Assam Company Limited	ACL		✓				
6	Bagadiya Brothers Private Limited	BBPL						✓
7	BDN Enterprises Private Limited	BDNEPL						✓
8	BF Infrastructure Limited	BFIL			✓			
9	Dart Energy	DE				✓		
10	Deep Industries Limited	DIL			✓			
11	Deep Natural Resources Limited	DNRL			✓			
12	Duggar Fiber Pvt Limited	DUGGAR						✓
13	Essar Oil Limited	EOL	✓			✓		
14	Focus Energy Limited	FEL	✓		✓			
15	Frost International Limited	FROST			✓			
16	Ganges Geo Resources Private Limited	GGRPL						✓
17	GEM Laboratories Private Limited	GEMLAB						✓
18	GEM Petro E&P Private Limited	GEMPETRO						✓
19	Geo Enpro Petroleum Limited	GEOENP		✓				
20	Great Eastern Energy Corporation Limited	GEECL				✓		
21	GNRL Oil & Gas Limited	GOGL		✓				
22	Hindustan Oil Exploration Company Limited	HOEC	✓	✓	✓		✓	✓
23	IMC Limited	IMCL			✓			
24	Invenire Eenergy Private Limited	INVENIRE						✓
25	Jubilant Energy (Kharsang) Private Limited	JEKPL		✓				
26	Jubilant Oil & Gas Private Limited	JOGPL			✓			
27	Jubilant Securities Private Limited	JSPL			✓			
28	Kanvel Finance Limited	KANVEL			✓			
29	Keerthi Industries Limited	KEERTHI						✓

Sl. No.	Company Name	Company Abbreviation	Pre-NELP Exploration	Pre-NELP Field	NELP	CBM	HELP	DSF
30	KEI-RSOS Petroleum & Energy Private Limited	KEI-RSOS						✓
31	KGN Industries Limited	KGNIL			✓			
32	KGN Oil & Gas Private Limited	KGNOGPL			✓			
33	Mahendra Infratech Private Limited	MIPL						✓
34	Megha Engineering and Infrastructures Limited	MEIL						✓
35	Mercator Petroleum Private Limited	MERCATOR			✓			
36	Monnet Ispat & Energy Limited	MIEL			✓			
37	Nippon Power Limited	NIPPON						✓
38	Oilmax Energy Private Limited	OILMAX						✓
39	Pan India Consultants	PANINDIA			✓			
40	PFH Oil And Gas Private Limited	PFH						✓
41	Prabha Energy Private Limited	PRABHA				✓		
42	Ramayna Ispat Private Limited	RAMAYNA						✓
43	Reliance Industries Limited	RIL			✓	✓	✓	
44	Reliance Infrastructure Limited	RINFRA				✓		
45	Reliance Natural Resources Limited	RNRL				✓		
46	Safal WSB Energy Private Limited	SAFAL			✓			
47	Savla Electronics Private Limited	SAVLA			✓			
48	Selan Exploration Technology Limited	SELAN		✓				
49	Shanno Business India Private Limited	SHANNO						✓
50	Shanti G.D. Ispat and Power Private Limited	SHANTIGD						✓
51	Shiv - Vani Oil & Gas Exploration Services Limited	SVOGL			✓			
52	Sun Petrochemical Private Limited	SUNPETRO		✓	✓			✓
53	Tata Petrodyne Limited	TPL		✓				
54	Vedanta Limited (Cairn Oil & Gas)	VEDANTA	✓		✓		✓	✓
55	Videocon Petroleum Limited	VPL		✓				
56	Vijayasri Bhaskar Industries Private Limited	VBIPL						✓
	Foreign Companies							
1	Birkbeck Investment Limited	BIRKBECK			✓			
2	BP Exploration (Alpha) Limited	BPEAL			✓		✓	
3	Cairn Energy Hydrocarbons Limited	CEHL	✓					
4	Deep Energy Llc	DEL			✓			
5	Geo-Global Resources Inc.	GGR	✓		✓			
6	Geo-Petrol International Inc.	GEOPET		✓				
7	Hardy Exploration & Production (India) Inc.	HEPI	✓					
8	Iservices Investment Limited	ISERVICES	✓					
9	Joshi Technologies Inc.	JTI		✓				
10	Newbury Oil Company Limited	NEWBURY	✓					
11	Oilex Limited	OILEX		✓				
12	Oilex-NL Holdings Limited	OILEX-NL		✓				
13	Ravva Oil (Singapore) Pte. Limited	ROS		✓				
14	South Asia Consultancy FZE	SAC						✓

8.5 Blocks and Fields under various Regimes (as on 31-03-2020)

Table 8.4: Blocks and Fields Operational under PSC

Sr No.	Bidding Round	Block Name	Basin	Location
1	Pre-NELP Exploration	AA-ON/7	AS	Onland
2		AA-ONJ/2	AS	Onland
3		AAP-ON-94/1	AS	Onland
4		CB-ON/2	CB	Onland
5		CB-ON/3	CB	Onland
6		CB-ON/7	CB	Onland
7		CB-OS/2	CB	Shallow Water
8		CY-OS/2	CY	Shallow Water
9		CY-OS-90/1 (PY-3)	CY	Shallow Water
10		RJ-ON/6	RJ	Onland
11		RJ-ON-90/1	RJ	Onland
Pre-NELP Exploration Total (11)				
1	Pre-NELP Field	ALLORA	CB	Onland
2		AMGURI	AS	Onland
3		ASJOL	CB	Onland
4		BAKROL	CB	Onland
5		BAOLA	CB	Onland
6		BHANDUT	CB	Onland
7		CAMBAY	CB	Onland
8		DHOLASAN	CB	Onland
9		DHOLKA	CB	Onland
10		HAZIRA	CB	Onland
11		KANAWARA	CB	Onland
12		KARJISAN	CB	Onland
13		KHARSANG	AS	Onland
14		LOHAR	CB	Onland
15		MODHERA	CB	Onland
16		NORTH KATHANA	CB	Onland
17		NORTH BALOL	CB	Onland
18		PY-1	CY	Shallow Water
19		RAVVA	KG	Shallow Water
20		UNAWA	CB	Onland
21		WAVEL	CB	Onland
Pre-NELP Field (21)				
1	NELP-I	KG-DWN-98/2	KG	Deep water
2		KG-DWN-98/3	KG	Deep water
3		NEC-OSN-97/2	MN	Shallow Water
4	NELP-II	CB-ONN-2000/1	CB	Onland
5	NELP-III	AA-ONN-2001/1	AS	Onland

Consortium (Participating Interest in %)	Date of Signing Contract	Awarded Area (In Sq.km)	Present Area (In Sq.km)	Status
ACL (100%)	19-02-1999	1,934.00	319.00	Exploratory
ONGC (100%)	07-11-2003	1,277.00	1,277.00	Exploratory
HOEC (26.882%) (Op.), OIL (44.086%), IOCL(29.032%)	30-06-1998	870.00	75.94	On Production
GSPC (80%) (Op.), GGR(20%)	12-04-2000	1,618.00	577.55	On Production
EOL(100%)	16-07-1998	574.00	132.78	On Production
HOEC (35%) (Op.), GSPC (35%), ONGC (30%)	23-11-2000	492.00	7.64	On Production
VEDANTA (40%) (Op.), ONGC (50%), TPL(10%)	30-06-1998	3,534.00	207.00	On Production
HEPI(75%) (Op.), GAIL (25%)	19-11-1996	5,010.00	859.00	Exploratory
HEPI(18%) (Op.), ONGC (40%),TPL(21%), HOEC (21%)	30-12-1994	81.00	81.00	On Production
FEL (7%) (Op.), ONGC (30%), ISERVICES(45.5%), NEWBURY (17.5%)	30-06-1998	5,378.00	2,176.00	On Production
VEDANTA (35%) (Op.),CEHL (35%), ONGC (30%)	15-05-1995	11,108.00	3,111.27	On Production
		31,876.00	**8,824.18**	-
GOGL(30%) (Op.), GSPC (70%)	23-02-2001	6.85	6.85	On Production
ACL (100%)	23-02-2001	52.75	52.75	On Production
HOEC (50%) (Op.), GSPC (50%)	03-02-1995	15.00	15.00	On Production
SELAN (100%)	13-03-1995	36.00	36.00	On Production
SUNPETRO(100%)	05-04-1995	4.00	4.00	On Production
OILEX-NL (40%) (Op.), GSPC (60%)	23-09-1994	6.00	6.00	On Production
OILEX (30%) (Op.), GSPC (55%), OILEX-NL (15%)	23-09-1994	161.00	161.00	On Production
GOGL(30%) (Op.), GSPC (70%)	23-02-2001	8.80	8.80	On Production
JTI (100%)	20-02-1995	48.00	48.00	On Production
SUNPETRO(33.33%)(Op.), GSPC (66.67%)	23-09-1994	50.00	50.00	On Production
GOGI(30%) (Op.), GSPC (70%)	23-02-2001	6.30	6.30	On Production
SELAN (100%)	16-02-2004	5.00	5.00	On Production
GEOENP(10%) (Op.), OIL (40%), JEKPL(25%), GEOPET (25%)	16-06-1995	10.00	10.00	On Production
SELAN (100%)	13-03-1995	5.00	5.00	On Production
SUNPETRO(100%)	23-02-2001	12.70	12.70	On Production
GOGI(30%) (Op.), GSPC (70%)	23-02-2001	12.20	12.20	On Production
HOEC (25%) (Op.), GSPC (45%), GOGL (30%)	23-02-2001	27.30	27.30	On Production
HOEC (100%)	06-10-1995	75.00	75.00	On Production
VEDANTA(22.5%) (Op.), ONGC (40%), ROS (12.5%), VPL (25%)	28-10-1994	331.26	331.26	On Production
GSPC (70%) (Op.), GOGL (30%)	23-02-2001	5.65	5.65	On Production
JTI (100%)	20-02-1995	9.00	9.00	On Production
		887.81	**887.81**	-
ONGC (100%)	12-04-2000	9,757.00	2,393.27	On Production
RIL(66.67%) (Op.), BPEAL (33.33%)	12-04-2000	7,645.00	1,135.24	On Production
RIL(66.67%) (Op.), BPEAL(33.33%)	12-04-2000	14,535.00	831.73	Exploratory
GSPC (50%) (Op.), GAIL (50%)	17-07-2001	1,424.00	57.05	On Production
ONGC (100%)	04-02-2003	3,018.35	968.54	On Production

Sr No.	Bidding Round	Block Name	Basin	Location
6	NELP-III	AA-ONN-2001/2	AS	Onland
7		CB-ONN-2001/1	CB	Onland
8		KG-OSN-2001/3	KG	Shallow Water
9	NELP-IV	AA-ONN-2002/1	AS	Onland
10		CB-ONN-2002/3	CB	Onland
11		CY-ONN-2002/2	CY	Onland
12	NELP-V	CB-ONN-2003/1	CB	Onland
13		CB-ONN-2003/2	CB	Onland
14		CB-OSN-2003/1	CB	Shallow Water
15		KG-ONN-2003/1	KG	Onland
16	NELP-VI	CB-ONN-2004/1	CB	Onland
17		CB-ONN-2004/2	CB	Onland
18		CB-ONN-2004/3	CB	Onland
19		CY-ONN-2004/2	CY	Onland
20		GS-OSN-2004/1	SU	Shallow Water
21		KG-ONN-2004/1	KG	Onland
22		KG-OSN-2004/1	KG	Shallow Water
23		MZ-ONN-2004/1	AAFB	Onland
24	NELP-VII	CB-ONN-2005/10	CB	Onland
25		CB-ONN-2005/9	CB	Onland
26		MB-OSN-2005/1	MB	Shallow Water
27		MB-OSN-2005/2	MB	Shallow Water
28		MB-OSN-2005/3	MB	Shallow Water
29		RJ-ONN-2005/1	RJ	Onland
30		SR-ONN-2005/1	SSRD	Onland
31		WB-ONN-2005/3	BP	Onland
32		WB-ONN-2005/4	BP	Onland
33	NELP-VIII	GK-OSN-2009/1	KC	Shallow Water
34		KG-OSN-2009/3	KG	Shallow Water
35		VN-ONN-2009/3	VN	Onland
36	NELP-IX	AA-ONN-2010/2	AS	Onland
37		AA-ONN-2010/3	AS	Onland
38		CB-ONN-2010/11	CB	Onland
39		CB-ONN-2010/3	CB	Onland
40		CB-ONN-2010/5	CB	Onland
41		CB-ONN-2010/8	CB	Onland
42		GK-OSN-2010/1	KC	Shallow Water
43		RJ-ONN-2010/2	RJ	Onland
44		VN-ONN-2010/1	VN	Onland
45		VN-ONN-2010/2	VN	Onland
NELP Rounds Total (45)				
PSC Grand Total (77)				

Consortium (Participating Interest in %)	Date of Signing Contract	Awarded Area (In Sq.km)	Present Area (In Sq.km)	Status
ONGC (80%) (Op.), IOCL(20%)	04-02-2003	5,340.00	2,660.00	Exploratory
ONGC (100%)	04-02-2003	215.00	26.00	On Production
ONGC (80%) (Op.), GSPC (10%), JOGPL (10%)	04-02-2003	1,850.00	530.50	On Production
JOGPL (20%) (Op.), GAIL (80%)	06-02-2004	1,680.00	1,260.00	Exploratory
GSPC (55%) (Op.), HPCL (15%), GGR(10%), JOGPL (20%)	06-02-2004	285.00	21.29	On Production
ONGC (60%) (Op.), BPRL (40%)	06-02-2004	280.00	140.00	Exploratory
SUNPETRO(100%)	23-09-2005	635.00	56.77	On Production
GSPC (50%) (Op.), JSPL (20%), GGR(10%), GAIL (20%)	23-09-2005	448.00	172.00	On Production
ONGC (100%)	23-09-2005	2,394.00	243.00	Exploratory
ONGC (51%) (Op.), VEDANTA(49%)	23-09-2005	1,697.00	54.46	On Production
ONGC (60%) (Op.), GSPC (40%)	02-03-2007	32.00	9.73	On Production
ONGC (55%) (Op.), GSPC (45%)	02-03-2007	423.00	88.36	On Production
ONGC (65%) (Op.), GSPC (35%)	02-03-2007	113.00	10.78	On Production
ONGC (80%) (Op.), BPCL(20%)	02-03-2007	375.00	126.80	Exploratory
ONGC (100%)	02-03-2007	6,589.00	552.00	Exploratory
OIL (90%) (Op.), GGR(10%)	02-03-2007	549.00	129.10	On Production
ONGC (100%)	02-03-2007	1,188.14*	205.90	Exploratory
OIL (85%) (Op.), SVOGL(15%)	02-03-2007	3,213.00	3,213.00	Exploratory
ONGC (100%)	22-12-2008	270.00	270.00	Exploratory
MERCATOR(100%)	22-12-2008	132.20	79.22	On Production
ONGC (80%) (Op.), GSPC (20%)	22-12-2008	2,811.00	1,250.00	Exploratory
AWEL(100%)	22-12-2008	1,191.00	714.60	Exploratory
ONGC (70%) (Op.), EOL(30%)	22-12-2008	2,810.00	1,685.00	Exploratory
HOEC (33.34%) (Op.), BPRL (33.33%), IMCL (33.33%)	22-12-2008	1,424.00	1,151.00	Exploratory
DEL (10%) (Op.), DIL(70%), KFL (10%), SAVLA (10%)	22-12-2008	789.00	789.00	Exploratory
ONGC (100%)	22-12-2008	4,001.00	4,001.00	Exploratory
ONGC (75%) (Op.), OIL (25%)	22-12-2008	3,940.00	3,940.00	Exploratory
ONGC(50), AWEL(25), IOC(25)	30-06-2010	1,264.00	517.00	Exploratory
CIL(100%)	30-06-2010	1,988.00	1,988.00	Exploratory
ONGC (100%)	30-06-2010	1,250.00	462.00	Exploratory
OIL (50%) (Op.), ONGC (30%), GAIL (20%)	28-03-2012	396.00	396.00	Exploratory
OIL (40%) (Op.), ONGC (40%), BPRL (20%)	28-03-2012	171.00	171.00	Exploratory
BPRL (25%) (Op.), BFIL (15%), MIEL (15%), GAIL (25%), EIL(20%)	28-03-2012	144.43	21.10	Exploratory
DEL (10%) (Op.), KGNOGPL (90%)	28-03-2012	534.00	534.00	Exploratory
PANINDIA (20%) (Op.), FROST(80%)	28-03-2012	49.00	49.00	Exploratory
BPRL (25%) (Op.), EIL (20%), BFIL (20%), MIEL(10%), GAIL (25%)	30-08-2012	42.00	42.00	On Production
ONGC (60%) (Op.), OIL (30%), GAIL (10%)	28-03-2012	1,361.00	1,077.00	Exploratory
FEL (10%) (Op.), BIRKBECK (90%)	28-03-2012	535.00	535.00	Exploratory
DEL (10%) (Op.), KGNIL (90%)	28-03-2012	3,776.00	3,776.00	Exploratory
DEL (10%) (Op.), DNRL (15%), SAFAL (75%)	28-03-2012	4,909.00	4,909.00	Exploratory
		97,473.12	**43,242.44**	**-**
		130,236.93	**52,954.43**	**-**

**Includes an area of 57.14 sq. km. additionally awarded*

Basins Abbreviation

Assam Shelf	AS	Deccan Syneclise	DS
Assam Arakan Fold Belt	AAFB	Ganga Punjab	GP
Cambay	CB	Himalayan Foreland	HF
Cauvery	CY	Bhima Kaladgi	BK
Krishna Godavari	KG	Chhattisgarh	CG
Mumbai Offshore	MB	Bastar	BS
Rajasthan	RJ	Kerala Konkan	KK
Andaman	AN	Satpura-South Rewa-Damodar	SSRD
Mahanadi	MN	Karewa	KW
Kutch	KC	Spiti Zanskar	SZ
Saurashtra	SU	Narmada	NA
Vindhyan	VN	Pranhita Godavari	PG
Bengal Purnea	BP	Cuddapah	CD

Table 8.5: Contract Areas Awarded under Discovered Small Field Bid Round-I

SL. No	Basin	Block Name	Consortium (Participating Interest In %)	Date of Signing Contract	Awarded Area	Present Area
					(in sq.km)	
Current Active Blocks (30 Blocks)						
Shallow Water						
1	MB	MB/OSDSF/B37/2016	SUNPETRO (100)	27-03-2017	124.00	124.00
2	MB	MB/OSDSF/B9/2016	AWEL (100)	27-03-2017	183.00	183.00
3	MB	MB/OSDSF/B15/2016	BPRL (100)	27-03-2017	41.00	41.00
4	MB	MB/OSDSF/B127E/2016	BPRL (100)	27-03-2017	39.30	39.30
5	MB	MB/OSDSF/B80/2016	HOEC(50) (Op.), ADBHOOT (50)	27-03-2017	56.02	56.02
6	KC	GK/OSDSF/KD/2016	IOCL (100)	27-03-2017	46.00	46.00
7	KG	KG/OSDSF/GSKV1/2016	KEI-RSOS (100)	27-03-2017	24.20	24.20
SUB TOTAL					**513.52**	**513.52**
ONLAND						
8	AAFB	AA/ONDSF/HILARA/2016	PPCL (100)	27-03-2017	9.60	9.60
9	AS	AA/ONDSF/ LAXMIJAN/2016	MEIL (100)	27-03-2017	8.90	8.90
10	AS	AA/ONDSF/ PATHARIA/2016	VBIPL (100)	27-03-2017	19.15	19.15
11	AS	AA/ONDSF/ BARSILLA/2016	RAMAYNA (29) (Op.), BDNEPL (29), DUGGAR (23), MIPL (19)	27-03-2017	6.22	6.22
12	AS	AA/ONDSF/ CHARAIDEO/2016	OILMAX (100)	27-03-2017	11.50	11.50

SL. No	Basin	Block Name	Consortium (Participating Interest In %)	Date of Signing Contract	Awarded Area	Present Area
					(in sq.km)	
13	AS	AA/ONDSF/DIPLING/2016	RAMAYNA (29) (Op.), BDNEPL (29), DUGGAR (23), MIPL (19)	27-03-2017	28.17	28.17
14	AS	AA/ONDSF/DUARMARA/2016	OILMAX (100)	27-03-2017	8.91	8.91
15	AS	AA/ONDSF/ JERAIPATHAR/2016	IOCL (100)	27-03-2017	10.10	10.10
16	AS	AA/ONDSF/KHEREM/2016	HOEC (40) (Op.), OIL (40), PPCL (20)	27-03-2017	16.45	16.45
17	CB	CB/ONDSF/ELAO/2016	PFH (100)	27-03-2017	9.98	9.98
18	CB	CB/ONDSF/SOUTH PATAN/2016	SAC (100)	27-03-2017	9.88	9.88
19	CB	CB/ONDSF/ KHAMBEL/2016	MEIL (100)	27-03-2017	9.78	9.78
20	CB	CB/ONDSF/KAMBOI/2016	NIPPON (100)	27-03-2017	2.35	2.35
21	CB	CB/ONDSF/WEST BECHRAJI/2016	NIPPON (100)	27-03-2017	9.15	9.15
22	CY	CY/ONDSF/ NEDUVASAL/2016	GEMLAB (100)	27-03-2017	10.01	10.01
23	CY	CY/ONDSF/ KARAIKAL/2016	BPRL (100)	27-03-2017	10.40	10.40
24	KG	KG/ONDSF/ ACHANTA/2016	PFH (100)	27-03-2017	9.63	9.63
25	KG	KG/ONDSF/ BHIMANAPALLI/2016	PFH (100)	27-03-2017	15.10	15.10
26	KG	KG/ONDSF/ KORAVAKA/2016	KEI-RSOS (100)	27-03-2017	9.90	9.90
27	KG	KG/ONDSF/ SANARUDRAVARAM/2016	PPCL (100)	27-03-2017	9.35	9.35
28	RJ	RJ/ONDSF/BAKHRI TIBBA/2016	BPRL (100)	27-03-2017	13.40	13.40
29	RJ	RJ/ONDSF/ SADEWALA/2016	BPRL (100)	27-03-2017	10.30	10.30
30	VN	VN/ONDSF/NOHTA/2016	IOCL (100)	27-03-2017	15.00	15.00
SUB TOTAL					**263.23**	**263.23**
TOTAL AREA :					**776.75**	**776.75**

Table 8.6: Contract Areas Awarded under Discovered Small Field Bid Round-II

SL. No	Basin	Block Name	Consortium (Participating Interest In %)	Date of Signing Contract	Awarded Area (in sq.km)	Present Area (in sq.km)
Current Active Blocks (23 Blocks)						
Shallow Water						
1	KG	KG/OSDSF/G4/2018	GEMPETRO (100)	07-03-2019	91.85	91.85
2	KG	KG/OSDSF/GSKW/2018	OIL (100)	07-03-2019	93.91	93.91
3	MB	MB/OSDSF/CA/2018	ONGC (100)	07-03-2019	343.95	343.95
4	MB	MB/OSDSF/D31/2018	ARCH (100)	07-03-2019	271.77	271.77
5	MB	MB/OSDSF/NMT/2018	ONGC (100)	07-03-2019	96.15	96.15
6	MB	MB/OSDSF/SB15/2018	ONGC (100)	07-03-2019	226.16	226.16
7	MB	MB/OSDSF/D33/2018	ONGC (100)	07-03-2019	207.55	207.55
8	MB	MB/OSDSF/D18/2018	GGRPL (100)	07-03-2019	90.86	90.86
9	BP	NEC/OSDSF/D11/2018	ARCH (100)	07-03-2019	541.44	541.44
SUB TOTAL					**1,963.64**	**1,963.64**
Onland						
10	AS	AA/ONDSF/ Madhakali/2018	ARSH (100)	07-03-2019	41.93	41.93
11	AS	AA/ONDSF/ Umatara/2018	IOCL (90), HOEC (10) (Jt. Op.)	07-03-2019	52.03	52.03
12	AS	AA/ONDSF/Disaijan/2018	INVENIRE (100)	07-03-2019	21.26	21.26
13	AS	AA/ONDSF/Tiphuk/2018	SHANTIGD (19) (Op.), BBPL (70), SHANNO (11)	07-03-2019	21.37	21.37
14	AS	AA/ONDSF/ Hazarigaon/2018	VEDANTA (100)	07-03-2019	30.74	30.74
15	AAFB	AA/ONDSF/ Tulamara/2018	OIL (100)	07-03-2019	47.23	47.23
16	CB	CB/ONDSF/Vadatal/2018	GGRPL (100)	07-03-2019	194.97	194.97
17	CB	CB/ONDSF/A1/2018	SHANTIGD (19) (Op.), BBPL (70), SHANNO (11)	07-03-2019	151.99	151.99
18	CB	CB/ONDSF/D45/2018	GGRPL (100)	07-03-2019	66.82	66.82
19	RJ	RJ/ONDSF/ Chinnewala/2018	ONGC (100)	07-03-2019	73.00	73.00
20	KG	KG/ONDSF/ Palakollu/2018	GGRPL (100)	07-03-2019	95.14	95.14
21	KG	KG/ONDSF/ Suryaraopeta/2018	GGRPL (100)	07-03-2019	98.43	98.43
22	KG	KG/ONDSF/Kaza/2018	VEDANTA (100)	07-03-2019	114.93	114.93
23	KG	KG/ONDSF/ Gokarnapuram/2018	KEERTHI (100)	07-03-2019	26.20	26.20
SUB TOTAL					**1,036.04**	**1,036.04**
TOTAL AREA :					**2,999.68**	**2,999.68**

Table 8.7: Exploration Blocks Awarded under First Round of OALP (OALP-I)

