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CRISIL
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India Progress Report

November 2024

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Introduction by The Economic Times

Sivakumar Sundaram
CEO (Publishing)
Bennett, Coleman & Co. Ltd

India stands at a defining moment in its journey toward becoming a developed nation by 2047. A decade ago, we were the world's tenth-largest economy; today, we're the fifth. This rapid ascent isn't just about numbers—it's about the power of vision, strategy, and collective effort. From policymakers to industry leaders and stakeholders, every contribution has helped transform aspirations into realities. Through the **India Ascends Summit, The Economic Times** is honoured to create a space where candid discussions, strategy, and collaboration will set the course for the future. India's journey has already inspired confidence on the global stage, and our progress reflects the commitment of our industries, who are adapting and growing to meet rising aspirations.

This year's **India Progress Report**, developed with CRISIL as our knowledge partner, offers insights into the global and domestic forces shaping our economic journey. India's rapid growth is uniquely positioned against a backdrop of global economic uncertainties. This report not only highlights India's resilience but also the opportunities that will enable us to achieve the $5 and $10 trillion milestones in the coming years. As India's private sector takes on a more significant role, the path forward will require continued alignment with policy initiatives to drive scalable, inclusive growth across all sectors.

The Economic Times is proud to facilitate these important conversations, enabling meaningful dialogue on the future of India's economy. As we journey together toward 2047, let us continue to aim higher, foster collaboration, and build an India that stands as a beacon of progress and possibility for the world.

Foreword from CRISIL

Amish Mehta
Managing Director & CEO
CRISIL Limited

It is with great enthusiasm that I present India Progress Report — a compendium that captures our country's dynamic journey towards becoming a $7 trillion economy by fiscal 2031, highlighting the evolving opportunities, challenges and the path ahead.

After a resilient post-pandemic run, India's real gross domestic product (GDP) growth is expected to moderate to 6.8% this fiscal from 8.2% in the last, reflecting cooling urban demand due to higher interest rates and the impact of fiscal consolidation.

Nevertheless, a favourable monsoon season, strong investments and a supportive policy environment will ensure India retains its status as the fastest-growing major economy despite the global uncertainties. In sync, India has consistently experienced the highest composite PMI expansion against key global economies over the past years.

Improved kharif sowing because of adequate rains and healthy rabi prospects offer some reprieve from stubbornly high inflation and pave the way for rate cuts, which will boost consumer purchasing power and investor sentiment. The repo rate is expected to reach 6.25% by March 2025.

Public investments remain robust, but private investment is now poised to take the lead, ensuring that the growth engine continues to run strong, even as the government focuses on fiscal consolidation. Notably, as private sector capital expenditure gains momentum, supported by stronger corporate balance sheets and targeted government policies, the government's role in driving capital formation is gradually shifting.

On the investment front, emerging sectors such as electronics manufacturing and renewable energy are in the lead, buoyed by India's strategic focus on reducing logistical bottlenecks and enhancing its role in the global supply chain.

The potential of India's manufacturing sector to increase its share of GDP to 20% by fiscal 2031, from the current 17%, is another promising development. Better physical infrastructure is beginning to improve connectivity and lower logistics costs for industries, while digital infrastructure is ushering in efficiency gains by serving as a platform for innovation and efficient payment systems. The recent success in mobile phone exports underscores the country's potential to expand high-tech manufacturing and climb the global value chain.

Though manufacturing will grow faster than in the recent years, services will continue to be the primary growth driver.

In this report, we have closely examined seven sectors—roads and highways, steel, textiles, food processing, automobiles, electronics and renewable energy—that are pivotal to India's manufacturing growth. Each sector is at a different stage of maturity, reflecting unique opportunities and challenges. These sectors are shaped by a combination of trade dynamics, target government policies and strategic interventions by companies.

The sector-specific focus highlights how tailored incentives, infrastructure development and private sector initiatives are charting a robust growth path, positioning India as an emerging player in the global market.

Looking ahead, India's journey towards becoming an upper-middle-income nation by fiscal 2031 remains firmly on track. With an expanding young workforce and rising per capita income, India is expected to reach the $7 trillion mark, driven by productivity gains and a strategic focus on high-growth sectors.

Competitiveness will play a crucial role in this transformation, as India enhances its position in the global market. Additionally, labour upskilling initiatives will be essential to equip the workforce with the necessary skills

to thrive in a rapidly changing economy. The impact of digital disruption cannot be overlooked, as it reshapes industries and creates new opportunities for innovation.

The country's ability to adapt its policies in response to industry needs and global trends will be critical in this transformation. It is imperative to note that India's long-term trajectory diverges from advanced economies, thanks to its domestic strengths and policy focus that shape its long-term potential.

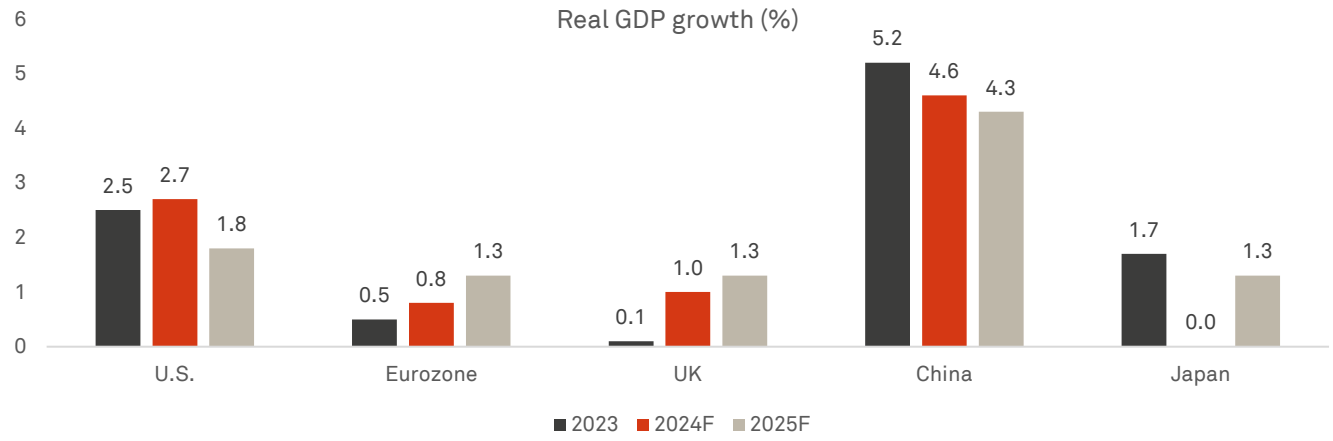
We hope this report offers valuable insights to help you navigate the evolving opportunities arising from India's transformation journey.

Global growth stabilising, but key economies on divergent paths

The global economy remains resilient despite diverging growth patterns in three key regions: the US, China and Eurozone.

S&P Global expects a slight moderation in global gross domestic product (GDP) growth to 3.2% in 2024 from 3.4% in 2023. Growth is expected to moderate further to 3.1% in 2025. Services and manufacturing sectors are on divergent paths in most regions as they respond to the monetary tightening in different ways — with the latter showing more sensitivity to higher interest rates (see the table on the next page). Global trade, barring the tech sector, is subdued. Risks continue to emanate from geopolitical uncertainties, leading to reconfiguration of shipping flows, energy supply chains and shocks to investor confidence.

Diverging growth scenarios



Source: S&P Global, CRISIL MI&A Research; F: Forecast

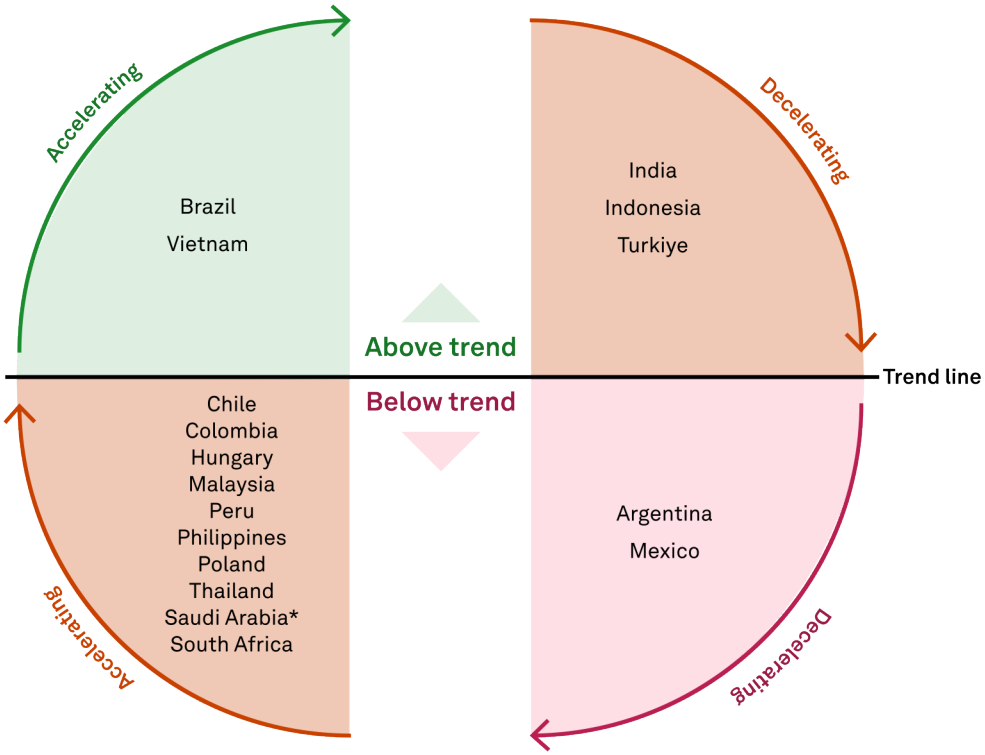
United States: The US economy has remained strong this year, but GDP growth is expected to slow to below-trend in 2025 from above-trend in 2024. The US Fed initiated the policy-easing cycle in September 2024 with a 50 basis points (bps) rate cut, signalling its commitment to prevent further cooling of the labour market. However, with consumption still healthy, near-term recession risks are not seen in the base case. S&P Global expects a terminal Fed rate of 3-3.25% by end-2025.

Eurozone: The economy is slowly recovering, with stronger growth expected in 2025. Consumer spending this fiscal and investment revival in the next are expected to lift real incomes amid softer inflation and further rate cuts. S&P Global expects the European Central Bank (ECB) to cut rates by 25 bps per quarter to reach a terminal rate of 2.5% by the third quarter of 2025. However, rising labour costs and a less-supportive trade environment amid a restrictive fiscal policy remain risks to growth.

China: The 2024 growth forecast of 4.6% is down from 4.8% previously. It is set to slow down further to 4.3% in 2025 as the economy continues to grapple with a sluggish property sector and weak domestic demand. Although the monetary easing measures announced towards the end of September are a positive sign, there is uncertainty around the potential impact of fiscal measures on growth.

Emerging economies: S&P Global believes the US' monetary policy normalisation, if accompanied by an orderly slowing of the US economy, is a net positive for emerging markets, particularly for those like Southeast Asia that have strong macroeconomic fundamentals. The adjacent illustration depicts the growth expectation in emerging economies with respect to the trend.

