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Structural Transformation and Growth Dynamics of the Indian Oil & Gas Industry: A Data-Driven Analysis from Abu Dhabi

Yogesh Kumar
Senior Engineer
Abu Dhabi National Oil Company (ADNOC), (Abu Dhabi)

Abstract:

This study examines the structural transformation and growth dynamics of the Indian oil and gas industry through a comprehensive assessment of production trends, trade flows, refining expansion, gas development, and policy reforms from an international prospect. The analysis highlights rising energy demand, increasing import dependence, expanding refining capacity, and strengthening export performance. It evaluates upstream production patterns across offshore and onshore fields, growth in liquefied natural gas integration, and the role of infrastructure development in enhancing supply security. Strategic initiatives such as vertical integration, unconventional resource exploration, storage expansion, and transition toward cleaner fuels are assessed to understand long term competitiveness. The paper also places India's energy trajectory within an international context, drawing insights relevant to global suppliers including Abu Dhabi. The findings indicate that sustained investment, regulatory reforms, and global partnerships are reshaping the sector's operational structure while reinforcing India's position as a major energy consumer and refining hub.

Key Word: Oil and Gas, Energy Consumption, Refineries, LNG, Natural Gas

Introduction:

The Indian oil and gas industry occupies a central position in the country's economic structure and energy security framework. India is the world's third largest energy consumer and its energy demand continues to rise with industrial growth, urbanisation, and expanding transport networks. The sector is highly diversified, covering exploration and production, refining, petrochemicals, pipeline transportation, city gas distribution, and liquefied natural gas operations. This wide operational base has enabled the industry to respond to domestic consumption needs while also participating actively in global energy trade. India is the second largest refiner in Asia, with a refining capacity that not only satisfies domestic requirements but also supports substantial exports of petroleum products. Indian refineries are technically advanced and designed to process varied grades of crude oil sourced from multiple regions. The country is also the fourth largest LNG importer, reflecting a strategic shift towards natural gas as a cleaner transition fuel. Expanding regasification terminals and pipeline networks have strengthened gas-based industrial activity and urban energy supply. Engineering capability plays a decisive role in this sector. Complex offshore platforms, subsea pipelines, refinery upgrade projects, and petrochemical integration require high technical competence and project management skills. Indian engineering firms collaborate with global technology providers to adopt advanced refining processes, digital monitoring systems, and

safety standards. Investment in research, automation, and energy efficiency is rising steadily as companies prepare for stricter environmental norms and operational optimization. The industry maintains strong international engagement. Indian public and private enterprises hold upstream assets across regions including the Middle East, Africa, and Russia to secure crude supply. Energy partnerships with countries such as the United Arab Emirates have strengthened supply chains, with Abu Dhabi serving as a major crude source and strategic reserve partner. Indian companies also explore joint ventures, long term LNG contracts, and refinery collaborations to manage price volatility and supply risks. Rapid expansion is visible through new refinery projects, petrochemical complexes, LNG terminals, and cross country pipeline networks. Growing demand for transportation fuels, aviation fuel, petrochemicals, and gas based energy continues to attract increasing investments and capital spending. Policy initiatives such as hydrocarbon licensing reforms, gas marketing freedom, and infrastructure incentives have created new opportunities for private and foreign participation. With sustained policy support, technological advancement, and global engagement, the Indian oil and gas industry remains a key pillar of economic development and international energy cooperation.

Refining Expansion and India's Rising Position in the Global Energy Market

India's oil and gas industry reflects strong industrial diversification supported by scale, technology, and sustained capacity expansion. As the second largest refiner in Asia and the fourth largest crude oil refiner globally, India has steadily enhanced its refining strength. Refining capacity increased from 256.8 MMTPA (Million Metric Tonnes Per Annum) in FY24 to 258.1 MMTPA in FY25, with plans to expand to 450-500 million tonnes by 2030. The country is also expected to add nearly one million barrels per day of refining capacity by 2028. This expansion supports domestic demand while strengthening India's role as a key exporter of refined petroleum products to global markets across Asia, Africa, and Europe. Modern refineries are equipped to process diverse crude grades, improving cost efficiency and trade flexibility.

