



Industry Report on Indian Construction Industry

(Roads and Highway & Runway Construction EPC and HAM Model and Solid Waste Management)

June 2026

Prepared for GNI Infrastructure Limited

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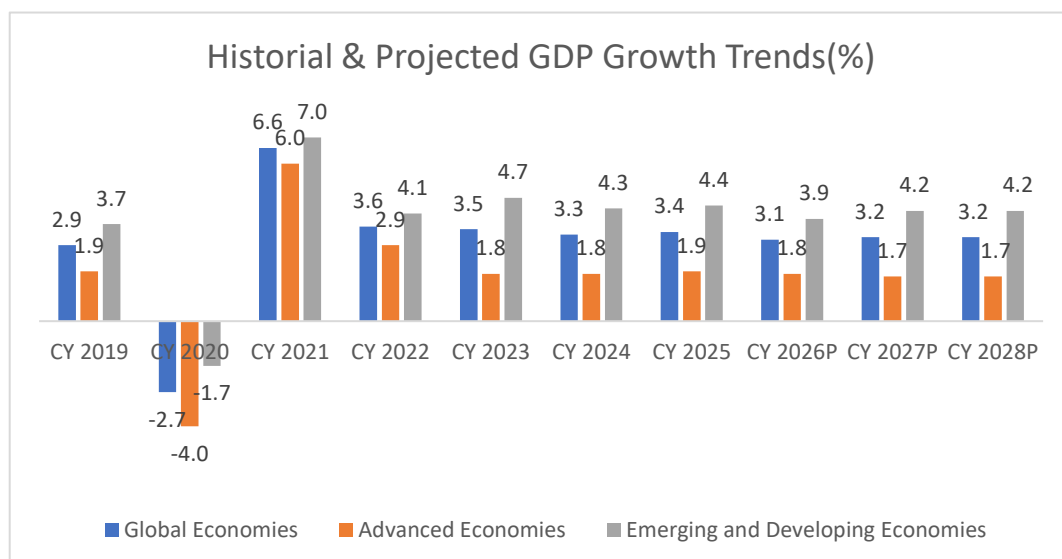
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Global Macroeconomic Scenario

Global Economic Overview

According to world economic outlook, Global growth is projected at 3.1% in 2026 and at 3.2% in 2027 and 2028, slower than the recent pace of about 3.4% in CY 2024–25 and is expected to settle at approximately that rate over the medium term, below the historical average of 3.7% during 2000–19. The forecast for 2026 has been revised downward by 0.2 percentage point, while the forecast for 2027 and 2028 remains unchanged compared with the January 2026 WEO Update. Global headline inflation is expected to rise to 4.4% in 2026 and decline to 3.7% in 2027, reflecting upward revisions for both years.

The US-Israel and Iran conflict is increasingly functioning as a global supply and confidence shock. The International Energy Agency (IEA) describes the current situation as the largest oil supply disruption on record, with flows through the Strait of Hormuz reduced to a trickle and the resulting effects spreading across refined fuels and liquefied natural gas (LNG). At the same time, aviation disruptions and elevated risk premia are weakening services activity and increasing uncertainty around investment decisions. A significant share of global energy flows through the Strait of Hormuz, and shipping disruptions and insurance constraints are therefore translating directly into higher landed costs, supply chain delays, and greater output risks for energy-intensive manufacturing. As a result, the policy environment has increasingly become challenging, while growth support is required but renewed cost-push inflation across energy, freight, and eventually food inputs is limiting the scope for faster monetary easing.



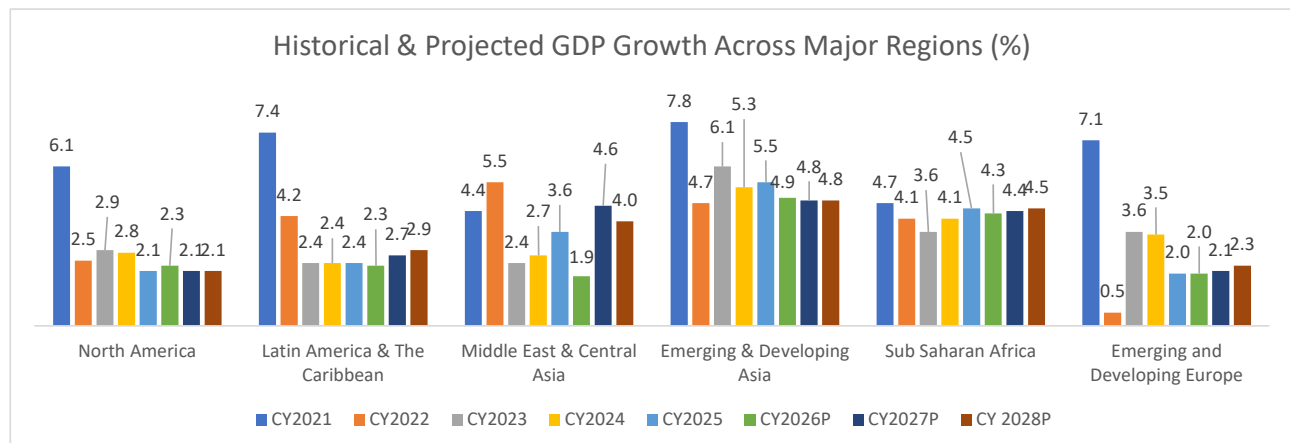
Note: Advanced Economies and Emerging & Developing Economies are as per the classification of the World Economic Outlook (WEO). This classification is not based on strict economic criteria and has evolved over time. It comprises 40 countries in the Advanced Economies category, including the G7 (the United States, Japan, Germany, France, Italy, the United Kingdom, and Canada) and selected Eurozone members (Germany, Italy, France, etc.). The group of emerging and developing economies (156) comprises all economies not classified as Advanced Economies (e.g., India, China, Brazil, Malaysia).

Historical and Projected GDP Growth

GDP growth across major regions showed a mixed trend during 2024–25. While growth in several regions—including Middle East & Central Asia, Emerging and Developing Asia, Sub-Saharan Africa as well as Latin America and the Caribbean—is expected to slow further in 2026, performance remains uneven across geographies.

In the Middle East and Central Asia, economic growth is projected to decline from **3.6% in 2025** to **1.9% in 2026**, before recovering to **4.6% in 2027** and **4% in 2028**, reflecting the region’s direct exposure to the conflict and the anticipated rebound thereafter. For commodity-exporting economies directly affected by the conflict, reduced production and export activity are expected to result in a significant downward revision to 2026 GDP growth projections.

Growth in emerging and developing Asia is projected to moderate from **5.5% in 2025** to **4.9% in 2026** and further estimated to grow at **4.8% in 2027 and 2028**. Within the region, China’s 2026 growth forecast has been revised upward by **0.2 percentage point** relative to the October estimate, to **4.4%**, despite a **0.1 percentage point downward revision** from January. This upward adjustment reflects the impact of lower effective U.S. tariff rates on Chinese goods, along with stimulus measures that are expected to offset the negative effects of the shock arising from the Middle East conflict. However, China’s growth is projected to slow to **4.0% in 2027**, as structural headwinds continue to weigh on the economy, including the prolonged slowdown in the housing sector, a shrinking labor force, declining returns on investment, and weaker productivity growth.



In Latin America and the Caribbean, economic growth is projected to remain broadly stable at 2.3% in 2026 before strengthening to 2.7% in 2027 and 2.9% in 2028. The effects of the Middle East conflict across the region are expected to be uneven, with smaller economies likely to experience a more pronounced negative impact due to their relatively greater vulnerability to external shocks.

Growth in sub-Saharan Africa is projected to remain relatively stable at 4.3% in 2026 and 4.4% in 2027 and 4.5% in 2028. However, this regional outlook masks significant variation across countries, with some

economies expected to face more pronounced challenges than others. In particular, oil-importing and non-resource-intensive economies are likely to be adversely affected by the conflict in the Middle East, as heightened external pressures may weigh on economic activity and weaken growth prospects. In emerging and developing Europe, economic growth is expected to slow sharply to 2.0% in 2025 and recover only marginally thereafter, with the region projected to expand at an average rate of 2.0% in 2026, 2.1% in 2027 and 2.3% in 2028.

Global Economic Outlook

The conflict between Israel/the United States and Iran, which began in February, has developed into a global shock to transport, trade, and security planning. As a result, periodic airspace closures across Israel and parts of the Gulf, together with severe disruption to shipping through the Strait of Hormuz, have affected the movement of oil, oil products, and LNG. Consequently, businesses have faced longer and less reliable supply lines, higher freight and insurance costs, and more frequent “stop-go” operating conditions.

The near-term growth outlook has softened as the conflict is affecting both demand and costs. Disruption to the oil channel is coinciding with pressure on the non-oil outlook as travel and services weaken and risk premia rise. Airspace disruption has increased operating costs and reduced travel reliability, while higher jet fuel costs have added to pressure on carriers and freight forwarders.

Investment conditions have also tightened as higher regional risk premia have increased insurance, shipping, hedging, and working capital costs. At the same time, logistics disruption and higher input costs are raising inflation risks. Fertilizer and related input disruption is also creating a lagged risk to food prices.

Asia-Pacific: In Asia-Pacific, the conflict has created sustained stress for business continuity. Even with fighting paused, energy availability, shipping disruption, and insurance costs are expected to continue weighing on operations over the next quarter. Oil prices remain well above January levels despite easing from March peaks, while war-risk insurance, tighter tanker availability, and rerouting costs remain elevated. As a result, several fuel-importing economies—including Japan, South Korea, India, and parts of Southeast Asia—have faced power-conservation measures and fuel rationing, increasing the risk of operational downtime in energy-intensive sectors.

Shipping and supply chains are also facing second-round effects. Many Asia–Europe shipments have been diverted via the Cape of Good Hope, thereby extending lead times by 10–14 days. Although some routes have reopened, schedules remain compressed and insurers remain cautious, which has increased delivery deadline risk across manufacturing, particularly in chemicals, electronics, and pharmaceuticals. Input volatility and fertilizer disruption are also adding to inflation risks and thereby complicating the policy outlook.

Latin America: In Latin America, the U.S.-Israel-Iran conflict has increased energy market pressures, with higher Brent crude prices raising input costs and inflation risks across the region. Consequently, net hydrocarbon exporters such as Brazil, Colombia, and Ecuador are benefiting from stronger external balances,

while net energy importers—including Panama, Chile, and much of Central America—are facing higher import costs. Elevated fertilizer prices are also weighing on agricultural output and margins, including in Brazil and Argentina. In response, governments have introduced fuel subsidies and price controls.

Middle East & North Africa: In the Middle East and North Africa, the conflict continues to affect the region directly, with many countries facing missile and drone attacks from Iran in response to attacks by the United States and Israel on Iran. In the short term, economic growth is expected to slow sharply as exports decline, uncertainty constrains spending, and governments delay investment initiatives. The reduction in food imports is also expected to significantly affect countries with limited domestic production capacity. Bahrain, Qatar, and Kuwait remain highly dependent on imports through the Strait of Hormuz and therefore face risks of food shortages and concerns regarding social stability if disruption persists.

Sub-Saharan Africa: In Sub-Saharan Africa, the conflict continues to disrupt energy and fertilizer supply chains, thereby keeping the region under significant external pressure. Higher global oil prices are sharply rising fuel and transport costs for import-dependent economies such as Kenya, Uganda, Ethiopia, and Ghana. Policy responses have varied across the region. Ethiopia introduced emergency fuel subsidies in mid-March to contain domestic price increases, while Kenya is experiencing stronger pass-through from higher fuel costs, which is weighing on aviation, logistics, and export activity.

Global Growth Projection

Growth in advanced economies is projected at 1.8% in 2026 and 1.7% in 2027 and 2028, while the overall impact of the Middle East conflict is expected to remain modest, lowering 2026 growth by 0.2 percentage point relative to the pre-conflict forecast. This limited effect reflects positive terms-of-trade gains in the United States and stronger growth momentum, supported by government measures, in Japan, whereas more significant negative effects are expected mainly in net energy-importing economies, including the euro area and the United Kingdom. In the United States, growth is projected at 2.3% in 2026 and 2.1% in 2027 and 2028, with fiscal policy and the lagged effects of monetary easing in 2025 continuing to support activity, even as higher trade barriers since April 2025 weigh on growth. The 0.1 percentage point downward revision from the January 2026 WEO Update reflects a small negative effect from the war, but this is partly offset by a rebound following the end of the 2025 federal government shutdown, along with stronger productivity growth and positive carryover effects. Although the International Emergency Economic Powers Act (IEEPA) ruling may reduce tariff-related fiscal revenues, its impact on the fiscal balance and activity is expected to remain limited and spread over the forecast horizon. Growth in 2027 is expected to remain solid, supported by tax incentives, including those for corporate investment under the One, Big, Beautiful Bill Act (OBBBA), while technology-driven momentum is projected to moderate and productivity growth is expected to gradually converge toward historical norms.

Growth in emerging market and developing economies is projected to slow to 3.9% in 2026 before recovering to 4.2% in 2027 and 2028, while the Middle East conflict is expected to have a greater impact on this group than on advanced economies, reducing 2026 growth by 0.3 percentage point relative to the pre-conflict forecast. In emerging and developing Asia, growth is expected to moderate from 5.5% in 2025 to 4.9% in 2026 and 4.8% in 2027 and 2028. Within the region, China's 2026 growth forecast has been revised upward to 4.4%, as lower effective U.S. tariffs and stimulus measures offset the impact of the conflict, although growth is projected to slow to 4.0% in 2027 as structural headwinds intensify. India's growth outlook has also improved, with growth revised upward to 7.6% in 2025 and projected to remain at 6.5% in 2026, 2027 and 2028, supported by strong carryover effects and lower additional U.S. tariffs on Indian goods. Meanwhile, several South and Southeast Asian economies are expected to face weaker domestic demand due to lower tourism and remittance inflows, while the Philippines has seen a sharp downward revision for 2026.

In the Middle East and Central Asia, growth is projected to decline from 3.6% in 2025 to 1.9% in 2026, before rebounding to 4.6% in 2027 and 4.0% in 2028, reflecting the region's direct exposure to the conflict. The downturn is expected to be most severe among affected commodity exporters, particularly Bahrain, Iran, Iraq, Kuwait, and Qatar, while the impact is expected to be less severe in other economies. Accordingly, Iran's economy is projected to contract by (-) 6.1% in 2026, before rebounding to 3.2% in 2027 and moderating to 1.5% in 2028. By contrast, Saudi Arabia's growth is projected at 3.1% in 2026, rising to 4.5% in 2027 before easing to 3.6% in 2028. In sub-Saharan Africa, growth is expected to remain broadly stable at

4.3% in 2026, 4.4% in 2027, and 4.5% in 2028, although oil-importing economies are likely to face greater pressure, while Nigeria and South Africa are expected to record moderate but gradually improving growth profiles. In Latin America and the Caribbean, growth is projected at 2.3% in 2026, 2.7% in 2027, and 2.9% in 2028, with Brazil expected to benefit modestly in the near term from its position as a net energy exporter, while Mexico is projected to recover gradually to 1.6% in 2026, 2.2% in 2027, and 2.1% in 2028.

In emerging and developing Europe, the sharp slowdown in growth to 2.0% in 2025 is expected to reverse only marginally, with the region projected to expand at an average rate of 2.0% in 2026, 2.1% in 2027, and 2.3% in 2028. Within the region, Russia's 2026 growth forecast has been revised upward by 0.3 percentage point relative to January, to 1.1%, as higher commodity prices are expected to support activity. This momentum is projected to continue, with growth remaining at 1.1% in 2027 before moderating slightly to 1.0% in 2028. By contrast, Türkiye's 2026 growth forecast has been revised downward by 0.8 percentage point relative to the January 2026 WEO to 3.4%, as weaker-than-expected growth in 2025 and higher oil and gas prices are expected to weigh on activity.

Key factors impacting Global Macroeconomic landscape

- Geopolitics continues to constitute a major source of global macroeconomic and business risk. The Russia–Ukraine war remains a persistent driver of instability, as Russia has intensified large-scale missile and drone attacks on Ukrainian cities and infrastructure, while Ukraine has stepped up strikes on Russian ports, refineries, and export infrastructure, reportedly contributing to a reduction in Russian oil output in April. The Israel–Iran–U.S. confrontation has emerged as the most significant near-term external shock to the global economy, with the IMF warning that disruptions to the Strait of Hormuz and regional energy infrastructure could materially weaken global growth and raise inflation; under its April 2026 reference forecast, global growth has been lowered to 3.1% and inflation raised to 4.4%, with materially worse outcomes under prolonged disruption scenarios. In parallel, the Pakistan–Afghanistan border conflict remains a significant regional flashpoint, although China-mediated talks are seeking to secure a ceasefire and reopen border crossings after months of cross-border attacks and trade disruption. At the same time, U.S. strategic activism continues to influence regional risk perceptions: Washington has removed sanctions on Venezuela's interim leadership and deepened engagement with Caracas, tensions over Greenland have re-emerged amid renewed U.S. rhetoric and ongoing diplomatic discussions with Denmark and Greenland, and U.S.–Nigeria security cooperation has continued to deepen in response to regional instability and counterterrorism concerns. In addition, resource nationalism and strategic competition over rare earths and other critical minerals have become increasingly operational concerns rather than distant strategic risks. The IEA's April 2026 assessment notes that demand for magnet rare earths has doubled since 2015 and is projected to increase by more than 30% by 2030, while supply chains remain highly concentrated, with China accounting for around 60% of mined output, more than 90%

of refining, and nearly 95% of permanent magnet production, thereby heightening global exposure to export controls, supply concentration, and industrial policy interventions

- The period of relatively frictionless trade supported by multilateral liberalisation and free trade agreements is increasingly giving way to regionalisation, nearshoring, friend-shoring, and diversification of production networks. Rising tariffs, policy uncertainty, and strategic realignment are creating a more fragmented trade environment and raising the premium on resilience over pure efficiency
- Technology adoption and sustainability have become core strategic priorities. Organizations are advancing digital transformation by embedding AI, automation, and cybersecurity into their operations to enhance productivity and safeguard critical assets. AI adoption is emerging as a visible driver of optimism, particularly within the information and communications sectors.

India Macroeconomic Analysis

India's economic growth outlook for 2025 has been revised upward by 1.0 percentage point from the October estimate to 7.6%, supported by stronger-than-expected performance in the second and third quarters of the fiscal year and sustained momentum in the fourth quarter. For 2026, the growth projection has been moderately increased by 0.3 percentage point (including a 0.1 percentage point upward revision from January) to 6.5%, primarily driven by the carryover effect of the strong 2025 performance and the reduction in additional U.S. tariffs on Indian goods from 50% to 10%, which more than offsets the adverse impact of the Middle East conflict. Growth is expected to remain steady at 6.5% in 2027. Across several South and Southeast Asian economies, disruptions linked to the Middle East conflict are anticipated to reduce tourism activity and remittance inflows, thereby weakening domestic demand and moderating overall economic performance.

Country	CY 2020	CY 2021	CY 2022	CY 2023	CY 2024	CY 2025	CY 2026 P	CY 2027 P	CY 2028P
India ¹	-5.8%	9.7%	7.6%	9.2%	6.5%	7.6%	6.5%	6.5%	6.5%
China	2.3%	8.6%	3.1%	5.4%	5.0%	5.0%	4.4%	4.0%	4.0%
United States	-2.2%	6.1%	2.5%	2.9%	2.8%	2.1%	2.3%	2.1%	2.1%
Japan	-4.2%	2.7%	0.9%	1.4%	-0.2%	1.2%	0.7%	0.6%	0.6%
United Kingdom	-10.3%	8.6%	4.8%	0.4%	1.1%	1.3%	0.8%	1.3%	1.6%
Russia	-2.7%	5.9%	-1.4%	4.1%	4.3%	1.0%	1.1%	1.1%	1.0%
Germany	-4.1%	3.9%	1.8%	-0.9%	-0.5%	0.2%	0.8%	1.2%	1.2%

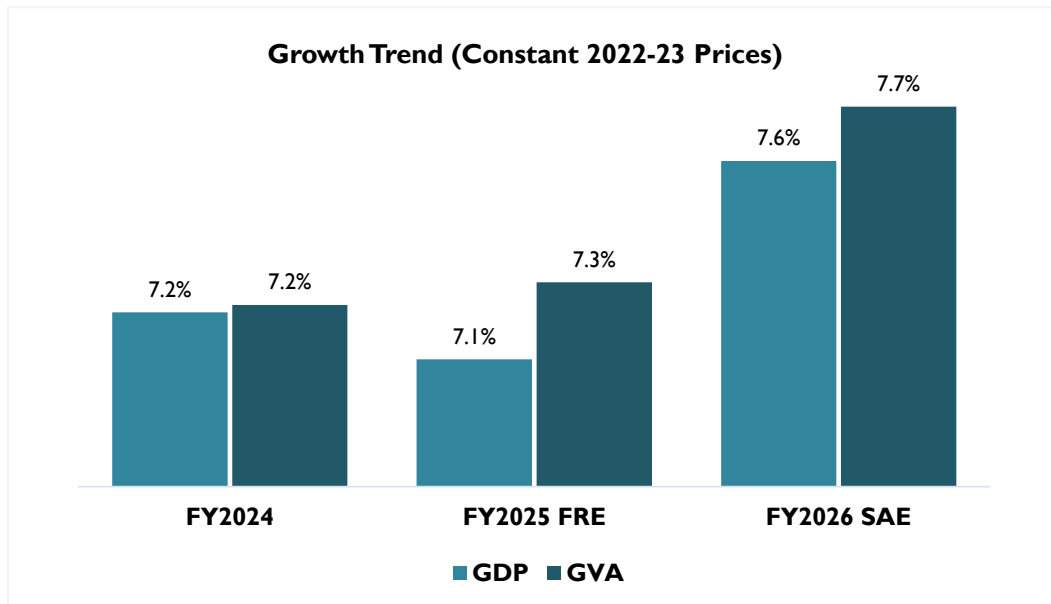
Source: World Economic Outlook, April 2026

Historical GDP and GVA Growth Trend

India Real GDP (GDP at constant prices) for FY 2025–26 is estimated to reach INR 322.58 lakh crore, compared to the First Revised Estimate (FRE) of INR 299.89 lakh crore for FY 2024–25. This represents a growth rate of 7.6% in 2025–26, higher than the 7.1% growth recorded in 2024–25.

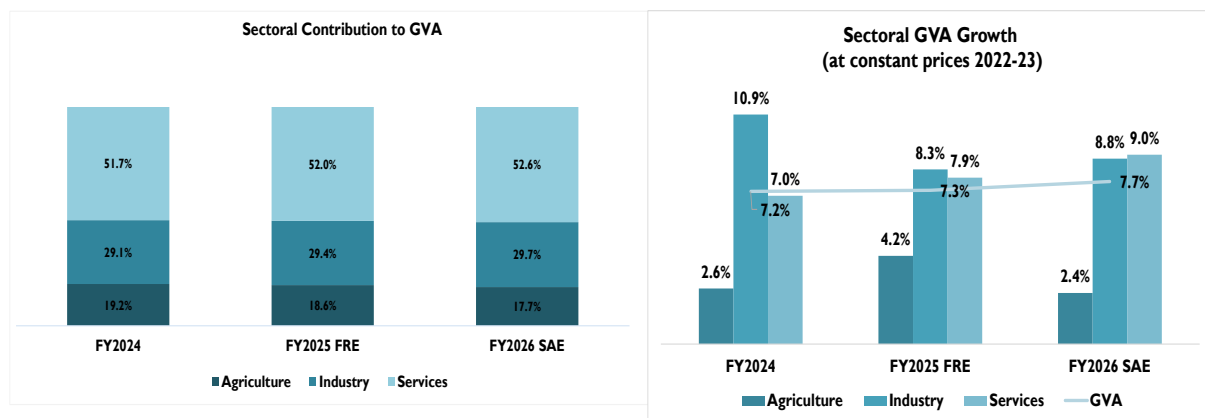
Similarly, Real GVA for FY 2025–26 is projected at INR 294.40 lakh crore, up from INR 273.36 lakh crore in FY 2024–25. This indicates a growth rate of 7.7%, compared with the 7.3% growth achieved in the previous year.

¹ For India, data and forecasts are presented on a fiscal year basis, and GDP from 2022 onward is based on GDP at market prices with fiscal year 2022/23 as a base year



Source: Ministry of Statistics & Programme Implementation (MOSPI), National Account Statistics: FY2025, FRE is First Revised Estimate, SAE is Second Advance Estimate

Sectoral Contribution to GVA and Annual Growth Trend



Source: Ministry of Statistics & Programme Implementation (MOSPI), CMIE Economics Outlook
FRE is First Revised Estimate, SAE is Second Advance Estimate

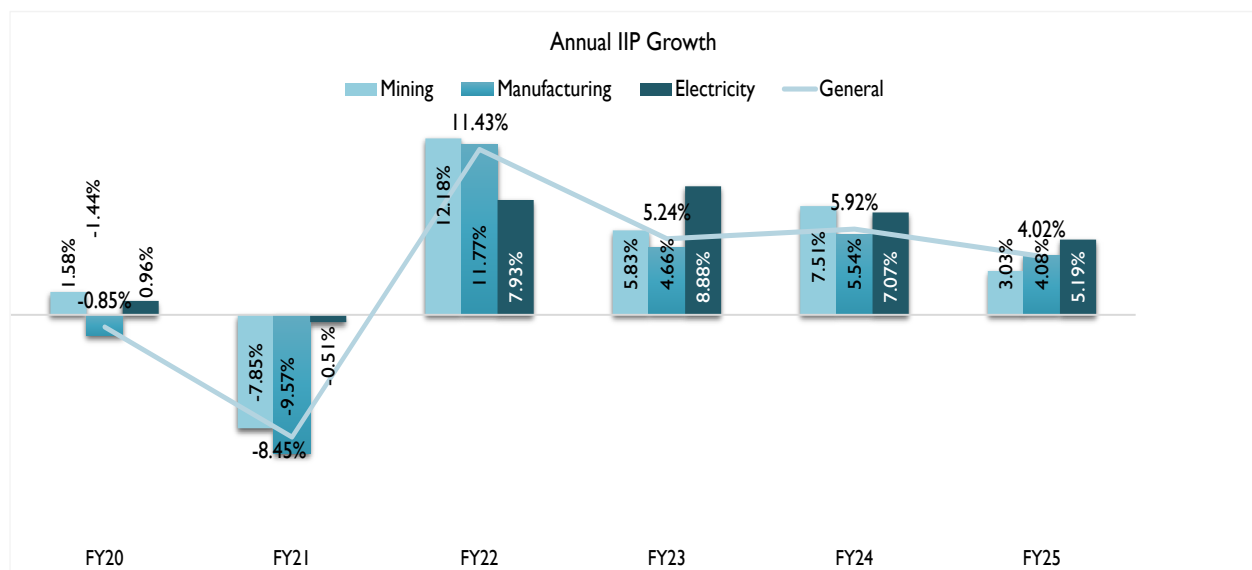
Sectoral analysis of GVA reveals that the industrial sector experienced steady growth momentum in FY 2026, recording a 7.7% y-o-y growth against 7.3% year-on-year growth in FY 2025. Within the industrial sector, growth moderated across sub-sector with mining, and construction activities growing by 4.08%, and 7.08% respectively in FY 2026, compared to 11.69%, and 7.30% in FY 2025. Growth in the utilities sector too moderated to 1.52% in FY 2026 from 2.87% in the previous year. The industrial sector's contribution to GVA increased marginally from 29.4% in FY 2025 to 29.7% in FY 2026.

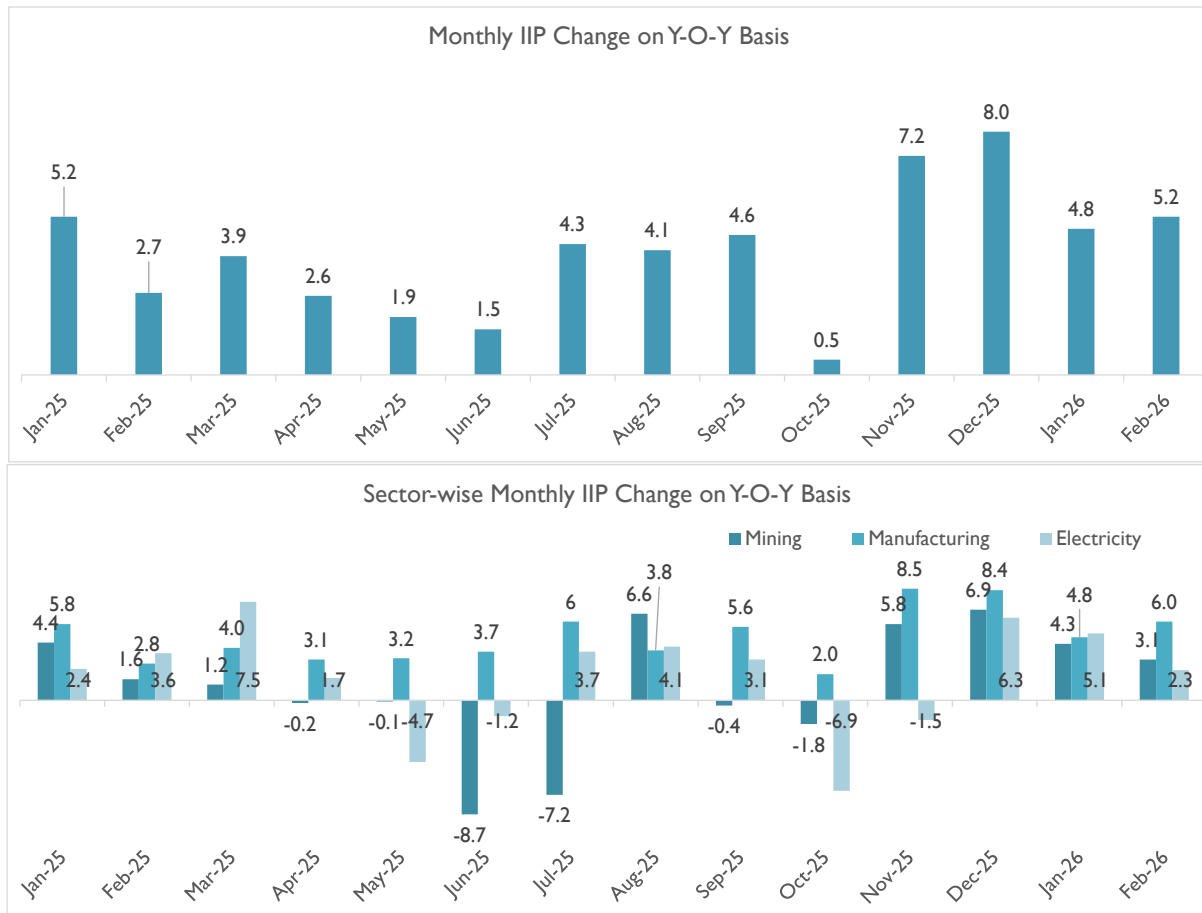
The services sector continued to be the main driver of economic growth. It expanded by 9.0% in FY 2026 from 7.9% in FY 2025. The services sector retained its position as the largest contributor to GVA, rising from 51.7% in FY 2024 to 52% in FY 2025, with a further increase to 52.6% in FY 2026.

The agriculture sector saw an acceleration in growth, increasing from 2.66% in FY 2024 to 4.18% in FY 2025, before moderating to 2.42% in FY 2026. However, its contribution to GVA declined marginally from 19.2% in FY 2024 to 17.7% in FY 2026. Overall, Gross Value Added (GVA) growth rose to 7.7% in FY 2026 from 7.3% in FY 2025.

Annual & Monthly IIP Growth

Industrial sector performance as measured by the 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, increasing by 4.08% in FY 2025 compared with 5.54% in FY 2024. The mining sector index also moderated, growing 3.03% in FY 2025 compared with 7.51% in the previous year, while the Electricity sector index moderated by 5.19% in FY 2025 compared with 7.07% in the previous year.