Current economic cycles in emerging markets



Note: A Hodrick-Prescott filter has been used on seasonally adjusted GDP levels to define above/below trend growth, and the average of the latest two quarters compared with that of the previous two to define acceleration/deceleration. *Saudi Arabia's non-oil GDP is above trend and accelerating.
Source: Reproduced from S&P Global Ratings, 2024, 'Economic Outlook Emerging Markets Q4 2024: Lower Interest Rates Help As Pockets Of Risk Rise'

PMI data shows manufacturing slowdown in most key economies

	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
US	47.9	50.7	52.2	51.9	50	51.3	51.6	49.6	47.9	47.3
Eurozone	44.4	46.6	46.5	46.1	45.7	47.3	45.8	45.8	45.8	45
UK	46.2	47	47.5	50.3	49.1	51.2	50.9	52.1	52.5	51.5
Japan	47.9	48	47.2	48.2	49.6	50.4	50	49.1	49.8	49.7
China	49	49.2	49.1	50.8	50.4	49.5	49.5	49.4	49.1	49.8
India	54.9	56.5	56.9	59.1	58.8	57.5	58.3	58.1	57.5	56.5

PMI: Purchasing Managers' Index
Source: Hamburg Commercial Bank, au Jibun Bank, S&P Global, Caixin, HSBC, CRISIL MI&A Research

Services activity continues to expand

	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
US	51.4	52.5	52.3	51.7	51.3	54.8	55.3	55	55.7	55.2
Eurozone	48.8	48.4	50.2	51.5	53.3	53.2	52.8	51.9	52.9	51.4
UK	53.4	54.3	53.8	53.1	55	52.9	52.1	52.5	53.7	52.4
Japan	51.5	53.1	52.9	54.1	54.3	53.8	49.4	53.7	53.7	53.1
China	50.4	50.7	51.4	53	51.2	51.1	50.5	50.2	50.3	50
India	59	61.8	60.6	61.2	60.8	60.2	60.5	60.3	60.9	57.7

Source: Hamburg Commercial Bank, au Jibun Bank, S&P Global, Caixin, HSBC, CRISIL MI&A Research

India perspective: Outlook for fiscal 2025

India's real GDP growth is expected to moderate to 6.8% in fiscal 2025, led by some weakness in urban demand. Investments should continue to fuel growth, while a good monsoon should ease the pressure on rural demand and retail inflation. That said, fiscal policy is consolidating at the aggregate level but retains some support to private consumption; the monetary policy cycle is expected to turn and the external sector remains less vulnerable than in the past. Despite slightly slower growth, the economy continues to be resilient to global shocks and remains the fastest-growing major economy.

Macro parameter	FY24	FY25F
Real GDP growth (y-o-y, %)	8.2	6.8
CPI inflation (y-o-y, %)	5.4	4.5
Repo rate (March-end)	6.5	6.25
10-year G-sec yield (March average, %)	7.1	6.7
Current account balance (% of GDP)	-0.7	-1.0
Exchange rate (March average, Rs/$)	83.0	84.0

F: Forecast
Source: CRISIL MI&A Research

Gross domestic product: CRISIL expects GDP growth to moderate to 6.8% this fiscal from the high growth of 8.2% last fiscal.

- High interest rates and stricter lending norms have begun to temper urban demand, while a somewhat lower fiscal impulse to growth (as the central government pursues fiscal consolidation) should also weigh on growth. We also expect a normalisation of the net tax impact on GDP growth witnessed last year
- Investments, particularly government-led, are expected to continue to fuel growth, albeit at a slower pace. The private sector is expected to take on the baton, though the process is somewhat slower than expected. Geopolitical uncertainties, challenging trade prospects and weak domestic consumption are compelling private corporate players to tread cautiously
- Meanwhile, we see an improvement in rural consumption growth this fiscal from a low base last year. A good monsoon, healthy kharif (June to October) sowing and improved rabi prospects are expected to bolster agriculture income and demand. Higher government spending on rural roads, affordable housing and under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) should lift non-agriculture income. In addition, lower inflation this fiscal should support discretionary spending and strengthen consumption

Inflation: CRISIL expects inflation based on the Consumer Price Index (CPI) to ease to 4.5% on average in fiscal 2025 from 5.4% in fiscal 2024, driven by lower food inflation.

- So far this fiscal, food inflation remains high at 7.8% on average, higher than the fiscal 2024 average of 7.5%, led by higher inflation in vegetables, fruits, meat and fish
- Better agricultural supplies on the back of a healthy monsoon should help cool food inflation. A high base effect is also expected to contribute as food inflation was high last fiscal
- Non-food inflation has been soft in the last several months, averaging 2.5% so far this fiscal. We expect some statistical uptick in the coming months, but overall, it is expected to remain soft, given the forecast of benign commodity prices this year. CRISIL Research expects crude oil prices to average $80-85 per barrel, close to the average of $82.7 last fiscal

Weather and geopolitical uncertainties are the key risks for our growth and inflation forecasts. Although kharif sowing is higher this year, the impact of excess and unseasonal rains needs to be ascertained. Given the rising frequency of weather shocks, an adverse weather event through the rest of this fiscal remains a constant risk to food inflation and agriculture income. The recent rise in global food prices is another monitorable for crops that India trades in – cereals, pulses and edible oils.

Any further escalation in geopolitical tensions could constrain supply chains, disturb trade and push up oil prices, impacting inflation and sending input costs soaring. A harder-than-expected landing in the global economy is another factor that could weigh on India's export prospects.

Interest rates: The Reserve Bank of India (RBI) awaits easing in food inflation to begin cutting policy rates. We expect one rate cut by the end of this fiscal.

- The RBI has already changed its stance to "neutral" from "withdrawal of accommodation" but remains cautious as it monitors the inflation trajectory. Repo rate cut, lower government market borrowing, softer inflation and a decline in oil prices are expected to bring down the yield on the benchmark 10-year G-sec to 6.7% in March 2025 from 7.1% in March 2024
- The government has budgeted a slimmer fiscal deficit for 2025, and its gross market borrowings via dated securities are budgeted to decline to Rs 14 lakh crore from Rs 15.4 lakh crore in the previous fiscal
- Foreign demand for Indian G-secs is expected to remain robust, given the inclusion of Indian government bonds in global bond indices. JP Morgan Emerging Market Bond Index started including Indian government bonds from June 2024. Bloomberg has announced that it will include the bonds in its Emerging Markets Local Currency Index starting January 2025, while FTSE will include the bonds in its Emerging Markets Government Bond Index starting September 2025

Current account balance and the rupee: We expect the current account deficit (CAD) to rise to 1.0% of GDP this fiscal from 0.7% in fiscal 2024. After witnessing some volatility, the rupee is expected to average 84/dollar by March 2025, compared with 83/dollar last year.

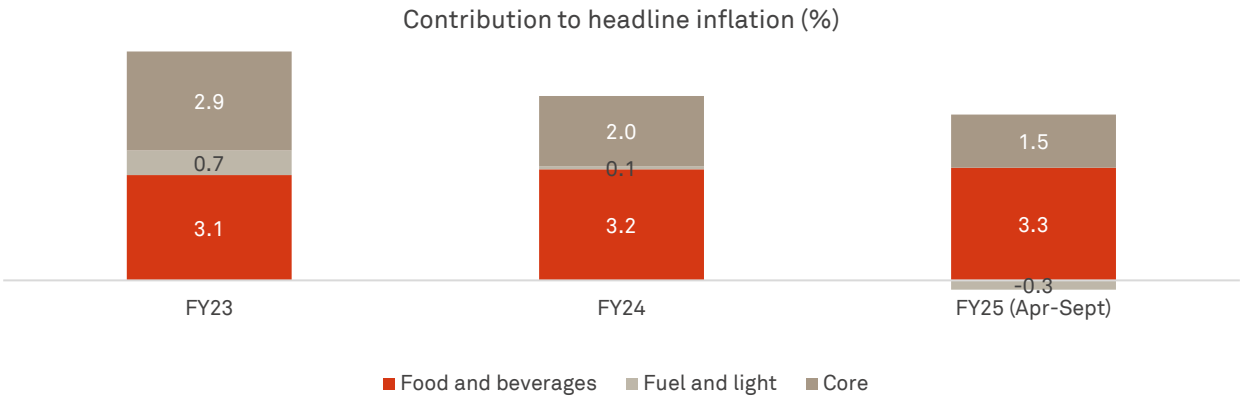
- The CAD expanded to 1.1% of GDP in the first quarter of fiscal 2025 from 0.5% surplus in the preceding quarter, led by a sharp increase in merchandise trade deficit. That said, the CAD is expected to remain in the safe zone, based on robust services exports and healthy remittance inflows
- We expect the rupee to average 84 versus the dollar in March 2025, compared with 83 in March 2024. A manageable CAD and healthy domestic macros should support the rupee this fiscal. However, it faces risks from geopolitical uncertainties
- Geopolitical uncertainties and crude oil prices are variables to be watched. Excess capacity in China amid weak growth is a key monitorable for trade as it could push up imports into India and thereby the merchandise trade deficit

Food inflation a hurdle for rate cuts, but expected to ease in the second half

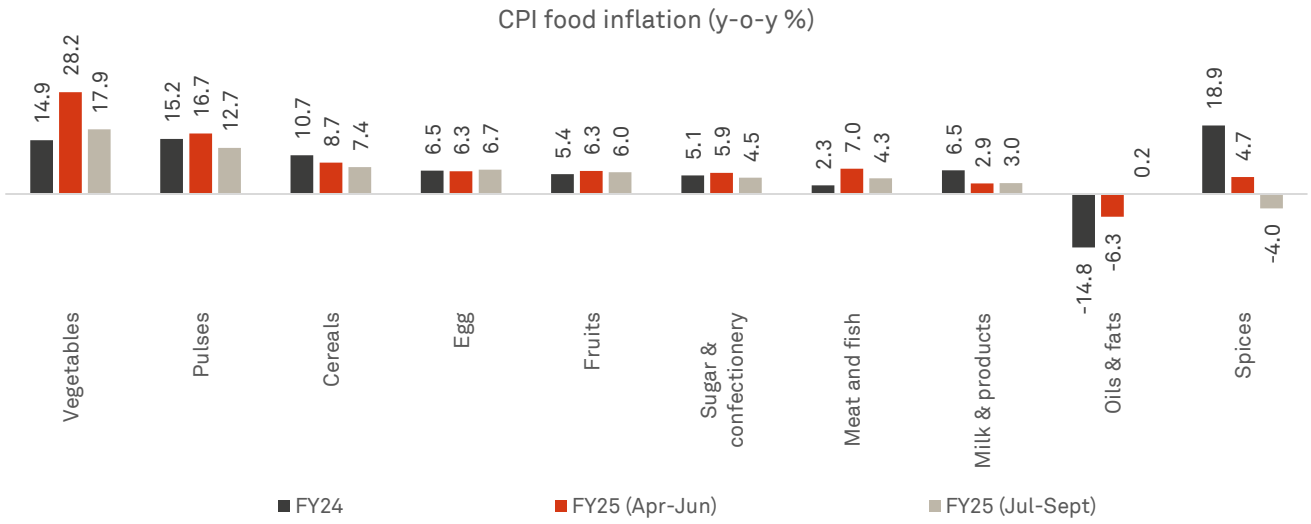
In the first half of this fiscal, rising food inflation dominated the inflation and monetary policy narrative, keeping the headline at a distance from the central bank's target. Uncertainty on three fronts—geopolitical uncertainty and its impact on energy prices, and the performance of monsoons and their role in reducing the pressure on food prices—were the other factors that led to a deferment in the easing of the domestic monetary policy. Meanwhile, strong domestic growth provided some room for the Monetary Policy Committee (MPC) to maintain the elevated rates.

For the second half of this fiscal, good monsoons, a healthy kharif sowing and improved rabi prospects should pave the way for softer food inflation. Meanwhile, non-food inflation remains low, which should bring down the headline inflation this fiscal compared with the last and create some room to ease the monetary policy. We expect the rate-cut cycle to be gradual (after the already announced change of stance) and a greater reliance on liquidity management to ensure policy transmission. We expect one rate cut by the MPC by the end of this fiscal. However, geopolitical uncertainties and the recent uptick in global food prices should keep the MPC cautious in this policy cycle.

Food price pressures have kept headline inflation elevated above the RBI's 4% target



Source: NSO, CEIC, CRISIL MI&A Research



Source: NSO, CEIC, CRISIL MI&A Research

Fiscal 2025 saw a challenging start on the inflation front. Overall inflation was lower in the first half, at 4.6% on average, compared with 5.4% in fiscal 2024, but there was heightened pressure from food prices.

Food inflation, already at a high of 7.5% average in fiscal 2024, remained high at 8.9% in the first quarter, as the impact of weather disruptions on crop output in the preceding year became apparent. The final estimates for 2023-2024 show lower on-year production of crops, such as pulses and oilseeds, and slow growth in cereals – key crops where inflationary pressure was felt. Vegetable output – where inflation surged – is also believed to have suffered the impact of an adverse weather.

