Industry Report

On

Engineering, Procurement & Construction (EPC) Industry

(Focus on the Oil & gas transportation, distribution & refining as well as thermal power)

August 2025

Prepared for

Vectras Enprocon Limited

Disclaimer

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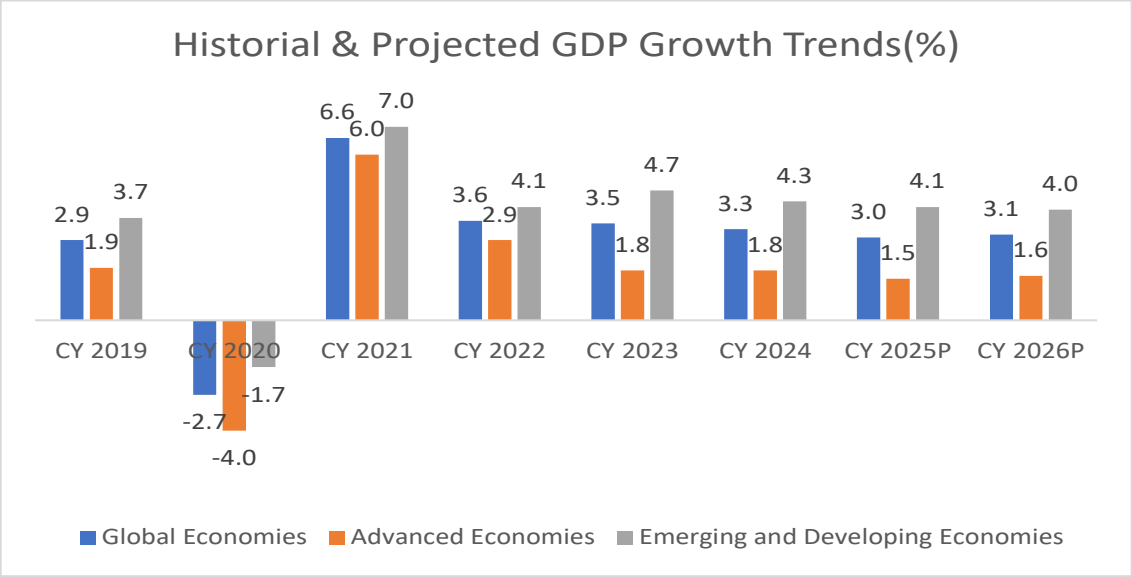
Global Macroeconomic Scenario

The global economy, which recorded GDP growth at 3.3% in CY 2024, is expected to show resilience at 3.0% in CY 2025. This marks the slowest expansion since 2020 and reflects a -0.3%point downgrade from January 2025 forecast. Moreover, the projection for CY 2026 has also reduced to 3.1%. This slowdown is majorly attributed due to numerous factors such as high inflation in many economies despite central bank effort to curb inflation, continuing energy market volatility driven by geopolitical tensions particularly in Ukraine and Middle East, and the re-election of Donald Trump as US President extended uncertainty around the trade policies as well as overall global economic growth. High inflation and rising borrowing costs affected the private consumption on one hand while fiscal consolidation impacted the government consumption on the other hand. As a result, global GDP growth is projected to slow down from 3.3% in CY 2024 to 3.0% in CY 2025.



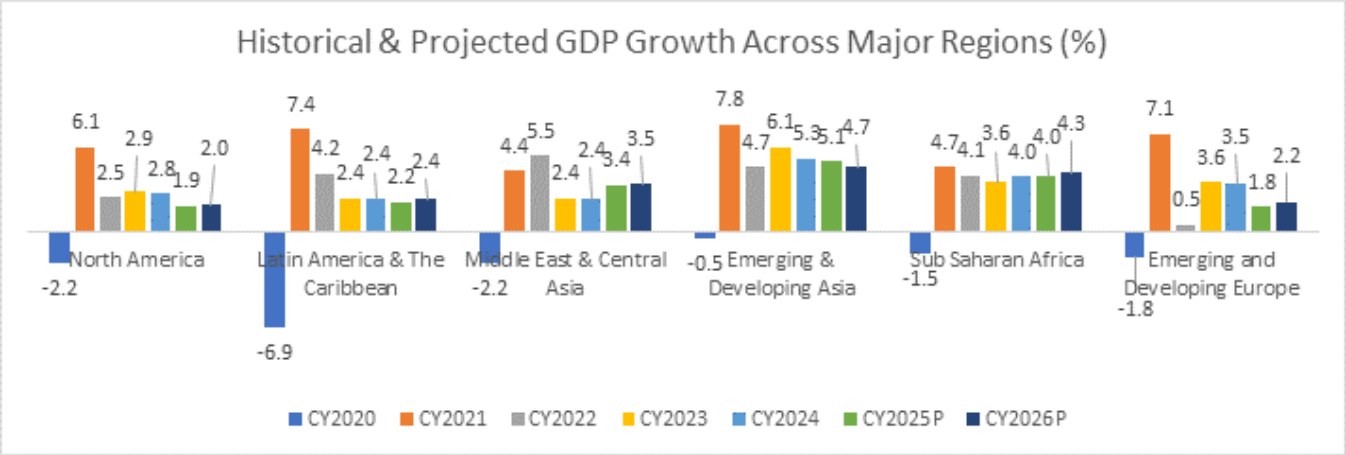
Source – IMF Global GDP Forecast Release July 2025

Note: Advanced Economies and Emerging & Developing Economies are as per the classification of the World Economic Outlook (WEO). This classification is not based on strict criteria, economic or otherwise, and it has evolved over time. It comprises of 40 countries under the Advanced Economies including the G7 (the United States, Japan, Germany, France, Italy, the United Kingdom, and Canada) and selected countries from the Euro Zone (Germany, Italy, France etc.). The group of emerging market and developing economies (156) includes all those that are not classified as Advanced Economies (India, China, Brazil, Malaysia etc.)

Historical and Projected GDP Growth

GDP growth across major regions exhibited a mixed trend between 2022-23, with GDP growth in many regions including North America, Emerging and Developing Asia, and Emerging and Developing Europe slowing further in 2024. In 2025, GDP growth rate in Emerging and Developing Asia (India, China, Indonesia,

Malaysia, etc.) is expected to moderate further to 5.1% from 5.3% in the previous year, while in the North America, it is expected to moderate to 1.9% in CY 2025 from 2.8% in CY 2024. Similarly in Emerging and Developing Europe is expected to moderate further to 1.8% from 3.5% in the previous year.



Source-IMF World Economic Outlook July 2025 update.

Except Middle East & Central Asia, all other regions like Emerging and Developing Asia, Emerging and Developing Europe, Latin America & The Caribbean, Sub Saharan Africa and North America, are expected to record a moderation in GDP growth rate in CY 2025 as compared to CY 2024. Further, growth in the United States is expected to come down at 1.9% in CY 2025 from 2.8% in CY 2024 due to lagged effects of monetary policy tightening, gradual fiscal tightening, and a softening in labour markets slowing aggregate demand.

Global Economic Outlook

The global macroeconomic environment remains shaped by divergent regional trends and continued geopolitical and policymaking uncertainties. A wave of new U.S. tariffs, mostly effective from August 7, has shaken markets and raised costs for global trade. On August 1, the U.S. announced higher tariff rates for countries from which it imports goods, with most of the rates effective from August 7. A 15% rate will act as a baseline floor for countries with which the U.S. has a trade deficit; a 10% rate applies for those with which the U.S. has a trade surplus. However, there are some countries that are subject to higher U.S. tariffs.

In North America, the United States continues to engage in trade negotiations with multiple countries and has announced plans to introduce sector-specific tariffs, targeting industries such as copper and pharmaceuticals. However, talks with Canada have stalled, despite Canada's decision to withdraw its Digital Services Tax in an effort to ease tensions. As a result, the U.S. imposed a 35% tariff on Canadian goods that

do not meet USMCA compliance standards, effective August 1. This move has further strained bilateral relations and added complexity to the regional trade landscape.

By August 7, the U.S. had announced increased tariffs of 15-50% on Asian economies, with most rates around 20%. Although these tariffs are lower than the levels announced in April, they remain higher than those applied to most Western counterparts, impacting exporters such as Taiwan Region (20%) and India (25%, with the U.S. saying this could rise to 50% at the end of August). Moreover, On July 28, the US imposed a 15% tariff on most EU imports under a new trade agreement, impacting Nordic countries such as Denmark, Finland, and Sweden. Key exemptions include aircraft parts and semiconductor equipment, while steel and aluminum continue to face 50% tariffs.

Tariffs and their unpredictable application have weighed on consumer and business sentiment, sunk global stock markets, raised recession risks, and made a global slowdown more likely. Our latest Global Business Optimism Insights report for indicates a further decline in business optimism as firms continue to grapple with trade-related policy uncertainty and its broader economic implications. Export-driven sectors reported sharp declines in optimism. Financial risk perceptions remain elevated as businesses contend with high borrowing costs and persistent inflation expectations. More broadly, the uncertainty is reflected in delayed capital expenditure and a pullback in hiring.

Tariffs have begun to exert pressure on central banks by contributing to inflationary pressures and increasing financial market volatility. Central banks are adjusting forward guidance and policy frameworks and may begin to consider the likelihood of softer growth being a bigger priority than high inflation by starting to cut interest rates to support economies. For businesses, this uncertainty translates into unpredictable cost structures, fluctuating credit availability, and the management of operational costs through diversified supply networks.

The latest Dun & Bradstreet Global Business Optimism Insights report reveals a further decline in business optimism, though at a more moderate pace than in the prior quarter, as businesses continued to grapple with trade-related policy uncertainty and its broader economic implications. Export-driven sectors such as automotives, electricals, and metals saw sharp declines in optimism, particularly in the U.S., Mexico, South Korea, and Japan, where rising tariffs and shifting trade policies have fueled cost pressures and demand volatility. Financial risk perceptions remain elevated.

Global Growth Projection

At broader level, the global economy is expected to experience a slowdown in 2025, with GDP growth projected to decline to 3.0%, down from 3.3% in 2024. This deceleration reflects persistent inflationary pressure, geopolitical uncertainties and tightened monetary policies. However, a sightly recovery is

anticipated in 2026, with growth projected to improve to 3.1%. Global inflation is expected to decline steadily, to 4.2% in 2025 and to 3.6% in 2026. Inflation is projected to converge back to the target earlier in advanced economies, reaching 2.2% in 2026, whereas in emerging market and developing economies, it is anticipated to decrease to 4.6% during the same period. Trade tariffs function as a supply shock for the countries imposing them, leading to a decrease in productivity and an increase in unit costs. Countries subject to tariffs experience a negative demand shock as export demand declines, placing downward pressure on prices. In each scenario, trade uncertainty introduces an additional layer of demand shock since businesses and households react by delaying investment and spending, and this impact could be intensified by stricter financial conditions and heightened exchange rate volatility. Moreover, Global trade growth is expected to slow down in 2025 to 1.7%. This forecast reflects increased tariff restrictions affecting trade flows and, to a lesser extent, the waning effects of cyclical factors that have underpinned the recent rise in goods trade. Geopolitical tensions as seen in the past such as the wars in Ukraine and the Middle East could exacerbate inflation volatility, particularly in energy and agricultural commodities.

India Macroeconomic Analysis

India emerged as one of the fastest growth economies amongst the leading advanced economies and emerging economies. In CY 2024, even amidst geopolitical uncertainties, particularly those affecting global energy and commodity markets, India continues to remain one of the fastest growing economies in the world and is expected to grow by 6.4% in CY 2025.

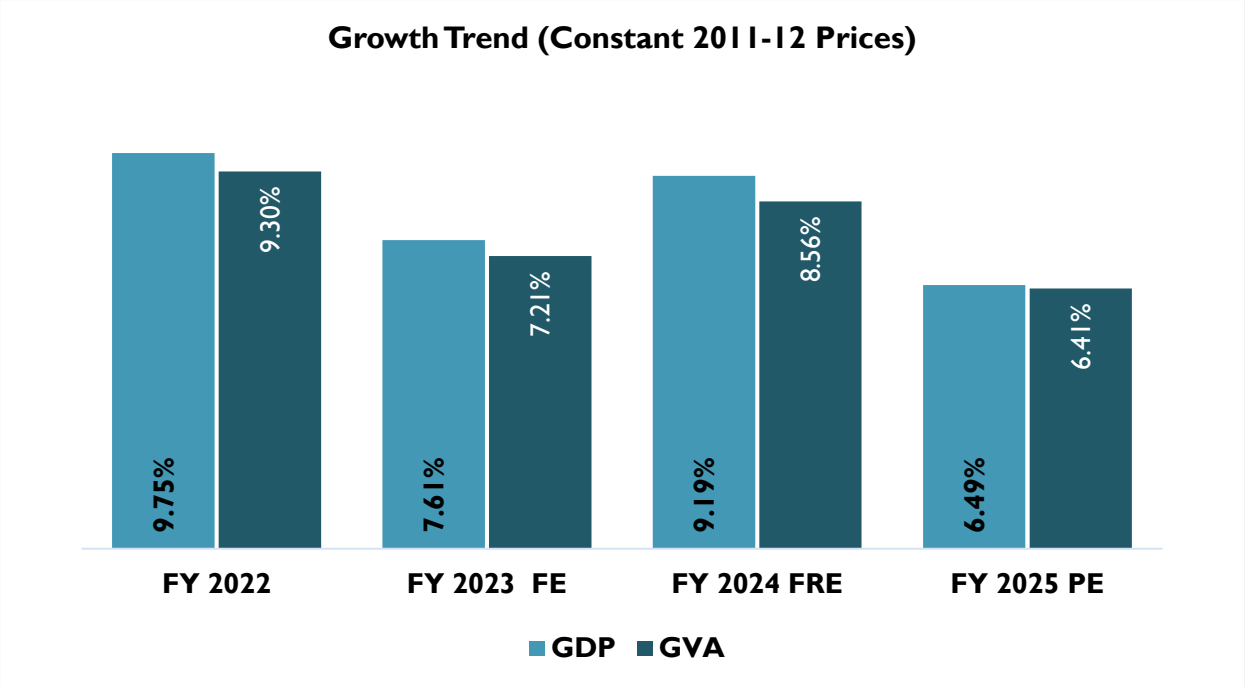
Country	CY 2020	CY 2021	CY 2022	CY 2023	CY 2024	CY 2025 P	CY 2026 P
India	–5.8%	9.7%	7.6%	9.2%	6.5%	6.4%	6.4%
China	2.3%	8.6%	3.1%	5.4%	5.0%	4.8%	4.2%
United States	-2.2%	6.1%	2.5%	2.9%	2.8%	1.9%	2.0%
Japan	-4.2%	2.7%	0.9%	1.4%	0.2%	0.7%	0.5%
United Kingdom	-10.3%	8.6%	4.8%	0.4%	1.1%	1.2%	1.4%
Russia	-2.7%	5.9%	-1.4%	4.1%	4.3%	0.9%	1.0%

Source: World Economic Outlook, July 2025

The Government stepped spending on infrastructure projects to boost the economic growth had a positive impact on economic growth. The capital expenditure of the central government increased by average 26.52% during FY 2023-FY 2024 which slowed to 7.27% in FY 2025 which is expected to translate in moderating GDP growth of 6.4% in CY2025. In the Union Budget 2025-2026, the government announced INR 11.21 billion capex on infrastructure (10.12% higher than previous year revised estimates) coupled with INR 1.5 trillion in interest-free loans to states. This has provided much-needed confidence to the private sector, and in turn, expected to attract the private investment.

Historical GDP and GVA Growth trend

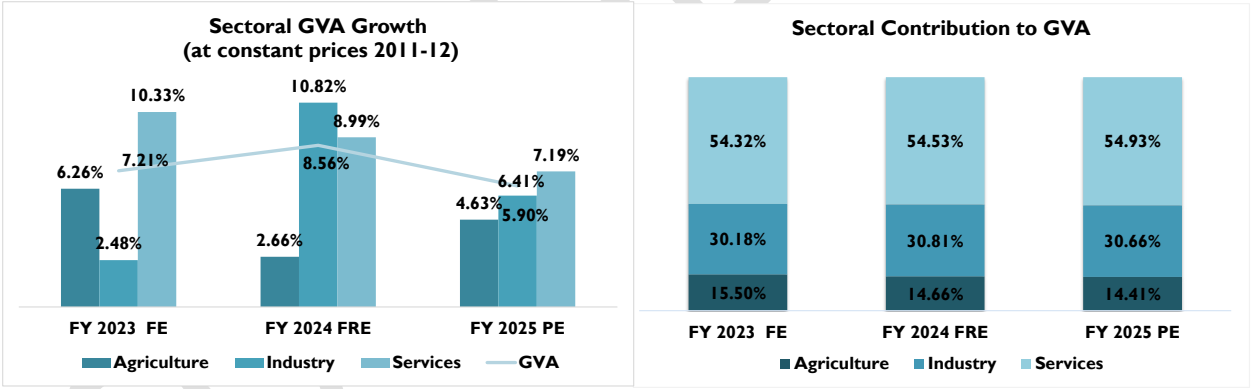
As per the latest estimates, India's GDP at constant prices is estimated to grow to INR 187.96 trillion in FY 2025 (Provisional Estimates) with the real GDP growth rates estimated to be 6.5% for FY 2025. Similarly, real Gross Value Added (GVA) growth stood is estimated to have moderated to 6.4% in FY 2025. Even amidst global economic uncertainties, India's economy exhibited resilience supported by robust consumption and government spending.



Source: Ministry of Statistics & Programme Implementation (MOSPI), National Account Statistics: FY2025.

FE is Final Estimates, FRE is First Revised Estimate and PE is Provisional Estimates

Sectoral Contribution to GVA and annual growth trend



Source: Ministry of Statistics & Programme Implementation (MOSPI)

FE is Final Estimates, FRE is First Revised Estimate and PE is Provisional Estimates

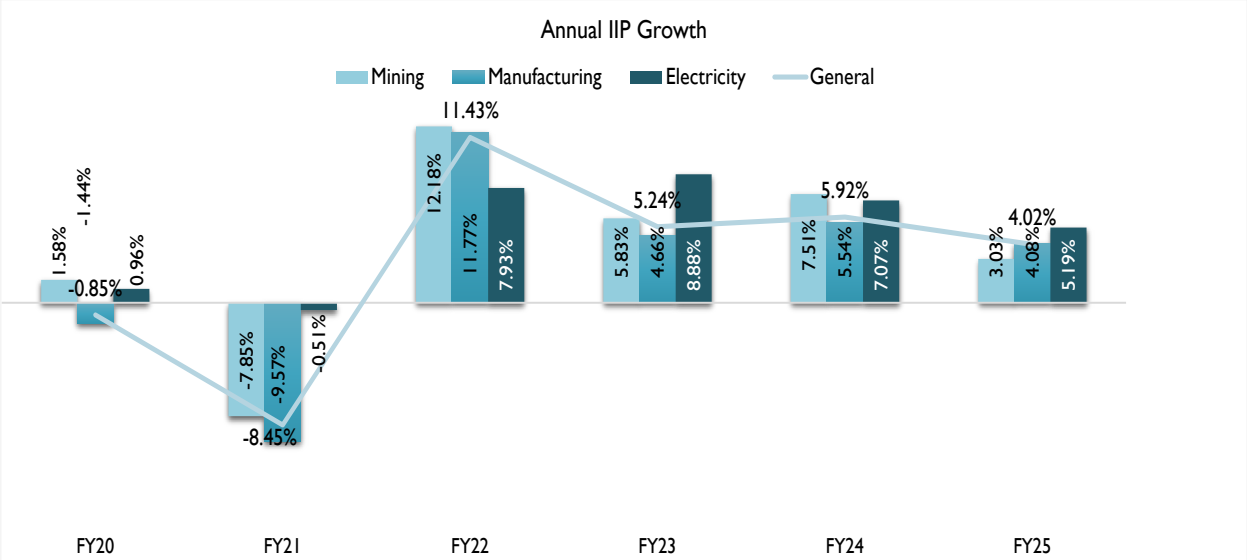
Sectoral analysis of GVA reveals that the industrial sector experienced a moderation in FY 2025, recording a 5.90% y-o-y growth against 10.82% year-on-year growth in FY 2024. Within the industrial sector, growth moderated across sub sector with mining, manufacturing, and construction activities growing by 2.69%, 4.52%, and 9.35% respectively in FY 2025, compared to 3.21%, 12.30%, and 10.41% in FY 2024. Growth in the utilities sector too moderated to 6.03% in FY 2025 from 8.64% in the previous year. The industrial sector's contribution to GVA moderated marginally from 30.81% in FY 2024 to 30.66% in FY 2025.

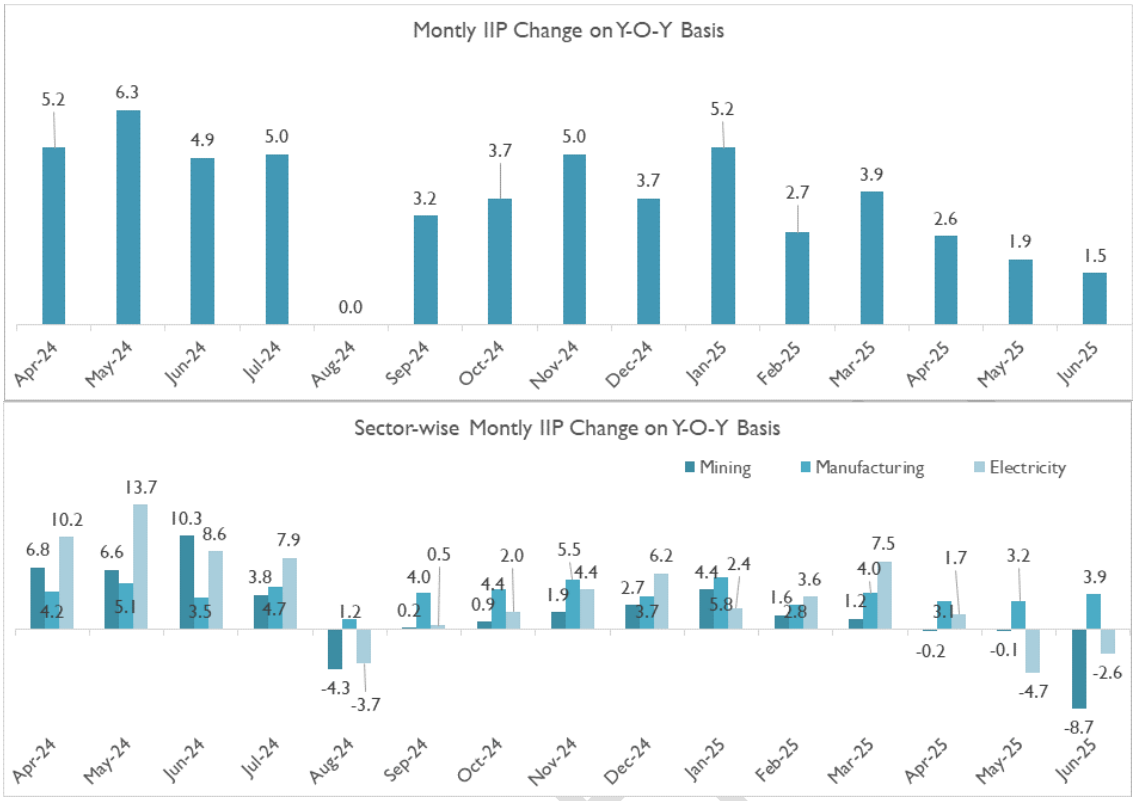
The services sector continued to be the main driver of economic growth, although its pace moderated. It expanded by 7.19% in FY 2025 from 8.99% in FY 2024. The services sector retained its position as the largest contributor to GVA, rising from 54.32% in FY 2023 to 54.53% in FY 2024, with a further increase to 54.93% in FY 2025.

The agriculture sector saw an acceleration, with growth increasing from 2.66% in FY 2024 to 4.63% in FY 2025. However, its contribution to GVA declined marginally from 14.66% in FY 2024 to 14.41% in FY 2025. Overall, Gross Value Added (GVA) growth moderated to 6.41% in FY 2025 from 8.56% in FY 2024

Annual & Monthly IIP Growth

Industrial sector performance as measured by IIP index exhibited moderation in FY 2025, recording a 4.02% y-o-y growth against 5.92% increase in the previous year. The manufacturing index showed moderation and grew by 4.08% in FY 2025 against 5.54% in FY 2024. Mining sector index too moderated and exhibited a growth of 3.03% in FY 2025 against 7.51% in the previous years while the Electricity sector Index, also witnessed moderation of 5.19% in FY 2025 against 7.07% in the previous year.