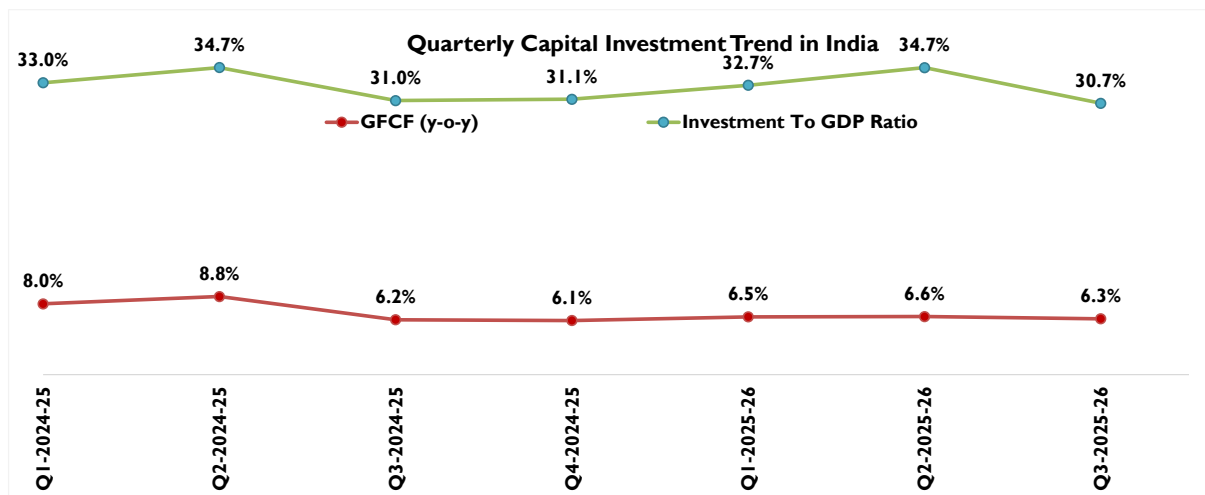
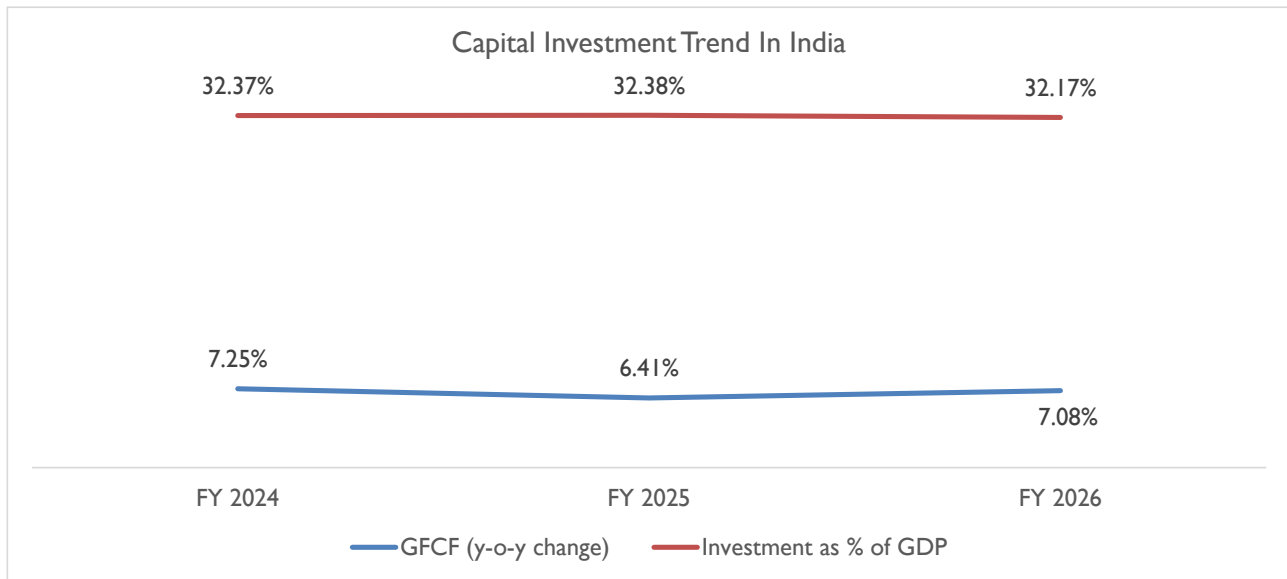


Source: Ministry of Statistics & Programme Implementation (MOSPI)

The IIP growth rate for the month of February 2026 is 5.2 percent which was 4.8 percent (Quick Estimate) in the month of January 2026. The growth rates of the three sectors, Mining, Manufacturing and Electricity for the month of February 2026 are 3.1 percent, 6.0 percent and 2.3 percent respectively.

Annual and Quarterly: Investment & Consumption Scenario

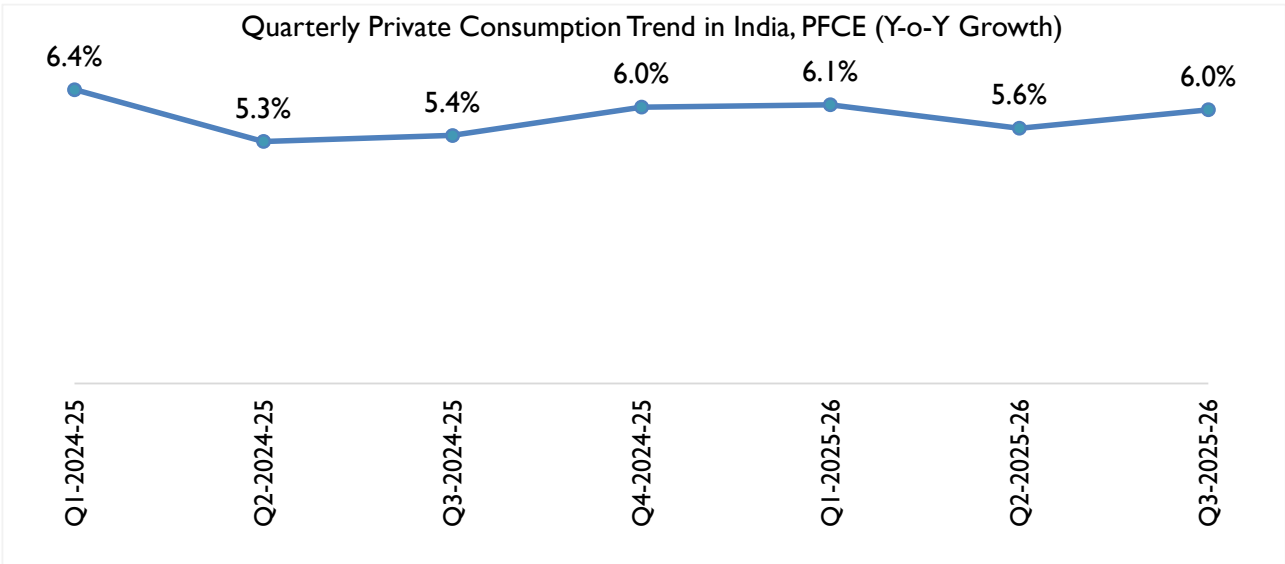
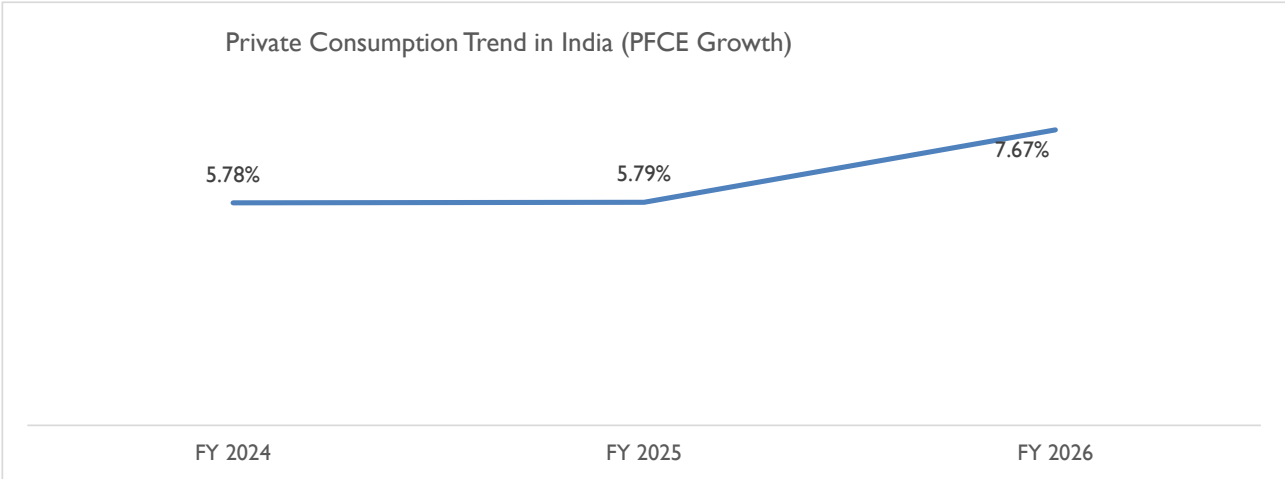
Other major indicators, such as Gross Fixed Capital Formation (GFCF), a measure of investment, increased during FY 2026, registering 7.08% year-on-year growth compared with 6.41% in FY 2025, bringing the GFCF-to-GDP ratio to 32.17%.



Source: Ministry of Statistics & Programme Implementation (MOSPI), CMIE Economics Outlook

On a quarterly basis, India's capital investment indicators display a pattern of moderate but uneven momentum. The Investment-to-GDP ratio remained above 30% throughout the period but shifted within a narrow and cyclical band—rising from 33.0% in Q1 FY 2024-25 to 34.7% in Q2, before softening to 31.0% and 31.1% in Q3 and Q4, respectively. The ratio recovered to 32.7% in Q1 FY 2025-26 and 34.7% in Q2, before easing to 30.7% in Q3, indicating fluctuating capital deployment across quarters. Meanwhile, GFCF (y-o-y) growth also exhibited volatility. After rising to 8.8% in Q2 FY 2024-25, growth moderated to 6.2% in Q3 and 6.1% in Q4, reflecting a deceleration in both government and private investment activity. Growth improved marginally to 6.5% in Q1 FY 2025-26 and 6.6% in Q2, but eased to 6.3% in Q3, signalling a plateauing in investment momentum. Overall, the data suggests that while investment levels remain healthy, quarterly volatility persists, underscoring the dependence on fiscal spending patterns and the still-gradual recovery of private capital expenditure.

Private Consumption Scenario



Sources: MOSPI, CMIE Economics Outlook

Private Final Consumption Expenditure (PFCE), a practical proxy for household spending, recorded growth in FY 2026 relative to FY 2025. Quarterly Private Final Consumption Expenditure (PFCE) has reported 6.0% growth rate during Q3 of FY 2025-26 as compared to the 5.6% growth rate in the corresponding period of the previous financial year.

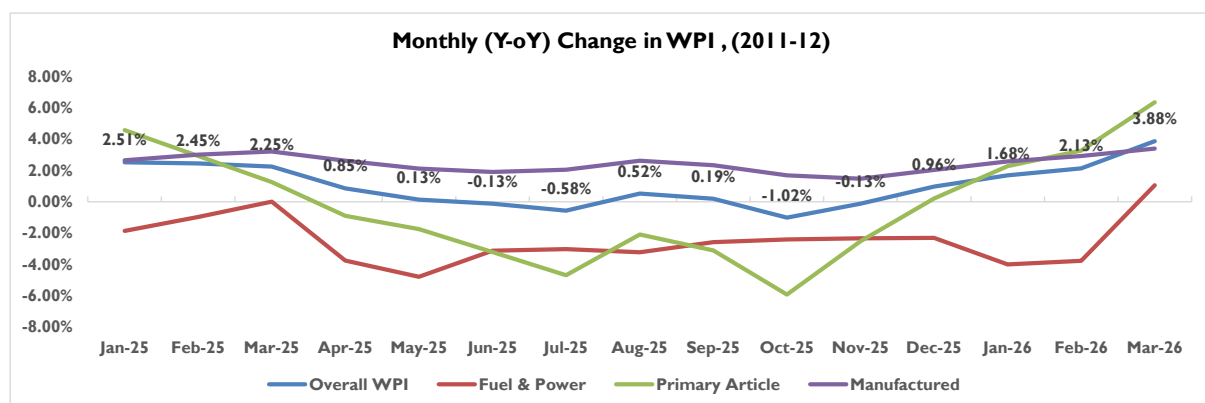
Inflation Scenario

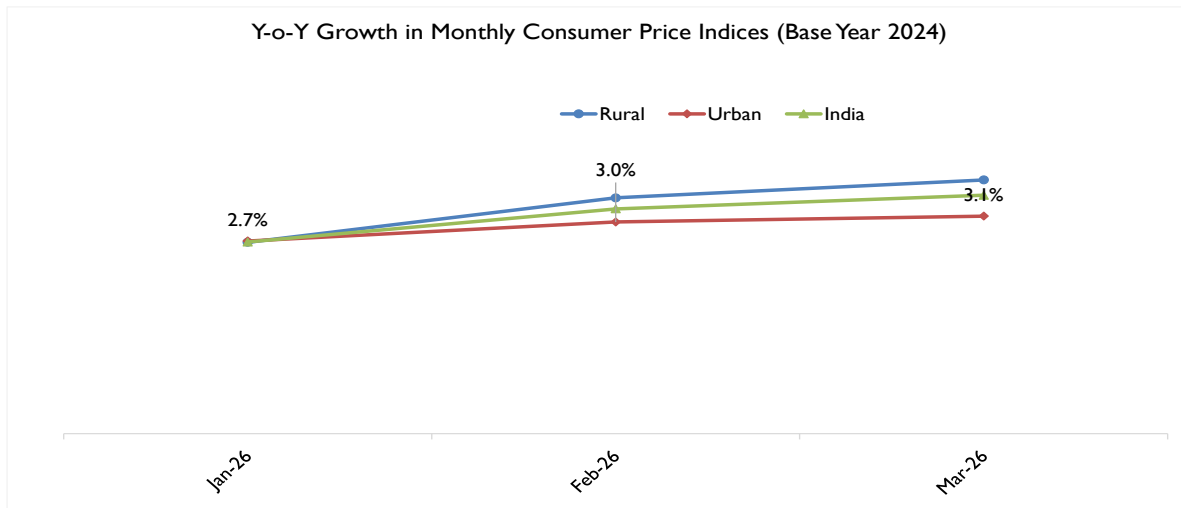
The annual rate of inflation based on All India Wholesale Price Index (WPI) number is 3.88% (provisional) for the month of March 2026 (over March 2025). Positive rate of inflation in March 2026 is primarily due to increase in prices of crude petroleum & natural gas, other manufacturing, non-food articles, manufacture of basic metals and food articles etc.

Primary Articles (Weight 22.62%): - The index for this major group increased by 2.28 % from 192.9 (provisional) for the month of February, 2026 to 197.3 (provisional) in March, 2026. The Price of crude petroleum & natural gas (36.16 %) and minerals (0.12%) increased in March, 2026 as compared to February, 2026. The Price of food articles (- 0.85%) and non- food articles (-0.22 %) decreased in March, 2026 as compared to February, 2026.

Fuel & Power (Weight 13.15%): - The index for this major group increased by 4.13 % from 147.6 (provisional) for the month of February, 2026 to 153.7 (provisional) in March, 2026. The Price of mineral oils (8.77 %) increased in March, 2026 as compared to February, 2026. The Price of electricity (-5.07%) decreased in March, 2026 as compared to February, 2026.

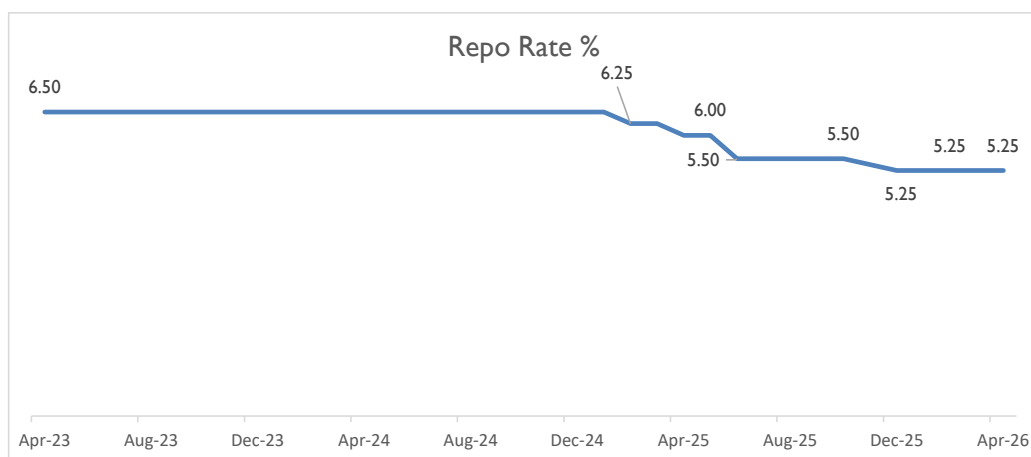
Manufactured Products (Weight 64.23%): - The index for this major group increased by 0.88 % from 148.2 (provisional) for the month of February, 2026 to 149.5 (provisional) in March, 2026. Out of the 22 NIC two-digit groups for manufactured products, 16 groups witnessed an increase in prices and 6 groups witnessed a decrease in prices. Some of the important groups that showed month-over-month increase in prices were manufacture of food products; chemicals and chemical products; basic metals; textiles and other manufacturing etc. some of the groups that witnessed a decrease in prices were manufacture of machinery and equipment; beverages; fabricated metal products, except machinery and equipment; computer, electronic and optical products and wearing apparel etc in march, 2026 as compared to February, 2026.





Source: MOSPI, Office of Economic Advisor

With effect from January 2026, the National Statistics Office (NSO) introduced a revised CPI series with base year 2024=100, drawing revised item weights from the Household Consumption Expenditure Survey (HCES) 2023-24. Year-on-year inflation rate based on All India Consumer Price Index (CPI) with base year 2024 for the month of March, 2026 over March, 2025 is 3.40%(Provisional). Corresponding inflation rates for rural and urban are 3.63% and 3.11%, respectively. On the monetary policy front, the RBI had cumulatively raised the repo rate by 250 basis points between May 2022 and February 2023, bringing it to 6.50%, where it was held steady through January 2025 to anchor inflationary expectations. With inflation moderating below target and growth requiring support, the RBI's Monetary Policy Committee (MPC) commenced an easing cycle in February 2025, delivering a cumulative 125 basis points of rate cuts through four reductions — 25 bps each in February 2025, April 2025, and December 2025, and a larger 50 bps cut in June 2025 — interspersed with pauses in August and October 2025. The repo rate currently stands at 5.25%, following the MPC's decision to hold rates unchanged at its April 2026 meeting.



Sources: CMIE Economic Outlook

Growth Outlook

The Union Budget 2026–27 sets out a quantitatively strong push to build resilient supply chains and develop next-generation industrial capacity. The record ₹12.2 trillion capital expenditure outlay is aimed at easing logistics bottlenecks and enhancing India’s cost competitiveness. Employment measures extend across both urban and rural India in one sweep. In cities and large towns, capex is channelled into “connectors” such as the seven proposed high-speed rail corridors and upgraded Tier-2 and Tier-3 infrastructure, thereby creating construction, logistics, and service jobs while cutting commute times. In smaller towns and villages, job creation is expected to be supported by mega textile parks, the Mahatma Gandhi Gram Swaraj Initiative’s push for khadi and handloom, training for tourist guides, and new waterways and coastal shipping. Together, these steps broaden the wage base instead of providing a short-term bump.

This domestic push is complemented by targeted measures to strengthen strategic supply chains. Dedicated rare earth corridors in Odisha, Kerala, Andhra Pradesh, and Tamil Nadu; customs exemptions for capital goods used in critical mineral processing and battery cells; and the India Semiconductor Mission 2.0 aim to pull manufacturing deeper into components and materials. If executed well, these measures could reduce import dependence in magnets, batteries, and chip inputs and lift the share of higher-productivity manufacturing jobs — thereby raising household incomes durably.

Alongside these domestic measures, India is also seeking to strengthen its external trade architecture through major trade agreements. The conclusion of the India–EU FTA negotiations mark a major strategic milestone, as it offers near-universal market access for 99.5% of India’s exports by value and integrates India more deeply into a USD 24 trillion economic bloc. By providing duty-free entry for key labour-intensive sectors, expanding services access, and establishing a mobility framework for Indian professionals, the agreement strengthens India’s export competitiveness, supports high-value job creation, and ensures a predictable, rules-based environment for long-term trade and investment flows.

In a similar vein, India–Oman Comprehensive Economic Partnership Agreement (CEPA)² has been framed as a comprehensive arrangement covering trade in goods and services, investment, professional mobility, and regulatory cooperation, with the objective of strengthening bilateral economic integration between India and Oman. Bilateral trade between the two countries stood at USD 10.61 billion in FY 2024–25, providing the economic basis for the agreement. Under the CEPA, India has secured 100% duty-free market access in Oman across 98.08% of tariff lines, covering 99.38% of India’s export value, thereby improving export competitiveness across sectors such as engineering goods, pharmaceuticals, agriculture and processed food, electronics, textiles, plastics, and gems and jewellery. At the same time, India has adopted a calibrated liberalisation approach by offering tariff concessions on 77.79% of its tariff lines, covering 94.81% of imports

² <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2213203®=3&lang=1>

The Comprehensive Economic Partnership Agreement (CEPA) between India and Oman marks a meaningful step forward in the economic relationship between the two countries. The agreement brings together trade in goods and services, investment, professional mobility, and regulatory cooperation under a single, coherent framework aimed at deepening bilateral economic integration.

from Oman by value, while retaining safeguards for sensitive domestic sectors. The agreement also provides gains in services, with Oman undertaking commitments across 127 services sub-sectors, alongside improved provisions for professional mobility, including an increase in the Intra-Corporate Transferee ceiling from 20% to 50% and commitments for a defined category of Indian professionals. Overall, the CEPA is presented as a framework intended to support trade expansion, improve market access, and strengthen long-term economic cooperation between India and Oman

However, these gains remain exposed to external geopolitical risks. The escalation of the Middle East crisis represents an external shock for India, transmitted primarily through energy markets, logistics, and trade-linked business exposure. The Gulf–Levant 11³ (GL 11) economies account for around 15% of India's merchandise exports and 21% of its imports, with trade concentrated in high-value categories such as mineral fuels, precious metals, and electronics; disruptions in this region therefore have an outsized impact despite its modest share of global GDP.

Export exposure is unevenly distributed across India, with risks concentrated in specific districts that serve as production hubs. Discretionary exporters, such as gems and jewellery firms in the districts of Surat, Jaipur, and Mumbai; apparel manufacturers in Tiruppur; automotive producers in Ahmedabad; and electronics assemblers in Kanchipuram and Kolar, are vulnerable to demand slowdown and order deferrals in Gulf markets.

At the same time, Perishable agricultural exporters, including grapes from Nashik, bananas from Solapur, and bovine meat from Ghaziabad, face acute risks from shipping delays and logistics disruptions. Dun & Bradstreet data show that over 4,500 Indian exporters and around 1,800 importers relied on the Strait of Hormuz trade route in 2025, exposing them to working capital stress, payment delays, and production interruptions, while, for import-dependent industries, delays in critical inputs raise the risk of temporary shutdowns and sustained energy price volatility amplifies margin pressure across manufacturing and services.

³ For the purposes of this report, the analysis is confined to a defined group of countries referred to as the Gulf–Levant 11 (GL-11). This group comprises Bahrain, Iran, Iraq, Israel Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. These economies are treated collectively because they are either directly involved in, or immediately exposed to, the current crisis through geographic proximity, security linkages, energy production and transit, or their role as regional trade and financial hubs

Construction Industry in India

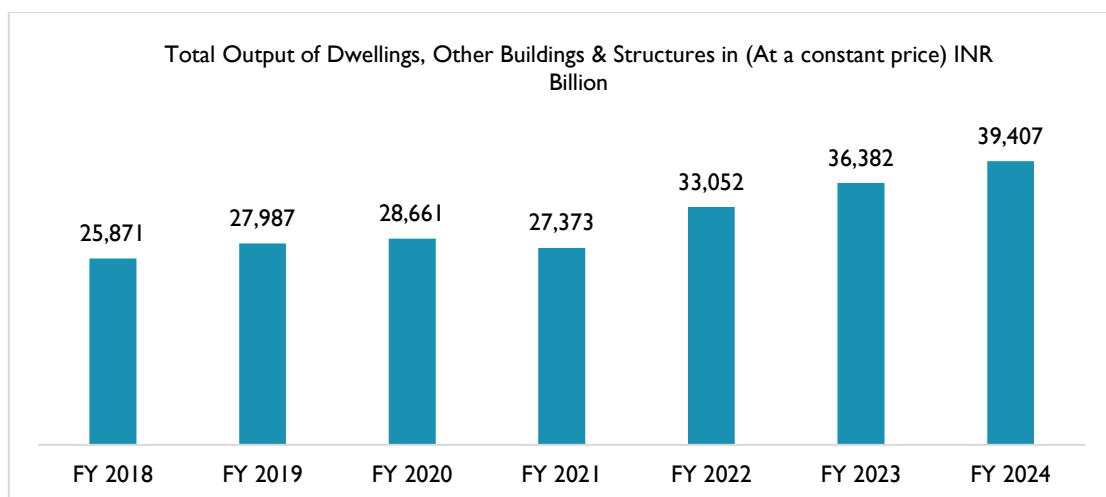
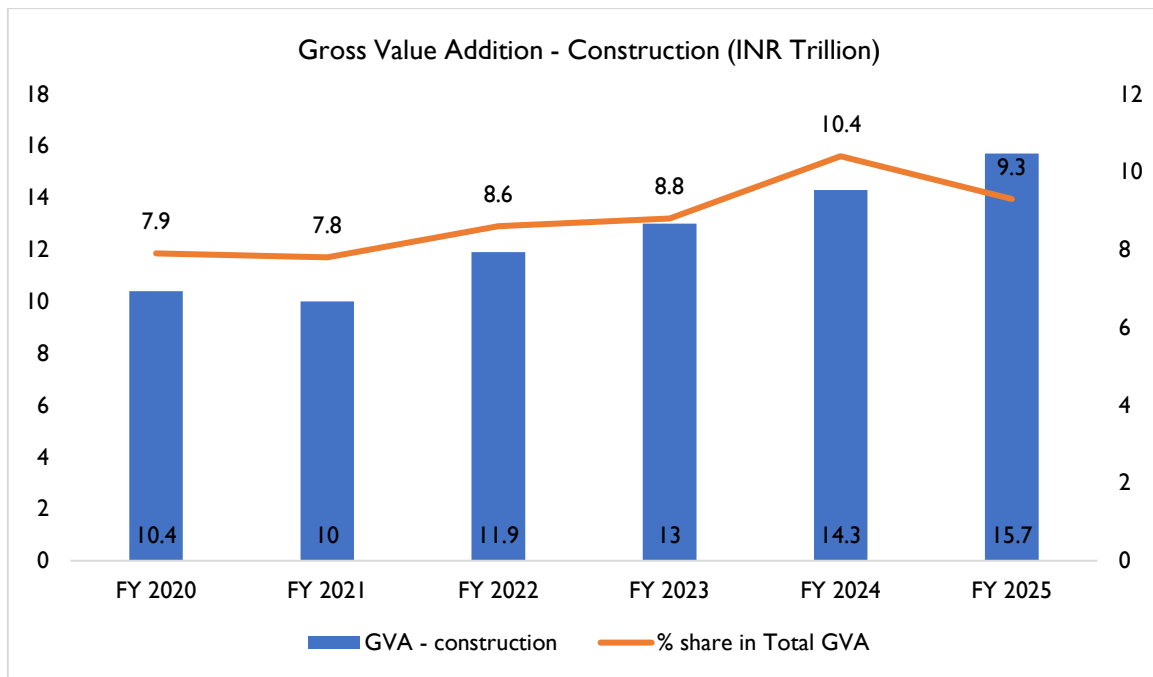
Construction Industry in India

The construction sector encompasses a broad range of activities involved in the planning, design, development, and maintenance of buildings and infrastructure. This includes residential, commercial, and industrial structures, as well as roads, bridges, railways, ports, airports, water supply systems, and energy facilities. It plays a foundational role in national development by creating the physical framework necessary for economic activity, public services, and improved quality of life. The sector is supported by a wide network of industries providing raw materials, equipment, and services, making it one of the most interconnected and influential components of the economy.

The construction sector serves as a vital pillar of the Indian economy, with extensive linkages spanning over 250 ancillary industries such as cement, steel, paints, bricks, tiles, and more. It ranks as the second-largest economic activity in the country after agriculture, contributing an estimated 9.1% to the national Gross Value Added (GVA) in FY 2025, according to data from the Ministry of Statistics and Programme Implementation (MoSPI). When combined with outputs from real estate services and ownership of dwellings, the broader construction ecosystem contributes approximately 14.3% to the total GVA at constant prices.

Characterized by high employment elasticity and a significant multiplier effect, the sector has the capacity to generate up to five times the income in other industries for every unit of investment, underscoring its importance in driving inclusive growth and industrial development. Construction is also the second-largest employment generator in India, providing jobs to nearly 71 million individuals in FY 2023, as reported by the Periodic Labour Force Survey (PLFS). This number is projected to surpass 100 million by 2030, propelled by increasing demand for infrastructure in both urban and rural areas, along with growth in the housing and industrial sectors.

The sector plays a crucial role in creating direct employment across various disciplines such as engineering, architecture, project management, and skilled trades. Additionally, it supports a wide range of indirect employment through its strong backward and forward linkages with industries such as manufacturing, transportation, logistics, and equipment leasing. Over the years, the contribution of the construction sector to the national economy has steadily increased. By FY 2025, its GVA is projected to reach approximately INR 15.6 trillion, accounting for about 9.1% of the national GVA.



As per the National Account Statistics 2024, the Total Output of Dwellings, Other Buildings & Structures (at constant prices) demonstrates a consistent long-term growth trajectory between FY 2018 and FY 2024. The output increased from INR 25,871 billion in FY 2018 to INR 27,987 billion in FY 2019, and further to INR 28,661 billion in FY 2020, before experiencing a minor contraction to INR 27,373 billion in FY 2021. The sector regained momentum thereafter, expanding to INR 33,052 billion in FY 2022, INR 36,382 billion in FY 2023, and ultimately reaching INR 39,407 billion in FY 2024. Overall, the construction output registered a compound annual growth rate of approximately 7.33% over the six-year period, reflecting sustained sectoral recovery and expansion despite short-term fluctuations.

Various Segment of Construction Sectors (INR Bn)	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	CAGR
I. Dwellings, Other Buildings & Structures	25,871	27,987	28,661	27,373	33,052	36,382	39,407	7.0%
I.1 Residential (Dwellings)	5,112	5,833	5,565	5,189	5,789	10,213	10,515	12.0%
I.2 Other Buildings & Structures	20,759	22,154	23,096	22,185	27,263	26,169	28,892	5.0%
I.2.1 Non-Residential Buildings	11,045	11,956	11,435	10,939	14,938	13,377	14,100	4.0%
I.2.2 Roads & Bridges	2,014	1,991	2,267	2,227	2,299	2,433	2,989	6.0%
I.2.3 Other Structures & Land Improvements	7,701	8,207	9,394	9,018	10,025	10,359	11,804	7.0%
Total Output of Construction Sector	26,477	28,433	29,050	27,654	33,310	36,557	39,775	6.9%
Total GVA of Construction Sector	9,643	10,268	10,434	9,954	11,935	13,022	14,378	6.8%

Sources: National Account Statistics 2024 by MOSPI

Increasing construction output is based on increased government spending on infrastructure. 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.

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.

Table 2: Sectors Attracting Highest FDI Equity Inflow

Sectors (INR Bn)	Amount in Rupees Crores	FY 2023	FY 2024	FY 2025	Cumulative Equity Inflow * (April, 2000-March, 2025)	%age out of total FDI Equity inflow (in terms of USD)
Construction (Infrastructure) Activities	Rupees Crores	13,588	35,076	18,962	2,58,516	5.0%
Construction Development: Townships, Housing, Built-up Infrastructure And Construction-development Projects	Rupees Crores	1,196	2,113	4,503	1,35,824	4.0%

Sources: Department for Promotion of Industry and Internal Trade

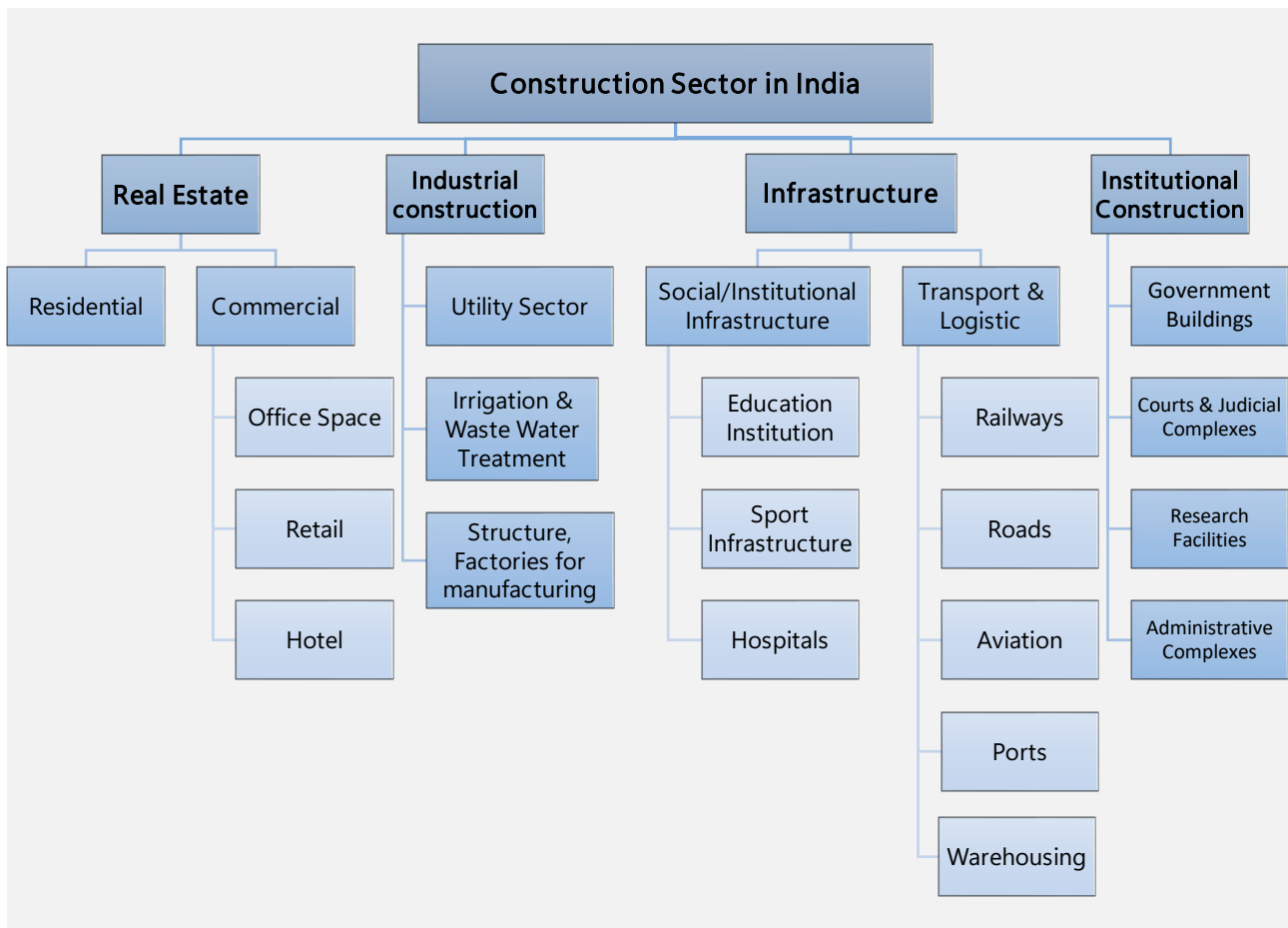
Construction sector, specifically infrastructure activities, has shown a notable growth trajectory in foreign direct investment (FDI) inflows. In FY 2023, the construction (infrastructure) activities sector attracted approximately USD 1,657 million, which increased significantly to approximately USD 4,201 million in FY 2024. For FY 2025 (up to March), the sector continued to see inflows of approximately USD 2,231 million. Cumulatively, from April 2000 to March 2025, the sector has attracted a substantial equity inflow, representing 5% of the total FDI equity inflow in terms of USD.