However, the second quarter brought relief, as a high base effect drove down food inflation to 6.8%. In the coming months, though food inflation is expected to tick up as the base effect fades, good crop prospects are expected to keep food inflation lower than the last fiscal. Given the rising frequency of weather shocks, an adverse weather event through the rest of this fiscal remains a constant risk to food inflation.

Non-food inflation has played a huge supporting role in limiting the pressure on the headline. Core inflation – which strips off the volatile food and fuel components – has been at a record low of 3.3% in the first half of the fiscal year.

Taking cognisance of this and the ongoing easing of the global monetary policy, the MPC has taken a step closer to monetary easing, though this cycle should see increased dependence on liquidity management rather than aggressive rate cuts. An easier monetary policy should, with a lag, support growth as rate cuts percolate over 2-3 quarters, lowering bank lending rates.

Tracing the medium-term drivers of growth

India is well on its way to becoming an upper-middle-income country by 2031, with the economy expected to remain resilient over the next seven years. Capital and productivity are expected to be the key drivers of growth, while the contribution of labour is expected to remain low.

We expect the Indian economy to grow 6.7% on average between fiscals 2025 and 2031, similar to the 6.6% growth seen in the pre-pandemic decade. That said, the dynamics of economic growth are likely to change.

To determine what will drive growth in the medium term, we use a growth-accounting model developed by Nobel laureate Robert Solow[1]. This allows us to assess the contribution of three factors of production—capital, labour and productivity—to India's growth story compared with the pre-pandemic decade, when the growth rate was similar.

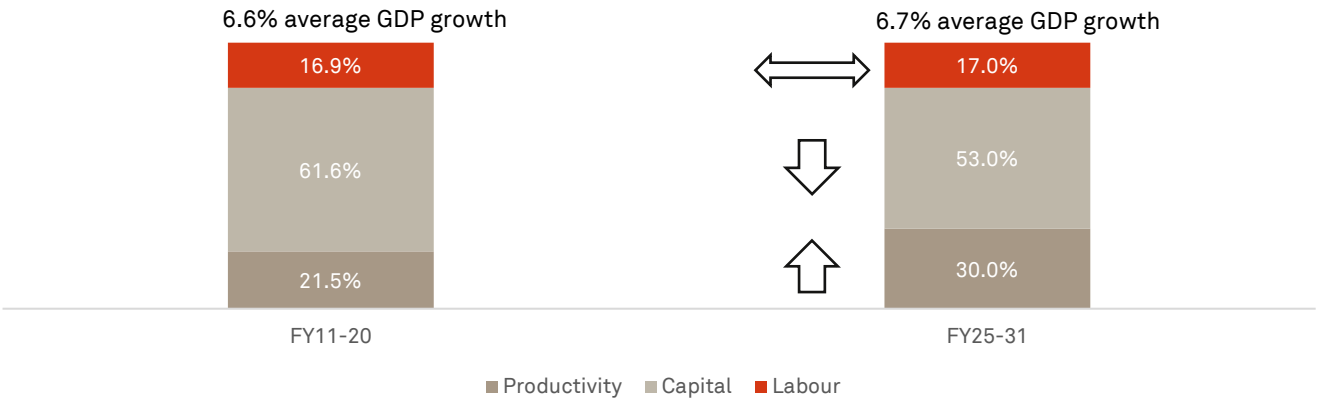
We find that between fiscals 2025 and 2031:

- Capital should continue to provide the largest contribution to growth, but the contribution should reduce as the government fiscally consolidates.
- The contribution of productivity should rise, supported by ongoing improvements in digital and physical infrastructure, coupled with reforms and processes.
- Labour's contribution should remain the smallest and unchanged, challenged by low labour force participation, insufficient skilling and an increase in automation.

I. Capital

- The contribution of capital should remain the highest, as we expect a revival in private sector investment. Yet, the government should continue to play a large role in driving infrastructure capex, particularly in the initial phase of the seven-year-period. The share of the central government's effective capex during fiscals 2022-2025 remains high today at 4.1% of GDP versus 2.8% in the pre-pandemic period.

Contribution to GDP growth (%)

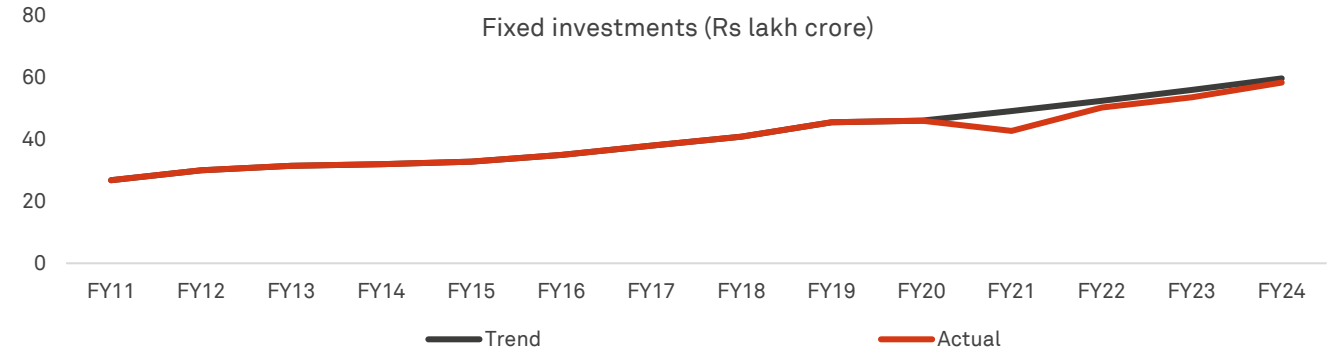


Source: CRISIL MI&A Research

- The government's role in overall capex is likely to decrease compared with the recent past, as it continues to fiscally consolidate. That said, we expect the private sector to pick up the slack and boost overall capex. Improving capacity utilisation and healthy corporate balance sheets are creating favourable conditions for the private sector to take on a larger role in investments (see 'Handing over the investment baton to the private sector' for details)
- CRISIL MI&A Research forecasts that emerging sectors, such as electric vehicles (EVs), semiconductors, electronics, and energy transition, will be the drivers of the incremental private capex thrust

[1]Aug 1957, Solow, R.M., 'Technical change and the aggregate production function.' The Review of Economics and Statistics, MIT Press

Investments back to pre-pandemic trend



Note: The data shown above is in real, i.e. constant 2011-12 prices
Source: NSO, CEIC, CRISIL MI&A Research

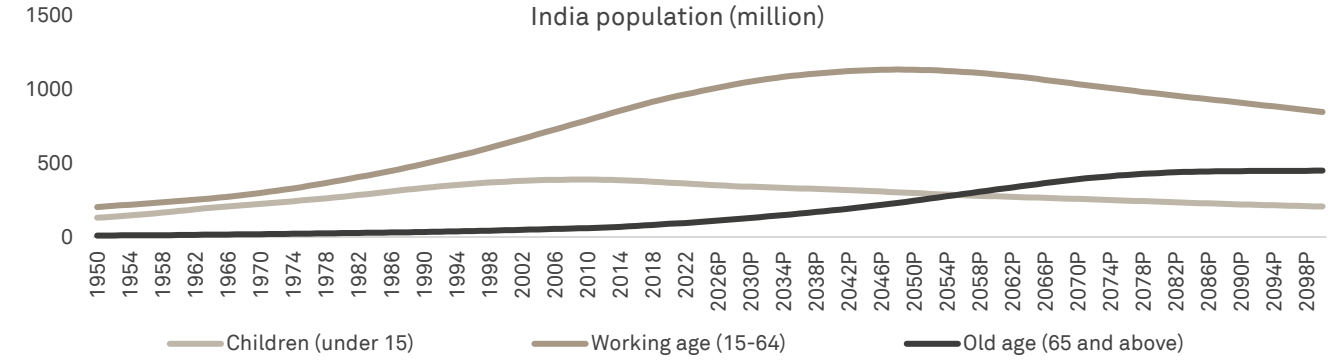
II. Productivity

- The contribution of productivity is expected to increase following the ongoing improvements in digital and physical infrastructure connectivity, coupled with reforms and process improvements
- Since an export-led growth strategy is very challenging in the current global environment, compared with when the 'Asian tigers' were growing their economies, productivity gains are critical for India to continue the high-growth path
- Productivity gains are visible thanks to the government's physical infrastructure push through schemes, such as the National Infrastructure Pipeline, Pradhan Mantri GatiShakti National Master Plan and National Logistics Policy. These have helped lower logistics costs, improve connectivity and decongest roads
- On the digital infrastructure front, Unified Payments Interface (UPI) and India Stack have played a key role in driving innovation, disbursing credit and making payment systems efficient. Digital payments increased 7x between fiscals 2018 and 2023, driven by an increase in UPI payments. Additionally, the linkage of Aadhaar with an individual's bank account has made social security transfers by the government seamless and plugged the leakages. Further efficiency gains are possible with artificial intelligence (AI). Generative AI, if adopted well by firms, can help improve their production processes. It can also help augment labour productivity by providing learning and skilling support to workers. Increased business and labour productivity will ultimately add to efficiency gains and an upside to GDP growth over the medium term
- Reforms, such as implementation of the Goods and Services Tax (GST), Insolvency and Bankruptcy Code (IBC) and Production Linked Incentive (PLI) initiatives, will also boost the contribution of productivity

III. Labour

- Despite a large and growing working-age population[2] (68% of population in 2024), the contribution of labour is expected to remain the lowest

India's working-age population to peak in 2048



Source: United Nations World Population Prospects 2024, CRISIL MI&A Research

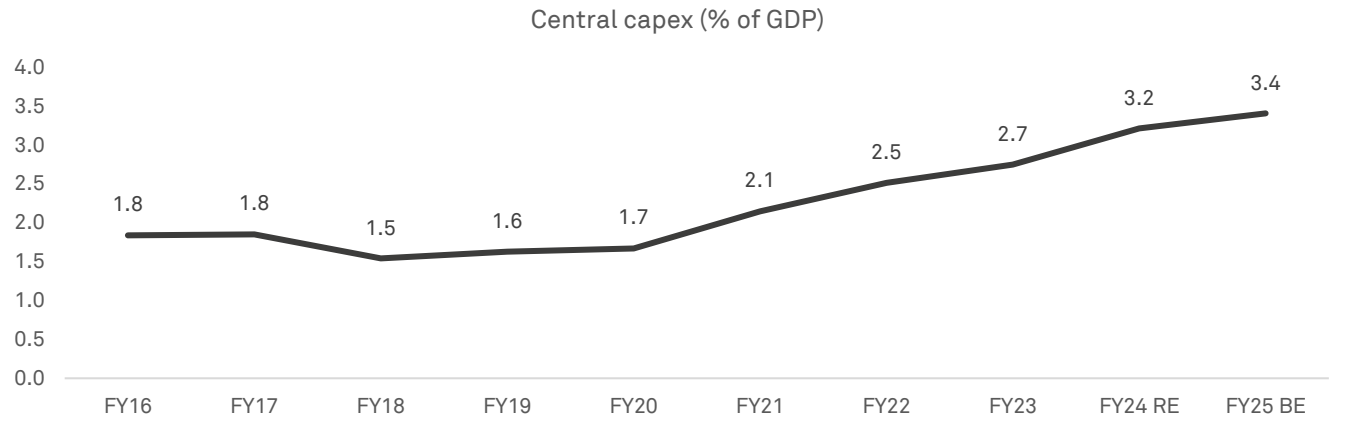
[2]Population between 15 and 64 years of age

- Low participation in the labour force (60.1% during July 2023-June 2024) and insufficient skilling are the key constraints
- Women's participation, despite some pick-up, is particularly low at 41.7% (July 2023-June 2024). China and Vietnam have women's participation of over 60%. As per the 2021-2022 round of the periodic labour force survey, 44.5% of women cited childcare or personal commitments to homemaking as the main reason for not participating in the labour force compared with only 0.8% of men
- India's working-age population is expected to peak at 1.14 billion in 2048. This gives India a demographic advantage – a dividend only if leveraged upon – especially since several major economies are now facing shrinking population
- Harnessing India's demographic advantage through skilling, providing access to high-quality education and creating jobs in sectors that can easily absorb women can lift the contribution of labour and provide an upside to growth. In this context, the budgetary measures at nudging the private sector to create formal jobs are noteworthy

Handing over the investment baton to the private sector

Through its enhanced infrastructure-led capital expenditure, the Government of India has played a proactive role in supporting the economy in its post-pandemic recovery. From 1.7% of GDP on average in the five years preceding the pandemic (fiscals 2016-2020), the central government capex is budgeted to double to 3.4% of GDP this fiscal.