SL. No	Basin	Block Name	Consortium (Participating Interest In %)	Date of Signing Contract	Awarded Area	Present Area
					(in sq.km)	
Current Active Blocks (55 Blocks)						
Onland						
1	RJ	RJ-ONHP-2017/1	VEDANTA (100)	01-10-2018	542	542
2	RJ	RJ-ONHP-2017/2	VEDANTA (100)	01-10-2018	1,072	1,072
3	RJ	RJ-ONHP-2017/3	VEDANTA (100)	01-10-2018	1,430	1,430
4	RJ	RJ-ONHP-2017/4	VEDANTA (100)	01-10-2018	1,087	1,087
5	RJ	RJ-ONHP-2017/5	VEDANTA (100)	01-10-2018	917	917
6	RJ	RJ-ONHP-2017/6	VEDANTA (100)	01-10-2018	925	925
7	RJ	RJ-ONHP-2017/7	VEDANTA (100)	01-10-2018	603	603
8	RJ	RJ/ONHP/2017/8	OIL (100)	01-10-2018	516	516
9	RJ	RJ/ONHP/2017/9	OIL (100)	01-10-2018	3,012	3,012
10	CB	CB/ONHP/2017/1	VEDANTA (100)	01-10-2018	1,490	1,490
11	CB	CB/ONHP/2017/2	VEDANTA (100)	01-10-2018	317	317
12	CB	CB/ONHP/2017/3	VEDANTA (100)	01-10-2018	83	83
13	CB	CB/ONHP/2017/4	VEDANTA (100)	01-10-2018	95	95
14	CB	CB/ONHP/2017/5	VEDANTA (100)	01-10-2018	990	990
15	CB	CB/ONHP/2017/6	VEDANTA (100)	01-10-2018	19	19
16	CB	CB/ONHP/2017/7	VEDANTA (100)	01-10-2018	1,335	1,335
17	CB	CB/ONHP/2017/9	BPRL (100)	01-10-2018	174	174
18	CB	CB/ONHP/2017/10	VEDANTA (100)	01-10-2018	2,766	2,766
19	CB	CB/ONHP/2017/11	VEDANTA (100)	01-10-2018	70	70
20	CB	CB/ONHP/2017/12	GAIL (100)	01-10-2018	212	212
21	KC	GK/ONHP/2017/1	VEDANTA (100)	01-10-2018	2,690	2,690
22	KG	KG/ONHP/2017/1	VEDANTA (100)	01-10-2018	2,321	2,321
23	KG	KG/ONHP/2017/2	VEDANTA (100)	01-10-2018	668	668
24	KG	KG/ONHP/2017/3	VEDANTA (100)	01-10-2018	49	49
25	CY	CY/ONHP/2017/1	ONGC (100)	01-10-2018	731	731
26	AS	AA-ONHP-2017/1	VEDANTA (100)	01-10-2018	715	715
27	AAFB	AA-ONHP-2017/2	VEDANTA (100)	01-10-2018	73	73
28	AAFB	AA-ONHP-2017/3	VEDANTA (100)	01-10-2018	268	268
29	AS	AA-ONHP-2017/4	VEDANTA (100)	01-10-2018	839	839
30	AS	AA-ONHP-2017/5	VEDANTA (100)	01-10-2018	758	758
31	AAFB	AA-ONHP-2017/6	VEDANTA (100)	01-10-2018	279	279
32	AS	AA-ONHP-2017/8	VEDANTA (100)	01-10-2018	611	611

SL. No	Basin	Block Name	Consortium (Participating Interest In %)	Date of Signing Contract	Awarded Area	Present Area
					(in sq.km)	
33	AS	AA-ONHP-2017/9	VEDANTA (100)	01-10-2018	18	18
34	AS	AA-ONHP-2017/10	OIL (100)	01-10-2018	543	543
35	AS	AA-ONHP-2017/11	VEDANTA (100)	01-10-2018	785	785
36	AS	AA-ONHP-2017/12	OIL (100)	01-10-2018	489	489
37	AS	AA-ONHP-2017/13	OIL (100)	01-10-2018	841	841
38	AAFB	AA-ONHP-2017/14	VEDANTA (100)	01-10-2018	1,719	1,719
39	AS	AA-ONHP-2017/15	VEDANTA (100)	01-10-2018	1,367	1,367
40	AS	AA-ONHP-2017/16	OIL (100)	01-10-2018	361	361
41	AS	AA-ONHP-2017/17	OIL (100)	01-10-2018	309	309
42	AS	AA-ONHP-2017/18	OIL (100)	01-10-2018	1,711	1,711
43	AAFB	AA-ONHP-2017/19	HOEC (100)	01-10-2018	79	79
44	AAFB	AA-ONHP-2017/20	OIL (100)	01-10-2018	125	125
45	GP	GV-ONHP-2017/1	VEDANTA (100)	01-10-2018	1,817	1,817
46	HF	HF-ONHP-2017/1	VEDANTA (100)	01-10-2018	666	666
SUB TOTAL					**38,487**	**38,487**
Shallow Water						
47	KC	GK-OSHP-2017/1	VEDANTA (100)	01-10-2018	2,960	2,960
48	SU	GS-OSHP-2017/1	VEDANTA (100)	01-10-2018	2,627	2,627
49	SU	GS-OSHP-2017/2	VEDANTA (100)	01-10-2018	674	674
50	MB	MB-OSHP-2017/1	ONGC (100)	01-10-2018	725	725
51	MB	MB-OSHP-2017/2	VEDANTA (100)	01-10-2018	2,690	2,690
52	KG	KG-OSHP-2017/1	VEDANTA (100)	01-10-2018	177	177
53	CY	CY-OSHP-2017/1	VEDANTA (100)	01-10-2018	1,794	1,794
54	CY	CY-OSHP-2017/2	VEDANTA (100)	01-10-2018	2,574	2,574
SUB TOTAL					**14,221**	**14,221**
DEEP WATER						
55	KG	KG-DWHP-2017/1	VEDANTA (100)	01-10-2018	6,574	6,574
SUB TOTAL					**6,574**	**6,574**
TOTAL AREA :					**59,282**	**59,282**

Table 8.8: Exploration Blocks Awarded under Second Round of OALP (OALP-II)

SL. No	Basin	Block Name	Consortium (Participating Interest In %)	Date of Signing Contract	Awarded Area	Present Area
					(in sq.km)	
Current Active Blocks (14 Blocks)						
Onland						
1	RJ	RJ-ONHP-2018/1	VEDANTA (100)	16-07-2019	417	417
2	CB	CB-ONHP-2018/1	VEDANTA (100)	16-07-2019	185	185
3	CB	CB-ONHP-2018/2	ONGC (100)	16-07-2019	847	847
4	CY	CY-ONHP-2018/1	IOCL (100)	16-07-2019	474	474
5	MN	MN-ONHP-2018/1	OIL (100)	16-07-2019	2,934	2,934
6	MN	MN-ONHP-2018/2	OIL (100)	16-07-2019	2,540	2,540
7	MN	MN-ONHP-2018/3	OIL (100)	16-07-2019	3,139	3,139
8	MN	MN-ONHP-2018/4	OIL (100)	16-07-2019	3,197	3,197
SUB TOTAL					**13,733**	**13,733**
Shallow Water						
9	KC	GK-OSHP-2018/1	VEDANTA (100)	16-07-2019	1,732	1,732
10	KC	GK-OSHP-2018/2	VEDANTA (100)	16-07-2019	813	813
11	AN	AN-OSHP-2018/1	OIL (100)	16-07-2019	3,669	3,669
12	AN	AN-OSHP-2018/2	OIL (100)	16-07-2019	5,947	5,947
13	MN	MN-OSHP-2018/1	VEDANTA (100)	16-07-2019	1,825	1,825
SUB TOTAL					**13,986**	**13,986**
Deep Water						
14	KG	KG-UDWHP-2018/1	BPEAL (40),RIL (60),	16-07-2019	1,514	1,514
SUB TOTAL					**1,514**	**1,514**
TOTAL AREA					**29,233**	**29,233**

Table 8.9: Exploration Blocks Awarded under Third Round of OALP (OALP-III)

SL. No	Basin	Block Name	Consortium (Participating Interest In %)	Date of Signing Contract	Awarded Area	Present Area
					(in sq.km)	
Current Active Blocks (18 Blocks)						
Onland						
1	RJ	RJ-ONHP-2018/2	OIL (100)	16-07-2019	3,016	3,016
2	CB	CB-ONHP-2018/3	VEDANTA (100)	16-07-2019	519	519
3	CB	CB-ONHP-2018/4	VEDANTA (100)	16-07-2019	559	559
4	CY	CY-ONHP-2018/2	ONGC (100)	16-07-2019	460	460
5	CY	CY-ONHP-2018/3	ONGC (100)	16-07-2019	1,403	1,403
6	KG	KG-ONHP-2018/1	VEDANTA (100)	16-07-2019	2,601	2,601
7	KG	KG-ONHP-2018/2	VEDANTA (100)	16-07-2019	230	230
8	MN	MN-ONHP-2018/5	OIL (100)	16-07-2019	2,300	2,300
9	BP	BP-ONHP-2018/1	ONGC (100)	16-07-2019	2,468	2,468
10	AS	AA-ONHP-2018/1	VEDANTA (100)	16-07-2019	249	249
11	AAFB	AA-ONHP-2018/2	OIL (100)	16-07-2019	2,527	2,527
12	AAFB	AA-ONHP-2018/3	OIL (100)	16-07-2019	1,234	1,234
13	AAFB	AA-ONHP-2018/4	ONGC (100)	16-07-2019	44	44
14	AAFB	AA-ONHP-2018/5	OIL (100)	16-07-2019	208	208
SUB TOTAL					**17,818**	**17,818**
Shallow Water						
15	MB	MB-OSHP-2018/1	ONGC (100)	16-07-2019	1,268	1,268
16	MB	MB-OSHP-2018/2	ONGC (100)	16-07-2019	4,668	4,668*
17	KK	KK-OSHP-2018/1	OIL (100)	16-07-2019	3,520	3,520
SUB TOTAL					**9,456**	**9,456**
Deep Water						
18	MN	MN-DWHP-2018/1	ONGC (100)	16-07-2019	2,491	2,491
SUB TOTAL					**2,491**	**2,491**
TOTAL AREA :					**29,765**	**29,765**

**9.52 sq.km. waived off out of total area of 4,668*

Table 8.10: Exploration Blocks Awarded under Fourth Round of OALP (OALP-IV)

SL. No	Basin	Block Name	Consortium (Participating Interest In %)	Date of Signing Contract	Awarded Area	Present Area
					(in sq.km)	
Current Active Blocks (7 Blocks)						
Onland						
1	RJ	RJ-ONHP-2019/1	ONGC (100)	02-01-2020	2,119	2,119
2	VN	VN-ONHP-2019/1	ONGC (100)	02-01-2020	2,731	2,731
3	VN	VN-ONHP-2019/2	ONGC (100)	02-01-2020	3,078	3,078
4	VN	VN-ONHP-2019/3	ONGC (100)	02-01-2020	3,097	3,097
5	VN	VN-ONHP-2019/4	ONGC (100)	02-01-2020	2,933	2,933
6	VN	VN-ONHP-2019/5	ONGC (100)	02-01-2020	1,422	1,422
7	BP	BP-ONHP-2019/1	ONGC (100)	02-01-2020	3,131	3,131
SUB TOTAL					**18,510**	**18,510**
TOTAL AREA :					**18,510**	**18,510**

Table 8.11: Nomination PEL Operated by OIL and ONGC

Sl. No.	Basin	Block Name	Effective Date Of Pel	Area (Sq. Km.)	Total Area (Sq. Km.)
ONGC Onland Blocks					
1	AAFB	Bhagty Bhandari	28-04-2006	620.00	1,590.00
2		Singphan	28-04-2006	320.00	
3		Dimapur	28-04-2006	650.00	
4	HF	Kangra-Mandi	10-11-2003	1,828.00	1,828.00
TOTAL ONGC ONLAND NOMINATION BLOCKS					**3,418.00**
ONGC Offshore Blocks					
5	KC	GK-DW-1	01-10-2004	420.00	420.00
6	MB	BB-OS-DW-II	28-12-2004	985.00	985.00
7	KG	KG-OS-DW-III	15-05-2003	283.05	283.05
TOTAL ONGC OFFSHORE NOMINATION BLOCKS					**1,688.05**
TOTAL ONGC NOMINATION BLOCKS					**5,106.05**
OIL Onland Blocks					
8	AAFB	Jairampur Extn.	03-03-2002	23.25	331.75
9		Namchik	05-01-2005	195.00	
10		Deomali	18-02-2005	113.50	
TOTAL OIL NOMINATION BLOCKS					**331.75**
GRAND TOTAL OF NOMINATION PEL OPERATED BY ONGC AND OIL					**5,437.80**

Table 8.12: PEL under Pre-NELP Exploration and NELP Blocks with NOCs/PVT./JV Companies under PSC

Sl. No.	Company / Operator	Basin	Block Name	Effective Date of PEL	Area (Sq.Km.)	Total Area (Sq.Km.)
1	Adani Welspun Exploration Ltd.	MB	MB-OSN-2005/2	04-02-2009	714.60	714.60
2	Assam Company Ltd.	AS	AA-ON/7	27-03-2001	319.00	319.00
3	DEEP ENERGY LLC & DEEP Natural Resources	VN	VN-ONN-2010/2	15-07-2019	4,909.00	4,909.00
4	Deep Energy LLC.	SSRD	SR-ONN-2005/1	24-10-2016	789.00	4,565.00
5		VN	VN-ONN-2010/1	24-06-2019	3,776.00	
6	Focus energy Ltd.	CB	CB-OSN-2004/1	28-05-2007	2,616.00	2,616.00
7	Hindustan Oil Exploration Company Ltd. & BPRL	RJ	RJ-ONN-2005/1	13-07-2009	1,151.00	1,151.00
8	Jubilant Oil & Gas Pvt. Ltd. (JOGPL)	AS	AA-ONN-2002/1	07-04-2004	1,260.00	1,260.00
9	Oil & Natural Gas Corp. Ltd.	AS	AA-ONN-2001/1	01-05-2003	843.74	20,163.61
10		AS	AA-ONN-2001/2	29-07-2003	2,660.00	
11		AS	AA-ONJ/2	07-11-2008	1,277.00	
12		BP	WB-ONN-2005/3	23-12-2009	4,001.00	
13		BP	WB-ONN-2005/4	23-12-2009	3,940.00	
14		CB	CB-ONN-2005/10	20-11-2009	270.00	
15		KG	KG-DWN-98/2	12-04-2000	1,628.87	
16		KC	GK-OSN-2009/1	05-08-2010	517.00	
17		KC	GK-OSN-2010/1	04-05-2012	1,077.00	
18		MB	MB-OSN-2005/1	27-01-2009	1,250.00	
19		MB	MB-OSN-2005/3	04-02-2009	1,685.00	
20		SU	GS-OSN-2004/1	25-04-2007	552.00	
21		VN	VN-ONN-2009/3	30-06-2010	462.00	
22	Oil India Ltd.	AAFB	MZ-ONN-2004/1	22-05-2007	3,213.00	3,909.10
23		AS	AA-ONN-2010/2	29-12-2014	396.00	
24		AS	AA-ONN-2010/3	12-12-2013	171.00	
25		KG	KG-ONN-2004/1	16-02-2008	129.10	
26	Pan India consultants & Frost international Ltd.	CB	CB-ONN-2010/5	28-03-2013	49.00	49.00
27	Reliance Industries Ltd.	MN	NEC-OSN-97/2	07-06-2000	831.73	831.73
28	Vedanta Ltd.	KG	KG-OSN-2009/3	05-08-2009	1,988.00	1,988.00
TOTAL PELs PSC						**42,476.04**

Table 8.13: Basin-wise Distribution of PEL Areas under Operation (Pre-NELP Exploration and NELP Blocks)

Basin (No. of Blocks)	Pre-NELP	NELP - I	NELP - III	NELP - IV	NELP - VI	NELP - VII	NELP - VIII	NELP- IX	Grand Total
Deep Water									
Krishna-Godavari (1)	-	1,628.87	-	-	-	-	-	-	1,628.87
Deep Water Total (1)	**-**	**1,628.87**	**-**	**-**	**-**	**-**	**-**	**-**	**1,628.87**
Shallow Water									
Cambay (1)	-	-	-	-	2,616.00	-	-	-	2,616.00
Krishna-Godavari (1)	-	-	-	-	-	-	1,988.00	-	1,988.00
Kutch (2)	-	-	-	-	-	-	517.00	1,077.00	1,594.00
Mahanadi (1)	-	831.73	-	-	-	-	-	-	831.73
Mumbai Offshore (3)	-	-	-	-	-	3,649.60	-	-	3,649.60
Saurashtra (1)	-	-	-	-	552.00	-	-	-	552.00
Shallow Water Total (9)	**-**	**831.73**	**-**	**-**	**3,168.00**	**3,649.60**	**2,505.00**	**1,077.00**	**11,231.33**
Onland									
Assam Shelf (7)	1,596.00	-	3,503.74	1,260.00	-	-	-	567.00	6,926.74
Assam-Arakan Fold Belt (1)	-	-	-	-	3,213.00	-	-	-	3,213.00
Bengal (2)	-	-	-	-	-	7,941.00	-	-	7,941.00
Cambay (2)	-	-	-	-	-	270.00	-	49.00	319.00
Krishna-Godavari (1)	-	-	-	-	129.10	-	-	-	129.10
Rajasthan (1)	-	-	-	-	-	1,151.00	-	-	1,151.00
Satpura-South Rewa-Damodar (1)	-	-	-	-	-	789.00	-	-	789.00
Vindhyan (3)	-	-	-	-	-	-	462.00	8,685.00	9,147.00
Onland Total (18)	**1,596.00**	**-**	**3,503.74**	**1,260.00**	**3,342.10**	**10,151.00**	**462.00**	**9,301.00**	**29,615.84**
Grand Total (28)	**1,596.00**	**2,460.60**	**3,503.74**	**1,260.00**	**6,510.10**	**13,800.60**	**2,967.00**	**10,378.00**	**42,476.04**

Figure 8.3: Round wise PEL Area

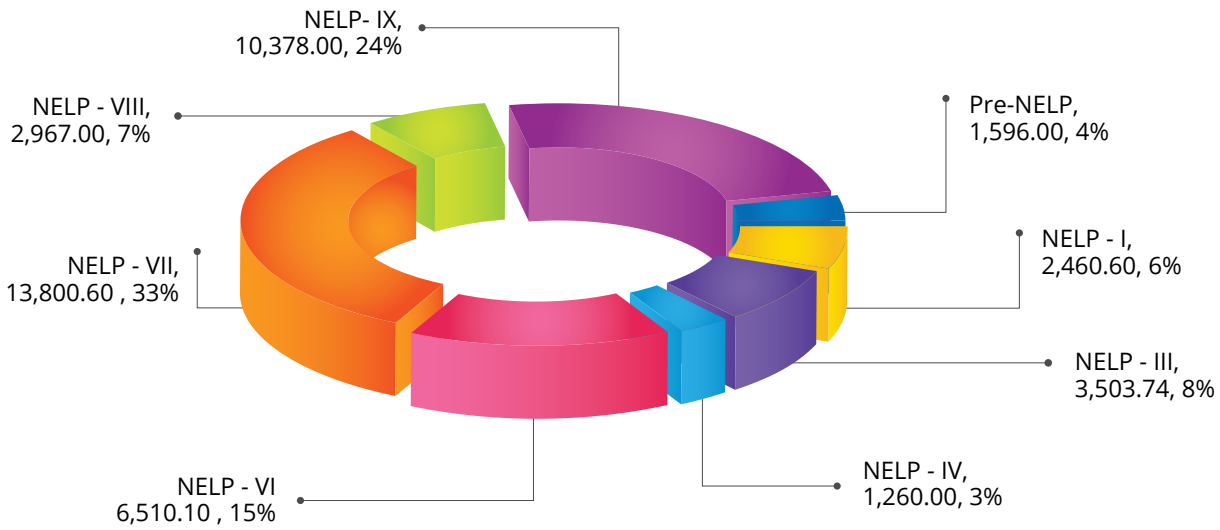


Table 8.14: Company-wise Distribution of PEL Areas under Operation (Pre-NELP & NELP Blocks)

Operator (No. of Blocks)	Pre-NELP	NELP - I	NELP - III	NELP - IV	NELP - VI	NELP - VII	NELP - VIII	NELP- IX	Grand Total
Adani Welspun Exploration Ltd. (1)	-	-	-	-	-	714.60	-	-	714.60
Assam Company Ltd. (1)	319.00	-	-	-	-	-	-	-	319.00
Deep Energy LLC & Deep Natural Resources. (1)	-	-	-	-	-	-	-	4,909.00	4,909.00
Deep Energy LLC. (2)	-	-	-	-	-	789.00	-	3,776.00	4,565.00
Focus Energy Ltd. (1)	-	-	-	-	2,616.00	-	-	-	2,616.00
Hindustan Oil Exploration Company Ltd. & BPRL (1)	-	-	-	-	-	1,151.00	-	-	1,151.00
Jubilant Oil & Gas Pvt. Ltd. (1)	-	-	-	1,260.00	-	-	-	-	1,260.00
Oil & Natural Gas Corp. Ltd. (13)	1,277.00	1,628.87	3,503.74	-	552.00	11,146.00	979.00	1,077.00	20,163.61
Oil India Ltd. (4)	-	-	-	-	3,342.10	-	-	567.00	3,909.10
Pan India Consultants & Frost International Ltd.(1)	-	-	-	-	-	-	-	49.00	49.00
Reliance Industries Ltd. (1)	-	831.73	-	-	-	-	-	-	831.73
VEDANTA (1)	-	-	-	-	-	-	1,988.00	-	1,988.00
Grand Total (28)	**1,596.00**	**2,460.60**	**3,503.74**	**1,260.00**	**6,510.10**	**13,800.60**	**2,967.00**	**10,378.00**	**42,476.04**

Table 8.15: State-wise PEL distribution under PSC

Onland/Offshore	Location Area	PEL Area Sq. km. (%)	
		Sq. km.	(%)
Offshore	Eastern Offshore	4,448.60	10.47%
	Western Offshore	8,411.60	19.80%
Offshore Total		**12,860.20**	**30.28%**
Onland	Andhra Pradesh	129.10	0.30%
	Assam	2,163.00	5.09%
	Chattisgarh	789.00	1.86%
	Gujarat	319.00	0.75%
	Madhya Pradesh	9,147.00	21.53%
	Mizoram	5,873.00	13.83%
	Rajasthan	1,151.00	2.71%
	Tripura	2,103.74	4.95%
	West Bengal	7,941.00	18.70%
Onland Total		**29,615.84**	**69.72%**
Grand Total		**42,476.04**	**100.00%**

Table 8.16: PEL Operated by Companies under OALP

Sl. No.	Bid Round	Basin	Block Name	Operator	State	Effective Date of PEL	Area (Sq. Km.)	Total Area (Sq. Km.)
1	OALP-I	AS	AA-ONHP-2017/1	VEDANTA	Assam	07-08-2019	668.36	668.36
2	OALP-I	AAFB	AA-ONHP-2017/2	VEDANTA	Arunachal Pradesh	18-02-2020	73.19	73.19
3	OALP-I	AAFB	AA-ONHP-2017/3	VEDANTA	Assam	07-08-2019	267.61	267.94
4	OALP-I	AAFB	AA-ONHP-2017/3	VEDANTA	Arunachal Pradesh	18-02-2020	0.33	
5	OALP-I	AS	AA-ONHP-2017/4	VEDANTA	Assam	07-08-2019	838.18	838.18
6	OALP-I	AS	AA-ONHP-2017/5	VEDANTA	Assam	07-08-2019	758.23	758.23
7	OALP-I	AAFB	AA-ONHP-2017/6	VEDANTA	Tripura	22-08-2019	278.79	278.79
8	OALP-I	AS	AA-ONHP-2017/8	VEDANTA	Assam	02-09-2019	610.54	610.54
9	OALP-I	AS	AA-ONHP-2017/9	VEDANTA	Assam	07-08-2019	18.32	18.32
10	OALP-I	AS	AA-ONHP-2017/10	OIL	Assam	27-08-2019	541.99	543.28
11	OALP-I	AS	AA-ONHP-2017/10	OIL	Arunachal Pradesh	18-12-2019	1.29	
12	OALP-I	AS	AA-ONHP-2017/11	VEDANTA	Assam	07-08-2019	784.55	784.55
13	OALP-I	AS	AA-ONHP-2017/12	OIL	Assam	27-08-2019	488.50	488.50
14	OALP-I	AS	AA-ONHP-2017/12	OIL	Arunachal Pradesh	18-12-2019	0.56	0.56
15	OALP-I	AS	AA-ONHP-2017/13	OIL	Assam	27-08-2019	0.36	840.69
16	OALP-I	AS	AA-ONHP-2017/13	OIL	Arunachal Pradesh	18-12-2019	840.33	
17	OALP-I	AAFB	AA-ONHP-2017/14	VEDANTA	Assam	02-09-2019	1,716.61	1,716.61
18	OALP-I	AS	AA-ONHP-2017/15	VEDANTA	Assam	07-08-2019	1,366.48	1,367.38
19	OALP-I	AS	AA-ONHP-2017/15	VEDANTA	Arunachal Pradesh	18-02-2020	0.90	