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 USD 146 million in FY 2023, which grew to approximately USD 253 million in FY 2024. For FY 2025 (up to March), this sector attracted approximately USD 530 million. Over the cumulative period from April 2000 to March 2025, the construction development sector has received a significant amount in equity inflows, making up 4% of the total FDI equity inflow.

Key segments: Real Estate Construction, Industrial Construction, Infrastructure Construction, Institutional Construction

Construction sector is one of the major segments that drives an economy. Construction projects are often categorized based on their scale, the types of structures being built, and the purpose of the project. The sector is broadly divided into real estate construction, Industrial, infrastructure and institutional construction.

According to the “Harmonized Master List of Infrastructure Sub-sectors” published by the Ministry of Finance, Infrastructure segment is segmented as transport and logistics segment and Social and Commercial Infrastructure.



Source: Dun & Bradstreet Desk Research

I. Real Estate Construction

- **Residential:** This segment focuses on the development of housing units, including standalone homes, apartments, townships, and affordable housing projects. It caters to the growing urban population and rising demand for quality living spaces.
- **Commercial:** This includes the construction of business-oriented infrastructure aimed at facilitating commercial activity:
 - **Office Space:** Development of corporate offices, IT parks, and business centres to support India's growing service and technology sectors.

- **Retail:** Establishment of malls, showrooms, and retail outlets catering to consumer markets.
- **Hotel:** Construction of hospitality infrastructure such as hotels, resorts, and serviced apartments to support tourism and business travel.

2. Industrial Construction

- **Utility Sector:** Covers construction of essential service infrastructure such as power plants, electrical substations, gas pipelines, and water supply systems that ensure seamless energy and utility distribution.
- **Irrigation & Waste Water Treatment:** This includes the development of dams, canals, and sewage treatment plants, aimed at enhancing agricultural productivity and ensuring sustainable water management.
- **Structure & Factories for Manufacturing:** Focuses on the construction of production facilities, assembly plants, and industrial warehouses to support India's manufacturing and "Make in India" initiatives.

3. Infrastructure Construction

- **Social/Institutional Infrastructure:** Projects under this category enhance quality of life and support societal development:
 - **Education Institutions:** Construction of schools, colleges, and universities that strengthen the education ecosystem.
 - **Sport Infrastructure:** Development of stadiums, sports complexes, and training academies to promote sports and recreation.
 - **Hospitals:** Establishment of healthcare infrastructure including hospitals, clinics, and diagnostic centres to improve public health access.
- **Transport & Logistics:** This sub-sector ensures the movement of goods and people efficiently:
 - **Railways:** Expansion and modernization of railway lines, stations, and terminals.
 - **Roads:** Construction of highways, expressways, rural roads, and flyovers, ensuring regional connectivity.
 - **Aviation:** Development and upgrade of airports, airstrips, and associated infrastructure.
 - **Ports:** Construction and expansion of seaports and inland waterways to enhance maritime trade.
 - **Warehousing:** Establishment of logistics hubs and storage facilities to support supply chain operations.

4. Institutional Construction

Institutional construction refers to the building of structures primarily intended for public or administrative use. This segment is crucial for governance, research, and policy execution.

- **Government Buildings:** Includes administrative offices, municipal buildings, and public service facilities.
- **Courts & Judicial Complexes:** Construction of district and high courts, legal service centres, and judicial academies.
- **Research Facilities:** Development of R&D centres, laboratories, and scientific institutions to support innovation and technological advancement.
- **Administrative Complexes:** Multi-functional government campuses that house different departments and streamline public administration.

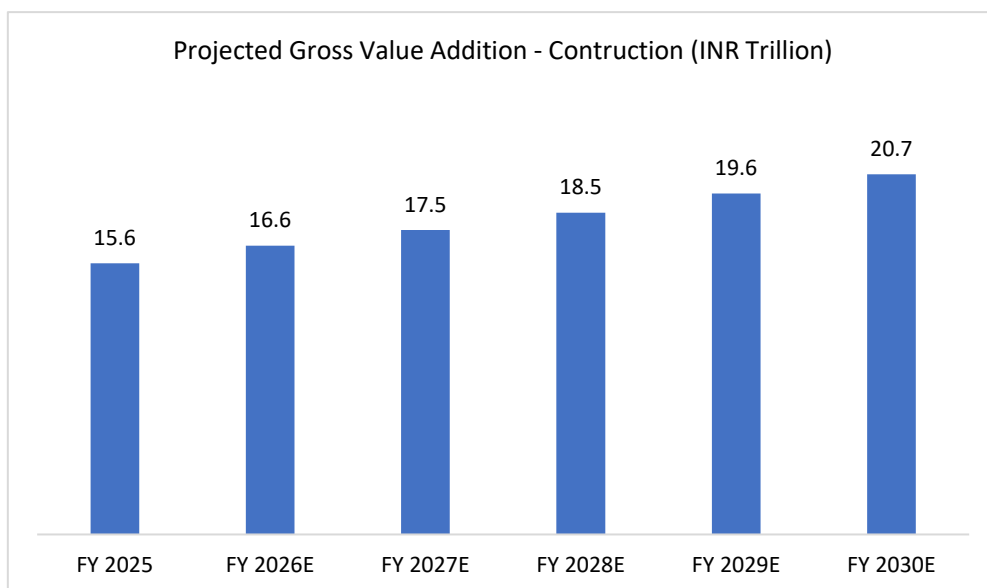
Hence, India's construction sector is a dynamic and multifaceted industry, broadly categorized into Real Estate, Industrial, Infrastructure, and Institutional construction. These segments collectively address the nation's diverse needs, ranging from urban housing and commercial spaces to vital utilities, transportation networks, and crucial public facilities, all contributing significantly to India's sustained growth and development.

Growth outlook

As the Indian economy continues to expand, rising disposable incomes are driving increased demand for residential, commercial, and retail spaces, thereby fuelling construction activity across various segments. A strong economic outlook also attracts both domestic and foreign investments in infrastructure sectors such as power generation, transportation, and industrial development, resulting in substantial construction contracts and further strengthening the industry.

The growth of key sectors including IT, e-commerce, and manufacturing is generating demand for specialized facilities such as commercial offices, warehouses, and production units, further accelerating construction momentum. Consequently, India's construction market is projected to become the second largest globally by 2030, with the sector's Gross Value Added (GVA) anticipated to reach INR 20.7 trillion, growing at a **CAGR of 5.8% between FY 2025 and FY 2030**.

Additionally, United Nations projections estimate India's population will reach 1.64 billion by 2047, with 51% residing in urban areas. This demographic shift, driven by a young population migrating to cities, will intensify demand for housing, student accommodation, and rental properties. It will also necessitate significant investments in essential infrastructure such as schools, healthcare facilities, and public transport systems. Recognizing that quality infrastructure is vital for sustained economic growth, the government continues to prioritize infrastructure development through initiatives such as Smart Cities, with a focus on sustainable urban planning, improved public amenities, and efficient waste management. The construction sector is therefore poised for strong growth, supported by increased government budget allocations and major infrastructure programs including the National Infrastructure Pipeline (NIP), PM Gati Shakti, Smart Cities Mission, Swachh Bharat Mission, and metro rail projects.



Sources: Forecast Based on CMIE Projection

Furthermore, government initiatives such as the Pradhan Mantri Awas Yojana (PMAY) are incentivizing the development of affordable housing for low-income households, thereby creating a new demand segment and fostering inclusive growth within the construction industry. From a policy standpoint, the government is undertaking regulatory reforms to facilitate investment in construction projects. Measures aimed at simplifying environmental clearances and streamlining land acquisition processes are expected to mitigate historical delays, creating a more conducive and business-friendly environment that encourages new market entrants.

However, the sector faces certain downside risks, including constrained credit flow from financial institutions and the impact of rupee depreciation on input costs. Despite these challenges, the long-term outlook for the construction industry remains positive, underpinned by major government-led initiatives such as the National Infrastructure Pipeline and the PM Gati Shakti program, both of which are expected to drive sustained construction activity.

Various Segment of Construction Sector (INR Bn)	FY 2023	FY 2024	FY 2030 Projected
I. Dwellings, Other Buildings & Structures	36,382	39,407	56,941
I.1 Residential (Dwellings)	10,213	10,515	10,844
I.2 Other Buildings & Structures	26,169	28,892	46,097
I.2.1 Non-Residential Buildings	13,377	14,100	24,039
I.2.2 Roads & Bridges	2,433	2,989	4,272
I.2.3 Other Structures & Land Improvements	10,359	11,804	17,786
Total Output of Construction Sector	36,557	39,775	57,661
% share of Dwellings, Other Buildings & Structures in total construction output	99.5%	99.0%	98.7%
Total GVA of Construction Sector	13,022	14,378	20,700
Construction GVA as a % of Construction Output	35.6%	36.1%	36.3%

Sources: National Account Statistics 2024 by MOSPI

Note: Mineral Exploration & Plantation output has not been represented in this table as a line item which account for remaining ~1% share in the total construction sector output. However, the total output value and GVA includes the same.

India's construction sector is on a strong growth trajectory, with the total economic output projected to rise from INR 39,775 billion in FY 2024 to INR 57,661 billion by FY 2030, reflecting a compound annual growth rate (CAGR) of approximately 5.8%. This growth is supported by sustained investments across housing, commercial infrastructure, and large-scale public infrastructure development. As a key pillar of India's economy, the sector plays a vital role in driving gross value added (GVA), employment, and urban

transformation. A segment-wise analysis highlights that "Dwellings, Other Buildings & Structures" will remain the dominant contributor, expected to grow from INR 39,407 billion in FY 2024 to INR 56,941 billion by FY 2030. While residential construction is set to grow moderately to INR 10,844 billion, demand will continue to be driven by urbanization, government housing initiatives, and a rising middle class. Meanwhile, the non-residential and infrastructure components are expected to see significant expansion, with the "Other Buildings & Structures" segment projected to reach INR 46,097 billion.

Sub-segments such as non-residential buildings, roads & bridges, and land improvement structures are central to this momentum. Non-residential buildings including commercial, industrial, and institutional developments are anticipated to nearly double, reaching INR 24,039 billion by FY 2030. Infrastructure development in roads and bridges is set to rise to INR 4,272 billion, while land and structural improvements are projected at INR 17,786 billion, underscoring robust public works and urban development. The sector's Gross Value Added (GVA) is expected to grow in tandem, increasing from INR 14,378 billion in FY 2024 to INR 20,700 billion by FY 2030. With construction GVA as a percentage of total output improving from 36.1% to 36.3%, this indicates enhanced sectoral productivity and economic value generation. Together, these trends reaffirm the sector's pivotal role in India's long-term development strategy.

Growth in the construction sector is being propelled by a combination of government and private sector initiatives. Key national programs like the National Infrastructure Pipeline (NIP) and PM Gati Shakti are driving investment into critical infrastructure segments such as transport, logistics, energy, and smart cities. Simultaneously, private sector participation in commercial real estate and industrial development is contributing to the rise in non-residential construction. Additionally, rapid urbanization and favourable demographic trends are driving long-term demand for both residential and public infrastructure.

In conclusion, India's construction sector is set for sustained and broad-based growth through FY 2030. The expansion is expected to be led by infrastructure and non-residential construction, supported by stable growth in residential activity. With strong government backing, increasing investment flows, and ongoing modernization, the sector is well-positioned to play a central role in shaping India's economic landscape in the years to come.

Infrastructure Construction

The infrastructure construction segment serves as a cornerstone of India's economic advancement and national development. It encompasses the creation, expansion, and maintenance of critical public infrastructure that supports connectivity, productivity, and improved living conditions. As a foundational pillar of the economy, this segment not only facilitates the movement of goods and people but also plays a vital role in shaping the socio-economic landscape of the nation. Infrastructure development is closely linked to industrial growth, urbanization, and regional development, contributing significantly to job creation, income generation, and improved access to essential services. With India embarking on ambitious infrastructure programs ranging from highways and smart cities to energy corridors and digital infrastructure—this segment continues to act as a powerful enabler of inclusive growth, long-term competitiveness, and sustainable development.

- **Enhancing Connectivity:** Robust transportation networks facilitate the seamless movement of people and goods, thereby strengthening trade and regional integration.
- **Driving Economic Activity:** Infrastructure projects stimulate job creation, attract private and public investment, and catalyse growth across multiple sectors of the economy.
- **Improving Living Standards:** Infrastructure development ensures access to essential services such as clean water, sanitation, and uninterrupted electricity, significantly enhancing the quality of life.

The infrastructure construction sector is broadly classified under Transport and Logistics Infrastructure, which includes roads, highways, railways, airports, ports, and allied facilities.

Key Segments of Infrastructure Construction:

Transport & Logistics Infrastructure

- **Roads & Highways:** India has made significant strides in expanding and modernizing its road network, which now stands as the second-largest globally. As of 2025, the total road network in the country spans approximately 6.7 million kilometres, comprising national highways, state highways, district roads, and rural roads. This extensive system supports nearly 65% of freight movement and about 90% of passenger traffic.

A notable milestone is the expansion of the national highway network, which has grown from 91,000 kilometres in 2014 to 146,145 kilometres in 2024 an addition of over 55,000 kilometres in a decade. Maharashtra leads the country in national highway length, with 18,459 kilometres, followed by Uttar Pradesh and Rajasthan. This expansion underscores the government's commitment to infrastructure development and plays a vital role in enhancing connectivity, logistics efficiency, and economic integration.

- **Railways:** India boasts the world's fourth-largest railway network, which is undergoing rapid modernization through initiatives such as dedicated freight corridors and high-speed rail development. Upgradation of railway stations is a central component of this modernization, aimed at delivering a world-class travel experience to passengers.

Enhancement efforts include the construction of modern waiting halls, restrooms, and passenger lounges equipped with advanced amenities like Wi-Fi, charging stations, and digital display systems for real-time train updates. Additionally, accessibility improvements such as the installation of ramps and elevators are being implemented to make railway services inclusive and user-friendly for all, including persons with disabilities.

- **Airports:** India is actively expanding and modernizing its airport infrastructure to accommodate growing air traffic and enhance regional connectivity. As part of this effort, over 100 airports are being built or upgraded across the country. According to the Ministry of Civil Aviation, a substantial capital expenditure (CAPEX) of over INR 91,000 crore is planned under the National Infrastructure Pipeline (NIP) for the period FY 2019-20 to FY 2024-25, with approximately INR82,600 crore already spent as of November 2024.

In the Union Budget 2026–27, the Ministry of Civil Aviation has been allocated INR 2,102 crore, reflecting a 12.42% year-on-year decrease, which may influence short-term investment momentum but aligns with the nearing completion of several major projects.

- **Ports:** With a coastline of approximately 7,517 km, India offers immense potential for port development, facilitating international trade and boosting maritime connectivity. As of July 2024, India has 12 major ports and around 200 minor ports. Indian ports handle 95% of the country's total international trade volume, with the 12 major ports accounting for 53% of the cargo traffic and minor ports contributing 47% in FY 2024.

In 2023–24, major Indian ports achieved a significant operational milestone by reducing container turnaround time to 22.57 hours, surpassing global benchmarks. Paradip Port reported a net surplus of INR1,570 crore (USD 188 million) with a 21% rise, while Jawaharlal Nehru Port posted a net surplus of INR1,263.94 crore (USD 151 million) highlighting improved efficiency and profitability.

Various initiatives led by central authorities aim to further enhance maritime transport through reduced turnaround times, optimized operational efficiency, increased capacity utilization, expansion of inland waterways, and lower logistics costs. Flagship programs such as the Sagarmala Project and Maritime India Vision 2030 are guiding India's transformation into a leading global maritime hub. To this end, India has outlined infrastructure investments worth USD 82 billion in port development projects by 2035, reinforcing the country's long-term strategic commitment to the sector

Mapping the role of infrastructure construction in economic development

Infrastructure construction serves as the foundation for economic advancement. It enhances connectivity, promotes trade, supports industrial growth, and improves the quality of life for citizens. In a rapidly developing nation like India, infrastructure plays a transformative role in accelerating national development and strengthening global competitiveness.

1. Infrastructure as a Key Economic Driver: The construction and upgradation of infrastructure such as roads, railways, ports, bridges, and digital networks is directly linked to economic productivity and efficiency.

- Public infrastructure is central to trade facilitation and logistics efficiency.
- It boosts industrial output by providing better access to raw materials and markets.
- Helps in equitable regional development by connecting remote and underserved areas.

2. Massive Growth in Infrastructure Spending: India's commitment to infrastructure is evident from the massive rise in public investment. In FY 2024, infrastructure spending surged to INR10 lakh crore, demonstrating its priority in national planning.

- Reflects combined efforts of public and private sectors in infrastructure growth.
- Accelerates demand for labour, machinery, raw materials, and construction services.
- Stimulates capital formation and contributes to GDP expansion.

3. High Multiplier Effect on GDP: Studies by the Reserve Bank of India (RBI) and the National Institute of Public Finance and Policy (NIPFP) show that infrastructure investments have strong economic returns.

- Every INR1 spent on infrastructure yields INR2.5 to INR3.5 in GDP growth.
- Positive spillover effects on employment, income levels, and productivity.
- Enhances investor confidence in India's growth story.

4. PM Gati Shakti: Coordinated Infrastructure Planning: Launched in 2021, the PM Gati Shakti National Master Plan (NMP) aims to ensure integrated planning and execution of infrastructure projects across ministries and states.

- 44 Central Ministries and 36 States/UTs onboarded by October 2024.
- 1,614 data layers integrated for evidence-based project planning.
- 208 big-ticket projects worth INR15.39 lakh crore aligned with Gati Shakti principles.
- Improves last-mile connectivity and reduces travel and logistics costs.

5. Supporting Technological and Industrial Advancements: The rise of Industry 4.0 and automation has led to increased demand for technologically capable infrastructure.

- Modern industries require digital-ready, intelligent infrastructure.
- Infrastructure construction supports integration of robotics, AI, and data analytics.
- Ensures competitiveness in manufacturing, logistics, and service sectors.

6. Landmark Infrastructure Projects in India: India has made significant progress through world-class construction achievements, symbolizing both engineering excellence and economic intent.

- **Atal Tunnel:** World's longest high-altitude highway tunnel, improving all-weather access to Ladakh.
- **Chenab Bridge:** World's highest railway bridge, enhancing strategic and passenger connectivity.
- **Zojila Tunnel:** Asia's longest bi-directional tunnel for year-round Himalayan connectivity.
- **Other Notable Projects:** Atal Setu (Mumbai), Bogibeel Bridge (Assam), Dhola-Sadiya Bridge (Northeast).

7. Boosting Inland Water Transportation: India is expanding alternative transportation modes by developing inland waterways. Under the National Waterways Act, 2016, 111 rivers have been declared National Waterways.

- Promotes low-cost, eco-friendly transport of goods and passengers.
- Reduces congestion on highways and railway lines.
- Enhances connectivity to remote and rural regions.

8. Macro Benefits of Infrastructure Construction: Infrastructure growth has both direct and indirect benefits across the economic spectrum.

- Increases employment opportunities in construction, logistics, and allied industries.
- Improves ease of doing business by reducing transaction costs.
- Enhances access to healthcare, education, and housing.
- Drives urbanization, innovation, and regional economic balance.

9. Vision 2047: Building a Developed India: Infrastructure development is central to realizing India's vision of becoming a developed nation by 2047.

- Acts as a growth engine for inclusive and sustainable development.
- Enables long-term structural reforms across sectors.
- Strengthens India's position as a global economic powerhouse.

Roads & Highways

Insight on Road Infrastructure

India's road infrastructure serves as the lifeline of its transportation and logistics network, enabling economic activity and social mobility across urban and rural regions. With a vast road network spanning over 6.7 million kilometres, India ranks as the second-largest in the world. This extensive connectivity facilitates the movement of goods and people across the country, with more than 64.5% of all goods transported via roads and 90% of total passenger traffic relying on roadways for daily commutes and inter-city travel. The strategic role of this sector in enabling trade, regional integration, and accessibility underscores its importance to India's development agenda.

The government continues to prioritize road infrastructure development through consistent policy and financial support. Under the Union Budget 2026–27, the Ministry of Road Transport and Highways was allocated INR 309875.30 crore, reflecting a 7.84% increase from the previous year. This allocation is part of a broader infrastructure push, with the Union Government's effective capital expenditure estimated at 4.4% of GDP in FY 2026–27. The majority of these funds are concentrated in roads and highways, highlighting the government's commitment to building a robust, high-capacity transport network that supports both economic growth and improved quality of life.

India also benefits from cost efficiency in this sector, ranking as the second least expensive country in Asia for road construction. This cost advantage enables the government and private developers to scale road infrastructure projects more affordably and at a faster pace. Further, the investment landscape is dynamic and diverse, with the India Investment Grid database reflecting approximately INR 69 trillion worth of infrastructure projects, most of which are in the roads and highways segment. Private sector participation has significantly strengthened through Public-Private Partnerships (PPPs), particularly under Build-Operate-Transfer (BOT) and Hybrid Annuity Mode (HAM) models. These contribute to around 27% of the projects listed under the National Monetization Pipeline, enhancing operational efficiency and accelerating project implementation.

India's continued emphasis on road development is integral to achieving seamless connectivity, reducing logistics costs, and enhancing national competitiveness. As key initiatives such as Bharatmala and economic corridors progress, road infrastructure will remain central to realizing inclusive and sustainable growth, serving as a critical enabler of India's long-term development trajectory.

Major Type of Road Project Execution Model including Engineering, Procurement & Construction (EPC), Hybrid Annuity Model (HAM), and Build Operate Transport (Toll)

India's road infrastructure development has evolved significantly over the years, driven by the need to build a modern, extensive, and high-quality transport network that supports economic growth and connectivity. To meet the growing demands of rapid urbanization and industrial expansion, multiple project execution models have been introduced and implemented, each tailored to optimize resource utilization, enhance operational efficiency, and attract private sector investment. Among the most prominent models are the Engineering, Procurement and Construction (EPC) model, the Hybrid Annuity Model (HAM), and the Build-Operate-Transfer (BOT) (Toll) model.

➤ **The Engineering, Procurement and Construction (EPC) model**

It is a government-funded structure where the public authority bears the entire financial responsibility for the project. Under this model, the private contractor is responsible for the detailed engineering design, procurement of necessary materials, and construction of the project within a stipulated timeframe and cost. While the government retains full ownership of the asset, the EPC model ensures timely delivery and quality control by leveraging private sector capabilities in execution and project management. It is particularly effective in projects where financial risks are high or traffic projections are uncertain.

In the EPC model, the contractor is obligated to deliver the completed project to the government in a ready-to-use condition, adhering to pre-defined technical specifications and quality standards. The financial risk, including costs related to construction, material procurement, and project delays, lies with the contractor. However, the government remains responsible for securing the required land, obtaining statutory clearances, and funding 100% of the construction cost through direct payments linked to project milestones.

This model is particularly effective for projects with limited scope for private revenue generation or uncertain traffic demand, as it eliminates the need for the private sector to recover costs through tolls or user fees. The EPC model ensures timely execution and transparency in public expenditure while leveraging the technical and managerial expertise of the private sector. It is often preferred for strategic or socially critical infrastructure projects, where public ownership and control remain essential throughout the asset's lifecycle.

Overall, the EPC model provides a balanced approach to infrastructure delivery, with clear delineation of responsibilities and reduced financial burden on private developers, making it a reliable choice for public infrastructure procurement.

➤ **Build Operate Transport (BOT) Model**

BOT is a conventional PPP (public private partnership) model wherein the private partner is granted the concession to finance, build, and operate the project for a specified time (20-to-30-year concession period). The developer recoups their investment during this period by way of user charges / toll chargers. At the end of the concession period the developer hands over the project back to the public sector.

During O&M (Operation & maintenance) period, government and O&M by the concessionaire will manage toll collection. Under this model, amount financed by the concessionaire during construction period will be recovered by the government through annuity payment (biannually for 15 years) along with interest payment based (on reducing balance method @ Bank rate +x%). Thus, lender of the project will be at comfort with assured annuity payment and private sector will not have to bear traffic risk. Over the years, BOT route has witnessed several innovations, spawning several variants.

Build Operate Transfer (BOT) Model & Variants	
Build Operate Transfer (BOT)	The BOT model adheres to a classic PPP structure where the private partner takes charge of the entire project lifecycle, from design and construction to operation, before eventually returning the facility to the public sector. Crucially, the private sector partner assumes the responsibility for financing and upkeep, making it particularly suitable for greenfield projects. Furthermore, the public sector permits the private entity to charge users for the services provided, ensuring financial sustainability
Build Own Operate (BOO)	In the BOO approach, a private entity retains ownership of the newly constructed facility. The public sector, in turn, agrees to procure the goods and services delivered by the project under mutually acceptable terms and conditions. This arrangement allows the private sector to maintain ownership while facilitating public access to essential services.
Build Own Operate Transfer (BOOT)	In this variation of the BOT model, the project eventually transitions to the government or a private operator after the agreed-upon period. The BOOT concept is commonly employed in the construction of highways and ports, exemplifying its utility in facilitating private sector involvement in infrastructure development.
Build Lease Transfer (BLT)	Under the BLT model, the asset is leased to the public entity for a defined period, while ownership remains with the private company. Unlike some other models, the public sector assumes responsibility for financing the investment, making it a unique partnership structure.

Build Own Lease Transfer (BOLT)	In the BOLT strategy, the government grants a building concession to a private company, potentially including the design phase. The facility may initially be owned by a private business, which can subsequently lease it to the public sector. Ultimately, ownership of the facility is transferred back to the government after the lease term expires.
Design Build Finance Operate (DBFO)	The DBFO model places the private party in full control of the project, encompassing design, construction, financing, and operation throughout the concession period. This comprehensive approach streamlines accountability and can be particularly attractive to clients seeking a single point of responsibility for project delivery and operation.
Lease Develop Operate (LDO)	Primarily employed in the development of airport facilities, the LDO model retains public ownership of the newly constructed infrastructure while establishing a lease agreement with the private promoter. Payments are made to the public sector under the terms of this lease, making it a valuable tool for enhancing airport infrastructure.
Design Construct Manage Finance (DCMF)	Under the DCMF model, private sector entities construct and manage the asset for a predetermined period, which can span from 20 to 50 years. The government compensates the contractor for the asset's use during this time, potentially diverting public spending from significant infrastructure projects to fund other public initiatives. This model finds application in various sectors, including jails, courts, and public hospitals.

➤ **Hybrid Annuity Model (HAM)**

To enhance private sector participation and attract investment in the road infrastructure sector, the Government of India introduced the Hybrid Annuity Model (HAM) a structured blend of the Engineering, Procurement, and Construction (EPC) and Build-Operate-Transfer (BOT) models. Under this framework, the project cost is shared between the government and the private developer in a 40:60 ratio, respectively. The concessionaire is responsible for the design, construction, and financing of 60% of the project cost. Upon

completion, the road asset is transferred back to the authority after a fixed operation and maintenance (O&M) period of 15 years.

During the O&M phase, toll collection is managed jointly by the government and the concessionaire. The developer recovers its investment through biannual annuity payments made by the government over the concession period. These payments also include interest, typically calculated using the reducing balance method based on the prevailing bank rate plus a defined margin. This assured payment structure provides greater financial security to lenders and eliminates traffic risk for the private developer. Moreover, compared to the upfront funding requirements under the EPC model, HAM reduces the initial capital outlay for the government, making it a more balanced and financially sustainable model.

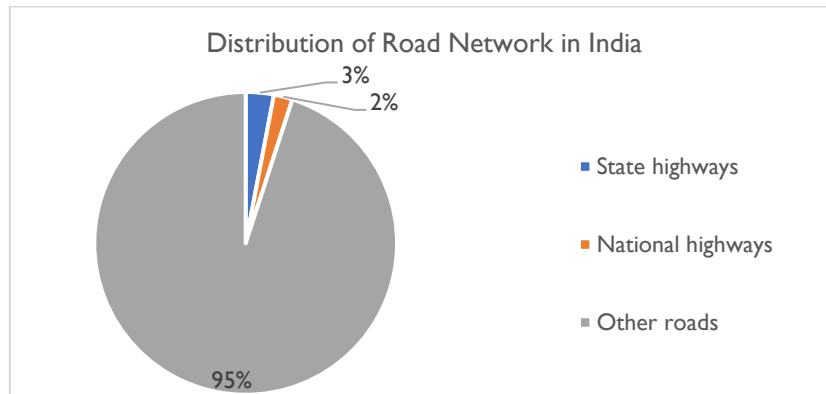
➤ **Toll Operate Transfer (TOT) Model**

The Toll-Operate-Transfer (TOT) model represents a strategic shift in road infrastructure development by monetizing operational national highway assets. In this model, investors make an upfront lump-sum payment to the government in exchange for the long-term right typically between 20 to 30 years to operate, maintain, and collect toll revenue from selected highway stretches. The bidding process is structured to award the concession to the highest bidder, ensuring value maximization for the government.

TOT is particularly attractive to investors as it eliminates the need for greenfield construction, thereby minimizing development and execution risks. It also addresses many of the risk-allocation challenges found in traditional BOT agreements by offering a more predictable revenue stream and established operational assets. For the government, the TOT model serves as a critical tool under the **National Asset Monetization Programme**, which aims to unlock capital from existing infrastructure assets and redirect it into new development. Specifically, the government has set a target of raising **INR 850 billion by FY 2024–25** through asset monetization, with the TOT model playing a central role in realizing this objective within the highways sector. Through models such as HAM and TOT, India continues to foster a more resilient and investment-friendly infrastructure ecosystem, leveraging public-private partnerships to drive long-term growth and sustainability.

Road network in India by segment: national highways, state highways & other roads

India possesses one of the largest and most extensive road networks in the world, playing a critical role in the nation's socio-economic development. Roads are the dominant mode of transportation in India, facilitating over 60% of freight and 85% of passenger movement. This vast network serves as the backbone for trade, commerce, and daily connectivity, bridging urban and rural regions across the subcontinent. As of the latest available data, the total road length in India stands at approximately 66.71 lakh kilometres, reflecting the immense scale and reach of the country's transportation infrastructure.



Source: India Brand Equity Foundation, Report, February 2025

The Indian road network is broadly segmented into three categories: **National Highways (NH)**, **State Highways (SH)**, and **Other Roads**, each serving distinct administrative, economic, and logistical purposes. **National Highways**, which form the arterial framework for long-distance and inter-state travel, comprise about **1,46,195 kilometres**, accounting for nearly **2%** of the total road length. Despite their relatively small share in total length, National Highways carry a disproportionately high volume of traffic and are central to national mobility and trade corridors.

State Highways serve as connectors between district headquarters and important cities within states. They have a combined length of **1,79,535 kilometres**, making up **3%** of the national road network. The largest share, however, is attributed to **Other Roads**, which include rural roads, municipal roads, and district roads. These roads cover a staggering **60,19,723 kilometres**, contributing to **95%** of the total road infrastructure. Together, these segments ensure inclusive connectivity, linking remote regions to economic centres and supporting last-mile access across India's diverse terrain.

➤ State Highway:

State Highways (SH) form a crucial component of India's road network, acting as vital links between National Highways, district headquarters, major towns, and important industrial or agricultural centres within states. With a total length of 1,79,535 kilometres, State Highways account for approximately 3% of the total road network in India. Despite their relatively modest share in overall road length, they play an indispensable role in intra-state connectivity and regional economic development.

State governments are responsible for the development and maintenance of these highways, often in collaboration with national or international funding agencies. Recognising the strategic importance of this network, significant investments have been channelled into its upgradation and expansion in recent years. For instance, in October 2020, the Asian Development Bank (ADB) and the Government of India signed a USD 177 million loan agreement aimed at upgrading 450 kilometres of State Highways and major district roads in Maharashtra, enhancing regional connectivity and boosting economic activity in the state.