Government's budgetary capex push



Source: CRISIL MI&A Research, budget documents

While this has helped crowd-in private sector investments in linked sectors such as steel and investment, the baton needs to pass to the private sector for a broad-based investment push, as: a) the government might have to gradually pull back on its investment thrust and focus on fiscal consolidation, given India's elevated debt level[3]; and b) the settings are in place for the private sector to press the investment pedal hard.

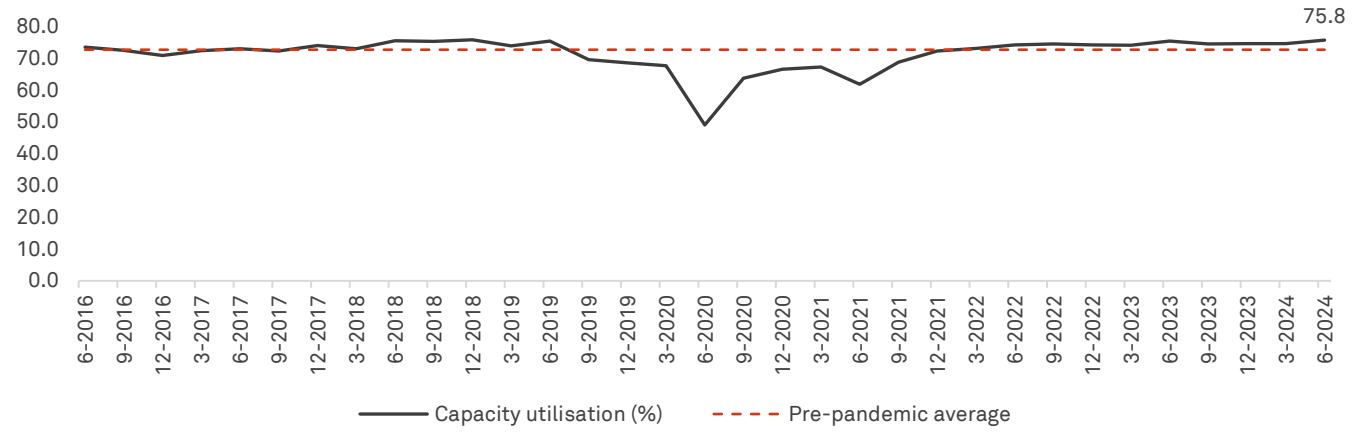
Capacity utilisation in the manufacturing sector has been rising, reaching a 22-quarter high of 75.8[4]% in the first quarter of fiscal 2025. But at the same time, CRISIL Ratings' analysis of 900 companies suggests that capex intensity (capex-to-Ebitda[5] ratio) remains moderate, averaging 50% over fiscals 2024 and 2025, as against a decadal high of 72% in fiscal 2016.

This, together with sustained deleveraging of corporate balance sheets, with median gearing[6] at less than 0.5 time in fiscal 2025 and healthy balance sheets of banks, augurs well for broad-based private capex cycle.

Notably, concerted efforts have been made by the government to promote domestic manufacturing through the PLI schemes, which support private capex in sectors such as auto components, textiles, pharmaceuticals and electronics. Increasing opportunities from supply-chain diversification, thrust on green transition and the semiconductor mission are also supporting the private sector capex investment cycle.

[3]India's net general government debt was 86% of GDP in 2023, highest among major emerging markets.
[4]On a seasonally adjusted basis
[5]Earnings before interest, taxes, depreciation and amortisation
[6]Defined as total debt/tangible net worth and is an indicator of the balance sheet strength

Rising capacity utilisation



Sources: RBI, CRISIL MI&A Research

In fact, according to a recent RBI study[7], which looked at various project funding sources, the envisaged private sector capex will increase to Rs 2.45 lakh crore in fiscal 2025 from Rs 1.59 lakh crore last fiscal.

As per S&P Global's estimates, large Indian conglomerates will invest $800 billion over the upcoming decade. This is three times of what they spent over the last decade and 40% of the new spends are expected in sectors such as green hydrogen, clean energy, aviation, semiconductors, EVs and data centers[8].

Manufacturing growth to gain momentum this decade; services to support

After long-term stagnation, manufacturing is poised to improve its share in the GDP this decade, driven by the following factors:

1. **Competitiveness to improve with easing logistical bottlenecks**

   The government's infrastructure push has enhanced transport connectivity. The improvements are visible across the segments of the logistics ecosystem — roads, railways and ports. This will reduce logistical bottlenecks for goods trade, which has constrained India's manufacturing competitiveness in the past.

2. **Domestic market pulls investors**

   Investors are noticing the sustained strong growth clocked by India after the pandemic, powered by domestic demand as household consumption accounts for ~55% of GDP. As India becomes an upper-middle-income country this decade, discretionary demand for manufactured products is expected to strengthen.

3. **Tailwinds from global supply chain shift**

   Shift in global supply chain beyond China offers an opportunity to India to attract manufacturing investment. India also benefits from its geopolitical alignment with advanced economies and offers a stable investment option for global firms.

4. **Signs of rising manufacturing investments**

   Investments in the manufacturing sector rose 14.1%, on average, during fiscals 2022 and 2023. Foreign direct investments (FDI) in manufacturing rose to $9.3 billion in fiscal 2024, higher than the $8.3 billion average in the pre-pandemic decade.

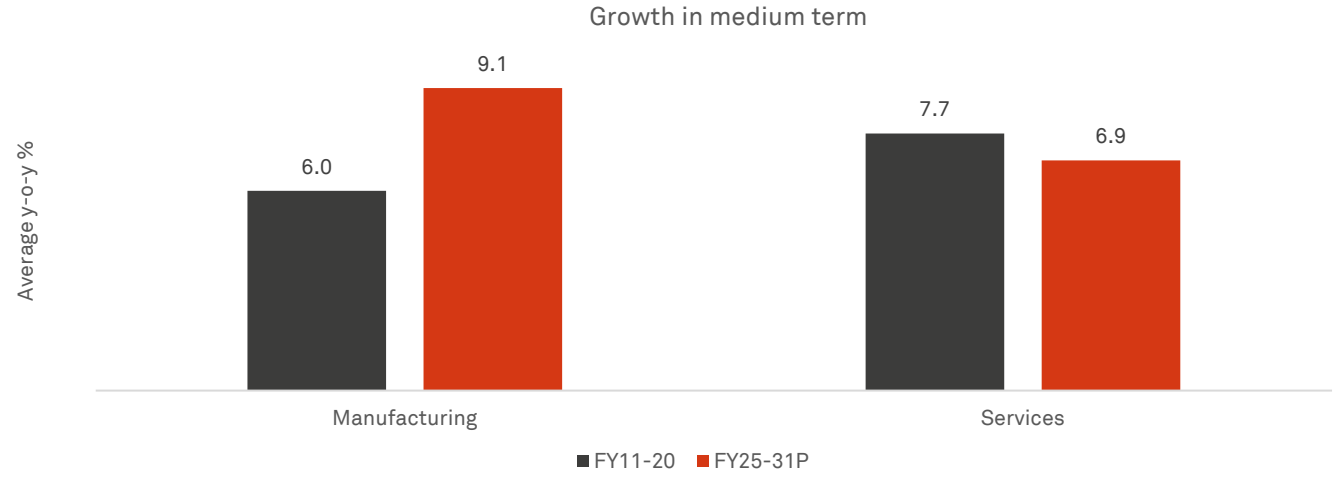
   The share of manufacturing in GDP is projected to rise to 20% by fiscal 2031.

   We expect services to continue to grow at a healthy pace, supported by domestic and external demand.

1. **India's growing young population and rising per capita income** augur well for urbanisation and services consumption.

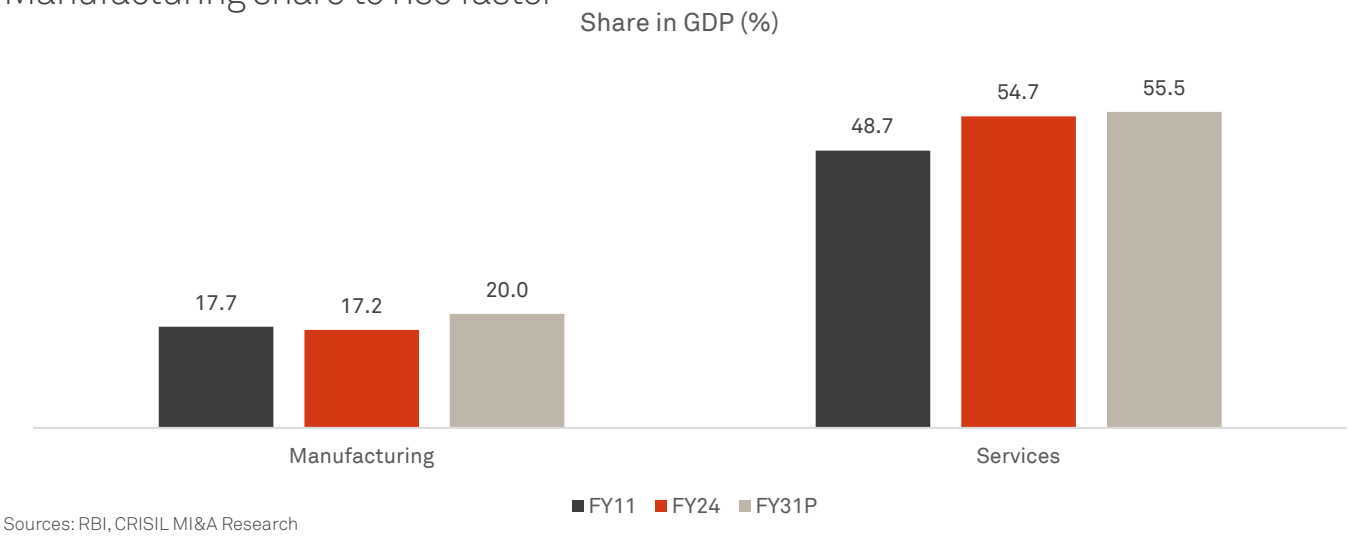
[7]Private corporate investment: Growth in 2023-24 and outlook for 2024-25, RBI Bulletin, August 2024
[8]October 14, 2024, 'Indian Conglomerates Poised for US$800 Billion Investment Push', S&P Global Ratings

Manufacturing growth to rise this decade



Sources: RBI, CRISIL MI&A Research

Manufacturing share to rise faster



Sources: RBI, CRISIL MI&A Research

2. **Services exports have been gaining prominence in** India's as well as global export mix. Though IT services dominate, business and professional services exports have also grown strongly in recent years.

3. **Digital platforms increasing opportunities for services**

   The rise of 'gig economy' and digital platforms have increased the growth potential of services. The Aadhaar-enabled India Stack has aided the growth of startups in the financial and other services segments over the past decade and will continue to provide opportunities for digitalising services delivery.

Manufacturing as well as services are needed to absorb India's large growing workforce. To this end, India's growth path between these two segments is becoming more balanced.

Path to a $7 trillion economy

Over the next few fiscals, the Indian economy is expected to achieve some key milestones. During fiscals 2025-2031, we expect the economy to sustain a real GDP growth of 6.7% and touch the $7 trillion nominal GDP mark.