Sl. No.	Bid Round	Basin	Block Name	Operator	State	Effective Date of PEL	Area (Sq. Km.)	Total Area (Sq. Km.)
20	OALP-I	AS	AA-ONHP-2017/16	OIL	Arunachal Pradesh	18-12-2019	359.87	361.49
21	OALP-I	AS	AA-ONHP-2017/16	OIL	Assam	27-08-2019	1.62	
22	OALP-I	AS	AA-ONHP-2017/17	OIL	Assam	27-08-2019	162.88	309.07
23	OALP-I	AS	AA-ONHP-2017/17	OIL	Arunachal Pradesh	18-12-2019	146.19	
24	OALP-I	AS	AA-ONHP-2017/18	OIL	Assam	27-08-2019	1,484.12	1,711.10
25	OALP-I	AS	AA-ONHP-2017/18	OIL	Arunachal Pradesh	18-12-2019	226.98	
26	OALP-I	AAFB	AA-ONHP-2017/19	HOEC	Assam	12-09-2019	79.21	79.21
27	OALP-I	AAFB	AA-ONHP-2017/20	OIL	Assam	27-08-2019	110.32	125.08
28	OALP-I	AAFB	AA-ONHP-2017/20	OIL	Arunachal Pradesh	18-12-2019	14.76	
29	OALP-I	CB	CB-ONHP-2017/1	VEDANTA	Gujarat	15-11-2019	1,490.40	1,490.40
30	OALP-I	CB	CB-ONHP-2017/2	VEDANTA	Gujarat	19-07-2019	317.38	317.38
31	OALP-I	CB	CB-ONHP-2017/3	VEDANTA	Gujarat	19-07-2019	82.57	82.57
32	OALP-I	CB	CB-ONHP-2017/4	VEDANTA	Gujarat	07-01-2020	95.10	95.10
33	OALP-I	CB	CB-ONHP-2017/5	VEDANTA	Gujarat	07-01-2020	990.10	990.10
34	OALP-I	CB	CB-ONHP-2017/6	VEDANTA	Gujarat	07-01-2020	18.91	18.91
35	OALP-I	CB	CB-ONHP-2017/7	VEDANTA	Gujarat	15-11-2019	1,335.45	1,335.45
36	OALP-I	CB	CB-ONHP-2017/9	BPRL	Gujarat	25-07-2019	173.71	173.71
37	OALP-I	CB	CB-ONHP-2017/10	VEDANTA	Gujarat	24-07-2019	2,099.41	2,765.60
38	OALP-I	CB	CB-ONHP-2017/10	VEDANTA	Rajasthan	27-05-2019	666.19	
39	OALP-I	CB	CB-ONHP-2017/11	VEDANTA	Gujarat	24-07-2019	69.66	69.66
40	OALP-I	CB	CB-ONHP-2017/12	GAIL	Gujarat	25-07-2019	212.27	212.27
41	OALP-I	CY	CY-ONHP-2017/1	ONGC	Offshore	22-11-2018	151.58	151.58
42	OALP-I	CY	CY-OSHP-2017/1	VEDANTA	Offshore	22-11-2018	1,653.47	1,653.47
43	OALP-I	CY	CY-OSHP-2017/2	VEDANTA	Offshore	22-11-2018	2,393.03	2,393.03
44	OALP-I	KC	GK-ONHP-2017/1	VEDANTA	Gujarat	26-07-2019	2,409.55	2,690.23
45	OALP-I	KC	GK-ONHP-2017/1	VEDANTA	Offshore	22-11-2018	280.68	
46	OALP-I	KC	GK-OSHP-2017/1	VEDANTA	Offshore	22-11-2018	2,834.45	2,960.25
47	OALP-I	KC	GK-OSHP-2017/1	VEDANTA	Gujarat	26-07-2019	125.80	
48	OALP-I	SU	GS-OSHP-2017/1	VEDANTA	Offshore	22-11-2018	2,627.33	2,627.33
49	OALP-I	SU	GS-OSHP-2017/2	VEDANTA	Offshore	22-11-2018	674.29	674.29
50	OALP-I	KG	KG-OSHP-2017/1	VEDANTA	Offshore	22-11-2018	177.37	177.37
51	OALP-I	KG	KG-DWHP-2017/1	VEDANTA	Offshore	22-11-2018	6,574.26	6,574.26
52	OALP-I	MB	MB-OSHP-2017/1	ONGC	Offshore	22-11-2018	724.72	724.72
53	OALP-I	MB	MB-OSHP-2017/2	VEDANTA	Offshore	22-11-2018	2,690.46	2,690.46
54	OALP-I	RJ	RJ-ONHP-2017/1	VEDANTA	Rajasthan	27-05-2019	542.33	542.33
55	OALP-I	RJ	RJ-ONHP-2017/2	VEDANTA	Rajasthan	27-05-2019	1,071.97	1,071.97
56	OALP-I	RJ	RJ-ONHP-2017/3	VEDANTA	Rajasthan	27-05-2019	1,418.33	1,429.56
57	OALP-I	RJ	RJ-ONHP-2017/3	VEDANTA	Gujarat	24-07-2019	11.23	

Sl. No.	Bid Round	Basin	Block Name	Operator	State	Effective Date of PEL	Area (Sq. Km.)	Total Area (Sq. Km.)
58	OALP-I	RJ	RJ-ONHP-2017/4	VEDANTA	Rajasthan	27-05-2019	1,087.29	1,087.29
59	OALP-I	RJ	RJ-ONHP-2017/5	VEDANTA	Rajasthan	27-05-2019	916.60	916.60
60	OALP-I	RJ	RJ-ONHP-2017/6	VEDANTA	Rajasthan	27-05-2019	924.60	924.60
61	OALP-I	RJ	RJ-ONHP-2017/7	VEDANTA	Rajasthan	27-05-2019	602.63	602.63
62	OALP-I	RJ	RJ-ONHP-2017/8	OIL	Rajasthan	27-05-2019	515.91	515.91
63	OALP-I	RJ	RJ-ONHP-2017/9	OIL	Rajasthan	27-05-2019	3,012.13	3,012.13
64	OALP-II	AN	AN-OSHP-2018/1	OIL	Offshore	30-08-2019	3,438.61	3,438.61
65	OALP-II	AN	AN-OSHP-2018/2	OIL	Offshore	30-08-2019	5,928.78	5,928.78
66	OALP-II	CB	CB-ONHP-2018/1	VEDANTA	Gujarat	13-02-2020	185.27	185.27
67	OALP-II	CB	CB-ONHP-2018/2	ONGC	Gujarat	08-01-2020	846.82	846.82
68	OALP-II	KC	GK-OSHP-2018/1	VEDANTA	Offshore	30-08-2019	1,731.78	1,731.78
69	OALP-II	KC	GK-OSHP-2018/2	VEDANTA	Offshore	30-08-2019	812.54	812.54
70	OALP-II	KG	KG-UDWHP-2018/1	RIL-BP	Offshore	30-08-2019	1,513.90	1,513.90
71	OALP-II	MN	MN-ONHP-2018/1	OIL	Offshore	30-08-2019	74.75	74.75
72	OALP-II	MN	MN-OSHP-2018/1	VEDANTA	Offshore	30-08-2019	1,824.50	1,824.50
73	OALP-III	AAFB	AA-ONHP-2018/4	ONGC	Tripura	14-02-2020	44.01	44.01
74	OALP-III	AAFB	AA-ONHP-2018/5	OIL	Tripura	16-10-2019	207.74	207.74
75	OALP-III	BP	BP-ONHP-2018/1	ONGC	West Bengal	16-01-2020	2,468.00	2,468.00
76	OALP-III	CB	CB-ONHP-2018/3	VEDANTA	Gujarat	09-01-2020	519.17	519.17
77	OALP-III	CB	CB-ONHP-2018/4	VEDANTA	Gujarat	09-01-2020	558.72	558.72
78	OALP-III	CY	CY-ONHP-2018/3	ONGC	Offshore	30-08-2019	143.97	143.97
79	OALP-III	KG	KG-ONHP-2018/1	VEDANTA	Offshore	30-08-2019	52.48	52.48
80	OALP-III	KK	KK-OSHP-2018/1	OIL	Offshore	30-08-2019	3,519.69	3,519.69
81	OALP-III	MB	MB-OSHP-2018/1	ONGC	Offshore	30-08-2019	1,267.96	1,267.96
82	OALP-III	MB	MB-OSHP-2018/2	ONGC	Offshore	30-08-2019	4,658.54	4,658.54
83	OALP-III	MN	MN-DWHP- 2018/1	ONGC	Offshore	30-08-2019	2,491.31	2,491.31
OALP Total							**85,100.77**	**85,100.77**

Table 8.17: Regime wise Area under PEL

Regime	Area under PEL
Nomination	5,438
PSC	42,476
RSC	85,101
Total	**1,33,015**

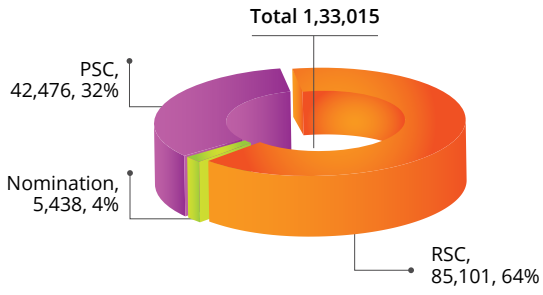


Table 8.18. Nomination PML areas operated by ONGC and OIL in India

Sl. No.	Company / Operator	Basin	Block Name	Onshore/ Offshore	Effective Date Of PML	PML Area (Sq. Km.)	Total PML Area (Sq. Km.)
1	ONGC	AS & AAFB	Banamali	Onshore	17-Dec-02	50.00	5,959.10
2	ONGC		Changmaigaon	Onshore	07-Feb-04	10.00	
3	ONGC		Changmaigaon East	Onshore	30-Jan-06	15.00	
4	ONGC		Charaideo-Nahorhabi	Onshore	30-Jan-06	12.75	
5	ONGC		Charaideo-Nahorhabi Extn.	Onshore	26-Sep-11	31.42	
6	ONGC		Charali	Onshore	20-Mar-19	54.86	
7	ONGC		Charali Ext.-I	Onshore	20-May-18	45.00	
8	ONGC		East Changmaigaon Extn.	Onshore	01-Dec-11	35.00	
9	ONGC		Geleki	Onshore	16-Aug-10	27.94	
10	ONGC		Geleki Ext.- II	Onshore	14-Dec-01	2.65	
11	ONGC		Geleki Ext.-I	Onshore	23-Oct-09	5.01	
12	ONGC		Laiplingaon Extn.	Onshore	26-Sep-11	30.45	
13	ONGC		Lakwa	Onshore	29-Sep-08	172.49	
14	ONGC		Mekeypore-Santak-Nazira	Onshore	30-Jan-06	77.00	
15	ONGC		Mekeypore-Santak-Nazira-Bihubar Extn.	Onshore	26-Sep-11	44.40	
16	ONGC		Namti	Onshore	09-Nov-07	30.35	
17	ONGC		North Rudrasagar	Onshore	30-Jan-06	149.00	
18	ONGC		Panidihing	Onshore	19-May-04	34.00	
19	ONGC		Rudrasagar	Onshore	30-May-09	70.50	
20	ONGC		SE Geleki	Onshore	30-Jan-06	20.50	
21	ONGC		SE Geleki Extn.	Onshore	26-Sep-11	25.38	
22	ONGC		Sonari	Onshore	01-Aug-09	30.00	
23	ONGC		West Charali	Onshore	23-Mar-12	12.00	
24	ONGC		Borholla	Onshore	17-Jun-18	32.23	
25	ONGC		Changpang ML	Onshore	14-Mar-07	12.00	
26	ONGC		East Lakhibari	Onshore	23-Jul-03	8.50	
27	ONGC		East Lakhibari Extn.	Onshore	10-Oct-13	49.00	
28	ONGC		Golaghat District	Onshore	22-Jun-18	52.12	
29	ONGC		Golaghat Extn. II-A	Onshore	09-Dec-09	24.00	
30	ONGC		Golaghat Extn. II-A (Add)	Onshore	27-Feb-17	61.00	
31	ONGC		Kalyanpur	Onshore	13-Apr-07	40.00	
32	ONGC		Kasomarigaon	Onshore	09-Dec-09	20.00	
33	ONGC		Kasomarigaon (Add)	Onshore	06-Jul-16	56.00	
34	ONGC		Khoraghat	Onshore	26-Jul-09	3.00	
35	ONGC		Khoraghat Ext. - I	Onshore	17-Jul-00	83.00	
36	ONGC		Laipling-Gaon	Onshore	13-Oct-03	26.00	
37	ONGC		Mekerong	Onshore	19-Sep-17	16.00	
38	ONGC		Nambar	Onshore	05-Sep-19	36.93	
39	ONGC		Titabar	Onshore	24-Dec-08	10.00	
40	ONGC		Adamtila	Onshore	24-Nov-14	4.00	
41	ONGC		Adamtila Extn.	Onshore	03-Mar-12	148.00	
42	ONGC		Badarpur	Onshore	01-Aug-19	2.40	

Sl. No.	Company / Operator	Basin	Block Name	Onshore/ Offshore	Effective Date Of PML	PML Area (Sq. Km.)	Total PML Area (Sq. Km.)
43	ONGC	AS & AAFB	Banaskandi	Onshore	21-Jul-17	15.00	
44	ONGC		Bhubandar	Onshore	22-Dec-02	6.00	
45	ONGC		Cachar District	Onshore	04-Jan-20	703.61	
46	ONGC		North Patharia	Onshore	30-Mar-12	40.85	
47	ONGC		Sector - VC	Onshore	30-Nov-14	497.00	
48	ONGC		Agartala Dome (AD-1)	Onshore	01-May-09	15.75	
49	ONGC		Agartala Dome (AD-4)	Onshore	01-Jan-18	32.58	
50	ONGC		Agartala Dome Extn.-II	Onshore	01-Feb-06	160.86	
51	ONGC		Agartala Dome Extn.-III	Onshore	30-Mar-11	60.00	
52	ONGC		Baramura Extn.-IV	Onshore	01-Feb-06	150.25	
53	ONGC		Baramura Field	Onshore	01-Oct-13	10.75	
54	ONGC		Gojalia block	Onshore	07-Feb-06	271.17	
55	ONGC		Konaban Field	Onshore	04-Mar-14	33.00	
56	ONGC		Kunjaban	Onshore	14-Jul-08	288.00	
57	ONGC		Manikyanagar-Sonamura Extn-I	Onshore	01-Feb-06	138.55	
58	ONGC		Rokhia (RO-15)	Onshore	01-Jan-18	0.80	
59	ONGC		Rokhia (RO-19)	Onshore	26-Feb-20	0.58	
60	ONGC		Rokhia (RO-2)	Onshore	14-Nov-08	5.01	
61	ONGC		Sundalbari-Agartala Dome	Onshore	13-Dec-10	301.00	
62	ONGC		Tichna block	Onshore	07-Feb-06	195.41	
63	ONGC		Tulamura (Add)	Onshore	01-Jan-20	41.33	
64	ONGC		West Tripura	Onshore	05-Jan-20	1,321.72	
65	ONGC	CB	Ahmedabad Ext.-I	Onshore	22-Feb-01	17.29	5,836.12
66	ONGC		Ahmedabad Ext.-II	Onshore	29-Jul-08	5.06	
67	ONGC		Ahmedabad Ext.-III	Onshore	11-Nov-11	34.75	
68	ONGC		Ahmedabad Ext.-IV	Onshore	08-Oct-98	10.21	
69	ONGC		Ahmedabad Ext-V	Onshore	08-May-20	20.11	
70	ONGC		Ahmedabad-Bakrol	Onshore	05-Aug-09	30.16	
71	ONGC		Balasar	Onshore	08-Jun-13	12.00	
72	ONGC		Gamij Ext.-III ML	Onshore	08-Feb-02	15.41	
73	ONGC		Gamij Ext. - II	Onshore	04-Apr-01	116.22	
74	ONGC		Gamij Ext.-I	Onshore	25-Mar-17	78.75	
75	ONGC		Gamij	Onshore	26-Jun-15	39.16	
76	ONGC		Halisa	Onshore	30-Jan-18	146.05	
77	ONGC		Hirapur	Onshore	24-Oct-17	91.16	
78	ONGC		Kadi Ext-III	Onshore	02-Feb-19	16.14	
79	ONGC		Kadi Extn.-IV	Onshore	28-Mar-07	5.28	
80	ONGC		Kadi Extn.-V	Onshore	22-Nov-10	13.00	
81	ONGC		Kalol (Main)	Onshore	13-May-04	35.84	
82	ONGC		Kalol Ext.-I	Onshore	04-Aug-06	159.92	
83	ONGC		Kalol Ext.-II	Onshore	11-Apr-09	15.50	
84	ONGC		Kalol North-East	Onshore	15-Mar-10	9.44	
85	ONGC		Kalol West ML	Onshore	21-Nov-03	14.53	

Sl. No.	Company / Operator	Basin	Block Name	Onshore/ Offshore	Effective Date Of PML	PML Area (Sq. Km.)	Total PML Area (Sq. Km.)
86	ONGC	CB	Kalol West Extn.-I	Onshore	03-Feb-06	27.00	
87	ONGC		Kalol West Extn.-I (Add)	Onshore	22-Aug-17	27.25	
88	ONGC		Kalol West Ext.-II	Onshore	20-Sep-07	20.00	
89	ONGC		Limbodra	Onshore	21-Dec-05	15.75	
90	ONGC		Limbodra Ext.-I	Onshore	25-Mar-18	14.56	
91	ONGC		Motera	Onshore	14-Aug-16	15.37	
92	ONGC		Motera Ext.-I	Onshore	25-Mar-17	23.22	
93	ONGC		Motera Ext.-II	Onshore	25-Mar-18	25.95	
94	ONGC		Nandej	Onshore	25-Mar-17	90.23	
95	ONGC		Nandej East	Onshore	26-Jun-15	20.92	
96	ONGC		Nandej Ext.-I	Onshore	08-Feb-02	56.18	
97	ONGC		Nawagam Main	Onshore	28-Mar-07	72.23	
98	ONGC		Nawagam Ext. - III	Onshore	31-Aug-00	56.00	
99	ONGC		Paliyad-Kalol-Limbodra	Onshore	26-Jun-15	161.48	
100	ONGC		Rajpur	Onshore	26-Jun-15	6.76	
101	ONGC		Rajpur Ext.-I	Onshore	02-Feb-19	9.10	
102	ONGC		Rupal	Onshore	29-Oct-04	14.06	
103	ONGC		Sanand	Onshore	10-May-09	81.36	
104	ONGC		Sanand Ext.-I	Onshore	30-Apr-13	18.51	
105	ONGC		Sanand Ext.-II	Onshore	23-Mar-19	9.58	
106	ONGC		Sanand Ext.-III	Onshore	11-Nov-11	19.30	
107	ONGC		South Wamaj ML	Onshore	28-Jun-02	18.29	
108	ONGC		Valod	Onshore	07-Nov-17	8.58	
109	ONGC		Valod Extn.-I	Onshore	22-Nov-10	106.00	
110	ONGC		Valod Extn.-II	Onshore	10-Sep-13	30.27	
111	ONGC		Varsoda-Halisa	Onshore	29-Aug-08	155.00	
112	ONGC		Varsoda-Halisa Extn.-I	Onshore	22-Nov-10	169.00	
113	ONGC		Viraj	Onshore	26-Jul-20	17.82	
114	ONGC		Wadu	Onshore	26-May-10	15.41	
115	ONGC		Wadu Ext.-I	Onshore	19-May-17	55.17	
116	ONGC		Wamaj	Onshore	25-Mar-17	20.08	
117	ONGC		Indrora	Onshore	13-Mar-20	130.00	
118	ONGC		Ankleshwar (Main)	Onshore	15-Aug-01	38.98	
119	ONGC		Ankleshwar Ext.-I	Onshore	26-May-05	17.43	
120	ONGC		Dabka	Onshore	01-May-13	21.67	
121	ONGC		Dabka Ext.-I	Onshore	03-Jan-08	12.85	
122	ONGC		Dabka Ext.-II	Onshore	03-Jan-08	0.56	
123	ONGC		Dabka Ext.-IV (D#6)	Onshore	20-Feb-17	1.07	
124	ONGC		Dabka Ext.-V (D#38)	Onshore	29-Jun-19	1.90	
125	ONGC		Dahej	Onshore	06-Feb-05	18.52	
126	ONGC		Dahej Ext.-I	Onshore	17-Apr-14	90.90	
127	ONGC		Degam	Onshore	25-Mar-08	15.47	
128	ONGC		Gandhar	Onshore	07-Jan-05	11.78	
129	ONGC		Gandhar Ext.-I	Onshore	08-Oct-06	32.75	

Sl. No.	Company / Operator	Basin	Block Name	Onshore/ Offshore	Effective Date Of PML	PML Area (Sq. Km.)	Total PML Area (Sq. Km.)
130	ONGC	CB	Gandhar Ext.-II (Denwa)	Onshore	08-Jul-06	54.30	
131	ONGC		Gandhar Ext.-III	Onshore	24-Feb-07	235.38	
132	ONGC		Gandhar Ext.-IV	Onshore	30-Aug-14	36.75	
133	ONGC		Gandhar Ext.-V	Onshore	22-Mar-16	29.42	
134	ONGC		Gandhar Ext.-VI (G#388)	Onshore	22-Jan-17	42.99	
135	ONGC		Gandhar Ext.-VII(G#155)	Onshore	24-Apr-99	25.82	
136	ONGC		Gandhar Ext.-VIII	Onshore	16-Aug-00	7.23	
137	ONGC		Gandhar Ext.-IX	Onshore	20-Aug-02	40.90	
138	ONGC		Gandhar Extn.-XII	Onshore	19-Jun-09	29.00	
139	ONGC		Jambusar-Dabka	Onshore	25-Mar-08	48.00	
140	ONGC		Jambusar-Dabka (Add)	Onshore	18-Sep-17	53.50	
141	ONGC		Karvan	Onshore	09-Jul-18	19.05	
142	ONGC		Kasiyabet	Onshore	12-Nov-09	5.06	
143	ONGC		Kharach	Onshore	23-Mar-15	0.77	
144	ONGC		Kim(ML)	Onshore	10-Mar-17	18.33	
145	ONGC		Kim Ext. - I	Onshore	04-Jan-02	56.11	
146	ONGC		Kosamba	Onshore	03-Jan-08	19.17	
147	ONGC		Kosamba Extn.-I	Onshore	01-Mar-03	39.00	
148	ONGC		Kudara	Onshore	28-Jun-02	2.60	
149	ONGC		Kural (ML)	Onshore	03-Apr-01	83.49	
150	ONGC		Malpur (ML)	Onshore	04-Jun-07	1.00	
151	ONGC		Matar	Onshore	01-Oct-09	36.00	
152	ONGC		Matar (Add)	Onshore	18-Sep-17	30.50	
153	ONGC		Motwan	Onshore	04-Jul-99	42.20	
154	ONGC		Nada	Onshore	05-Aug-09	9.85	
155	ONGC		Nada Ext.-I	Onshore	02-Sep-18	7.22	
156	ONGC		Olpad (A)	Onshore	24-Nov-02	2.75	
157	ONGC		Olpad-Dandi Ext. - I	Onshore	01-Jan-04	94.40	
158	ONGC		Pakhajan(ML)	Onshore	21-Aug-07	6.25	
159	ONGC		Pakhajan Ext.-I	Onshore	10-Jan-15	17.99	
160	ONGC		Pakhajan Extn.-II	Onshore	16-Sep-02	38.50	
161	ONGC		Sanaokhurd	Onshore	30-Dec-16	18.80	
162	ONGC		South Dahej	Onshore	12-Nov-08	27.00	
163	ONGC		Umra	Onshore	08-Oct-06	8.44	
164	ONGC		Umra Ext.-I	Onshore	19-Oct-14	9.93	
165	ONGC		Umra Extn.-II	Onshore	13-Mar-17	34.43	
166	ONGC		Akholjuni	Onshore	27-Jul-00	81.25	
167	ONGC		Anklav Ext.-I	Onshore	15-Feb-02	61.00	
168	ONGC		Asmali ML	Onshore	02-Feb-19	41.01	
169	ONGC		Cambay	Onshore	14-Dec-04	2.60	
170	ONGC		Chaklasi-Rasnol	Onshore	06-Dec-07	42.00	
171	ONGC		Chaklasi-Rasnol Extn.-I	Onshore	16-Nov-10	91.29	
172	ONGC		Kathana	Onshore	22-Nov-08	16.95	
173	ONGC		Kathana Ext.-I	Onshore	15-Mar-04	16.99	

Sl. No.	Company / Operator	Basin	Block Name	Onshore/ Offshore	Effective Date Of PML	PML Area (Sq. Km.)	Total PML Area (Sq. Km.)
174	ONGC	CB	Nawagam Ext.-I	Onshore	21-Mar-03	2.77	
175	ONGC		Nawagam Ext.-II	Onshore	26-Nov-99	14.66	
176	ONGC		Nawagam South Ext.-I	Onshore	21-Nov-03	30.88	
177	ONGC		Nawagam South Ext.-II	Onshore	21-Nov-03	43.94	
178	ONGC		Nawagam South Ext.-III	Onshore	13-Dec-05	53.71	
179	ONGC		Padra Main	Onshore	18-Sep-06	1.25	
180	ONGC		Padra Extn-I	Onshore	11-Apr-11	8.42	
181	ONGC		Padra Extn-II	Onshore	03-Sep-03	14.50	
182	ONGC		Padra Extn-III	Onshore	12-May-94	0.38	
183	ONGC		Padra Extn-IV	Onshore	15-Mar-96	6.37	
184	ONGC		Padra Extn-V	Onshore	03-Feb-97	3.75	
185	ONGC		Padra Extn-VI	Onshore	28-Jan-99	83.95	
186	ONGC		Padra Extn-VII	Onshore	26-Apr-00	7.11	
187	ONGC		Padra Extn-VIII	Onshore	08-Nov-00	15.68	
188	ONGC		Padra Extn-IX	Onshore	10-Mar-04	21.00	
189	ONGC		Padra Extn-X	Onshore	15-Jan-08	10.00	
190	ONGC		Siswa	Onshore	12-Feb-00	39.09	
191	ONGC		Vasad-Kathol Ext.-III	Onshore	08-Jul-11	103.18	
192	ONGC		Balol	Onshore	25-May-10	24.00	
193	ONGC		Balol Extn.-I	Onshore	26-Dec-18	5.83	
194	ONGC		Bechraji	Onshore	31-Aug-11	37.11	
195	ONGC		Chansma	Onshore	28-Sep-16	2.81	
196	ONGC		Charada	Onshore	06-Oct-14	10.60	
197	ONGC		Charada Mansa	Onshore	23-Oct-12	187.50	
198	ONGC		Dedana (ML)	Onshore	04-Nov-16	5.44	
199	ONGC		East Sobhasan	Onshore	28-Jun-02	22.42	
200	ONGC		Geratpur	Onshore	20-Aug-00	18.31	
201	ONGC		Jakasana(ML)	Onshore	02-Jun-01	9.80	
202	ONGC		Jotana	Onshore	26-Jul-00	39.50	
203	ONGC		Jotana Ext.-I	Onshore	27-Nov-06	57.70	
204	ONGC		Jotana Ext.-II	Onshore	16-Jun-17	0.85	
205	ONGC		Jotana-South	Onshore	10-Mar-08	23.00	
206	ONGC		Jotana-Warosan	Onshore	24-Jun-05	38.05	
207	ONGC		Kadi	Onshore	18-Aug-08	64.49	
208	ONGC		Kadi Asjol	Onshore	28-Aug-03	0.72	
209	ONGC		Langhnaj ML	Onshore	23-Jul-02	17.92	
210	ONGC		Langhnaj-Wadasma	Onshore	05-Feb-01	13.84	
211	ONGC		Lanwa	Onshore	09-Dec-02	30.00	
212	ONGC		Lanwa Ext.-I	Onshore	16-Dec-16	2.15	
213	ONGC		Linch	Onshore	16-Oct-13	43.73	
214	ONGC		Linch Ext.- I	Onshore	18-Aug-08	34.25	
215	ONGC		Linch Ext.-II	Onshore	24-Mar-17	13.35	
216	ONGC		Mansa	Onshore	26-Jul-15	58.72	
217	ONGC		Mansa Extn.-I	Onshore	20-Sep-08	12.50	
218	ONGC		Mehsana City	Onshore	08-Aug-16	8.85	