India's position as the world's third largest energy consumer and third largest oil consumer further drives competitiveness. Petroleum product consumption rose from 158.4 MMT (Million Metric Tonnes) in FY14 to 239.2 MMT in FY25, recording a compound annual growth rate of about 3.82 % over the decade. According to the International Energy Agency, India's primary energy demand is projected to nearly double by 2040 as economic output expands significantly. This demand momentum encourages upstream investment, refining integration, and petrochemical development.

In the gas segment, India is the fourth largest LNG importer, with LNG meeting nearly one fourth of total gas demand. LNG imports reached 36,699 million standard cubic meters in FY25, marking a 15.4 % increase over the previous year. Planned expansion of LNG import capacity to 50 million tonnes will further integrate India with global gas markets. Through diversification across refining, petrochemicals, natural gas, and international trade partnerships, India continues to strengthen its industrial depth and global energy competitiveness.

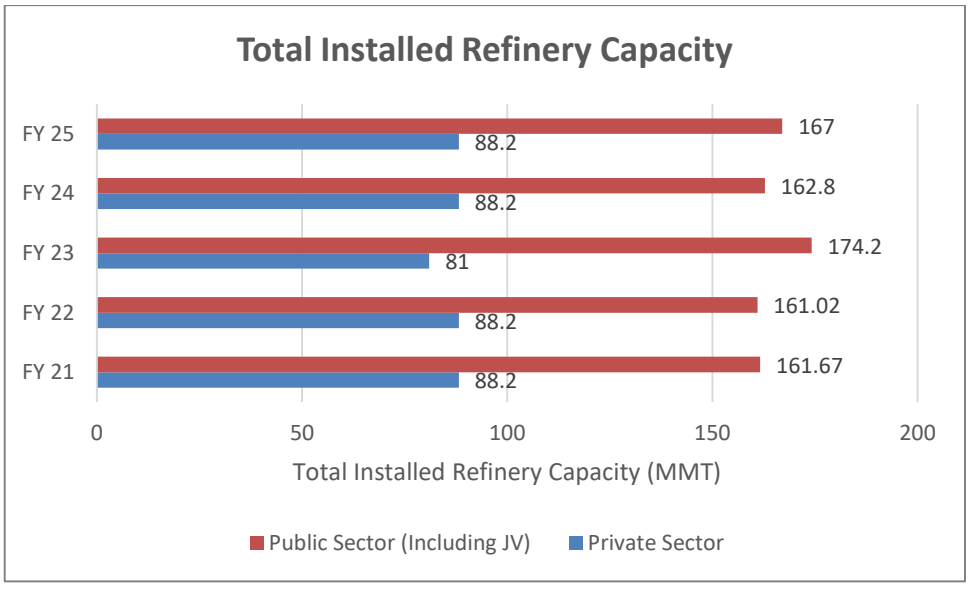
Pipeline Infra and Capacity		
Pipeline	Capacity (MMTPA/April 25)	Length (kms/April 25)
Crude Pipeline	153.1	10445
Product Pipeline	145.8	24130
Natural Gas Pipeline	111.63 (March 24)	33203