This, along with a similar growth rate in the past decade, would yield compounding gains for the economy — helping it grow to $7 trillion by fiscal 2031 from $3.6 trillion in fiscal 2024. Fiscal 2031 would mark the year when India enters the upper-middle-income category with per capita income rising to ~$4,500.

It is also interesting to note that the Covid-19 pandemic does not seem to have deflected the economy from reaching $5 trillion milestone by fiscal 2028 (and subsequently $7 trillion) for two reasons: first, nominal GDP was only 2.4% below the pre-pandemic trend level (the forecast value of nominal GDP in fiscal 2024 had the pandemic not happened) and, second, slower pace of rupee weakening. The rupee weakened 4%, on average, over fiscals 2021-2024, compared with 4.3% in the pre-pandemic decade.

India could touch the $7 trillion mark powered by productivity gains and a strategic focus on high-growth sectors. The country's ability to adapt its policies in response to industry needs and global trends will be critical in this transformation.

S&P Global's estimates suggest that the inclusion of India's bonds in global bond indices could attract initial inflows of $20-40 billion and increase to $180 billion over the next decade[9].

At $7 trillion, the economy is expected to be 1.9 times larger in seven years.

Growth drivers

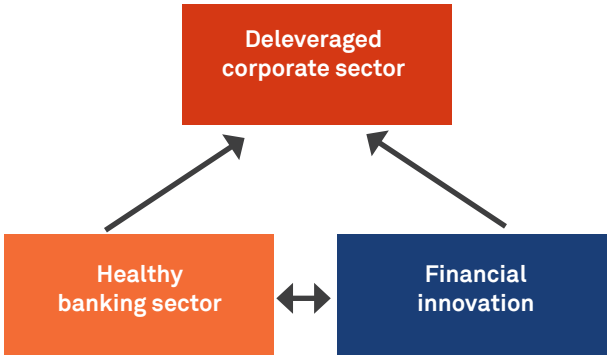
1. Greater financial sector push to growth:

India's ability to finance growth is at the decadal best, due to the following factors[10]:

i. **Deleveraged corporate sector:** CRISIL Ratings' analysis shows that the private sector's capex potential has risen three-fold over the past decade, following a long spell of deleveraging and profit growth

ii. **A healthy banking sector** has improved India's ability to finance growth. This is visible in sustained strong bank credit growth since fiscal 2023. Gross non-performing assets (GNPAs) remained low at ~2.5% as of March 2024, suggesting banks have headroom for robust credit offtake

iii. **Innovative financial products** have increased avenues to raise capital. Products such as infrastructure investment trusts (InvITs), real estate investment trusts (REITs) and restricted groups (RGs) have risen in prominence, helping attract domestic and foreign funds



2. Faster reform push

Implementing the next stage of reforms can unlock efficiency gains and raise growth.

- **Land reforms** are needed to facilitate efficient land acquisition and increase transparency of land records
- **Labour laws** need to be simplified and unified across states

  Streamlining of land and labour laws will help attract more business investments (both domestic and foreign) in the manufacturing sector. Uniform implementation of the labour code, with cooperation from the state governments, will aid the above
- **Agriculture productivity** needs improvement, as crop yields remain low while losses (harvest as well as post-harvest) remain high compared with international best practices. Reforms to improve agriculture infrastructure, increase investments and facilitate better price discovery for farmers can help boost agriculture growth

  Over the past decade, the government has also implemented 'process' reforms such as the GST, the IBC and the Real Estate (Regulation and Development) Act, which aim to improve the ease of doing business in India. For instance, the GST implementation has not only boosted the buoyancy of indirect tax collections, especially in the post-pandemic period, but also direct tax collections through more accurate reporting of income[11].

  Further efficiency gains can be unlocked if the government moves on pending reforms.

[9]S&P Global, 'Look Forward: India's Moment, Volume 3', August 2023

[10]Mehta, Amish, 2024, 'Banks and companies can now fund India's next growth cycle', Indian Express. Available at: https://indianexpress.com/article/opinion/columns/banks-and-companies-can-now-fund-indias-next-growth-cycle-9467689/

[11]Economic Survey 2022-23, Government of India

Risks and shocks that will bear watching

Geopolitical risks

Conflicts: Geopolitical tensions keep uncertainty at elevated levels. So far, India's economy has remained resilient, but any escalation (in the Middle East crisis) will be a red herring as logistics costs and crude oil supplies could come under further pressure.

Elections: More than 60 countries, including the US, have had general elections in 2024. As a result of the sizeable population and economic influence of these countries, a post-election change in policy agenda could have global ramifications.

Climate change

The frequency of extreme weather events is expected to increase with climate change. India witnessed the second hottest year and the driest August in 123 years in 2023, dragging down agricultural growth to 1.8% last fiscal from 4% in fiscal 2023.

Decarbonising while growing: Infrastructure and manufacturing, India's key growth engines, are carbon-intensive. Thus, any climate-change-related action will pose a unique challenge to the country.

Global indebtedness

S&P estimates global debt-to-GDP stood at 231% in 2023, and it is projected to increase further. High global leverage in a scenario of 'higher-for-longer' interest rates and slowing growth creates conditions for distress and financial crises.

Any escalation in the geopolitical tensions could dent consumer confidence and spending.

A harder-than-expected landing of global growth

A harder-than-expected landing in the global economy, especially triggered by a US growth meltdown, would weigh on export demand.

Complacency risks

India's resilience in an environment of elevated global risks and shocks since the pandemic was a result of good policy choices. But our past resilience should not create recency bias and breed complacency in policymaking and reforms. If India wants to maintain its stature as the fastest growing large economy and create an upside to its growth potential, it cannot remove the foot from the reform pedal.

Impetus to private investments

India's growth journey will be augmented by manufacturing and services verticals. Investments in the country are supported by the government's push for localisation, increasing opportunities from supply chain diversification and the thrust on green transition. Pick-up in capex, driven by infrastructure expansion and private sector investments, will set the foundation for sustained growth in the manufacturing sector.

Investments back to pre-pandemic trend

Direct monetary support

- Reforms, including Make in India, Phased manufacturing programme and PLI scheme, are already showing benefits across sectors such as electronics and toys, which from net importers have become net exporters over the past five to seven years
- Timely interventions, import duty imposition, stringent quality control measures have acted as key enablers
- To be specific, with net imports of more than $3 billion, the mobile devices industry had limited domestic capacities in fiscal 2017. Among 14 sectors under PLI, mobile electronics has taken lead in terms of on-ground implementation. Mobile phone exports have already reached $7.5 billion in the first five months of fiscal 2025 (up to August), marking a 34% increase over the same period last year

Increasing opportunities from supply chain diversification

- With changing trade dynamics, focus on supply chain diversification has ramped up in recent times. The trend is clearly visible in sectors such as semiconductor and electronics, where trade dynamics and cost competitiveness play an important role
- There is a strong investment intent in emerging sectors. Global giants and large corporates have also expressed investment interest in India expansion
- While India continues to provide demographic advantage and access to a large consumption base, competition from peers such as Vietnam, Thailand and Malaysia continues to be monitorable

Thrust on green transition

- Under the Panchamrit action plan, India has defined glide path of achieving net zero emission targets by 2070. This will drive investments in two verticals
- First, renewable energy sectors stand to gain. We believe renewable segments will have 60-65% share in the country's installed capacity by 2030. This entails strong investments in solar, wind and storage systems
- Second, rapid transition and increase in penetration levels in the EV segment would encourage original equipment manufacturers (OEMs) to build capacity or expand in battery and components
- Under the PLI scheme, manufacturing capacity of 40 Giga Watt hours (GWh) of batteries with an incentive outlay of Rs 18,100 crore was approved in fiscal 2021 with Rs 25,000 crore worth capex in the sector. With these investments, India will be able to move up the value chain from battery assembling to cell production and move towards electrode production

A strong manufacturing sector is not only an economic driver but also a strategic lever to boost exports, contributing substantially to foreign exchange earnings and fortifying India's position in the global value chain. Through innovations and sector-specific strategies, a thriving manufacturing industry can act as a catalyst for overall economic development. Notably, countries that adopted such growth trajectory have 20%+ share of manufacturing in overall GDP.

India has long aspired to be a serious contender in the hi-tech and electronics manufacturing industry and be a credible alternative to the Chinese dominance in this space. However, we have been unable to replicate the success seen in services exports in manufacturing, mainly because India is ranked low in the pecking order of key investment criteria–business and infrastructure. India ranked 25th and 53rd in global competitive ranking in 2024 on business efficiency and infrastructure, respectively. Against that, China ranked 15th on both parameters[12].

Despite the progressive reforms and pro-business initiatives, India's ecosystem continues to face the challenges of low labour productivity, high logistics and power costs, and limited innovation.

Resultantly, so far, manufacturing growth is way behind service sector growth. To be specific, during fiscals 2011-2020, services GDP increased at a CAGR of 7.7% vs 6.0% for manufacturing GDP. This is about to change over the next five years, with manufacturing GDP likely to clock a CAGR of 9.1%, much higher than services GDP CAGR of 6.9%. This will help India amp up the share of manufacturing in GDP to 20% from 17.2% last fiscal.

So, what has changed for India? Is it only the outcome of global supply chain diversification or are the government initiatives finally bearing fruit? To be sure, it is not that simple. Five major factors are at play here.

[12]International Institute of Management Development, World Competitiveness Ranking, 2024

Levers of manufacturing push

Enhancement of physical infrastructure

India's logistics efficiency has been a key focus area. India's ascent in the Logistics Performance Index ranking, advancing from 44th in 2018 to 38th in 2023[13], is a testament to strategic initiatives. Programmes like Bharatmala, Sagarmala, and the infrastructure expansion through the National Infrastructure Pipeline, along with the GatiShakti Initiative, have played pivotal roles. Other interventions have also helped. Implementation of E-WayBill System - leading to reduced documentation and faster processing; digitation of toll plaza with more than 95% collection through FastTag, reducing waiting time at toll plazas by more than 90%, should continue benefiting in terms of efficiency gain.

Focus on backward integration

The targeted emphasis on backward integration through PLI scheme and India Semiconductor Mission has been a game changer. With combined incentives of more than Rs 2.5 lakh crore through fiscal 2030, the schemes are focused on 14 sectors for enhancing manufacturing value chains to reduce import dependence and improve competitiveness to support exports. Evolution of mobile manufacturing in India is a classic story. The mobile devices industry, which had limited domestic capacity in fiscal 2017, has seen significant growth with smartphone imports reducing from $3 billion fiscal 2017 to $0.9 billion in fiscal 2024. The sector has also seen a significant increase in exports, with mobile device exports from India reaching $15.5 billion in fiscal 2024 (representing 3.5% of Indian merchandise exports, up from 1% in fiscal 2022), a 42% y-o-y growth.

Corporate India's financial flexibility

Corporate India's financial flexibility along with sustained healthy profitability and domestic industrial policy push will act as key enablers for the investment cycle. Capex-intensive sectors, accounting for ~70% of annual industrial capex, are likely to maintain capacity utilisation above decadal averages. This, supported by deleveraged balance sheets and strong financial profile, continues to enhance the credit profiles of Indian corporates, as evident by upgrade-to-downgrade ratio remaining well over 1 for past 12 quarters.

Stakeholder consultations

The government has been actively participating in stakeholder consultations. It is encouraging to witness continuous review of policies through industry feedback for sectors under PLI. There are at least three such instances to highlight. Recently, the government announced a shift in incentive payout period from annual to quarterly for the white goods sector to enable better working capital cycle for companies. In the past, the timeline for mobile PLI was extended as many players indicated operational difficulties in the first year. Also, based on industry feedback, electronics sub-assembling and components may come under focus for domestic push.

Opportunities in emerging sector

Its an opportunist time for India to gain share in supply chain diversification strategies adopted by global corporates. The trend is clearly visible in sectors such as semiconductors and electronics, where trade dynamics and cost competitiveness play important roles. With announcements of more than Rs 1 lakh crore of investment in India, there is strong interest visible in emerging sectors such as chip fabrication, outsourced semiconductor assembly, testing, marking, and packaging from global giants and large corporates.