Sl. No.	Company / Operator	Basin	Block Name	Onshore/ Offshore	Effective Date Of PML	PML Area (Sq. Km.)	Total PML Area (Sq. Km.)
219	ONGC	CB	Mehsana City Ext.-II	Onshore	18-Jul-15	7.58	
220	ONGC		Nandasan - Langhnaj	Onshore	27-Apr-06	61.90	
221	ONGC		Nandasan Ext.-I	Onshore	18-Jul-15	26.39	
222	ONGC		North Kadi Ext.-I (New)	Onshore	03-May-13	61.43	
223	ONGC		North Sobhasan Ext.-I	Onshore	12-Mar-01	56.85	
224	ONGC		North Sobhasan Ext.-II	Onshore	17-Nov-01	23.00	
225	ONGC		North Sobhasan Part (A, B)	Onshore	25-Jan-19	12.92	
226	ONGC		Patan-Tharad	Onshore	04-Sep-13	10.24	
227	ONGC		Sanganpur ML	Onshore	05-Jun-02	6.97	
228	ONGC		Santhal	Onshore	09-Jun-14	19.46	
229	ONGC		Sobhasan	Onshore	20-Aug-13	35.89	
230	ONGC		South Patan	Onshore	16-Jun-97	1.09	
231	ONGC		West Mewad(ML)	Onshore	11-Oct-00	13.20	
232	ONGC		West Sobhasan	Onshore	23-Apr-03	9.60	
233	ONGC	CY (Onshore)	Adiyakka Mangalam	Onshore	27-May-99	17.80	3,324.13
234	ONGC		Greater Bhuvanagiri Extn.	Onshore	01-Apr-17	91.80	
235	ONGC		Greater Kali	Onshore	21-Jul-10	36.00	
236	ONGC		Greater Kamalapuram	Onshore	26-Dec-04	22.00	
237	ONGC		Greater Narimanam	Onshore	26-Jan-06	53.76	
238	ONGC		Kali	Onshore	01-Jun-01	19.00	
239	ONGC		Kali-6	Onshore	01-Jan-04	1.60	
240	ONGC		Kamalapuram-I	Onshore	27-May-99	23.50	
241	ONGC		Kamalapuram-II	Onshore	04-May-14	5.12	
242	ONGC		Kanjirangudi	Onshore	13-Oct-03	68.00	
243	ONGC		Kizhvelur	Onshore	27-May-99	3.60	
244	ONGC		Kuthalam	Onshore	01-Jun-01	91.00	
245	ONGC		Kuthalam-13	Onshore	01-Aug-02	12.00	
246	ONGC		Kuthanallur	Onshore	26-Feb-04	6.25	
247	ONGC		Larger Kovilkalappal	Onshore	15-May-07	90.77	
248	ONGC		L-I	Onshore	31-Dec-12	870.36	
249	ONGC		L-II	Onshore	31-Dec-12	1,470.83	
250	ONGC		Mattur	Onshore	04-May-94	3.00	
251	ONGC		Nannilam-I	Onshore	26-Apr-13	4.70	
252	ONGC		Nannilam-II	Onshore	27-May-99	1.00	
253	ONGC		Neyveli	Onshore	15-Mar-08	3.84	
254	ONGC		PBS-1-1	Onshore	01-Oct-03	9.00	
255	ONGC		Perungulam-periyapattinam	Onshore	15-Jul-17	74.28	
256	ONGC		Pundi	Onshore	27-May-99	1.00	
257	ONGC		Ramanathapuram (Add)	Onshore	21-Nov-12	323.04	
258	ONGC		Tulsapatnam	Onshore	27-May-99	3.70	
259	ONGC		Vadatheru	Onshore	31-Dec-07	15.18	
260	ONGC		Vijayapuram #13	Onshore	26-Feb-02	2.00	

Sl. No.	Company / Operator	Basin	Block Name	Onshore/ Offshore	Effective Date Of PML	PML Area (Sq. Km.)	Total PML Area (Sq. Km.)
261	ONGC	KG (Onshore)	Achanta	Onshore	28-Nov-08	7.60	4,887.08
262	ONGC		Adavipalem-Ponnamanda	Onshore	30-Jul-16	81.07	
263	ONGC		Bantumilli Extn.	Onshore	05-Jan-09	38.00	
264	ONGC		Bantumilli Extn. (Add)	Onshore	21-Nov-12	117.67	
265	ONGC		Chintalapalli Extn.	Onshore	12-Nov-09	18.56	
266	ONGC		Elamanchali	Onshore	21-Feb-11	6.00	
267	ONGC		Endamuru-I	Onshore	03-Apr-12	3.00	
268	ONGC		Endamuru-4	Onshore	30-Apr-03	6.00	
269	ONGC		Endamuru-7&9	Onshore	19-May-03	7.30	
270	ONGC		Enugupalli	Onshore	06-Jul-00	7.00	
271	ONGC		Godavari On-land	Onshore	01-Jan-13	2,160.87	
272	ONGC		Kaikalur-3	Onshore	01-Jul-07	9.00	
273	ONGC		Kavitam	Onshore	12-Oct-07	32.98	
274	ONGC		Kavitam (Add)	Onshore	21-Nov-12	120.35	
275	ONGC		Kesanapalli	Onshore	18-Jul-12	3.70	
276	ONGC		Kesavadasupalem	Onshore	30-Jul-02	26.50	
277	ONGC		Lakshmaneswaram	Onshore	30-Jul-02	23.50	
278	ONGC		Lingala	Onshore	21-Dec-09	7.60	
279	ONGC		Lingala Ext. & Kaikalur-12	Onshore	30-Jul-02	30.00	
280	ONGC		Mahadevapatnam	Onshore	28-Nov-08	138.89	
281	ONGC		Malleswaram	Onshore	22-Nov-11	241.18	
282	ONGC		Mandapeta	Onshore	22-Aug-15	40.00	
283	ONGC		Mandapeta West	Onshore	01-Jun-04	20.00	
284	ONGC		Mandapeta-19	Onshore	01-May-18	6.00	
285	ONGC		Manepalli Extn.	Onshore	12-Nov-09	10.00	
286	ONGC		Medapadu	Onshore	08-Jul-12	16.60	
287	ONGC		Mori-1	Onshore	07-Apr-11	6.50	
288	ONGC		Mori-5	Onshore	05-Jun-15	1.56	
289	ONGC		Nandigama	Onshore	31-Jan-00	55.00	
290	ONGC		Pasarlapudi-8	Onshore	27-Jun-12	5.50	
291	ONGC		Pasarlapudi-9	Onshore	23-Jul-12	6.60	
292	ONGC		Penumadam-1	Onshore	03-Apr-12	9.60	
293	ONGC		Penumadam-2	Onshore	01-Jul-04	3.20	
294	ONGC		Razole-1 & 2	Onshore	23-Jan-08	18.85	
295	ONGC		Srikatpalli - Pasarlapudi	Onshore	30-Jul-02	163.00	
296	ONGC		Suryaraopeta	Onshore	30-Jul-02	56.00	
297	ONGC		Tatipaka-Pasarlapudi	Onshore	14-Feb-14	62.00	
298	ONGC		Turputallu (Add)	Onshore	21-Nov-12	37.58	
299	ONGC		Vadali	Onshore	20-Apr-10	4.00	
300	ONGC		West Godavari	Onshore	01-Jan-13	1,278.32	
301	ONGC	RJ	Chinnewala Tibba	Onshore	15-Oct-03	114.86	882.01
302	ONGC		Ghotaru Ext. - I	Onshore	10-Jan-01	562.76	
303	ONGC		Manherra Tibba	Onshore	01-May-14	24.00	
304	ONGC		South-Kharatar	Onshore	25-Mar-11	180.39	
305	ONGC	VN	Nohta-Damoh-Jabera	Onshore	10-Feb-15	1,135.00	1,135.00
ONGC PML AREA (Onshore)							**22,023.44**

Sl. No.	Company / Operator	Basin	Block Name	Onshore/ Offshore	Effective Date Of PML	PML Area (Sq. Km.)	Total PML Area (Sq. Km.)
306	ONGC	CY (Offshore)	PBS-1-1 Extn.	Offshore	01-Apr-09	11.00	85.83
307	ONGC		PBS-1-1 Extn. (Add)	Offshore	21-Nov-12	74.83	
308	ONGC	KG (Offshore)	G-1 Field	Offshore	05-Sep-03	105.00	1,073.68
309	ONGC		Godavari	Offshore	24-Jan-08	77.28	
310	ONGC		GS-15 & 23	Offshore	01-Feb-20	38.06	
311	ONGC		GS-29	Offshore	30-Oct-09	35.00	
312	ONGC		GS-29 Extn.	Offshore	27-Jun-13	137.62	
313	ONGC		GS-49	Offshore	22-Oct-09	32.00	
314	ONGC		GS-49 (Add)	Offshore	21-Nov-12	20.50	
315	ONGC		GS-49 Extn.	Offshore	06-Sep-13	77.68	
316	ONGC		Vainateyam	Offshore	20-Sep-08	145.80	
317	ONGC		Vainateyam Extn.	Offshore	11-Jan-11	68.95	
318	ONGC		Vasistha	Offshore	15-Feb-08	119.00	
319	ONGC		Yanam	Offshore	19-Nov-09	49.68	
320	ONGC		Yanam (Add)	Offshore	21-Nov-12	167.11	
321	ONGC	KC (Offshore)	GK-28	Offshore	10-Oct-11	840.00	1,242.50
322	ONGC		GK-28 (Add)	Offshore	21-Nov-12	402.50	
323	ONGC	MB	Around D-1 Field	Offshore	14-Sep-09	384.00	28,504.18
324	ONGC		B-55	Offshore	30-Jun-19	119.50	
325	ONGC		Bassein Field Extn. (SB-II)	Offshore	15-Jun-05	22.55	
326	ONGC		C-37 (BOFF I, II & III)	Offshore	12-Sep-07	227.85	
327	ONGC		C-37 (BOFF I, II & III) (Add)	Offshore	21-Nov-12	177.00	
328	ONGC		C-Series Fields	Offshore	01-Apr-06	3,594.37	
329	ONGC		D-1 Field	Offshore	31-Jul-05	25.60	
330	ONGC		D-18	Offshore	01-Jan-05	103.14	
331	ONGC		Extn. of NW-Mumbai High	Offshore	07-Nov-08	395.49	
332	ONGC		Extn. of NW-Mumbai High (Add)	Offshore	21-Nov-12	1,905.55	
333	ONGC		Mukta	Offshore	22-Dec-19	777.00	
334	ONGC		North Tapti Field	Offshore	09-Jan-06	68.14	
335	ONGC		Panna	Offshore	22-Dec-19	427.00	
336	ONGC		S&E of Bassein	Offshore	01-Apr-06	1,413.01	
337	ONGC		South Bassein	Offshore	01-Oct-07	743.00	
338	ONGC		Vasai East	Offshore	10-Apr-06	103.69	
339	ONGC		West of Bassein	Offshore	01-Apr-06	812.69	
340	ONGC		B-119 / B-121	Offshore	15-May-17	113.40	
341	ONGC		BOFF	Offshore	03-Jan-20	10,047.37	
342	ONGC		Mumbai High-South	Offshore	09-Jan-06	331.00	
343	ONGC		Mumbai High-South (Add)	Offshore	21-Nov-12	448.93	
344	ONGC		Mumbai High-SW	Offshore	01-Apr-06	960.64	
345	ONGC		Mumbi High-NW	Offshore	01-Apr-06	1,545.67	
346	ONGC		Single PML MH Field	Offshore	24-Oct-10	1,950.13	
347	ONGC		B-173A	Offshore	01-Jun-18	51.95	

Sl. No.	Company / Operator	Basin	Block Name	Onshore/ Offshore	Effective Date Of PML	PML Area (Sq. Km.)	Total PML Area (Sq. Km.)
348	ONGC	MB	Heera	Offshore	20-Nov-04	448.05	
349	ONGC		Neelam	Offshore	14-Nov-09	213.00	
350	ONGC		North Heera	Offshore	04-Dec-07	50.46	
351	ONGC		North Heera (Add)	Offshore	21-Nov-12	39.00	
352	ONGC		Ratna & R-Series	Offshore	30-Mar-16	1,005.00	
ONGC PML AREA (Offshore)							**30,906.19**
ONGC TOTAL PML AREA (Onshore+Offshore)							**52,929.63**
353	OIL	AS & AAFB	Ningru Extension	Onshore	11-May-04	58.55	4,334.89
354	OIL		Ningru	Onshore	27-Nov-03	427.06	
355	OIL		"Dum-Duma BK-D (10.36 Sq.Km.) Dum-Duma BK-C (85.47 Sq.Km.) Dum-Duma BK-B (311.96 Sq.Km.) Dum-Duma BK-A (98.42 Sq.Km.)"	Onshore	26-Nov-09	487.09	
356	OIL		Baghjan	Onshore	14-May-03	58.64	
357	OIL		Borhapjan	Onshore	07-Dec-00	87.00	
358	OIL		Borhat	Onshore	13-Aug-13	81.00	
359	OIL		Chabua	Onshore	12-Jun-02	186.47	
360	OIL		Dholiya	Onshore	18-Oct-02	131.00	
361	OIL		Dibrugarh	Onshore	21-Jan-18	186.00	
362	OIL		Dibrugarh Extn.	Onshore	15-Feb-15	64.08	
363	OIL		Digboi	Onshore	14-Oct-01	49.33	
364	OIL		Dumduma Extn.	Onshore	19-Nov-19	4.55	
365	OIL		Hugrijan	Onshore	10-Jan-01	725.20	
366	OIL		Hugrijan Extn.	Onshore	22-Nov-19	8.45	
367	OIL		Mechaki	Onshore	19-May-03	195.00	
368	OIL		Mechaki Extnension	Onshore	06-Jul-10	9.00	
369	OIL		Moran	Onshore	10-Jan-01	384.07	
370	OIL		Moran Extn.	Onshore	01-Nov-06	525.49	
371	OIL		Nahorkatiya	Onshore	04-Feb-04	1.42	
372	OIL		Nahorkatiya Extn.	Onshore	10-Jan-11	165.76	
373	OIL		Sapkaint	Onshore	24-Dec-07	72.25	
374	OIL		Tinsukia	Onshore	07-Dec-01	242.48	
375	OIL		Tinsukia Extension	Onshore	17-May-03	185.00	
376	OIL	RJ	Baghewala	Onshore	30-May-03	210.00	460.00
377	OIL		Dandewala (Jaisalmer)	Onshore	01-Jan-16	250.00	
OIL TOTAL PML AREA							**4,794.89**
NOMINATION (OIL+ONGC) TOTAL PML AREA							**57,724.52**

Table 8.19 PML Areas under operation in PSC regime

Sl. No.	Operator	Basin	Block/Field Name	Field Name	Pre-Nelp/ Field/Nelp	PML Effective Date	PML Area (Sq. Km.)	Total Area (Sq.km.)
1	CAIRN	KG	Ravva	Ravva-offshore	Field	28-10-1994	311.56	3,629.77
2		KG		Ravva-onland	Field	04-07-1997		
3		CB	CB-OS/2	Lakshmi	Pre-NELP	01-01-2002	121.06	
4				Gauri		01-04-2004	52.70	
5				CBX		-	33.28	
6		RJ	RJ-ON-90/1	DA1	Pre-NELP	20-06-2005	1,859.00	
7				DA2		15-11-2006	430.17	
8				DA3		06-11-2007	822.00	
9	ONGC	CB	CB-ONN-2002/1	West Patan	NELP IV	30-03-2015	17.00	1,397.79
10			CB-ONN-2001/1	Nadiad – 1	NELP III	07-05-2015	26.00	
11			CB-ONN-2004/1	Karan nagar - 1	NELP VI	20-03-2015	9.73	
12			CB-ONN-2004/2	Vadatal-1	NELP VI	20-03-2015	14.37	
13				Vadatal- 3 & 5	NELP VI	14-06-2017	72.19	
14			CB-OSN-2003/1	Aliabet	NELP V	04-07-2017	243.00	
15			CB-ONN-2004/3	Uber-2	NELP VI	08-11-2017	10.78	
16		KG	KG-ONN-2003/1	Nagayalanka	NELP V	25-09-2017	54.46	
17			KG-OSN-2004/1	KG-OSN-2004/1	NELP VI	08.11.2019	148.76	
18			KG-DWN-98/2	Cluster - II	NELP I	18.08.2017	764.00	
19			KG-OSN-2001/3	DDW	NELP III	11-08-2010	37.50	
20	BG-RIL-ONGC	MB	Panna	Panna	Field	22-12-1994	430.00	2,678.00
21			Mukta	Mukta	Field	22-12-1994	777.00	
22			M&S Tapti	M&S Tapti	Field	22-12-1994	1,471.00	
23	GEOENPRO	AS	Kharsang	Kharsang	Field	21-10-1997	10.00	10.00
24	ACIL	AS	Amguri	Amguri	Field	23-11-2003	52.75	52.75
25	HOEC	CB	Asjol	Asjol	Field	09-04-1996	15.00	200.88
26			N. Balol	N. Balol	Field	21-03-2002	27.30	
27			CB-ON/7	Pramoda /South Pramoda	Pre-NELP	21-09-2005/ 02-12-2008	7.64	
28		CY	PY-1	PY-1	Field	06-10-1995	75.00	
29		AS	AAP-ON-94/1	Dirok	Pre-NELP	25-08-2017	75.94	

Sl. No.	Operator	Basin	Block/Field Name	Field Name	Pre-Nelp/ Field/Nelp	PML Effective Date	PML Area (Sq. Km.)	Total Area (Sq.km.)
30	SUNPETRO	CB	Baola	Baola	Field	05-04-1995	4.00	123.50
31			Modhera	Modhera	Field	06-11-2008	12.70	
32			CB-ONN-2003/1	Bhaskar	NELP V	24-06-2019	56.80	
33			Hazira	Hazira	Field	23-09-1994	50.00	
34	JTI	CB	Wavel	Wavel	Field	20-02-1995	9.00	57.00
35			Dholka	Dholka	Field	20-02-1995	48.00	
36	SELAN	CB	Lohar	Lohar	Field	13-03-1995	5.00	189.65
37			Indrora	Indrora	Field	13-03-1995	130.00	
38			Bakrol	Bakrol	Field	13-03-1995	36.00	
39			Karjisan	Karjisan	Field	23-11-2005	5.00	
40			Ognaj	Ognaj	Field	05-08-2008	13.65	
41	GNRL	CB	Kanawara	Kanawara	Field	27-02-2003	6.30	34.15
42			Dholasan	Dholasan	Field	04-02-2003	8.80	
43			Allora	Allora	Field	16-05-2003	6.85	
44			N. Kathana	N. Kathana	Field	11-06-2003	12.20	
45	OILEX	CB	Cambay	Cambay	Field	23-09-1994	161.00	167.00
46			Bhandut	Bhandut	Field	23-09-1994	6.00	
47	GSPCL	CB	Unawa	Unawa	Field	19-05-2003	5.65	100.21
48			CB-ONN-2000/1	Ingoli/SE-01/ Balpura Field	NELP II	05-09-2005	53.03	
49			CB-ONN-2003/2	Ank-21	NELP V	25-02-2014	1.60	
50				Ank-40s	NELP V	15-09-2015	11.09	
51			CB-ONN-2002/3	Mirroli	NELP IV	25-02-2014	3.29	
52			CB-ONN-2002/3	Sanand	NELP IV	20-03-2015	18.00	
53			CB-ON/2	Tarapur#1	Pre-NELP	12-02-2009	7.55	
54				Tarapur#G	Pre-NELP	03-03-2014		
55				Tarapur#6	Pre-NELP	06-07-2015		
56	FOCUS	RJ	RJ-ON/6	SGL	Pre-NELP	23-06-2010	176.00	176.00
57	HARDY	CY	CY-OS-90/1	PY-3	Pre-NELP	30-12-1994	81.00	81.00
58	RIL	KG	KG-DWN-98/3	D1 & D3	NELP I	02-03-2005	339.41	1,174.51
59				D-26 (MA)		17-04-2008	49.71	
60				D-2,6,19 & 22		21-06-2012	84.65	
61				D-34		30-09-2013	530.00	
62				D-29 & 30		20-07-2018	170.75	

Sl. No.	Operator	Basin	Block/Field Name	Field Name	Pre-Nelp/ Field/Nelp	PML Effective Date	PML Area (Sq. Km.)	Total Area (Sq.km.)
63	ESSAR	CB	CB-ON/3	ESU	Pre-NELP	23-04-2007	7.81	13.73
64				EEU		21-10-2016	1.41	
65				ENS		09-11-2016	2.93	
66				ENP		13-12-2016	1.58	
67	Mercator	CB	CB-ONN-2005/9	Jyoti	NELP VII	27-06-2018	31.37	31.37
68	BPRL	CB	CB-ONN-2010/8	Pasunia	NELP IX	26-02-2019	42.00	42.00
69	ONGC	AS	AA-ONN-2001/1	Khubal	Pre-Nelp	01-07-2019	124.80	124.80
Total of PMLs awarded								**10,284.11**

Table 8.20: Bidding Round wise PML Area under PSC Regime

PSC Bidding Round	Area (in Sq.Kms)	% Area
Pre-NELP	3,804.87	37.0%
Field	3,689.76	35.9%
NELP I	1,938.51	18.8%
NELP II	53.03	0.5%
NELP III	63.50	0.6%
NELP IV	38.29	0.4%
NELP V	366.95	3.6%
NELP VI	255.83	2.5%
NELP VII	31.37	0.3%
NELP IX	42.00	0.4%
Total	**10,284.11**	**100.0%**

Fig 8.4: Round wise PML Area under PSC Regime

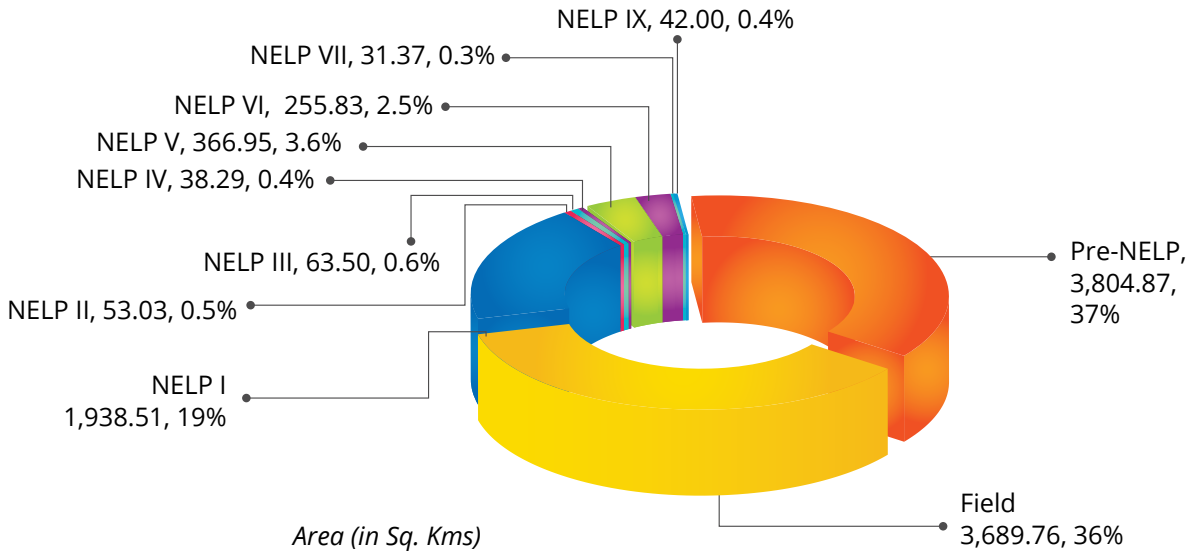


Table 8.21: PML Areas under operation in DSF Bid Round I - 2016 (RSC Regime)