Similarly, in January 2021, the New Development Bank (NDB) extended financial support by signing two loan agreements worth USD 646 million with the Government of India. These funds were designated for the improvement of State Highway and District Road networks in Andhra Pradesh, enabling safer, faster, and more efficient transportation across key routes. Such infrastructure initiatives not only improve road quality and capacity but also contribute to employment generation, reduced travel times, and enhanced access to markets, healthcare, and education in underserved regions.

➤ **National Highways:**

National Highways (NH) are the most critical component of India's road infrastructure, serving as the primary network for inter-state transport and long-distance travel. Though they constitute only 2% of the country's total road length approximately 1,46,195 kilometres National Highways handle over 40% of road traffic, underscoring their pivotal role in the movement of goods and passengers across regions.

Over the past decade, India has made substantial progress in expanding and modernizing its National Highway network. The network has grown from 91,287 kilometres in FY 2014 to 1,46,145 kilometres by FY 2025, representing a 59% increase in just nine years. This impressive expansion has positioned India's road network as the second-largest in the world, significantly enhancing national connectivity, trade logistics, and economic integration.

The government has remained committed to accelerating highway development through major policy reforms, public-private partnerships, and sustained capital investments. In FY 2025 (up to December) alone, the Ministry of Road Transport and Highways awarded contracts for the construction of 3,100 kilometres of National Highways, reflecting a robust pipeline of infrastructure activity.

While the focus remains on highways, broader urban transit connectivity is also being addressed. For example, in January 2025, Prime Minister Narendra Modi launched several metro development projects in Delhi, with a total investment of Rs. 12,200 crore (USD 1.43 billion), showcasing an integrated approach to urban and national mobility. Overall, the growth and modernization of National Highways are instrumental in supporting India's economic ambitions, reducing logistics costs, and connecting remote and underserved regions to mainstream development corridors.

Other Road:

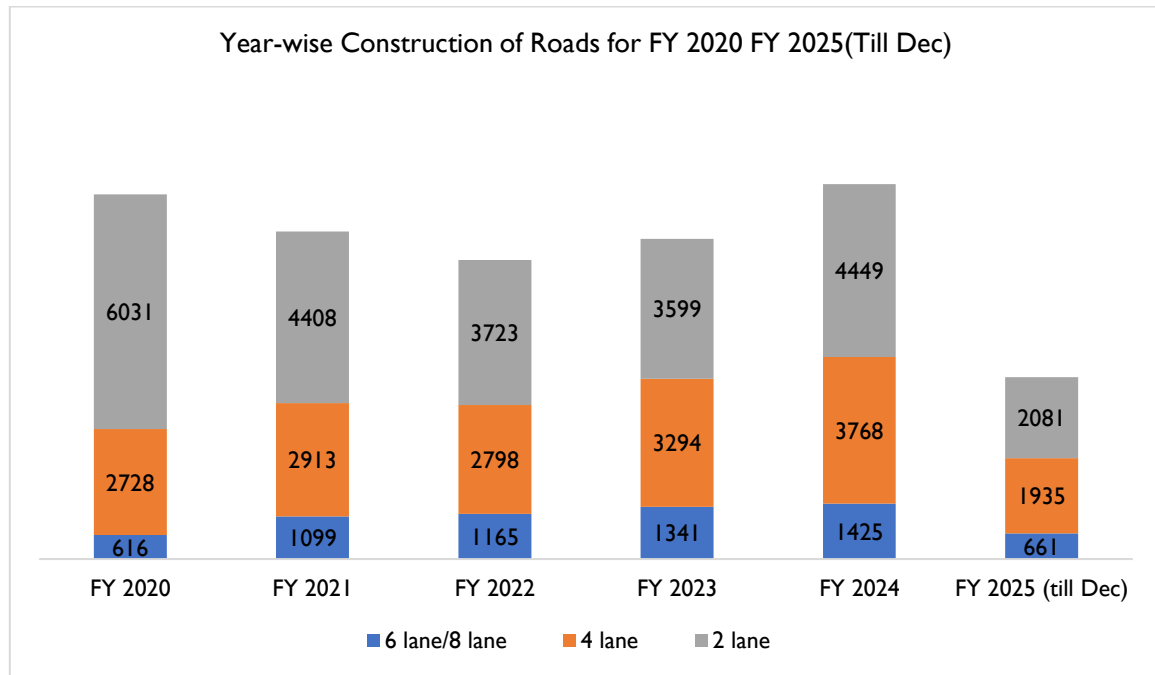
Other Roads constitute the largest and most expansive segment of India's road network, comprising rural roads, district roads, municipal roads, panchayat roads, and urban streets not classified under the National or State Highway categories. With a total length of 60,19,723 kilometres, this segment accounts for an overwhelming 95% of the country's total road network. These roads are essential for ensuring last-mile connectivity, promoting inclusive development, and facilitating access to basic services in rural and semi-urban regions.

Managed primarily by local and state-level authorities, Other Roads play a crucial role in agricultural supply chains, rural livelihoods, and local commerce. They connect remote villages to nearby markets, schools, healthcare facilities, and administrative centres, forming the foundation of India's grassroots mobility infrastructure. Programs like the Pradhan Mantri Gram Sadak Yojana (PMGSY) have been instrumental in expanding and upgrading rural road infrastructure, thereby fostering socio-economic development in historically underserved areas.

Despite their critical role, many of these roads face challenges related to quality, durability, and year-round accessibility, particularly in regions prone to adverse weather conditions. Continued investment in maintenance, weather-proofing, and upgrading these roads is essential to improve their reliability and integrate them effectively with the broader national transportation network. In summary, while Other Roads may lack the visibility and strategic prominence of highways, they serve as the lifeline of rural India, enabling mobility, reducing regional disparities, and driving local development.

Analysis of historical growth trend of the last 5 years

Over the past five years, India's road infrastructure development has followed a varied yet forward-moving trend, as reflected in the year-wise construction data from FY 2020 to FY 2025 (till December). The construction activity peaked in FY 2020 with 9,375 km of roads built, dominated by 2-lane roads (6,031 km), indicating a focus on widespread rural and regional connectivity. In the following years, despite a dip in total output due to pandemic-related disruptions and project recalibrations, there was a clear policy shift towards building higher-capacity roads.



Source: Government Of India Ministry Of Road Transport And Highways, Annual Report 2025

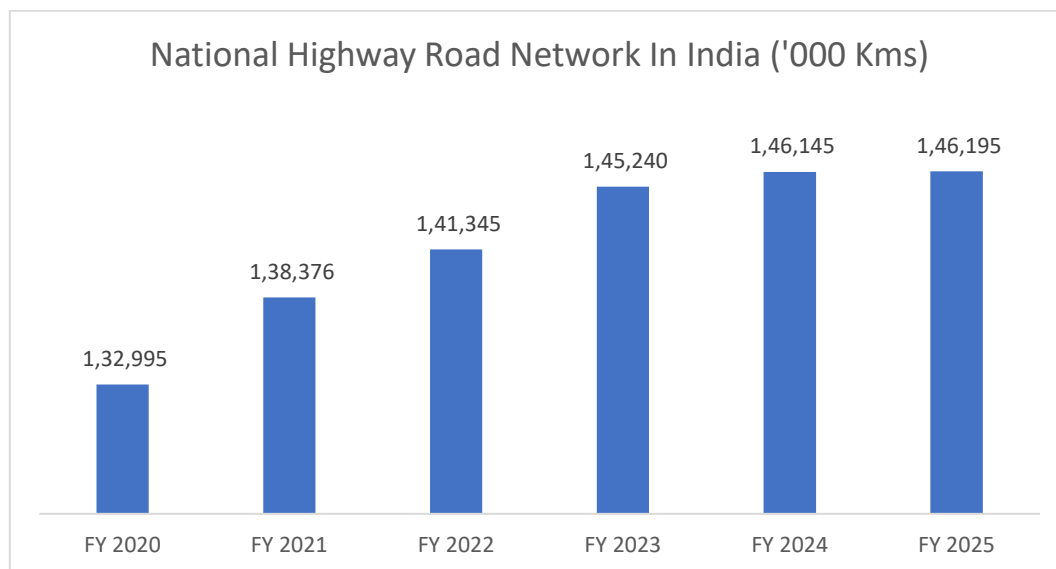
FY 2023 and FY 2024 witnessed a resurgence, particularly in 4-lane and 6/8-lane road construction, with FY 2024 achieving the highest share of 4-lane roads (3,768 km). However, FY 2025 (till December) shows a reduced output at 4,677 km, possibly due to ongoing transitions in project priorities or year-end completions being pending. Across the five years, a consistent increase in multi-lane roads highlights a strategic shift towards high-speed and heavy-capacity corridors to support economic growth.

In line with India's vision of becoming a USD 5 trillion economy by 2027, it is estimated that the country will need to spend approximately USD 4.51 trillion on infrastructure by 2030. Recognizing the pivotal role of transport infrastructure in this transformation, the government launched the National Infrastructure Pipeline (NIP), under which INR 20.34 trillion has been allocated for the highways sector by 2025. Specifically, for the road sector, INR 20.33 trillion was committed for development during the FY 2020–2025 period. Out of this, around INR 17 trillion is planned to be spent on constructing expressways, economic corridors, coastal and port connectivity highways, and strategic border roads. This reflects a significant policy thrust toward creating a robust and globally competitive road network.

Additionally, the government has set a long-term target of creating a world-class highway system by 2037, with a revised goal of expanding the national highway network to 2 lakh kilometres by then. This adjustment from the initial 2025 target demonstrates a shift towards quality and sustainability in project execution. A key component of this strategy includes the acceleration of high-speed access-controlled highways, aimed at enhancing freight efficiency, reducing travel time, and supporting regional economic development. This long-term infrastructure planning is central to India's growth ambitions and will continue to shape the country's developmental priorities well beyond 2025.

National highway network in India: pattern of growth in network, geographical spread

India's national highway network has experienced consistent and structured growth over the past five years, reflecting the government's focus on building a strong and efficient transportation backbone to support economic development. The expansion of this network is a key component of India's infrastructure strategy, aimed at enhancing national connectivity, reducing logistics costs, and enabling regional integration.



Source: Government Of India Ministry Of Road Transport And Highways, Annual Report 2025

As shown in the chart “National Highway Road Network in India (in '000 kms)”, the total length of national highways increased from **1,32,995 km in FY 2020** to **1,46,195 km in FY 2025**, marking an addition of over **13,200 km** during the five-year period. The most significant expansion occurred between FY 2021 and FY 2023, with the network growing from **1,38,376 km to 1,45,240 km**, highlighting a phase of accelerated construction and widening. In contrast, FY 2024 and FY 2025 witnessed marginal growth, suggesting a potential shift from rapid expansion to the prioritization of quality improvement, road durability, and efficiency enhancement across the existing network.

Top states with most National Highway network as on year ending on March 2024	
State	National Highway (in Kms)
Maharashtra	18,459
Uttar Pradesh	12,292
Rajasthan	10,706
Madhya Pradesh	9,104
Andhra Pradesh	8,683
Karnataka	8,191
Gujarat	8,099

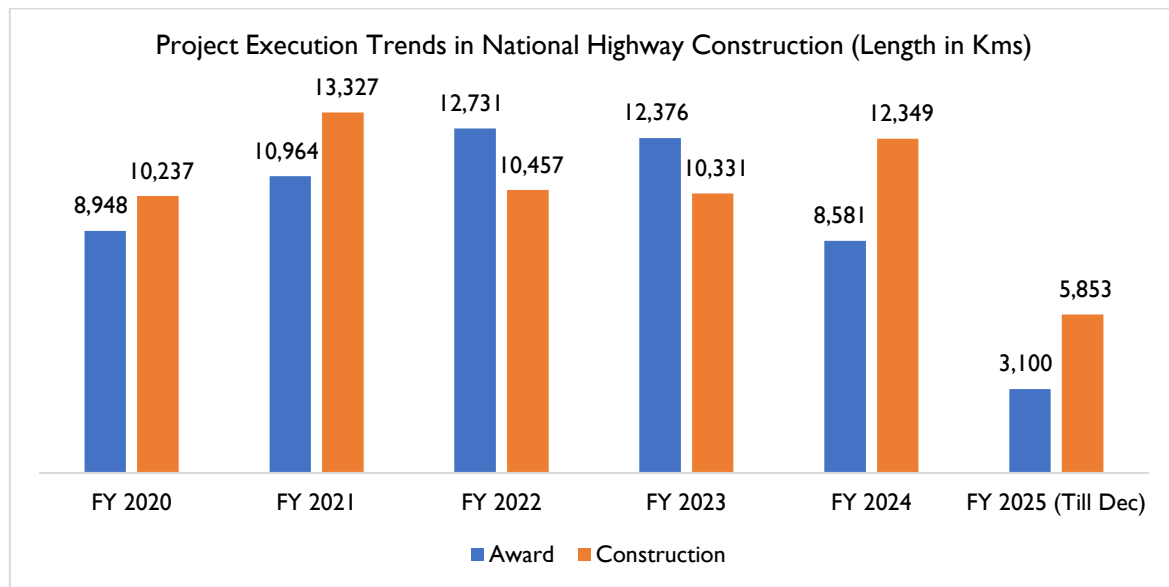
Source: Ministry of Road Transport & Highways, Government of India

The growth of the national highway network is not just numerical but also strategic in terms of geographical coverage. The network has been progressively expanded to improve regional connectivity, link economic zones, and integrate remote areas into the national economy. While almost all states have benefitted from this expansion, a few stand out as top contributors to the total highway length as of March 2024. Maharashtra leads with 18,459 km of national highways, followed by Uttar Pradesh (12,292 km) and Rajasthan (10,706 km). These states are key industrial, agricultural, and logistics hubs, and their extensive highway networks support both interstate trade and last-mile connectivity.

Other notable states include **Madhya Pradesh (9,104 km)**, **Andhra Pradesh (8,683 km)**, **Karnataka (8,191 km)**, and **Gujarat (8,099 km)**. The presence of these states in the top rankings highlights the government's focus on balanced regional development across northern, western, central, and southern India. These regions host critical corridors such as the Golden Quadrilateral, North-South and East-West corridors, and various economic and coastal linkages.

Insights on national highway project execution: Historical trend (awarded v/s constructed) in the last 5 years

This bar chart illustrates the trends in National Highway construction in India from FY 2020 to FY 2025 (till December). It shows both the length of projects 'Awarded' and 'Constructed' in kilometres.

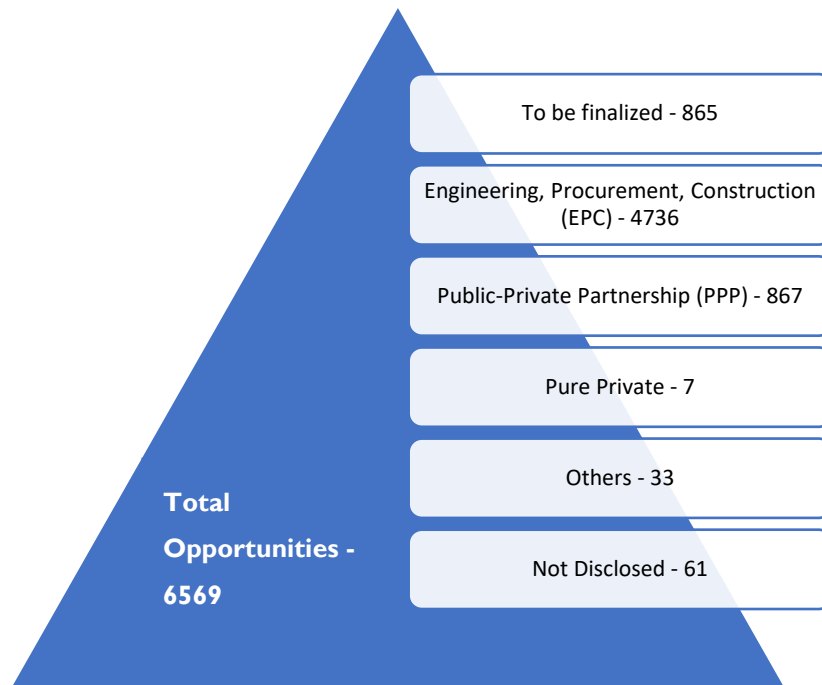


Source: Ministry of Road Transport & Highways, Government of India

The graph indicates a fluctuating trend in both awarded and constructed lengths of National Highways over the years. While there was a significant peak in both awarded and constructed lengths in FY 2021, subsequent years (FY 2022 and FY 2023) saw a decline in awarded projects, despite relatively consistent construction. FY 2024 shows a recovery in construction, significantly exceeding the awarded length for that fiscal year, potentially indicating the completion of projects awarded in previous periods, while FY 2025 (till Dec) projects lower figures for both, which is expected as it's not a full fiscal year.

Prevalent Scenario in Road Project execution

India's road infrastructure sector is expanding rapidly, backed by major government programs like Bharatmala and PM Gati Shakti. Currently, there are **6,569 active road project opportunities** in the country, with a total estimated worth of **USD 577.5 billion**.



Source: Invest India Report, 2025

The EPC (Engineering, Procurement, Construction) model dominates execution with 4,736 projects, followed by 867 projects under the PPP model. Additionally, 865 projects are yet to finalize their mode of implementation, 61 remain undisclosed, while 33 fall under other categories and 7 are purely private. While technology and policy reforms are improving project delivery, common challenges include land acquisition delays and regulatory clearances.

Overall, the road sector remains a high-investment, high-impact area with growing private involvement and strong government support.

Insights on expressway segments within the larger road infrastructure

India is witnessing a transformative shift in its transportation infrastructure, with expressways emerging as a central focus of development. These high-speed, access-controlled roads are designed to provide seamless connectivity between key cities and economic zones, reducing travel time, improving logistics efficiency, and facilitating regional integration.

Recognizing the critical role of road transport in driving economic activity, the Government of India has prioritized the construction of world-class expressways under the Bharatmala Pariyojana and other national programs. In line with this, the Ministry of Road Transport and Highways (MoRTH) is spearheading the development of five major Greenfield expressways across the country. These projects collectively span **2,489 kilometres** and involve a substantial capital investment of **INR 1,68,488 crore**, underscoring the scale and ambition of India's ongoing infrastructure push.

- **Delhi–Mumbai Expressway** (1,386 km, INR 1,03,636 crore) is the largest, set for completion in **FY 2025**, significantly improving connectivity between India's capital and financial center.
- **Ahmedabad–Dholera Expressway** (109 km, INR 4,372 crore) supports the Dholera smart city project, also targeted for **FY 2025**.
- **Bengaluru–Chennai Expressway** (262 km, INR 17,356 crore) enhances southern metro connectivity.
- **Delhi–Amritsar–Katra Expressway** (669 km, INR 38,905 crore) links religious and tourism hubs, to be completed by **FY 2026**.
- **Kanpur–Lucknow Expressway** (63 km, INR 4,219 crore) improves regional access in Uttar Pradesh.

These Greenfield expressways reflect a shift toward high-speed, access-controlled corridors that reduce congestion, lower logistics costs, and promote regional development forming a vital part of India's long-term infrastructure strategy. As these corridors near completion, they are expected to not only ease traffic congestion on existing routes but also catalyse industrial growth, regional development, and enhanced mobility laying a strong foundation for India's future as a globally competitive economy.

Demand drivers: Key factors driving the growth in road network in India.

India's road infrastructure has witnessed robust expansion in recent years, driven by a combination of economic, demographic, and policy-related factors. As the backbone of national connectivity, the road network is being scaled up to support trade, mobility, and industrialization. Several key demand drivers are contributing to the sustained growth of the Indian road network:



Regulatory framework:

Exploring the role of Government (central, state & Quasi Government agencies) in the development of road network in India

India's road infrastructure is a vital driver of economic growth, regional integration, and inclusive development. The continuous expansion and modernization of the country's extensive road network are made possible by the concerted efforts of the central government, state governments, and a range of quasi-government agencies. Each entity plays a distinct yet interconnected role in shaping the road transport landscape, contributing to planning, funding, policy formulation, and project execution.

➤ **Role of central government**

At the national level, the central government, through the Ministry of Road Transport and Highways (MoRTH), holds primary responsibility for developing the National Highways network and setting the strategic direction for road infrastructure development across the country. The Ministry is tasked with designing policies, allocating funds, framing standards, and implementing large-scale infrastructure programs. Among the most transformative initiatives led by the central government are Bharatmala Pariyojana, the National Infrastructure Pipeline (NIP), and the PM Gati Shakti Master Plan.

These programs aim to bridge critical infrastructure gaps, enable seamless freight and passenger movement, and promote multimodal connectivity across regions. In August 2022, Minister for Road Transport and Highways, Mr. Nitin Gadkari, announced a new investment model designed to encourage small investors to participate in infrastructure development, reflecting the government's efforts to broaden the financial base of national projects.

The central government also provides crucial funding support for road infrastructure through annual budget allocations and dedicated financing mechanisms. In the Union Budget for FY 2027, a total of INR 309875.30 crore was allocated to MoRTH, marking a **7.85%** increase from the previous fiscal year. Additionally, the Central Road and Infrastructure Fund (CRIF), financed through a cess on fuel, channels funds to both national and state-level projects, facilitating road development in a decentralized yet coordinated manner.

➤ **Role of State governments**

State governments complement initiatives, policies, and infrastructure development programs undertaken by the central government by overseeing the planning, construction, and maintenance of roads that fall within their jurisdiction. These include state highways, district roads, and rural roads, all of which form the backbone of regional connectivity and access to remote areas. State authorities also play a pivotal role in facilitating land acquisition, environmental clearances, and administrative support for centrally funded projects. Several states have launched their own schemes such as the Mukhya Mantri Gram Sadak Yojana to enhance last-mile rural connectivity. In parallel, states collaborate with the Centre under co-funded initiatives like the Pradhan

Mantri Gram Sadak Yojana (PMGSY), which has significantly transformed rural road infrastructure across India.

PMGSY stands as one of the most impactful centrally sponsored schemes, jointly executed by central and state governments to ensure all-weather road access to unconnected rural habitations. As per the latest data, a total of 190,970 works has been cleared under the scheme, including 121,691 new connectivity works and 69,279 upgradation projects. Out of these, 182,867 road works have been completed, contributing to the construction of over 781,619 kilometres of rural roads. Approximately 8,103 works remain in progress. This initiative has not only improved rural mobility but also boosted access to education, healthcare, and markets for millions of people.

➤ **Quasi-government agencies**

Apart from the central and state governments, various quasi-government agencies play a crucial role in strengthening India's road development framework. Operating with technical and administrative specialization, these bodies contribute to various aspects of road development, including project planning, funding, standard setting, and capacity building. They often focus on specific areas such as infrastructure in remote or border regions, technical research and innovation, training of personnel, and the development of road connectivity in industrial and transit corridors. Additionally, they assist in mobilizing financial resources through dedicated infrastructure funds and ensure adherence to construction norms and safety standards. By complementing the efforts of the central and state governments, these agencies help ensure efficient implementation, enhance institutional capacity, and promote sustainable and integrated road development across the country.

List of major quasi-government agencies involved in road development in India, along with their specific roles:

Quasi Agency	Primary Role
NHAI	National Highway development and tolling
NHIDCL	Road development in border/hilly regions
IRC	Road design and technical standards
CRIF	Road infrastructure funding
State SRDCs (e.g., MSRDC)	State highway/expressway execution
NITHE	Training and capacity building
NATPAC	Research & Development and transport planning
DMICDC, NCRTC	Corridor and industrial area road connectivity

National Highway Authority of India (NHAI) and its role in the development of highway infrastructure in India

The National Highways Authority of India (NHAI) is the apex statutory body responsible for the development, maintenance, and management of national highways in India. It was established by the National Highways Authority of India Act, 1988, with the primary objective of planning, developing, and maintaining an efficient and high-quality national highway network to facilitate smooth and safe transportation across the country. NHAI became operational on February 10, 1995, functioning as an autonomous agency under the administrative control of the Ministry of Road Transport and Highways (MoRTH), Government of India. Since its inception, NHAI has played a pivotal role in transforming India's road infrastructure, executing large-scale highway projects that serve as the backbone of the country's logistics and mobility systems.

Key Functions and Mandate - Under **Section 16(1)** of the NHAI Act, the Authority is mandated to



NHAI is responsible for implementing some of India's most critical infrastructure projects. These include the National Highway Development Project (NHDP), launched in 1998 to upgrade the highway network, and its key components like the Golden Quadrilateral and North-South and East-West Corridors. NHAI also leads newer initiatives such as the Bharatmala Pariyojana, aimed at improving freight and passenger movement by developing economic corridors, border roads, and coastal routes. In addition, it handles Port Connectivity Projects and has executed major projects like the Naini Bridge, Hapur Bypass, and Durg Bypass.

As of FY 2023, NHAI manages over 50,000 kilometers of highways, contributing to a total national highway length of approximately 132,499 kilometers. Though national highways make up only 1.7% of the road network, they carry about 40% of traffic, playing a key role in national connectivity. NHAI uses international best practices in project delivery, employing models like BOT, HAM, and EPC, along with competitive bidding and quality audits to ensure transparency, efficiency, and high construction standards.

Flagship programs: Bharatmala Pariyojana, National Highway Development Project (NHDP), National Infrastructure Pipeline (focus on Road Projects) & others

➤ **Bharatmala Pariyojana:**

Launched in 2017 by the Government of India, the Bharatmala Pariyojana is a comprehensive highway development initiative aimed at enhancing the efficiency of freight and passenger movement across the country. The program seeks to bridge critical infrastructure gaps by constructing economic corridors, inter-corridors, feeder routes, national corridors, greenfield expressways, and roads that improve border, international, coastal, and port connectivity.

Under Phase I, Bharatmala targeted the development of approximately 34,800 km of highways by integrating ongoing National Highway Development Project (NHDP) works into a more strategic and outcome-driven approach. A key objective has been to increase the number of districts connected by national highways from 300 to 550, thereby significantly improving India's logistical and connectivity landscape. This enhancement in road infrastructure is expected to boost economic growth by reducing transport costs, facilitating trade, and promoting regional development.

As of 31 December 2024, a total length of 26,425 km has been approved and awarded under Bharatmala Pariyojana, including 6,758 km of residual NHDP works, with a total capital cost of INR 8,536.56 billion. However, no new projects are currently being undertaken under this program. The implementation status of various components is as follows:

Components / Scheme	Total Length (km)	Total Length Completed up to 31.12.2024 (km)
Economic Corridors	8,737	5,986
Inter Corridors	2,889	2,108
Feeder Roads	973	540
National Corridor	1,777	1,394
National Corridor Efficiency Improvement	824	732
Expressways	2,422	1,791
Border & International Road Connectivity	1,619	1,400
Coastal Roads	77	72
Port Connectivity Road	348	12
Subtotal	24,800	12,769
Balance Road Works under NHDP	6,758	5,058
Grand Total	26,425	19,201

The Bharatmala Pariyojana represents a transformative shift in India's approach to highway infrastructure development. By focusing on strategic connectivity, multimodal integration, and economic corridor-based planning, the program has significantly improved freight efficiency and regional accessibility. With over 26,000

km of road network already awarded and substantial progress in project execution, Bharatmala has laid the groundwork for enhanced trade, reduced logistics costs, and accelerated economic growth. Although no further projects are currently being undertaken under the scheme, its outcomes have set a strong precedent for future infrastructure planning in India. The successful implementation of Bharatmala underscores the importance of integrated transport networks in achieving national development goals and improving the overall competitiveness of the Indian economy.

➤ **National Highway Development Project (NHDP)**

The National Highways Authority of India (NHAI) serves as the primary implementing agency for the National Highways Development Project (NHDP), the largest highway infrastructure initiative ever undertaken in India. Launched in 1998, the NHDP aims to upgrade, expand, and modernize the national highway network to meet international standards. As of FY 2025, approximately 72,000 km of highway projects have been awarded under an approved outlay of INR 1,500 billion for the remaining phases of the NHDP.

The National Highways Development Project (NHDP) offers a wide range of benefits critical to India's economic and social progress. A well-developed highway network leads to significant savings in vehicle operating costs and fuel consumption, while also reducing maintenance expenses for both infrastructure and vehicles. It facilitates faster and more comfortable travel, improving connectivity across regions and contributing to the timely movement of goods especially perishable commodities which is vital for trade and supply chain efficiency. Additionally, enhanced road safety features contribute to safer travel, while improved access and connectivity promote the all-round development of surrounding areas, supporting regional growth and integration.

Key Focus Areas of NHDP: The NHDP is designed to deliver highways that meet international quality standards, ensuring the uninterrupted flow of traffic and improved user experience. Its core focus areas include:

- Implementation of enhanced safety features
- Construction of divided carriageways and service roads
- Provision of better riding surfaces for smoother travel
- Development of grade separators, overbridges, and underpasses
- Improvement of road geometry for safer and more efficient driving
- Deployment of advanced traffic management systems and clear signage
- Construction of bypasses and provision of wayside amenities

By prioritizing high-quality infrastructure, the NHDP plays a pivotal role in strengthening national connectivity, promoting regional development, and supporting India's long-term economic growth objectives.

➤ National Infrastructure Pipeline (NIP)

If India is to become a USD 5 Trillion economy by FY 2028, as well as continue its 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.

Launched in December 2019, the Government initially announced an investment of INR 102 trillion over five years under the NIP. This projection was subsequently revised to INR 111 trillion in May 2020, translating to an average annual infrastructure spending of INR 22 trillion. The NIP is designed to enhance the quality of life for citizens by facilitating access to essential services and modern infrastructure.

The pipeline encompasses projects across a wide range of sectors, including housing, clean drinking water, renewable and affordable energy, education, healthcare, modernized transport infrastructure (such as railway stations, airports, metro systems, and bus terminals), logistics and warehousing, and irrigation. Projects under the NIP are categorized based on their size and stage of development.

In terms of implementation, the central government is expected to contribute 39%, while state governments will account for 40%, and the private sector is projected to participate with a 21% share. The allocated investment will focus on the development of key social and economic infrastructure, including highways, railways, ports, airports, and other critical public services, thereby laying a strong foundation for long-term economic growth and improved quality of life.

Sub Sector	Amount to be invested between 2020-25 in INR Bn	% Share in Total Investment
Road	20,338	18.3%
Railway	13,676	12.3%
Aviation	1,434	1.3%
Urban Infrastructure	19,193	17.2%
Industrial Infrastructure	3,150	2.8%
Others	53,514	48.1%
Total	1,11,304	100%

Sources: NIP Presentation

Despite these efforts, key challenges remain, particularly concerning the **maintenance of existing facilities** and the need to develop infrastructure for a wider range of sports beyond cricket. Addressing these gaps is essential to foster a vibrant sporting ecosystem in the country. Moreover, sports infrastructure development presents a significant opportunity for the **construction industry** to contribute to and benefit from this expanding sector.

➤ **National Monetization Pipeline (NMP)**

The National Monetization Pipeline (NMP), introduced by the Government of India in collaboration with NITI Aayog, is a strategic initiative aimed at unlocking value from public infrastructure assets over FY 2022–2025. The NMP outlines a roadmap to monetize assets worth INR 6 trillion, enhancing transparency, investor confidence, and performance tracking across ministries.

During the first two years:

- FY 2022 target: INR 2.5 trillion; actual realization: ~INR 0.9 trillion
- FY 2023 target: INR 2.5 trillion; actual realization: ~INR 1.4 trillion
- FY 2024 target: INR 1.8 trillion; actual realization: INR 1.56 trillion (a 159% increase over FY 2022 achievement)
- FY 2025 target: Revised to INR 1.9 trillion

The National Highways Authority of India (NHAI) has identified 33 assets for monetization and released relevant macroeconomic assumptions to facilitate private sector participation and planning. In FY 2024, significant contributions to the National Monetization Pipeline came from various key ministries. The Ministry of Coal led with a monetization value of INR 567.94 billion, followed by the Ministry of Road Transport and Highways with INR 403.14 billion, and the Ministry of Power contributing INR 146.90 billion. Additional contributions included INR 95.87 billion from the Ministry of Petroleum and Natural Gas, INR 76.27 billion from the Ministry of Shipping, INR 64.80 billion from the Ministry of Urban Development, and INR 40.90 billion from the Ministry of Mines. Notably, the Ministries of Coal, Power, and Road Transport and Highways **exceeded** 70% of their respective monetization targets, reflecting enhanced operational efficiency and a strong commitment to infrastructure asset monetization.

Notably, ministries such as Coal, Power, and Road Transport and Highways achieved over 70% of their respective monetization targets, demonstrating growing efficiency in infrastructure asset monetization.