[13]World Bank, Logistics Performance Index, 2023

Between fiscals 2019 and 2023, household demand and infrastructure development have been at the forefront of India's capex, primarily bankrolled by central and state governments. As India moves forward, while infrastructure capex is expected to continue to grow, private sector investments are also stepping up, in conventional industries as well as emerging sectors and providing a critical boost to the capex cycle. During fiscals 2021-2024, industrial capex averaged Rs 4.4 lakh crore per annum. The momentum is expected to strengthen with investments reaching ~Rs 6.7 lakh crore by fiscal 2028 and marking an average annual increase of 1.5x. This ramp-up is likely to be driven by higher capacity utilisation, strong investor sentiment and the PLI scheme, which aims to propel growth across sectors over the next 3-4 years.

Vertical	FY21-24 (Rs lakh crore)	FY25-28P (Rs lakh crore)	FY25-FY28P /FY21-FY24
Infrastructure	44	70-75	1.7x
Industrial	18	25-30	1.5x
Total investments	62	100-105	1.6x

Source: CRISIL MI&A Research, budget documents

As India transitions to value-added manufacturing, emerging sectors such as EVs, semiconductors and electronics are poised to become the main drivers of industrial capex. These segments are projected to account for more than 70% of non-PLI emerging sector capex, underscoring the country's shift towards sustainable and tech-driven growth.

Over fiscals 2025-2028 , PLI schemes and emerging sectors are together set to account for a quarter of India's capex, as against a 10% share between fiscals 2021 and 2024 . This significant increase emphasises the growing importance of these sectors in India's industrial landscape. PLI-driven capex is expected to peak by fiscal 2026 as approved projects aim to fulfil commitments to avail incentives. Simultaneously, investments in emerging sectors will continue to strengthen India's manufacturing capabilities, aligning with its broader goals of self-reliance and making local production globally competitive.

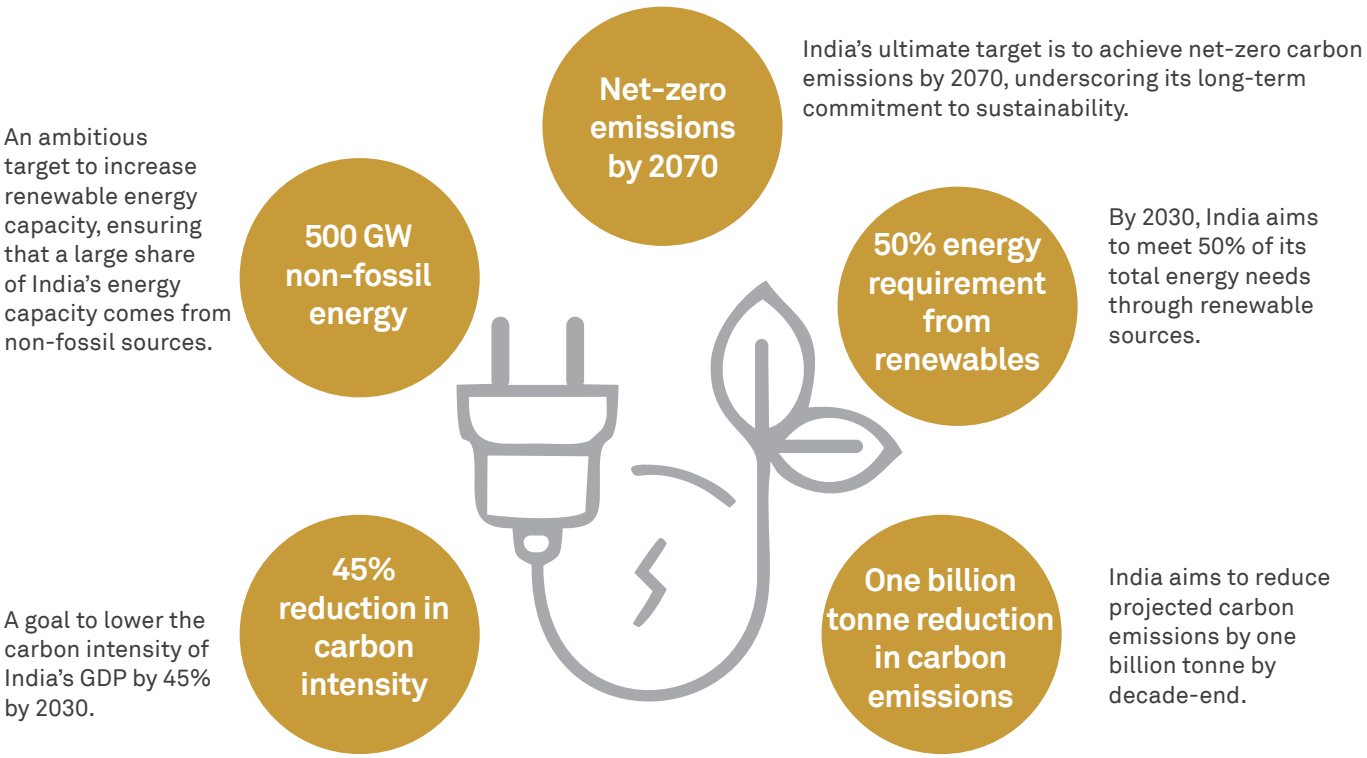
Focused capex in the infrastructure and industrial sectors over fiscals 2021-2028 reflects not only India's economic growth objectives but also a strategic commitment to sustainable development.

By directing capex into infrastructure and emerging industries, India is bolstering its economic growth goals with sustainability imperatives . This investment approach ensures economic growth is aligned with global sustainability standards, reinforcing India's emphasis to long-term ecological resilience.

Sustainable development: Catalyst for out-of-the-box opportunities

India's commitment to sustainable development is gradually opening up economic opportunities across sectors, though the path is complex and challenging. Over the past decade, government policies and corporate initiatives have placed significant emphasis on reducing carbon emissions, increasing energy efficiency and boosting India's renewable capacity. With more than 70% of CO_2 equivalent emissions in India coming from the energy sector, there is potential to make meaningful progress. However, translating this potential into action requires overcoming infrastructural and financial barriers. While India is aligning with global trends in sustainable development, balancing emission reduction with the economic growth of an emerging economy remains a formidable task.

Panchamrit action plan



Source: Ministry of Environment, Forest and Climate Change, CRISIL MI&A Research

Sustainable development has also fostered the adoption of a circular economy model, with emphasis on waste reduction, recycling and resource efficiency. Some companies are creating opportunities in recycling even beyond the regulatory requirements, such as extended producer responsibility. Electronics and auto industries, specifically, are integrating circular practices, reducing dependency on raw materials and enhancing supply chain resilience. By embracing the circular economy, India can create a more self-reliant and sustainable industrial base. Amid sustainability becoming a key focus area in global trade, it is necessary that India stays a frontrunner to bank on the opportunities that are opening up with emission reduction.

With ambitious renewable energy targets, the green energy sector has become a hotspot for investments, particularly in solar and wind power. Major corporates are also increasingly investing in sustainable infrastructure projects such as green buildings and efficient transportation, supporting India's climate goals while generating long-term economic value. While these projects signal India's shift towards a resilient, low-carbon economy, the journey will require sustained financial support, policy consistency and innovation to ensure long-term economic viability and environmental impact.

In line with its sustainability commitments, India has set ambitious Panchamrit targets, which were announced

at the COP26 climate summit as part of its contribution to global climate action. By pursuing these goals, India positions itself not only as a responsible global climate leader but also as a potential hub for sustainable innovations, green investments and renewable energy industry. Meeting these targets could stimulate economic growth by attracting foreign investments, creating green jobs and reducing dependency on imported fossil fuels, thus bolstering energy security. However, to capitalise on these opportunities, India must address significant challenges in financing, technology and infrastructure. Successfully navigating these hurdles could transform India's economy, turning sustainability efforts into a competitive advantage in the global market.

India's sustainability journey is not only an environmental necessity but also a strategic economic opportunity. By aligning economic growth with ecological goals, India is setting the course for a resilient and future-oriented economy. Emphasising sustainable development will create new industries and jobs, ensure long-term stability and reduce ecological risks, making India a benchmark for responsible growth in emerging markets.

India's manufacturing evolution: A sectoral deep dive

India's manufacturing landscape is undergoing a profound transformation shaped by shifting global dynamics, ambitious domestic reforms and an increasingly assertive role for the private sector. To unlock the intricacies of this evolution, it is imperative to analyse seven critical sectors: roads and highways, steel, textiles, food processing, automobiles, electronics and renewable energy. These sectors offer a window of opportunity, not without challenges that lie at the heart of India's industrial growth. Each at a different stage, these sectors are not only pivotal to the manufacturing ecosystem but also mirror the strategic policy interventions and investment trends driving India's broader economic ascent.

The focus on capex has emerged as a crucial driver of India's manufacturing growth. With the private sector increasingly taking the lead, understanding how investments flow into different industries and how they are supported by targeted policy initiatives is critical. This report evaluates each sector through the lens of investment trends, market potential and government support, delving into their unique roles in India's manufacturing future.

1. **Roads and highways: Driving infra expansion**

   The roads and highways sector is the cornerstone of India's infrastructure development, crucial for improving logistics, reducing transportation costs and enabling efficient supply chains. The long-standing shift to the build-operate-transfer (BOT) model has been instrumental in addressing issues of risk allocation and financial viability, attracting private investments. These infrastructure improvements are not just about physical connectivity—they directly enhance the competitiveness of India's manufacturing sectors, creating a strong foundation for long-term growth.

2. **Steel: Emerging prospects**

   The steel industry, a fundamental component of India's industrial fabric, is experiencing robust capacity expansion, driven by rising domestic demand and a focus on building infrastructure. Government policies have supported this growth, yet the sector needs to balance increasing demand and adherence to environmental sustainability goals, particularly in terms of reducing its reliance on coal. The steel industry's trajectory is closely linked to broader construction and manufacturing activities, making it a barometer of India's industrial health.

3. **Textiles: A blend of tradition and innovation**

   India's textile industry, with its rich heritage and diverse production capabilities, remains a key player in the global market. With ambitious targets to increase exports to $100 billion by 2030, the sector is leveraging its strength in natural fibres while embracing technological advancements in weaving, knitting and processing. Facing competition from countries such as China and Bangladesh, the textile sector's growth trajectory offers insights into how India balances tradition with innovation, aiming to sustain its competitive advantage and drive rural employment.

4. **Food processing: Adding value to agriculture**

   The food processing industry serves as a vital link between India's vast agricultural base and the global marketplace. It has immense potential for large-scale industrialisation and the development of small and medium-sized enterprises (SMEs), creating opportunities for rural employment and export growth. As India seeks to enhance the value addition in agriculture, investments in food processing are critical for improving supply chain efficiency, expanding market reach and ensuring better price realisation for farmers.

5. **Automobiles: OEMs to put sector in fast lane**

   India's automobile industry is at the forefront of a transformative shift, moving towards sustainable mobility solutions. The transition to EVs, hybrid models and alternative fuels such as compressed natural gas (CNG) is reshaping the industry, driven by a combination of domestic demand and government incentives. However, while India's automobile market continues to grow, achieving a competitive edge in exports remains a challenge. This sector reflects India's broader industrial ambition to balance innovation with market realities.

6. **Electronics: Demand on the upswing**

   The electronics sector, particularly mobile phone manufacturing, showcases India's ascent in global value chains. From being a net importer to becoming a net exporter, India's success in this domain highlights the potential for high value-added manufacturing to become a cornerstone of its economic strategy. The PLI scheme has been a game changer as it has attracted investments and encouraged technological upgrades.

7. **Renewable energy: Powering the future**

   The renewable energy sector is rapidly emerging as a pillar of India's commitment to sustainability. With ambitious targets for solar and wind power generation and a growing focus on green hydrogen, India is positioning itself as a global leader in the clean energy transition. Government support through policy frameworks and incentives has made renewable energy increasingly viable, creating opportunities not only for domestic use but also for exporting clean energy solutions. This sector exemplifies India's shift towards a sustainable industrial base, aligning with global climate goals.