Sl. No.	Operator	Basin	Block/Field Name	PML Effective Date	PML Area (Sq. Km.)	Total Area (Sq.Km.)
1	RAMAYNA (29), BDNEPL (29), DUGGAR (23), MIPL (19)	AS	AA/ONDSF/BARSILLA/2016	22-06-17	6.22	
2	RAMAYNA (29), BDNEPL (29), DUGGAR (23), MIPL (19)	AS	AA/ONDSF/DIPLING/2016	22-06-17	28.17	
3	OILMAX (100)	AS	AA/ONDSF/ CHARAIDEO/2016	26-07-17	11.50	92.95
4	OILMAX (100)	AS	AA/ONDSF/ DUARMARA/2016	26-07-17	8.91	
5	IOCL (100)	AS	AA/ONDSF/ JERAIPATHAR/2016	26-07-17	10.10	
6	VBIPL (100)	AS	AA/ONDSF/PATHARIA/2016	10-11-17	19.15	
7	MEIL (100)	AS	AA/ONDSF/LAXMIJAN/2016	21-04-18	8.90	
8	NIPPON (100)	CB	CB/ONDSF/KAMBOI/2016	04-08-17	2.35	
9	NIPPON (100)	CB	CB/ONDSF/WEST BECHRAJI/2016	04-08-17	9.15	
10	PFH (100)	CB	CB/ONDSF/ELAO/2016	04-08-17	9.98	41.14
11	MEIL (100)	CB	CB/ONDSF/KHAMBEL/2016	08-08-17	9.78	
12	SAC (100)	CB	CB/ONDSF/SOUTH PATAN/2016	08-08-17	9.88	
13	PFH (100)	KG	KG/ONDSF/ BHIMANAPALLI/2016	24-04-18	15.10	
14	PFH (100)	KG	KG/ONDSF/ACHANTA/2016	29-06-18	9.63	48.93
15	KEI-RSOS (100)	KG	KG/OSDSF/GSKV1/2016	02-06-17	24.20	
16	IOCL (100)	KC	GK/OSDSF/KD/2016	11-05-17	46.00	46.00
17	HOEC (50), ADBHOOT (50)	MB	MB/OSDSF/B80/2016	11-05-17	56.02	
18	AWEL (100)	MB	MB/OSDSF/B9/2016	11-05-17	183.00	
19	BPRL (100)	MB	MB/OSDSF/B15/2016	16-05-17	41.00	443.32
20	BPRL (100)	MB	MB/OSDSF/B127E/2016	02-06-17	39.30	
21	SUNPETRO (100)	MB	MB/OSDSF/B-37/2016	11-05-17	124.00	
22	BPRL (100)	RJ	RJ/ONDSF/BAKHRI TIBBA/2016	27-09-17	13.40	23.70
23	BPRL (100)	RJ	RJ/ONDSF/SADEWALA/2016	27-09-17	10.30	
24	IOCL (100)	VN	VN/ONDSF/NOHTA/2016	24-05-17	15.00	15.00
Total of MLs awarded in DSF Bid Round I						**711.04**

Table 8.22: PML Areas under operation in DSF Bid Round II - 2018 (RSC Regime)

Sl. No.	Operator	Basin	Block/Field Name	PML Effective Date	PML Area (Sq. Km.)	Total Area (Sq.Km.)
1	ARSH	AS	AA/ONDSF/Madhakali/2018	08-01-2020	41.93	136.59
2	IOCL (90%), HOEC (10%)	AS	AA/ONDSF/Umatara/2018	03-12-2019	52.03	
3	INVENIRE (100)	AS	AA/ONDSF/Disaijan/2018	10-01-2020	21.26	
4	SHANTIGD (19%), BBPL (70%), SHANNO (11%)	AS	AA/ONDSF/Tiphuk/2018	08-01-2020	21.37	
5	OIL (100)	AAFB	AA/ONDSF/Tulamara/2018	14-11-2019	47.23	47.23
6	GGRPL (100)	CB	CB/ONDSF/Vadatal/2018	08-01-2020	194.97	413.78
7	SHANTIGD (19%), BBPL (70%), SHANNO (11%)	CB	CB/ONDSF/A1/2018	08-01-2020	151.99	
8	GGRPL (100)	CB	CB/ONDSF/D45/2018	08-01-2020	66.82	
9	ONGC (100)	RJ	RJ/ONDSF/Chinnewala/2018	02-12-2019	73.00	73.00
10	OIL (100)	KG	KG/OSDSF/GSKW/2018	08-07-2019	93.90	93.90
11	ONGC (100)	MB	MB/OSDSF/CA/2018	25-06-2019	343.95	1,236.44
12	ARCH (100)	MB	MB/OSDSF/D31/2018	09-08-2019	271.77	
13	ONGC (100)	MB	MB/OSDSF/NMT/2018	08-07-2019	96.15	
14	ONGC (100)	MB	MB/OSDSF/SB15/2018	08-07-2019	226.16	
15	ONGC (100)	MB	MB/OSDSF/D33/2018	08-07-2019	207.55	
16	GGRPL (100)	MB	MB/OSDSF/D18/2018	08-07-2019	90.86	
17	ARCH (100)	BP	NEC/OSDSF/D11/2018	09-08-2019	541.44	541.44
Total of MLs awarded in RSC (DSF) regime						**2,542.38**

Table 8.23: Regime wise PML area

Regime	Area (in Sq. Kms)
Nomination (OIL+ONGC)	57,725
PSC (NOCs/Pvt./JV)	10,284
RSC (DSF)	3,253
Grand Total	**71,262**

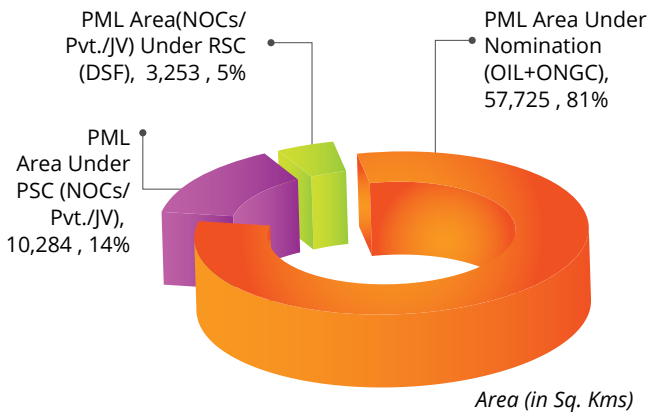


Table 8.24: PEL/PML Area trend over last 10 years

Year	PEL					PML				
	ONGC (N)	OIL (N)	PSC	RSC	Total	ONGC (N)	OIL (N)	PSC	RSC	Total
2010-11	74,130	2,414	9,66,588	-	**10,43,132**	24,436	4,916	7,659	-	**37,011**
2011-12	67,913	2,367	8,63,227	-	**9,33,507**	24,541	4,916	7,835	-	**37,292**
2012-13	43,399	1,894	7,35,224	-	**7,80,516**	52,900	4,916	7,835	-	**65,651**
2013-14	42,826	1,239	3,41,658	-	**3,85,722**	54,016	5,006	8,596	-	**67,618**
2014-15	42,826	1,230	1,70,826	-	**2,14,881**	54,510	5,006	8,674	-	**68,190**
2015-16	37,794	1,230	1,26,842	-	**1,65,865**	56,845	5,006	8,865	-	**70,716**
2016-17	37,793	1,230	78,207	-	**1,17,230**	56,512	5,006	8,741	-	**70,259**
2017-18	37,739	332	52,961	-	**91,032**	55,691	5,006	9,404	-	**70,101**
2018-19	37,739	332	40,687	20,782	**99,539**	55,997	4,731	10,010	711	**71,448**
2019-20	5,106	332	42,476	85,101	**1,33,015**	52,930	4,795	10,284	3,253	**71,262**

Fig 8.4: PEL/PML Area trend over last 10 years

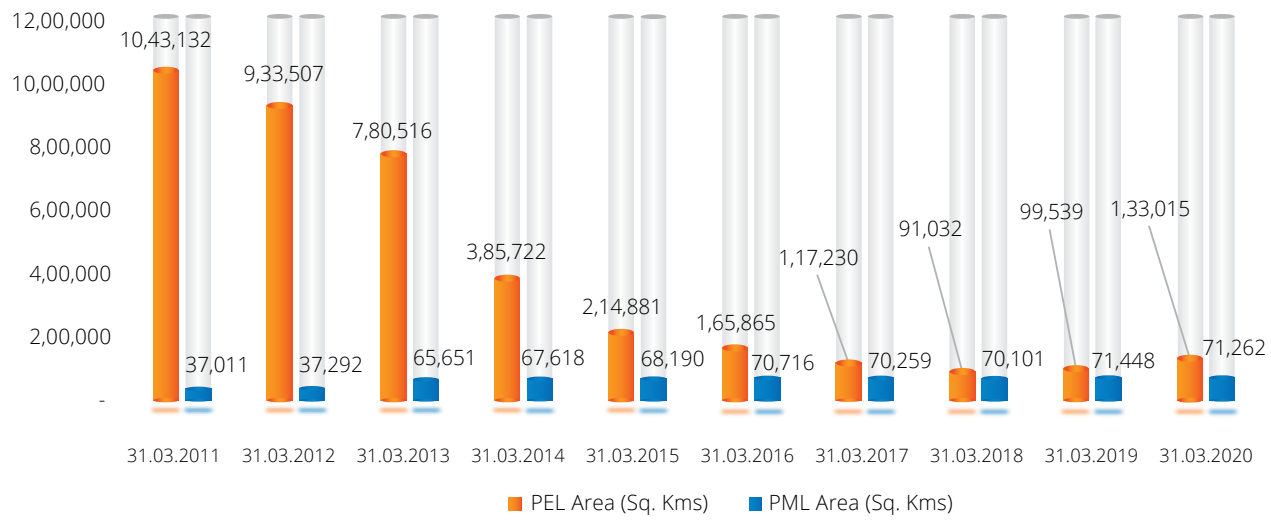


Table 8.25: Details of Fiscal Terms under which blocks were offered under various Pre-NELP Exploration Rounds in India

No.	Item	Round,1991	Round,1993	Round,1993	Round, 1994	Round, 1994	JV Exploration Program,1995
1	Bonus	No signature or production bonus					
2	Royalty	No royalty payment	No royalty payment, No custom duty	No royalty payment	No royalty payment	No royalty payment	No royalty payment/ cess payment
3	GoI interest	"GoI or its nominee will have carried interest of 30% from the date of signing of contract, with the option to convert it into a working interest after the decision to proceed with the development and production of discovered hydrocarbons has been taken. GoI or its nominee may also acquire 10% working interest in any block it chooses at the time of signing of contract, thereby sharing 10% of exploration cost"					ONGC or OIL will have a participating interest of between 25% to 40% in the JV from the date of signing of contract, thereby sharing the exploration cost in proportion to their participating interest
4	Pricing of crude oil and natural gas	International market price for oil produced. The pricing formula for associated gas would be on a cost plus basis, while for non-associated gas it would be related to the international price of fuel oil, the exact relationship being negotiable. The price payable for both associated and non-associated gas would not exceed the price paid to the producer National Oil Companies (exclusive of cess, taxes and royalty)		International market price for oil produced. The pricing formula for gas would be on internationally accepted principles. Arrangement for marketing of the gas produced would be negotiable between the GoI and the Company			International market price for oil produced. The JV will have freedom to make arrangements for marketing the gas
5	Sharing of profit	Profit oil shall be bid based on sliding scale tied to post tax rates of return or multiples of investment recovered					
6	Minimum expenditure	No minimum expenditure commitment No ring fencing of blocks for corporate tax purposes		No minimum expenditure commitment during the exploration period No ring fencing of blocks for corporate tax purposes			
7	Operatorship	NA	Company will be operator for exploration and appraisal period. Time of transfer of operatorship to GoI or its nominee during development and production phase is negotiable				Operatorship is negotiable Time of transfer of operatorship to ONGC/OIL during development and production phase is also negotiable

Table 8.26: Fiscal Terms of Upstream Oil and Gas Bid Rounds - Upto NELP rounds

No.	Item	Nomination	Pre-NELP Exploration Blocks	Small fields,1992
1	Bonus	NA	No signature or production bonus	Signature/production bonuses payable by companies to ONGC and OIL
2	Royalty	Royalty: For Crude Oil: 20% for onshore 10% for Shallow water 10% for deep water for first 7 years 5% for deep water for after 7 years Natural Gas: 10% for all onshore and offshore Cess on Oil production: 20 per cent of well head value of oil	Oil: 20% for Onland Shallow water: 10% Deep water: 10% for first 7 years, 5% after 7 years Natural Gas: 10% for all onshore and offshore Cess on Oil production: 20 per cent of well head value of oil	Royalty: Rs.481 per MT for first round and Rs.528 per MT for second round for Oil Differential royalty payment for state Government. 10% for Gas Cess on Oil production: Rs. 900/MT for crude Oil as mentioned in respective PSC
3	Government of India (GoI) interest	Government owned	Government of India or its nominee will have carried interest of 30% from the date of signing of contract, with the option to convert it into a working interest after the decision to proceed with the development and production of discovered hydrocarbons has been taken GoI or its nominee may also acquire 10% working interest in any block it chooses at the time of signing of contract, thereby sharing 10% of exploration cost OR ONGC or OIL will have a participating interest of between 25% to 40% in the JV from the date of signing of contract, thereby sharing the exploration cost in proportion to their participating interest	ONGC/OIL would have no participating or carried interest in the Contract. NOCs not allowed to bid
4	Pricing of crude oil and natural gas	As per prevailing rate and subsidy arrangement	International market price for oil produced The pricing formula for associated gas would be on a cost plus basis, while for non-associated gas it would be related to the international price of fuel oil, the exact relationship being negotiable. The price payable for both associated and non-associated gas would not exceed the price paid to the producing National Oil Companies (exclusive of cess, taxes and royalty) OR The pricing formula for gas would be on internationally accepted principles Arrangement for marketing of the gas produced would be negotiable between GoI and the Company OR The JV will have freedom to make arrangements for marketing the gas	First right of refusal to Government of India in respect of purchase of crude oil produced. International market price for oil produced.
5	Sharing of profit	In the pattern of shareholding	Profit oil shall be bid based on sliding scale tied to post tax rates of return or multiples of investment recovered	Sharing of the profit oil shall be bid, based on a sliding scale tied to post tax rates of return or multiples of investment recovered and shall be specified in each Contract
6	Minimum expenditure	NA	No minimum expenditure commitment No ring fencing of blocks for corporate tax purposes	Percentage of annual production of crude oil expected to be allocated for recovery of costs should be indicated in the offer
7	Operatorship	NOC (ONGC/ OIL)	Company will be operator for exploration and appraisal period Time of transfer of operatorship to GoI or its nominee during development and production phase is negotiable OR Operatorship is negotiable, Time of transfer of operatorship to ONGC/OIL during development and production phase is also negotiable OR NA	As per Article 7 of PSC
8	Exploration for Conventional & Unconventional		Originally exploration for conventional was allowed but as per GOI Guidelines 2018 exploration for both conventional and unconventional is allowed	

Medium fields,1992	Discovered fields,1993	NELP (1999 till 2010)
Signature/production bonuses payable by coventures	Signature/production bonuses payable by coventures	No signature, discovery or production bonus
Royalty and Cess: Rs.481 per MT for first round and Rs.528 per MT for second round for Oil Differential royalty payment for state Government. 10% for Gas Cess on Oil production: Rs. 900/MT for crude Oil as mentioned in respective PSC		Royalty: Oil- 12.5% for on- shore,10% for offshore, 5% for deep water; Gas- 10% onshore, 10% offshore, 5% for deep water ad valorem applicable to all companies No custom duty on imports for Petroleum Operation Income Tax holiday of 7 years for Mineral Oil No cess
ONGC/OIL will have upto 40% Participating Interest	ONGC/OIL will have up to 40 % Participating Interest in medium size fields ONGC/OIL would have no participating or carried interest in the Contracts of small fields. NOCs not allowed to bid for small size fields	No State participation or any carried interest NOCs to compete for acreage with Private
First right of refusal to Government of India in respect of purchase of crude oil & natural gas produced International market price for oil produced and in case of natural gas, related to international price of fuel oil for Non-associated gas and determined on a cost plus basis for associated gas	Domestic market would have the first call on natural gas produced, arrangements for marketing of gas produced would be negotiable between GoI and Company. The pricing would be based on internationally accepted principles	International Crude Oil price at arm's length Gas pricing requires approval of GoI
NA	Sharing of the profit oil/gas would have to be indicated in the offer, based on a sliding scale tied to post tax rates of return or multiples of investment recovered as in the Rounds of bidding for exploration blocks	Sharing of Profit Petroleum with Govt. on biddable pre-tax investment multiple NELP I to VI: Step ladder based system of Investment multiple for GoI Share NELP VII to IX: Linear based system of Investment multiple for GoI Share
Preferential treatment to companies taking up exploration blocks under round the year bidding scheme of the Government of India	Flexibility of negotiations: The terms and conditions are indicative and companies can state in their bids the specific assumptions made in respect of these terms. While the Govt. of India has a flexible approach to these terms, it reserves to itself the right to accept or reject any bid in its sole discretion	No ring fencing of expenditures Tax Incentives for Site Restoration Fund Scheme (SRFS)
As per Article 7 of PSC		
Originally exploration for conventional was allowed but as per GOI Guidelines 2018 exploration for both conventional and unconventional is allowed		

Table 8.27: Progressive Modifications of Terms & Conditions in Different NELP Rounds

S. No.	Item	NELP-I to V	NELP-VI
1	Categorization of blocks	Blocks categorized as Deepwater blocks, shallow offshore blocks and onland blocks. No sub-categorization of blocks.	Each category is sub-categorized as Type A and Type B.
2	Exploration phases	Three exploration phases	
3	Work Program	No mandatory work program	Mandatory work specified in the NIO for some of the blocks.
4	Bid Evaluation Criteria	1.Technical Capability 2.Financial Capability 3.Work Program 4.Fiscal Package	1.Technical Capability 2.Work Program 3.Fiscal Package
5	Investment Multiple and GoI share	Stair-step based system of Investment multiple for GoI Share	
6	Part Relinquishment	Part area relinquishment, after phase –I and after phase-II	Part area relinquishment, after phase–I
7	Liquidated Damages	No Liquidated Damages (LD) specified. Penalties for unfinished work program computed case-to-case basis.	
8	Bank Guarantee	Bank Guarantee @ 35% of Annual work program.	
9	Bid Bond	No Bid bond to be furnished at the time of submission of bids.	

Table 8.28: Progressive Modifications of Terms & Conditions in different DSF and OALP Bidding Rounds

No.	Item	DSF Round I-2016	DSF Round II-2018	OALP Bid Round I, II & III under HELP
1	Bonus	No signature, discovery or production bonus		No signature, discovery or production bonus
2	Royalty	Royalty : For Crude Oil- 12.5% for onshore 10% for Shallow water 5% for Deep water* For Natural Gas- 10% for onshore 10% for Shallow water 5% for deep water* *for first 7 year of commencement of production in a Contract Area and 10% thereafter No custom duty on imports for Petroleum Operations	Onland - 12.5% of well head price on ex-royalty basis Shallow Water - 7.5 % of well head price on ex-royalty basis Deep water first 7 years - Zero Royalty Deep water after 7 years - Royalty of 5% of well head price No custom duty on imports for Petroleum Operations	Royalty : For Crude Oil- 12.5% for onshore 7.5% for Shallow water 5% for Deep water after 7 years (No royalty for First 7 years) 2% for Ultra Deep water after 7 years (No royalty for first 7 years) For Natural Gas- 10% for onshore 7.5% for Shallow water 5% for deep water 2% for Ultra Deep water No royalty for first 7 year in Deep and Ultra Deep Water. No custom duty on imports for Petroleum Operations

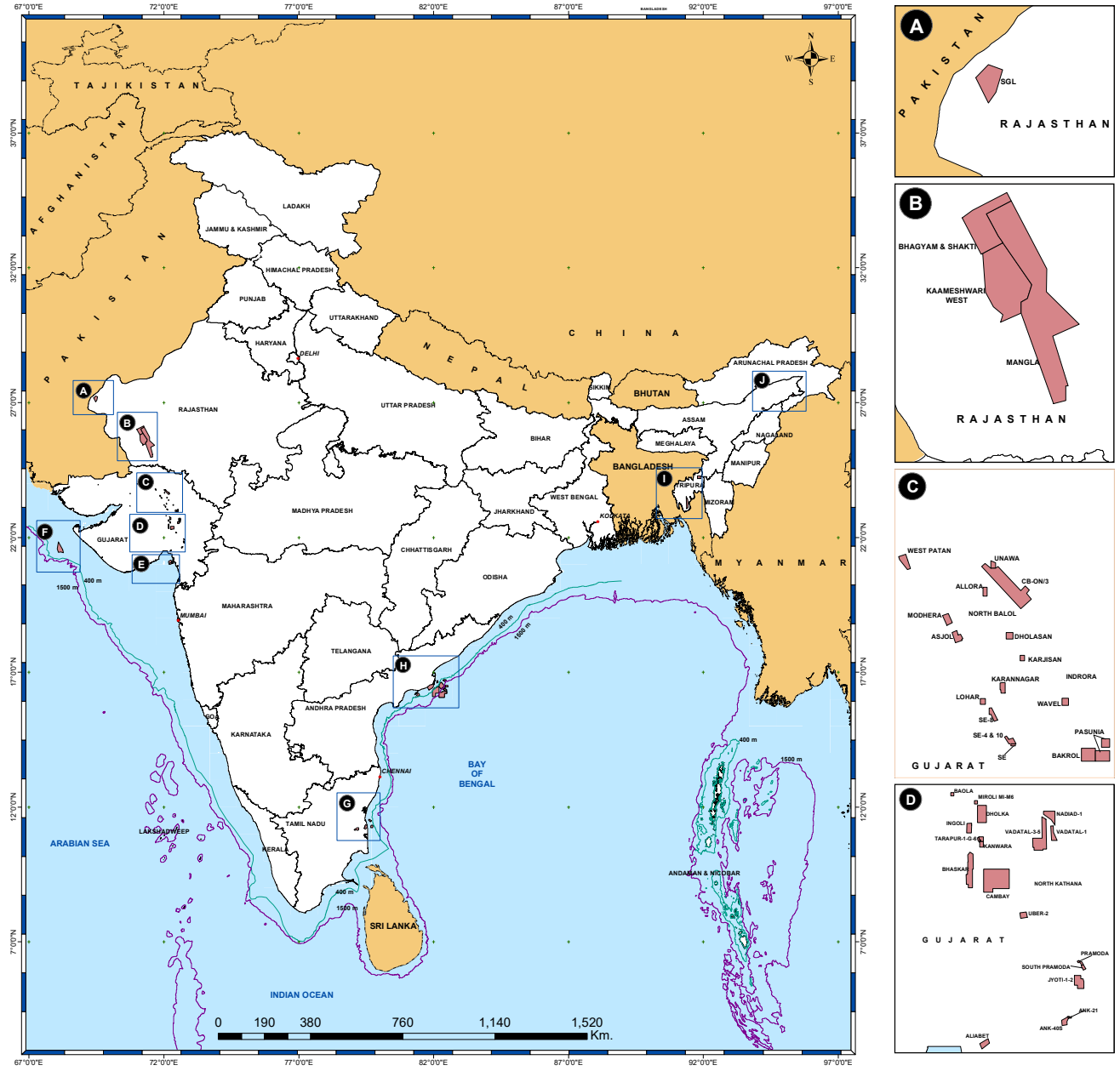
	NELP-VII	NELP-VIII & IX
	Sub-categories Type A and Type B continued New category Type S with small onland blocks of size less than 200 sq. km. introduced For Type S blocks, Technical capability is not considered for pre- qualification or evaluation.	Type A & B classification among onland, shallow water and deep water blocks removed. Category Type S continued.
	Two exploration phases	
	Mandatory work specified in the NIO for some of the blocks.	
	Investment Multiple and GoI share Stair-step based system of Investment multiple for GoI Share	
		No part area relinquishment after phase-I
		Liquidated Damages (LD) specified upfront for unfinished work program
		One time BG introduced @ 7.5% of total committed work program.
		Bid bond to be submitted at the time of submission of bids.