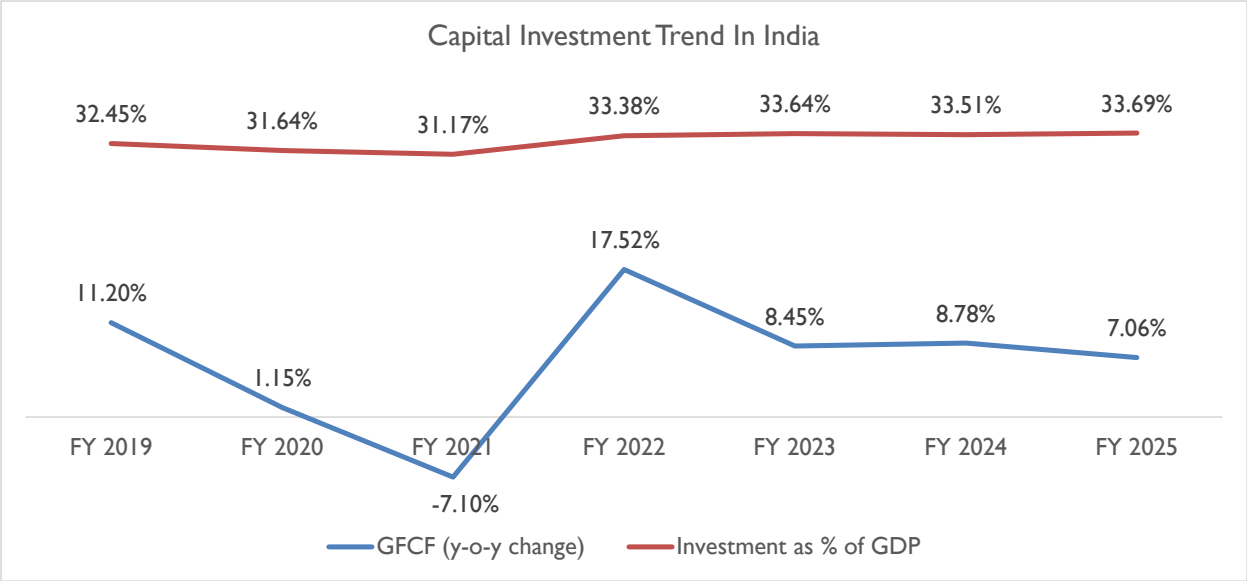


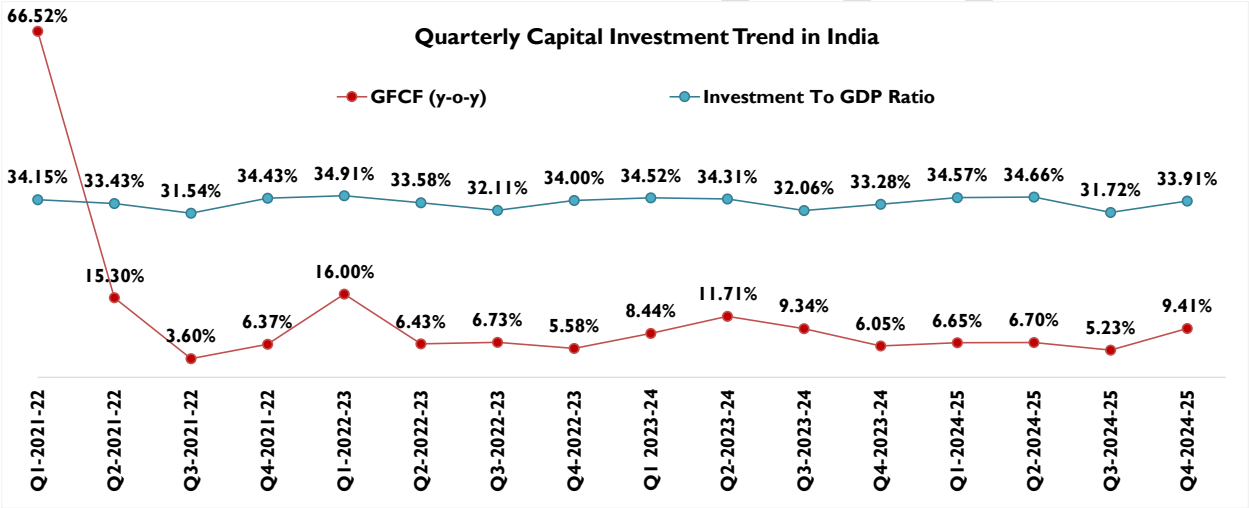
Source: Ministry of Statistics & Programme Implementation (MOSPI)

The IIP growth rate for the month of June 2025 is 1.5% which was 1.9% in the month of May 2025. The growth rates of the three sectors, Mining, Manufacturing and Electricity for the month of May 2025 are (-)8.7%, 3.9% and (-)2.6% respectively.

Annual and Quarterly: Investment & Consumption Scenario

Other major indicators such as Gross fixed capital formation (GFCF), a measure of investments, has shown fluctuation during FY 2025 as it registered 7.06% year-on-year growth against 8.78% yearly growth in FY 2024, taking the GFCF to GDP ratio measured to 33.69%.

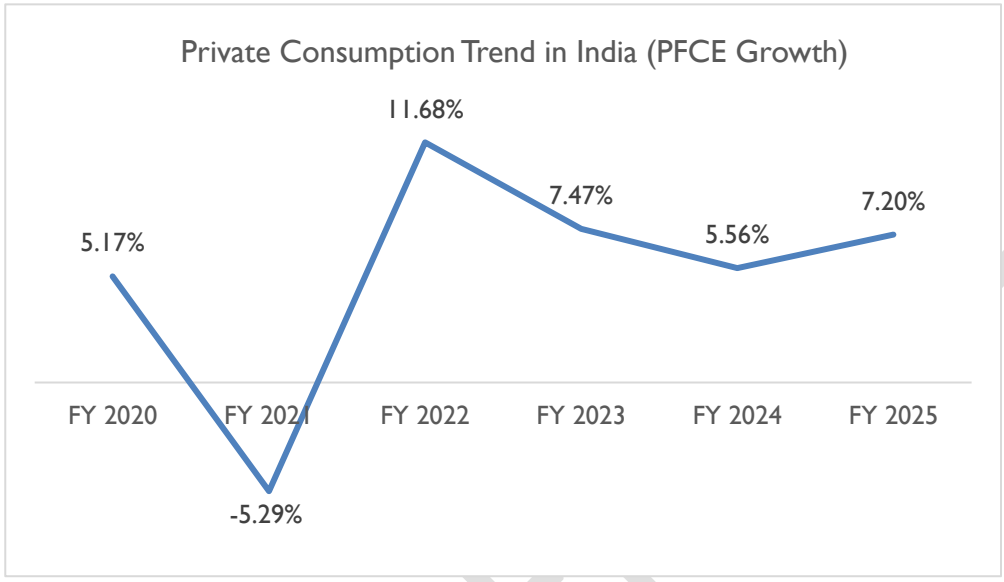


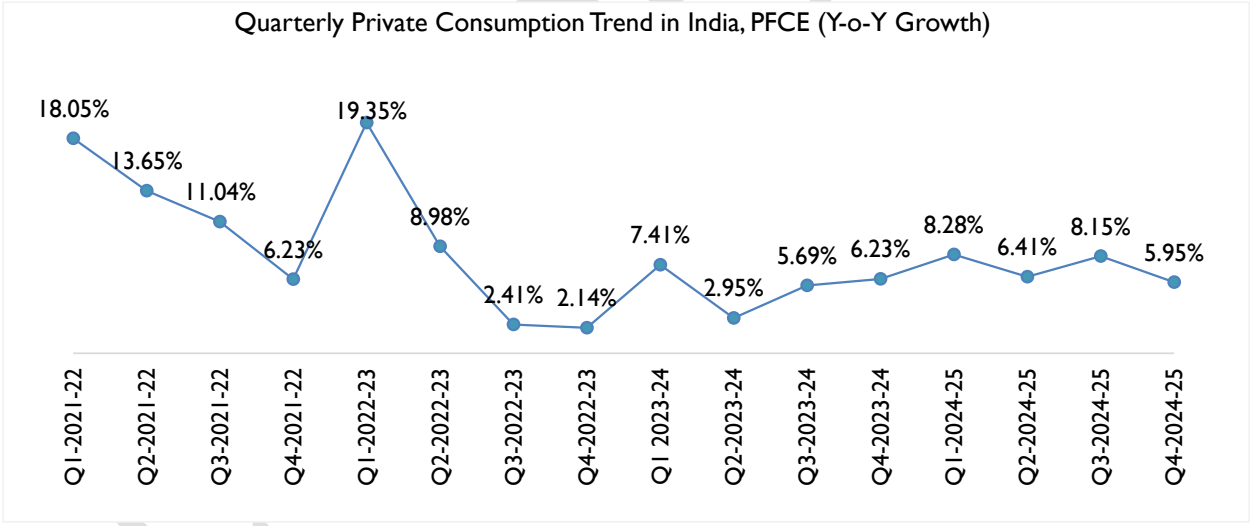


Source: Ministry of Statistics & Programme Implementation (MOSPI)

On quarterly basis, GFCF exhibited a fluctuating trend in quarterly growth over the previous year same quarter. In FY 2024, the growth rate moderated to 6.05% in March quarter against the previous two quarter as government went slow on capital spending amidst the 2024 general election while it observed an improvement in Q1 FY 2025 by growing at 6.65% against 6.05% in the previous quarter and moderated in the subsequent two quarter. On yearly basis, the growth rate remained lower compared to the same quarter in the previous year during FY 2025. The GFCF to GDP ratio measured 33.91% in Q4 FY 2025.

Private Consumption Scenario





Sources: MOSPI

Private Final Expenditure (PFCE) a realistic proxy to gauge household spending, observed growth in FY 2025 as compared to FY 2024. However, quarterly data indicated some improvement in the current fiscal as the growth rate improved over the corresponding period in the last fiscal.

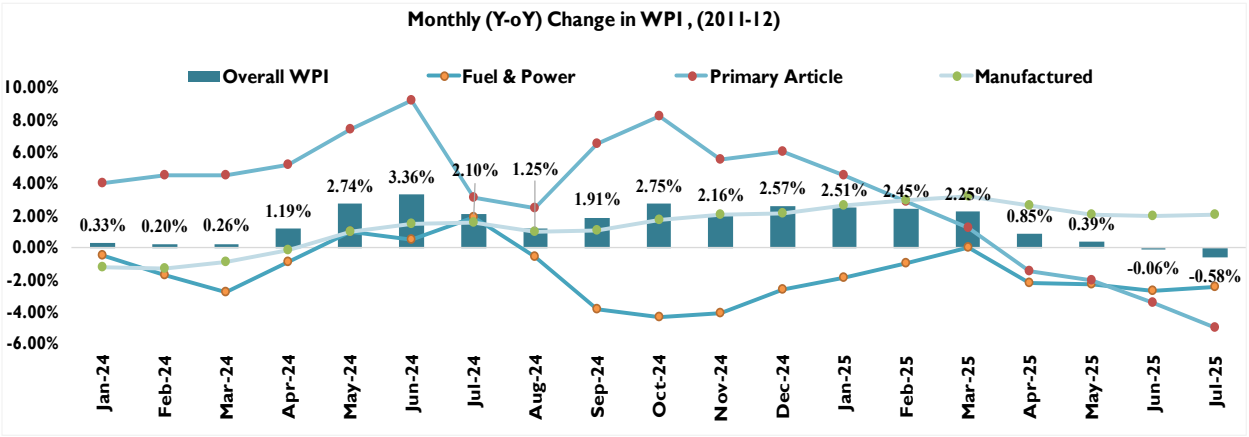
Inflation Scenario

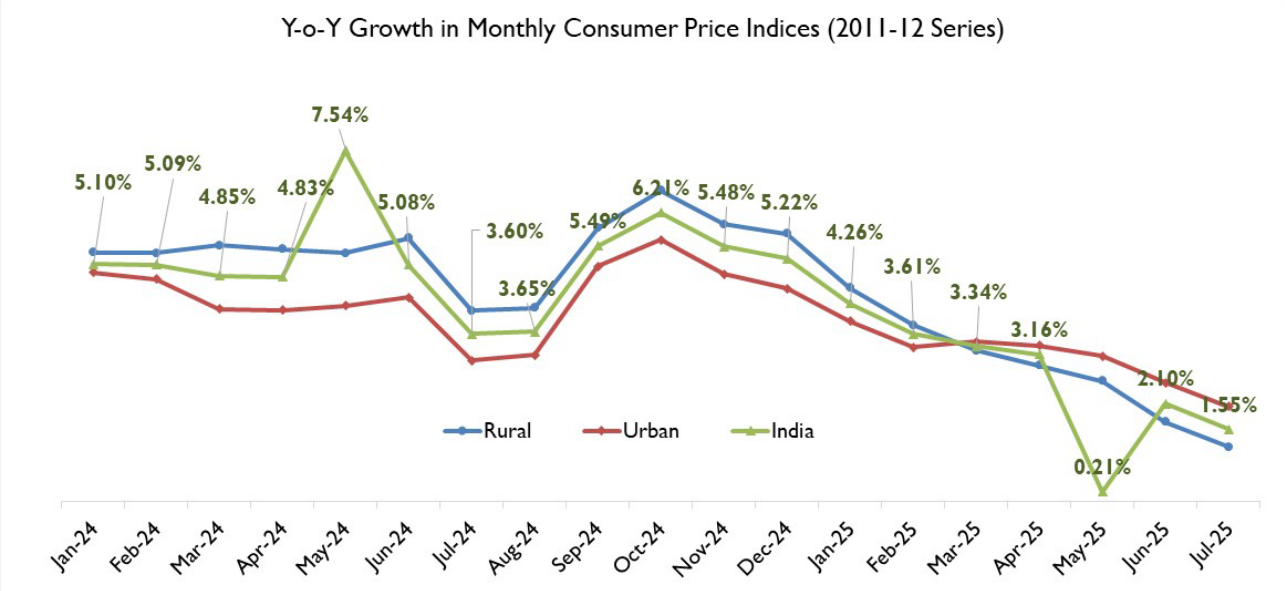
The inflation rate based on India's Wholesale Price Index (WPI) exhibited significant fluctuations across different sectors from January 2024 to July 2025. The annual rate of inflation based on All India Wholesale Price Index (WPI) number is (-) 0.58% (provisional) for the month of July, 2025 (over July, 2024). Negative rate of inflation in July 2025 is primarily due to increase in prices of manufacture of food products, electricity, other manufacturing, chemicals and chemical products, manufacture of other transport equipment and non-food articles etc.

By July 2025, Primary Articles (Weight 22.62%), - The index for this major group increased by 1.18 % from 185.8 (provisional) for the month of June 2025 to 188.0 (provisional) in July, 2025. Price of Crude Petroleum & Natural Gas (2.56%), non-food articles (2.11%) and food articles (0.96%) increased in July, 2025 as compared to June, 2025. The price of minerals (-1.08%) decreased in July, 2025 as compared to June, 2025.

Moreover, power & fuel, the index for this major group increased by 1.12% from 143.0 (provisional) for the month of June, 2025 to 144.6 (provisional) in July, 2025. The price of mineral oils (1.98%) increased in July, 2025 as compared to June, 2025. Price of coal (-0.44%) and electricity (-0.36%) decreased in July, 2025 as compared to June, 2025.

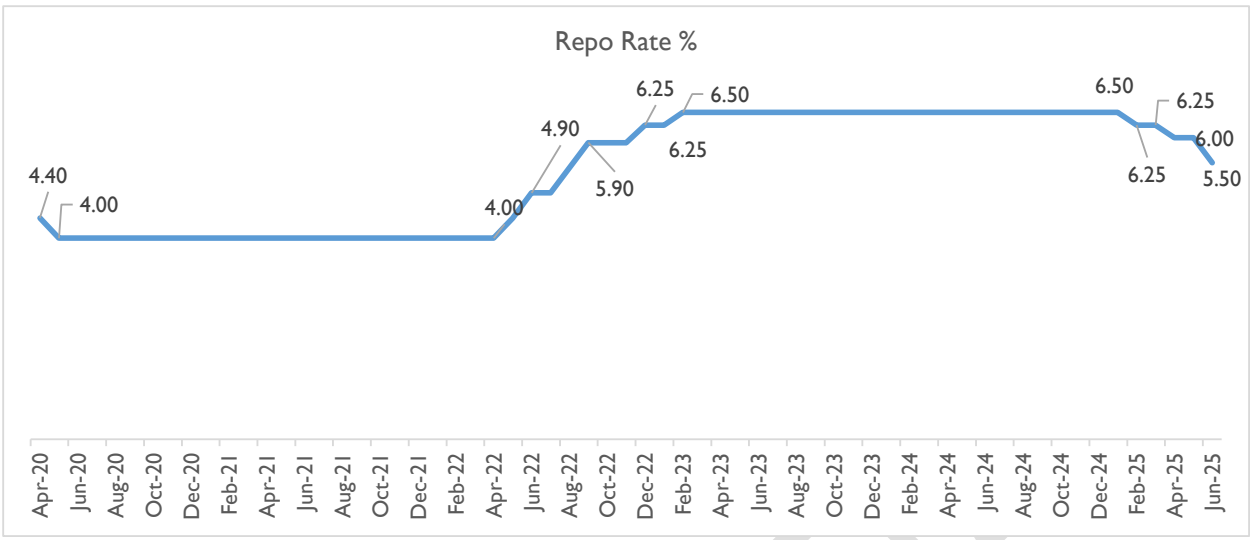
Furthermore, Manufactured Products (Weight 64.23%), The index for this major group declined by 0.14% from 144.8 (provisional) for the month of June, 2025to 144.6 (provisional) in July, 2025. Out of the 22 NIC two-digit groups for manufactured products, 9 groups witnessed an increase in prices, 9 groups witnessed a decrease in prices and 4 groups witnessed no change in prices. Some of the important groups that showed month-over-month increase in prices were other manufacturing; other transport equipment; motor vehicles, trailers and semi-trailers; other non-metallic mineral products and furniture etc. Some of the groups that witnessed a decrease in prices were manufacture of basic metals; fabricated metal products, except machinery and equipment; food products; chemicals and chemical products and paper and paper products etc in July, 2025 as compared to June, 2025.





Source: MOSPI, Office of Economic Advisor

Retail inflation rate (as measured by the Consumer Price Index) in India showed notable fluctuations between January 2024 and July2025. Overall, the national CPI inflation rate moderated to 1.55% by July 2025, indicating a gradual easing of inflationary pressures across both rural and urban areas. Rural CPI inflation peaked at 6.68% in October 2024, declining to 1.18% in July 2025. Urban CPI inflation followed a similar trend, rising to 5.62% in October 2024 and then dropping to 2.05% in July 2025. CPI measured above 6.00% tolerance limit of the central bank since July 2023. As a part of an anti-inflationary measure, the RBI has hiked the repo rate by 250 bps since May 2022 and 8 Feb 2023 while it held the rate steady at 6.50 % till January 2025. On 6th June 2025, RBI reduced the repo rate by 50 basis points which currently stands at 5.50%.



Sources: CMIE Economic Outlook

Growth Outlook

The Union Budget 2025-26 has laid the foundation for sustained growth by balancing demand stimulation, investment promotion and inclusive development. Inflation level is reaching within the central bank's target; the RBI may pursue further monetary easing that will support growth. The medium-term outlook is bright, fueled by the emphasis on physical and digital infrastructure spending. With a focus on stimulating demand, driving investment and ensuring inclusive development, the budget introduces measures such as tax relief, increased infrastructure spending and incentives for manufacturing and clean energy. These initiatives aim to accelerate growth while maintaining fiscal discipline, reinforcing India's long-term economic resilience. The expansion of tax relief i.e zero tax liability for individuals earning up to INR 12 lacs annually under the new tax regime is expected to strengthen household finances and, consequently, boost consumption.

The external sector remains resilient, and key external vulnerability indicators continue to improve. However, tariff-related uncertainty is likely to weigh on exports and investment, prompting us to cut our CY26 GDP growth forecast to 6.4%.

Overview of EPC Industry

Construction sector is one of the major segments that drives an economy. Growth in the number of construction projects creates the demand for a myriad range of products and services. These include project management services, EPC/EPCM services and architecture consulting services, to name a few.

Engineering, Procurement, and Construction (EPC)

EPC is a prominent form of contracting agreement in the construction industry. Companies that deliver EPC Projects are commonly referred to as EPC Contractors. Today, EPC contracting is the most sought method of executing projects globally. EPC is a contract under which the project is executed under a single point responsibility of a contractor. EPC contracts are pivotal agreements in the construction industry, designed to streamline project execution by transferring substantial project risks from the owner to the contractor. These contracts encompass the full scope of project responsibilities, including design, procurement, and construction, ensuring a single point of accountability for the project's completion. The primary appeal of EPC contracts lies in their ability to provide cost certainty, making them particularly attractive to developers who lack the financial or technical resources to manage unexpected expenses and project intricacies. By transferring risks associated with workplace accidents, labour and material shortages, and critical schedule milestones, developers can mitigate potential disruptions and focus on other strategic priorities.

One of the significant advantages of EPC contracts is the reduced level of engagement required from developers. This hands-off approach allows developers to save on time, labour, and resources, relying on the contractor to meet project deadlines and specifications. Establishing clear design and construction standards before entering an EPC contract can further enhance project outcomes by ensuring consistency and quality while minimizing the need for developer intervention. However, the transfer of all project risks to the contractor can come at a premium cost. Contractors must account for all known and unknown contingencies, which can significantly inflate the contract price. To strike a balance, developers may negotiate shared responsibilities for unforeseen circumstances, such as fluctuating material costs, thereby achieving better financial terms and fostering a more cooperative relationship with the contractor.

Third-party reviews of EPC designs are highly recommended for developers lacking in-house expertise or bandwidth. Engaging an independent engineering firm to assess the contractor's designs can safeguard the developer's interests and ensure that the final project aligns with the specified requirements. These reviews are particularly crucial when millions of dollars are at stake, offering an additional layer of oversight and assurance. It is important to note that EPC contracts can alter the dynamics between developers and contractors. The contractual focus on financial transactions and risk management can strain relationships,

particularly if there were pre-existing collaborative ties. Developers must be mindful of this potential shift and consider limiting the use of EPC contracts to specific project types where the benefits outweigh the relational costs. In addition to traditional EPC contracts, developers might explore alternative models such as Cost-Plus contracts and Hybrid EPC contracts. Cost-Plus contracts allow developers to maintain greater involvement and oversight, reimbursing contractors for project costs plus a percentage for overhead and profit. Hybrid EPC contracts offer a blend of flexibility and fixed pricing, with the initial stages of the project managed on a time-and-material basis before transitioning to a fixed-price arrangement.

Types of EPC Contracts

Lump Sum EPC Contract: In this model, the contractor commits to completing the project for a fixed price. This contract type is typically employed for projects with well-defined scopes and timelines, facilitating straightforward cost and budget management. For instance, a residential complex construction project might use a lump sum contract to ensure cost certainty for the developer.

Unit Price EPC Contract: This arrangement involves pricing based on the actual units of work completed. It is particularly suited for projects where the scope is uncertain, offering flexibility in pricing and resource allocation. Road construction projects are a common example of unit price contracts, as the quantity of materials required can vary depending on site conditions.

Cost-Plus EPC Contract: Under this contract, the contractor is reimbursed for actual costs incurred plus an agreed-upon fee. This model is advantageous for projects with undefined requirements, providing a safety net for contractors. It is especially useful in research and development projects where project specifications may evolve over time.

Design and Build EPC Contract: In this model, the contractor oversees both the design and construction phases of the project. This integrated approach can expedite project completion and enhance coordination between design and construction. Large-scale infrastructure projects, such as airports, often utilize this contract type to ensure seamless integration and timely delivery.

Turnkey EPC Contract: This comprehensive contract requires the contractor to deliver a fully operational facility to the client upon project completion. Common in sectors such as energy and water supply, the turnkey model ensures that the end product meets specific operational standards from the outset, providing a complete solution to the client.

Additional Types with EPC

Engineering, Procurement, and Construction Management (EPCM): In an EPCM contract, the contractor provides oversight and management services instead of performing the construction work

directly. This model grants the client greater control over the project, as the contractor coordinates with various subcontractors and manages the overall execution of the project. This approach is often favoured when clients wish to retain significant involvement in the project's execution while relying on the contractor for management expertise.

Engineering, Procurement, Construction, and Installation (EPCI): EPCI contracts are typically employed in offshore construction projects and cover the full spectrum of design, procurement, construction, transportation, and installation. In this model, the contractor assumes substantial risk regarding timely completion and cost management. This comprehensive contract ensures that all aspects of the project, from initial design to final installation, are integrated and managed by the contractor.

Engineering, Procurement, Construction and Commissioning (EPCC): EPCC contracts include an additional phase of commissioning beyond the standard design, procurement, and construction services. This type of contract is specifically designed to ensure that the project meets the required performance levels upon delivery, with the contractor responsible for ensuring that the facility operates according to its intended specifications.

Engineering and Procurement (EP): This simplified contract focuses exclusively on engineering and procurement services. It is often used in scenarios where the construction risk is too high for the contractor or when the client plans to manage the construction phase independently. This contract type allows clients to engage specialized engineering and procurement services while retaining control over the construction process.

Attributes and Features of EPC Contracts

Single Point of Responsibility

EPC contracts provide a unified management approach where the contractor assumes full responsibility for engineering, procurement, and construction. This simplifies project oversight for the client by consolidating accountability and streamlining the management process.

Fixed Price and Cost Certainty

These contracts often involve a fixed price or lump sum, offering cost certainty and predictable financial commitments. This arrangement reduces financial risk for the client, making it easier to secure financing and manage budgets without unexpected cost overruns.

Risk Transfer

The contractor assumes significant risks associated with design, procurement, and construction. This risk transfer protects the client from unforeseen costs and potential project delays, ensuring greater financial stability and predictability.

Detailed Specifications:

EPC contracts typically outline detailed project specifications and scope at the outset. This clarity minimizes changes during construction and helps prevent potential cost overruns by defining project parameters from the beginning.

Integrated Project Management:

The contractor manages all aspects of the project, including coordination with subcontractors and suppliers. This integrated approach enhances project efficiency and communication, ensuring smoother execution and coordination.