Source: Ministry of Petroleum and Natural Gas

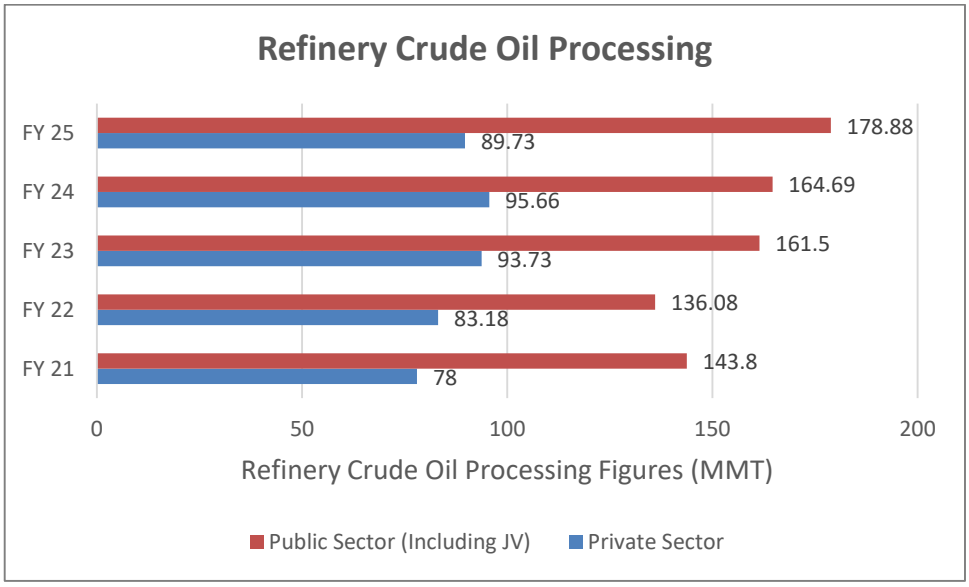
Refining Capacity and Processing Performance:

Refining capacity and processing performance are central indicators of operational strength and supply stability in the oil and gas sector. An assessment of installed capacity and actual crude throughput provides insight into utilization efficiency, export capability, and the industry's ability to meet rising domestic and international demand.

Public sector refining capacity increased from 161.67 MMT in FY21 to 167 MMT (Million Metric Tonnes) in FY25, showing growth of about 3.3 %, while private capacity remained stable at 88.2 MMT. Processing volumes reveal stronger momentum. Public sector crude processing rose from 143.8 MMT in FY21 to 178.88 MMT in FY25, a substantial increase of about 24.4 %. Private sector processing increased from 78 MMT to 89.73 MMT, reflecting growth of nearly 15 %. These trends demonstrate improved capacity utilization, expansion of refinery operations, and strengthening of India's refining competitiveness.



Source: Ministry of Petroleum and Natural Gas



Source: Ministry of Petroleum and Natural Gas

Demand Surge, Infrastructure and Policy Driven Growth:

India's oil and gas industry is witnessing strong demand expansion supported by infrastructure growth and active policy intervention. As the world's third largest energy consumer, India continues to record rising import and consumption figures. Crude oil imports increased by 4.2 % to 242.4 million tonnes in FY25. Natural gas consumption is projected to grow by nearly 60 % by 2030, reaching about 297 million standard cubic metres per day from 188 MMSCMD in FY24. Oil demand is expected to double and reach 11 million barrels per day by 2045. Domestic production is likely to reach a mid decade peak around 2027, supported by output from the KG Basin projects operated by Reliance Industries Limited and Oil and Natural Gas Corporation.

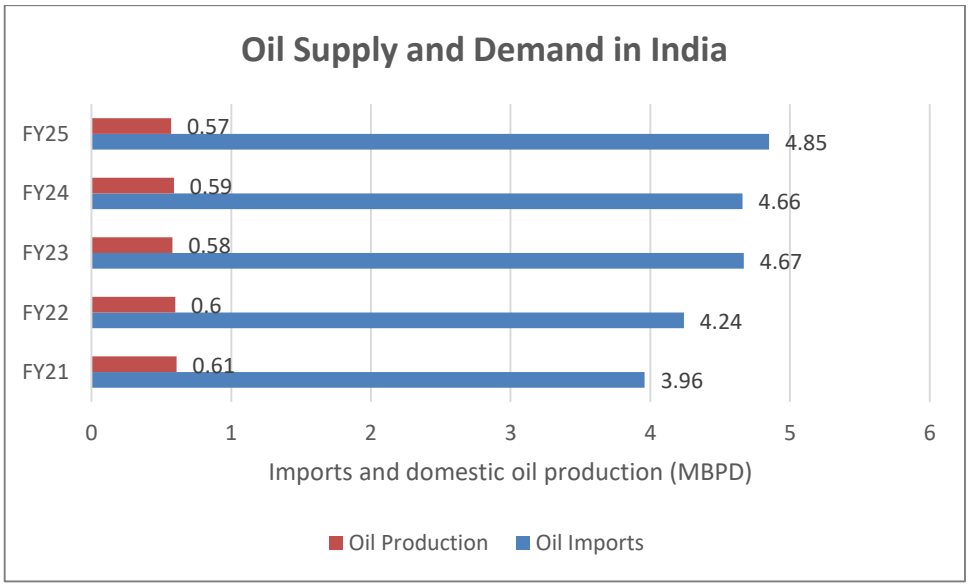
Rapid expansion in refining and petrochemicals is strengthening supply capacity. Refining capacity rose from 256.8 MMTPA in FY24 to 258.1 MMTPA in FY25, and refiners plan to add 56 MMTPA by 2028, taking domestic capacity to 310 MTPA. Long term projections indicate potential expansion to 667 MTPA by 2040. A capital expenditure push of Rs 3.28 lakh crore aims to position India as a major petrochemical producer by 2030. The sector is expected to attract nearly US 25 billion in exploration and production investments. Reforms under the New Exploration Licensing Policy and Open Acreage Licensing Policy have already resulted in significant discoveries and capital inflows.