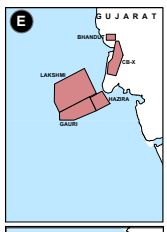
	OALP Bid Round IV onwards under HELP		
	Category I basins	Category II basins	Category III Basins
	No signature, discovery or production bonus		
	Royalty: For Crude Oil: Onland:11.25%; Shallow water: 6.75%; Deepwater: NIL for first 7 years), 4.50% (After 7 Years); Ultra deep water: NIL for first 7 years; 1.80% after 7 years For Natural Gas/CBM- Onland: 9%; Shallow water:6.75% Deepwater: NIL for first 7 years), 4.5 % (After 7 Years); Ultra deep water: NIL for first 7 years; 1.80% after 7 years No custom duty on imports for Petroleum Operations	Royalty: For Crude Oil: Onland:10 %; Shallow water: 6%; Deepwater: NIL for first 7 years), 4 % (After 7 Years); Ultra deep water: NIL for first 7 years; 1.60% after 7 years For Natural Gas/CBM- Onland: 8%; Shallow water:6 % Deepwater: NIL for first 7 years), 4 % (After 7 Years); Ultra deep water: NIL for first 7 years; 1.60% after 7 years No custom duty on imports for Petroleum Operations	Royalty: For Crude Oil: Onland:8.75 %; Shallow water: 5.25%; Deepwater: NIL for first 7 years), 3.5 % (After 7 Years); Ultra deep water: NIL for first 7 years; 1.40% after 7 years For Natural Gas/CBM- Onland: 7%; Shallow water:5.25 % Deepwater: NIL for first 7 years), 3.5 % (After 7 Years); Ultra deep water: NIL for first 7 years; 1.40% after 7 years No custom duty on imports for Petroleum Operations

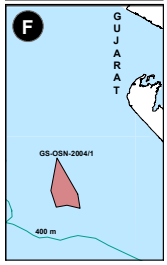
No.	Item	DSF Round I-2016	DSF Round II-2018	OALP Bid Round I, II & III under HELP
3	Government of India (GoI) interest	No State Participation or any carried interest, NOCs to compete for acreage with Private companies		No State Participation or any carried interest, NOCs to compete for acreage with Private
4	Pricing of crude oil and natural gas	Full Marketing and pricing freedom subject to floor price as per Article 19 of Model Revenue Sharing Contract (MRSC)		Full Marketing and pricing freedom subject to floor price as per Article 19 of Model Revenue Sharing Contract (MRSC) for the purpose of sharing of revenue with the Government
5	Sharing of profit / revenue	Profit Sharing has been replaced by Revenue Sharing Linear based system on Actual revenue generated by the contractor and rates quoted upfront at LRP and HRP		Profit Sharing has been replaced by Revenue Sharing Linear based system of Investment multiple for GoI Share
6	Minimum expenditure	No minimum expenditure. Companies to bid for work programme LDs (Liquidity Damage) value specified		No minimum expenditure. Companies to bid for work programme LDs (Liquidity Damage) value specified
7	Operatorship	As per Article 7 of RSC Operator required no qualification / prior experience		As per Article 7 of RSC Any Company Single or consortium with minimum qualification /experience
8	Exploration for Conventional & Unconventional	Exploration for both conventional and unconventional is allowed		
9	Categorization of blocks	Blocks categorised as Onland, Shallow, Deepwater and Ultra Deep Water blocks	Blocks categorised as Onland and Shallow water	Blocks categorised as Onland, Shallow and Deep water
10	Exploration Period/Development period	Development period of 3 years from effective date for onland blocks, 4 years from effective date for shallow water and 6 years for Deep Water offshore area	Development period of 3 years from effective date for onland blocks 4 years from effective date for Shallow Water	Two phases Initial exploration Phase and Subsequent Exploration Phase. Exploration period of 6 years for all type of blocks with the provision of extension of 2 years in case of onland/shallow water/ CBM Blocks and 4 years in case of Deep/ Ultra Deep Water blocks
11	Work Program	Committed Work Programm is submitted at the time of bidding		
12	Bid Evaluation Criteria	Biddable Work Programme: 20 Biddable Govt. share of Revenue : 80		Originator Incentive (5%) Work Programme Commitment (45%) Revenue Share (50%)
13	GoI share	Calculated based on rate quoted at LRP and HRP		Calculated based on rate quoted at LRP and HRP
14	Liquidated Damages	Predetermined Liquidated Damages (LD) specified upfront for unfinished work program		Liquidated Damages (LD) specified upfront for unfinished work program
15	Bank Guarantee	One-time Bank Guarantee (BG) valid for the Appraisal/Development period for the Biddable Work Program		BG equivalent to amount of liquidated damages as per the rate prescribed and committed work Programme
16	Bid Bond	Bidders shall be required to furnish bid bond for Rs 1.0 million at the time of submission of bid		Bid bond to be submitted at the time of submission of bids.
17	Categorization of Basin			No categorization of Basin

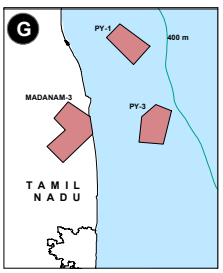
OALP Bid Round IV onwards under HELP		
Category I basins	Category II basins	Category III Basins
No State Participation or any carried interest, NOCs to compete for acreage with Private		
Full Marketing and pricing freedom subject to floor price as per Article 19 of Model Revenue Sharing Contract (MRSC) for the purpose of sharing of revenue with the Government		
Revenue shall be shared with Government as per the provisions of MRSC when Windfall Gain accrues to the Contractor		
No minimum expenditure. Companies to bid for work programme LDs (Liquidity Damage) value specified		
As per Article 7 of RSC Any Company Single or consortium with minimum qualification /experience		
Exploration for both conventional and unconventional is allowed		
Blocks categorised as Onland, Shallow, Deep water and Ultra Deep water		
Exploration period of 3 years for Onland/CBM/shallow water blocks and 4 years for Deep water/Ultra Deep water blocks with the provision of automatic extension of 9 months in case of onland/shallow water/CBM Blocks and 18 months in case of deep/ultra deep water blocks		
Committed work Programm is submitted at the time of bidding		
Originator Incentive (5%) Work Programme Commitment (65%) Revenue Share (30%)	Originator Incentive (5%) Work Programme Commitment (95%)	
Calculated based on rate quoted at LRP and HRP subject to a cap of 50% quote at HRP and quote at HRP>Quote at LRP	Revenue share only in case of Windfall Gain	
Liquidated Damages (LD) specified upfront for unfinished work program		
BG equivalent to amount of liquidated damages as per the rate prescribed and comiited work Programme PBG for a specified amount to be submitted within 30 days of submission of FDP		
Bid bond to be submitted at the time of submission of bids.		
basins have been categorized in Category-I,II and III as notified in Policy reform dated 28th Feb 2019. Contractual terms are being specific to Category of Basins		