Change Orders

Changes to the project scope or design are managed through formal change orders. This structured method for handling modifications includes associated cost adjustments, providing a clear process for addressing alterations while managing financial impacts.

Turnkey Delivery

EPC contracts are often described as "turnkey" agreements, meaning the contractor delivers a fully operational facility upon completion. This allows the client to immediately commence operations without additional modifications or inputs, streamlining the transition to operational use.

Fixed Completion Date

A fixed completion date is typically specified in EPC contracts. Failure to meet this deadline usually entitles the owner to claim damages for delays, providing an incentive for the contractor to adhere to the project's timeline.

Performance Guarantees

Performance guarantees are commonly included to assure the client that the completed project will meet specified performance standards. These guarantees protect against subpar work or defects, ensuring that the project operates as intended.

Caps on Liability

EPC contracts often include caps on liability for the contractor, limiting financial exposure in cases of non-compliance or adverse outcomes. This feature balances accountability and risk management, providing a clear limit to the contractor's financial responsibility.

Defined Risk Allocation

A key characteristic of EPC contracts is the clear allocation of risk between the contractor and the owner. By transferring most design and construction risks to the contractor, these contracts help the owner manage potential uncertainties throughout the project.

Key Segments of EPC Contracts

Engineering

The engineering segment encompasses the detailed design and planning of the project. The EPC contractor is tasked with creating comprehensive engineering drawings, specifications, and plans that adhere to project requirements and industry standards.

Procurement

During the procurement phase, the contractor is responsible for sourcing and acquiring all necessary materials, equipment, and services. This involves managing the supply chain and ensuring timely delivery of components to prevent construction delays.

Construction

This segment covers the actual construction and installation activities. The EPC contractor oversees all construction processes, ensuring that the work aligns with the design specifications and is completed within the agreed timeline.

Commissioning

Following construction, the commissioning phase is critical for verifying that all systems and components function correctly. The contractor conducts thorough testing to ensure the facility meets performance guarantees before transferring it to the client.

Handover

The handover phase involves transferring the completed project to the client. The contractor provides essential documentation, training, and support to enable the client to operate the facility effectively.

Performance Guarantees

EPC contracts frequently include performance guarantees, where the contractor commits to meeting specific performance criteria. These guarantees are crucial for securing project financing and mitigating operational risks.

Risk Allocation

Effective risk allocation is a key aspect of EPC contracts. The contractor typically assumes the majority of risks related to design, procurement, construction, and performance, protecting the project owner from unforeseen issues.

Liquidated Damages

This segment outlines predetermined penalties for the contractor in the event of delays or failure to meet performance standards. Liquidated damages act as a financial incentive for timely and high-quality project delivery.

Security Mechanisms

EPC contracts often include security measures, such as bank guarantees or retention clauses, to safeguard the project owner against potential contractor defaults or failures to meet obligations.

Scope of EPC Services

The scope of EPC service varies according to the sub segment within the industry. The type of services required by an infrastructure developer would be entirely different from a residential real estate developer or industrial construction developer. EPC is a major service sought by infrastructure developer while real estate developers would look for support in building finishing (cladding & glazing), and mechanical, electrical & plumbing works.

In industrial segment, with rising number of projects and complexities in the scope of work, the responsibility of successful project execution has shifted from project owner/developer to EPC and EPCM contractors. For industrial plants spanning across chemical, fertilizer, oil & gas, and petroleum sector, amongst other, prominent turnkey solution and services provided by EPC companies include Site Investigation Service, Project Management, Procurement & Supply, Design & Detail Engineering, Manufacturing & Erection of Equipment, Installation and Mechanical Completion, Piping, Instrumentation, Commissioning, Performance Guarantee Test Run, and Operation & Maintenance, amongst others.

EPC Service scope in Oil & Gas, and power generation

The Engineering, Procurement, and Construction (EPC) model is a critical part of infrastructure development in sectors like oil & gas, and power generation in India. Here's how EPC works in each of these segments:

Oil & Gas Sector

- **Scope of Work:** EPC contractors in the oil & gas sector are responsible for the complete lifecycle of a project, from the design phase to the construction and commissioning of facilities. This includes refineries, pipelines, storage tanks, and processing plants.
- **Engineering:** Detailed engineering design is created based on the client's specifications. This involves designing process flows, equipment, and layouts for the efficient operation of oil & gas facilities.
- **Procurement:** Contractors handle the sourcing of all necessary materials, equipment, and technology required for the project. They manage supplier relationships, logistics, and quality control to ensure timely delivery and compliance with industry standards.
- **Construction:** The construction phase involves the physical building of the project, which includes the installation of machinery, laying pipelines, and constructing structures. This phase requires strict adherence to safety and environmental regulations.
- **Commissioning:** Once construction is completed, the EPC contractor is responsible for testing and commissioning the facilities, ensuring they operate as intended before handing them over to the client.
- **Challenges:** The sector faces challenges such as volatile oil prices, regulatory hurdles, and the need for advanced technology and skilled labor. Additionally, EPC projects in oil & gas are capital-intensive and often involve complex logistical considerations.

Power Generation Sector

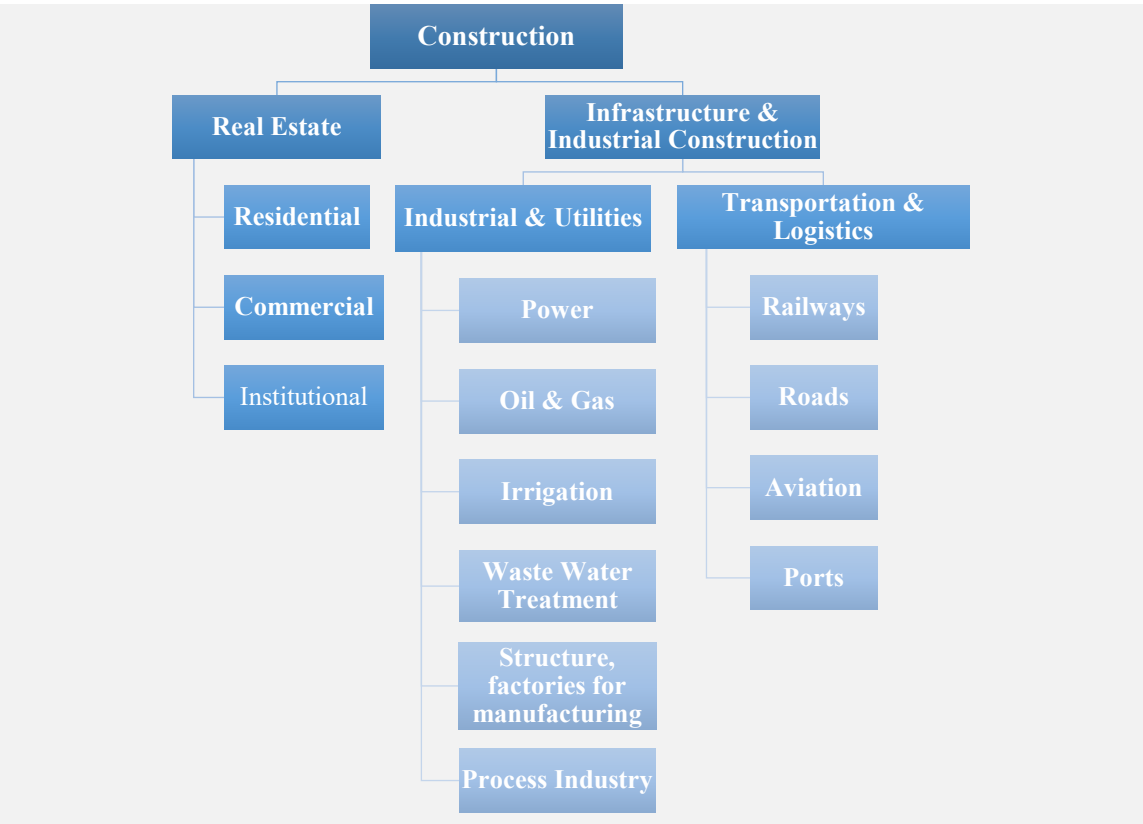
- **Scope of Work:** EPC contractors in the power generation sector are responsible for the complete lifecycle of power projects, including thermal, hydro, nuclear, solar, and wind power plants. Their scope covers feasibility studies, design, procurement, construction, and commissioning of generation facilities and associated infrastructure like substations and transmission lines.
- **Engineering:** Detailed engineering design is developed based on client and regulatory specifications. This includes designing plant layouts, electrical systems, turbines, boilers, control systems, and grid integration mechanisms to ensure efficient and safe power generation.

- **Procurement:** Contractors manage the sourcing of critical equipment such as generators, transformers, turbines, solar panels, and control systems. They oversee vendor selection, logistics, and quality assurance to ensure timely delivery and compliance with technical and environmental standards.
- **Construction:** This phase involves site preparation, civil works, and installation of mechanical and electrical systems. It includes erecting power generation units, substations, and transmission infrastructure. Strict adherence to safety, environmental, and labor regulations is essential during execution.
- **Commissioning:** After construction, EPC contractors conduct testing and commissioning of the plant. This includes performance validation under various load conditions, synchronization with the grid, and ensuring operational readiness before handing over to the client.
- **Challenges:** The sector faces challenges such as regulatory delays, land acquisition issues, integration of renewable energy sources, high capital investment, and the need for skilled labor and advanced technology. EPC contractors must also manage risks related to cost overruns, procurement bottlenecks, and performance guarantee disputes.

Construction industry in India

Overview

Construction sector includes a broad spectrum of activities including planning & design to actual construction. The sector is broadly divided into two: real estate construction and Industrial & infrastructure construction.



Source: Dun & Bradstreet Desk Research

Growth in the number of construction projects creates the demand for a myriad range of products and services. These include project management services, EPC services and architecture consulting services, to name a few.

Key Segments of the Industrial Construction

Power Plants: The growing demand for energy necessitates the construction of new power plants across various technologies, including thermal, renewable, and nuclear. Expertise in specialized construction techniques and safety protocols is crucial in this segment.

Logistics Infrastructure: Warehousing facilities, cold storage units, and inland container terminals are in high demand as India's logistics sector booms. Optimizing space utilization and integrating automation solutions are key considerations.

Chemical & Pharmaceutical Plants: Stringent safety regulations and specialized construction materials characterize this segment. Expertise in handling hazardous materials and adhering to environmental norms is essential.

Refineries: Construction of facilities for processing crude oil into usable products like gasoline, diesel, and petrochemicals. High safety standards due to the flammable nature of materials, robust containment systems to prevent leaks, and adherence to environmental regulations.

Factory Buildings: This segment forms the backbone, catering to diverse industries with customized production spaces. Prefabricated structures and green building technologies are gaining traction for their efficiency and sustainability.

While significant progress has been made, challenges like inadequate infrastructure quality, skill gaps in the workforce, and limited access to financing remain concerns. The increasing integration of technologies like Building Information Modeling (BIM) and robotics is enhancing efficiency and reducing project timelines. Environmental considerations are gaining prominence, with green building practices and renewable energy solutions being incorporated into industrial construction projects.

Current Market Scenario

The construction sector is a key component of the Indian economy with linkages across more than 200+ sub sectors. Construction, the second largest economic activity in India (after agriculture) contributes around ~9.1% to the national GDP. Further, India is poised to become the third largest construction market in the next 2-3 years on the back of stable economic growth as the real estate sector has emerged to be a critical engine in the country's growth story. As per a Knight Frank report, the construction sector, along with the output generated from real estate services and ownership of dwellings, contributes nearly 18% to the economy's total output.

It is the second largest employment generator in India with nearly 71 million workforce which is expected to cross 100 million by 2030. High employability of the sector is due to chain of backward and forward linkages that the sector has with other sectors of the economy. It provides impetus to other manufacturing sectors like cement, bitumen, iron and steel, chemicals, bricks, paints, tiles among others. A unit increase in expenditure in construction sector has a multiplier effect on other sectors with a capacity to generate income as high as five times in other sectors.

India's construction industry is on a phenomenal growth trajectory, projected to reach a staggering USD 1.4 trillion by 2025, accounting for 8%-10% of India's GDP. This represents a significant leap from its current size of approximately USD 820 billion, showcasing the dynamism and potential of this sector. Cities are a major driver for the construction industry as more than 40% of the population is expected to live in urban India (compared to the current 33%), leading to a demand for 25 million additional mid-end and affordable units by 2030. Further, the Smart Cities Mission targeted at 100 cities is aimed at improving the quality of life through modernized/ technology driven urban planning.

The Indian government's ambitious Gati Shakti National Master Plan plays a pivotal role in propelling the construction industry forward. This comprehensive roadmap aims to seamlessly integrate infrastructure development across various sectors, creating a national logistics network that will boost efficiency and reduce costs.

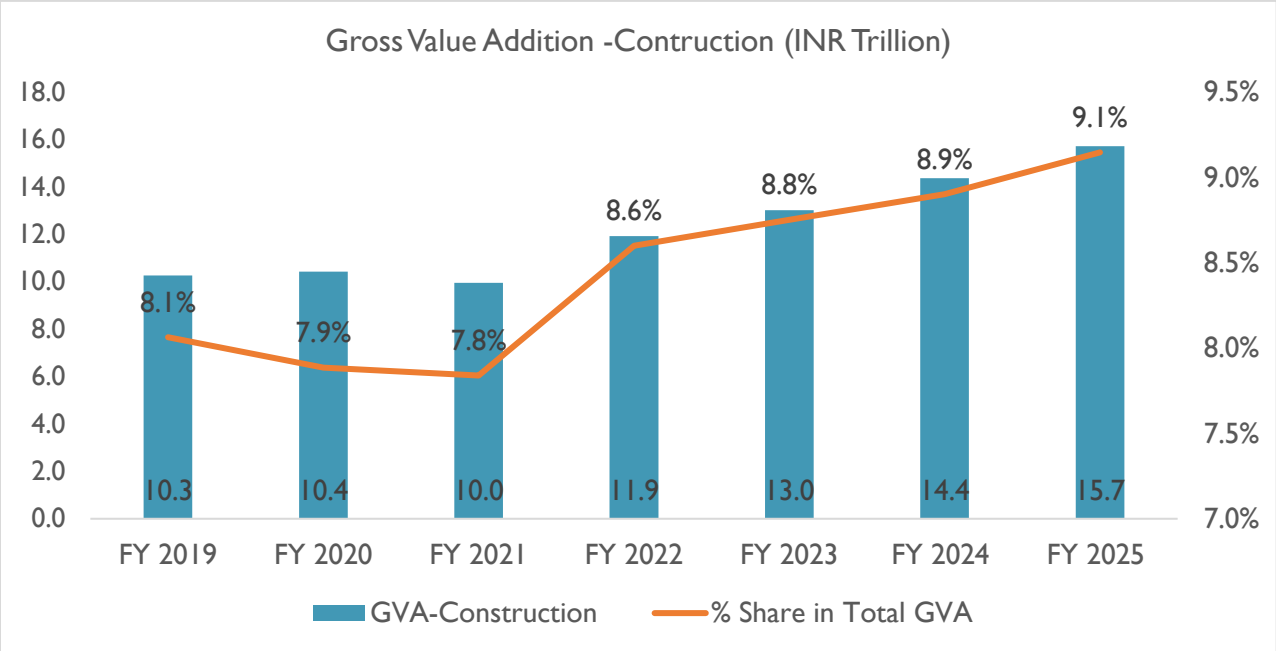
The Bharatmala Pariyojana initiative complements Gati Shakti by focusing specifically on developing a world-class highway network spanning over 83,000 kilometers. This ambitious project comprises several expressways, ring roads, and economic corridors, aiming to improve connectivity, boost regional development, and facilitate trade. The booming construction industry is a significant job creator, directly employing millions of workers across various disciplines like engineering, construction, architecture, and skilled labor. Additionally, the sector indirectly supports numerous job opportunities in associated

industries like manufacturing, transportation, and logistics

Historical growth trend in construction industry

Contribution to national economy by the construction sector has steady improved over the years, and by FY 2025 it is estimated to account for nearly 9.1% of national Gross Value Added (GVA). In actual terms, the GVA by construction sector reached approximately INR 15.6 trillion in FY 2025.

This positive development is based on increased government spending on infrastructure as well as faster than expected demand growth in the real estate sector. The housing sector especially is seeing stable demand, on the back of low loan rates, deductions in stamp duty announced by several state Governments as well as drop in property price volatility.



Source: Ministry of Statistics & Programme Implementation (base year 2011-12)

The government has identified infrastructure as a priority sector to bolster GDP growth. Various reforms have been introduced from time to time to attract investment in infrastructure. Infrastructure sector was opened to private participation post-liberalization in 1991 and currently up to 100% FDI under automatic route is allowed in most sectors/activities.

Also, 100% FDI under automatic route is allowed in construction-development projects which would include development of townships, construction of residential/commercial premises, roads or bridges, hotels, resorts, hospitals, educational institutions, recreational facilities, city and regional level infrastructure, townships. India has steadily emerged as a safe and attractive destination for foreign investment over the past decade. The construction development segment comprising townships, housing, built-up infrastructure, and

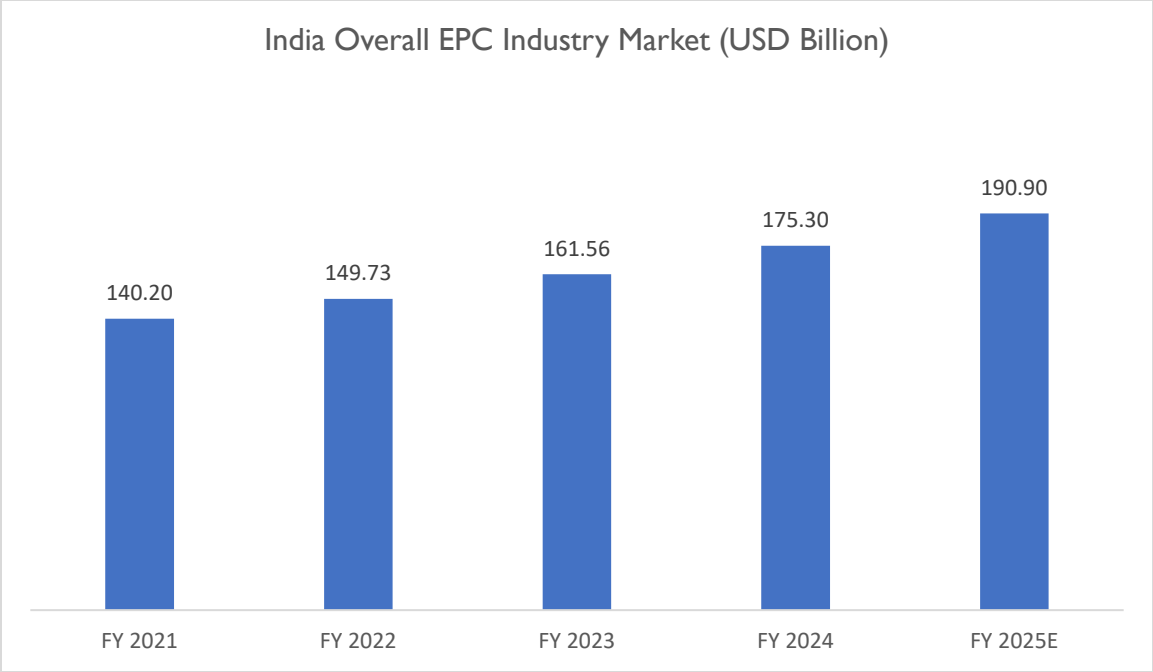
other construction-development projects has become a significant contributor, ranking as the seventh-largest recipient of FDI.

Sectors	Amount in INR Crores	FY 2023	FY 2024	FY 2025	Cumulative Equity Inflow * (April 2000-March, 2025)	%age out of total FDI Equity inflow
Construction (Infrastructure) Activities	Rupees Crores	13,588	35,076	18,962	2,58,516	5%
Construction Development: Townships, Housing, Built-up Infrastructure And Construction-development Projects	Rupees Crores	1,196	2,113	4,503	1,35,824	4%

Sources: Department for Promotion of Industry and Internal Trade

The construction sector, specifically infrastructure activities, has shown a notable growth trajectory in foreign direct investment (FDI) inflows. In FY 2023, the construction (infrastructure) activities sector attracted approximately INR 13,588 crore, which increased significantly to INR 35,076 crore in FY 2024. For FY 2025 (up to March), the sector continued to see inflows of approximately INR 18,962 crore. Cumulatively, from April 2000 to March 2025, the sector has attracted a substantial equity inflow of INR 2,58,516 crore, representing 5% of the total FDI equity inflow.

Similarly, the construction development sector, which includes townships, housing, built-up infrastructure, and other construction-development projects, also recorded strong FDI inflows. This sector saw an inflow of approximately INR 1,196 crore in FY 2023, which grew to approximately INR 2,113 crore in FY 2024. For FY 2025 (up to March), this sector attracted approximately INR 4,503 crore. Over the cumulative period from April 2000 to March 2025, the construction development sector has received a significant equity inflow of INR 1,35,824 crore, making up 4% of the total FDI equity inflow.



Source- Dun & Bradstreet Primary Research

The Indian government's ambitious National Infrastructure Pipeline and PM Gati Shakti program two of the flagship government programs that would herald the next phase of growth in infrastructure development in India. Both the flagship policies outline ambitious programs that entails investments of billons of dollar, and construction projects of the scale that has never been attempted before. Apart from the mega projects, the focus on improving coordination between implementing agencies and steps to remove project delays are also noteworthy. Together, these two flagship policies provide favorable demand scenario for the EPC services in India. The Indian EPC industry has seen steady growth over the years, with a market size increasing from USD140.20 billion in 2021 to USD175.30 billion in 2024, reflecting a CAGR of 7.7%. Going ahead, the over EPC Industry is expected to touch USD 190.9 billion in FY 2025.

Key Demand Drivers

Economic Factors

Rising Domestic Consumption: The growth of India's middle class, which is expected to reach 580 million by 2025, is significantly driving domestic consumption. With rising disposable incomes, there is an increasing demand for a variety of consumer goods, compelling manufacturers to enhance their production capabilities. As a result, businesses are investing heavily in new factories and industrial facilities to meet this demand. This

trend is not only boosting domestic manufacturing but also necessitating substantial industrial construction projects across the country to accommodate increased production needs.

Export Potential: India's youthful demographic, with over 65% of its population under the age of 35, provides a distinct advantage in the global market. This demographic is increasingly skilled and cost-competitive, attracting foreign manufacturers looking to diversify their supply chains. The surge in foreign direct investment (FDI) has been notable, with inflows rising from USD 45.15 billion in FY 2015 to a record high of USD 81.04[1] billion in FY 2025. This influx drives the establishment of new production facilities and logistics hubs, creating a growing demand for industrial construction as companies seek to tap into both domestic and international markets.

Globalization and Trade Agreements: India's involvement in 13 free trade agreements (FTAs) and ongoing negotiations with countries like the U.K., Canada, and the European Union underscores its commitment to enhancing trade opportunities. These agreements facilitate smoother access to global markets, prompting local manufacturers to increase production capabilities. As companies scale their operations to leverage these trade opportunities, the demand for robust industrial infrastructure including manufacturing plants and logistics facilities grows significantly, further stimulating industrial construction activity.

Technological Advancements: The integration of advanced technologies, including automation and Industry 4.0 initiatives, is revolutionizing India's manufacturing landscape. As companies increasingly adopt these technologies to enhance production efficiency, there is a pressing need for modern production facilities that can support sophisticated processes. This shift necessitates substantial investments in upgrading existing infrastructure and developing new industrial spaces, thereby driving demand for specialized industrial construction projects that cater to the needs of high-tech manufacturing operations.

Government Initiatives

Make in India: The "Make in India" initiative aims to transform India into a global manufacturing hub by promoting domestic production across 25 key sectors, including textiles, chemicals, and electronics. By providing incentives such as tax breaks and streamlined regulatory processes, the program has attracted significant investment and increased manufacturing output. This initiative has created substantial demand for industrial infrastructure, as companies seek to establish or expand manufacturing units to take advantage of these benefits, thus fueling industrial construction projects nationwide.

[1] Department for Promotion of Industry and Internal Trade

Production Linked Incentive Scheme (PLI): The Production Linked Incentive Scheme represents a strategic commitment by the Indian government, with an outlay of INR 1.97 trillion[2] (over USD 26 billion) announced in the Union Budget FY 2026 for 14 key manufacturing sectors. This financial support incentivizes companies to increase production levels, particularly in sectors like electronics, pharmaceuticals, and automobiles. By attracting global players and stimulating domestic production, the PLI scheme significantly drives the demand for industrial construction, as businesses invest in building or upgrading manufacturing facilities to qualify for these incentives.

Infrastructure Development: The Indian government's massive investments in infrastructure, including highways, ports, railways, and power grids, create an enabling environment for industrial growth. Improved logistics and connectivity enhance the operational efficiency of industrial zones, making them more attractive to businesses. As these infrastructure developments progress, they lead to increased demand for new manufacturing units and warehouses, driving a corresponding rise in industrial construction activities that support these enhanced capabilities.

Skill Development Programs: Initiatives like "Skill India" and "Make in India Skill Development Centers" are crucial for addressing skill gaps in the workforce. These programs aim to train millions of individuals in various technical skills necessary for modern manufacturing processes. By ensuring a steady supply of skilled labor, these initiatives facilitate the establishment of new industrial units, which, in turn, generates increased demand for industrial construction to accommodate the growth of these facilities and ensure they are staffed with qualified personnel.