An All-Round View of India's Manufacturing Ecosystem

The analysis of these seven sectors through a capex-driven lens offers a holistic view of India's industrial evolution. Each sector plays a distinct role in the broader narrative—from the foundational infrastructure investments in roads and steel to the forward-looking focus on electronics and renewable energy. This approach reveals the interplay of market potential, policy support, investment trends and sector-specific challenges, providing a nuanced understanding of how India's manufacturing base is evolving.

The evolving investment landscape, supported by the PLI scheme, targeted infrastructure projects and strategic government interventions, reflects a maturing ecosystem where the private sector is increasingly taking the lead.

By focusing on these sectors, we can trace the broader trends in India's manufacturing strategy and understand the key levers that will drive its growth over the coming decade. This deep dive not only highlights the current state of Indian manufacturing but also provides insights into the future course of action, where the balance between traditional strengths and new-age industries will define India's position in the global economic order.

Roads and highways: Driving infra expansion

India's roads and highways sector has expanded significantly over fiscals 2014-2024, riding on a cumulative capital expenditure of ~Rs 24 lakh crore.

The sector achieved a construction pace of 31-32 km per day, on average, between fiscals 2021 and 2024, laying a strong foundation for infrastructure growth, enhancing logistics efficiency and supporting economic growth.

In addition to key government initiatives, the sector's expansion has been driven by increasing urbanisation and improved toll-collection efficiencies, particularly through implementation of the electronic toll collection system FASTag, under which daily revenue rose to Rs 178 crore in fiscal 2024, up 20% from fiscal 2023.

Asset monetisation strategies under toll-operate-transfer (TOT) and infrastructure investment trusts (InvITs) are central to the sector's financial strategy as the government aims to monetise road assets worth Rs 60,000 crore by fiscal 2025.

The efforts are supported by a series of regulatory reforms that encourage private sector investment in the sector and facilitate project execution. Such initiatives ensure the roads sector remains well-positioned to meet future challenges and demands.

Strong pipeline of projects continues to support capex momentum

The government has infused significant capex into the sector. National highways (NH) grew 60% to 1,46,145 km in fiscal 2024 from 91,287 km in fiscal 2014, supported by various government schemes.

Capex in the roads and highways sector recorded a CAGR of 13% between fiscals 2020 and 2024. The upward trajectory is expected to persist, with a projected growth of 9-11% in the next two to three fiscals, aided by capex by both public and private sectors. The strong pipeline of projects and recent amendments in implementation models will likely support the growth trajectory.

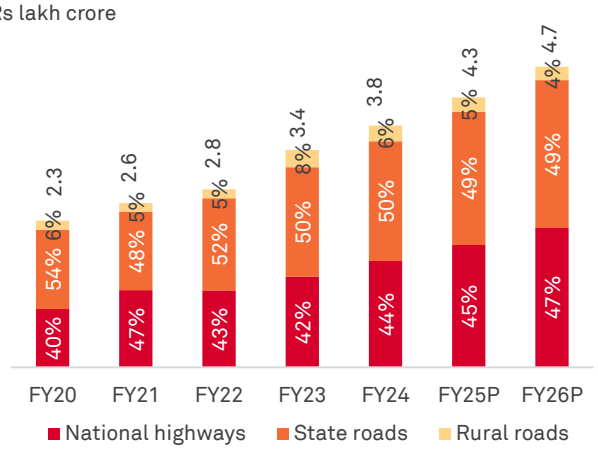
Highways are expected to remain the primary focus of investment. New implementation models such as hybrid annuity model (HAM) in fiscal 2016 and revamping of existing models such as BOT in fiscal 2024 are likely to boost capex from government and private sectors.

In addition, investments in state highways and rural roads are on the rise, owing to proactive measures by the Centre and states. Following announcements in the Union budget 2025, Phase 4 of the Pradhan Mantri Gram Sadak Yojana (PMGSY) is set to connect 25,000 rural habitations, with an allocation of Rs 0.26 lakh crore designated for rural road projects. Additionally, states have committed to a combined capital outlay of over Rs 1.63 lakh crore for the enhancement and development of the state road network.

Progress in national highways and state and rural roads

Capex split for different segments in roads sector

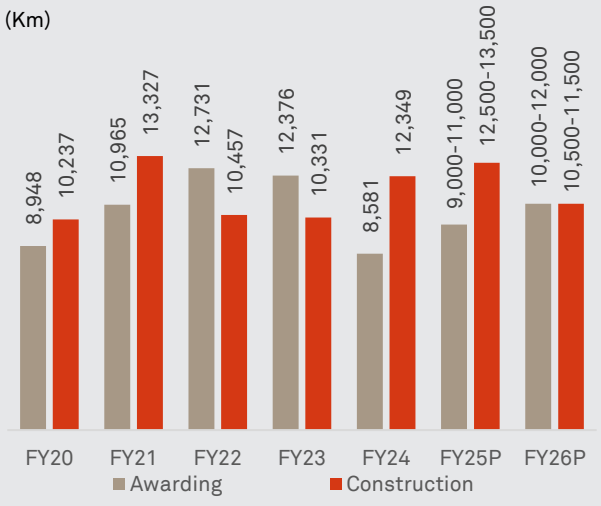
Rs lakh crore



Source: Ministry of Road Transport and Highways of India (MoRTH), CRISIL MI&A Research

NH construction to normalise; awarding likely to recover over the upcoming fiscals

The government has intensified its efforts in developing the NH network, leading to a noticeable rise in the number of highway projects being awarded and constructed over the past five fiscals. Typically, it takes 9-18 months from the award of a project to the issuance of the appointed date, marking the commencement of construction. This trend underscores the government's commitment to enhancing road infrastructure and suggests a continued focus on expanding and improving the NH network in the upcoming years.



Source: MoRTH, CRISIL MI&A Research

Awarding

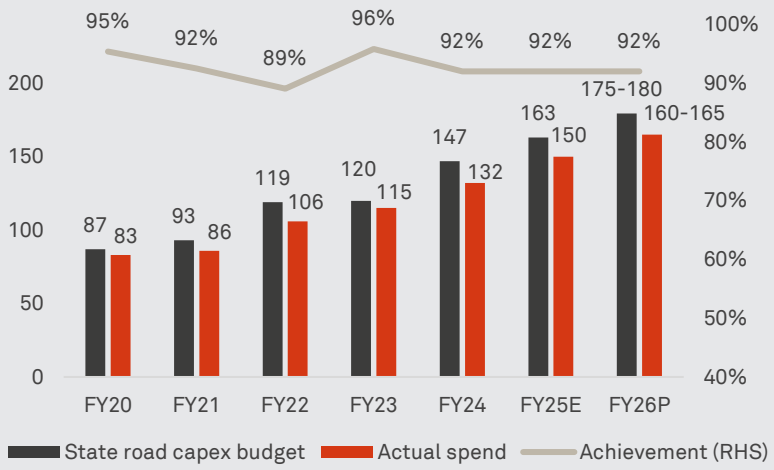
Between fiscals 2021 and 2023, NH projects totalling 36,072 km were awarded, averaging 12,024 km annually. However, fiscal 2024 recorded a significant reduction, with only 8,581 km of projects being awarded. The 31% decrease was attributed to funding constraints. Cost escalations under Bharatmala Pariyojana increased 148%, with costs in Phase-I nearly doubling, mainly due to rising land acquisition expenses. Following the Cabinet's approval of a revised financing strategy, it is anticipated that the volume of project awarding will recover, expected to reach between 10,000 to 12,000 km by fiscal 2026.

Construction

In fiscal 2024, road construction volume increased 20% on-year, reaching a record high of 12,349 km, propelled by the substantial number of NH projects awarded in the preceding years. Despite lower project awards in fiscal 2024, construction activity is projected to stabilise, with volumes ranging from 10,500 to 11,500 km by fiscal 2026. Despite normalisation in construction pace, capex growth is expected to remain robust at 9-11%. The sustained investment growth will be supported by the development of broader expressways and new transportation corridors.

State spending on road network development and maintenance set to increase on high base

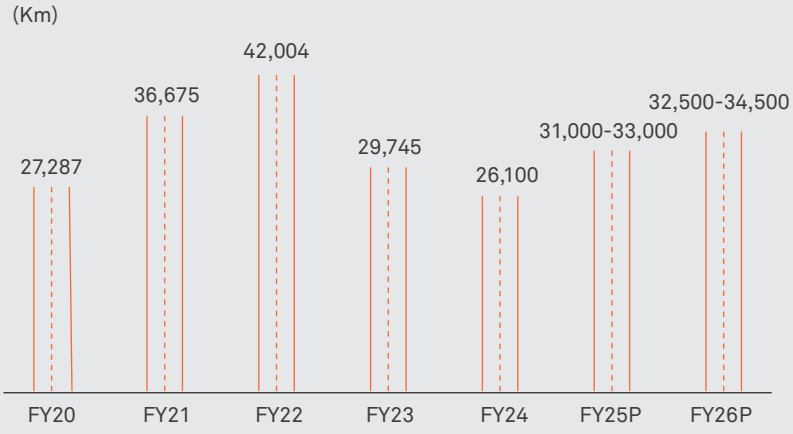
Spending on road infrastructure by the top 15 states is projected to increase 10-12% in fiscal 2026, continuing from a strong base established in the current fiscal. Over the previous five fiscals, the budget achievement ratio has consistently remained high at 93%, indicating that a substantial portion of the budget increase planned for the next fiscal is expected to be effectively utilised.



Note: State budget data for Andhra Pradesh, Bihar, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh and West Bengal account for 85% of total state road capex outlay
Source: State budget, CRISIL MI&A Research

Rural road construction sluggish in fiscal 2024, set for revival over upcoming fiscals under PMGSY- IV

Construction of rural roads dropped in the past two fiscals as the government approached its targets under the flagship PMGSY. However, with the initiation of Phase IV of the PMGSY, which targets to connect 25,000 villages with an allocation of Rs 0.26 lakh crore, making them all-weather roads, the construction of rural roads is expected to accelerate in the upcoming fiscals.



Source: PMGSY, CRISIL MI&A Research

Three growth drivers: Traffic, BOT and asset monetisation

The growth of India's roads sector is primarily driven by a surge in traffic, owing to rapid urbanisation and increasing transportation demands, necessitating the expansion and upgradation of road networks.

Toll collection has been significantly rising via FASTag implementation, with 98% penetration (as of June 2024) and allowing more flexible toll revenue via implementation under the Global Navigation Satellite System (GNSS). These drastically reduce waiting times at toll plazas and reduce leakages and forced exemptions.

Additionally, under recent amendments to BOT Model Concession Agreements (MCA) financial risks have been reduced, making them more investor-friendly.

Besides, TOT and InvITs are employed as innovative asset monetisation strategies to generate upfront revenue from existing road assets, enabling efficient management and operation of roadways.

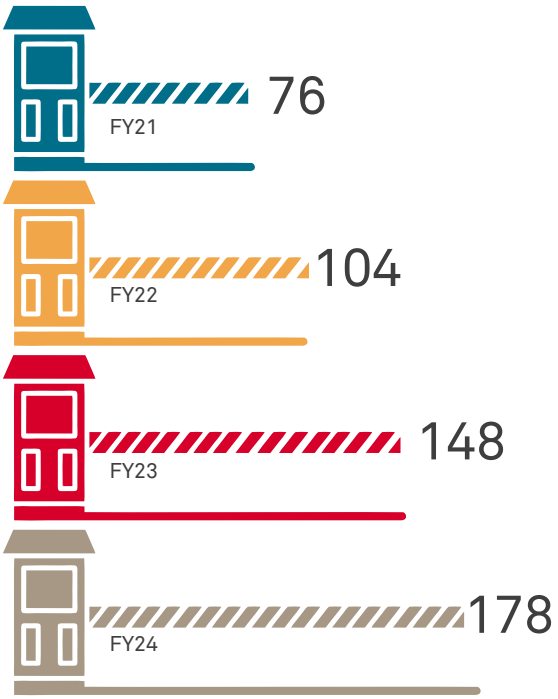
These measures ensure sustainability and facilitate ongoing enhancements in connectivity, which are crucial for supporting India's economic growth.