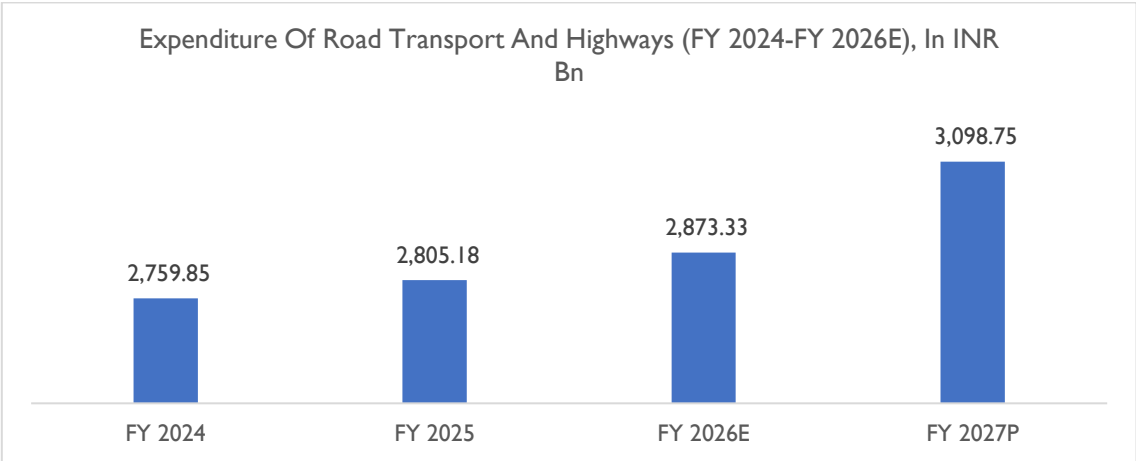
Furthermore, under NMP, two national stadiums and two SAI regional centres are scheduled for monetization between FY 2025, with an indicative value of USD 1.43 billion. These assets will be offered under the Operation, Management, and Development Agreement (OMDA) model, providing private concessionaires with a 30+30-year lease in exchange for an upfront premium, annual fees, and revenue sharing.

➤ **PM Gati Shakti – National Master Plan for Infrastructure**

Launched in October 2021, the PM Gati Shakti – National Master Plan for Multimodal Connectivity is a digital platform designed to enhance inter-ministerial coordination in infrastructure development. With a projected investment of INR 100 trillion, the initiative integrates key programs such as Bharatmala, Sagarmala, port development, the Dedicated Freight Corridor initiative by Indian Railways, and the development of Special Economic Zones (SEZs). By offering a unified framework for planning and implementation, PM Gati Shakti aims to streamline execution timelines and promote holistic infrastructure growth across sectors.

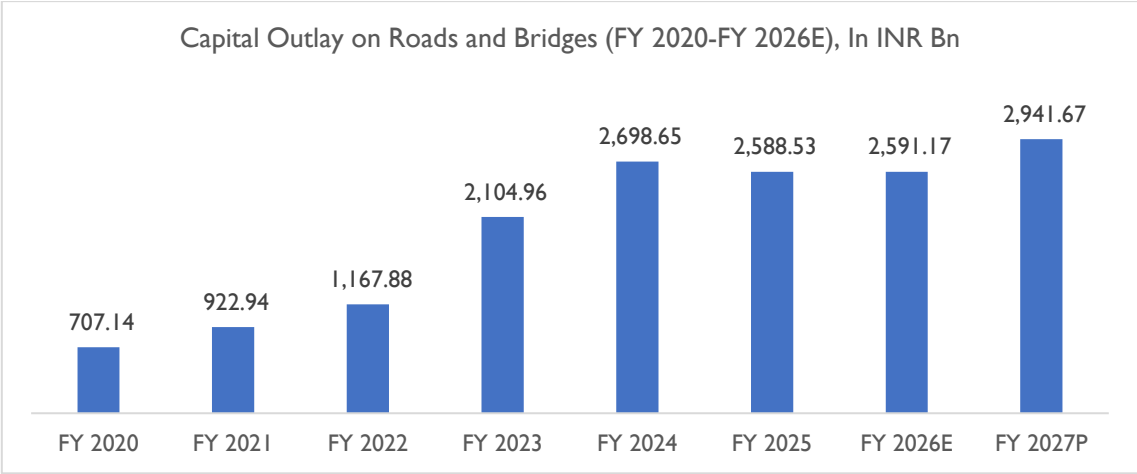
Budgetary Allocation: Road Infrastructure

India’s road infrastructure sector continues to receive strong fiscal support as part of the government’s broader push for economic development and regional connectivity. Increased budgetary allocations reflect a sustained focus on upgrading highways, expanding rural roads, and enhancing multimodal transport access. These investments are key to improving logistics efficiency, promoting tourism, and driving inclusive growth across urban and rural areas.



Source: Union Budget FY 2026-27, Government of India

The logistics efficiency, and improved connectivity across regions. Reflecting this strategic focus, the Ministry of Road Transport and Highways (MoRTH) has maintained a steady increase in its expenditure outlay over the years. The ministry’s allocation stood at INR 2,759.85 billion in FY 2024, rising to INR 2,805.18 billion in FY 2025 and further estimated at INR 2,873.33 billion in FY 2026E. The outlay is projected to increase significantly to INR 3,098.75 billion in FY 2027P. This sustained upward trend, representing a CAGR of approximately 3.94% between FY 2024 and FY 2027P, underscores the government’s continued commitment toward expanding highway infrastructure, modernizing transport corridors, reducing logistics costs, and strengthening regional and economic integration across the country. Government of India continues to prioritize road infrastructure development as a key driver of economic expansion, enhanced



Source: Union Budget FY 2025-26, Government of India

Furthermore, targeted initiatives amplify the strategic focus of these allocations. The Pradhan Mantri Gram Sadak Yojana (PMGSY) a flagship rural connectivity program has seen its budget increased from INR 145 billion in FY 2025 (RE) to INR 190 billion in FY 2026 (BE), reinforcing the government’s push to bridge rural-urban infrastructure gaps. Additionally, the FY 2027 budget outlines efforts to enhance connectivity to the top 50 tourist destinations, including land acquisition for new roads, aiming to stimulate tourism-linked economic activities and regional development.

The bar graphs clearly demonstrate a progressive increase in budgetary allocations toward road and bridge infrastructure over the years, complemented by consistent expenditure by the Ministry of Road Transport and Highways. This financial commitment, along with targeted initiatives such as the PMGSY expansion and connectivity to tourism hubs, illustrates a comprehensive approach by the government to build resilient, inclusive, and future-ready road infrastructure. The stable outlay levels from FY 2024 to FY 2027 signal long-term investment confidence and an overarching national agenda for sustainable connectivity and infrastructure-led growth.

Road & Highway Construction Scenario in Maharashtra

Maharashtra, India's most industrialized and economically advanced state, commands a critical position in the nation's road infrastructure development landscape. As of FY 2024, the state boasts a robust and expansive road network spanning 3,28,526 kilometres, comprising National Highways (NH), Major State Highways (MSH), State Highways (SH), Major District Roads (MDR), Other District Roads (ODR), and Village Roads. This intricate and layered network is not only essential for intrastate connectivity but also underpins Maharashtra's broader vision of economic expansion, trade facilitation, and inclusive growth.

Segments	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	% Share for each segment FY 2024
National highways	17,726	18,089	18,366	18,366	18,366	5.6%
Major State highways	2,967	2,900	2,622	2,716	2,692	0.8%
State highways	29,030	29,388	29,265	30,465	30,922	9.4%
Major district roads	63,886	68,350	68,535	71,574	74,178	22.6%
Other district roads	47,398	46,408	45,371	43,229	43,229	13.1%
Village roads	1,48,335	1,57,980	1,59,714	1,59,139	1,59,139	48.4%
All roads	3,09,342	3,23,115	3,23,873	3,25,489	3,28,526	100%

Source: Maharashtra State Road Transport Corporation.

Maharashtra's economic prominence stems from its dynamic industrial base, skilled labour force, and a dense ecosystem of trade and export hubs. With Mumbai as India's commercial capital and Pune as a thriving IT and educational center, the state supports key sectors such as information technology, electronics, automobile manufacturing, and pharmaceuticals. It is also a leading agricultural state, contributing significantly to the production of onions, sugarcane, and cotton, and maintaining a high volume of exports, including gems and jewellery, engineering goods, and chemicals. The transportation infrastructure in Maharashtra supports this economic vibrancy. The state is interspersed with:



Each of these economic nodes is intrinsically linked by Maharashtra's road infrastructure, placing immense demand on the state's highway and district road networks to perform efficiently and sustainably. As Maharashtra pursues its **ambitious target of becoming a USD 1 trillion economy by FY2028**, the role of its road infrastructure becomes increasingly vital. Roads serve as the arteries of commerce, enabling the movement of goods, labour, and services between urban growth centres and rural hinterlands. In particular:

- State Highways (SH) and Major District Roads (MDR) are expected to absorb a major share of intrastate freight and passenger movement.
- These roads link critical zones like industrial parks, SEZs, agricultural mandis, ports, and tourist locations with state and national highways.
- Upgrading and maintaining these corridors ensures reduced travel time, enhanced road safety, and efficient logistics, all of which are prerequisites for sustaining Maharashtra's economic momentum.

Given the scale and complexity of Maharashtra's road network, coordinated planning, robust funding mechanisms, and inter-agency collaboration are essential. Unlike smaller states, Maharashtra's geographical and economic diversity demands tailored approaches to road construction and maintenance across its regions.

State Road Network

Maharashtra possesses one of the most expansive and strategically important road networks in India, supporting its role as the country's leading industrial and economic powerhouse. As of March 2024, the total road length maintained by the National Highways Authority of India (NHAI), Public Works Department (PWD), and Zilla Parishad (ZP) stood at approximately 3.28 lakh kilometres, reflecting a steady increase in road development over the years.

The road infrastructure includes a mix of national highways, major state highways, state highways, major and other district roads, and extensive village roads. These roads are essential for facilitating agricultural logistics, industrial freight, passenger travel, and rural connectivity. As of **1st January 2025**, the total number of registered vehicles in Maharashtra was approximately **488 lakhs**, marking a significant increase from **458 lakh** in January 2024. This translates to a vehicular density of **149 vehicles per kilometer** of road length, up from **141 vehicles per kilometer** in the previous year. The rising density underscores the increasing stress on the existing road infrastructure and calls for urgent capacity expansion, modern traffic management, and infrastructure upgradation.

➤ Public Road Transport Operations – MSRTC

The Maharashtra State Road Transport Corporation (MSRTC) plays a crucial role in enabling affordable and accessible public transport across the state. During 2024–25 (up to December), MSRTC operated an average of 15,560 buses per day, carrying 58.69 lakh passengers daily. The key performance indicators of MSRTC over the past three years are detailed below:

Item	Unit	FY 2023	FY 2024	FY 2025E
Total vehicles in possession	Number	15,618	15,760	15,560
Avg. buses on road per day	Number	13,316	14,160	14,416
Avg. passengers carried per day	Lakh	43.78	55.49	58.69
Avg. effective km operated per day	Lakh km	45.54	49.54	51.01
Vehicle productivity	Km	291.58	314.34	327.84
Crew productivity	Km	218.21	219.94	223

Source: Maharashtra State Road Transport Corporation.

Also, according to MSRTC's role is particularly vital in providing direct or near-direct access to villages. As per 2023–24 data:

- **77.4% of villages** have direct access to bus services.
- An additional **14.8%** are located within 3 km of a bus stop.
- Only **3.3% of villages** remain more than 5 km from a bus route.

This widespread coverage highlights the inclusivity of Maharashtra's public transport network in enhancing rural mobility.

Major Drivers

Maharashtra, one of India's most economically significant states, is witnessing transformative changes in its road infrastructure landscape. The growth trajectory of the state's road network is shaped by a confluence of strategic policy initiatives, economic ambitions, and targeted investment programs. The following drivers are playing a pivotal role in steering the development of road infrastructure in Maharashtra:

1. Strategic Government Vision and Long-Term Planning

The Government of Maharashtra has adopted a forward-looking approach through the **Amritkal State Road Development Plan 2025–2047**, which outlines a roadmap for enhancing state-wide road connectivity over the next two decades. This long-term vision aims to integrate core sectors such as tourism, agriculture, logistics, and manufacturing by providing seamless connectivity to all key regions. As part of this, major projects are being aligned with broader socio-economic development goals to ensure that infrastructure acts as a catalyst for inclusive growth.

2. Enhancing Connectivity to Tourist and Pilgrimage Destinations

A key driver of the road sector in Maharashtra is the planned expansion of the network to connect **tourist centres, pilgrimage sites, and national parks** by 2047. The objective is to boost tourism-led economic activity and promote cultural accessibility across the state. The upcoming **SHORE (State Highway for Ornamental and Religious Economy) project**, with an allocation of **₹8,400 crore** for the coastal districts, exemplifies this thrust. These efforts not only aim to strengthen tourism infrastructure but also improve socio-economic conditions in remote and coastal regions.

3. Rural Road Development and Inclusive Growth

The **Mukhya Mantri Gram Sadak Yojana** and the **Pradhan Mantri Gram Sadak Yojana (PMGSY) Phase 3** are instrumental in enhancing rural connectivity. Under the state scheme, around **3,582 villages are slated to be connected** to major roads and highways at a substantial investment of **₹30,100 crore**. Furthermore, under PMGSY Phase 3, **1,500 km** of rural roads are proposed for construction in **FY 2025–26**. These programs aim to bridge the urban-rural divide by facilitating better access to markets, healthcare, education, and employment for rural populations.

4. Institutional Funding and Project Execution

The role of multilateral funding agencies such as the **Asian Development Bank (ADB)** is also a significant driver of the road sector. Under the **ADB Project Phase-3**, a total of **23 road projects covering 755 km** have been completed, involving an investment of **₹6,589 crore**. Such financial assistance has enabled the state to accelerate large-scale road development while incorporating international standards and project management practices.

5. Growth Centres and Economic Corridors

The concept of **growth centres** is central to Maharashtra's regional development strategy. These centres which include **industrial hubs, logistics parks, SEZs, ports, airports, tourism circuits, mining zones, and agricultural markets** serve as nodes for economic activities. Their integration into the **Road Network Master Plan** ensures that the road infrastructure facilitates efficient movement of goods and people. By enhancing connectivity to and from these centres, the state is enabling **employment generation, industrial expansion, agricultural market access, and freight mobility**. Moreover, the road linkages to growth centres help in **reducing regional imbalances** and fostering equitable development.

6. Urbanisation and Changing Land Use Patterns

The expansion of Maharashtra's road network is also influenced by the state's rapid **urbanisation and evolving land use dynamics**. As cities grow and peripheral areas develop, there is increasing pressure on existing road infrastructure to accommodate higher volumes of traffic and facilitate last-mile connectivity. Infrastructure planning is being aligned with **smart city initiatives, housing clusters, and suburban expansion**, thereby reinforcing the need for modern, resilient, and sustainable road networks.

Maharashtra's road infrastructure development is not a standalone agenda but a multifaceted strategy driven by policy vision, economic needs, rural inclusion, tourism enhancement, and growth centre integration. From multilateral-funded urban highways to rural village roads, the focus remains on building a comprehensive and future-ready road network that supports the state's long-term development aspirations. As these initiatives progress, they are expected to yield significant socio-economic benefits, improve regional connectivity, and position Maharashtra as a leader in infrastructure-led growth.

Major Scheme and State Budgetary Allocation

Pradhan Mantri Gram Sadak Yojana (PMGSY)

- Initiated on **August 15, 2000**, PMGSY is a flagship Central Government scheme designed to provide all-weather road connectivity to unconnected rural habitations across India. In Maharashtra, it is implemented under the auspices of the RDD and PWD, focusing particularly on **tribal, hilly, and backward regions**. The scheme ensures year-round access to schools, health services, and marketplaces, significantly contributing to rural development. It remains one of the most pivotal rural road schemes in the state.

Deen Dayal Upadhyay Grameen Kaushalya Yojana (DDU-GKY)

- Though not a road-specific initiative, **DDU-GKY** appears in this section as it supports broader rural infrastructure objectives. Launched by the Ministry of Rural Development, it provides **skill training and placement** for rural youth, indirectly boosting road usage and the demand for better connectivity.

Sansad Adarsh Gram Yojana (SAGY)

- Launched on **October 11, 2014**, SAGY aims to create model villages through participatory development efforts across the country. While its focus spans various rural infrastructure elements (water, sanitation, education, energy), road connectivity forms a critical component. Maharashtra's RDD integrates SAGY priorities into its local road planning and resource allocation.

SVAMITVA Yojana

- This Central Sector Scheme launched under the Ministry of Panchayati Raj aims to provide **property ownership records for rural households**, facilitating rural development financing. Though not directly related to roads, SVAMITVA's land-mapping framework supports road planning and infrastructure mapping at the Gram Panchayat level.

Pradhan Mantri Awas Yojana (Rural)

- Launched on **April 1, 2016**, PMAY-R focuses on providing affordable housing to rural households. Its integration with ground-level infrastructure includes ensuring proper access through stable road connectivity. The scheme is jointly implemented by the Ministry of Rural Development and Maharashtra's RDD.

Amritkal State Road Development Plan (2025–2047)

- To meet the evolving infrastructure needs of Maharashtra, the state has proposed the *Amritkal State Road Development Plan*, spanning from 2025 to 2047. This visionary roadmap will focus on strengthening transportation linkages to support tourism, economic corridors, pilgrimage routes, and national parks. The plan aims to bring systematic and region-specific development in road infrastructure, aligning with the broader vision of India@2047 for a developed nation.

Revised Hybrid Annuity Scheme

- Under the *Revised Hybrid Annuity Scheme*, Maharashtra is implementing large-scale cement concreting of roads spanning **6,000 kilometers**. These roads are being developed at a project cost of **₹36,964 crore**, reflecting the government's commitment to durable, long-lasting road infrastructure. The hybrid annuity model allows shared risk between the public and private sectors and ensures quality construction through performance-linked payments over the operational period.

Chief Minister's Village Road Scheme – Phase 3

- The *Chief Minister's Village Road Scheme–3* aims to connect **3,582 villages**, each with a population of over 1,000, to major district roads, state highways, or national highways using **cement concrete roads**. The total length of road construction planned under this phase is **14,000 km**, with an estimated project cost of **₹30,100 crore**. This initiative is vital in providing last-mile connectivity and enhancing socio-economic opportunities for rural communities.

Budgetary Allocation:

The state of Maharashtra has laid out a comprehensive and forward-looking budget for FY 2027, with a significant emphasis on fiscal discipline, social equity, and developmental planning. The financial estimates for the upcoming fiscal year reflect the government's ongoing commitment to prudent economic management, while also scaling up investments in critical sectors to support long-term growth.

A notable highlight is the government's success in maintaining the fiscal deficit below 3% of the Gross State Domestic Product (GSDP), in alignment with the stipulations of the Fiscal Responsibility and Budget Management (FRBM) Act. This indicates a well-balanced fiscal strategy, where growth aspirations are being pursued without compromising financial stability. Additionally, the revenue deficit has remained consistently under 1% of gross state income, pointing to careful expenditure control and efficient revenue mobilization

Item (In INR Crore)	FY 2024 Budget Estimate	FY 2025 Revised Estimate	FY 2026 Budget Revised Estimate	FY 2027 Budget Estimate
Revenue Receipts	4,99,463	5,36,463	6,01,489.14	6,16,098.82
Revenue Expenditure	5,19,514	5,62,998	6,38,543.79	6,56,651.17
Revenue Deficit	20,051	26,536	37,054.65	40,552.35
Total Expenditure	6,12,293	6,72,030	7,55,920.24	7,69,466.87
Fiscal Deficit	1,10,355	1,32,873	1,51,536.14	1,50,491.35

Source: Government of Maharashtra, Finance Department.

On the expenditure front, the state has proposed a substantial increase in total outlays across all major budget heads. The Budget Estimate for FY 2027 reflects continued growth in proposed allocations over the previous years, highlighting the government's focus on developmental spending and public welfare initiatives. Of particular importance is the marked rise in the budgetary provisions for Scheduled Caste and Tribal Component Programmes, registering the highest percentage increase among all categories. This reflects the government's commitment to the inclusive development and the upliftment of historically marginalized communities.

Item	Outlay of FY 2025	FY 2026 Proposed Outlay	FY 2027 Proposed Outlay	Percentage Growth in Outlay
State level general	1,42,582	1,90,242	2,08,886	46.5%
Scheduled Caste component programme	15,893	22,568	23,150	45.7%
Tribal Component Program	15,360	21,495	21,723	41.4%
District Annual Plan	18,165	20,165	21,867	20.4%

Source: Government of Maharashtra, Finance Department

The outlay under the “State Level General” component continues to register a significant increase in FY 2027, reflecting the government’s enhanced focus on state-level infrastructure development, public services, and administrative capacity-building. Simultaneously, the “District Annual Plan” has also recorded steady growth, ensuring that balanced regional development remains a core priority. The continued rise in allocations towards the Scheduled Caste Component Programme and Tribal Component Programme further highlights the government’s commitment towards inclusive growth and social welfare.

Overall, the budgetary allocations for FY 2027 demonstrate a strategic balance between developmental priorities and welfare-oriented spending. Through sustained emphasis on infrastructure, regional planning, and targeted social programmes, the Maharashtra government continues to strengthen the foundation for long-term economic development and inclusive progress across the state.

Capex announcement, Major Ongoing and announced projects in the sector

The State of Maharashtra continues to drive infrastructure-led growth through significant capital expenditure in the road and highway sector. Spearheaded by the **Maharashtra State Road Development Corporation (MSRDC)**, the state is currently undertaking a number of high-value projects aimed at improving connectivity, reducing urban congestion, and supporting economic development across regions.

As of **December 2024**, several major road development and expressway projects are underway under MSRDC, with a total estimated capital outlay exceeding ₹4.3 lakh crore. These projects span strategic corridors, multimodal transport links, and greenfield expressways, primarily executed through **Build-Operate-Transfer (BOT)** and **Public-Private Partnership (PPP)** models.

Ongoing State and Regional Road Projects:

Name of project	Estimated project cost (₹ Crore)	Expenditure incurred (₹ Crore)	Expected year of completion
Versova- Bandra sea link project	18,120.96	3,602.55	2028-29
Mumbai - Pune Expressway Augmentation	7,155.00	7,560.44	2024-25
Hindu Hruday Samrat Balasaheb Thackeray Maharashtra Samruddhi Mahamarg	63,264.00	64,755.00	2024-25
Pune ring road	42,277.70	6,242.63	2026-27
Thane creek bridge - Phase III	775.58	724	2024-25
Virar - Alibaug Multimodal transport lane	66,253.25	3,438.19	2026-27
Revas - Reddy coastal road	27,290.00	447.73	2026-27
Kokan Greenfield Expressway	71,298.00	16.39	2028-29

Jalna - Nanded Expressway	24,702.92	958.55	2026-27
Nagpur-Gondia access controlled super communication Expressway	21,670.03	28.94	2027-28
Bhandara- Gadchiroli access controlled super communication Expressway	12,586.62	76.08	2027-28
Nagpur- Chandrapur access controlled super communication Expressway	21,702.33	0.63	2027-28
Pune Nashik Industrial Corridor	-	1.72	NA
Pune to Aurangabad Greenfield Expressway	-	3.44	NA
Nagpur- Goa Maharashtra Shaktipeeth Expressway	-	43.86	NA

Some of the flagship projects under implementation include:

- The Hindu Hruday Samrat Balasaheb Thackeray Maharashtra Samruddhi Mahamarg, a high-speed expressway connecting Nagpur and Mumbai, with investment exceeding ₹63,000 crore.
- The Versova–Bandra Sea Link and Kokan Greenfield Expressway, expected to transform coastal mobility and regional logistics.
- The Pune Ring Road, Virar–Alibaug Multimodal Transport Corridor, and several access-controlled expressways in Nagpur, Gondia, Chandrapur, and Bhandara–Gadchiroli, aimed at improving inter-district and intra-state freight and passenger movement.

Many of these projects are targeted for completion between 2024 and 2029, with some already nearing final stages of execution. Additionally, proposals like the Pune–Aurangabad Greenfield Expressway and the Pune–Nashik Industrial Corridor are in preliminary stages, highlighting the government’s forward planning approach. Collectively, these projects are set to play a pivotal role in supporting Maharashtra’s broader objective of becoming a USD 1 trillion economy by FY 2028 through enhanced physical infrastructure and regional connectivity.

Active Projects in Maharashtra⁴

➤ Hybrid Annuity Road Project – 2

The Government of Maharashtra (GoM) launched the Phase I Highway Asset Management (HAM) project in 2016 to enhance road infrastructure development across the state. Under the HAM model, the government funded 60% of the project cost during the construction phase, while the remaining 40% was financed by private sector participants, with recovery through annuity-based payments over the concession period. The project targeted the development of approximately 10,000 kilometers of roads, of which around 8,600 kilometers have been completed to date. It is listed as an active project under execution on the MSIDC

⁴ <https://msidc.org/projects/>

website. It is part of broader efforts building on earlier Maharashtra HAM initiatives. Construction is ongoing across packages, with total portfolio progress tracked under MSIDC

➤ **Green field Expressway along existing Highway**

The proposed Greenfield Expressway along the existing highway corridor is being developed to enhance high-speed connectivity between Pune and Chhatrapati Sambhajanagar. The project spans approximately 245.9 km and is planned in two phases.

- Phase I comprises the development of a 53.4 km corridor from Kharadi Junction to Shirur Bypass, featuring a 6-lane elevated highway along with a 4-lane at-grade road and provision for a future metro corridor along the existing highway alignment.
- Phase II involves the construction of a 192.5 km access-controlled greenfield 6-lane expressway from Shirur Bypass to the Samruddhi Expressway near Chhatrapati Sambhajanagar on a completely new alignment.

The total estimated project cost is around INR 22,400 crore. This project is proposed to be developed under the DFBOT (Design, Finance, Build, Operate and Transfer) model through a Public-Private Partnership (PPP) framework. The project is currently in the planning and approval stage, with Detailed Project Reports (DPRs) under preparation and approvals in process. Based on the present project status and expected tendering timelines, construction is anticipated to commence during FY 2026 or early FY 2027. However, an official construction start date has not yet been formally announced by the authorities.

➤ **Elevated Highway, Pune: Talegaon to Chakan to Shikrapur**

The Talegaon–Chakan–Shikrapur Elevated Highway project is aimed at improving connectivity and easing traffic congestion in the Pune region through the upgradation of the existing 2-lane road with paved shoulders into a 4-lane elevated corridor along with a 4-lane at-grade road. The project spans approximately 53.2 km and connects the major industrial and logistics hubs of Talegaon, Chakan, and Shikrapur. Currently carrying traffic of around 40,839 PCU per day, the corridor is expected to significantly enhance road capacity, reduce travel time, and improve transportation efficiency. The project involves the acquisition of nearly 38.79 hectares of land, while toll collection will be implemented in accordance with NHAI policy. The estimated project cost is around INR 6,150 crore, and the Detailed Project Report (DPR) prepared by NHAI has been handed over to Maharashtra State Infrastructure Development Corporation (MSIDC) for further execution. Project is not yet begun as of early 2026 reports. Expected soon after work order issuance. The Talegaon–Chakan–Shikrapur Elevated Highway project in Maharashtra, proposed under BOT (Toll) mode with 8 lanes.

➤ **Elevated Highway, Pune: Hadapsar to Yewat**

The Hadapsar–Yewat Elevated Highway project is proposed to strengthen road connectivity and accommodate increasing traffic demand in the Pune region through the upgradation of the existing 4-lane road with paved shoulders into a 6-lane elevated corridor along with a 6-lane at-grade road. The proposed highway spans approximately 31.5 km with a planned right of way of 30 meters and currently

handles traffic of nearly 54,817 PCU per day. The project is expected to significantly improve traffic flow, reduce congestion, and enhance travel efficiency along the corridor. Toll collection will be implemented in accordance with NHAI Toll Policy, while approximately 47.25 hectares of land will be acquired for project development. The total estimated project cost stands at around INR 4,258 crore. The Draft Detailed Project Report (DPR) prepared by NHAI has been submitted to Maharashtra State Infrastructure Development Corporation (MSIDC), and the project is presently awaiting Cabinet approval from the Government of Maharashtra (GoM). Project is not yet started as of the latest available updates of May 2026. Work was expected to begin in early 2026 after work order issuance, final approvals, and land acquisition progress.

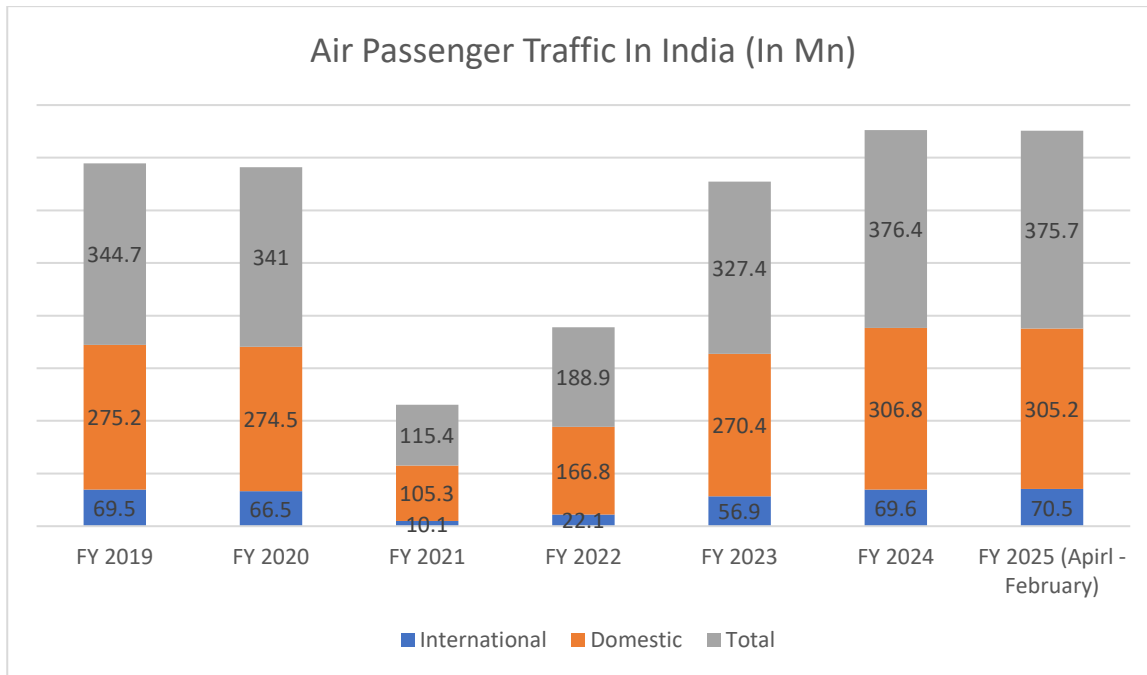
Airport Infrastructure

Current Snapshot of Airport Infrastructure in India

India's airport infrastructure operates under a dual governance model comprising Public-Private Partnership (PPP) arrangements and fully government-managed airports. In the PPP model, private entities invest in, develop, and operate airports in collaboration with the government to enhance operational efficiency, improve service quality, and share risks. Currently, eight airports in India are managed under private control. Among these, Delhi International Airport (DIAL) and Mumbai International Airport (MIAL) are operated by Joint Venture Companies (JVCs), while six others Ahmedabad, Jaipur, Lucknow, Guwahati, Thiruvananthapuram, and Mangalore function under the PPP framework. The remaining majority of airports are operated and maintained by the Airports Authority of India (AAI), which is responsible for planning, developing, and managing airports across the country, especially in smaller and remote regions.

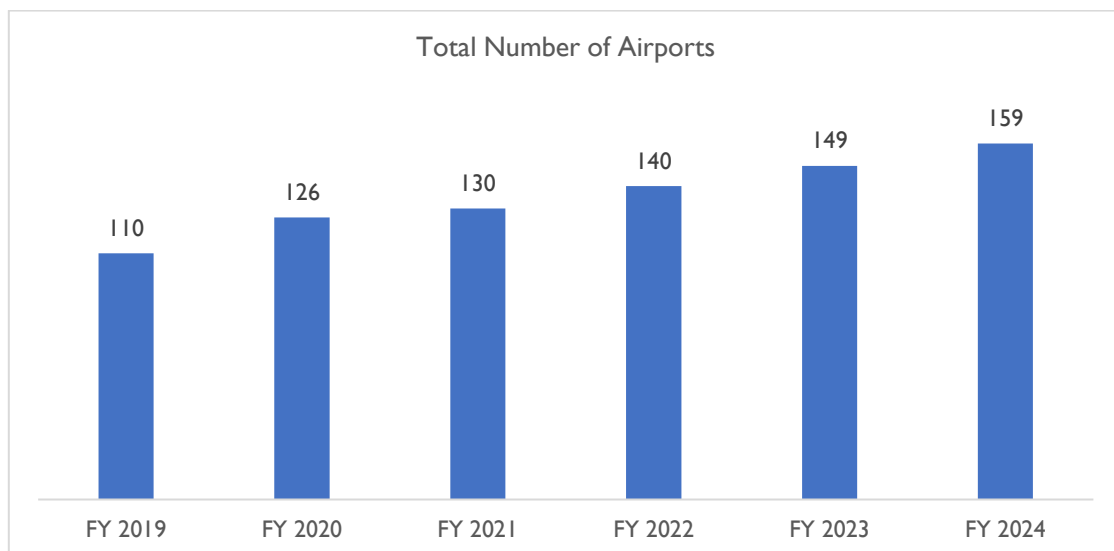
As of December 2024, according to AAI, India had a total of 159 airports, which includes international airports, domestic airports, civil enclaves, heliports, and water aerodromes. With rising economic activity, growing middle-class population, and increasing demand for air travel, the Indian aviation sector has witnessed rapid growth. Air passenger traffic, which stood at 344.7 million in FY 2019, saw a drastic dip to 115.4 million in FY 2021 due to the COVID-19 pandemic. However, the sector has shown a strong recovery, with passenger traffic reaching 327.4 million in FY 2023 and surpassing pre-pandemic levels in FY 2024 at 376.4 million. From April to February in FY 2025 alone, 375.7 million passengers were recorded, indicating continued momentum.