Business-Friendly Reforms: The Indian government has implemented numerous reforms since 2014 aimed at simplifying regulations and reducing bureaucratic hurdles, making it easier for companies to establish and operate in India. The ease of doing business has improved significantly, as evidenced by India's rise in the World Bank's Ease of Doing Business rankings. This pro-business environment attracts both domestic and international investments, leading to an increase in industrial infrastructure projects as firms seek to capitalize on favorable conditions for growth.

Access to Free Trade Agreements: India's strategic engagement in free trade agreements (FTAs) not only enhances its trade opportunities but also positions the country as an attractive destination for global manufacturers. The signing of 13 FTAs and ongoing negotiations signal a commitment to improving market access for businesses. As companies look to establish production bases in India to leverage these trade benefits, the demand for industrial construction rises to create the necessary facilities for manufacturing and

[2] Ministry of Commerce and Industry

logistics. This trend aligns with India's broader economic goals of boosting manufacturing capabilities and increasing exports, making industrial construction a vital component of its economic strategy.

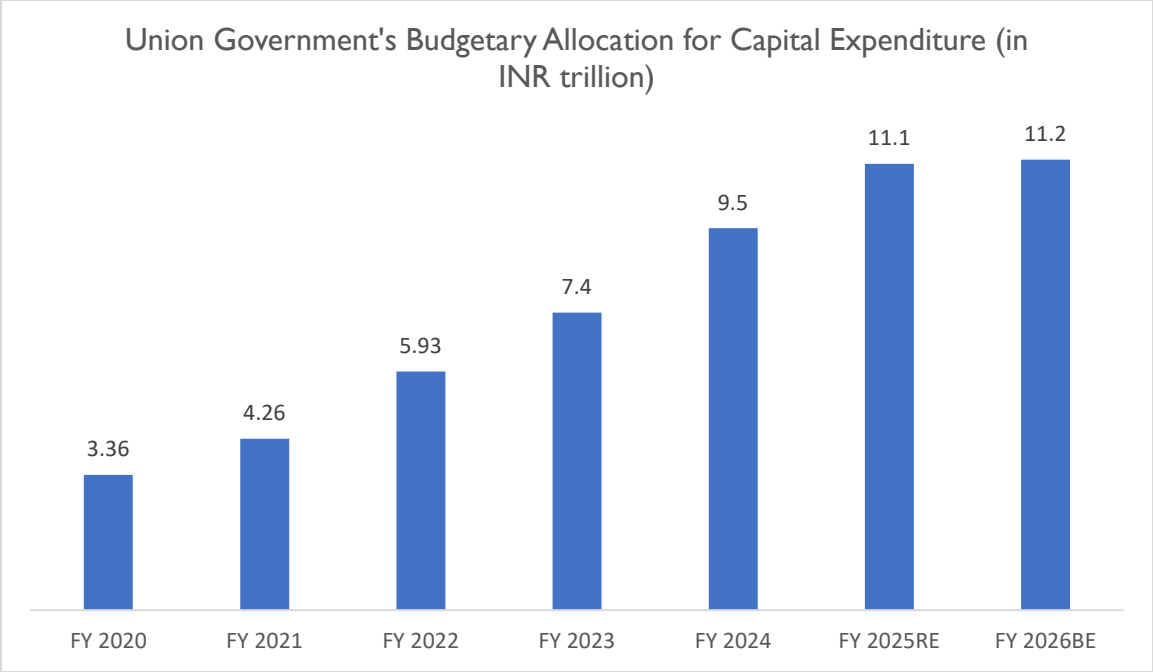
Regulatory Landscape

The government has identified infrastructure as a priority sector to bolster GDP growth. Various reforms have been introduced from time to time to attract investment in infrastructure. Infrastructure sector was opened to private participation post-liberalization in 1991 and currently up to 100% FDI under automatic route is allowed in most sectors/activities. Under this route, no permission from the Central Government is required for FDI inflow, but the same is subject to applicable laws/regulations, security and other conditions. However, participation was low due to high upfront capital investment, long gestation period, and uncertain returns in investment. Public Private Partnership (PPP) project mode was introduced to circumvent this hurdle. The government continued thrust on infrastructure expansion is evident from rising budgetary allocation towards infrastructure.

Government Budgetary Allocation to Infrastructure Sector

Growing infrastructure spending is vital for overall infrastructure development as it has a multiplier effect on overall economic growth. By allocating substantial funds to the development of roads, railways, airports, and urban infrastructure, the government stimulates economic growth and improves public facilities. This investment not only enhances connectivity and logistics but also creates a ripple effect, driving demand for EPC services.

Large-scale projects such as highway expansions, and smart city initiatives necessitate the expertise of EPC companies, fostering innovation and efficiency in project execution. Consequently, the government's focus on capex not only accelerates infrastructure development but also opens a plethora of opportunities for the EPC sector, contributing to job creation, technological advancements, and overall economic development. Consequently, the government with stepped up public spending over the last few years has been providing support to the sector.



Union Budget, Government of India

Multiple flagship scheme focussing the development of infrastructure construction creates immense opportunities for EPC segments. These are discussed below:

National Infrastructure Pipeline (NIP)

If India is to become a USD 5 Trillion economy by 2028, as well as continue it strong economic growth, the country will have to spend close to USD 4.5 trillion on infrastructure construction by 2030. National Infrastructure Pipeline is the consolidated platform that captures the multiple infrastructure investment projects planned by the Government to propel Indian economy to USD 5 trillion mark.

In Union Budget 2019-20, the government announced to invest INR 100 trillion in infrastructure over the next five years. The National Infrastructure Pipeline aims to improve the ease of living for its citizen. National Infrastructure Pipeline will include projects in various sectors such as housing, safe drinking water, access to clean and affordable energy, world-class educational institutes, healthcare for all, modern railway stations, airports, bus terminals, metro and railway transportation, logistics and warehousing, irrigation projects, etc. These projects are classified as per their size and stage of development.

The National Infrastructure Pipeline (NIP) was launched with 6835 projects envisaging investment worth INR 103 trillion in December 2019. The project pipeline has now comprised of nearly 9,736 projects which is together worth nearly USD 1.82 billion covering 56 diverse industry segments. Of this nearly 2,014 projects are under various stages of development. With NIP spanning FY 2019 – 25 period, the remaining projects

are expected to be developed in the next couple of years. This points to a flurry of infrastructure construction activity in the country, which in turn would create numerous opportunities for the EPC segment.

PM Gati Shakti

PM Gati Shakti plan – National Master Plant for Multi Modal Connectivity – launched in October 2021 is a digital platform that is aimed at improving the coordination among multiple ministries and departments involved in infrastructure development in the country. The program covers all the infrastructure initiatives outlined under Bharatmala & Sagarmala initiatives, port development, dedicated freight corridor program of railways as well as development of special economic zones.

India Infrastructure Project Development Fund Scheme (IIPDF Scheme)

The Department of Economic Affairs (DEA) introduced the India Infrastructure Project Development Fund (IIPDF) Scheme on November 3, 2022, to enhance infrastructure development through Public-Private Partnerships (PPPs). This scheme aims to improve the quality and speed of infrastructure projects by encouraging private sector participation. The DEA focuses on creating a conducive policy framework for private investment in infrastructure.

The IIPDF Scheme provides financial support to Project Sponsoring Authorities (PSAs) at both Central and State Government levels, covering expenses for transaction advisors and consultants in PPP project development. This funding ensures the development of viable and bankable PPP projects, promoting modern infrastructure across the country. Complementing the IIPDF Scheme is the Viability Gap Funding (VGF) Scheme, which supports economically justified but commercially unviable PPP projects. Together, these schemes facilitate the development of quality infrastructure projects, enhancing efficiency and private capital infusion.

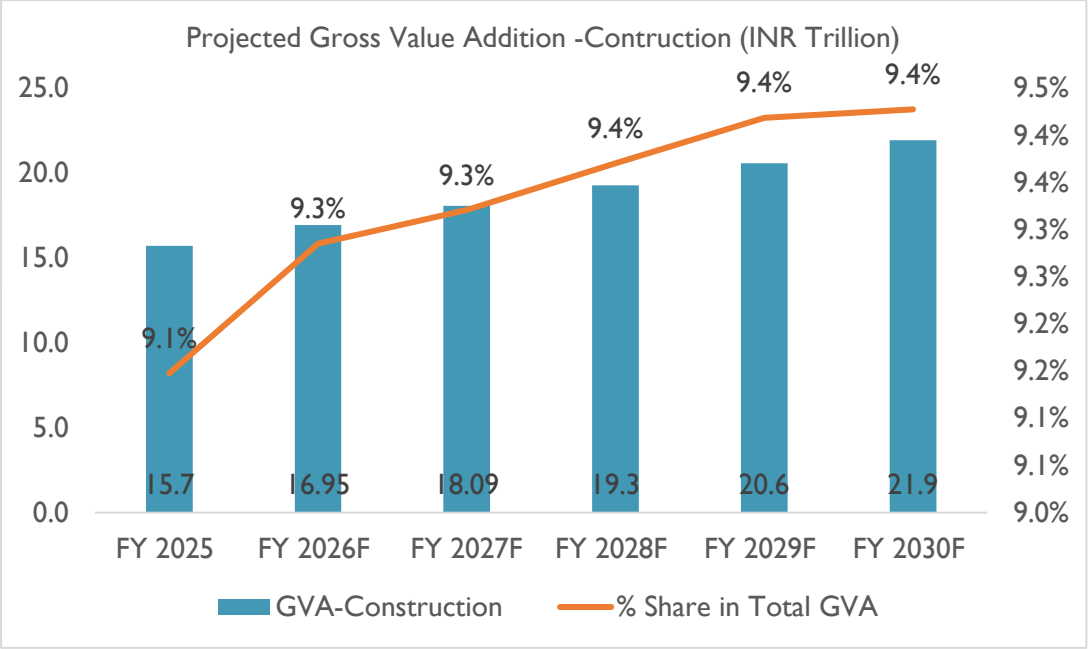
The DEA's initiatives streamline the procurement of advisory services, addressing delays and suboptimal structuring of PPP projects. By providing necessary funding and technical support, these schemes boost the EPC sector, fostering innovation, efficiency, and sustainable infrastructure growth in India.

National Infrastructure Pipeline and PM Gati Shatkti program two of the flagship government programs that would herald the next phase of growth in infrastructure development in India. Both the flagship policies outline ambitious programs that entails investments of billons of dollar, and construction projects of the scale that has never been attempted before. Apart from the mega projects, the focus on improving coordination between implementing agencies and steps to remove project delays are also noteworthy. Together these two flagship policies provide favourable demand scenario for the stainless-steel consumption in infrastructure construction segment.

Growth Outlook

As the Indian economy expands, people have more money to spend, driving demand for new homes, office spaces, and retail outlets. This fuels construction activity across various segments. A robust economy attracts domestic and foreign investments in infrastructure projects like power plants, transportation networks, and industrial parks. This translates into significant construction contracts and boosts the industry. Growth in sectors like IT, e-commerce, and manufacturing creates a need for specialized commercial spaces, warehouses, and production facilities, further stimulating construction.

Consequently, India's construction market is expected to be the second largest globally by 2030, with construction sector GVA expected to grow to INR 21.9 trillion, projected to grow at 6.9% CAGR between FY 2025-30. Separately, projections by the United Nations indicate that India's population will reach 1.64 Bn by 2047, with 51% living in urban centres. A growing young population migrating to cities creates a demand for new housing units, student accommodation, and rental properties. This puts pressure on existing infrastructure and necessitates construction of new schools, hospitals, and public transportation systems. Thus, acknowledging the fact that good infrastructure is critical to support overall economic growth, infrastructure remains a thrust area for the government. The Government plans to develop smart cities with improved infrastructure, sustainable living spaces, and efficient waste management systems. The construction sector is set to witness a robust growth, driven by higher budgetary allocation on infrastructure on yearly basis and flagship infrastructure projects like NIP, PM Gati Shakti, Smart Cities, Swachh Bharat Mission, and metro rail expansions.



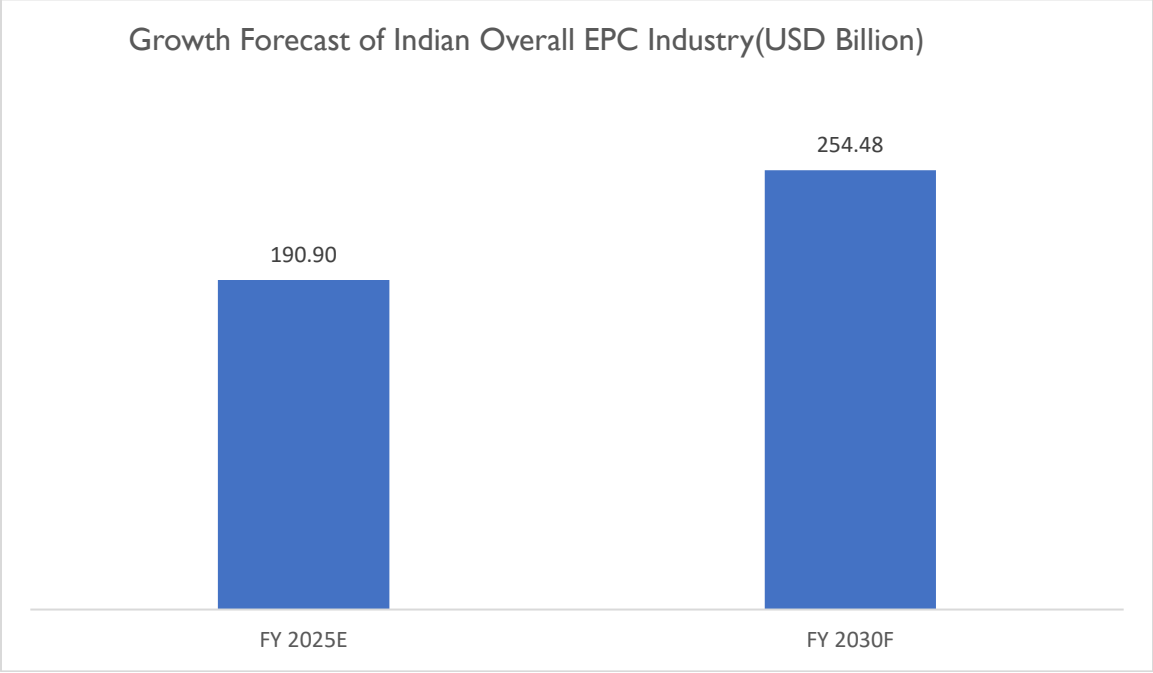
Sources CMIE Economic Outlook

Additionally, the Government initiatives like Pradhan Mantri Awas Yojana (PMAY) incentivize the construction of affordable housing units for low-income families. This creates a new segment of demand and promotes inclusive growth in the industry.

On policy side, the government is streamlining regulations and processes to make it easier for companies to invest in construction projects. Efforts to simplify environmental clearances and land acquisition are expected to overcome previous delays. This fosters a more business-friendly environment and attracts new players to the sector.

The downside risk to sector includes slowed credit flow from banks and rupee depreciation affecting costs. Nevertheless, the sector's long-term prospects remain strong, supported by government initiatives such as the National Infrastructure Pipeline and PM Gati Shakti project, which will boost construction activity.

With consistent projected growth in construction sector, EPC growth prospects in the country remains intact. India's overall EPC industry is projected to increase at CAGR of 6% reach USD 254.48 billion in 2030 from 190.9 billion in 2025E. The Indian construction sectors offer promising opportunities for EPC (Engineering, Procurement, and Construction) players, driven by rapid industrialization, urbanization, and increasing government spending.

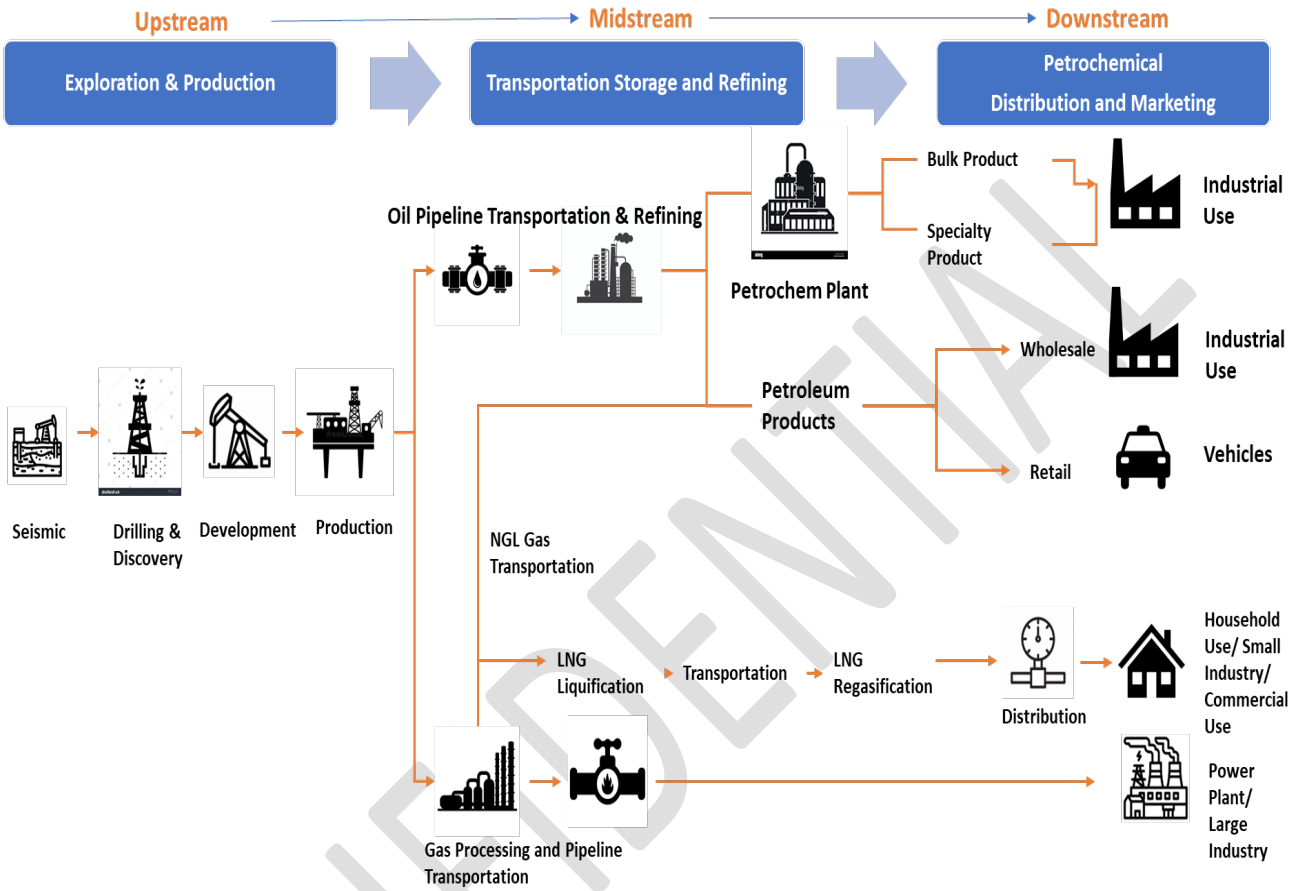


Source- Dun & Bradstreet Primary Research

The Engineering, Procurement, and Construction (EPC) model is revolutionizing India's construction industry by streamlining project delivery and enhancing efficiency. By consolidating design, procurement, and construction under a single contract, EPC contracts reduce complexity and improve coordination, leading to cost control and timely project completion. This approach has accelerated infrastructure development, particularly in projects like highways and power plants, and attracted foreign investment, fostering modernization and global competitiveness. The adoption of advanced technologies such as BIM, IoT, and AI, alongside government initiatives like the National Infrastructure Pipeline and renewable energy targets, further supports growth. However, challenges including regulatory hurdles, and a skilled labour shortage remain, necessitating ongoing adjustments to fully leverage the benefits of the EPC model. Overall, the EPC model is poised to significantly impact India's construction sector, driving efficiency and innovation while contributing to the country's infrastructure goals.

Focus Segment: Oil & Gas

Oil & Gas Value Chain in India



Upstream

Oil & Gas Exploration: Involves searching for crude oil reservesthrough geological surveys, seismic studies, and exploration drilling. Key players include ONGC (Oil and Natural Gas Corporation) and Oil India Ltd. Similar to oil exploration, natural gas exploration includes offshore and onshore drilling to locate gas reserves

Drilling is a crucial phase in oil and gas exploration and production. Exploratory drilling involves drilling wells to confirm the presence and assess the quantity and quality of hydrocarbons. Once reserves are confirmed, development drilling takes place to maximize extraction from the field by drilling additional wells.

Production involves extracting hydrocarbons from the ground. This phase includes well completion, which prepares the well for production after drilling. To maximize recovery rates throughout the well's life, various production optimization techniques are employed, including enhanced oil recovery methods.

Midstream

Transportation: Midstream companies are responsible for transporting crude oil and natural gas from production sites to refineries or processing plants. Pipelines are the most common mode for long-distance transportation due to their efficiency and cost-effectiveness. Rail and trucking are used for shorter distances or where pipeline infrastructure is limited, while barges and tanker ships are employed for transportation across waterways.

Storage: Midstream operations include the construction and management of storage facilities such as tanks and terminals.

Downstream

The downstream sector encompasses all activities following the extraction of crude oil and natural gas. Key activities include refining crude oil into various products, transporting them to storage and retail outlets, and finally, marketing these products to consumers through diverse channels.

Oil & Gas Pipeline

Talking about oil & gas industry, India is currently the 3rd largest energy and oil consumer in the world, after China and US. According to IEA's report under the stated policy scenario, India's oil consumption is projected to rise significantly by 50% by 2030, compared to a global demand increase of only 7%. India's oil consumption is expected to grow from 4.8 million barrels per day (mbd) in 2019 to 6.7 mbd in 2030. For natural gas, the country's consumption is projected to double from 64 billion cubic meters (BCM) in 2019 to 115 BCM in 2030. India's oil consumption grew to 5.4 mbd while natural gas consumption stood at 60 BCM at the end of 2023.

As of April 2025, India holds the position of the fourth-largest refining capacity globally, following the United States, China, and Russia. The country's total refining capacity stands at 258 million metric tons per annum (MMTPA), with a daily refining capacity of 5 million barrels. Indian Oil Corporation (IOC), a leading Indian refiner, has indicated that the country needs to add 2 million barrels per day to its refining capacity by 2030 to support its economic expansion.

	Crude Oil Average price (India basket) USD/bbl.	Total Imports (MMT)	Domestic Production (MMT)	Total	% share of Imports	% share of Domestic Production
2019-20	60.47	226.95	32.2	259.15	87.57%	12.43%
2020-21	44.82	196.46	30.5	226.96	86.56%	13.44%
2021-22	79.18	212.38	29.7	242.08	87.73%	12.27%
2022-23	93.15	232.70	29.2	261.90	88.85%	11.15%
2023-24	82.58	234.26	29.4	263.66	88.85%	11.15%
2024-25	78.56	243.22	28.7	271.92	89.45%	10.55%

Source: Petroleum Planning & Analysis Cell

In April 2025, India's crude oil imports reached 243.2 million metric tonnes, driven by rising domestic demand and export opportunities. This represented a 3.8% year-over-year increase. The total import bill for crude oil and petroleum products in FY25 rose to USD 161 billion, up from USD 156.3 billion in FY24. As per sources, Indian refiners, including major players like Reliance Industries and Nayara Energy (backed by Rosneft), are expected to boost their imports of Russian crude oil by 10–20% starting in August. This means an increase of around 150,000 to 300,000 barrels per day.

Such high import dependency renders the country's economy vulnerable to international crude oil market dynamics. Consequently, to insulate the domestic economy from external shocks and conserve forex

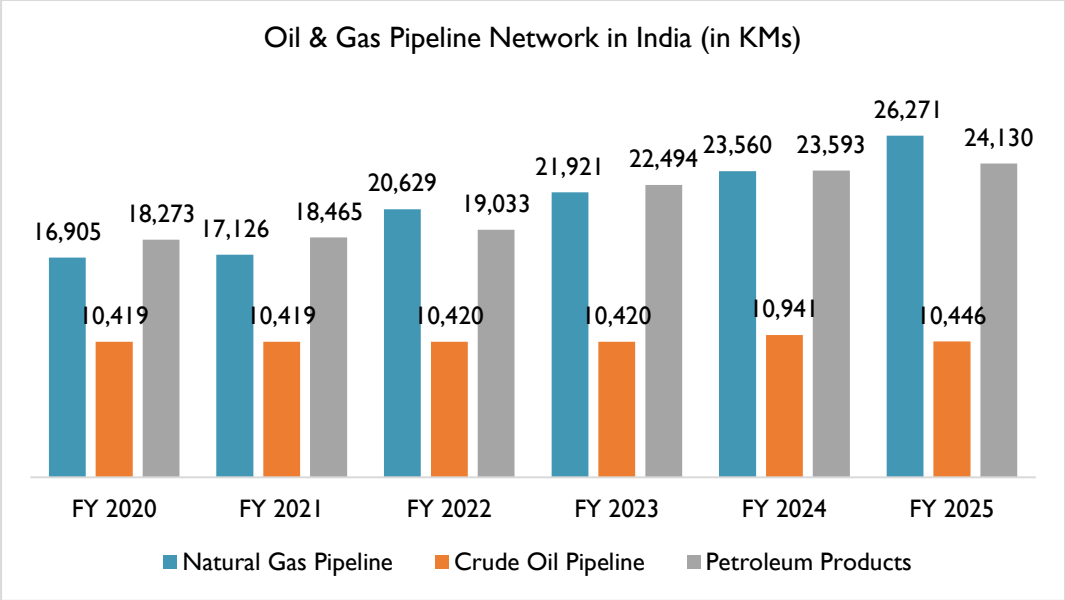
reserves, the government is working towards increasing domestic E&P (Exploration & Production), to reduce import gradually. The government envisages to cut India's oil import dependence by 50% by 2030.