Gas infrastructure is also expanding. The 'Petroleum and Natural Gas Regulatory Board' is coordinating city gas distribution growth, targeting 126.3 million PNG connections and 18,336 CNG stations by 2034. Budgetary allocations for pipeline infrastructure and the second phase of the Indian Strategic Petroleum Reserves project reflect sustained government commitment. Supportive FDI norms allowing 49 % foreign investment in public sector refining projects further enhance capital access and global participation.

Production, Trade and Infrastructure Trends:

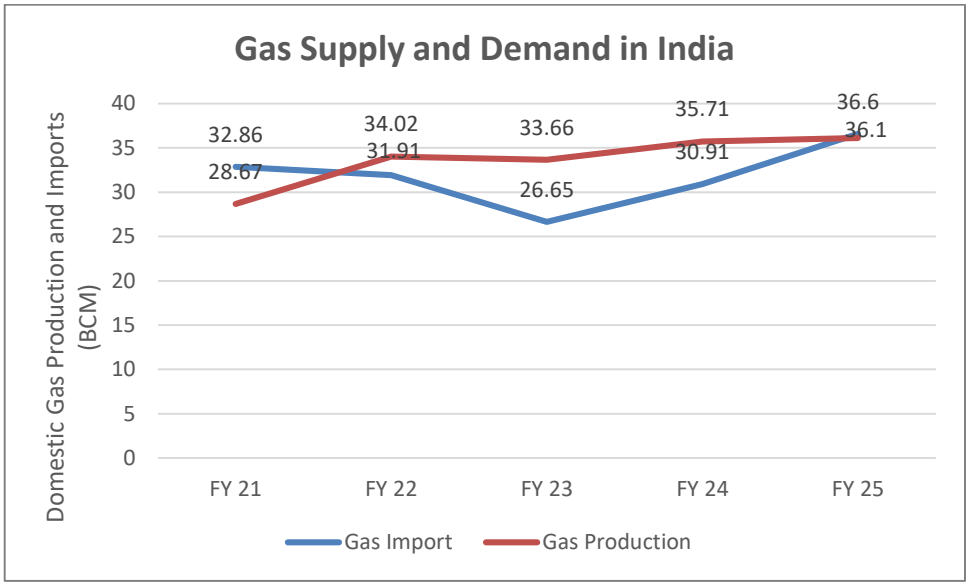
India's oil and gas sector presents a mixed pattern of rising demand, moderate production growth, expanding refining activity, and increasing trade integration. Over the past five years, the country has experienced sustained growth in crude imports, petroleum product exports, and natural gas consumption, reflecting strong industrial expansion and rising mobility needs. At the same time, domestic crude production has shown limited growth, while offshore gas output has emerged as a major contributor to supply improvement. Refining capacity and processing volumes have expanded steadily, strengthening India's position as a key refining and export hub. Infrastructure development in both oil and gas segments indicates efforts to enhance energy security and reduce supply vulnerabilities. The following sections examine key trends in oil supply and demand, gas production and imports, export performance, upstream production structure, and refinery capacity utilization, supported by recent data and growth rates.