This surge in air travel demand has put immense pressure on India's civil aviation infrastructure, necessitating the expansion and modernization of existing facilities such as terminals, runways, and air traffic control systems. Looking ahead, India is projected to handle around 480 million air passengers by 2036, surpassing the combined air passenger volumes of Japan and Germany. To meet this anticipated growth, continued investments in both PPP and government-managed airports will be essential to strengthen the capacity, efficiency, and global competitiveness of India's airport infrastructure.



Sources: Airport Authority of India

In addition, the Indian government is investing heavily in the aviation sector. The government is building new airports, expanding existing airports, and improving air traffic management systems. According to the Airports Authority of India (AAI), the number of airports in the country has **increased from 74 in 2015 to 159 in 2024**. Also, Air travel has also surged, with the number of airports planned to increase to 220 airports by 2025.



Source: Ministry of Civil Aviation, Airports Authority of India (AAI), as on 31.12, 2024

Market Scenario for the Airport Runway Construction in India

India's aviation sector is witnessing robust infrastructure development, with a strong emphasis on runway expansion and modernization across existing and upcoming airports. This transformation is driven by the need to accommodate increasing passenger traffic, enhance safety standards, and support the operational capabilities of larger aircraft. Several airports across the country are either upgrading existing runways or constructing new ones as part of broader airport development plans. The following highlights key runway construction and expansion projects shaping the future of Indian aviation:

➤ **Thiruvananthapuram International Airport**

At Thiruvananthapuram International Airport, significant work has been undertaken to improve runway safety and compliance with global aviation norms. Between January 14 and March 29, 2025, the airport carried out resurfacing and recarpeting of its main runway, a crucial move to enhance operational safety and efficiency. Additionally, the planned expansion of the Runway End Safety Area (RESA) is currently pending the acquisition of approximately 4.5 acres of land. This expansion is essential for aligning the airport with international safety standards.

➤ **Noida International Airport (Jewar)**

The Noida International Airport at Jewar is emerging as a flagship greenfield project in North India. A state-of-the-art runway measuring 3.9 kilometers in length and 60 meters in width has already been completed, with final calibration and validation flights underway in early 2025. The airport aims to commence commercial operations by April 2025. Initially launching with one runway and terminal, the airport is designed for scalable growth. Future phases plan for up to six runways, with passenger handling capacity expected to increase from 12 million per year to 70 million upon full development.

➤ **Varanasi Airport (Lal Bahadur Shastri Airport)**

The Union Cabinet approved a comprehensive expansion plan for Varanasi's Lal Bahadur Shastri Airport in 2024, at an estimated cost of ₹2,869.65 crore. The project includes extending the runway from 2,745 meters to 4,075 meters to support wide-body aircraft and long-haul flights. This expansion, managed by the Airports Authority of India (AAI), is expected to boost the airport's annual passenger handling capacity from 3.9 million to 9.9 million. Additionally, the construction of a 75,000 sq. m. terminal and a new apron for parking 20 aircraft is underway. A notable innovation is the foundation laying of a 2.89-kilometer highway tunnel beneath the expanded runway, marking India's first highway-under-runway project.

➤ **Patna & Bihta Airports**

In Bihar, Patna's Jayprakash Narayan Airport is undergoing vital upgrades focused on runway usability and safety. These include the relocation of obstructions such as a clock tower and enhanced land acquisition to improve runway clearance. Parallely, a greenfield airport at Bihta is under development to cater to the growing regional demand. The Bihta Airport will feature a new 12,000-foot runway along with a modern terminal, with operations anticipated to begin by 2027. This dual-airport strategy aims to decongest Patna and provide robust aviation infrastructure for the state.

➤ **Mysuru Airport**

To enable jet aircraft operations and expand air connectivity, Mysuru Airport is undertaking a runway expansion project. Around 240 acres have been acquired for this purpose. Once completed, the extended runway will allow for direct air links with major Indian cities, boosting tourism and economic activity in Karnataka.

➤ **Kota Greenfield Airport**

In Rajasthan, a new greenfield airport is planned for Kota, with an emphasis on supporting mid-sized jet operations. Phase I of the project will include a 3,200-meter runway, with Phase 2 expanding it to 3,581 meters. Bidding for construction was initiated in early 2025. The design will accommodate Airbus A320-class aircraft, supporting regional connectivity and industrial development.

➤ **Chhatrapati Shivaji Maharaj International Airport (Mumbai)**

Mumbai's Chhatrapati Shivaji Maharaj International Airport is undergoing significant runway and taxiway upgrades as part of a ₹17,500 crore expansion plan led by the Adani Group. These enhancements are expected to be completed by 2029, aiming to improve aircraft movement efficiency and reduce congestion at one of India's busiest airports.

Runway construction and expansion projects across India are critical to accommodating future aviation demand and meeting global safety and operational benchmarks. From major metro cities to regional hubs and greenfield airports, the emphasis is on creating resilient, scalable, and future-ready infrastructure. These developments not only strengthen the nation's connectivity but also play a pivotal role in economic growth, tourism, and regional development.

Project Execution Model

India's airport infrastructure development is guided by a multi-pronged execution framework designed to meet the growing demands of air travel while promoting efficiency, public-private collaboration, and regional inclusion. The execution of airport projects in India primarily follows three major models: Public Sector Execution, Public-Private Partnership (PPP), and Greenfield vs Brownfield Development supported by a robust and diversified financing framework.

1. Public Sector Projects (AAI-Managed)

The Airports Authority of India (AAI) is the principal public sector agency responsible for planning, developing, operating, and maintaining civil aviation infrastructure across the country. Functioning under the administrative control of the Ministry of Civil Aviation (MoCA), AAI directly manages over 100 airports across metro, non-metro, and remote locations.

These projects are fully funded and executed by the government, often focused on enhancing connectivity in **tier-II, tier-III, and Northeast regions**, where commercial viability for private players is limited. Public sector execution ensures equitable access to air infrastructure as a public good, serving strategic and socio-economic needs of underserved areas.

Additionally, the government operates other aviation-related public sector entities:

- **Pawan Hans Limited (PHL)** – offering helicopter services, often in remote terrains.
- **AI Asset Holding Limited (AIAHL)** and its subsidiaries (including **Alliance Air**) – operating regional and legacy assets of Air India post-privatization.

These entities reinforce the state's commitment to universal access and national integration through air connectivity.

2. Public-Private Partnership (PPP) Model

The PPP model has emerged as a strategic approach to bring private capital, modern management practices, and innovation into India's aviation infrastructure. Under this model, private developers are responsible for funding, constructing, operating, and maintaining the airport, while the government retains regulatory oversight and, in some cases, partial ownership.

Major metro and high-traffic airports are typically developed under PPP due to their potential for commercial profitability. These projects are governed through long-term concession agreements, ensuring clear revenue-sharing, service obligations, and operational standards.

Prominent examples of PPP airports include:

- Delhi International Airport – operated by GMR Group
- Mumbai International Airport – operated by Adani Group

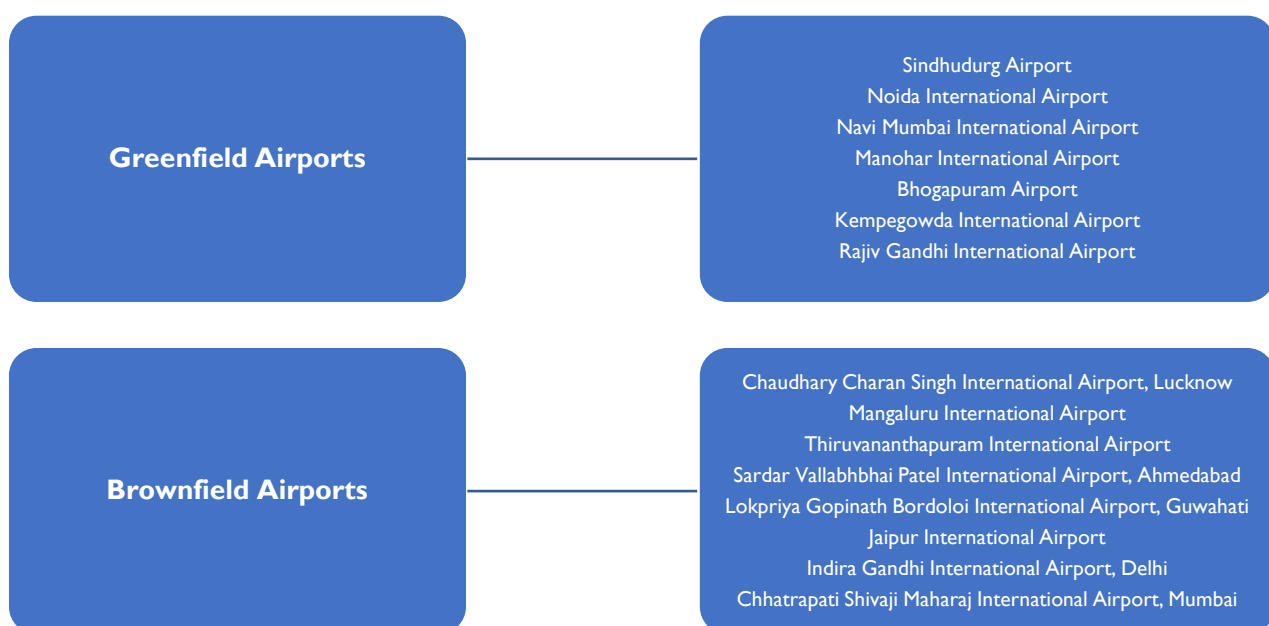
- Noida International Airport (Jewar) – being developed by Zurich Airport International

PPP projects have demonstrated significant success in improving infrastructure quality, passenger services, and overall airport rankings at global platforms.

3. Greenfield vs Brownfield Development

India's approach to airport infrastructure development is strategically divided into greenfield and brownfield models, each serving distinct but complementary purposes in meeting the country's growing aviation demand. Greenfield development involves the construction of entirely new airports on previously undeveloped land. These projects are initiated in areas with no existing aviation infrastructure, often targeting regions with rising economic activity, tourism potential, or strategic significance. Greenfield projects offer a clean slate, allowing developers to design state-of-the-art facilities with the latest technologies in passenger processing, sustainability, and safety standards. Since there are no legacy constraints, planning can fully align with modern international benchmarks and future expansion prospects. However, greenfield development typically requires extensive land acquisition, complex regulatory approvals, higher capital investment, and longer gestation periods.

On the other hand, brownfield development refers to the upgradation, expansion, or modernization of existing airports. This model is adopted when operational airports face increasing passenger volumes, congestion, or outdated infrastructure. Brownfield projects may involve extending runways, building new terminals, retrofitting existing structures, or incorporating advanced technologies for improved efficiency and passenger experience. The key advantage of brownfield development lies in faster execution, lower initial costs compared to greenfield airports, and the benefit of leveraging existing infrastructure and connectivity. However, these projects must be carefully managed to avoid disruptions to ongoing airport operations and often contend with space limitations or urban encroachment.



Together, both development models play a critical role in India's airport infrastructure strategy. Greenfield projects open up new geographies and expand the national aviation footprint, while brownfield projects enhance capacity and service quality at existing high-traffic locations. A balanced integration of both ensures a future-ready, resilient, and inclusive air transportation network.

4. Financing Framework

The development of airport infrastructure in India is supported by a diversified and robust financing framework that combines public investment, private sector participation, and strategic policy support. The Airports Authority of India (AAI), under the Ministry of Civil Aviation, plays a crucial role in funding and executing projects, particularly at non-metro and remote locations. AAI has committed approximately ₹25,000 crore towards airport modernization and expansion under the National Infrastructure Pipeline (NIP), which has earmarked a total investment of over ₹91,000 crore for airport infrastructure between FY 2020 and FY 2025. Complementing AAI's efforts, private developers contribute a significant portion of the investment, especially in Public-Private Partnership (PPP) projects, bringing in capital, innovation, and operational expertise to high-traffic airports.

To promote equitable air connectivity, the government also provides financial support through Viability Gap Funding (VGF) under the Regional Connectivity Scheme – UDAN. This ensures that air services are extended to underserved and unserved regions, even where commercial returns are low. Additionally, India allows 100% Foreign Direct Investment (FDI) in airport infrastructure through the automatic route, which has attracted global players and enhanced funding options. Together, these mechanisms enable the creation of modern, sustainable, and inclusive airport infrastructure capable of meeting the demands of a rapidly growing aviation market.

Demand Growth Scenario



Major Project and Scheme Planned towards the Airport Infrastructure development in India

To meet the rising demand for air travel, the Government of India is undertaking a large-scale expansion of airport infrastructure across the country. A key national objective is to increase the number of operational airports from 158 in FY 2023 to 220 by the year 2025. This ambitious vision is being propelled by several flagship initiatives and capital investment programs aimed at enhancing capacity, connectivity, and accessibility.

➤ NABH Nirman Scheme

Announced in the Union Budget 2018, the NABH (NextGen Airports for Bharat) Nirman scheme seeks to dramatically scale up airport capacity across India, targeting one billion passenger trips annually. The

scheme envisions the construction of 100 new airports over the next decade, backed by an estimated investment of INR 2,000 billion. This initiative is instrumental in meeting long-term aviation demand and ensuring seamless passenger experience.

➤ **Capital Expenditure by Airport Operators**

Complementing the NABH Nirman initiative, airport developers and operators have committed to a combined Capital Expenditure (CAPEX) of over INR 900 billion for the modernization and expansion of airport infrastructure by 2025. The Airports Authority of India (AAI) alone is contributing more than INR 260 billion toward the development and upgradation of existing facilities.

➤ **Regional Connectivity Scheme (RCS) – UDAN**

Launched in October 2016, the UDAN (Ude Desh ka Aam Naagrik) scheme aims to make air travel affordable and accessible by enhancing regional air connectivity. The government has allocated INR 45 billion for the revival and development of unserved and underserved airports, heliports, and water aerodromes under this initiative.

For FY 2024, the Ministry of Civil Aviation has been allocated INR 32.24 billion (approximately USD 440.36 million), with INR 6 billion (USD 77.52 million) earmarked specifically for the RCS-UDAN scheme. The initiative also supports airlines through Viability Gap Funding (VGF), encouraging them to operate on less commercially viable regional routes.

Since its inception, UDAN has facilitated air travel for over 13.6 million passengers and operationalized 559 regional routes, connecting 84 airports, including 13 heliports and 2 water aerodromes. By 2025, the scheme aims to operationalize 1,000 regional routes and develop 100 new unserved airports, heliports, and water aerodromes.

➤ **Twin City Airport Initiative**

In an effort to decongest existing major airports and support the growing urban footprint, the Ministry of Civil Aviation has proposed the development of "Twin City Airports." These airports are strategically planned to serve two urban centers or metropolitan regions simultaneously.

The plan envisions the construction of six twin city airports by 2030, expanding to 15 by 2040 and 30 by 2047. So far, three such projects have been identified:

- Noida International Airport (Jewar) – to complement and relieve congestion at Indira Gandhi International Airport, Delhi.
- DB Patil International Airport (Navi Mumbai) – to decongest Chhatrapati Shivaji Maharaj International Airport, Mumbai.

- Manohar International Airport (Goa) – to support and supplement operations at Dabolim Airport.

In addition, several state governments have approached the central government to propose new greenfield airports that align with this strategic initiative.

Growth Outlook

India's air passenger traffic is projected to grow by 7% in 2025, fueled by the rise of the middle class and greater affordability of air travel. According to Joshua Ng, Director at Alton Aviation Consultancy, India now accounts for 10% of the Asia-Pacific region's domestic and international air traffic, having not only recovered to pre-pandemic levels but also positioned itself for sustained long-term growth.

The momentum is being reinforced by the government's expansive aviation infrastructure strategy, which includes the planned development of 150 new airports across the country. In parallel, Indian airlines are scaling up operations with a collective aircraft order book nearing 1,900 units. Notably, the merger of Air India and Vistara is expected to bring greater market stability establishing Air India as a key full-service operator, while reinforcing IndiGo's dominance in the low-cost carrier segment.

Globally, the aviation sector has returned to pre-COVID passenger traffic levels and is expected to grow at an average annual rate of 4% between 2024 and 2034. This growth aligns with an anticipated 2.7% annual increase in global GDP. Within this context, the Asia-Pacific region spearheaded by China and India is projected to remain the world's largest aviation market, with a forecasted growth rate of 5.1% per annum.

Despite these positive trends, the industry faces notable challenges. Aircraft manufacturers are dealing with a significant delivery backlog of approximately 9.7 years, as highlighted by research from CAPA and Alton. While passenger numbers and revenues are expected to reach record highs in 2025, the sector must navigate headwinds including moderating ticket yields, inflationary pressures, and ongoing geopolitical risks.

Operational constraints also persist, with pandemic-era supply chain disruptions and labour shortages continuing to affect airline efficiency. To address these issues, airlines are focusing on enhancing aircraft utilization, shortening turnaround times, and strategically employing wet leasing arrangements to boost operational flexibility and competitiveness in a rapidly evolving market environment.

Growth forecast: Expected growth in road infrastructure in India

The Indian Road sector is experiencing significant growth and is set to expand further in the future. The government has recognized the importance of improving transportation infrastructure and has taken initiatives to enhance the road network in the country. It is estimated that India will need to spend USD 4.51 trillion on infrastructure by 2030 to achieve its vision of becoming a USD 5 trillion economy by 2027. In line with this, the National Infrastructure Pipeline (NIP) has allocated a total capital investment of INR 20.34 trillion for the highways sector by 2025.

Under the NIP, the government has already allocated INR 20.33 trillion for road infrastructure development during the period of FY 2020-2025. The government has set ambitious targets for the highway sector, with plans to spend approximately INR 17 trillion within the five-year period of FY 2020-2025. This investment will be focused on the construction of expressways, economic corridors, coastal and port connectivity highways, and border roads or strategic highways.

Furthermore, the government is emphasizing the need to adopt green technology in road construction. The National Rural Infrastructure Development Agency is targeting the construction of 50,000 km of rural roads by 2030, with a focus on utilizing green technology. In addition, the government plans to construct 26 Green Highways in India by 2024, highlighting its commitment to sustainable infrastructure development.

The growth potential of the Indian road sector is immense. The highway construction industry is projected to experience a significant growth rate of 133% by 2025. India aims to achieve a target of 60 km of road construction per day, already building a record-breaking 30 km per day. The government has also set specific targets for expressways and expects to see reduced travel time between major cities such as Delhi, Dehradun, Haridwar, Jaipur, Chandigarh, and Amritsar.

The Indian Road sector is poised for substantial growth in the coming years. With increased capital expenditure, improved infrastructure, and a focus on sustainability, India aims to enhance connectivity, boost economic development, and create more efficient transportation systems. The government's commitment to the development of the road sector will play a vital role in realizing its vision for a USD 5 trillion economy and meeting the growing infrastructure needs of the country.

The Government has taken various measures to reduce delays and fast track many stuck projects to increase the per day construction target in the current fiscal .

The government has expedited the construction of national highways, including high-speed access-controlled roads, to establish a world-class road network by 2 India's road infrastructure sector is witnessing robust expansion, underpinned by strategic government initiatives and significant capital investments. As the country aspires to become a USD 5 trillion economy by 2027, an estimated USD 4.51 trillion will be required for infrastructure development by 2030, with road infrastructure playing a pivotal role.

To align with this vision, the **National Infrastructure Pipeline (NIP)** has earmarked a capital investment of INR 20.34 trillion for the highways sector by 2025. Of this, INR 20.33 trillion has already been allocated for road development projects between FY 2020 and FY 2025. The government's focus is on building expressways, economic corridors, coastal highways, port connectivity roads, and strategic border routes.

Sustainability has become a core objective, with the **National Rural Infrastructure Development Agency** aiming to construct 50,000 km of rural roads by 2030 using eco-friendly technologies. Additionally, 26 Green Highways are planned to be developed by 2024, reaffirming the commitment toward environmentally responsible infrastructure.

The growth outlook for India's road sector is exceptionally strong. The highway construction industry is projected to grow by **133% by 2025**, supported by a government target of building **60 km of roads per day**, up from the current pace of 30 km/day. This surge is expected to significantly cut travel times between major cities including Delhi, Dehradun, Haridwar, Jaipur, Chandigarh, and Amritsar.

To accelerate progress, the government has introduced reforms to reduce project delays and revive stalled developments, ensuring faster implementation. High-speed, access-controlled highways are being prioritized as part of the larger ambition to establish a world-class road network.

Originally, the national highway network was projected to reach **200,000 km by 2025**, but revised projections now extend this target to **FY 2037**. However, based on historical growth trends, strong policy support, and rising infrastructure demand, **Dun & Bradstreet (D&B)** anticipates that this milestone could be achieved well before FY 2037.

With a strong emphasis on capital investment, sustainable practices, and fast-tracked execution, India's road infrastructure sector is on a transformational growth path. These developments are expected to significantly enhance connectivity, stimulate economic growth, and contribute meaningfully to the nation's infrastructure ambitions.

The target to increase the total national highways network to which was targeted to be achieved by 2025 initially has now been proposed be achieved by 2 lakh kilometers 2037.

However, basis the historical growth trend in road construction, the various demand drivers that are directly & indirectly impacting the road construction segment, the new growth forecast / targets set by the relevant Government agencies / ministries, D&B anticipate the national highway network to reach approximately 200,000 kms much ahead of FY 2037.

Institutional Construction

Insight on Construction of social infrastructure building including hospitals, education institutes and administrative building etc

The construction of social infrastructure plays a pivotal role in shaping India's human capital development and supporting inclusive economic growth. Social infrastructure encompasses the development of essential public assets such as hospitals, educational institutions, administrative buildings, community halls, and other public service facilities that directly impact the well-being of citizens. In recent years, the Government of India has significantly increased investments in this sector through flagship initiatives like the Smart Cities Mission, Samagra Shiksha, and the PM-Ayushman Bharat Health Infrastructure Mission. As of March 2024, over 7,555 projects worth INR 1,51,361 Cr. under the Smart Cities Mission have been completed, many involving the construction of new public buildings and modernization of civic infrastructure. Additionally, the expansion of Health and Wellness Centres (HWCs) under the Ayushman Bharat initiative and the establishment of PM SHRI schools reflect growing public investment in health and education facilities.

According to the National Infrastructure Pipeline (NIP), social infrastructure accounts for an estimated INR 2.86 lakh crore of the planned INR 111 lakh crore investment between FY 2020 and FY 2025. These investments aim to bridge infrastructure gaps in underserved areas, ensure access to public services, and improve overall governance. Furthermore, such construction activities are aligned with India's commitment to achieving the UN Sustainable Development Goals (SDGs), especially those related to health (SDG 3), education (SDG 4), and sustainable communities (SDG 11). The continuous growth of this sector presents significant opportunities for construction and infrastructure companies, EPC contractors, and allied industries across India.

➤ Healthcare Infrastructure

The Government of India, under the PM-Ayushman Bharat Health Infrastructure Mission, has established a significant number of Health & Wellness Centres (HWCs) renamed Ayushman Arogya Mandirs to strengthen primary healthcare at the grassroots. According to an official PIB press release, as of 15 January 2024, a total of 164,043 Arogya Mandirs had been operationalized across rural and urban India.

Simultaneously, the Pradhan Mantri Swasthya Suraksha Yojana (PMSSY) is actively expanding tertiary care capacity by setting up AIIMS-like institutions and upgrading district hospitals and government medical colleges. Under PMSSY, six AIIMS-like institutions are already operational (in Bhopal, Bhubaneswar, Jodhpur, Patna, Raipur, and Rishikesh), with 22 new AIIMS approved and 75 medical colleges slated for upgradation. These enhancements are significantly expanding specialty and emergency healthcare services across underserved regions.

➤ Educational Infrastructure

Education infrastructure has been prioritized through long-standing schemes like Samagra Shiksha and the newer PM SHRI (Pradhan Mantri Schools for Rising India) initiative. Approved in September 2022, PM SHRI aims to upgrade over 14,500 schools into model institutions equipped with smart classrooms, laboratories, libraries, and eco-friendly facilities. As of October 7, 2024, 10,855 schools had been officially selected under PM SHRI to receive these infrastructure enhancements.

The selection and rollout are tracked in phases via the Ministry of Education's PM SHRI dashboard: as of May 26, 2025, a total of 12,079 schools had been selected across four phases 1,329 primary, 3,340 elementary, 2,921 secondary, and 4,489 senior secondary schools. This sizable pipeline underscores the central government's commitment to modernizing the physical and pedagogical environment in government schools nationwide.

➤ **Administrative & Civic Infrastructure Development**

India's urban infrastructure is undergoing a substantial transformation driven by the Smart Cities Mission, implemented by the Ministry of Housing & Urban Affairs. As of May 9, 2025, across 100 smart cities, 7,555 of the 8,067 sanctioned projects (94%) have been completed, at a total project cost of INR 1.51 lakh crore; the remaining 512 projects worth INR 13,043 crore are currently ongoing. These completed initiatives include the creation and modernization of Integrated Command & Control Centres (ICCCs), municipal service hubs, digitized administrative complexes, public utility buildings, and open civic spaces designed to harness smart technology and sustainable design in improving urban governance and service delivery.

Demand scenario in Government administrative building sector

Government administrative buildings are critical components of India's institutional infrastructure, enabling governance, public service delivery, and policy implementation across urban and rural regions. These structures include secretariats, collectorates, municipal offices, panchayat bhavans, and integrated service delivery centres such as Jan Seva Kendras and Common Service Centres (CSCs). As the population grows and urban areas expand, the pressure on existing administrative infrastructure has intensified, necessitating the construction of new buildings and the modernization of existing ones to improve efficiency, accessibility, and citizen experience.

The Government of India, along with state governments, has placed increasing emphasis on strengthening public administration through infrastructure development, digital integration, and decentralized governance. National programs like the Smart Cities Mission, AMRUT, and Digital India, along with flagship projects such as the Central Vista Redevelopment, reflect this commitment. Administrative buildings are now evolving to include digital command centers, e-governance service points, and green building norms, signaling a shift from traditional brick-and-mortar establishments to smart, efficient public infrastructure. This evolution is creating a sustained and rising demand for administrative building construction across the country.

The growing demand for modern administrative buildings stems from a convergence of demographic pressures, policy initiatives, and technological transformation. The following key factors are driving the need for both greenfield construction and redevelopment of government administrative infrastructure across India:

Urban Population Growth

India's rapidly expanding urban population is creating unprecedented demand for robust administrative infrastructure. As cities become denser, the need for effective public service delivery and civic management intensifies. This demographic shift is exerting pressure on existing administrative buildings, necessitating the construction of new government offices, civic centres, and administrative hubs to manage urban planning, utilities, law and order, and social welfare schemes efficiently. The growth of metropolitan areas as well as the emergence of new urban agglomerations is driving both vertical and horizontal expansion in the administrative building segment.

Government's Capital Expenditure Push

The increased allocation for capital expenditure under the Union Budget 2024–25 demonstrates a clear government focus on infrastructure-driven economic growth. A significant portion of this capital outlay is being directed towards the Ministry of Housing and Urban Affairs (MoHUA), indicating a commitment to strengthening civic and administrative frameworks. This strategic push is stimulating demand for new administrative buildings, renovation of outdated government structures, and the development of high-capacity office complexes capable of supporting modern governance functions, especially in growing urban and semi-urban areas.

Smart Cities & Digital Governance Infrastructure

The operationalisation of Integrated Command and Control Centres (ICCCs) under the Smart Cities Mission is catalysing the transformation of traditional administrative buildings into high-tech governance hubs. These centres serve as the digital nerve centres of cities, integrating services like traffic management, surveillance, utility monitoring, and emergency response. Many of these ICCCs are housed within or connected to government administrative buildings, thereby driving demand for modernised structures equipped with advanced IT infrastructure, data centres, and collaborative workspaces to enable real-time decision-making and efficient citizen service delivery.

Decentralization and Ease of Living

- Decentralisation of governance through initiatives such as e-Governance reforms, AMRUT 2.0, and urban rejuvenation schemes is fostering the development of smaller, decentralized administrative offices across the country. This is particularly evident in Tier-2 and Tier-3 cities, where municipal corporations and ward-level offices are being upgraded or newly constructed to bring governance closer to citizens. These efforts are not only improving accessibility and ease of living but are also significantly contributing to the rising demand for modern, climate-resilient, and citizen-centric administrative infrastructure.

Construction opportunities arising in the administrative sector

Construction opportunities arising in the administrative sector:➤ **Government Institutional Infrastructure**

- **Prison Administration Modernization:** The Punjab government has initiated construction of a new “Jail Bhawan” in Mohali a five-storey administrative complex featuring escalators, central HVAC, solar units, and parking all slated for completion by March 2027 (likely December 2026) at an estimated cost of INR 35 crore. This project underscores a trend towards upgrading hierarchical administrative buildings with modern amenities, creating repeated opportunities for contractors in civil, MEP (mechanical, electrical, plumbing), and sustainability works
- **Hospital Administrative Integration via PPP:** The Delhi government is exploring PPP models to complete and operate 11 under-construction hospitals (multi-specialty and ICU centres), which saw cost escalations from INR 2,663 crore to INR 3,947 crore. This presents opportunities in not just medical construction, but also administrative and facility management infrastructure

➤ **Public-Private Partnerships (PPP) in Urban Admin:**

The growing adoption of Public-Private Partnerships (PPPs) in India reflects a broader shift toward collaborative infrastructure development, particularly in healthcare, water supply, and urban services. As of late 2020, nearly 1,103 PPP projects worth around INR 20.44 trillion (USD 275 billion) had been launched, of which about 188 projects were in the urban sector. While most urban PPPs have focused on transport and waste management, administrative infrastructure such as municipal offices, integrated command centres, and governance hubs remains underutilized.

➤ **Smart Cities and Secretariat Redevelopment**

- **Smart Cities Mission:** Since 2015, the Government of India sanctioned ~8,058 urban-centric tenders (up to January 2025), with INR 150,002 crore utilized focusing on city administrative hubs, municipal buildings, command/control centres, etc. Though officially concluding in March 2025, ancillary administrative facility construction remains in advanced stages.
- **Central Vista Redevelopment:** The Central Government’s INR 1,300 crore Central Vista Central Secretariat redevelopment (including new ministry buildings, administrative offices, etc.) is ongoing and scheduled to complete by 2026 offering long-term opportunity streams for civil, electrical, and finishing works.

➤ **Tier-II City Tech and Administrative Hubs:**

CBRE projects that 60–65% of new office supply in 2025 will be concentrated in integrated tech parks many of which include administrative hubs and zones. Traditional government office migration may follow this trend into tier-II cities like Pune, Chennai, and Hyderabad, indicating potential tender volumes in civic architecture and allied services.

➤ **Green & Sustainable Administrative Buildings**

In Rajasthan alone, over 600 IGBC-certified green buildings mostly offices covering 185 million sq ft have delivered energy savings of 40–50%, with paybacks in 18 months. Such sustainability benchmarks are increasingly mandated in state and central administrative construction, driving demand for green architecture, solar integration, and water-saving systems. The broader construction sector, projected to reach INR 25.3 trillion in FY 2025, anticipates strong demand for solar-powered commercial buildings and AI-driven property management, indicating rising priorities for tech-forward admin infrastructure.

Key threats & challenges facing the infrastructure industry

➤ **Project Delays & Management Deficiencies**

Road and runway construction projects in India continue to face widespread delays due to systemic project management gaps. As highlighted by the Ministry of Statistics and Programme Implementation (MoSPI), as of March 2024, out of 1,873 monitored infrastructure projects above ₹150 crore, 449 had significant cost overruns, exceeding ₹5.01 lakh crore, with project costs escalating from ₹26.87 lakh crore to ₹31.88 lakh crore. Many of these delays affect key highway expansion, expressway development, and airport runway modernisation works. The average 36-month time overrun reflects persistent weaknesses in planning, risk assessment, contractor performance, and decision-making cycles. Additionally, 393 projects lacked defined commissioning timelines, underscoring the absence of structured scheduling and monitoring frameworks. Such delays disrupt transport connectivity, impede logistics efficiency, and ultimately elevate the financial burden on executing agencies.

➤ **Land Acquisition & Legal Disputes**

Land acquisition challenges remain one of the most critical constraints for road and airport runway construction in India. Highway projects often face delays due to land ownership disputes, fragmented land parcels, prolonged compensation negotiations, and litigation over title clarity. Similarly, airport runway expansion and greenfield airport development frequently encounter delays arising from complex regulatory approvals and local resistance. These issues, combined with slow land aggregation and administrative bottlenecks, significantly impact project timelines. As a result, developers working under EPC and HAM models face accelerated cost escalations and increased risk exposure, making timely project delivery difficult.

➤ **Inadequate Financing & Budget Constraints**

Despite increasing investment in transport infrastructure, financing gaps remain a major challenge, particularly for long-gestation road corridors and runway development projects with limited direct revenue potential. As noted in the Economic Survey, approximately 78% of India's infrastructure investment still comes from central and state governments, as private players remain cautious about taking on financially uncertain projects. Budget limitations often lead to phased construction, delayed payments to contractors, and slower execution of projects like rural road networks, runway strengthening, and airport modernization. Funding reallocations and delays in public-sector disbursements further exacerbate operational inefficiencies.