Oil & Gas pipeline network in India[3]

Pipelines are essential for transporting oil, gas, and water across India, offering safe, reliable, and cost-effective transport compared to road and rail. They ensure a continuous supply of resources to refineries, industries, and power plants, aiding in uninterrupted production and electricity generation. Pipelines have lower maintenance needs and energy consumption, leading to reduced transportation costs and economic benefits. Environmentally, pipelines cause less pollution and land use compared to other transport modes, supporting India's sustainability goals. They can transport large volumes of resources efficiently, crucial for meeting industrial and consumer demands, and help conserve resources by minimizing leakages and ensuring timely supply. Expanding and modernizing the pipeline network can enhance these benefits, making it a critical part of India's infrastructure.

Pipelines play a crucial role in maintaining the supply chain for crude oil, petroleum products, and gas in the country. Onshore cross-country pipelines are buried underground at a depth of approximately 1.5 meters within a corridor spanning about 18 meters, operating at elevated pressures. As of March 31, 2025, the total length of the crude oil pipeline network in India is 10,446 kilometers, boasting a capacity of 153.1 million metric tons per annum (MMTPA). During FY 2024- 25, the utilization of crude oil pipelines stands at 66.5%. Product pipelines, inclusive of LPG, form a comprehensive network spanning 24130 kilometers with a capacity of 145.8 MMTPA. During FY 2024-25, the utilization of product pipelines reached 71.1%, an increase from 68.9% in FY 2023-24.

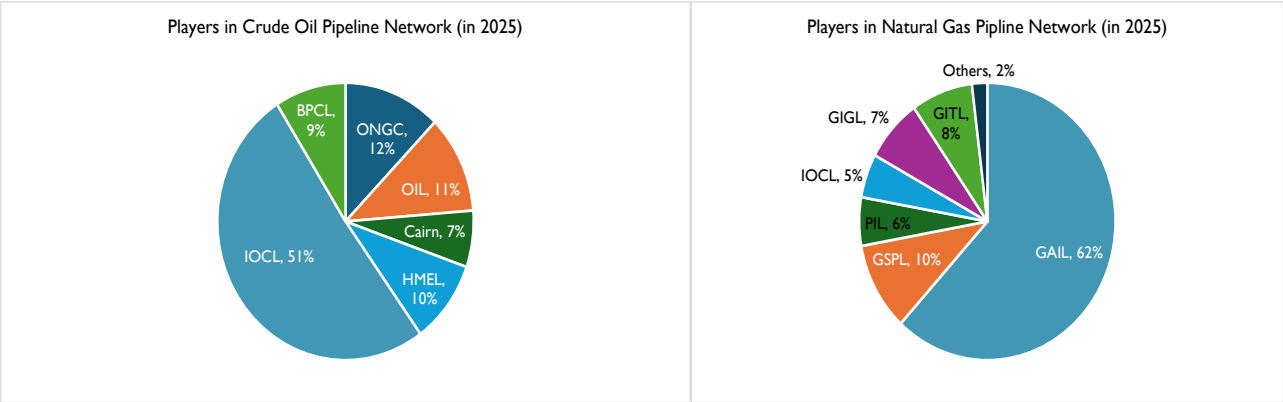
[3] Ministry of Petroleum & Natural Gas



Source: Petroleum Planning & Analysis Cell

The Indian government has undertaken key projects to expand this network, including the Pradhan Mantri Urja Ganga Project, which aims to develop the natural gas infrastructure in eastern India, and the North-East Gas Grid, which seeks to integrate the northeastern states with the national gas grid. The broader National Gas Grid initiative aims to create a unified pipeline network, enhancing the availability of natural gas nationwide and promoting cleaner energy usage.

Despite their advantages, India's pipeline networks face challenges. Frequent leakages due to old, corroded pipelines lead to significant resource loss and environmental damage. Delays in pipeline expansion projects, caused by land acquisition issues, regulatory hurdles, and technical difficulties, result in under-utilization and unmet infrastructure needs. Security threats, including pipeline theft, sabotage, and vandalism, disrupt supplies and increase operational costs. Safety measures are often inadequate, lacking advanced leak detection systems and emergency response infrastructure, which heightens the risk of incidents. Addressing these challenges is crucial to maximizing the effectiveness and reliability of India's pipeline network.



Source: Petroleum Planning & Analysis Cell

The oil & gas pipeline network players reveal a concentrated market structure in India's oil and gas pipeline sectors. In crude oil pipelines, Indian Oil Corporation Limited (IOCL) dominates with over half the market share, while companies like Oil and Natural Gas Corporation (ONGC) and Oil India Limited (OIL) hold significant stakes. The natural gas pipeline network is heavily controlled by Gas Authority of India Limited (GAIL), which holds about two-thirds of the market share. Other players like Gujarat State Petronet Limited (GSPL) and Petronet LNG Limited (PIL) have smaller but notable presences. This concentration suggests a mature industry with established infrastructure, though some diversity among operators remains in both sectors.

Prospects for India's oil and gas pipeline network are promising, driven by increasing energy demand, supportive government policies, and the push for cleaner energy sources. The expansion of this network is expected to improve energy security, reduce transportation costs, and support the country's transition to a more sustainable energy mix. Continuous investments and technological advancements will further enhance the efficiency and reliability of India's oil and gas transportation infrastructure, contributing significantly to the nation's energy sector growth and development.

Demand drivers

Growing Demand[4]

The projected increase in India's oil demand from 5.4 million barrels per day (bpd) in 2023 to 6.7 million bpd by 2030, driven by a rise in road transport fuel demand (with diesel increasing by 520,000 bpd and gasoline by 270,000 bpd), economic and industrial growth, and the expansion of refining capacity by one million bpd, necessitates the expansion of the oil and gas pipeline infrastructure. Despite an increase in domestic refining

[4] IEA report, Indian Oil Market Outlook to 2030

capacity to 6.8 million bpd, India's import needs are expected to rise to 5.6 million bpd by 2030. This increased demand for oil underscores the need for a robust pipeline network to ensure efficient transportation, distribution, and strategic energy security.

Government Initiatives and Policies

The Indian government has implemented several policies and initiatives aimed at boosting the oil and gas pipeline infrastructure. Programs like the National Gas Grid and the Pradhan Mantri Urja Ganga Project aim to create a comprehensive network of pipelines across the country. These initiatives are designed to improve energy access, reduce regional disparities, and promote the use of cleaner energy sources. The government has also permitted 100% FDI under the automatic route for oil and gas PSUs and is implementing policy support and pricing reforms to attract investments in the upstream and midstream gas sectors. Additionally, regulatory reforms are being introduced to ensure fair and transparent access to pipeline infrastructure.

Economic Growth and Industrialization

India's rapid economic growth and ongoing industrialization have significantly increased the demand for energy. Industries, power plants, and residential consumers are driving the need for a robust pipeline infrastructure to ensure a consistent and efficient supply of oil and natural gas. This growth necessitates expanding the pipeline network to meet rising energy demands.

Shift Towards Cleaner Energy

As part of its commitment to reducing carbon emissions and combating climate change, India is transitioning towards cleaner energy sources. Natural gas, being a cleaner alternative to coal and oil, is becoming increasingly important in the country's energy mix. Expanding the natural gas pipeline infrastructure is crucial to facilitate this shift and provide a reliable supply of cleaner fuel.

Technological Advancements

Advancements in pipeline technology have made it more feasible to construct and operate extensive pipeline networks. Improvements in materials, construction techniques, and monitoring systems have enhanced the safety, efficiency, and cost-effectiveness of pipelines. These technological developments are driving the expansion of the pipeline infrastructure in India.

Strategic Importance and Energy Security

Enhancing energy security is a key priority for India. Diversifying supply sources and routes through an extensive pipeline network reduces dependency on road and rail transport, which is less efficient and more susceptible to disruptions. A well-developed pipeline network ensures a stable and secure supply of energy, crucial for the country's economic stability and growth.

Environmental Regulations and Sustainability Goals

Stringent environmental regulations and sustainability goals are pushing India towards the adoption of cleaner energy practices. Expanding the natural gas pipeline network helps reduce the carbon footprint associated with energy consumption. This expansion supports the country's environmental objectives and aligns with global sustainability trends.

Investment and Public-Private Partnerships

Increased investment from both the public and private sectors is fueling the growth of pipeline infrastructure. Public-private partnerships (PPPs) are playing a significant role in financing and executing large-scale pipeline projects. These collaborations bring in the necessary capital, expertise, and technology to expand the pipeline network efficiently.

Urbanization and Residential Demand

Urbanization in India is leading to higher residential demand for natural gas, particularly for cooking and heating purposes. Expanding the pipeline network to urban and peri-urban areas ensures that households have access to a consistent and reliable supply of natural gas, improving living standards and reducing reliance on traditional fuels like LPG and kerosene.

Expansion of Pipeline Network

Several pipeline projects are under construction to enhance transportation infrastructure. These include:

Mundra Panipat Crude Oil Pipeline

- A 1,033 km long pipeline with a capacity of 17.5 MMTPA from Churwa in Gujarat to Panipat in Haryana. The project cost is Rs. 9,028 Cr.

Ennore – Thiruvallur – Bengaluru – Puducherry – Nagapattinam – Madurai – Tuticorin Natural Gas Pipeline

- A 1,444 km pipeline with a capacity of 35 MMSCMD to supply natural gas to Tamil Nadu, Andhra Pradesh, and Karnataka. The project cost is Rs. 6025 Cr.

Paradip Hyderabad Pipeline Project

- A 1,212 Km pipeline for transporting petroleum products from Paradip to Hyderabad. The project cost is Rs. 3,338 Cr.

Augmentation of Salaya-Mathura Crude Oil Pipeline System

- This augmentation project involves augmenting pumping facilities at 5 locations storage facilities, and delivery facilities at Koyali refinery, all in Gujarat. The project cost is Rs 1614 Cr.

Increase in Petroleum Product Consumption[5]

The rise in petroleum product consumption from 232,561 units in FY 2024 to 238,954 units in FY 2025 highlights a growing demand for oil and gas resources. This increase underscores the need for expanding India's pipeline network to efficiently handle the higher volume of petroleum products. Expanding the pipeline infrastructure will ensure a stable and reliable supply, support economic growth, and enhance resource distribution across the country.

Fuelling Expansion

India's robust economic growth has significantly driven up transportation demand, with road transport being a major contributor. Road vehicles, crucial for personal mobility and freight movement, account for approximately 90% and 70% of these activities, respectively. This strong dependence on road fuels, particularly diesel, is expected to continue as the economy expands. Although car ownership in India has increased eightfold since 2000, it remains relatively low compared to global standards, such as in China. With around 58 million cars on the road in 2023 and projections indicating more than 40% growth in the car fleet by 2030, there is substantial potential for increased oil demand, further fuelling the growth of the oil and gas pipeline network.

Air Travel Potential

[5] Petroleum Planning & Analysis Cell

Currently, jet/kerosene accounts for only 3.4% of Indian oil demand, significantly below the global average. Although air travel demand is relatively low, substantial growth is anticipated, with an average annual increase of 5.9% expected through 2030. This growth reflects the potential for expansion as India progresses towards middle-income status and air travel becomes more accessible.

EPC Services in Oil & Gas

Engineering, Procurement, and Construction (EPC) services play a crucial role in the development and maintenance of oil and gas pipeline infrastructure. These services encompass the entire lifecycle of pipeline projects, from initial planning and design through procurement and construction to final commissioning. The key services in oil & gas pipeline domain include:

Engineering

- Design and Planning: EPC contractors design the pipeline infrastructure, including route selection, pipeline specifications, and integration with existing systems. This involves detailed engineering studies, feasibility assessments, and environmental impact analyses.
- Technical Specifications: Development of technical specifications and design criteria for pipelines, including material selection, stress analysis, and safety standards.
- Project Management: Comprehensive project management services to oversee the planning, execution, and completion of pipeline projects. This includes scheduling, budgeting, and coordination among various stakeholders.

Procurement

- Material Sourcing: Procurement of materials and equipment required for pipeline construction, including pipes, valves, fittings, and construction machinery. EPC firms manage supplier relationships and ensure timely delivery of high-quality materials.
- Contract Management: Handling contracts with suppliers and subcontractors, ensuring that terms and conditions are met and that materials are sourced cost-effectively.

Construction

- Pipeline Installation: On-site construction services, including excavation, trenching, welding, and laying of pipelines. This phase also involves the installation of associated infrastructure such as pump stations, compressor stations, and control systems.

- Testing and Commissioning: Conducting tests to ensure the integrity and safety of the pipeline system, including pressure testing, leak detection, and system calibration. Commissioning involves bringing the pipeline into operation and ensuring it meets all operational requirements.

Maintenance and Upgrades

- Ongoing Maintenance: Providing maintenance services to ensure the continuous and efficient operation of pipelines. This includes regular inspections, repairs, and replacements of worn or damaged components.

- Upgrades and Enhancements: Implementing upgrades to improve pipeline performance, incorporate new technologies, and meet evolving industry standards and regulatory requirements.

EPC services are crucial for the effective development and operation of oil and gas pipelines, ensuring projects are completed on schedule, within budget, and meet quality and safety standards. By utilizing their expertise in engineering, procurement, and construction, EPC firms optimize pipeline infrastructure, improve operational efficiency, and support sector growth. Key industry trends include the integration of advanced technologies such as digital twins, automated welding, and smart sensors to enhance project efficiency and safety, a focus on sustainable practices and regulatory compliance to reduce environmental impact, and innovative procurement and construction techniques aimed at cost reduction and improved project economics. Overall, EPC services are fundamental for maintaining and advancing the efficiency, safety, and reliability of oil and gas pipeline infrastructure.

Capacity Addition in Oil & Gas

India, holding the global rank of the fourth-largest crude oil refiner, is on track to significantly enhance its refining capacity by an additional one million barrels per day (mb/d) over the next five years. According to the International Energy Agency, there would be a substantial increase in India's refining capability from 5.2 mb/d in 2022 to an expected 6.2 mb/d by the year 2028. The Petroleum Planning and Analysis Cell (PPAC) reports that India processed a cumulative 4.85 mb/d of crude oil in the fiscal year 2022, and this figure rose to 5.02 mb/d in the fiscal year 2023. Remarkably, the crude oil processing during the initial two months of fiscal year 2024 reached 5.31 mb/d.

The medium-term growth outlook is notably influenced by Indian expansions, totalling one mb/d. This anticipated surge in capacity is primarily attributed to expansions at existing refining sites, with the notable exception being the Barmer greenfield project, which is expected to come online with a capacity of 180,000 barrels per day. These expansion projects would collectively contribute to India's strategic efforts to boost

its refining capabilities, aligning with the nation's position as a major player in the global crude oil refining landscape.

Regulatory Landscape

Regulatory Framework

India's oil and gas sector is governed by a comprehensive regulatory framework comprising several key laws and regulations:

Oilfields (Regulation and Development) Act, 1948: This act regulates the upstream oil and gas sector, granting the government authority to lease and license petroleum mines, formulate rules for mineral development, and control mining methods. It also empowers the government to appoint officers for mine inspections, examination of personnel in control of mines, and requisition of pertinent documents.

Petroleum and Natural Gas Rules, 1959: Enacted under the Oilfields Act, these rules detail the procedures for granting licenses and leases for onshore and offshore exploration and production.

Mines Act, 1952: Along with the Oil Mines Regulations, 2017, this act provides regulations concerning the health, safety, and welfare of workers in oil mines.

Petroleum and Natural Gas Regulatory Board (PNGRB) Act, 2006: This act established the Petroleum and Natural Gas Regulatory Board (PNGRB), which oversees the refining, processing, storage, transportation, distribution, marketing, and sale of petroleum, petroleum products, and natural gas. The PNGRB is also responsible for addressing complaints and inquiries related to technical standards and regulations within the sector.

The Petroleum and Minerals Pipelines (Acquisition of Right of User in Land) Act, 1962: This act provides for the acquisition of the right of user in land for laying pipelines for the transportation of petroleum and minerals.

The Petroleum Pipelines (Acquisition of Right of User in Land) Act, 2011: This act provides for more stringent punishment to curb incidents of pilferage from and sabotage of pipelines and serves as a deterrent to the emerging security threat to pipeline installations.

Guidelines for Laying Petroleum Product Pipelines, 2002: Notified by the Ministry of Petroleum and Natural Gas (MoPNG), these guidelines lay down the policy for laying pipelines in the country on a common carrier principle.

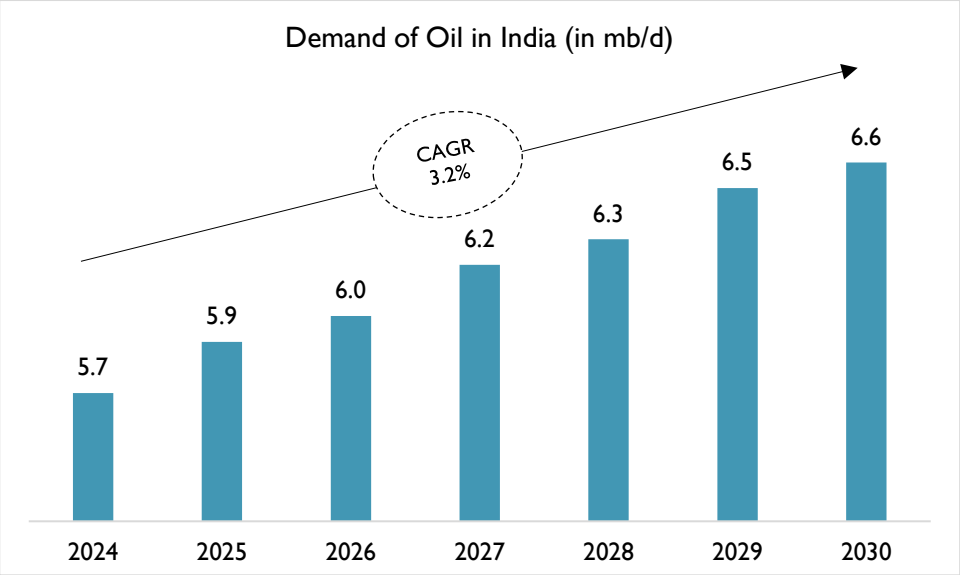
Initiatives to Expand oil & Gas Pipeline Infrastructure

The government has adopted several measures to expand the oil and gas pipeline infrastructure in India, aimed at ensuring energy security and promoting investment:

- **Investor-Friendly and Liberalized Policies**: The government has gradually moved towards investor-friendly and liberalized policies and reforms to push EPC demand in the oil and gas sector.
- **Foreign Direct Investment (FDI)**: Up to 100% FDI is allowed through the automatic route in exploration and production (E&P). The New Exploration Licensing Policy (NELP) allows domestic and foreign private investors to participate under similar fiscal and contract terms.
- **New Exploration Licensing Policy (NELP)**: Opening up the oil sector for private and foreign investment, resulting in 145 hydrocarbon discoveries (53 crude oil and 92 natural gas) under the NELP regime in 48 blocks.
- **Hydrocarbon Exploration Licensing Policy (HELP)**: Approved in March 2016 to double India's oil production and reduce import dependency by 10% by 2022, HELP features a uniform license for conventional and unconventional oil and gas resources, including the Open Acreage Licensing Policy (OALP), revenue sharing model, graded royalty rates, and marketing freedom.
- **Open Acreage Licensing Policy (OALP)**: This policy allows companies to select exploration blocks without waiting for formal bid rounds, ensuring oil and gas acreages are available year-round.
- **Revenue Sharing Model**: Replacing the profit-sharing model, the revenue-sharing model minimizes government interference by focusing on gross revenue from the sale of oil, gas, etc., rather than scrutinizing cost details of private companies.
- **Marketing Freedom**: The policy provides marketing and pricing freedom for new gas production from Deepwater, Ultra Deepwater, and High-Pressure High Temperature Areas, promoting minimal government interference in operations of companies.
- **Northeast Vision 2030**: Envisaging an investment of INR 1,300 billion by 2030 in the hydrocarbon sector in Northeast India, the vision focuses on exploration and production, pipelines, and expanding marketing networks.

Growth Forecast

India is projected to be the largest contributor to global oil demand growth from 2023 to 2030, slightly surpassing China. Driven by robust economic and demographic expansion, India's oil demand is anticipated to rise by nearly 1.2 million barrels per day (mb/d) during this period, accounting for over one-third of the total projected global increase of 3.2 mb/d.



Source: IEA report, Indian Oil Market Outlook to 2030

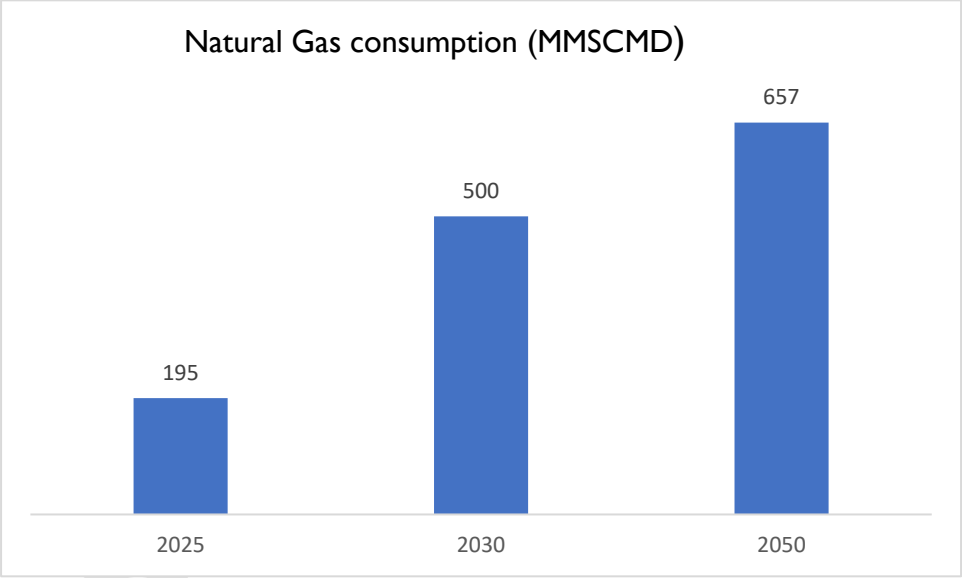
Unlike other major economies, India's demand growth will be more diversified across different product categories. While globally, over 90% of oil demand growth is directed towards petrochemical feedstock, only 18% of India's additional demand will be for this purpose. In contrast, China's net gains are predominantly for chemical production. India's balanced growth profile reflects its dynamic economic development and relatively low per-capita fuel consumption. The rapid advancements in sectors such as manufacturing, commerce, transportation, and agriculture are expected to significantly boost diesel use, with Indian gasoil consumption growth of 540 kb/d contributing to one-sixth of the global oil demand increase between 2023 and 2030. India is set to account for one-third of non-OECD gasoil growth, a stark contrast to the declining usage in OECD countries.

India's accelerated oil consumption is partly due to its stage of economic development, with GDP per capita estimated at USD 2,400 in 2022—significantly lower than China's USD 12,700. Typically, developing countries experience the highest energy demand growth when GDP per capita reaches between USD 2,000 and USD 10,000, due to increased income elasticity.

The rapid growth is also fuelled by the expanding middle class, which is leading to increased demand for energy-intensive goods such as cars and home appliances. India's youthful demographics (median age of 28.7 years) contribute to long-term consumption potential as incomes rise.

Industrialization further boosts oil consumption, with increased domestic consumption driving demand for capital goods and expanding the energy-intensive manufacturing sector. India's growing role as an industrial hub, coupled with governmental efforts to improve infrastructure, supports both industrialization and accelerated oil demand growth.

The Indian government has set an ambitious target to triple the country's natural gas consumption to 500 million metric standard cubic meters per day (MMSCMD) by 2030, up from the current 195 MMSCMD. This initiative is part of a broader strategy to enhance national energy security and drive growth in ancillary industries dependent on natural gas. The plan was highlighted during the 12th City Gas Distribution (CGD) bidding round organized by the Petroleum and Natural Gas Regulatory Board (PNGRB), which marked a significant step towards achieving nationwide coverage under the CGD network.



Source: D&B Desk Research

India's natural gas consumption is projected to more than triple by 2050, rising from 198 million metric standard cubic meters per day (MMSCMD) in 2022 to 657 MMSCMD. This growth, driven largely by increased industrial demand, reflects an annual increase of 4.4%, surpassing China's 2.0% growth rate. To support this, domestic production is expected to nearly triple, and net imports will also rise significantly, from 102

MMSCMD to 485 MMSCMD. The expansion in consumption will be supported by both domestic production and liquefied natural gas (LNG) imports.[6]

As of mid-2025, India has 25,429 km of operational natural gas pipelines out of 34,233 km authorized by the Petroleum and Natural Gas Regulatory Board (PNGRB). The network covers 307 Geographical Areas (GAs) and serves approximately 1.52 crore domestic PNG connections and over 8,154 Compressed Natural Gas (CNG) stations. The expansion of the Northeastern Gas Grid and the Gurdaspur-Jammu Natural Gas Pipeline is set to further enhance the natural gas infrastructure. Recent CGD initiatives are expected to increase PNG and CNG connections and explore innovations such as blending natural gas with hydrogen or compressed biogas.