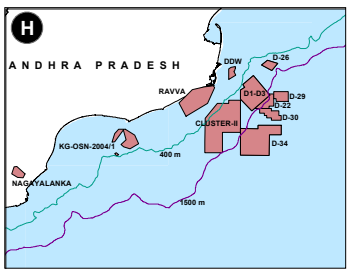
8.6 Maps of Awarded Acreages

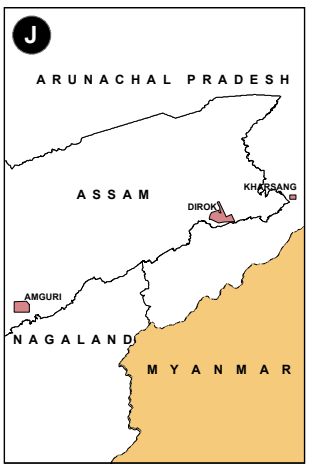


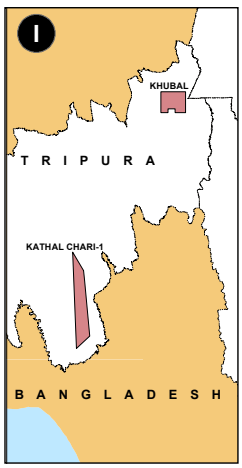






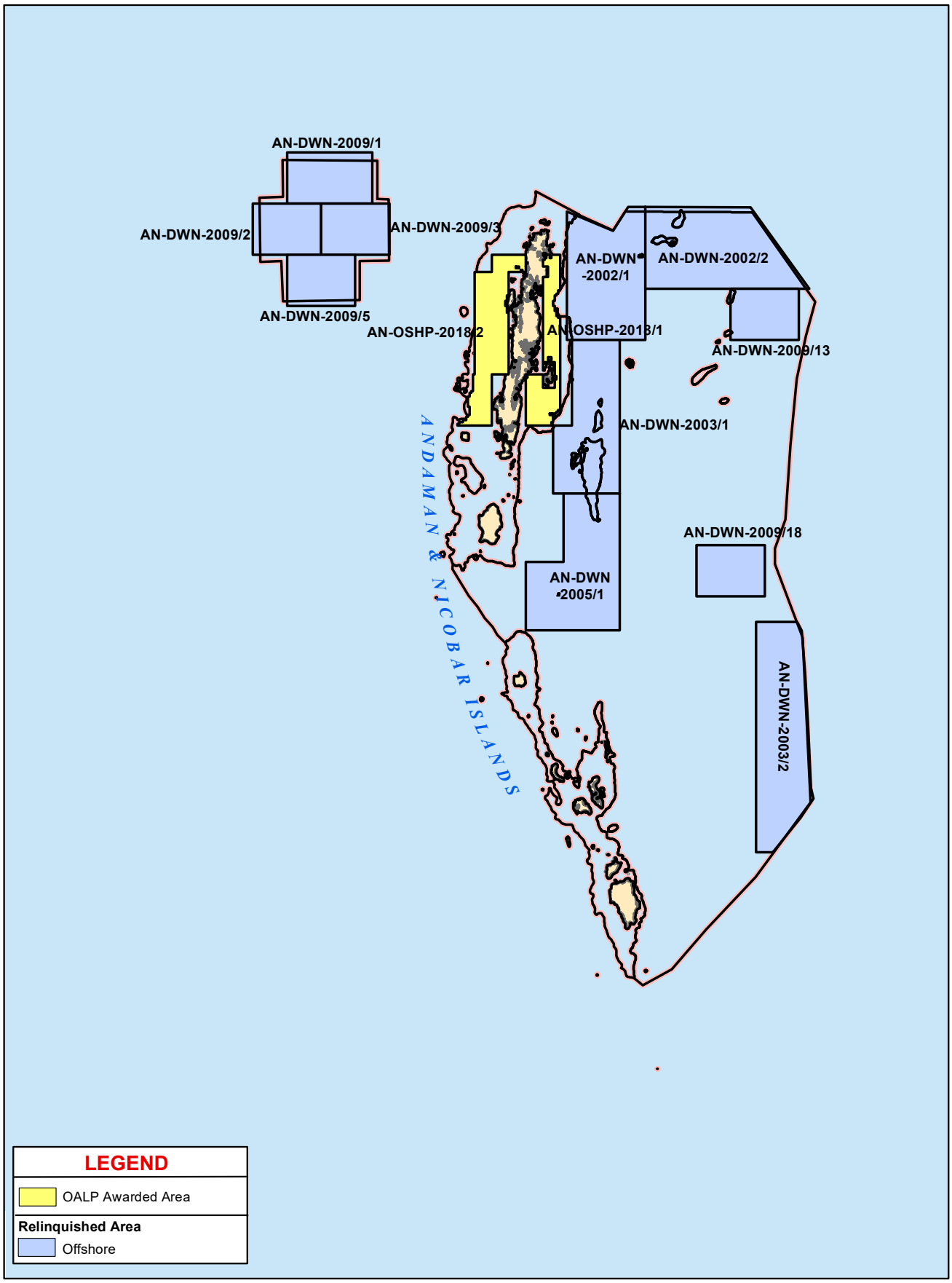




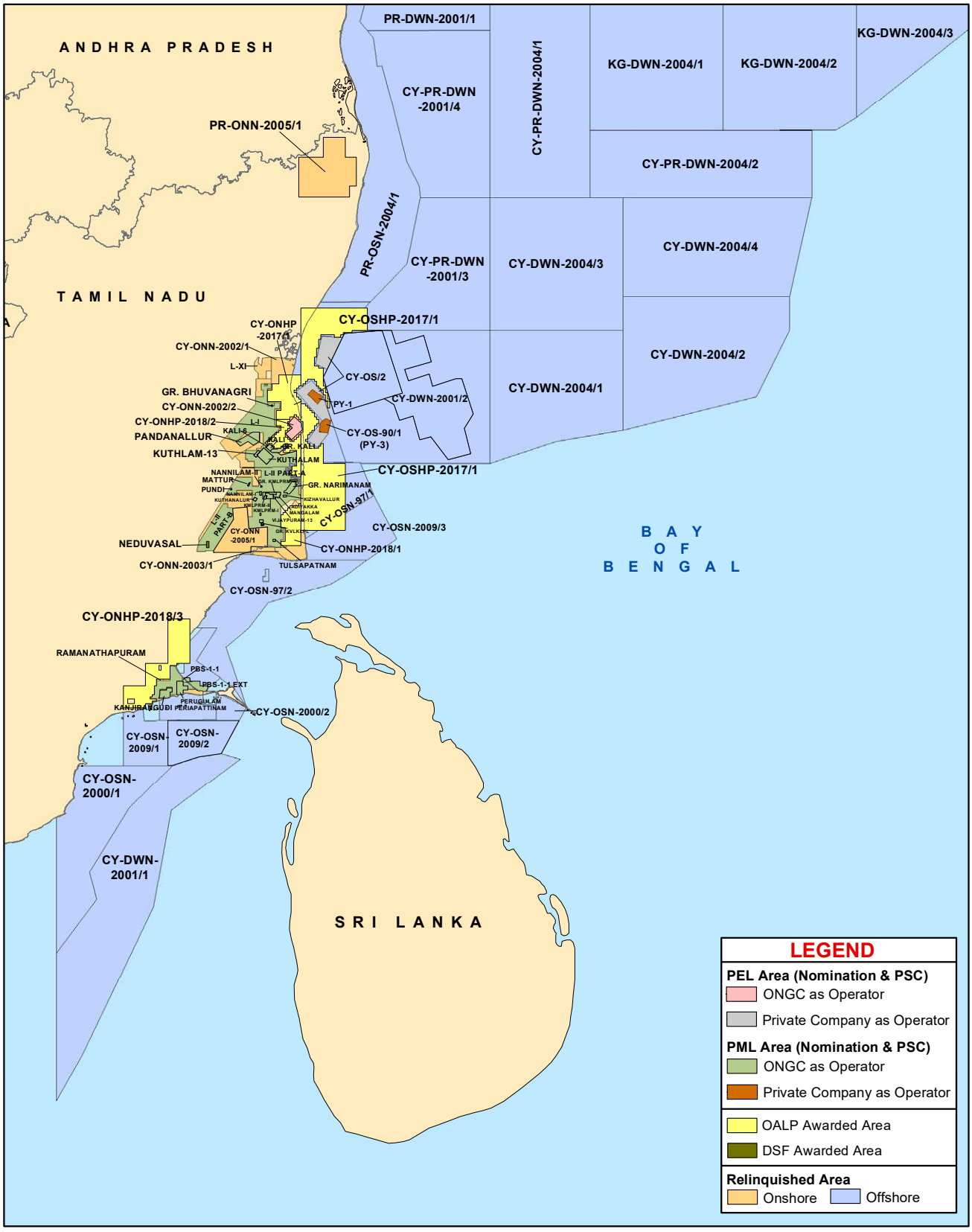


PRODUCING FIELDS UNDER PSC REGIME

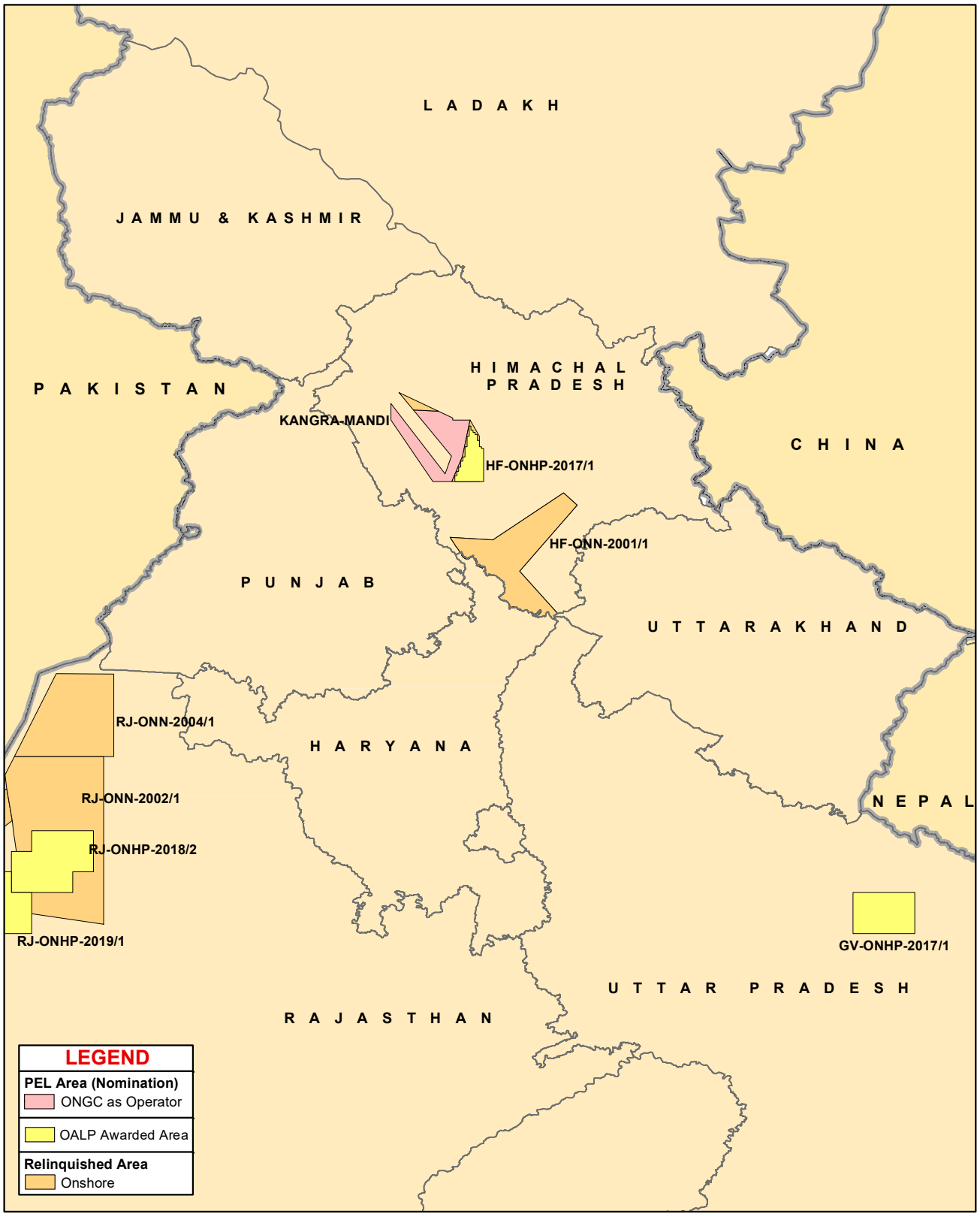
ANDAMAN-NICOBAR BASIN



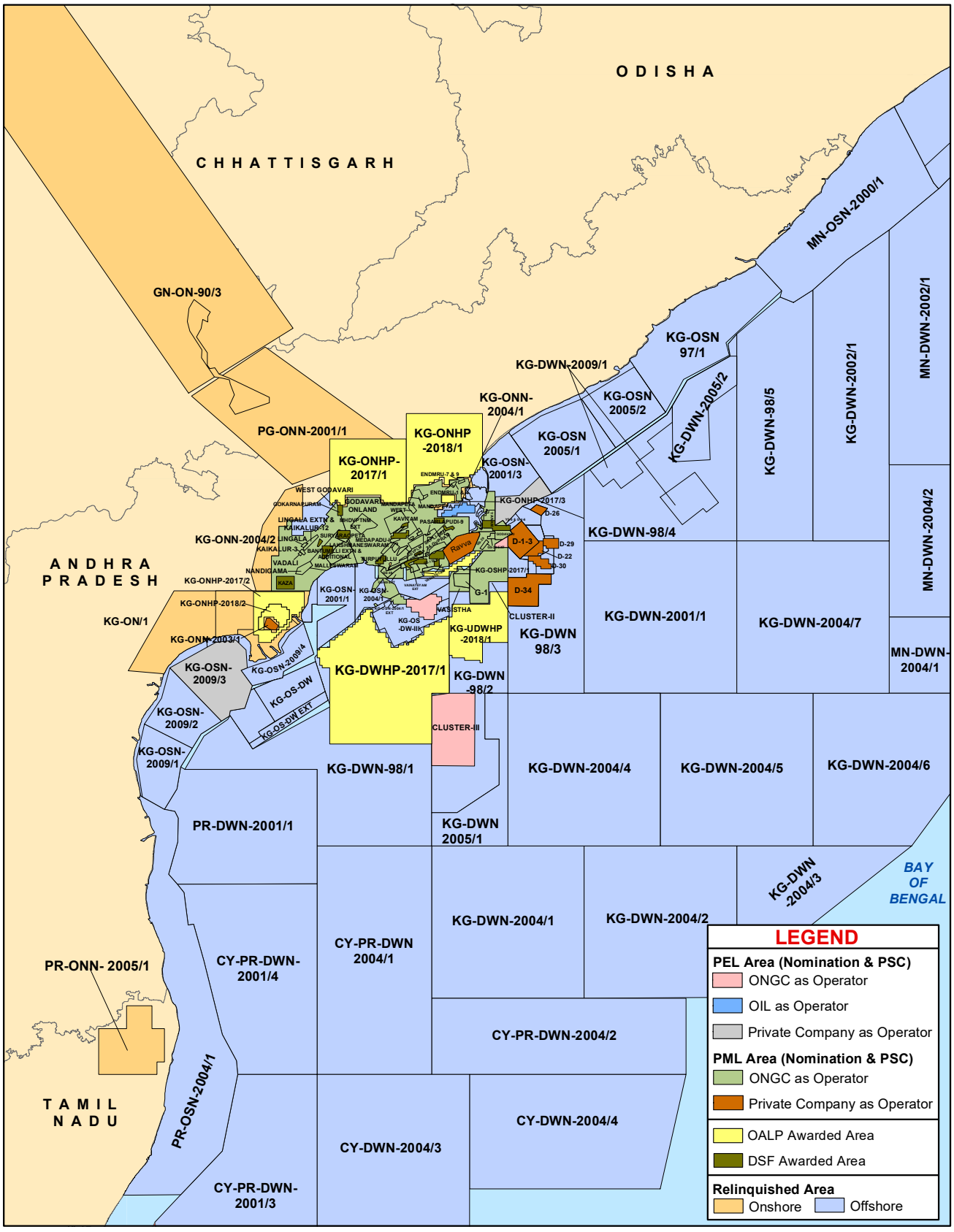
CAUVERY BASIN



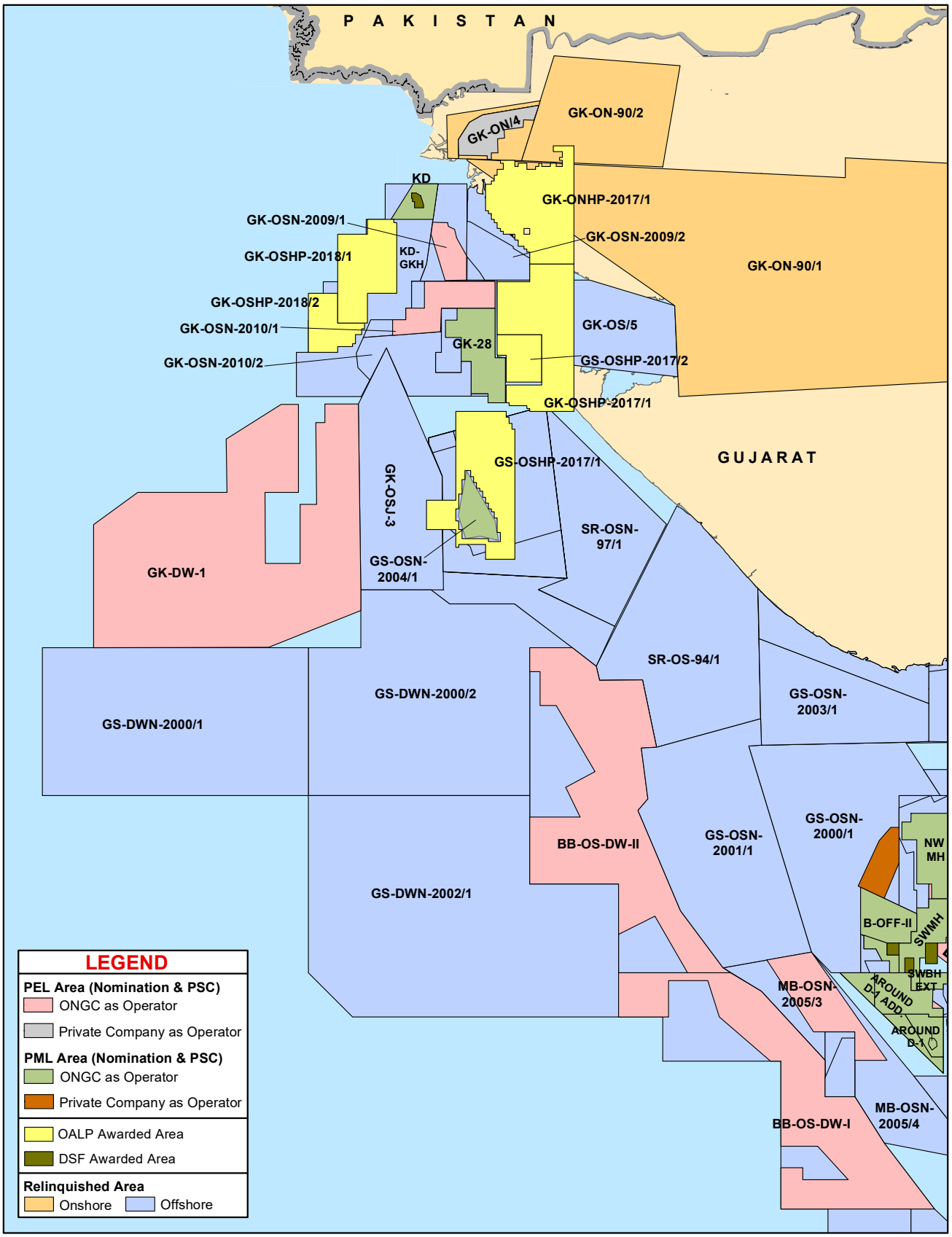
HIMALAYAN FORELAND BASIN



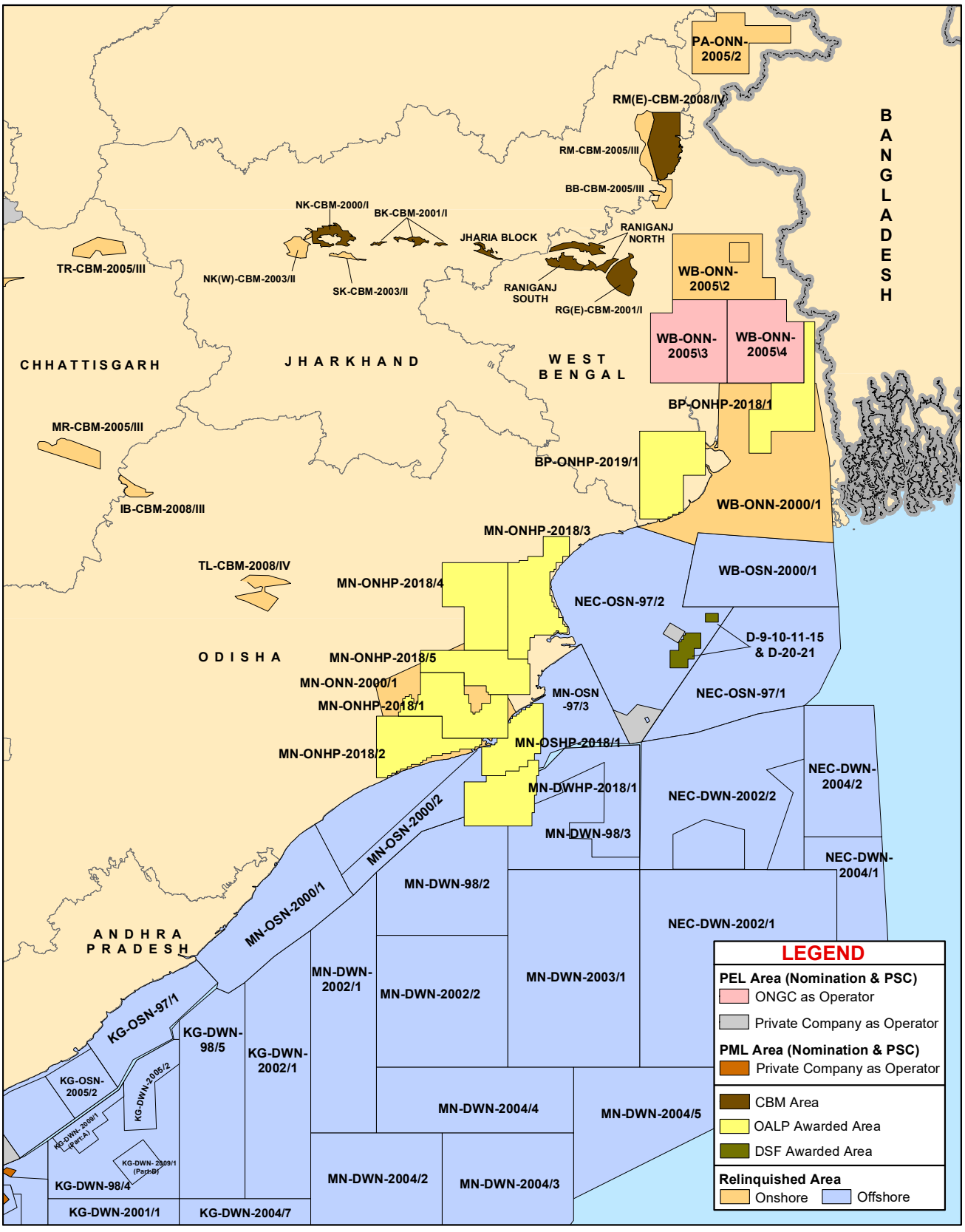
KRISHNA-GODAVARI BASIN



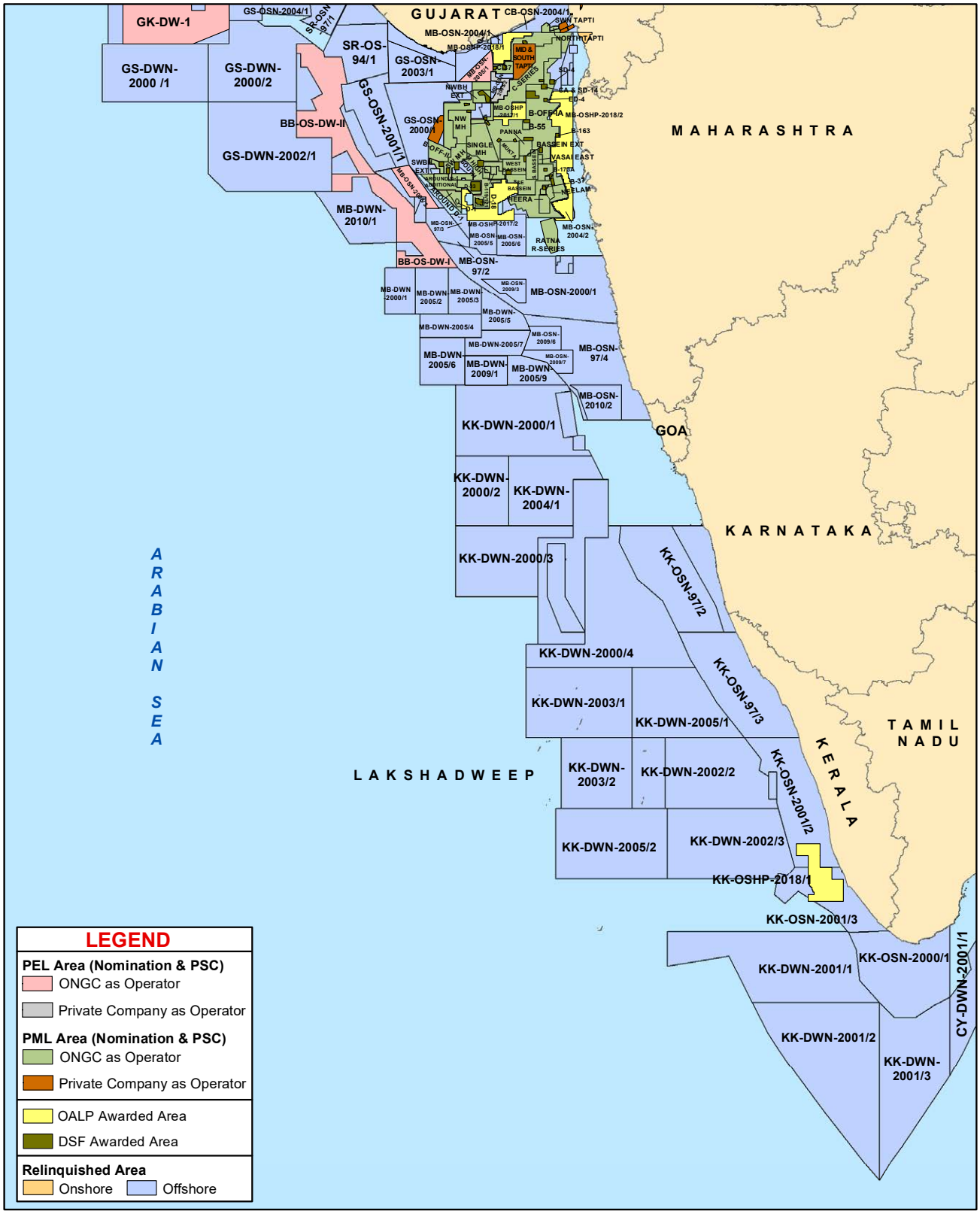
KUTCH-SAURASHTRA BASIN



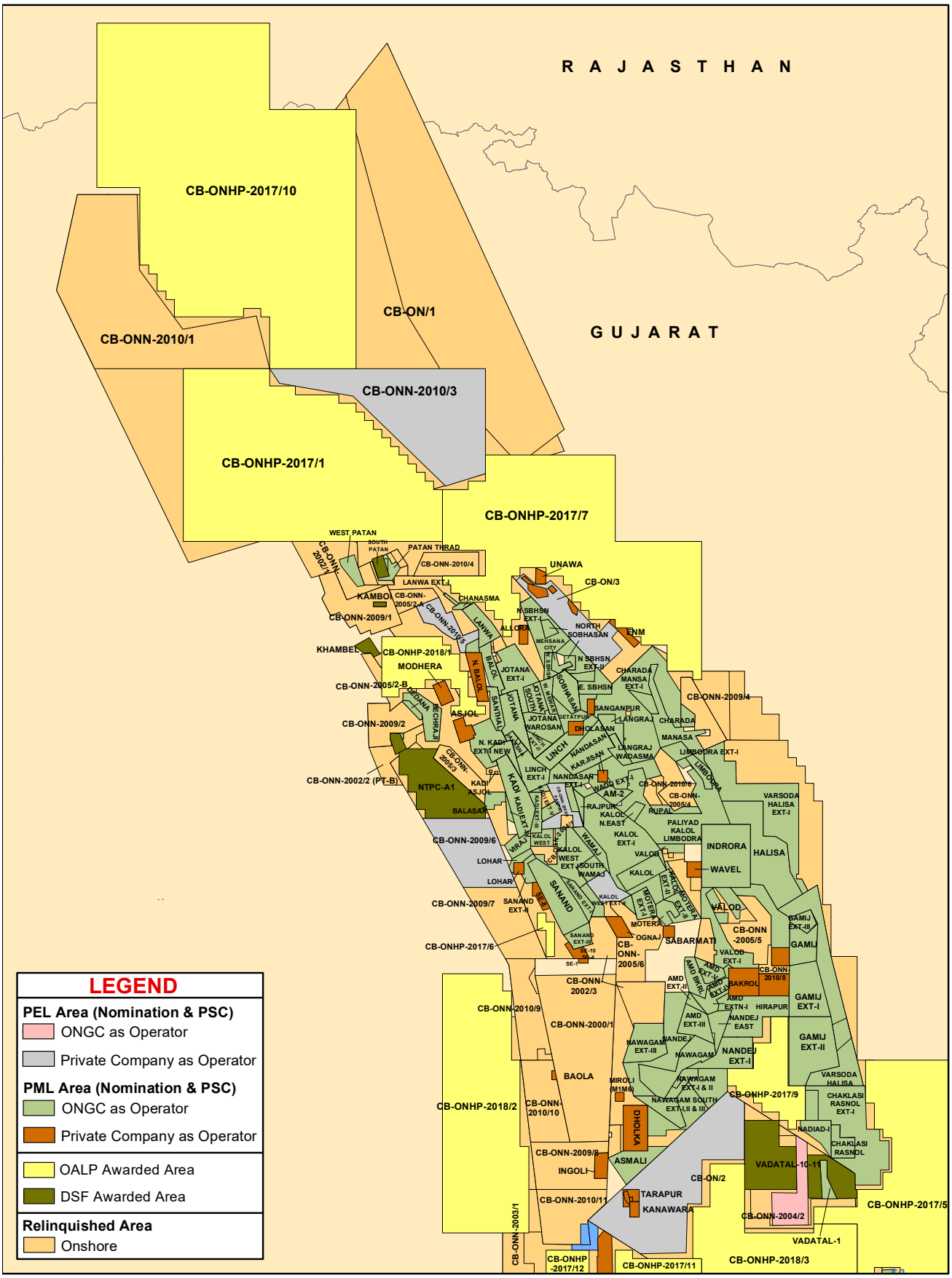
MAHANADI - BENGAL - DAMODAR BASINS



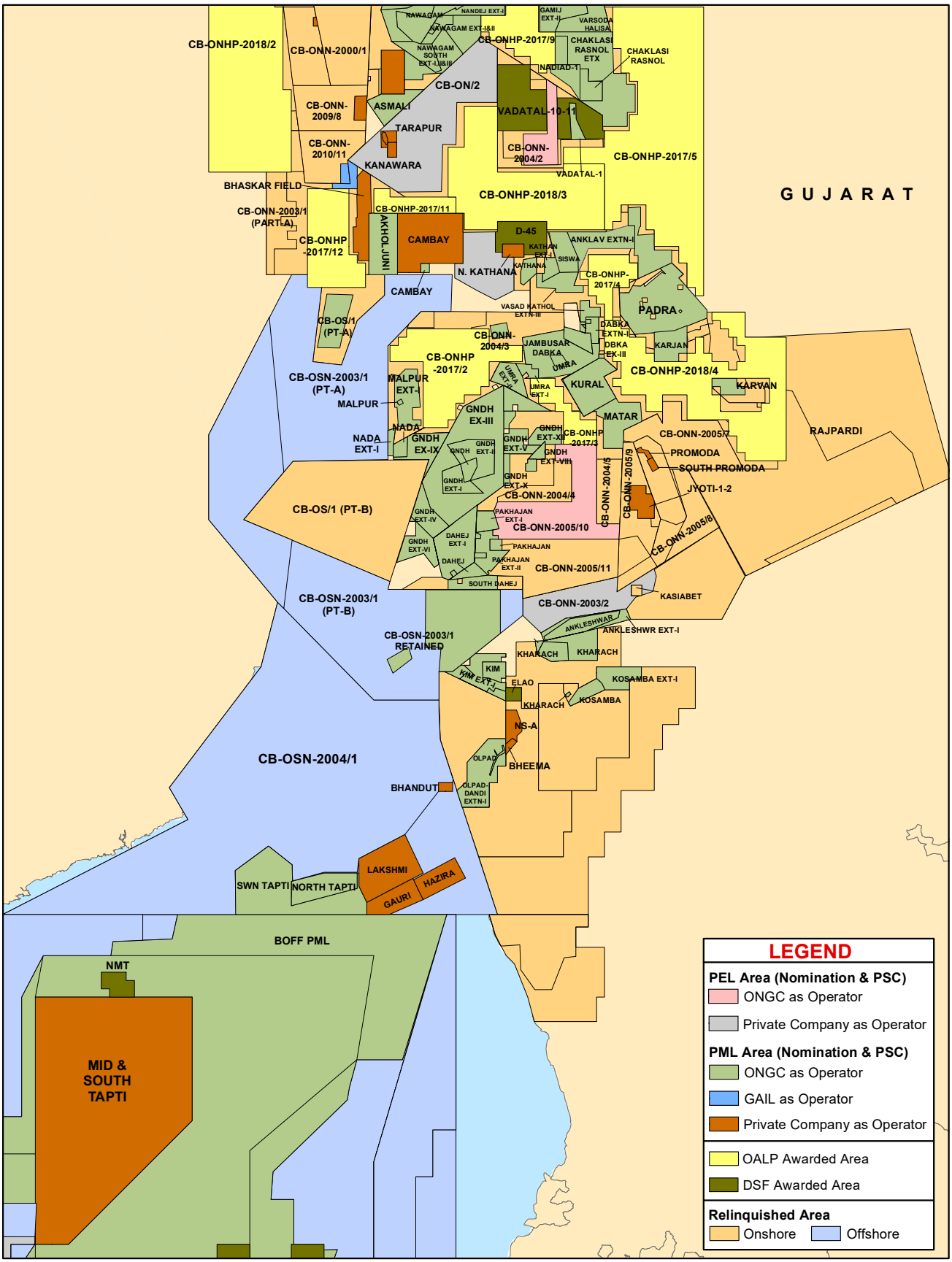
MUMBAI OFFSHORE & KERALA - KONKAN BASIN



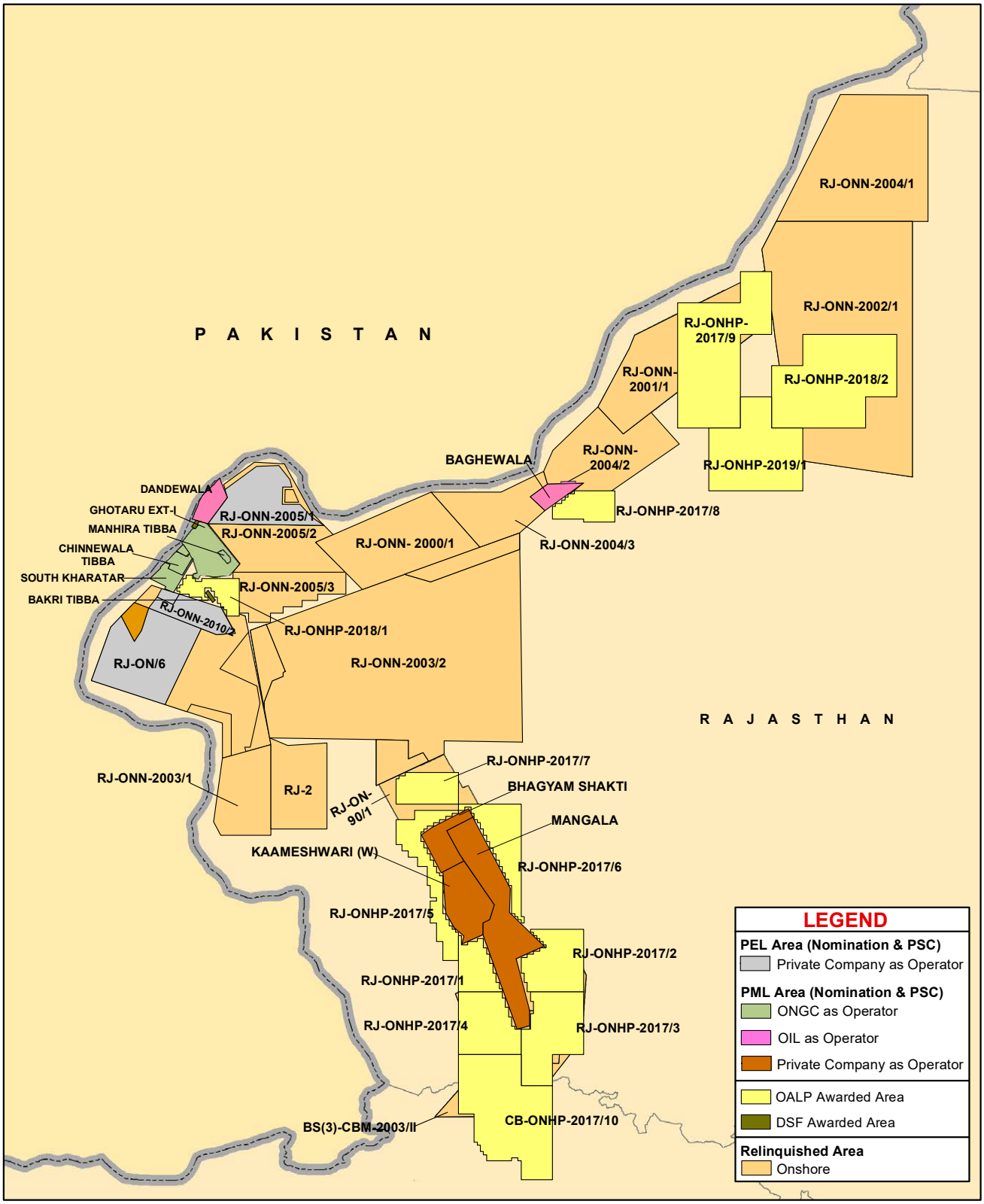
NORTH CAMBAY BASIN



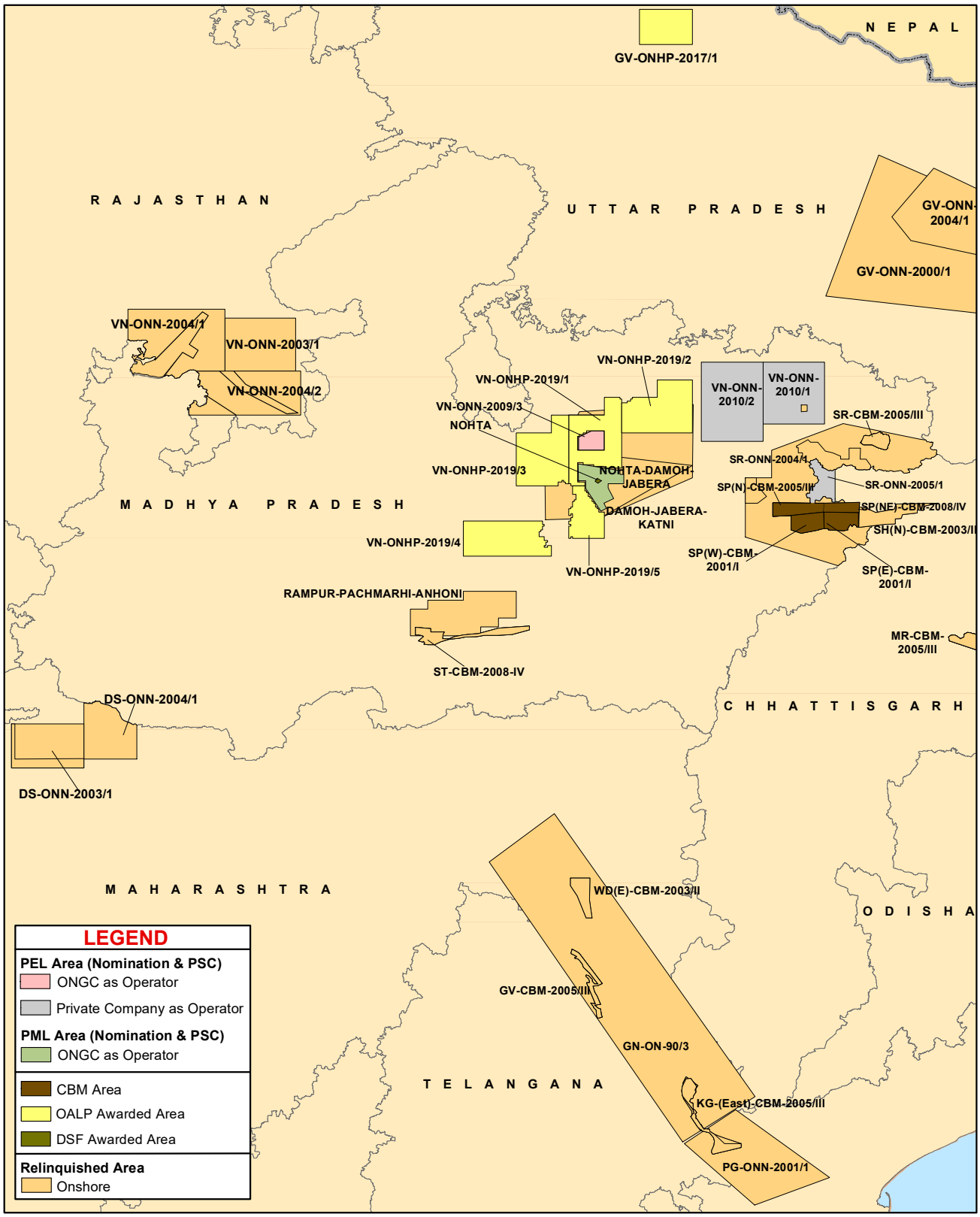
SOUTH CAMBAY BASIN



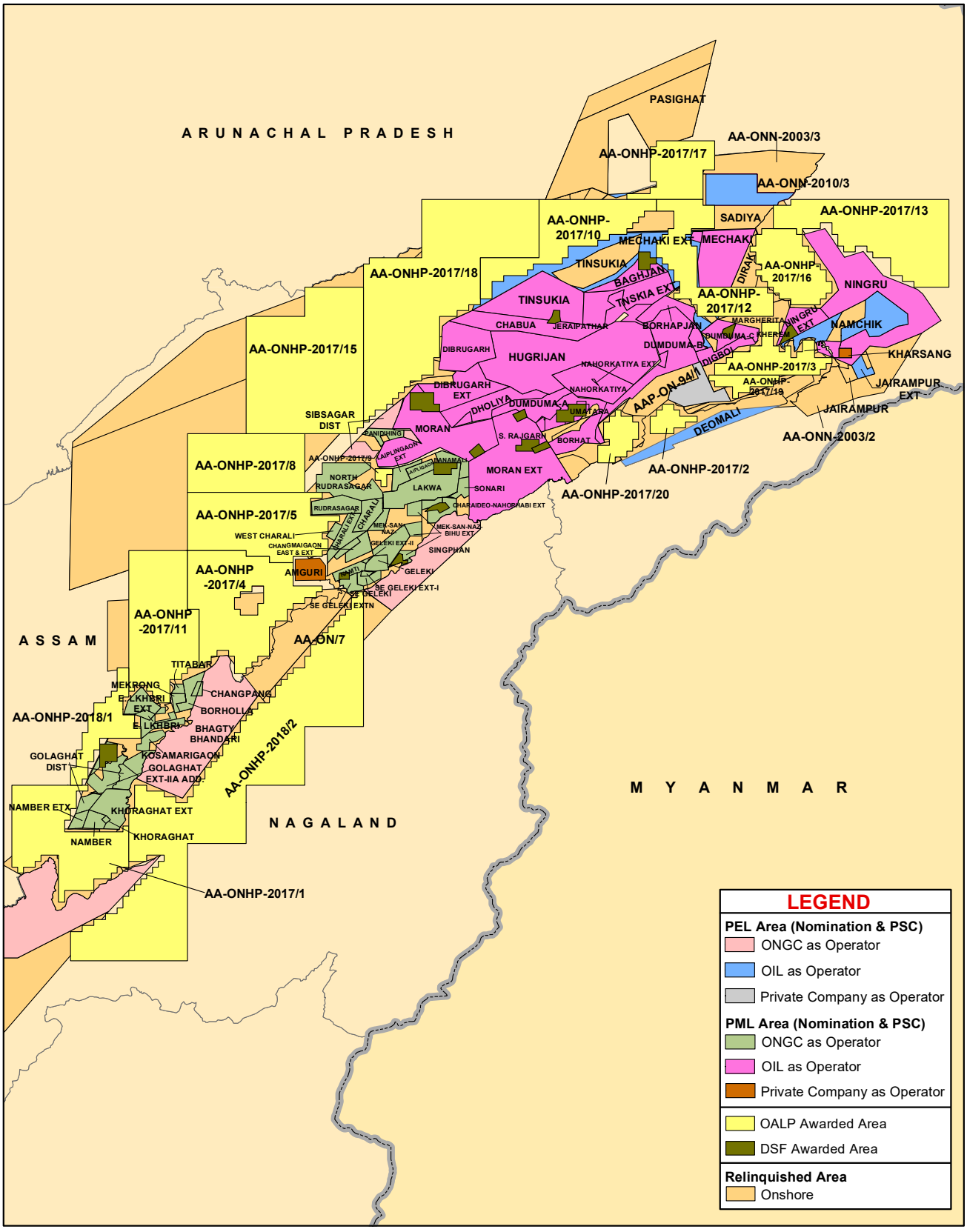
RAJASTHAN BASIN



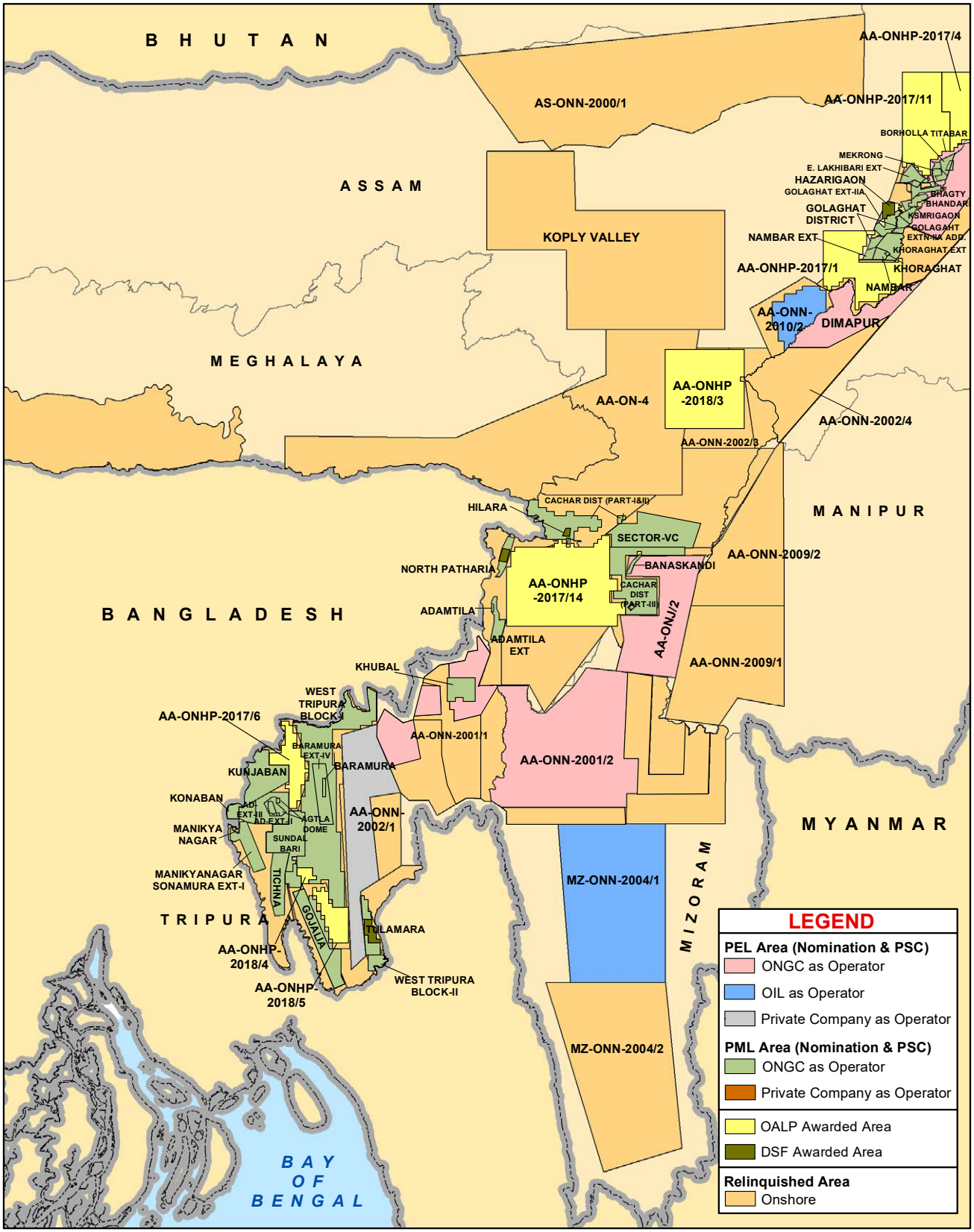
SATPURA-PRANHITA GODAVARI BASINS



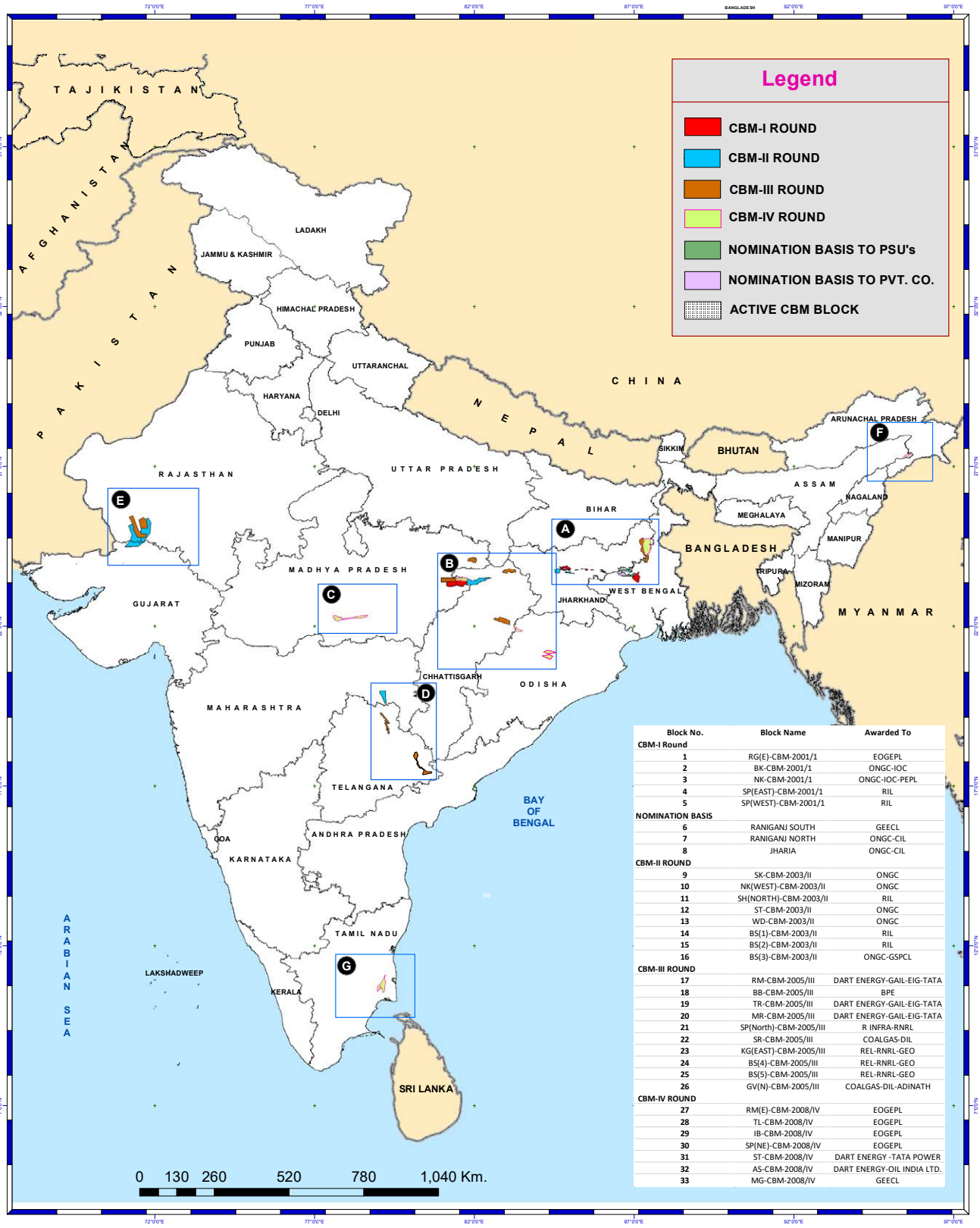
UPPER ASSAM ARAKAN BASIN



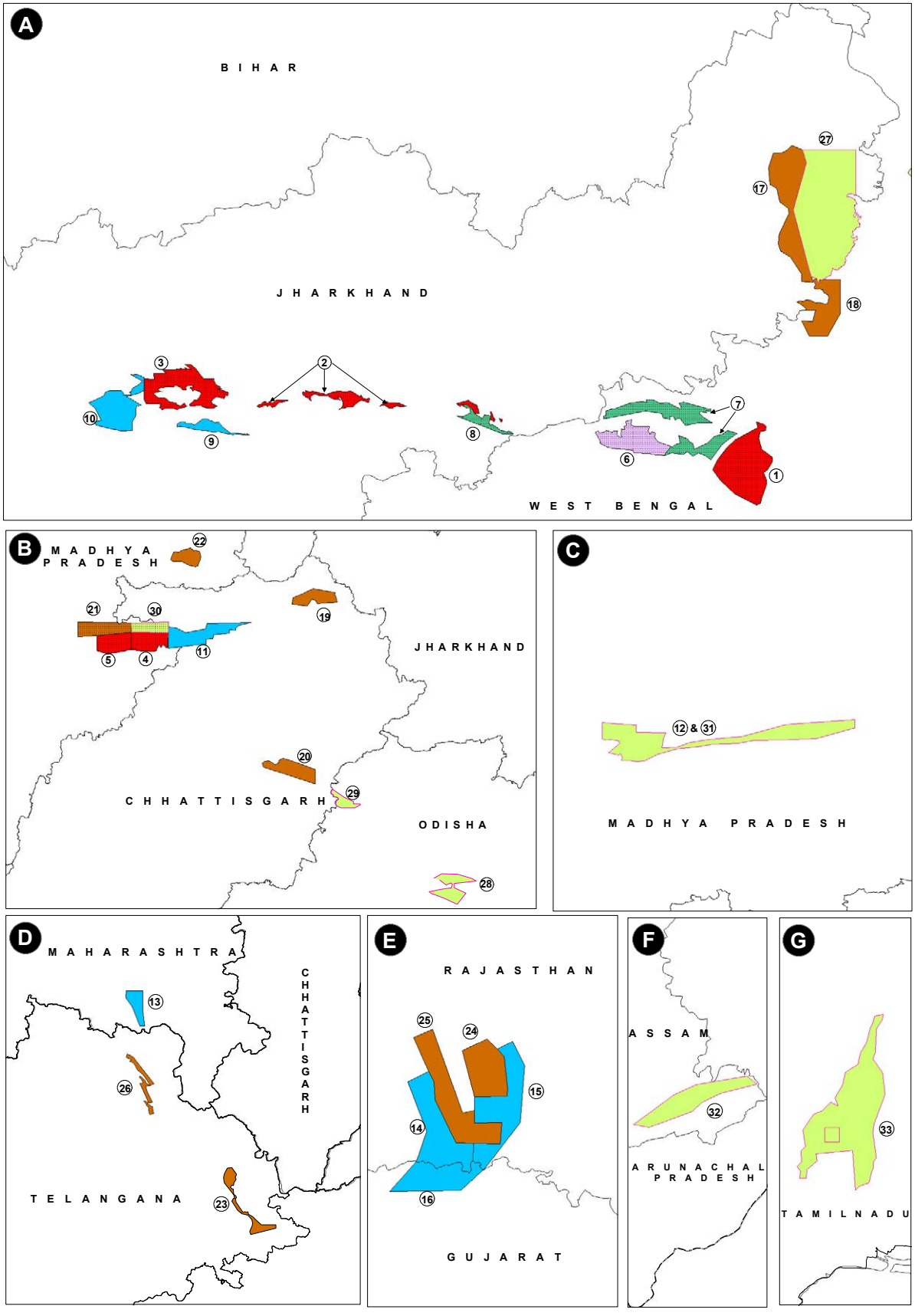
LOWER ASSAM ARAKAN BASIN



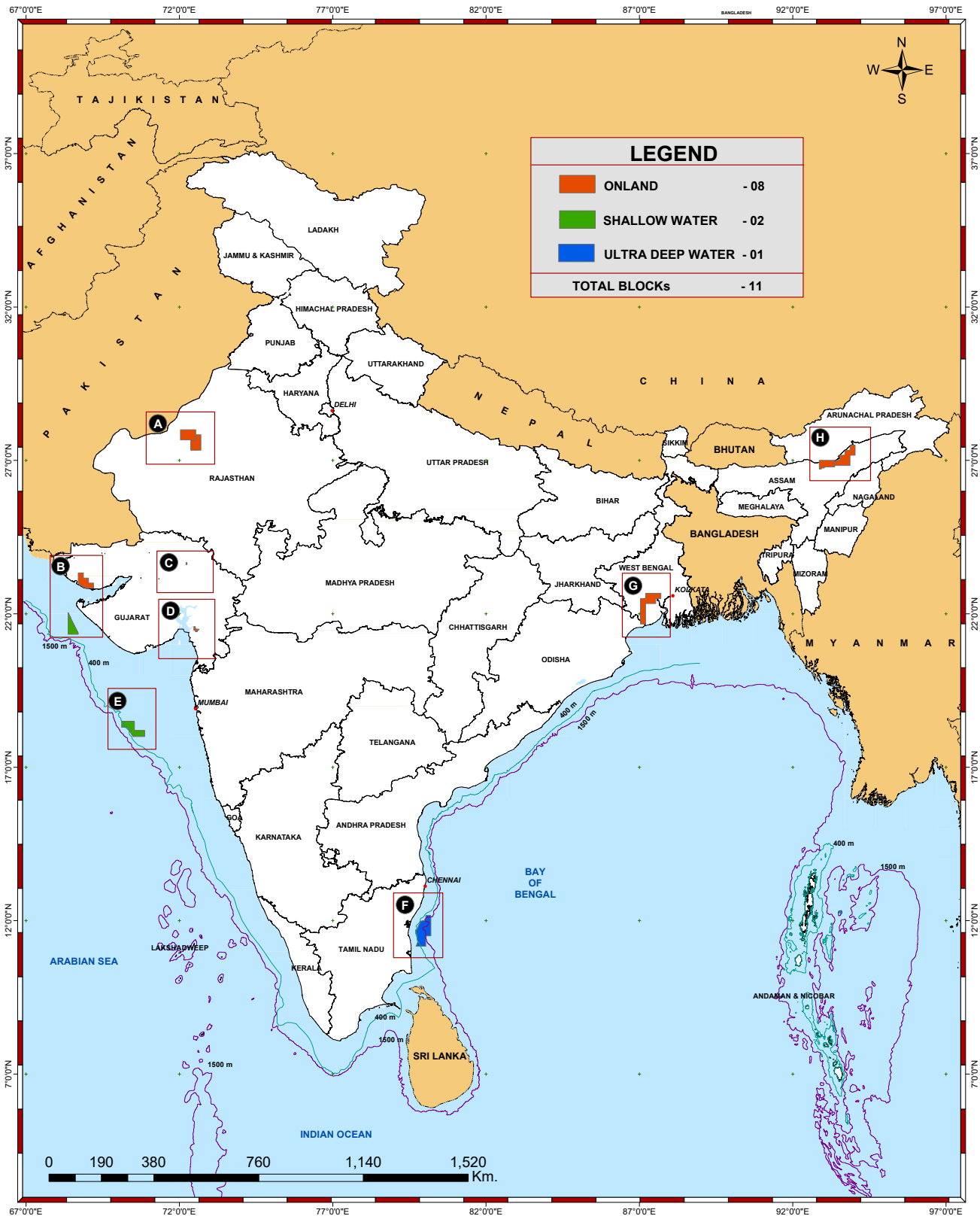
CBM BLOCKS AWARDED UNDER CBM ROUND-I, II, III , IV AND ON NOMINATION BASIS

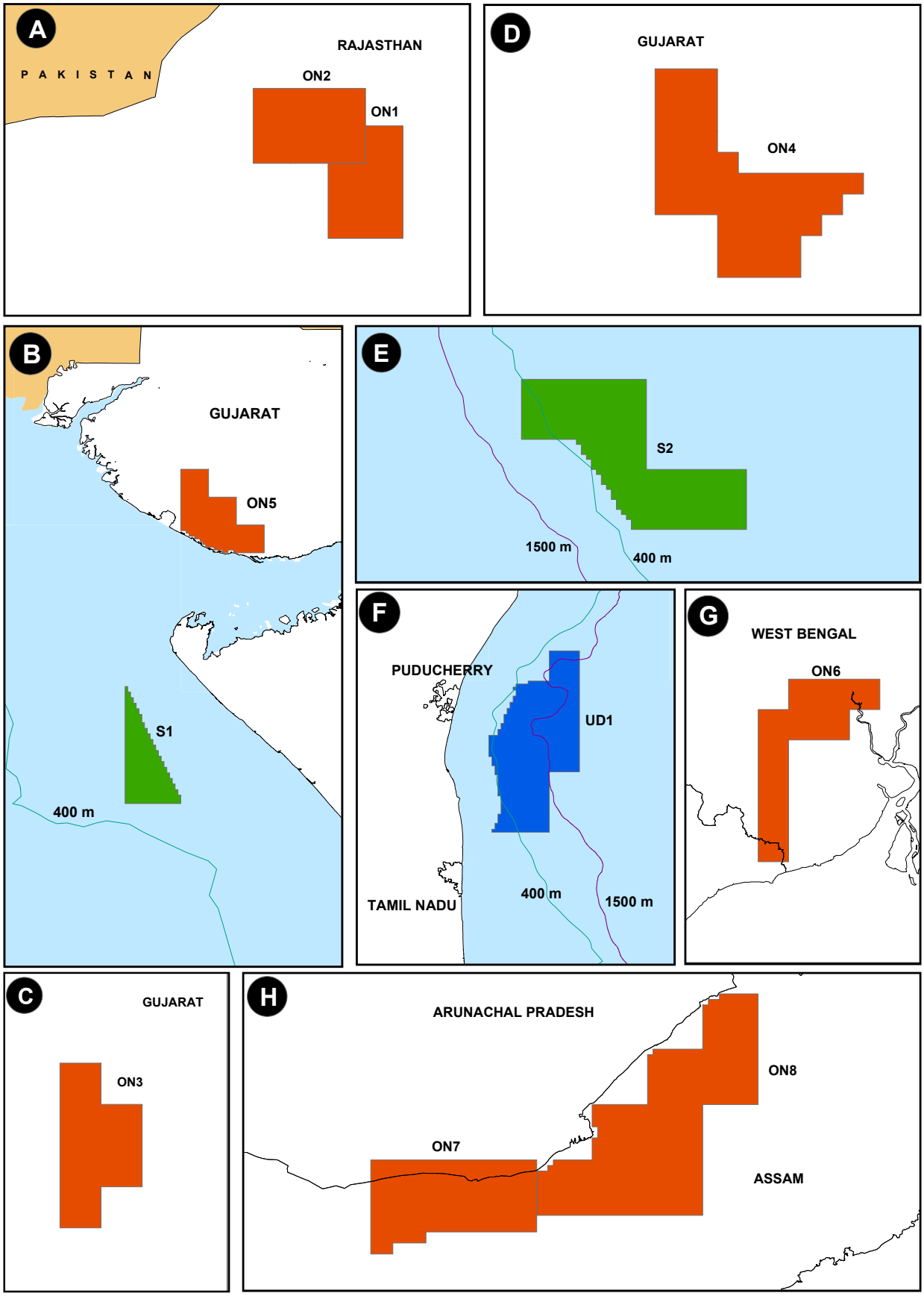


Block No.	Block Name	Awarded To
CBM-I Round		
1	RG(E)-CBM-2001/1	EOGEPL
2	BK-CBM-2001/1	ONGC-IOC
3	NK-CBM-2001/1	ONGC-IOC-PEPL
4	SP(EAST)-CBM-2001/1	RIL
5	SP(WEST)-CBM-2001/1	RIL
NOMINATION BASIS		
6	RANIGANJ SOUTH	GEECL
7	RANIGANJ NORTH	ONGC-CIL
8	JHARIA	ONGC-CIL
CBM-II ROUND		
9	SK-CBM-2003/II	ONGC
10	NK(WEST)-CBM-2003/II	ONGC
11	SH(NORTH)-CBM-2003/II	RIL
12	ST-CBM-2003/II	ONGC
13	WD-CBM-2003/II	ONGC
14	BS(1)-CBM-2003/II	RIL
15	BS(2)-CBM-2003/II	RIL
16	BS(3)-CBM-2003/II	ONGC-GSPCL
CBM-III ROUND		
17	RM-CBM-2005/III	DART ENERGY-GAIL-EIG-TATA
18	BB-CBM-2005/III	BPE
19	TR-CBM-2005/III	DART ENERGY-GAIL-EIG-TATA
20	MR-CBM-2005/III	DART ENERGY-GAIL-EIG-TATA
21	SP(North)-CBM-2005/III	R INFRA-RNRL
22	SR-CBM-2005/III	COALGAS-DIL
23	KG(EAST)-CBM-2005/III	REL-RNRL-GEO
24	BS(4)-CBM-2005/III	REL-RNRL-GEO
25	BS(5)-CBM-2005/III	REL-RNRL-GEO
26	GV(N)-CBM-2005/III	COALGAS-DIL-ADINATH
CBM-IV ROUND		
27	RM(E)-CBM-2008/IV	EOGEPL
28	TL-CBM-2008/IV	EOGEPL
29	IB-CBM-2008/IV	EOGEPL
30	SP(NE)-CBM-2008/IV	EOGEPL
31	ST-CBM-2008/IV	DART ENERGY -TATA POWER
32	AS-CBM-2008/IV	DART ENERGY-OIL INDIA LTD.
33	MG-CBM-2008/IV	GEECL


A
BIHAR
JHARKHAND
WEST BENGAL
B
MADHYA PRADESH
JHARKHAND
CHHATTISGARH
ODISHA
C
MADHYA PRADESH
D
MAHARASHTRA
CHHATTISGARH
TELANGANA
E
RAJASTHAN
GUJARAT
F
ASSAM
ARUNACHAL PRADESH
G
TAMILNADU

BLOCKS ON OFFER UNDER HELP, Open Acreage Licensing Policy BID ROUND-V




A
PAKISTAN
RAJASTHAN
ON2
ON1
D
GUJARAT
ON4
B
GUJARAT
ON5
S1
400 m
E
S2
1500 m
400 m
F
PUDUCHERRY
UD1
TAMIL NADU
400 m
1500 m
G
WEST BENGAL
ON6
C
GUJARAT
ON3
H
ARUNACHAL PRADESH
ON8
ON7
ASSAM

8.7 Abbreviation

DGH	Directorate General of Hydrocarbons
2D	2 Dimension
3D	3 Dimension