➤ **Funding Constraints & Financial Viability**

Even when funding avenues exist, the long construction cycles of highways, bridges, and runway projects make lenders hesitant, especially in regions with weaker economic prospects. The banking sector's exposure to high NPAs has made institutions cautious about lending to projects with uncertain toll revenues or limited commercial returns. High interest rates increase capital costs under EPC contracts, while HAM projects struggle if traffic projections or annuity payments face delays. Many transportation assets such as regional runways, smaller airports, and rural roads depend heavily on government viability support, making them financially unattractive for private developers without substantial subsidies.

➤ **Regulatory Delays & Bureaucratic Hurdles**

Road and runway projects frequently encounter regulatory and administrative delays due to the multiplicity of approvals required from land, environment, forest, aviation, and utility authorities. Environmental clearances, shifting of utilities, wildlife approvals, and permissions from aviation regulators (for runway upgrades) often take months beyond planned schedules. The absence of integrated approval systems slows down pre-construction activities, delaying right-of-way availability and increasing project uncertainty for EPC and HAM contractors. This fragmented regulatory ecosystem not only affects execution timelines but also diminishes investor confidence in large transportation infrastructure programs.

➤ **Infrastructure Fragility & Poor Resilience**

Concerns around construction quality and resilience have intensified across India's transportation sector. Incidents of road cave-ins, bridge failures, and damage to airport runways often triggered by heavy rains, inadequate supervision, or material inconsistencies highlight systemic weaknesses in quality control. These issues reveal gaps in engineering oversight, contractor practices, and adherence to national design standards. Cost pressures, combined with limited onsite monitoring, sometimes lead to compromised construction practices, resulting in roads and runways that are vulnerable to weather stress, structural fatigue, and safety hazards.

➤ **Institutional & Coordination Gaps**

Highway and runway projects are often delayed due to weak coordination between central ministries, state governments, airport authorities, local bodies, and implementation agencies. Overlapping mandates between

NHAI, state PWDs, MoRTH, MoCA, and ULBs frequently result in procedural delays for land approvals, utility shifting, or environmental permissions. Projects stall when responsibilities for certain components such as service roads, drainage, or runway lighting fall between agencies with unclear accountability. These institutional gaps slow execution and reduce the overall efficiency of India's road and aviation infrastructure programs.

➤ **Material Shortages & Contractor Inefficiencies**

Supply-chain disruptions and contractor performance issues remain common across road and runway construction. Shortages of key materials such as bitumen, cement, aggregates, and steel, combined with cost volatility, frequently delay project progress. Research from mid-2025 identifies material supply delays, cost inflation, and inconsistent contractor capabilities as major contributors to schedule overruns. In highway and runway projects, changes in design scope, re-tendering due to underperforming contractors, and disputes over project specifications further slow execution. Selection of lowest-bid contractors without adequate capability assessment often results in quality issues, timeline slippages, and the need for frequent rework.

➤ **Unavailability of Skilled Staff**

A major challenge facing India's construction and infrastructure sector is the persistent shortage of skilled and semi-skilled manpower. Despite large-scale project activity across roads and highways, runway development, EPC and HAM projects, and solid waste management infrastructure, the industry continues to rely heavily on an aging and limited workforce. The lack of trained engineers, machine operators, project managers, and technicians affects project quality, slows execution timelines, and increases dependency on on-site learning rather than specialized expertise. Additionally, limited access to structured training programs, high attrition, and migration of skilled workers to other sectors or overseas markets further widen the talent gap. This shortage poses a significant risk to project efficiency, cost control, adoption of advanced technologies, and long-term industry productivity.

➤ **Highly Competitive Industry**

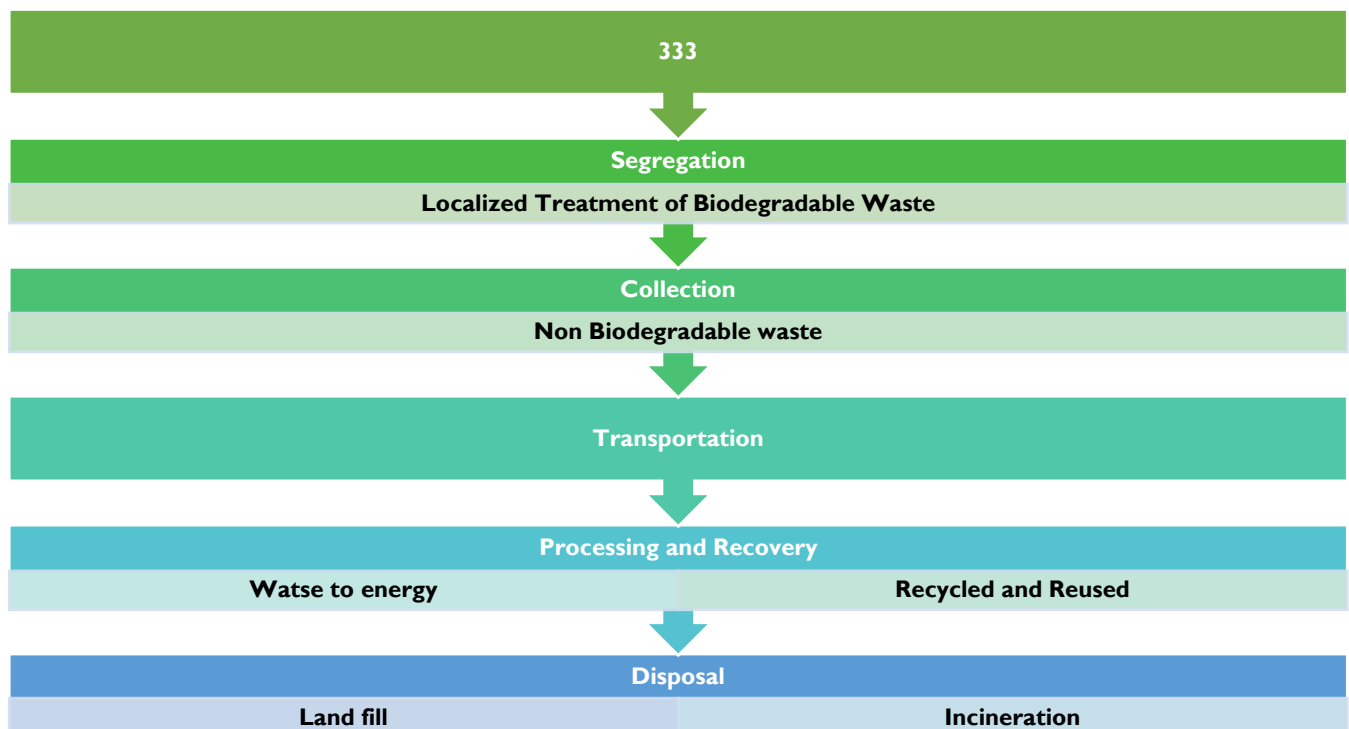
The Indian construction and infrastructure sector operates in a highly competitive environment, with a few well-established large players such as Larsen & Toubro (L&T), Hindustan Construction Company (HCC), and Adani Enterprises alongside an expanding group of specialist companies like PNC Infratech, Ashoka Buildcon, KNR Constructions, and Sadbhav Engineering dominating key segments. This combination of strong incumbents and niche experts intensifies competition across roads and highways, runway construction, EPC and HAM models, and solid waste management projects. The presence of these mature and technically capable firms drives aggressive bidding, compresses profit margins, and raises technical and execution standards. For mid-sized companies, competing against both large integrated contractors and domain-specialist players makes it increasingly difficult to secure major contracts, posing a significant challenge to sustaining growth and profitability in the industry.

Solid Waste Management

Overview of Solid Waste Management Industry in India

India, a nation undergoing rapid urbanization and industrial growth, is confronting an increasingly complex solid waste management challenge. The rising volume of waste generated each year is placing significant strain on infrastructure, environmental systems, and public health. TPD (Tonnes Per Day) is the standard unit used by the Central Pollution Control Board (CPCB) to quantify daily waste generation. As per the CPCB Annual Report 2021–22, India generated approximately 1,70,338 TPD of solid waste. In comparison, the 2020–21 CPCB report estimated total generation at 160,038.9 TPD, with a collection efficiency of 95.4% (152,749.5 TPD collected). Despite this high collection rate, only 50% of the collected waste (79,956.3 TPD) underwent treatment, leaving nearly one-third of the total waste generated without formal processing or safe disposal.

Despite the comparatively low per capita waste generation, India currently ranks seventh globally in total SWG volume. The Ministry of Environment, Forest and Climate Change (MoEFCC) estimates that India produces 62 million tonnes of waste annually, with this number growing at an average annual rate of 4%. Of this, municipal solid waste (MSW), plastic waste, and electronic waste (E-waste) form the bulk of the stream. With continued urban expansion and lifestyle changes, municipal solid waste alone is expected to increase to 165 million tonnes by 2030.



I. Generation: This is the first stage in the solid waste management process, where waste is created from everyday human activities. Waste is generated from households, commercial establishments, industries, institutions, and public spaces. It includes organic waste (like food scraps), recyclables (such as plastics, paper, and glass), and hazardous items (like batteries and chemicals).

2. Segregation: Once generated, waste needs to be segregated at the source into different categories—primarily biodegradable and non-biodegradable. Segregation is essential to ensure that recyclable and organic waste can be processed efficiently, reducing the burden on landfills and promoting sustainable waste management practices.

3. Localized Treatment of Biodegradable Waste: Biodegradable waste such as food scraps, garden waste, and other organic materials can be treated locally through composting, vermicomposting, or biomethanation. Treating this waste near the source reduces transportation costs and helps generate valuable by-products like compost or biogas, which can be used as fertilizers or clean energy.

4. Collection: After segregation, waste is collected by municipal bodies or private contractors. This process involves door-to-door collection, community bin collection, or pickup from commercial establishments. Proper collection is critical to maintain hygiene and prevent littering in public spaces.

5. Non-Biodegradable Waste: Non-biodegradable waste includes materials such as plastics, metals, glass, and synthetic packaging. These items cannot decompose naturally and require separate handling. Once collected, they are sorted and sent to recycling units or waste-to-energy plants depending on their composition and reusability.

6. Transportation: Waste, both biodegradable and non-biodegradable, is then transported from collection points to treatment plants, recycling facilities, or disposal sites. Efficient and covered transportation systems are necessary to avoid spillage, reduce environmental pollution, and maintain public health standards.

7. Processing and Recovery: At this stage, waste undergoes processing to extract value. This involves:

- **Waste-to-Energy (WTE):** Technologies like incineration, gasification, or anaerobic digestion convert waste into electricity or fuel.
- **Recycling and Reuse:** Recyclable materials are sorted, cleaned, and transformed into new products, reducing the demand for virgin resources.

Processing and recovery help reduce the volume of waste sent to landfills and support the circular economy.

8. Disposal: The final step involves disposing of the remaining waste that cannot be treated, recycled, or reused. This is done through:

- **Landfilling:** Disposal of inert or non-recyclable waste in engineered landfills.
- **Incineration:** Controlled burning of certain types of waste to reduce volume, often with energy recovery.

Disposal should be carried out scientifically to minimize environmental impact and safeguard human health

Composition of type of solid waste such Municipal waste, Industrial waste, and E-waste in India generated in India

Understanding the precise composition of solid waste is foundational for developing effective and sustainable waste management strategies. This detailed characterization informs crucial decisions regarding appropriate collection systems, selection of processing technologies (such as composting, recycling, or waste-to-energy), and the implementation of resource recovery initiatives. Different waste streams municipal, industrial, and e-waste possess distinct physical and chemical characteristics, necessitating tailored management approaches to optimize their handling and potential for value recovery.

➤ **Municipal Solid Waste (MSW) :**

It constitutes a predominant portion of India's total waste stream, with its volume continually increasing due to burgeoning population, rapid urbanization, and evolving consumption patterns. The per capita waste generation in India exhibits variability across different regions and city sizes. Estimates range from 100-500 grams per person per day (g/person/day) in small and large towns, respectively. Recent estimates indicate that India's cities and towns now generate around 55 million tonnes of municipal solid waste (MSW) annually, equivalent to approximately 1.5 lakh tonnes per day. With rising incomes and accelerating urbanization, both the volume and composition of waste are expected to change significantly per capita waste generation is projected to increase, and the proportion of non-biodegradable materials in the waste stream is likely to grow. Looking ahead, MSW generation in India is expected to reach 165 million tonnes by 2030 and further escalate to about 436 million tonnes by 2050, underscoring the urgent need for stronger waste-management systems and infrastructure.

The composition of MSW in India is notably heterogeneous, influenced by factors such as regional variations, socioeconomic conditions, and even seasonal changes. Despite these variations, consistent patterns in the major components are observed:

- **Organic/Compostable Matter:** This consistently forms the largest fraction of Indian MSW. Studies indicate it ranges from 40-60% to 51-53% , and in some developing country contexts, it can be as high as 40-70%. For example, in Guwahati city, organics constituted 42.2% of the MSW. This high organic content is a key characteristic that makes biological treatment methods, such as composting and biomethanation, highly suitable for a significant portion of India's MSW.
- **Recyclable Content:** This category includes materials like paper, plastics, glass, and metals. Its share in MSW varies, typically ranging from 10-25% to 13-20% or 10-30%. In Guwahati, plastic wastes alone accounted for 25.2% of the MSW.
- **Inert Material:** This fraction, comprising non-biodegradable and non-recyclable components, generally constitutes 30-50% of MSW.

- **Moisture Content:** Indian MSW typically exhibits a high moisture content, ranging from 30-60% to 43.4-58.3% and 46.76%. This is primarily attributable to the substantial organic fraction present in the waste.
- **Carbon-to-Nitrogen (C/N) Ratio:** This ratio is critical for efficient composting processes, with an ideal range of 20-40. Indian MSW generally falls within this optimal range, with reported values around 32 or 26:5, indicating its suitability for composting.

Waste composition and generation rates exhibit notable regional variations across Indian cities, influenced by a confluence of factors including population density, economic conditions, and prevailing cultural practices. For instance, secondary data indicates that Chennai generated approximately 3000 tons per day (TPD) of solid waste, followed by Bangalore with 2200 TPD, Ahmedabad with 1200 TPD, and Dehradun with 200 TPD. The organic matter content also varied across these cities, with Bangalore showing the highest, followed by Ahmedabad, Dehradun, and then Chennai. These differences underscore the necessity for localized waste management strategies that account for specific regional characteristics rather than a one-size-fits-all approach.

➤ **Industrial Waste Generation:**

Industrial waste is one of the most significant by-products of economic development and industrialization. As India's manufacturing and processing sectors expand, the volume and complexity of industrial waste continue to grow. Managing this waste effectively is essential for environmental protection, resource efficiency, and public health. This chapter presents an overview of the types, volumes, and characteristics of industrial waste in India, along with its potential for energy generation and the regulatory response.

Industrial waste in India comprises both hazardous and non-hazardous forms, originating from diverse sectors including chemicals, textiles, pharmaceuticals, cement, food processing, and metallurgy. According to recent estimates by the Ministry of New and Renewable Energy (MNRE), India has the potential to generate approximately 1,300 MW of energy from industrial waste, highlighting its significance not only as an environmental concern but also as an untapped energy resource.

Classification of Industrial Waste:

- **Hazardous Industrial Waste:** Hazardous waste includes substances that pose substantial or potential threats to public health and the environment. These may be solid, liquid, or gaseous and become even more dangerous when interacting with other wastes.
 - Characteristics: Toxic, flammable, corrosive, reactive.
 - Generation Rate: Hazardous waste constitutes about 10–15% of the total industrial waste and is increasing at a rate of 2–5% annually.
 - Examples: Spent solvents, industrial sludge, heavy metal residues, and chemical by-products.

In India, as per the Hazardous Waste (Management and Handling) Rules, 2003, around 11,138 industrial units have been authorized by State Pollution Control Boards (SPCBs) to handle hazardous waste, primarily for temporary storage within premises. Annually, the country generates approximately 4.43 million tonnes of hazardous waste, of which around 71,833 tonnes are incinerable, as reported to the Supreme Court of India.

Notably, the European Union has demonstrated the feasibility of using hazardous waste as fuel for instance, 3 million tonnes of hazardous waste from cement plants have been repurposed as alternative fuel. India, too, must explore co-processing and industrial symbiosis to reduce the burden of hazardous waste disposal.

➤ Non-Hazardous Industrial Waste

Non-hazardous waste includes by-products that are not toxic or dangerous and generally resemble municipal solid waste in composition.

- Characteristics: Non-toxic, non-reactive, and requires no specialized treatment.
- Examples: Paper, cardboard, wood, textiles, packaging waste, and food residues from industrial kitchens or cafeterias.

This type of waste is often generated by retailers, small businesses, workshops, and commercial units, and is usually processed alongside household waste in conventional municipal treatment facilities. Its relatively benign nature makes it suitable for reuse, recycling, and composting, depending on its composition. Despite the existing data gaps for non-hazardous industrial waste, reports highlight its substantial potential for circularity, emphasizing that industrial waste should be viewed as a valuable resource rather than merely a liability.

- **Steel Slag:** Out of an estimated 52.5 MT of steel slag projected to be generated by 2030, approximately 35.3-41 MT can be effectively utilized in cement manufacturing.
- **Fly Ash:** Similarly, from the 437 MT of fly ash expected by 2030, roughly 208-231 MT has the potential for use in the cement sector.
- **Refuse-Derived Fuel (RDF) and Biomass:** The utilization of RDF in cement industries and the co-firing of biomass in thermal power plants offer significant environmental benefits. These practices can contribute to a reduction in CO₂ emissions ranging from 46.6 to 85.6 MT CO₂e by 2030.

Embracing circular economy principles, which advocate for the sharing, leasing, reusing, repairing, refurbishing, and recycling of existing materials, can lead to substantial resource conservation. Utilizing these industrial wastes can conserve over 450 MT of natural resources like coal and gypsum and significantly reduce carbon emissions. Industrial waste management in India presents both challenges and opportunities. While hazardous waste requires strict regulatory oversight and safe disposal mechanisms, non-hazardous industrial waste offers significant potential for recycling and resource recovery.

➤ E-Waste

E-waste, or electronic waste, refers to discarded electrical and electronic devices such as computers, mobile phones, televisions, and other equipment that are no longer functional or are made obsolete by rapid technological advancements. With rising digital adoption and shorter device lifecycles, India has become the world's third-largest generator of e-waste, after China and the United States.

The volume of e-waste generated in India has seen a dramatic increase over the past decade. As per recent estimates, India produces over 1.6 million metric tonnes (MT) of e-waste annually, and this number is growing at a compound rate of 23% per year. The country's e-waste volume surged by 151.03% in six years, from 7.08 lakh MT in 2017–18 to 17.78 lakh MT in 2023–24, reflecting the exponential pace of electronic consumption and disposal.

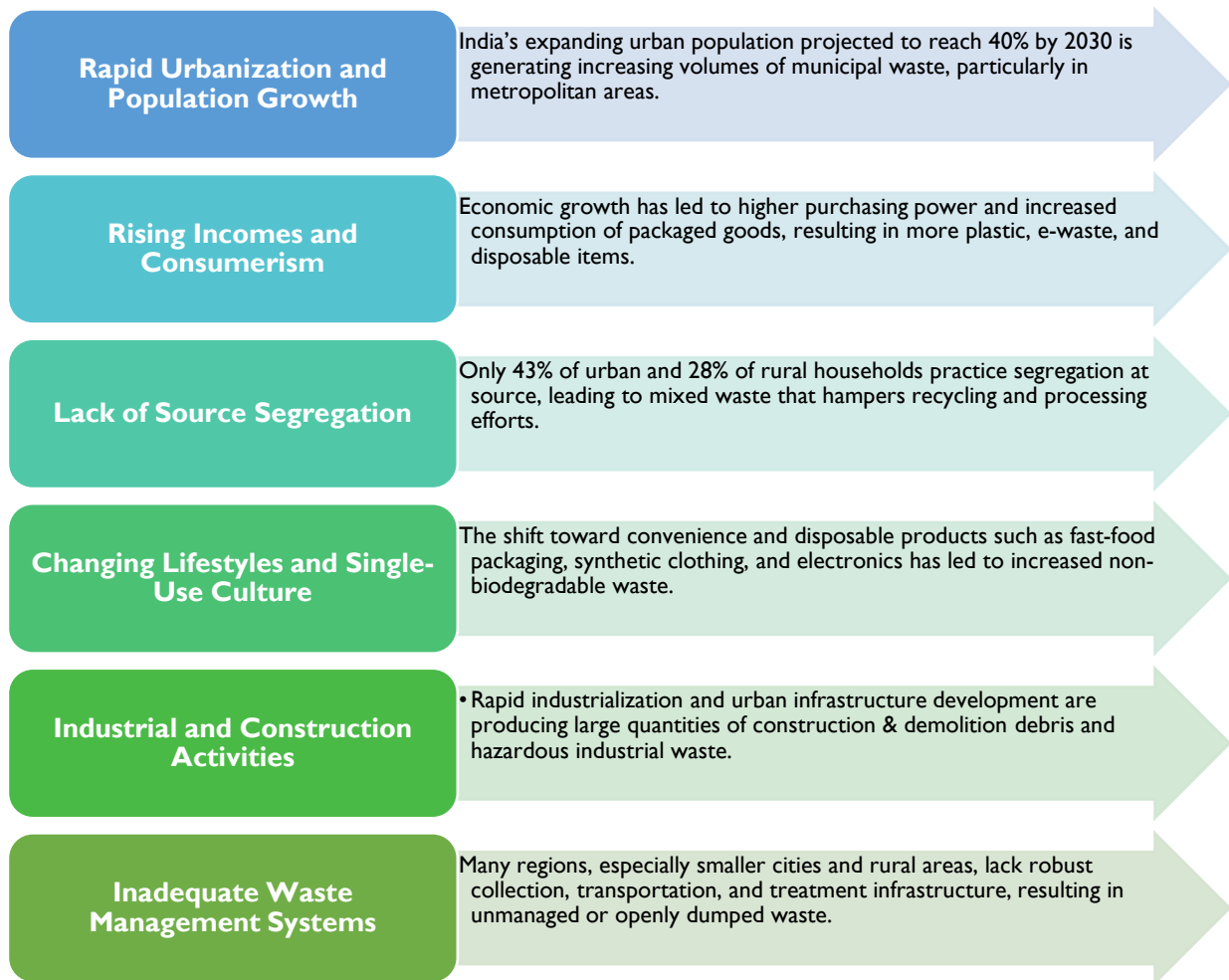
Below is a data-based snapshot of e-waste generation in India over time:

Year	E-Waste Generation (Metric Tonnes, MT)
2015	1.97
2016	2.22
2017	2.53
2018	2.86
2019	3.23
2020	53.6
2030	74.7 (Projected)

Improper e-waste management in India poses severe environmental, social, and economic consequences. With over 95% of e-waste processed informally, toxic recycling methods such as open burning, acid leaching, and manual dismantling expose workers many of whom are women and children to harmful substances like lead, mercury, and cadmium. These practices lead to air and water pollution, soil contamination, and severe health issues, reducing life expectancy in informal workers to under 27 years. Economically, the country loses over ₹80,000 crore annually in valuable metals like gold, silver, and copper, and forfeits around \$20 billion in potential tax revenue due to unregulated and undocumented recycling activities.

Despite a regulatory framework, India faces significant challenges in establishing a formal e-waste management system. A lack of authorized collection centers especially in Tier-II and Tier-III cities combined with limited consumer awareness and incentives, restricts proper disposal. Informal scrap dealers remain the primary touchpoint for e-waste collection, often using hazardous methods without safety gear. Additionally, grey-channel imports of used electronics under the guise of donations or refurbished goods exacerbate the problem. Addressing this crisis requires expanding formal infrastructure, enforcing Extended Producer Responsibility (EPR), integrating informal workers, and promoting safe recycling technologies to transition toward a circular and sustainable e-waste economy.

Any analysis of major factor for the waste generation in India



An analysis of waste processing Infrastructure, current processing Level and Gap in Waste Management in India.

India's waste management ecosystem has evolved considerably over the past two decades, yet the nation continues to grapple with structural challenges related to capacity, technology, regulatory enforcement, and public participation. With rising urbanization and increasing per capita waste generation, an effective and scalable waste processing infrastructure is critical for sustainable environmental outcomes. This chapter provides a detailed examination of India's current waste processing infrastructure, evaluates its operational capacity, and highlights the gaps that hinder comprehensive waste management.

Overview of Waste Processing Infrastructure

India has established a network of waste management facilities spanning landfills, waste-to-energy (WTE) plants, composting units, recycling facilities, and specialized treatment centres for hazardous and biomedical waste. However, a dichotomy exists between formal and informal systems, with infrastructure largely concentrated in Tier I and metropolitan cities.

➤ **Engineered Landfills and Dumpsites**

As per official estimates, India has developed **1,244 engineered landfill sites**, of which **669 have been constructed** and **645 are currently operational**. Despite this, **2,452 open dumpsites** remain active across the country. Most of these legacy dumps lack essential environmental safeguards, such as base liners, leachate collection systems, and gas venting provisions, resulting in severe soil and groundwater contamination.

➤ **Waste-to-Energy (WTE) Plants**

India has established **13 operational WTE plants** with a **combined capacity of 127.072 MW**, processing approximately **6,800 tonnes per day (TPD)** of non-recyclable municipal solid waste (MSW). Notably, **Delhi alone operates three WTE plants** with a **cumulative capacity of ~5,100 TPD**, producing around **52 MW of electricity**. Despite their potential to reduce landfill pressure, these plants face challenges related to:

- Inconsistent waste quality due to inadequate source segregation.
- High moisture and inert content in feedstock.
- Community resistance due to emissions concerns.

➤ **Composting and C&D Waste Management**

Composting remains underutilized despite its potential for organic waste management. In Delhi, a 200 TPD compost plant is operational alongside Construction and Demolition (C&D) waste processing facilities with capacities of 2,000 TPD and 500 TPD, respectively. However, across India, composting is not uniformly implemented, often due to logistical issues and market limitations for compost products.

➤ **Hazardous and Biomedical Waste Facilities**

- **Hazardous Waste:** Approximately 635 authorized recyclers process around 360,665 metric tonnes (MT) of catalyst and metal waste annually.
- **Biomedical Waste:** As of 2020, India had 208 Common Bio-Medical Waste Treatment Facilities (CBWTFs) with a combined capacity of 1,153 TPD, primarily concentrated in urban centres. Rural and semi-urban areas often rely on rudimentary or non-compliant disposal practices.

Current Processing Level of Waste in India

The waste processing levels in India remain considerably low compared to the total waste generated. With an estimated 160,000+ tonnes of municipal solid waste generated daily, only about 30–35% of this waste is scientifically processed. The rest is either dumped in open landfills or handled by informal sector recyclers under unregulated conditions.

Key findings include:

- **Source Segregation:** According to the National Sample Survey Office (NSSO), only 43% of urban households and 28% of rural households practice source segregation an essential precursor for effective processing.
- **Recycling:** A significant share of recycling, particularly for plastic, paper, and metals, is driven by the **informal sector**, which lacks regulatory oversight and safety standards.
- **Organic Waste:** Less than 20% of organic waste is composted or treated via biomethanation.
- **C&D Waste:** Out of the estimated 150 million tonnes of C&D waste generated annually, less than 1% is formally recycled due to limited plant capacities and enforcement.

Gap Analysis in Waste Management

Despite visible improvements in infrastructure, India's waste management system continues to face significant structural and operational challenges. As per the data provided, India has constructed 1,244 engineered landfill sites, with only 645 currently operational, while still relying on 2,452 active dumpsites that largely lack environmental safeguards. This reliance on outdated and unsafe dumping practices illustrates a major infrastructural and regulatory gap, particularly in smaller cities and rural areas.

The 13 Waste-to-Energy (WTE) plants currently operational in India, with a total capacity of 127.072 MW and processing around 6,800 tonnes of non-recyclable waste per day, demonstrate some progress in reducing landfill pressure. However, issues such as poor feedstock quality and emission concerns persist, as highlighted in the data, which limits the effectiveness of WTE plants as standalone waste solutions. For example, the installed WTE infrastructure in Delhi processes ~5,100 TPD and generates around 52 MW, yet it still coexists with other facilities like composting and C&D waste plants, indicating a fragmented approach.

The issue of source segregation remains a critical bottleneck. The National Sample Survey Office (NSSO) data reveals that only 43% of urban households and 28% of rural households practice source segregation. This lack of primary waste separation severely hampers the functionality of both centralized and decentralized processing systems, leading to low utilization of composting and recycling facilities.

In addition, while India has established 635 authorized recyclers for hazardous waste and 208 Common Bio-Medical Waste Treatment Facilities (CBWTFs) with a collective capacity of 1,153 TPD (as of 2020), these facilities are concentrated in urban centres, leaving rural and peri-urban regions underserved. This reflects both a geographic and capacity-based gap in specialized waste management.

India's waste processing infrastructure has seen measurable progress with the development of engineered landfills, Waste-to-Energy plants, composting units, and specialized facilities for hazardous and biomedical

waste, yet major gaps persist in processing capacity, source segregation, and equitable infrastructure distribution.

Regulatory Landscape

Major regulatory bodies for governing waste management

Waste management in India is administered through a multi-tiered institutional structure involving central, state, and local authorities. Each body has specific responsibilities, ranging from policy formulation to execution and monitoring.

- **Ministry of Environment, Forest and Climate Change (MoEFCC):** The apex regulatory authority, MoEFCC is responsible for the formulation of environmental policies and regulations, including rules pertaining to solid, hazardous, biomedical, plastic, and e-waste management. It notifies national frameworks such as the Solid Waste Management Rules (2016).
- **Central Pollution Control Board (CPCB):** Operating under the MoEFCC, CPCB provides technical guidelines, coordinates with State Pollution Control Boards (SPCBs), and ensures nationwide compliance with environmental regulations. It monitors implementation of waste management rules and sets standards for waste processing and disposal.
- **State Pollution Control Boards (SPCBs):** SPCBs are responsible for enforcing waste management rules at the state level, granting authorizations to waste management facilities, monitoring emissions, and ensuring compliance by local governments and private operators.
- **Ministry of Housing and Urban Affairs (MoHUA):** MoHUA plays a crucial role in supporting urban local bodies (ULBs) in managing municipal waste through technical and financial assistance, especially under national flagship programs like the Swachh Bharat Mission.
- **Urban Local Bodies (ULBs):** Empowered under the **74th Constitutional Amendment**, ULBs such as municipal corporations, councils, and nagar panchayats are directly responsible for waste collection, segregation, transportation, and disposal. Waste management is one of the 18 functional areas assigned to ULBs under the **12th Schedule** of the Constitution.
- **Constitutional Mandate for Citizens:** Article **51A(g)** of the Indian Constitution emphasizes the **fundamental duty of every citizen** to protect and improve the natural environment, thereby establishing a civic responsibility in maintaining environmental hygiene and waste management.

Analysis of major regulation and policy initiative for waste handling

India's regulatory framework for waste management has matured significantly in recent years, with a shift towards integrated, technology-driven, and participatory approaches. The following are key policy and regulatory initiatives shaping waste handling in India:

- **Solid Waste Management Rules, 2016:** These rules marked a paradigm shift by introducing segregation at source, promoting decentralized processing, and extending responsibility to bulk waste generators, manufacturers, and brand owners. They empower ULBs to fine defaulters and mandate the scientific management of different waste streams.
- **Swachh Bharat Mission (SBM):** Launched in 2014, SBM is India's flagship cleanliness initiative promoting solid and plastic waste management in both urban and rural areas. The mission has led to increased funding, public participation, and the development of waste infrastructure such as composting units and material recovery facilities.
- **Swachh Survekshan:** An annual cleanliness survey conducted by MoHUA to rank cities based on sanitation, waste management practices, and citizen feedback. This initiative incentivizes cities to improve waste collection, segregation, and public outreach.
- **Swachhata Hi Seva Campaign:** A nationwide mass mobilization initiative that engages civil society, educational institutions, and industries to promote cleanliness through citizen-driven activities, aligning with the vision of Jan Andolan (People's Movement).
- **Compost Banao, Compost Apnao Campaign:** This campaign encourages citizens to convert kitchen waste into compost at the source, thereby reducing the load on landfills and promoting organic waste management at the household and community level.
- **Project REPLAN (Reducing Plastic in Nature):** Spearheaded by KVIC, this initiative seeks to utilize processed plastic waste mixed with cotton rags to manufacture eco-friendly carry bags, promoting recycling and rural employment simultaneously.
- **Waste to Wealth Mission:** Part of the Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STIAC), this mission aims to identify and scale scientific solutions to manage waste, extract resources, and generate energy. It aligns with circular economy goals and estimates a USD 14 billion opportunity in waste-to-energy and resource recovery by 2025.
- **Waste to Energy Program (by MNRE):** This initiative focuses on generating electricity and thermal energy from municipal and industrial waste. It supports the setting up of bio-methanation plants, incineration-based WTE units, and RDF-based combustion plants.
- **Waste to Wealth Portal:** An online platform designed to facilitate the deployment of technologies for waste treatment, recycling, and resource recovery by connecting researchers, innovators, and industry stakeholders.

Major Industry Trend

Decentralized Waste Management Systems

Increasing adoption of ward-level composting, biomethanation units, and Material Recovery Facilities (MRFs) is reducing reliance on centralized processing and promoting local, community-driven waste solutions.

Expansion of Waste-to-Energy (WTE) Projects

- With growing investment in converting non-recyclable waste to electricity and heat, WTE is emerging as a key strategy to manage urban waste and reduce landfill dependency.

Implementation of Extended Producer Responsibility (EPR)

- Enforcement of EPR regulations for plastics, e-waste, and other post-consumer waste is shifting responsibility to producers and stimulating growth of Producer Responsibility Organizations (PROs).