As India positions itself as a global leader in oil demand and natural gas consumption, the country's ambitious plans for expanding its oil and gas pipeline network mark a pivotal step in reshaping its energy landscape. The government has committed USD 67 billion in investments over the next six years to support the natural gas sector, aiming to stabilize consumer prices and promote natural gas usage across the country. The recent CGD bidding round offered eight Geographical Areas (GAs) across six North Eastern States and the Union Territories of Jammu & Kashmir and Ladakh, covering 103 districts. This round is expected to attract investments of INR. 410 Bn, boosting employment and advancing the CGD network development.

The dynamic evolution of India's pipeline network not only addresses the immediate demands of a burgeoning economy but also prepares the country for future energy needs. By covering nearly 100% of the population and extending to remote and underserved areas, the infrastructure will support increased access to natural gas and contribute to the growth of ancillary industries. This transformation underscores India's commitment to creating a robust, sustainable energy framework that aligns with its economic goals and environmental priorities. As the pipeline network expands, it will play a crucial role in driving both short-term benefits and long-term stability, ensuring that India's energy future is both secure and prosperous.

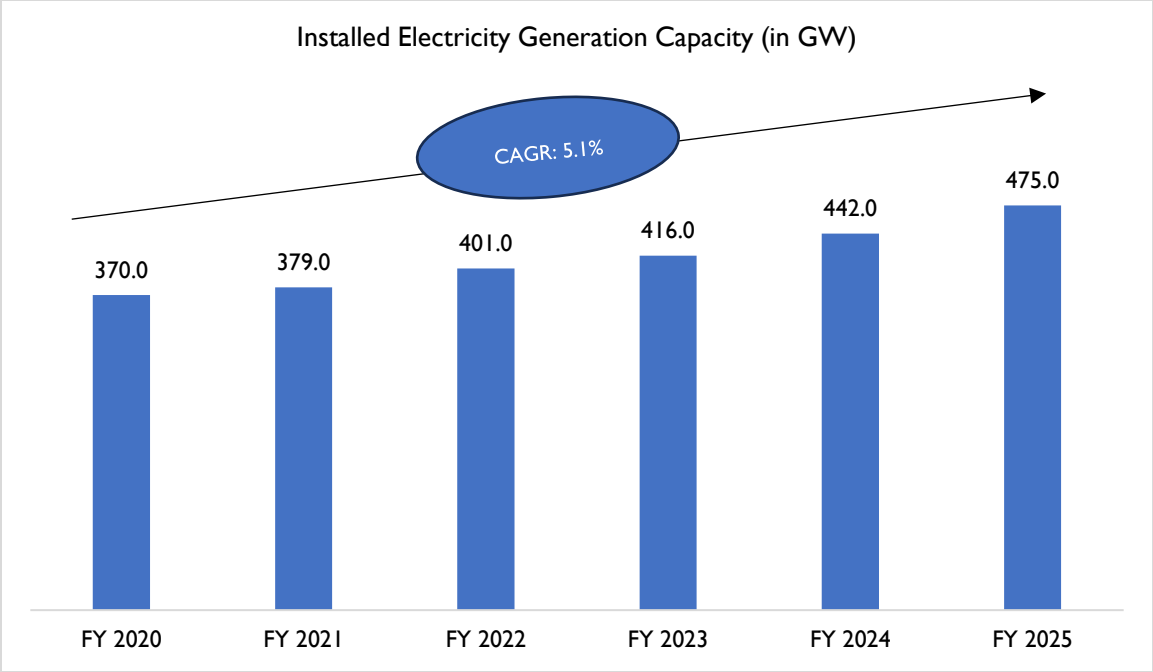
[6] U.S. Energy Information Administration

Power Generation Scenario in India

India's installed electricity generation capacity has shown consistent growth over the past five years, increasing from 370 GW in FY 2020 to m GW in FY 2025. This expansion represents a Compound Annual Growth Rate (CAGR) of 5.1%, underscoring the country's sustained efforts to enhance its power infrastructure in response to rising energy demand. Year-on-year additions have been steady, with capacity rising to 379 GW in FY 2021, 401 GW in FY 2022, and further to 416 GW in FY 2023. This upward trend reflects India's proactive approach to ensuring energy availability for industrial, commercial, and residential sectors.

The acceleration in capacity addition is driven by significant investments in both conventional and renewable energy sources. From 416 GW in FY 2023, the installed capacity reached 442 GW in FY 2024 and further climbed to 475 GW in FY 2025, indicating a strong push toward energy diversification and sustainability. As of June 2025, the total installed generation capacity reached 478 GW. This growth not only supports India's economic expansion but also aligns with national objectives of improving energy access, reducing dependence on imports, and transitioning to a cleaner, more resilient energy system.

The power sector is witnessing a strong shift toward **renewable energy**, with India targeting **500 GW of non-fossil fuel capacity by 2030**. While **coal continues to dominate** electricity generation, contributing nearly **50% of total power output**, the government is focusing on cleaner and more efficient coal-based technologies. Meanwhile, **solar and wind power** are expanding rapidly, backed by policy incentives and private sector investments. The growing adoption of **energy storage solutions, smart grids, and digital infrastructure** is further strengthening the power sector, ensuring grid stability amid rising renewable energy integration.

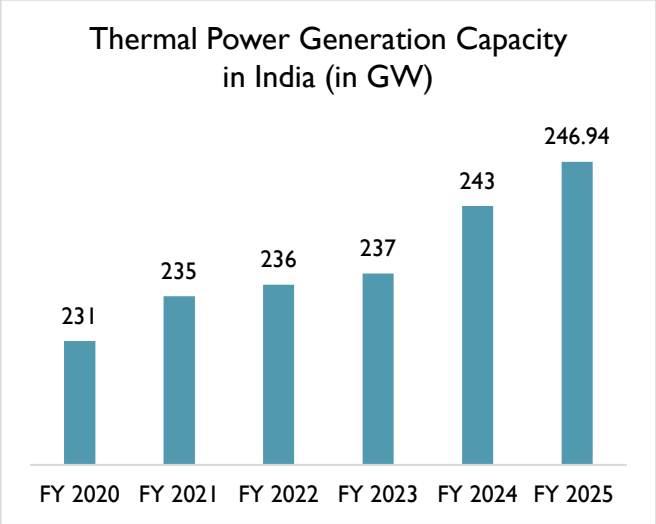


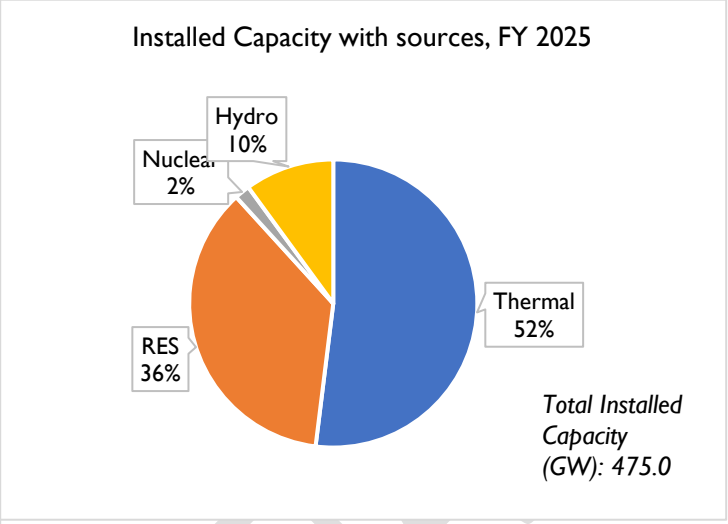
Source: Central Electricity Authority

Generation capacity by sources (thermal / renewable / hydro / others)

India's electricity generation capacity is built on a diverse mix of energy sources, structured to balance energy security, affordability, and environmental sustainability. Thermal power, primarily coal-based, has historically dominated the installed capacity due to its reliability in providing continuous baseload power. Natural gas and lignite contribute smaller portions within the thermal category. Over time, the country has significantly expanded its non-fossil fuel capacity, particularly in the renewable energy space, driven by supportive policy frameworks, technological advances, and international climate commitments.

Renewables, including solar, wind, small hydro, and biomass, now form a key pillar of India's installed capacity strategy, with solar and wind showing strong year-on-year growth. Large hydroelectric projects, while technically renewable, are often tracked separately and continue to play a critical role in peak power and grid balancing. Other sources like nuclear energy provide clean baseload power, though their share remains modest due to long development timelines and regulatory complexities. Overall, India's capacity mix is shifting steadily toward cleaner sources, with a growing emphasis on grid flexibility, energy storage, and hybrid systems to support the integration of variable renewable energy.





Source: Central Electricity Authority

Thermal power continues to dominate the energy landscape, accounting for 52% of the total installed capacity, or 246.94 GW. This includes coal, lignite, gas, and diesel-based generation. Despite growing environmental concerns, thermal power remains the backbone of India's electricity supply due to its ability to provide consistent base-load power and support grid stability, particularly in regions with high demand and limited renewable penetration.

Renewable Energy Sources (RES), comprising solar, wind, biomass, and small hydro, make up 36% of the installed capacity, totalling 172.36 GW. This significant share reflects India's strong commitment to clean energy, driven by ambitious government targets, favourable policy frameworks, and increased private sector participation. Solar and wind energy, in particular, have seen rapid growth due to falling technology costs and large-scale project implementation under national missions.

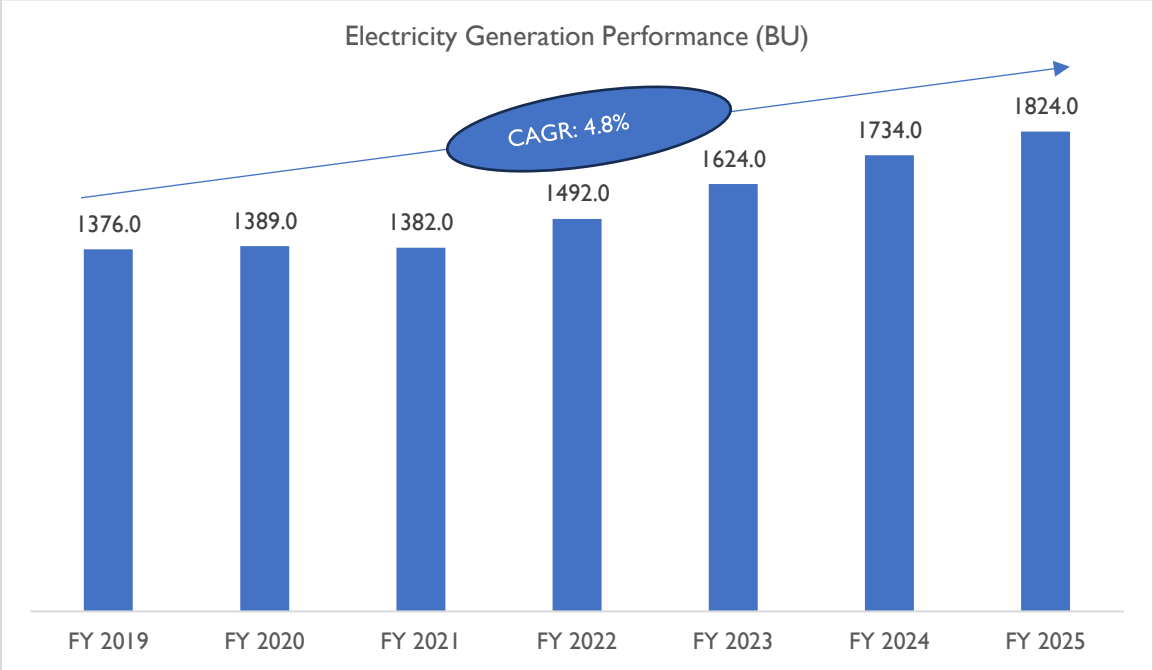
Hydropower contributes 10% of the capacity (47.72 GW), reinforcing its role as a flexible and dispatchable renewable source. Hydropower not only aids in peak load management but also supports grid balancing, especially with the growing share of intermittent renewables like solar and wind. Meanwhile, nuclear energy, with a capacity of 8.18 GW (or 2%), provides a stable, low-emission base-load alternative and continues to play a supporting role in India's clean energy ambitions.

This distribution of capacity in FY 2025 reflects India's multi-pronged approach to energy planning, maintaining reliable conventional generation while accelerating the shift toward greener and more sustainable energy solutions.

Electricity generation scenario in India: current scenario & historical growth trend in generation

India's electricity generation landscape is marked by a diversified energy mix and a strong emphasis on capacity expansion to meet rising demand. The country relies on thermal power primarily coal as its dominant source, but there is a growing shift toward renewable energy, including solar, wind, and hydro power, in line with climate commitments and sustainability goals. The government has implemented numerous policy initiatives to promote clean energy, enhance grid integration, and ensure reliable supply. With a focus on self-reliance and energy security, India is also investing in nuclear power and emerging technologies like green hydrogen and battery storage. The sector is undergoing a transformation with increasing private participation, digitalization of power assets, and enhanced efficiency through modern generation techniques and environmental compliance.

India's electricity generation performance has demonstrated a steady and growth trend over recent fiscal years, reflecting an expanding capacity and increasing demand for electricity. The generation performance, measured in billion units (BU), shows a clear upward trajectory from FY 2019 to FY 2025, with an overall Compound Annual Growth Rate (CAGR) of 4.8%. In FY 2019, the total electricity generation was 1,376 BU. This figure experienced a modest increase to 1,389 BU in FY 2020 and then slightly rose to 1,382 BU in FY 2021. A more significant rise was observed in FY 2022, where generation reached 1,492 BU. The growth continued into FY 2023, with generation reaching 1,624 BU, and the latest data for FY 2025 shows a further increase to 1,824 BU.



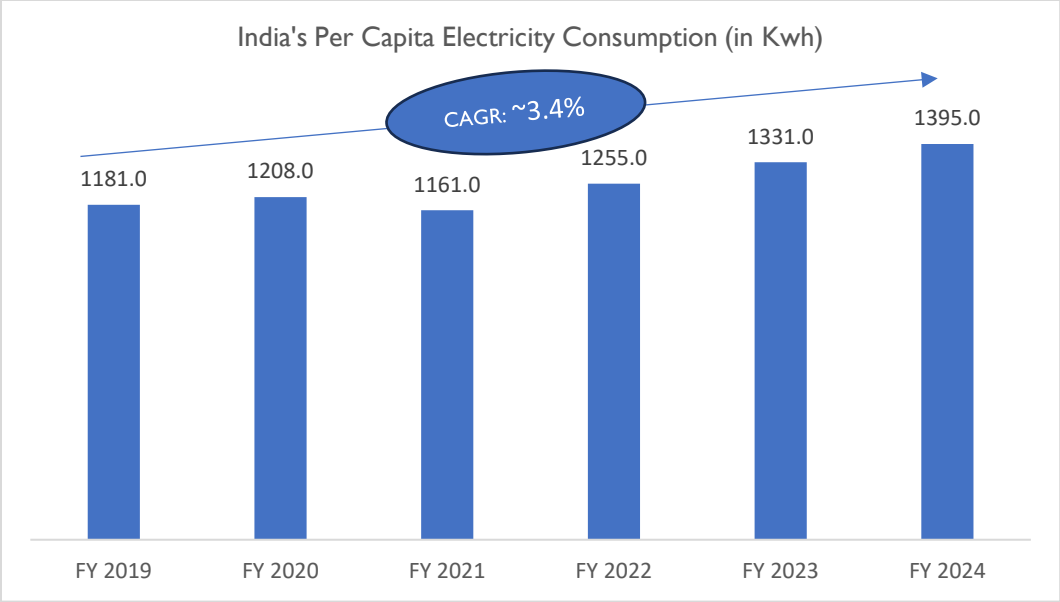
Source: Ministry of Power

This projection suggests a sustained growth in electricity generation, driven by increasing energy needs and expanding generation capacities. The CAGR of 4.8% highlights a robust and consistent growth rate in electricity generation. This growth can be attributed to various factors, including improvements in power generation infrastructure, higher utilization of existing capacity, and the addition of new generation projects. It also reflects the country's ongoing efforts to meet the rising electricity demand driven by population growth, urbanization, and economic development.

The steady increase in electricity generation performance underscores the effectiveness of India's energy policies and investment in the power sector. As the generation figures rise, they also indicate a positive impact on the country's energy security and economic development. Continued investments in both conventional and renewable energy sources are likely to support this growth trend and further enhance the electricity generation capacity. The electricity generation performance reveals a strong and positive trend, reflecting India's expanding power sector and its ability to meet growing electricity demand. The consistent growth in generation capacity is indicative of a well-functioning energy sector poised to support the country's future development needs.

Tracking the per capita electricity consumption growth in India

India's per capita electricity consumption has been steadily increasing over the years, reflecting its rapid industrialization, urbanization, and efforts to electrify rural areas. Despite this growth, India's consumption remains lower than the global average, reflecting the vast population and ongoing energy access challenges. Electricity consumption growth in India includes extensive rural electrification efforts through initiatives such as Saubhagya and the Deen Dayal Upadhyaya Gram Jyoti Yojana, which have provided electricity access to millions of rural households. Additionally, the expansion of industries, particularly in manufacturing, cement, steel, and textiles, has significantly fuelled industrial demand. India's per capita electricity consumption remains considerably lower than that of many developed nations, largely due to its vast population and diverse socio-economic conditions.



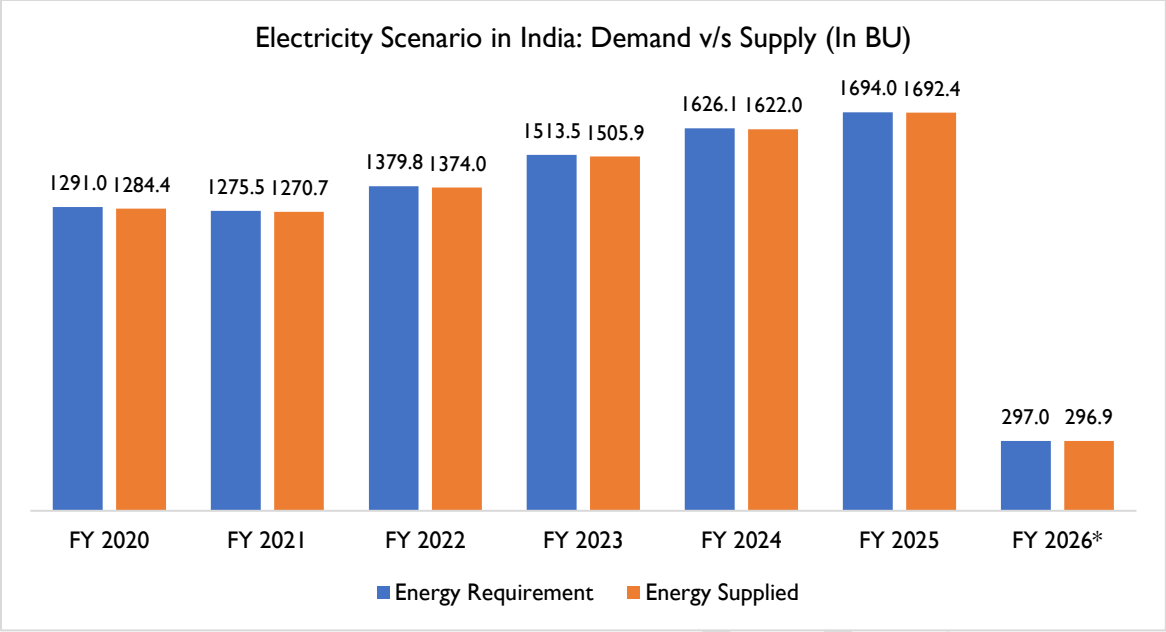
Source: Central Electricity Authority

India has demonstrated a notable upward trend in per capita electricity consumption over recent fiscal years, reflecting a broader expansion in energy use among its population. The per capita consumption, measured in kilowatt-hours kWh, exhibited a consistent increase from FY 2019 to FY 2024, with an overall CAGR of approx. 3.4%. This growth trajectory signifies an ongoing rise in electricity demand, likely driven by economic development, increased industrial activity, and improving access to electricity across various regions.

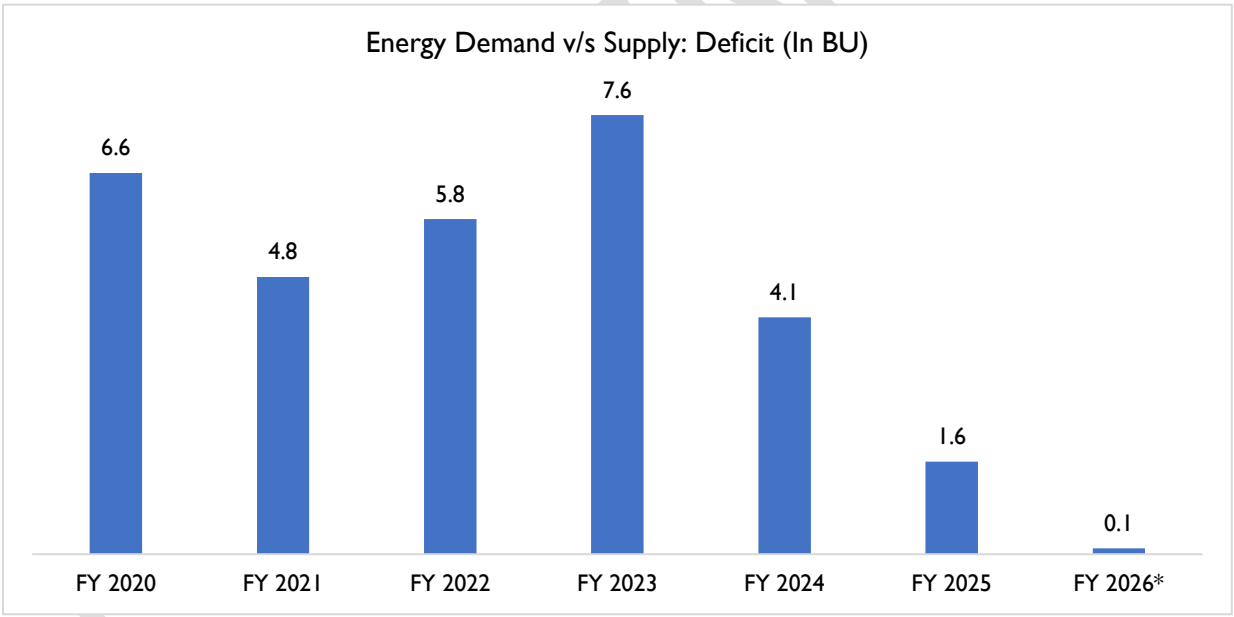
In FY 2019, the per capita consumption stood at 1,181 kWh. This figure saw a modest increase to 1,208 kWh in FY 2020. Despite a slight dip to 1,161 kWh in FY 2021, the consumption rebounded to 1,255 kWh in FY 2022. This upward trend continued into FY 2023, with per capita consumption reaching 1,331 kWh. The latest data for FY 2024 indicates a further rise to 1,395 kWh. This steady increase in per capita consumption underscores India's expanding energy needs. The CAGR of 3.4% suggests a sustained growth in electricity consumption, which can be attributed to several factors.

Electricity demand v/s supply scenario in India

India's electricity demand has grown steadily over recent years, reflecting increased industrial activity, urbanization, and rural electrification. Between FY 2020 and FY 2025, the total energy requirement rose from 1,291 BU to 1,694 BU, registering a Compound Annual Growth Rate (CAGR) of 5.6%. This consistent rise highlights the expanding energy needs of the country's growing economy. In parallel, electricity supply has kept pace, improving significantly in both volume and reliability. For instance, while the supply in FY 2020 was 1,284.4 BU, it increased to 1,692.4 BU by FY 2025, resulting in a sharp decline in the power deficit from 6.6 BU to just 1.6 BU over the same period.