India's crude oil import dependence has steadily increased over the past five years. Imports rose from 3.96 MBPD (Million Barrels Per Day) in FY21 to 4.85 MBPD in FY25, registering an overall growth of about 22.5 %. The sharpest annual rise occurred between FY22 and FY23, reflecting post pandemic demand recovery and higher industrial activity. In contrast, domestic oil production declined from 0.61 MBPD in FY21 to 0.57 MBPD in FY25, a fall of nearly 6.6 %. This divergence indicates structural supply constraints in mature fields and highlights India's continued reliance on global crude markets to sustain economic growth and mobility demand.



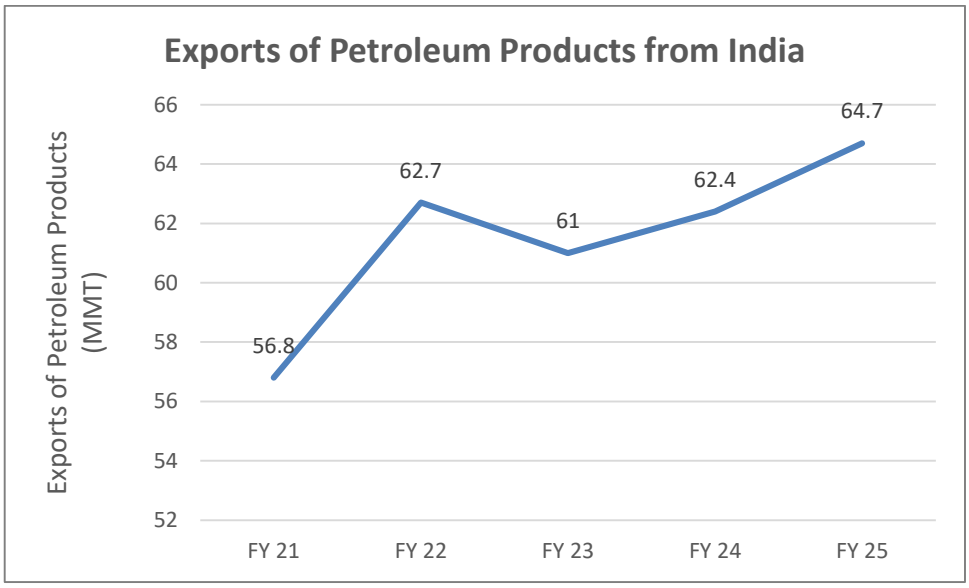
Source: Ministry of Petroleum and Natural Gas, BP Statistical Review 2020

Natural gas supply trends show moderate growth in both imports and domestic production. Gas imports increased from 32.86 BCM in FY21 to 36.6 BCM in FY25, marking a growth of about 11.4 %. Domestic gas production expanded more strongly, rising from 28.67 BCM (Billion Cubic Metres) to 36.1 BCM during the same period, reflecting growth of nearly 26 %. The rise is largely supported by offshore output and improved extraction technologies. The narrowing gap between imports and domestic supply suggests efforts to strengthen energy security and reduce excessive import exposure.