API	American Petroleum Institute
BCM	Billion Cubic Meter
BHT	Bottom Hole Temperature
BOPD	Barrels of Oil Per Day
CBM	Coal Bed Methane
CCEA	Cabinet Committee of Economic Affairs
CCS	Carbon Capture Storage
CCSP	Carbon Capture and Storage Program
CCU	Carbon Capture Utilization
CMPDI	Central Mine Planning and Design Institute
CRZ	Coastal Regulation Zone
DoC	Declaration of Commerciality
DRDO	Defence Research and Development Organization
DST	Drill Stem Testing
E&P	Exploration and Production
EAC	Expert Appraisal Committee
EC	Environment Clearance
EIA	Environment Impact Assessment
EPS	Early Production System
FC	Forest Clearance
FDP	Field Development Plan
FPSO	Floating Production Storage and Offloading
G&G	Geology and Geophysics
GIP	Gas In Place
GIPIP	Good International Petroleum Industry Practices
HCPV	Hydrocarbon Pore Volume
HPHT	High Pressure High Temperature
IOR-EOR	Improved Oil Recovery- Enhanced Oil Recovery
KLPD	Kilo Litres Per Day
LCMD	Lakh Cubic Meters per Day
LD	Liquidated Damages
LKM	Line Kilometer
LWD	Logging While Drilling
MC	Management Committee
mD	Milli Darcy
MMbbls	Million Barrels
MMBO	Million Barrels of Oil
MMSCF	Million Standard Cubic Feet
MMSCMD	Million Standard Cubic Meters per Day
MMT	Million Metric Tonne
MMtoe	Million Metric Tonne of Oil Equivalent
MoC	Ministry of Coal
MoD	Ministry of Defence
MoEF&CC	Ministry of Environment , Forest and Climate Change
MoHA	Ministry of Home affairs
MoP&NG	Ministry of Oil and Natural Gas
MoU	Memorandum of Understanding
MPT	Mangala Processing Terminal
MT	Magneto - Telluric / Metric (Thousand) Tonnes
MWP	Minimum Work Program
NDR	National Data Repository
NELP	New Exploration Licensing Policy
NGHP	National Gas Hydrate Program
NSP	National Seismic Programme
NoCs/Pvt/JV	National Oil Company/Private/Joint Venture
O+OEG	Oil plus Oil Equivalent Gas
OALP	Open Acreage Licensing Policy
OIDB	Oil Industry Development Board
PCI	Potential Commercial Interest
PEL	Petroleum Exploration License
PML	Petroleum Mining Lease
PSC	Production Sharing Contract
PSI	Pounds per Square Inch
PSUs	Public Sector Undertaking
PVT	Pressure Volume Temperature
RDG	Raageshwari Deep Gas
RRR	Reserve-Replacement Ratio
SC	Steering Committee
SCMD	Standard Cubic Meter per Day
SKM	Square Kilometer
SRFS	Site Restoration Fund Scheme
STOIIP	Stock Tank Original Oil-Place
TCF	Trillion Cubic Feet
TMT	Thousand Metric Tonnes
TPD	Tonnes Per Day
TVDSS	True Vertical Depth Sub Sea
US DOE	United States Department of Energy
USGS	United States Geological Survey
VSP	Vertical Seismic Profiling
WAG	Water Alternating Gas
WP&B	Work Program and Budget

Investor Outreach & Stakeholder Consultation in 2019-20

Global Petroleum Show

11th June 2019, Calgary

ADIPEC

11th-14th Nov, 2019
Abu Dhabi

E&P Stakeholder Consultation

14th Jan 2020, Delhi

SPG Conference

23rd-25th Feb 2020, Kochi

OALP Facilitation Workshop

26th Feb 2020, Mumbai

DIRECTORATE GENERAL OF HYDROCARBONS

Ministry of Petroleum and Natural Gas, Government of India

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