Source: Central Electricity Authority, Ministry of Power



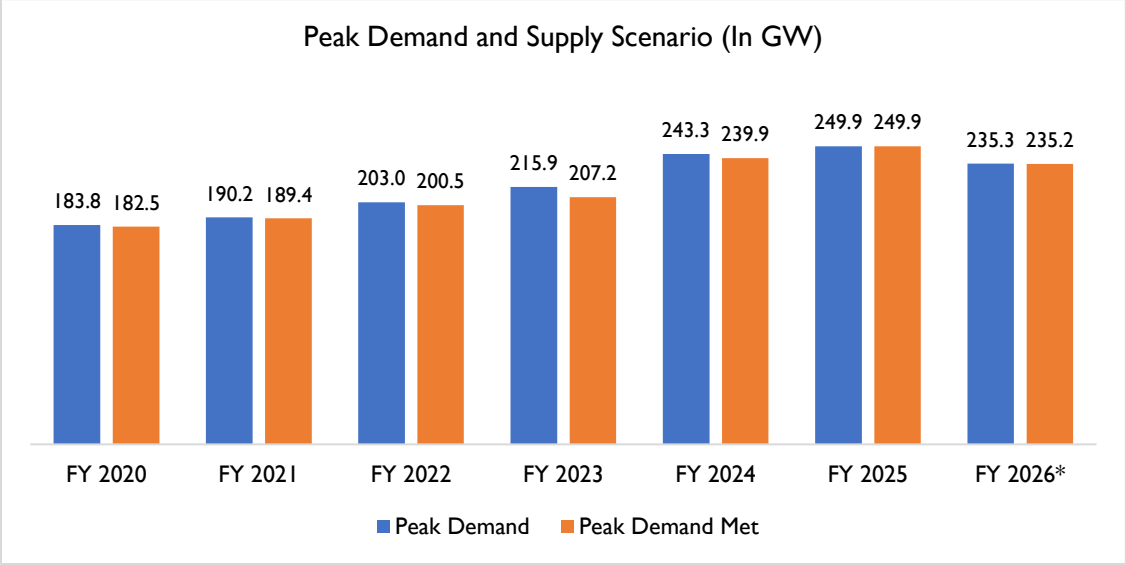
Source: Central Electricity Authority, Ministry of Power

*Note: For FY 2026, the figures are up to May 2025

The narrowing gap between demand and supply over these years indicates improvements in generation capacity, grid infrastructure, and operational efficiency. Even as demand surged year after year, the shortfall remained marginal and continued to shrink. Notably, in **FY 2026 (up to May)**, the deficit stood at just **0.1 BU**, pointing to a near-balanced power scenario. This performance underscores India's progress toward achieving energy adequacy, ensuring uninterrupted supply, and reducing regional and seasonal shortages. It

reflects the success of sustained investments in power generation, particularly in renewables, along with better demand forecasting and grid management.

India's peak electricity demand has seen a steady upward trajectory in recent years, driven by rising consumption across residential, industrial, and commercial sectors. From 183.8 GW in FY 2020, the country's peak demand increased to 249.9 GW in FY 2025, reflecting a Compound Annual Growth Rate (CAGR) of 6.3% over the five-year period. This robust growth mirrors the country's broader economic expansion, increased electrification, and higher appliance and cooling loads, especially during summer months.



Source: Central Electricity Authority, Ministry of Power

*Note: For FY 2026, the figures are up to May 2025

Alongside rising demand, the country has significantly improved its ability to meet peak load requirements. While in earlier years there were minor gaps, such as a shortfall of 1.3 GW in FY 2020 and 8.7 GW in FY 2023, India achieved full demand met in FY 2025, with supply matching peak demand at 249.9 GW. This milestone highlights improvements in power system reliability, better grid resilience, and enhanced coordination between generation and transmission infrastructure.

For FY 2026, provisional figures up to May 2025 indicate a peak demand of 235.3 GW, with a marginal shortfall of 0.1 GW. While these values may increase as the year progresses, especially during peak summer, early data suggests continued strength in India's ability to handle peak load situations. Overall, the trend points to a power sector that is becoming more responsive and resilient, capable of keeping pace with rising demand while maintaining grid stability and supply adequacy.

Regulatory Scenario

The Central Electricity Regulatory Commission (CERC) and the State Electricity Regulatory Commission (SERC) are the two main regulatory bodies governing the power sector.

FDI Policy

India's Foreign Direct Investment (FDI) policy in the power sector continues to permit 100% FDI under the automatic route for projects involving power generation (excluding atomic energy), transmission, distribution, and trading. Specifically, in the renewable energy sector, this policy has attracted substantial investments, with the sector receiving $6.1 billion in FDI equity between April 2020 and September 2023. Regarding power exchanges, the Government of India allows foreign investment up to 49% under the automatic route, subject to certain conditions, as per the existing policy framework. While the core FDI policy in the power sector has remained consistent, there have been significant developments in related areas. Notably, in February 2025, India proposed amendments to its nuclear liability laws to encourage private and foreign investment in the nuclear energy sector. These changes aim to facilitate the development of nuclear power projects by addressing previous constraints related to stringent liability provisions.

The Electricity (Amendment) Bill, 2021:

The latest Bill pertaining to electricity has been the Electricity (Amendment) Bill, 2021 which was introduced in the monsoon session of 2021. The Central Government's vision to make available "power for all" has helped in fastening of power generation, having more focus on renewable energy, which as of date is having an installed capacity of approximately 160 GW and has a target to increase the renewables capacity to 500 GW by 2030 and reducing cumulative emissions by one billion tonnes by 2030. Some of the major affairs discussed in the Bill are de – licensing of distribution of electricity so that the consumers on their own have the option to choose a distribution company in their area, reducing the power costs by way of indigenization, particularly for industrial and manufacturers consumers amongst others.

UDAY 2.0 Scheme:

The Indian Government launched 'UDAY 2.0' scheme under the Union Budget 2020-21.

The key objectives of the scheme being:

- Ensuring short term accessibility of Coal
- Getting smart prepaid meters installed in majority of the households
- Regular and prompt payments by DISCOMs
- Regenerating gas-based plants.

Liquidity Infusion Scheme

The Government of India announced the Liquidity Infusion Scheme on May 13, 2020 as part of the 'Aatmnirbhar Bharat Abhiyan'. This scheme was launched to support the power distribution companies owing to the fact that amidst the lockdown imposed nationwide, people were unable to pay their respective electricity bills as a consequence of which the revenues of these power distribution companies took a dip. As of Mar 2021, total loans of worth INR 1.35 Lakh Crore have been sanctioned to several DISCOMS and As of December 2021, INR 1,03,387 Crore have been disbursed to several power distribution utilities or DISCOMs functioning in the country.

Scheme for Central Financial Assistance

The Union Cabinet, in its meeting on August 28, 2024, approved a scheme to provide Central Financial Assistance (CFA) for equity participation by State Governments in the North Eastern Region (NER) for the development of Hydro Electric Projects (HEPs). Under this initiative, the State Government's equity share—capped at 24% of the total project equity, will receive financial support, with a maximum limit of ₹750 crore per project. The scheme, aimed at boosting hydroelectric capacity in the region, will be implemented from FY 2024-25 to FY 2031-32, with a total financial outlay of ₹4,136 crore.

Tariff Regulation 2024

In 2024, the Central Electricity Regulatory Commission (CERC) introduced revised tariff regulations, effective from April 1, 2024, to March 31, 2029, aimed at enhancing transparency, investment, and economic efficiency in India's power sector. The updated framework establishes clear guidelines for tariff determination for central sector generating companies and inter-state transmission licensees. One of the key changes is the revision of the Return on Equity (RoE), with hydroelectric projects now receiving an RoE of 16.5%, while new hydro projects with pondage units are eligible for an additional 0.5%, bringing their total RoE to 17%. Meanwhile, new transmission assets have a slightly lower RoE of 15%. The depreciation period for new projects has been set at 15 years, enabling faster cost recovery and improving cash flows for developers. Interest on loans will now be determined based on the company's overall financial standing, promoting sound financial management. Additionally, detailed norms for Operation and Maintenance (O&M) expenses have been introduced to encourage efficiency and cost optimization. These regulatory adjustments are designed to strike a balance between consumer interests and industry profitability, ensuring a more sustainable, competitive, and economically efficient electricity sector in India.

Demand landscape:

India's electricity demand has grown steadily over the last decade, driven by industrial expansion, rapid urbanization, and rural electrification. As the country advances on its developmental path, energy-intensive sectors and rising per capita consumption are creating sustained pressure on the power value chain from generation to last-mile distribution. Concurrently, agricultural mechanization and the growing penetration of irrigation systems are increasing power consumption in rural areas.

The government's proactive policy push through electrification schemes, infrastructure-focused programs like the National Infrastructure Pipeline (NIP), and support for renewable energy integration is further catalysing the need for robust power infrastructure. Additionally, rising household incomes, proliferation of electric appliances, and the digitalization of services are driving per capita electricity consumption higher. Together, these factors are generating strong and sustained demand across the electricity value chain from generation and transmission to last-mile distribution offering significant growth opportunities for EPC players engaged in developing and upgrading power infrastructure across the country.

Growth in Economic Activity & Industrialization: India's power demand is being significantly propelled by sustained economic growth and industrial expansion. In FY 2025, India's real GDP grew by 6.5% while nominal GDP rose by 9.8%, supported by robust sectors like construction and manufacturing. The construction sector alone grew around 9.4%, reflecting heightened infrastructure activity that drives demand for reliable electricity.

Meanwhile, the Central Electricity Authority's 20th Electric Power Survey forecasts India's peak demand to reach approximately 366 GW by FY 2031-32, and energy requirement to grow to about 2,473 BU a significant increase from nearly 1,852 BU projected for FY 2026-27. These projections underscore accelerating demand from industrial corridors, manufacturing zones, commercial complexes, and urban agglomerations. The policy emphasis on infrastructure and industrialization such as the development of industrial clusters, economic zones, and capacity expansion in manufacturing further amplifies electricity requirements.

Agricultural Power Demand: India's power demand is significantly influenced by its agrarian economy, where irrigation pump sets and rural mechanization contribute heavily to electricity consumption, thereby creating targeted opportunities for EPC firms in rural power systems and solar infrastructure. According to the Central Electricity Authority, agriculture accounted for approximately 16.9% of total electricity consumption in FY 2022-23. To reduce diesel dependency, enhance water and energy security and supplement farmers' income, the government rolled out the PM-KUSUM scheme under the Ministry of New & Renewable Energy.

Approved in March 2019 and extended to March 2026, this flagship program aims to deploy 34,800 MW of solar capacity across three components: decentralized solar plants (Component A), standalone solar pumps (Component B), and grid-connected pump solarization (Component C). These electrification and solarization efforts are expanding decentralized energy access in rural areas, while simultaneously boosting EPC demand particularly for off-grid solar projects, rural substations, and feeder-level distribution upgrades integrated with agricultural electrification.

Urbanization and Population Growth Driving Electricity Demand: Rapid urbanization and demographic growth are significantly elevating electricity demand in India's urban and peri-urban regions. According to the Government of India's *Handbook of Urban Statistics* , With India's urban population projected to reach 600 million by 2036 (≈40% of the total population), cities are becoming epicentres of electricity consumption. These urban centres expected to contribute nearly 75% of India's GDP are placing increasing demands on power distribution networks, substations, and monitoring systems, necessitating large-scale infrastructure upgrades.

Urban growth is intensifying electricity consumption across residential complexes, commercial centres, transportation nodes, and civic amenities. To meet this surge in demand, government programs such as the Smart Cities Mission and urban electrification policies are scaling investments into advanced power infrastructure such as underground cabling, automated substations, real-time monitoring systems, and SCADA networks creating a steady demand pipeline for EPC projects in urban power modernization.

Government Electrification Initiatives and Flagship Policies: India's mission to ensure 24×7 electricity access for all is built on a series of sequential electrification programs. These flagship government schemes have progressively expanded the reach and quality of power infrastructure across rural and urban India:

- **Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY)** – Launched prior to 2017, this scheme focused on rural electrification through the strengthening of sub-transmission and distribution infrastructure. Over **18,374 villages** were electrified under this program.
- **Saubhagya (Pradhan Mantri Sahaj Bijli Har Ghar Yojana)** – Introduced in **2017**, it targeted household-level electrification. By **March 2022**, it enabled power connections to over **2.86 crore** rural and urban households, delivering last-mile grid connectivity and meter installations.
- **Revamped Distribution Sector Scheme (RDSS)** – Approved in **2021**, this ongoing program has a total outlay of **INR 3.03 lakh crore**, including **INR 97,631 crore** in budgetary support. RDSS focuses on smart metering, feeder separation, distribution network strengthening, and grid reliability improvements continuing the electrification momentum while addressing AT&C losses.

This phased and layered approach to electrification has not only expanded power access but also created sustained opportunities for EPC players across grid extension, substation development, and smart metering rollouts.

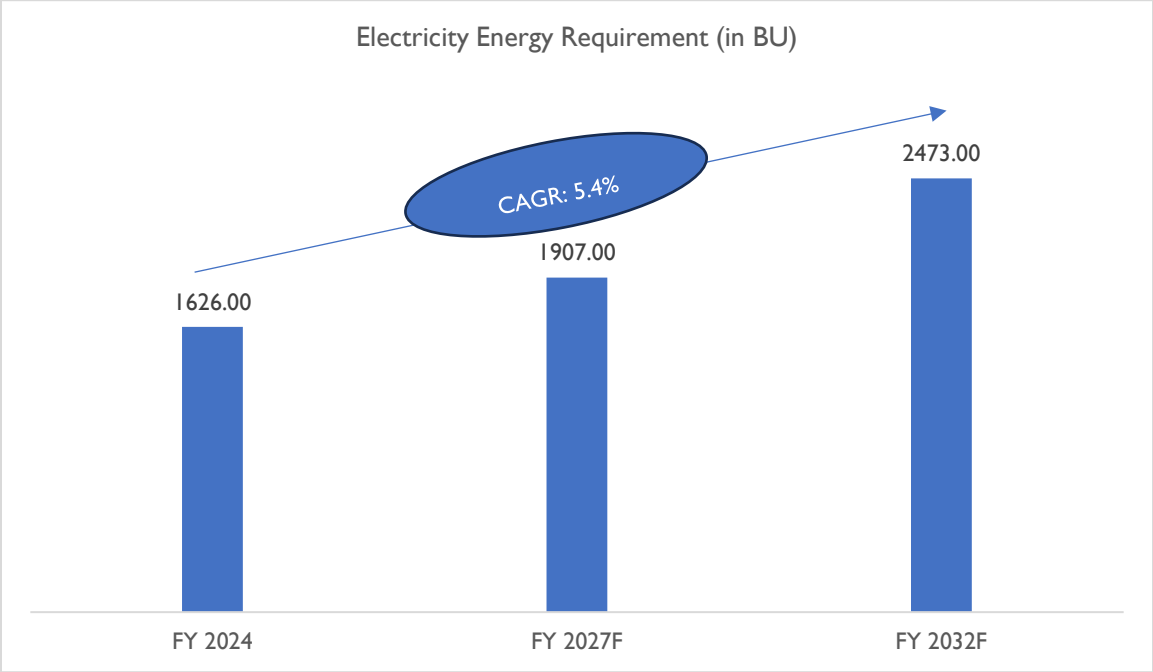
Growth in Renewable Energy Capacity: India has reached a major milestone in its clean energy transition, with non-fossil fuel sources now accounting for over 50% of the country's total installed electricity capacity a target achieved five years ahead of the 2030 deadline, as confirmed by the Government of India in July 2025. As of June 30, 2025, total installed capacity stood at 484.82 GW, of which 242.78 GW (50.08%) came from non-fossil sources, including renewables (184.62 GW), large hydro (49.38 GW) and nuclear (8.78 GW). This landmark achievement underscores the impact of flagship programs such as PM-KUSUM, solar parks, and the National Wind-Solar Hybrid Policy, which have driven exponential growth in solar, wind, and bioenergy segments.

During FY 2025 alone, India added a record 29.52 GW of renewable energy capacity, led by solar (23.83 GW) and wind (4.15 GW). The clean energy project pipeline remains robust, with 169.40 GW under implementation and 65.06 GW tendered, including hybrid, RTC, and peaking projects. These developments are generating sustained EPC demand across generation, transmission, and storage infrastructure as India moves confidently toward its 500 GW non-fossil target for 2030.

Growth Forecast

Expected growth in electricity demand in India

India has been experiencing a significant and steady increase in the demand for power and electricity, driven by rapid urban development, industrial growth, and the increasing use of electricity across sectors such as transport, housing, and manufacturing. Government-led initiatives promoting household electrification, electric mobility, and renewable energy integration are further accelerating this demand. Schemes supporting rooftop solar adoption and clean energy use are contributing to greater consumption at the grassroots level, while emerging areas like green hydrogen are beginning to shape future electricity needs. This rising demand reflects a broader transformation in India's energy consumption patterns as the country modernizes and urbanizes.



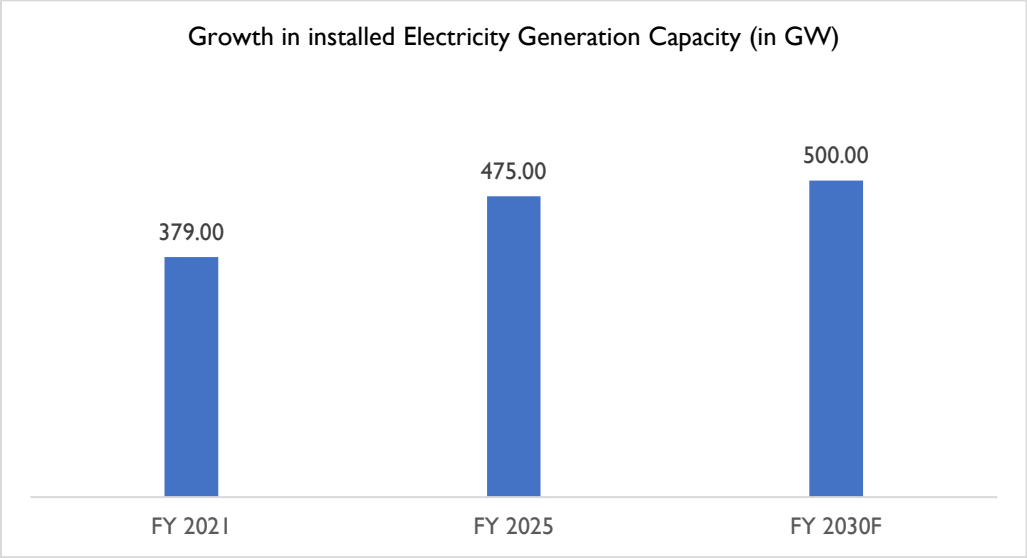
Sources: CEA, (Electric Power Survey, 2022)

The graph highlights a steadily increasing trend in India's electricity energy requirement, indicating the country's growing power needs over the next decade. Starting from 1,626 Billion Units (BU) in FY 2024, the requirement is projected to rise to 1,907 BU by FY 2027 and further to 2,473 BU by FY 2032. This progression reflects the rising demand driven by factors such as industrial growth, urbanization, increased household electrification, and the uptake of new electricity-intensive sectors like electric mobility and green hydrogen. Over this period, the CAGR from FY 2024 to FY 2032 is ~ 5.4%, signifying a healthy and sustained pace of growth in energy consumption.

Expected growth in installed electricity generation capacity in India

India's installed electricity generation capacity is expected to grow steadily in the coming years, driven by rising power demand, electrification of rural and urban sectors, and the country's commitment to energy security and economic development. The government's focus on '24x7 Power for All' and the expansion of industries, transport electrification, and digital infrastructure are pushing utilities and private players to ramp up capacity addition across conventional and renewable sources. The Central Electricity Authority (CEA), through its National Electricity Plan (NEP), outlines an integrated roadmap that balances coal-based generation while accelerating renewable energy, particularly solar and wind.

Renewable energy is poised to play a central role in India's future capacity additions, supported by favorable policies, international partnerships, and technological advancements. Solar parks, green hydrogen initiatives, and offshore wind developments are expected to supplement traditional capacity sources like coal and hydropower. Grid modernization, flexible generation technologies, and robust inter-state transmission networks are being developed in tandem. Overall, India's strategy involves not just adding more gigawatts but building a cleaner, smarter, and more resilient power generation infrastructure to meet long-term national goals.



Source: Central Electricity Authority, Ministry of Power

The graph illustrates the projected growth in India's installed electricity generation capacity from FY 2021 to FY 2030. In FY 2021, the installed capacity stood at approximately 379 GW, and is expected to increase significantly to 475 GW by FY 2025. This sharp increase reflects India's push to meet the rising electricity demand driven by expanding industrial activity, urbanization, and household electrification. The period up to

FY 2025 is characterized by rapid additions, primarily fuelled by renewable energy expansion, especially in solar and wind segments, as part of India's clean energy transition.

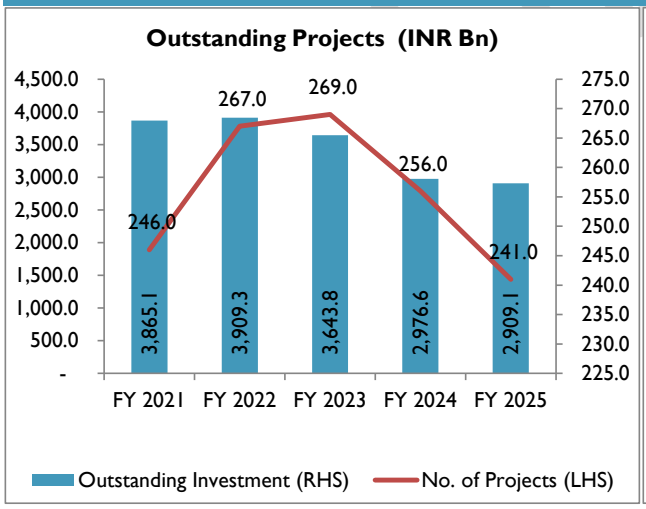
From FY 2025 to FY 2030, the growth trajectory shows a relatively moderate rise, with capacity projected to reach 500 GW. This signals a maturing phase where the focus is likely to shift toward enhancing efficiency, grid stability, and renewable integration rather than merely adding capacity. The slower pace could also reflect the stabilization of base demand growth and a more strategic deployment of flexible generation and energy storage systems. Overall, the graph captures India's dual strategy of meeting demand while transitioning toward a more sustainable and resilient power system.

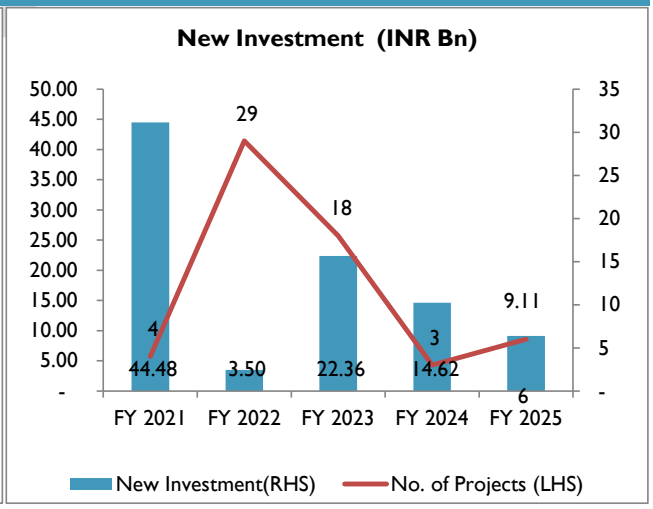
Capacity Expansion

Crude Oil & Natural Gas Infrastructure.

India is making significant strides in developing its oil and gas pipeline infrastructure. GAIL (India) Ltd. is set to invest ₹844 crore to expand the capacity of its Dahej-Uran-Dabhol-Panvel (DUPL-DPPL) gas pipeline network. The upgrade will increase the pipeline's capacity from 19.9 million standard cubic metres per day (MMSCMD) to 22.5 MMSCMD over the next three years, aiming to meet growing energy demand.

Investment Trend in Crude oil & Natural gas





Source: CMIE Capex

The investment trends in India's crude oil and natural gas sector from FY 2021 to FY 2025 reveal a significant downturn in both ongoing and new project investments. The data indicates a consistent decline in outstanding projects, with their total value falling from INR 3,865.1 Bn in FY 2021 to INR 2,909.1 Bn in FY 2025. The number of outstanding projects also dropped, peaking at 269 in FY 2023 before sharply decreasing to 241 in

FY 2025. New investments in the sector have exhibited a volatile pattern. In FY 2022 there was a spike in the number of new projects, with 29 initiatives, the investment value was notably lower at INR 3.50 Bn. By FY 2025, new investments had plummeted, with 6 project worth INR 9.11 Bn being initiated. Bakrol Oil and Gas Block Expansion Project' is a capex project costing Rs.9.1 billion by Selan Exploration Technology Ltd. The project is intended to extract crude oil & natural gas at Bakrol in Anand, Gujarat.

Capacity Expansion Plans in Refinery Sector

India's refinery sector is witnessing significant expansion to meet rising domestic fuel demand and enhance export capacity. With the government's target of achieving **450 million metric tonnes per annum (MTPA) refining capacity by 2040**, major **public sector (CPSEs) and private refiners** have announced expansion plans, focusing on **capacity enhancement, petrochemical integration, and green energy solutions.**

Detailed information about an expansion in refining capacity for each refinery is given below:

1. **Indian Oil Corporation Limited (IOCL)**:

- Panipat Refinery (Haryana): IOCL plans to expand the Panipat refinery's capacity from 15 million metric tonnes per annum (MMTPA) to 25 MMTPA by June 2026.
- Barauni Refinery (Bihar): The expansion aims to increase capacity from **6 MMTPA to 9 MMTPA**, with completion targeted by December 2025.
- Gujarat Refinery: Plans are underway to expand capacity from **13.7 MMTPA to 18 MMTPA**, integrating lube and petrochemical production units, expected to be completed by December 2025.

2. **Bharat Petroleum Corporation Limited (BPCL)**:

- Bina Refinery (Madhya Pradesh): BPCL is expanding the Bina refinery's capacity from **7.8 MMTPA to 11 MMTPA**, primarily to cater to the feed requirements of new petrochemical plants.
- New Refinery and Petrochemical Complex (Andhra Pradesh): BPCL plans to invest USD 11 billion in a new refinery and petrochemical complex in Andhra Pradesh, featuring a 9 MMTPA refinery integrated with an ethylene cracker unit, aiming for 35% petrochemical intensity.

3**. Hindustan Petroleum Corporation Limited (HPCL)**:

- Visakhapatnam Refinery (Andhra Pradesh): HPCL is enhancing its refining margins by utilizing more Russian oil and upgrading production facilities at the Vizag refinery.