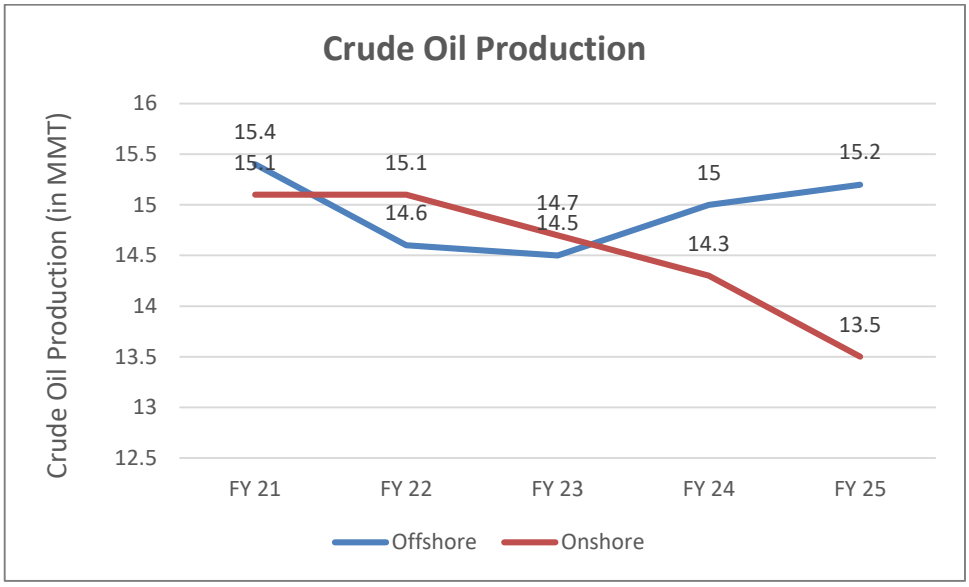
Source: Ministry of Petroleum and Natural Gas, BP Statistical Review 2020

Exports of petroleum products increased from 56.8 MMT (Million Metric Tonnes) in FY21 to 64.7 MMT in FY25, an expansion of around 13.9 %. The growth reflects higher refinery throughput, competitive pricing, and strong demand from emerging economies. India's complex refineries enable processing of varied crude grades, supporting export competitiveness even during periods of global price volatility.



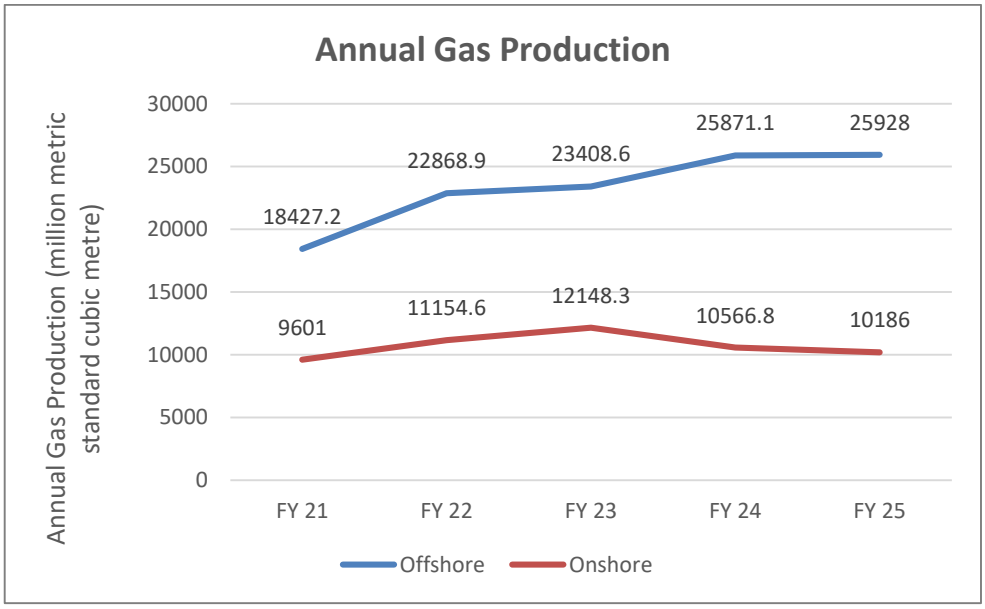
Source: Ministry of Petroleum and Natural Gas, BP Statistical Review 2020

Offshore crude production remained relatively stable, moving from 15.4 MMT (Million Metric Tonnes) in FY21 to 15.2 MMT in FY25, with marginal fluctuation of about 1.3 % decline across the period. Onshore production declined more visibly from 15.1 MMT to 13.5 MMT, a contraction of nearly 10.6 %. This pattern indicates ageing onshore assets and greater dependence on offshore developments.