Digitalization and Smart Waste Solutions

- Cities are increasingly using smart bins, IoT-based tracking, and digital platforms for real-time monitoring, route optimization, and citizen engagement in waste management.

Public-Private Partnerships (PPP) for Infrastructure Development

- Municipalities are collaborating with private entities to build and operate waste processing facilities, boosting investment, innovation, and operational efficiency in the sector.

Challenges

1. Low Segregation at Source

Segregation levels in Indian cities remain below 30%, leading to mixed waste entering the collection system. This reduces the efficiency of composting, recycling, and Waste-to-Energy plants. Mixed waste also increases contamination, raising processing costs and lowering material recovery rates.

2. Inadequate Processing & Disposal Infrastructure

A large share of municipal waste still ends up in open dumps due to limited scientific landfills, composting units, MRFs, and WTE facilities. Many ULBs lack the technical capacity to plan and operate modern processing systems. This gap results in backlogs, higher transportation burdens, and poor environmental outcomes.

3. Financial & Operational Constraints of ULBs

Most municipalities operate with limited budgets and struggle to fund collection, transport, and processing infrastructure. Dependence on government grants and weak PPP structuring slow project execution.

Operational inefficiencies like outdated vehicles and insufficient manpower further impact waste handling performance.

Threats

1. Environmental and Public Health Concerns

Unregulated dumping sites and poorly managed waste disposal create major risks such as groundwater contamination, air pollution, and methane emissions. These health and environmental hazards intensify as cities generate more waste each year. If not controlled properly, they can trigger regulatory actions, project shutdowns, and substantial penalties for contractors and operators.

2. Rising Regulatory Pressure and Compliance Requirements

Authorities such as the National Green Tribunal (NGT), Central Pollution Control Board (CPCB), and State Pollution Control Boards (SPCBs) are enforcing strict adherence to the Solid Waste Management Rules, 2016. This includes mandates on segregation, scientific processing, and restrictions on landfilling unsegregated waste. Non-compliance can lead to financial penalties, delays in approvals, or forced work stoppages, increasing overall project risk.

3. Community Opposition to Waste Management Infrastructure

Residents often resist the construction of Waste-to-Energy (WTE) plants, sanitary landfills, and Material Recovery Facilities (MRFs) due to fears related to pollution, odour, and increased traffic. Such community pushback can delay land acquisition, halt construction activity, or force redesigning of project layouts. This creates uncertainty in timelines and can lead to cost overruns for EPC and concession-based projects.

Competitive Landscape

The Indian construction industry presents a dynamic and highly competitive landscape, characterized by a mix of large established players, mid-sized regional specialists, and emerging contractors. Competition is particularly intense in the Roads and Highways sector, given the significant government impetus on infrastructure development through models like EPC (Engineering, Procurement & Construction) and HAM (Hybrid Annuity Model). Key differentiators among players include technological prowess, project execution capabilities, financial strength to bid for large-scale projects, and the ability to manage complex supply chains and regulatory environments efficiently. The continuous flow of public-funded projects, while creating ample opportunities, also fuels fierce bidding wars, putting pressure on margins.

The competitive intensity is further amplified by the entry of new players and the expansion strategies of existing ones into new geographies or specialized segments, such as airport runway construction or solid waste management. Companies often compete on factors beyond just cost, including adherence to project timelines, quality of work, safety records, and reputation for innovation. The industry's cyclical nature, influenced by government policies, economic growth, and investment cycles, means that companies with diversified portfolios across various infrastructure segments (roads, airports, waste management) and robust financial health are better positioned to weather market fluctuations.

Smaller and mid-sized firms, while often specializing in niche areas or regional projects, face stiff competition from larger entities that can leverage economies of scale, extensive equipment fleets, and broader access to capital. Strategic partnerships, joint ventures, and collaborations are increasingly common, enabling companies to pool resources, share risks, and collectively bid for larger, more complex projects that might be beyond the individual capacity of a single firm. Maintaining a strong order book, efficient project management, and prudent financial management are paramount for sustained growth and competitiveness in this evolving sector.

Analysis of Key Factors Shaping the Construction Sector: Players

The Indian construction sector, particularly focusing on Roads & Highways and Solid Waste Management, is shaped by a confluence of macroeconomic, regulatory, technological, and financial factors. For the listed players B.R. Goyal Infrastructure Ltd, RPP Infra Projects Ltd, Gayatri Projects Ltd, Ganesh Infracore Ltd, AVP Infracore Ltd, Sadbhav Infrastructure Projects Ltd, SRM Contractors Ltd, Rachana Infrastructure Ltd, A B Infracore Ltd, and Udayshivakumar Infra Ltd these factors dictate their operational strategies, growth trajectories, and competitive positioning.

I. Government Policy and Investment:

The most significant factor is the central and state governments' aggressive push for infrastructure development. Flagship programs like Bharatmala Pariyojana, National Infrastructure Pipeline, and substantial budgetary allocations for roads, highways, and smart cities directly create demand for these companies.

Players proficient in EPC and HAM models, as specified in the SOW, benefit immensely from this focus. The consistency and scale of public investment are crucial for these companies' order book and revenue stability.

2. Regulatory Framework and Clearances:

The ease of obtaining environmental clearances, land acquisition, and other regulatory approvals significantly impacts project timelines and cost overruns. Delays in these areas can severely affect project profitability and cash flow for companies, regardless of their operational efficiency. Players with a strong track record of navigating the regulatory landscape effectively hold an advantage.

3. Funding and Financial Health:

Access to capital and financial stability are critical. Projects, especially HAM and larger EPC ventures, require substantial upfront investment or bank guarantees. The ability of these firms to secure financing at competitive rates, manage debt-to-equity ratios, and maintain healthy working capital is paramount. Companies with stronger balance sheets and better credit ratings can bid for more projects and absorb initial operational costs more comfortably. For players like Gayatri Projects Ltd (which has faced financial challenges), robust financial restructuring and management become a key factor.

4. Technology Adoption and Project Execution Capabilities:

Modern construction increasingly relies on advanced technologies for design, project management (e.g., BIM), and execution (e.g., automated machinery). Companies that invest in modern equipment, employ skilled labor, and implement efficient project management practices can ensure timely completion, adherence to quality standards, and better cost control. This factor is crucial for all listed players to remain competitive and improve their operational efficiencies.

5. Competition and Margin Pressures:

The sheer number of players, including those listed, leads to intense bidding competition for projects. This often results in thin margins, particularly for less differentiated projects. Companies must focus on operational excellence, cost optimization, and strategic bidding to maintain profitability. The ability to win and execute projects efficiently without compromising on quality is vital for sustaining competitive advantage.

6. Supply Chain and Labor Management:

Efficient management of raw material procurement (cement, steel, aggregates), logistics, and a skilled labor force is essential. Fluctuations in raw material prices or labor availability can directly impact project costs and timelines. Companies with robust supply chain networks and effective labor relations are better equipped to handle these challenges.

Peer Companies Profiling:

SRM Contractors Limited

Company Overview: SRM Contractors Limited, incorporated in 2008 and headquartered in Jammu (Jammu & Kashmir), is a listed engineering and construction company focused on the development of roads, bridges, tunnels, slope stabilisation works and miscellaneous civil infrastructure across India. The Company completed its initial public offering in April 2024 and is listed on both the NSE and BSE. With around 17 years of operating experience and a presence built around the most demanding terrains in Jammu & Kashmir and Ladakh, the Company has executed work in temperatures ranging from 45°C to -30°C and operates across multiple delivery models including EPC, item-rate and sub-contracting. The Company is now actively expanding geographically into Uttarakhand, Himachal Pradesh, the Northeast and Gujarat, alongside an international foray into the GCC and African markets with a wholly owned subsidiary planned in Abu Dhabi. SRM had 286 permanent employees on its rolls, supplemented by an extensive sub-contracting and joint-venture execution model.

Product & Service Offerings

- **Road Projects:** Highways, bridges and road realignments, with a focus on high-altitude and landslide-prone corridors, including widening and restoration works.
- **Tunnel Projects:** End-to-end EPC execution of new tunnel construction, widening, stabilisation and avalanche protection works.
- **Slope Stabilisation:** Reinforced soil walls, RE Walls and rock-fall protection systems, reinforced by a 51% stake in Maccaferri Infrastructure Private Limited (Indian subsidiary of Officine Maccaferri Spa, Italy).
- **Miscellaneous Civil Construction:** Drainage, irrigation, flood-control infrastructure and residential developments executed primarily for government clients.

Key Customer Segments Served

- **Indian Railways and Railway Infrastructure Bodies:** Long-standing engagements with Konkan Railway, IRCON International and Northern Railway, including delivery of India's tallest reinforced soil wall on the Udhampur–Srinagar–Baramulla Rail Link (USBRL) project at Reasi, J&K.
- **Defence and Strategic Sector Agencies:** Execution of strategic high-altitude infrastructure for the Border Roads Organisation, including projects under Project Himank and Project Vijayak in Ladakh.

- **National and State Highway Authorities:** Project delivery on NH-244, NH-07 and other national highway corridors across J&K, Ladakh, Uttarakhand and Gujarat, alongside state-level engagements with PWD Jammu.
- **Private Sector EPC Majors:** Sub-contracting and joint-venture engagements with HCC, ERA Infrastructure and other leading infrastructure companies.

Key Strengths

- **Specialist expertise in challenging terrain:** A demonstrated ability to deliver complex civil works in high-altitude, landslide-prone and extreme-climate regions with operating experience across a 45°C to -30°C temperature range.
- **Marquee engineering deliveries:** India's tallest reinforced soil wall (USBRL Reasi) and India's longest precast cut-and-cover tunnel evidence deep tunnelling and geotechnical capability.
- **JV-led execution model with experienced partners:** Active joint ventures with Rajinder, ECI Engineers, RSB, Sai, Sarvangik and Kapahi provide scale, risk-sharing and access to larger order packages.
- **Strong post-IPO financial trajectory:** FY25 consolidated revenue grew approximately 54% YoY and net profit more than doubled, supported by an order book spread across central PSUs, defence, railways and state PWDs.
- **Geographic diversification underway:** Expansion beyond J&K into Uttarakhand, Himachal Pradesh, the Northeast, Gujarat, and overseas into the GCC, Africa and UAE widens the addressable opportunity.

RPP Infra Projects Ltd

Company Overview: RPP Infra Projects Limited (RPPIPL), formed in 1995 and based in Erode, Tamil Nadu with roots tracing back to RPP Builders established in 1988 operates as an asset-light infrastructure contractor through partnerships with equipment rental firms and joint ventures. The company has executed around 150 projects, including roads, buildings, industrial structures, water-supply and irrigation works, utilizing a team of approximately 310 professionals and managing up to 12 concurrent projects. It owns equipment valued at about INR 46.63 crore and brings a combined experience of nearly 1,500 person-years to project execution. Its operations are concentrated in South India, primarily Tamil Nadu, Karnataka, and Andhra Pradesh.

Product & Service Offerings

- **Industrial and building structures:** Execution of industrial facilities and civil building projects.

- **Water supply & irrigation works:** Delivery of water management systems and irrigation infrastructure.
- **Power and infrastructure projects:** Participation in broader infrastructure development, including power-related civil work.

Key Customer Segments Served

- **Large Public Sector Enterprises:** RPIPL lists projects completed for state and national-level clients such as BHEL, MRPL, Chemplast, Thermax, and Siemens, indicating experience working with major industrial and energy-sector organizations.
- **Government Infrastructure Agencies:** Their portfolio includes infrastructure development in roads, power, irrigation, industrial structures, and buildings suggesting contracts with various government departments and agencies overseeing public projects.

Key Strengths

- **Extensive project track record:** Completed approximately 150 projects to date, demonstrating operational consistency.
- **Dedicated workforce:** Maintains a team of around 310 professionals and frequently handles up to 12 projects concurrently
- **Owned equipment assets:** Possesses equipment valued at INR 46.63 crore, supporting its asset-light yet capable model.
- **Diverse service capability with a strong focus on quality:** Undertakes construction across roads, buildings, industrial structures, power, and irrigation sectors while adhering to BIS standards and promoting cost-effective, eco-friendly solutions within robust governance frameworks.

Ceigall India Limited:

Company Overview: Ceigall India Limited, incorporated in 2002 and headquartered in Ludhiana, Punjab, is a listed infrastructure construction company engaged in the development of roads, highways, expressways, bridges, flyovers, railway overbridges (“ROBs”), tunnels and airport runway infrastructure across India. The Company undertakes projects primarily under EPC and Hybrid Annuity Model (“HAM”) formats for central and state government authorities and executes projects through standalone contracts, joint ventures and special purpose vehicles (“SPVs”). Ceigall India has developed execution capabilities across greenfield and brownfield transportation infrastructure projects supported by in-house project management capabilities and owned construction equipment, with operations spread across multiple Indian states.

Product & Service Offerings

- **Road & highway construction:** Execution of highways, expressways, bypasses, road widening and corridor development projects under EPC and HAM models.
- **Bridges & elevated structures:** Construction of bridges, flyovers, railway overbridges (“ROBs”), interchanges and elevated transportation infrastructure.
- **Tunnel & civil infrastructure works:** Execution of tunnels, underpasses, retaining structures, drainage systems and associated civil engineering works.
- **Airport runway infrastructure:** Development and rehabilitation of airport runway and related aviation infrastructure projects.

Key Customer Segments Served

- **Central infrastructure authorities:** Execution of projects for agencies such as the National Highways Authority of India (“NHAI”) and the Ministry of Road Transport and Highways (“MoRTH”).
- **State government departments & agencies:** Road, bridge, and associated infrastructure projects for state public works and infrastructure departments.
- **Railway & transportation infrastructure bodies:** Construction of railway overbridges and transportation connectivity infrastructure projects.
- **Aviation infrastructure authorities:** Execution of airport runway development and rehabilitation projects.

Key Strengths

- **Diversified transportation infrastructure execution capabilities:** Execution capabilities across highways, expressways, bridges, flyovers, tunnels and runway infrastructure projects.
- **Experience across EPC & HAM projects:** Experience in execution of both EPC and Hybrid Annuity Model (“HAM”) projects through standalone contracts, joint ventures and SPVs.
- **In-house execution capabilities:** Integrated project management operations supported by owned construction equipment and execution infrastructure.
- **Multi-state project presence:** Established execution presence across multiple Indian states with experience in large-scale transportation infrastructure development.
- **Greenfield & brownfield project expertise:** Experience in road expansion, rehabilitation, corridor development and associated civil infrastructure works.

Company Profile: GNI Infrastructure Limited

Company Overview: GNI Infrastructure Limited is a multi-disciplinary infrastructure development company based in Chhatrapati Sambhajnagar, Maharashtra. Originating in 1980 as Gurunanak Industries, a partnership firm, the company evolved into a private limited entity in 2007 and was later converted into a public limited company to better harness the opportunities in India's rapidly expanding infrastructure sector. GNI Infrastructure Ltd. has built a solid reputation in India's infrastructure sector through its focused expertise in road and highway construction and maintenance. Its consistent focus on delivering projects that are timely, cost-effective, and of high quality has helped it earn a trusted reputation in both public and private sectors.

The company envisions becoming one of the most admired and trusted infrastructure firms in India by setting industry benchmarks through operational excellence, responsible citizenship, and strong corporate performance. GNI Infra's mission is centred around becoming a technology-driven, efficient, and financially sound organization that exceeds customer and stakeholder expectations. It promotes a work culture that fosters creativity, individual growth, and team spirit, while upholding core values of trust, integrity, and transparency in all its dealings.

Key Projects Executed

Project	Location	Tender Value (₹ crore)	Client
Construction & Widening of Beed Bypass Road	Aurangabad	305	World Bank Project Division
NH-44 Improvement (TOT Bundle-2)	Maharashtra–Telangana Border	152.10 (JV)	NHIT Western Projects Pvt. Ltd.
Akola City Road (Old NH-6)	Akola	131	National Highways Authority of India
Badnapur–Jamkhed & Sillod–Bhokardan Road	Maharashtra	232	World Bank Project Division

GNI Infra also owns a modern fleet of construction equipment enabling efficient execution of large-scale projects. Key machinery includes:

- 6 Batching Plants, 4 Crushing Plants, 1 Asphalt Plant
- 3 Slip-form Pavers, 3 Concrete Boom Pumps
- 6 Vibratory Rollers, 10 Excavators, 100 Dumpers/Trucks
- Asphalt Melters, Wet Mix Macadam Plant, Self-Loading Mixers, Screening Machines

This equipment base ensures quality, cost-efficiency, and timely project completion.

Department	Name of Work	Tender Cost (₹ Cr)	Project Period	Start/Appoint ed Date
PWD, Chhatrapati Sambhajanagar	Construction of Four Lane Road from Nagarnaka to NH-52 near Aurangabad City	136.19 (51% JV)	18 months	LI Bidder
MSIDC, Mumbai	EPC AM-II (51C) – Widening of Pusad Gaul Vasantnagar Umarkhed Dhanki Kurli SH-262	235.60	30 months	Oct '24
MSIDC, Mumbai	EPC AM-II (51D) – Improvement to Vidul-Chalgani-Sakhara-Kharus-Devasari Road	76.15	30 months	Oct '24
MSIDC, Mumbai	EPC AU-II (40A) – Chaklamba Georai Jategaon Selu Marfala to NH-222	121.68	30 months	Sept '24
PWD, Chhatrapati Sambhajanagar	Construction of C.C. Road, RCC Gutter & Divider at Deolai Shindon Bhindon Road	12.01	12 months	Oct '24
MSIDC, Mumbai	EPC Paithan-Ahmednagar Link Road and Kanchanwadi-Satara-Devlai Road	183.83	30 months	Oct '24
PWD, Chhatrapati Sambhajanagar	EPC-34 – Improvement of SH-219 and SH-215	218.30	24 months	Sept '24
PW ADB, Buldhana	EPC-31 – Improvement to SH-214 from Paradh to Chikhali	107.92 (51% JV)	24 months	Oct '24
MSIDC, Mumbai	EPC AM-II (46B) – Improvement to roads incl. MDR-21 & SH-441	181.32	30 months	Oct '24
CIDCO, Waluj	Asphalting & Resurfacing in Nagar I, II & IV at CIDCO Waluj Mahanagar	35.77	18 months	Oct '24
PWD, Nashik	Improvements to SH-21 from Saptasurungi Gad to Aliyabad	41.90	12 months	Sept '24
SWM Dept, Municipal Corp.	Legacy Waste Remediation by Biomining (Ch. Sambhajanagar)	67.00	12 months	Sept '24
World Bank Project Division	Construction of Railway Under Bridge at Shivaji Nagar LC No. 55	11.23	12 months	Oct '23
PWD, Aurangabad	Improvement & Construction of Roads (Deolai-Gadiwat-Kachner etc.)	17.79	18 months	Aug '23

PWD, Aurangabad	Rebuilding of SH-61 Thergaon to Hiradpuri Road	17.37	12 months	Jul '23
PWD No.2, Jalna	EPC-22 – Improvement of SH-222 from Ranjani to Rajatakali	232.40 (49% JV)	24 months	Oct '22

Product and Service Offerings

• Road Infrastructure:

GNI Infra undertakes the construction of **asphalt (bituminous)** and **cement concrete roads**. Its expertise spans across:

- National highways
- Urban roads
- Airport runways

The company has executed both EPC-mode and HAM-mode road development projects.

• Irrigation and Canal Construction:

The company executes irrigation-related projects including canal linings and dam construction. With its fleet of earthmoving and concreting machinery, GNI Infra is equipped to handle challenging terrain and large-scale water infrastructure development.

• Ready-Mix Concrete (RMC):

GNI Infra supplies RMC to residential, industrial, and commercial projects, particularly across **Chhatrapati Sambhajinagar**. It owns and operates its own RMC batching plants ensuring control over quality and delivery.

• Urban Infrastructure: The company executes infrastructure works such as:

- Bridges and culverts
- Cement concrete gutters and dividers
- Urban and rural road improvements
- Municipal projects such as biomining and solid waste remediation

Key Strengths

- **Diversified Execution Capability:** GNI Infra's presence across multiple verticals such as roads, irrigation, urban infrastructure, and RMC allows it to tap a broad range of infrastructure opportunities, thereby mitigating sector-specific risks.
- **In-house Equipment Base:** The company owns a comprehensive fleet of modern construction equipment and plants, enabling cost-effective, quality-controlled, and timely project execution. This self-reliance enhances project profitability and operational flexibility.
- **Experienced Promoter Group:** The business is promoter-driven, with key management personnel having 15 to 35+ years of experience in the infrastructure and construction sector. Their leadership has been instrumental in driving growth and operational efficiency.
- **Strong Government Clientele:** GNI Infra has established long-standing relationships with central and state government departments such as PWD, MSIDC, CIDCO, and the World Bank-funded project units, ensuring a consistent project pipeline.
- **Financial Resilience and Profitability:** The company has maintained healthy profit margins, supported by efficient project execution, asset ownership, and low operational leakages. Its net worth has steadily grown over recent years, indicating strong financial fundamentals.
- **Quality Policy:** GNI Infra has committed to comply with quality management systems and continuously improve its effectiveness by setting and reviewing objectives periodically. The company strives to deliver high-quality infrastructure and construction services, ensure environmental preservation, safety, and optimal resource usage while maximizing stakeholder value.

Financial Analysis:⁵

Particular	Unit	SRM Contractors Limited				Ceigall India Limited				RPP Infra Projects Limited				GNI Infrastructure Limited			
		As at end of the Fiscal				As at end of the Fiscal				As at end of the Fiscal				As at end of the Fiscal			
		Nine months ended Dec 31, 2025*	Fiscal 2025	Fiscal 2024	Fiscal 2023	Nine months ended Dec 31, 2025*	Fiscal 2025	Fiscal 2024	Fiscal 2023	Nine months ended Dec 31, 2025*	Fiscal 2025	Fiscal 2024	Fiscal 2023	Nine months ended Dec 31, 2025*	Fiscal 2025	Fiscal 2024	Fiscal 2023
Total Income	₹ in Million	5,832.17	5,420.49	3,500.15	3,006.51	26,778.44	34,929.60	30,661.88	20,870.41	10,536.80	14,550.70	14,031.40	10,657.30	2,501.45	3,383.65	2,110.26	3,234.75
Revenue From Operations	₹ in Million	5,798.28	5,281.29	3,424.21	3,002.91	26,358.91	34,367.32	30,293.52	20,681.68	10,434.80	14,394.30	13,534.10	10,403.30	2,318.09	3,090.72	1,821.01	3,099.29
EBITDA	₹ in Million	938.68	814.39	416.24	382.96	3,618.86	5,183.78	5,176.62	2,956.29	428.40	912.80	572.40	387.70	876.44	1,086.42	635.77	1,104.06
EBITDA Margin	in %	16.19%	15.42%	12.16%	12.75%	13.73%	15.08%	17.09%	14.29%	4.11%	6.34%	4.23%	3.73%	37.81%	35.15%	34.91%	35.62%
Net Profit	₹ in Million	569.22	550.03	269.66	187.48	1,811.14	2,876.62	3,049.09	1,677.04	253.40	652.90	572.00	289.60	496.64	761.21	469.62	754.11
Net Profit Margin	in %	9.76%	10.15%	7.70%	6.24%	6.76%	8.24%	9.94%	8.04%	2.40%	4.49%	4.08%	2.72%	19.85%	22.50%	22.25%	23.31%
Cash Profit	₹ in Million	679.39	685.58	358.89	265.54	2,265.04	3,433.23	3,598.99	2,053.04	313.40	748.70	678.80	380.60	675.97	876.95	560.29	849.42
Cash Profit Margin	in %	11.65%	12.65%	10.25%	8.83%	8.46%	9.83%	11.74%	9.84%	2.97%	5.15%	4.84%	3.57%	27.02%	25.92%	26.55%	26.26%
Return on Capital Employed	in %	-	21.45%	23.71%	27.63%	-	14.28%	23.52%	19.95%	-	14.46%	9.98%	6.68%	12.59%	20.34%	19.28%	32.19%
Return on Equity	in %	-	19.96%	29.85%	29.58%	-	15.60%	33.64%	28.28%	-	12.32%	13.44%	7.93%	12.55%	25.25%	21.84%	48.61%

⁵ GNI Infrastructure Ltd believes that its main competitors with comparable size and operational capabilities are Ceigall India Limited, SRM Contractors, and RPP Infra Projects Limited, it may also face competition from other larger and more established players.

Return on Assets	in %	-	13.49%	11.47%	13.78%	-	6.77%	11.78%	9.19%	-	6.91%	6.87%	3.71%	6.23%	11.08%	10.00%	19.68%
Debt Equity Ratio	In Times	-	0.15	0.53	0.74	-	0.76	1.17	1.18	-	0.07	0.10	0.22	0.60	0.61	0.73	0.75
Net debt	₹ in Million	-	(520.66)	(117.11)	272.56	-	7,631.10	6,981.79	3,422.13	-	216.30	15.40	416.50	2,102.18	2,017.99	1,617.58	1,300.72
Net Debt to EBITDA	in Times	-	(0.64)	(0.28)	0.71	-	1.47	1.35	1.16	-	0.24	0.03	1.07	2.40	1.86	2.54	1.18
Fixed assets turnover ratio	in Times	-	7.27	8.60	7.61	-	10.16	10.23	8.41	-	15.62	20.99	15.52	2.22	3.66	5.84	8.97
Net Working capital (Days)	in Days	-	81.21	53.38	34.42	-	79.44	35.43	32.86	-	63.96	69.01	73.19	679.51	454.73	560.56	288.27
Order Book	₹ in Million	14,237.90	14,605.70	11,993.13	8,346.94	1,32,951.00	1,08,062.00	92,257.00	1,08,090.43	23,367.80	27,628.90	30,099.90	32,000.00	10,210.33	10,862.88	2,290.96	1,944.04
Book to Bill Ratio	in Times	2.46	2.77	3.50	2.78	5.04	3.14	3.05	5.23	2.24	1.92	2.22	3.08	4.40	3.51	1.26	0.63

Note: *Not annualized

Source: Data for GNI Infrastructure Limited has been sourced from Restated Consolidated Financial Information. All the financial information for listed industry peers mentioned above is sourced from the Consolidated audited financial results of the respective company for the year/period.

Formula Used:

Ratio	Methodology
Total Revenue	Total Income includes Revenue from Operations and Other Income.
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	Restated profit before tax minus Other Income plus Finance Costs and Depreciation & amortisation expense.
EBITDA Margin	EBITDA Margin is calculated as EBITDA divided by revenue from operations.
Net Profit	Restated profit after tax for the period/year.
Net Profit Margin	Net profit margin is calculated as Restated profit after tax for the period/year as a % of Total Income.
Cash Profit	Cash profit is calculated as restated profit after tax plus depreciation and amortization expense
Cash Profit Margin	Cash Profit Margin is calculated as Cash Profit as a % of Total Income.
Return on Capital Employed	Return on Capital Employed (%) is calculated as the sum of Restated Profit Before Tax and Finance Costs, divided by the aggregate of Total Equity, Total Borrowings (including both current and non-current borrowings), and Lease Liabilities.
Return on Equity	Return on Equity (%) is calculated as Profit After Tax attributable to Equity Shareholders divided by Total Equity attributable to Equity Shareholders, excluding Non-Controlling Interest (NCI).
Return on Assets	Return on Assets is calculated by dividing Restated Profit after tax by Total Assets, excluding Right of Used Assets.
Debt-to-equity ratio	Debt to equity ratio is calculated as the sum of total debt and lease liability divided by Total equity, including NCI.
Net Debt	Net Debt is calculated as Total Debt minus cash and cash equivalents, bank balances other than cash and cash equivalents.
Net Debt to EBITDA	Net Debt to EBITDA ratio is calculated as Net Debt divided by EBITDA.
Fixed assets turnover ratio	Fixed Asset Turnover is calculated as Revenue from Operations divided by the Net Block of Property, Plant & Equipment.

Net Working Capital Days	Net Working Capital Days is calculated as Net Working Capital divided by Revenue from Operations, multiplied by 365. Net Working Capital is the difference between Current Assets, excluding cash and cash equivalents, and Current Liabilities
Total Order Book	Order Book represents the estimated contract value of the unexecuted portion of existing assigned contracts and is an indicator of the visibility of future revenue for our Company.
Book-to-Bill Ratio	Book-to-Bill Ratio is calculated as the Order Book at a particular period divided by the Revenue from operations for that period.

Explanation for all the above KPIs:

KPI	Explanation for KPIs
Financial Indicators	
Total Income	Total Income represents the aggregate of Revenue from Operations and Other Income earned by the Company during the relevant fiscal year/ period.
Revenue from Operations	Revenue from operations represents the scale of our business as well as providing information regarding our financial performance from operating activities.
EBITDA	EBITDA provides information regarding the operational efficiency of the business.
EBITDA Margin	EBITDA Margin is an indicator of the operational profitability and financial performance of our business.
Net Profit	Net profit provides information regarding the overall profitability of the business.
Net Profit Margin	Net profit Margin is an indicator of the overall profitability and financial performance of our business.
Cash Profit	Profit generated from business operations after adding back non-cash expenses such as depreciation and amortization.
Cash Profit Margin	Cash Profit Margin represents cash profit as a percentage of total income and indicates the proportion of cash earnings generated.
Return on Capital Employed	Return on Capital employed represents the return generated on the total capital employed in the business (including debt and equity).
Return on Equity	Return on Equity provides how efficiently our Company generates profits from shareholders' funds.

Return on Assets	Return on Assets represents profit earned relative to total assets deployed and indicates efficiency in utilization of assets for generating earnings.
Debt to equity	The debt-to-equity ratio is a measure of the extent to which our Company can cover our debt and lease liabilities and represents our indebtedness position in comparison to our equity position. It helps evaluate our financial leverage.
Net debt	Net debt is a liquidity metric, and it represents the absolute value of borrowings net of cash and cash equivalents, bank balances other than cash and cash equivalents.
Net Debt to EBITDA	Net debt to EBITDA ratio enables us to measure the ability and extent to which our Company can cover our debt in comparison to the EBITDA being generated by our Company.
Fixed assets turnover	Fixed Assets Turnover represents revenue generated per unit of investment in fixed assets such as Property, Plant & Equipment and indicates the efficiency of utilization of fixed assets in generating income.
Net Working Capital Days	Net Working Capital Days represents the number of days required to convert net working capital into revenue and indicates the efficiency of working capital management.
Operational Indicators	
Total Order Book	The order book represents the estimated unexecuted contract value of our Ongoing Projects.
Book to Bill Ratio	Book-to-Bill Ratio represents the proportion of the outstanding order book to revenue from operations and indicates revenue visibility based on executable orders.

Annexure for Abbreviation used

GDP	Gross Domestic Product
GVA	Gross Value Added
IIP	Index of Industrial Production
PFCE	Private Final Consumption Expenditure
GFCF	Gross fixed capital formation
WPI	Wholesale Price Index
CPI	Consumer Price Index
y-o-y	Year on Year
m-o-m	Month on Month
IMF	International Monetary Fund
RBI	Reserve Bank of India
MOSPI	The Ministry of Statistics and Programme Implementation
Est., Adv. Est	Estimated, Advance Estimates
P, F	Projected, Forecast
USD	US Dollar
INR	Indian Rupee
Mn, Bn, Tn, Cr	Million, Billion, Trillion, Crore
PLI	Production Linked Incentive
NSO	National Statistics Office
IT	Information Technology
GST	Goods and Service Tax
UPI	Unified Payments Interface
RBI	Reserve Bank of India
CAGR	Compound Annual Growth Rate
FDI	Foreign Direct Investment

EFTA	European Free Trade Association
FTA	Free Trade Agreements
MMT	Million Metric Tonnes
UIDF	Urban Infrastructure Development Fund
GW	Gigawatts
RES	Renewable Energy Sources
MPC	Milk Producer Companies
LPI	Logistics Performance Index
NMP	National Monetization Pipeline
IIG	India Investment Grid
HAM	Hybrid Annuity Mode
BOT	Build-Operate-Transfer
PPP	Public-Private Partnerships
PE	Private Equity
VC	Venture Capitalists
HWCs	Health and Wellness Centres
BIM	Building Information Modeling
EBITDA	Earnings Before Interest, Taxes, Depreciation, and Amortisation.
PAT	Profit After Tax
ROA	Return on Assets
ROCE	Return on Capital Employed
R&D	Research and Development
EPC	Engineering, Procurement & Construction
HAM	Hybrid Annuity Model
NHAI	National Highway Authority of India
NHDP	National Highway Development Project
PMAY	Pradhan Mantri Awas Yojana

NIP	National Infrastructure Pipeline
NIPFP	National Institute of Public Finance and Policy
BOO	Build Own Operate
BOOT	Build Own Operate Transfer
BLT	Build Lease Transfer
BOLT	Build Own Lease Transfer
LDO	Lease Develop Operate
DCMF	Design Construct Manage Finance
NH	National Highway
SH	State Highway
ADB	Asian Development Bank
PMGSY	Pradhan Mantri Gram Sadak Yojana
CRIF	Central Road and Infrastructure Fund
ODR	Other District Roads
OMDA	Operation, Management, and Development Agreement
ZP	Zilla Parishad
JVC	Joint Venture Companies
AAI	Airports Authority of India
RESA	Runway End Safety Area
SDG	Sustainable Development Goals
SBM	Swachh Bharat Mission
WTE	Waste to Energy