4. **Numaligarh Refinery Limited (NRL)**:

- Numaligarh Refinery (Assam): NRL plans to expand its refining capacity from **3 MMTPA to 9 MMTPA** by March 2027. This includes laying a crude oil pipeline connecting the refinery to Paradip Port in Odisha, expected to be completed by December 2025.

5. **Mangalore Refinery and Petrochemicals Limited (MRPL**):

- Mangalore Refinery (Karnataka): MRPL is planning a phased expansion to increase its capacity from **15 MMTPA to 18 MMTPA**, with investments in petrochemical production and advanced refining technologies.

6. **Chennai Petroleum Corporation Limited (CPCL):**

- Nagapattinam Refinery (Tamil Nadu): CPCL is expanding the Nagapattinam refinery's capacity from **1.0 MMTPA to 9.0 MMTPA**, aiming to make it a major refining hub in southern India.

7. **Private Sector Initiatives**:

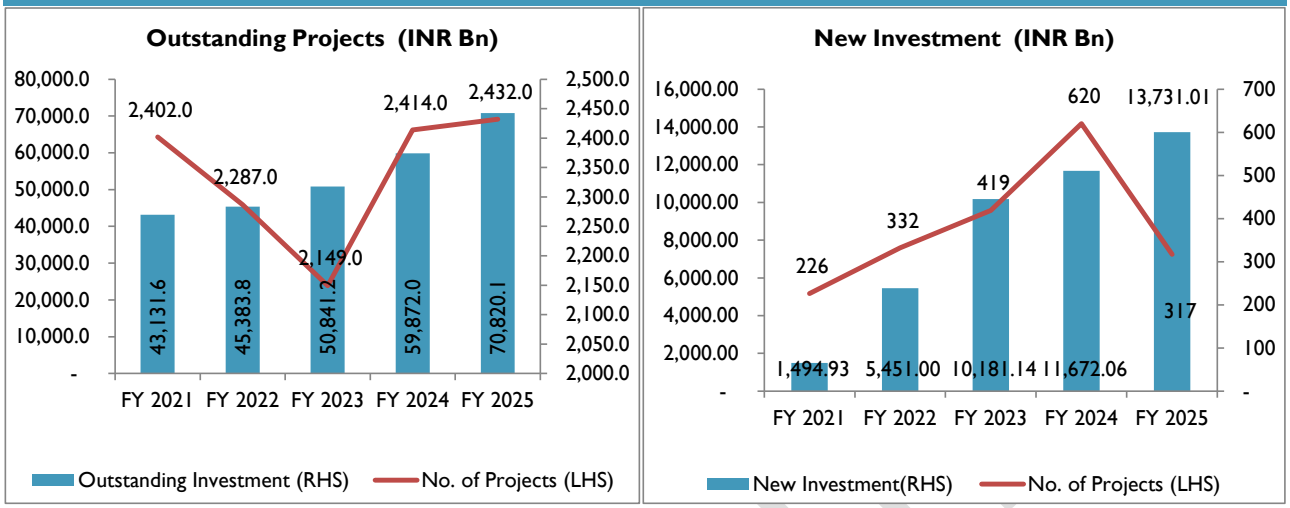
- Reliance Industries Limited (RIL): While not expanding crude refining capacity, RIL is focusing on advanced petrochemicals, biofuels, and hydrogen production, investing in renewable energy-driven refining processes.
- Nayara Energy (Vadinar Refinery): Nayara Energy is investing in a Petrochemical Expansion Project to diversify its product mix beyond fuels and plans for a Green Hydrogen Initiative to support sustainability goals.

India's refining sector is on a strong growth trajectory, with significant capacity expansions planned by 2027. Public sector refineries, led by IOCL, BPCL, HPCL, and MRPL, are at the forefront of this expansion, increasing their refining capacities to meet the rising domestic demand for petroleum products. Meanwhile, private refiners like Reliance Industries and Nayara Energy are shifting their focus towards high-value petrochemicals, biofuels, and green hydrogen production, rather than expanding crude refining capacity.

The industry is also undergoing a transformation with greater emphasis on green energy, integrating low-carbon technologies, renewable energy solutions, and sustainable refining processes. These developments align with India's broader goal of achieving fuel self-sufficiency, reducing dependence on crude oil imports, and strengthening energy security, positioning the country as a global refining and petrochemical hub in the coming years.

Power Industry

Investment Trend in Power Industry



Source: CMIE Capex

The Indian power sector is witnessing a surge in capital expenditure, driven by the country's growing energy demands and its commitment to sustainable energy solutions. Investments are flowing into various segments, including renewable energy generation, grid modernization, and transmission infrastructure. This capex push is fuelled by government initiatives, private sector participation, and international collaborations, aiming to enhance power generation capacity, improve grid stability, and integrate renewable energy sources.

As on FY 2025, the outstanding investment in the education sector stood at INR 70,820.1billion spread across 2,432 projects while 317 new projects envisaging worth INR 13,731 billion was earmarked announced during FY 2025. These announcements, spearheaded by the Central Government and State governments, underscore a concerted effort to enhance the infrastructure of the power sector.

Competitive Landscape

The Engineering, Procurement, and Construction (EPC) industry in India exhibits a highly fragmented structure, comprising over 180 participants and a wide range of stakeholders. This sector includes a substantial number of small and medium-sized players as well as a few large conglomerates that dominate the construction of complex projects such as roads, power plants, ports, airports, industrial plants, and railways. The competitive dynamics within the EPC industry are primarily shaped by substantial upfront capital investments and stringent technical norms established by contract awarding authorities, which restrict smaller players from entering large-scale projects. Consequently, smaller firms predominantly focus on less complex projects like urban and rural road construction, where entry barriers and investment requirements are relatively lower. This section offers a detailed analysis of the competitive landscape within the Indian EPC sector, emphasizing the key factors influencing competition, the strategic positioning of major players, and the significant entry barriers that new entrants encounter. Understanding these dynamics is crucial for stakeholders to navigate the complexities of the EPC market and identify potential opportunities for growth and collaboration.

Key Factors Shaping Competition in EPC Segment

Market Fragmentation and Player Segmentation: The Indian EPC market is highly fragmented, with a significant number of small and medium-sized players and a few large conglomerates. Large players typically handle high-capital and technically demanding projects, leveraging their extensive experience and financial strength. In contrast, smaller firms focus on less complex projects, such as urban and rural road construction, due to lower entry barriers and investment requirements.

Technological Advancements: Advancements in construction technologies and project management tools are pivotal in shaping competition. Companies investing in cutting-edge technology and innovative construction techniques gain a competitive edge by improving efficiency, reducing costs, and ensuring timely project completion.

Government Policies and Regulations: Government initiatives, such as the National Infrastructure Pipeline (NIP) and various public-private partnership (PPP) models, significantly impact the competitive landscape. These policies create opportunities for EPC players to participate in large-scale infrastructure projects, while regulatory norms ensure adherence to quality and safety standards, thus influencing competitive dynamics.

Financial Strength and Capital Requirements: High upfront capital investments and longer break-even periods are crucial factors. Large players with robust financial backing can undertake extensive projects,

whereas smaller firms often face challenges in securing necessary funding. The ability to manage finances effectively and maintain liquidity is a critical competitive factor.

Contract Awarding Criteria: EPC contracts are awarded based on a fine balance of technical capability and cost efficiency. Firms that can demonstrate superior technical expertise while offering competitive pricing are more likely to win contracts. This necessitates continuous improvement in technical skills and cost management strategies.

Sector Focus and Diversification: EPC companies often build their reputations based on sector focus. Some firms specialize in specific sectors like power transmission or urban infrastructure, while others diversify their operations across multiple sectors to mitigate risks and enhance market presence. Diversification strategies help companies to leverage opportunities across various segments, thereby shaping the competitive environment.

Key Entry Barriers

High Capital Investment: Entering the EPC market, particularly for large and complex projects, requires substantial capital investment. This includes costs related to acquiring advanced machinery, hiring skilled labour, and securing raw materials. High capital requirements deter many small players from entering the market, ensuring that large, well-established firms dominate.

Stringent Technical and Operational Norms: Contract awarding authorities impose rigorous technical and operational standards that companies must meet to qualify for project bids. These include criteria related to past project experience, technical expertise, and financial stability. Meeting these stringent requirements can be challenging for new entrants, thereby acting as a significant entry barrier.

Experience and Reputation: A proven track record and established reputation are crucial in the EPC sector. Clients prefer to engage firms with a history of successfully completed projects, reliable performance, and adherence to timelines. New entrants often struggle to compete with established players who have built strong reputations over time.

Regulatory Compliance: Compliance with numerous regulatory requirements, including environmental regulations, safety standards, and quality certifications, is mandatory for EPC companies. Navigating these regulatory frameworks demands substantial expertise and resources, posing a challenge for new entrants unfamiliar with the complex regulatory environment.

Market Competition and Price Sensitivity: The intense competition within the EPC sector, combined with the price-sensitive nature of contracts, creates a challenging environment for new players. Established

companies with efficient cost structures and economies of scale can offer competitive pricing, making it difficult for new entrants to compete on price without compromising on quality or profitability.

Access to Skilled Labor and Technology: The availability of skilled labour and access to advanced construction technologies are critical for success in the EPC industry. New entrants may find it difficult to attract and retain skilled professionals or invest in the latest technologies, further inhibiting their ability to compete effectively.

Established Relationships: Existing players often have long-standing relationships with suppliers, subcontractors, and clients. These connections can provide them with better pricing, preferential treatment, and access to projects, creating a barrier for new entrants trying to establish similar networks.

Brand Reputation: Trust and reliability are crucial in the EPC industry. Established companies benefit from their reputation, which can take years to build. New entrants may struggle to convince clients of their capabilities without a solid track record.

Major Players

Company	Overview
KEC International Ltd	Headquartered in Mumbai, India, KEC operates in over 110 countries with a workforce of more than 7,500 employees. The company's operations span six key verticals: Transmission & Distribution, Civil, Transportation (including Railways, Urban Infrastructure, and Ropeways), Oil & Gas Pipelines, Renewables, and Cables & Conductors. This diversified yet synergistic portfolio enables KEC to deliver integrated infrastructure solutions at scale. From constructing power transmission lines and next-generation data centers to executing metro systems, railway electrification, cross-country pipelines, and solar power plants, KEC demonstrates its capability to operate across complex terrains. Its robust in-house design capabilities and eight manufacturing facilities across India, the UAE, Brazil, and Mexico ensure a resilient and responsive supply chain for transmission towers, hardware, cables, and conductors KEC's Oil & Gas Pipelines division offers end-to-end EPC solutions for cross-country pipeline infrastructure. Its capabilities include the execution of Oil & Gas pipelines, Sectionalising Valve (SV) stations, Intermediate Pigging (IP) stations, pumping stations, as well as Receiving and Despatch terminals and Composite Station works. In addition, the business is also engaged in the construction of iron ore slurry

	pipelines and water distribution pipelines, demonstrating its versatility and expertise across fluid transport systems.
Afcons Infrastructure Ltd	Established in 1959, Afcons Infrastructure is the flagship engineering and construction company of the Shapoorji Pallonji Group. With over six decades of expertise, Afcons has delivered transformative infrastructure projects across some of the most challenging environments—ranging from undersea and underground works to high-altitude and remote locations. The company is recognized for its engineering excellence, innovation, and ability to execute complex projects that contribute significantly to national and global infrastructure development. AIL's Oil & Gas business operates across both offshore and onshore segments, delivering comprehensive EPC solutions. The company made a significant industry milestone by becoming the first Indian EPC contractor to install an offshore process platform—Heera Redevelopment (HRD)—using float-over technology, completing the project on time. AIL's global footprint supports a robust and agile supply chain that spans over 30 countries across two continents. This international presence enhances the company's ability to mobilize resources efficiently, manage complex logistics, and deliver large-scale infrastructure projects with speed and precision
Kalpataru Projects International Ltd	Kalpataru Projects International Limited (KPIL), a part of the esteemed Kalpataru Group, is a diversified engineering and construction company engaged in Power Transmission & Distribution (T&D), Buildings & Factories, Water Supply & Irrigation, Railways, Oil & Gas Pipelines, Urban Mobility (Flyovers & Metro Rail), Highways, and Airports. Since its inception in 1981, KPIL has delivered cutting-edge EPC solutions across these sectors, establishing a global presence in over 75 countries with more than 300 ongoing projects in 30+ nations. The company has executed projects worth over USD 14 billion and strengthened its international footprint through strategic acquisitions such as Linjemontage in Sweden and Fasttel in Brazil. Notably, KPIL has successfully commissioned over 11,500 km of Oil and Gas pipelines, consistently adhering to international best practices in project execution, quality control, health, safety, and environmental standards. Backed by advanced design and testing facilities, KPIL emphasizes quality, environmental responsibility, and occupational health and safety. As of March 31, 2025, the company holds a robust order book of USD 7.5 billion and reported consolidated revenue of USD 2.6 billion for FY25.

Financial Performance

Key Indicators INR Crore	KEC International Ltd			Afcons Infrastructure Ltd			Kalpataru Projects International Limited		
	FY 2025	FY 2024	FY 2023	FY 2025	FY 2024	FY 2023	FY 2025	FY 2024	FY 2023
Revenue From Operations	21,846.7	19,914.2	17,281.7	12,548.4	13,267.5	12,637.4	22,315.8	19,626.4	16,361.4
EBITDA	1,574.8	1,267.0	861.1	1,830.3	1,744.4	1,517.3	1,896.6	1,692.6	1,409.2
EBITDA Margin (%)	7.2%	6.4%	5.0%	14.6%	13.1%	12.0%	8.5%	8.6%	8.6%
Profits after Tax	570.7	346.8	176.0	486.8	449.8	410.9	567.27	515.90	435.02
PAT Margin (%)	2.6%	1.7%	1.0%	3.9%	3.4%	3.3%	2.5%	2.6%	2.7%
Net Worth	5,347.5	4,095.7	3,771.4	5,262.1	3,597.5	3,177.3	6,468.9	5,112.8	4,693.9
Debt Equity Ratio	0.08	0.06	0.14	0.42	0.68	0.49	0.65	0.76	0.78
Return on Equity (%)	10.7%	8.5%	4.7%	9.3%	12.5%	12.9%	8.8%	10.1%	9.3%
Return on Capital Employed (%)	23.4%	24.0%	15.7%	15.2%	19.7%	17.3%	16.2%	16.8%	14.6%
Return on Asset (%)	2.6%	1.8%	1.0%	2.8%	2.8%	2.9%	2.2%	2.3%	2.2%

**** The financial data is derived from respective annual reports of the company***

Between FY 2023 and FY 2025, Kalpataru Projects International Ltd (KPIL) emerged as the revenue leader, growing from INR 16,361 crore to INR 22,316 crore, driven by its diversified global operations. KEC International also demonstrated steady growth, increasing revenue by 26% over the same period, while Afcons Infrastructure maintained a stable revenue base with a slight dip in FY 2025. In terms of profitability, Afcons consistently outperformed its peers with the highest EBITDA margins, peaking at 14.6%, reflecting its operational efficiency in complex infrastructure projects. KPIL maintained stable margins around 8.5%, while KEC showed notable improvement from 5.0% to 7.2%. Afcons also led in PAT margins and return ratios, supported by strong project execution and cost control. KEC maintained the lowest debt-equity ratio, indicating a conservative capital structure, while KPIL and Afcons operated with higher but manageable leverage. Overall, Afcons stood out for profitability and capital efficiency, KPIL for scale and global reach, and KEC for financial prudence and improving performance.

Key Challenges & Risks with EPC business in India.

Engineering, procurement, and construction (EPC) procurement is essential for large-scale construction projects, involving the sourcing and management of materials, equipment, human resources, and services. The complexity and global nature of EPC projects introduce numerous risks, including long lead times, global supply chain challenges, and significant financial risks. Effective risk management strategies are crucial for project success.

Long Lead Times:

- **Procurement Delays**: Poor planning and scheduling in EPC projects can result in significant delays, cost overruns, and resource allocation issues. Unforeseen changes or scope creep can further complicate project timelines. Additionally, the procurement of large, specialized equipment and materials, which often takes months or even years to produce and deliver, can cause substantial delays if not managed properly. These delays in procurement can have a considerable impact on the overall project schedule.
- **Impact on Project Schedules**: Poor planning and scheduling can lead to delays, cost overruns, and resource allocation issues. Unforeseen changes or scope creep can further complicate project timelines. The extended lead times can disrupt project schedules, leading to cascading delays in subsequent project phases such as construction and commissioning.
- **Budget Overruns**: EPC projects are susceptible to cost overruns due to inaccurate estimates, fluctuating material prices, and unforeseen expenses. Prolonged procurement timelines can result in increased costs due to inflation, storage costs for early arrivals, and expedited shipping charges for delayed items.

Global Supply Chain Complexities:

- **Regulatory Compliance**: Managing the supply chain is critical to ensure timely delivery of materials, which affects the overall project schedule. Sourcing materials and equipment globally require navigating a myriad of regulatory frameworks, including import/export regulations, customs duties, and local environmental laws.
- **Logistical Challenges**: Coordinating the transport of materials across multiple countries involves dealing with various logistical hurdles, including transportation delays, port congestions, and varying standards of infrastructure.

- **Cultural and Legal Considerations**: Understanding and managing different cultural expectations and legal requirements can complicate supplier relationships and contractual agreements.

Financial Risks:

- **Capital Expenditures**: EPC projects typically involve large capital outlays, making them highly susceptible to financial risks. Any increase in costs can have a significant impact on the overall project budget.
- **Cost Overruns**: Unanticipated costs, such as those arising from design changes, scope creep, or unexpected site conditions, can lead to budget overruns.
- **Payment Delays**: Delays in payments from clients, particularly in public sector projects, can strain the financial resources of EPC firms, impacting their ability to meet ongoing project expenses.

Supplier and Subcontractor Risks:

- **Supplier Reliability**: The reliability and performance of suppliers are critical. Issues such as poor quality, delayed deliveries, or supplier insolvency can disrupt the project.
- **Subcontractor Performance**: Managing subcontractors effectively is essential. Poor performance, lack of adherence to schedules, or substandard workmanship can lead to rework and delays.
- **Supplier Relationships**: Maintaining good relationships with suppliers and subcontractors is crucial for ensuring cooperation and timely delivery.

Project Management and Coordination Risks:

- **Coordination Challenges**: Multiple teams, including engineers, procurement specialists, and construction crews, often work across various locations, leading to potential miscommunication and misalignment of project goals. EPC projects require meticulous coordination among various stakeholders, including project managers, engineers, suppliers, and contractors. Miscommunication or lack of coordination can lead to errors and delays.
- **Resource Management**: Efficient management of resources, including labour, equipment, and materials, is essential. Any disruption can impact project timelines and costs.
- **Quality Control**: Ensuring consistent quality across all phases of an EPC project can be challenging, especially when multiple vendors and subcontractors are involved. Ensuring consistent quality and adherence to standards is critical to avoid rework and penalties. Implementing robust quality control measures is necessary.

External Risks:

- **Political and Economic Instability**: Political changes or economic instability in the countries involved can affect project approvals, funding, and the availability of materials.
- **Natural Disasters**: Natural calamities such as floods, earthquakes, and cyclones can disrupt project execution and cause damage to infrastructure and materials.
- **Geopolitical Tensions**: International trade issues and geopolitical tensions can impact the availability and cost of materials, as well as the smooth flow of goods across borders.

Company Profile[7]

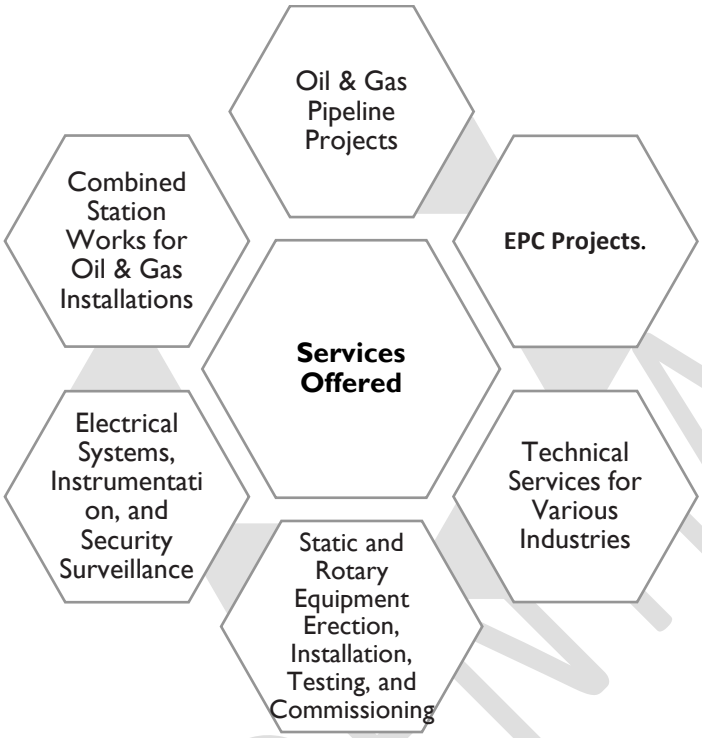
Vectras Enprocon Limited, established in 2021 as part of the Vectras Group (incorporated in 2015), is an Engineering, Procurement, and Construction (EPC) company recognized for delivering innovative, high-quality, and technologically advanced solutions. With a strong legacy of successful project execution across India, Vectras Enprocon Limited serves leading clients in sectors such as Oil & Gas, Infrastructure, Energy, and Power. The company's certifications in ISO 9001 (Quality Management), ISO 14001 (Environmental Management), ISO 27001 (Information Security Management), and ISO 45001 (Occupational Health & Safety Management) reflect its unwavering commitment to excellence, sustainability, data security, and workplace safety. Through cutting-edge methodologies, state-of-the-art technology, and a highly skilled workforce, VEL consistently strives to exceed industry benchmarks and contribute meaningfully to India's industrial and infrastructure development.

The company growth journey has been marked by consistent progress and strategic achievements across successive financial years. In FY 2021–22, the company laid its foundation with a focus on EPC, Oil & Gas, and Infrastructure projects, supported by key client onboarding, and recorded a revenue of INR 3.82 Crores. In FY 2022–23, it secured INR 45 Crores IOCL CSW project at Vadinar from KEC Spur Pvt. Ltd., achieving INR 10.52 Crores in revenue and strengthening its readiness for larger engagements. FY 2023–24 saw major expansion, with INR 135 Crores in secured projects—including a INR 120 Crores IOCL CSW order from Zetwerk Mfg. Pvt. Ltd.—and revenue rising to INR 54.31 Crores, alongside enhancements in infrastructure and operations. In FY 2024–25, the company accelerated its growth by expanding its asset base, growing its team to over 300 skilled professionals, and achieving INR 80.48 Crores in revenue, with an order book exceeding INR 206 Crores.

Vectras Enprocon has established strong relationships with major Public Sector Undertakings (PSUs) and leading corporate clients in the Oil & Gas sector. Its client base includes prominent organizations such as NHPC, ONGC, Bharat Petroleum, GAIL, Central Railway, Gujarat Gas, and others. These partnerships reflect the company's credibility, technical competence, and ability to deliver high-value engineering solutions across critical infrastructure domains.

[7] Company Sources

Services Offered



Financial Analysis

Key Indicators (INR Crore)	FY 2025	FY 2024	FY 2023
Revenue from Operations	80.5	54.3	10.5
EBITDA	15.1	8.7	0.3
EBITDA Margin (%)	18.8%	16.0%	2.5%
PAT	10.2	5.8	0.1
PAT Margin (%)	12.7%	10.7%	1.4%
Net Worth	22.4	12.1	0.3
Debt Equity Ratio	0.53	0.34	11.50
ROE (%)	45.8%	47.9%	44.6%
ROCE (%)	0.6%	0.7%	0.7%
ROA (%)	22.0%	27.8%	1.9%

Vectras Enprocon Limited, has demonstrated remarkable financial growth over the three-year period. Revenue from operations surged from INR 10.5 crore in FY 2023 to INR 80.5 crore in FY 2025, reflecting

strong project execution and market expansion. Profitability improved significantly, with EBITDA margins rising from a modest 2.5% to an impressive 18.8%, and PAT margins increasing from 1.4% to 12.7%. Net worth grew sharply from INR 0.3 crore to INR 22.4 crore, indicating robust earnings retention. A notable shift occurred in the capital structure, with the debt-equity ratio dropping from a highly leveraged 11.50 in FY 2023 to a more sustainable 0.53 in FY 2025. Despite this, the company maintained exceptional return metrics, with ROE consistently above 45% and ROA peaking at 27.8% in FY 2024. These trends highlight a well-managed transition from a capital-intensive phase to a more stable and profitable growth trajectory.

Formulas

Parameter	Formula
Revenue From Operations	Revenue from operations means the revenue from operations as appearing in the restated statement of profit & loss for the relevant year/period.
EBITDA	PBT+Finance Cost+ Depreciation
EBITDA Margin	EBITDA/Revenue from Operations
PAT Margin	PAT /Revenue from Operations
Net worth	Shareholder Equity
Debt Equity Ratios	Short term Borrowing +Long Term Borrowing/Shareholder Equity
Return on Equity	PAT /Shareholder Equity
Return On Asset	PAT/Total Asset
Return on Capital Employed	EBIT / (Total Assets – Total Current Liabilities)