Source: Ministry of Petroleum and Natural Gas

Offshore gas production expanded from 18,427 MMSCM in FY21 to 25,928 MMSCM in FY25, recording robust growth of approximately 40.7 %. Onshore gas output rose from 9,601 to 10,186 MMSCM, reflecting moderate growth of about 6.1 % despite fluctuations after FY23. Offshore basins therefore remain the principal drivers of gas output growth.



Source: Ministry of Petroleum and Natural Gas

Strategic Expansion, Diversification and Energy Transition Initiatives:

India's oil and gas sector is pursuing integrated growth strategies that combine capacity expansion, upstream investment, storage security, unconventional exploration, and transition toward cleaner energy. The approach reflects a shift from volume driven growth to value chain integration and long term sustainability.

- **Expansion of Refining and Gas Infrastructure:**

  India continues to expand refining capacity, petrochemical integration, and gas networks to meet rising domestic demand. Large capital expenditure programs aim to strengthen refining output, LNG infrastructure, and pipeline connectivity, improving energy security and export competitiveness.

- **Vertical Diversification and Integration:**

  Companies are moving across the value chain to improve margins and reduce risk exposure. Oil India Limited plans to enter refining and downstream operations. Indian Oil Corporation Limited is expanding into exploration and production. This integration enhances operational control from upstream to retail distribution.

- **Large Scale Upstream Investments:**

  The Exploration and Production segment offers investment potential of nearly US 100 billion by 2030. Cairn Oil & Gas is investing heavily in enhanced oil recovery and upstream expansion. A US 67 billion gas sector roadmap aims to increase gas share in the energy mix to 15 %.

- **Strategic Petroleum Reserves and Commercial Flexibility**

  India is optimizing storage facilities at Visakhapatnam, Mangalore, and Padur to manage supply risks and price volatility through partial commercialisation of reserves.

- **Focus on Unconventional Resources**

  Shale gas pilot projects in Rajasthan and West Bengal, led by Oil and Natural Gas Corporation and Cairn, reflect efforts to diversify domestic production sources.

- **Transition to Non-Conventional Energy**

  Major firms are investing in renewable energy, green hydrogen, and carbon capture. Indian Oil targets net zero operational emissions by 2046, while ONGC aims for net zero by 2038, strengthening long term sustainability and global competitiveness.

Global Opportunities in the Indian Oil and Gas Market:

India presents significant opportunities for global investors and energy companies due to its sustained demand growth and supportive policy structure. As one of the fastest growing major energy markets, India's expanding transport sector, industrial base, and urban population are driving consistent increases in oil and gas consumption. The domestic market offers scale and long

term stability, making it attractive for upstream, refining, petrochemical, and gas infrastructure investments. Rising natural gas demand, supported by efforts to increase its share in the primary energy mix, creates opportunities in LNG supply, regasification terminals, pipeline networks, and city gas distribution.

Favourable business conditions further strengthen investor confidence. India allows 100 % foreign direct investment in many segments of the oil and gas value chain, ensuring ease of capital entry and technology collaboration. Policy reforms in exploration licensing, marketing freedom, and pricing mechanisms have improved transparency and operational flexibility. The country also benefits from abundant crude processing infrastructure, strategic geographic location for exports, and availability of skilled engineering and technical manpower. Government support through infrastructure funding, strategic reserves, and gas expansion programs enhances market resilience. From a global perspective, India represents a high growth, policy supported, and investment friendly energy destination with long term commercial potential.

Conclusion:

The Indian oil and gas industry is undergoing a significant structural shift driven by demand growth, infrastructure expansion, and strategic diversification. While domestic crude production remains constrained, refining strength, export capacity, and gas sector development have improved resilience and global relevance. Policy support, foreign investment openness, and upstream reforms have strengthened investor confidence and encouraged technological advancement. Expansion of city gas networks, strategic petroleum reserves, and unconventional exploration reflects a broader approach toward energy security. Simultaneously, commitments toward cleaner fuels and decarbonisation signal preparation for a gradual energy transition. From an international perspective, including engagement with energy partners such as UAE and Abu Dhabi, India represents a stable and expanding market with long term collaboration potential. The sector's transformation demonstrates a shift from capacity augmentation alone to integrated growth combining security, competitiveness, and sustainability.

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