Traffic volumes scale new high in fiscal 2024, rate hikes to augur well for toll collection

The implementation of FASTag led to a significant rise in the average daily revenue. Daily collection reached Rs 178 crore in fiscal 2024 from Rs 76 crore in fiscal 2021.

Traffic volume also remained strong in fiscal 2024, supported by steady economic activity.

The growth in traffic and toll collections bodes well for the sector, boosting the confidence of road developers and private investors.



NHAI toll collection (Rs crore per day)

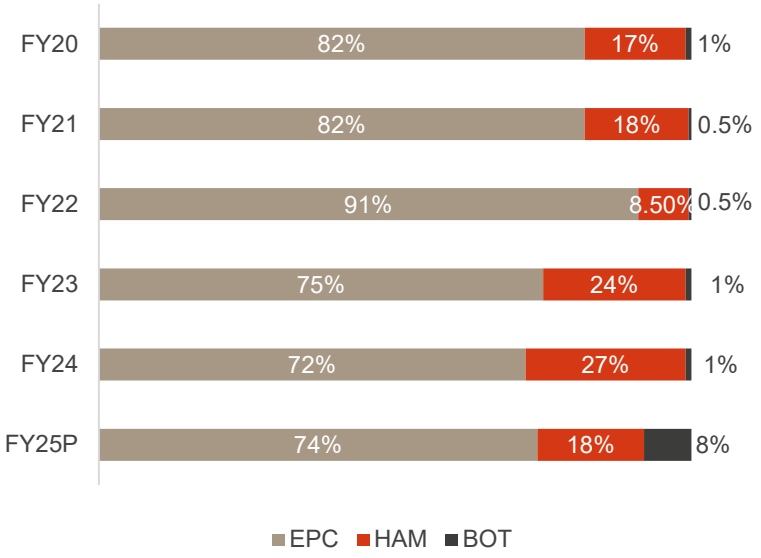
Source: National Electronic Toll Collection, CRISIL MI&A Research

Expected revival of BOT model with amendments in MCA favourable for large players

The amendments to the BOT MCA made in fiscal 2024 are expected to boost the roads and highways sector by addressing key concerns, such as risk allocation and financial viability.

These amendments will encourage private sector participation, reduce project delays and enhance investor confidence, ultimately accelerating project execution.

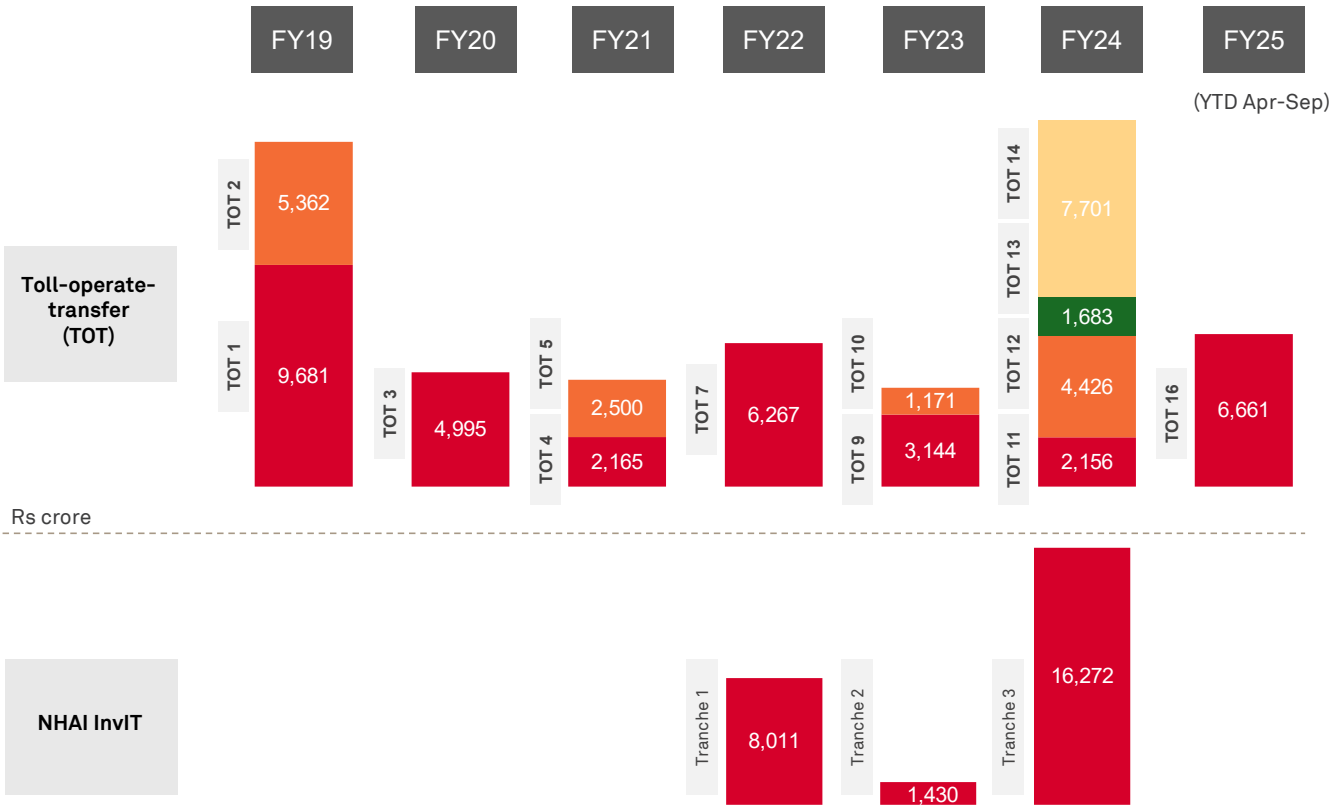
Awarding mix via different models (in km)



Note: Percentage spilt of engineering, procurement and construction/HAM/BOT models in NH awarding for each fiscal
Source: MoRTH, CRISIL MI&A Research

Asset monetisation to play a key role in growth trajectory

The roads and highways sector is a key contributor to the government's efforts towards asset monetisation. With ambitious targets set to monetise road assets worth Rs 60,000 crore in fiscal 2025 through the TOT or InvITs model, the strategy is poised to boost sector growth.



Sources: CRISIL MI&A Research

Key enablers

The substantial growth of India's roads sector is significantly enabled by government policies and reforms, which provide a structured and supportive framework for road development. These policies aim to streamline project approvals and encourage private investment through favourable amendments. Notably, the government has implemented policy adjustments to expedite project timelines by introducing pre-completion incentives. In addition, sustainability practices in the roads sector will also play a pivotal role, with the adoption of environment-friendly construction methods and materials, and the integration of green technologies in road construction and maintenance. These practices mitigate the impact on the environment and improve the durability and efficiency of road networks, thus supporting India's commitment to sustainable development.

Government schemes and initiatives

The introduction of HAM in 2016 reduced project risks, with the government bearing 40% of the construction costs and the remainder paid via annuities during operations. In 2018, the expansion of the TOT model enabled the monetisation of existing highways, generating funds for new projects and attracting private investment. The launch of the National Infrastructure Pipeline and National Monetisation Pipeline between fiscals 2019 and 2021 provided a combined investment roadmap necessary to fuel infrastructure development and capital recycling. Furthermore, amendments to the public-private partnership and MCA in HAM and BOT have enhanced financial viability, encouraging greater private sector participation in the sector's growth.

Major government policy interventions aid in sector growth

Regulatory reforms

HAM introduction

Government pays 40% of the project cost during construction, with the remaining 60% via annuities during operations

Toll-operate-transfer (TOT) model expansion

Expansion of TOT model to monetise existing highways and raise funds for new projects

Amendments in PPP model

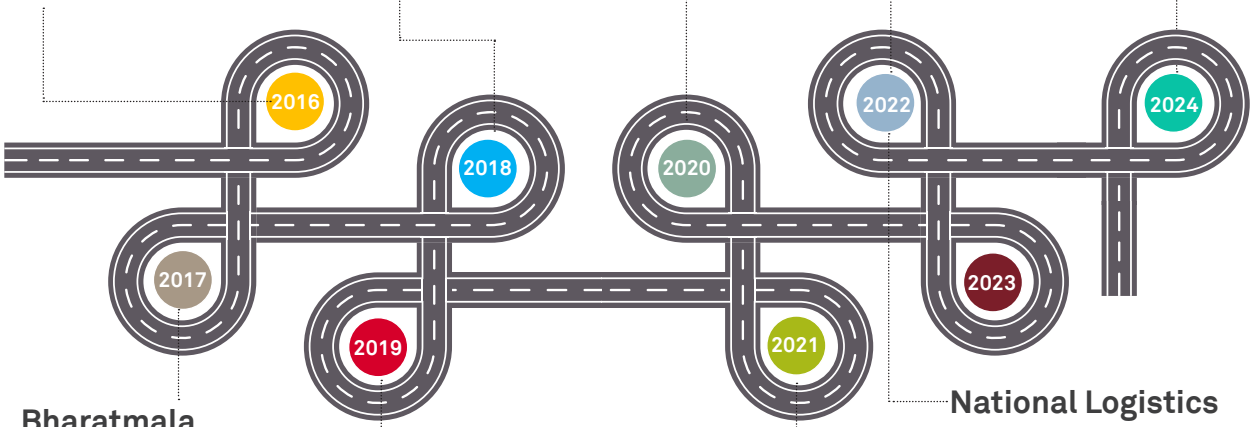
Increased flexibility in public-private-partnership (PPP) contracts to encourage greater participation of private developers

MCA changes in HAM model

Changes in MCA pertaining to milestone payments, change in ownership and better financial closure

MCA changes in BOT model

Amendments in MCA pertaining to BOT model. A step towards revival of the BOT model



Bharatmala Pariyojana

Phase-1 target of constructing 84,000 km of national highway network at an investment of Rs 10.63 lakh crore

National Infrastructure Pipeline

To develop world-class infrastructure across sectors with an aim of Rs 111 lakh crore investment until 2025

National Monetisation Pipeline and PM Gati Shakti

Assets monetisation blueprint of Rs 1.6 lakh crore to recycle capital

National Logistics Policy

Unified logistics programme to enable integration between ministries and states with a focus on technology

Government schemes

Embracing environment-friendly materials and technologies for resilient infrastructure.

Sustainable practices in road construction are gaining traction to address environmental and economic challenges. Key innovations include using recycled and environment-friendly materials such as plastic waste, modified bitumen, fly ash and geosynthetics, which improve road durability and reduce environmental impact.

MoRTH has actively promoted the use of plastic waste, mandating it for top layers of roads across the national highway network. Alternative materials, such as green cement and environment-friendly concrete, have become more common, lowering the carbon footprint of construction projects. Techniques such as cold mix technology, which lower emissions by reducing heating requirements, are also increasingly used in remote and environmentally sensitive areas.

Additionally, digital tools such as drones, building information modelling and Internet of Things systems enhance project accuracy and efficiency, helping contractors manage resources more sustainably. These measures align with India's broader infrastructure goals, contributing to resilience and cost savings in the long term.

Risks and challenges

Risk	Challenge
Land acquisition	Delays in road projects lead to time and cost overruns. Sector-specific policies are being introduced to mitigate them.
Environmental clearances	Delays in environmental clearances remain a challenge for the road sector, though initiatives such as PM Gati Shakti aim to streamline approvals. Projects under construction must also adapt to evolving environmental regulations.
Approval delays	Road projects often face delays due to the need for multiple approvals from local bodies, many of which work independently with limited coordination, slowing regulatory clearances.
Political risk	Political risk can range from demand for a change in the alignment of projects to the entire projects getting cancelled after the commencement of construction or achieving financial closure
Geographical risk	Natural calamities such as flooding, landslide, excessive rains, local hinderances, terrorism and unavailability/low availability of raw materials could have an adverse impact on any project.

The future of India's roads and highways sector is promising, underpinned by substantial investments and strategic initiatives that have propelled substantial growth and modernisation.

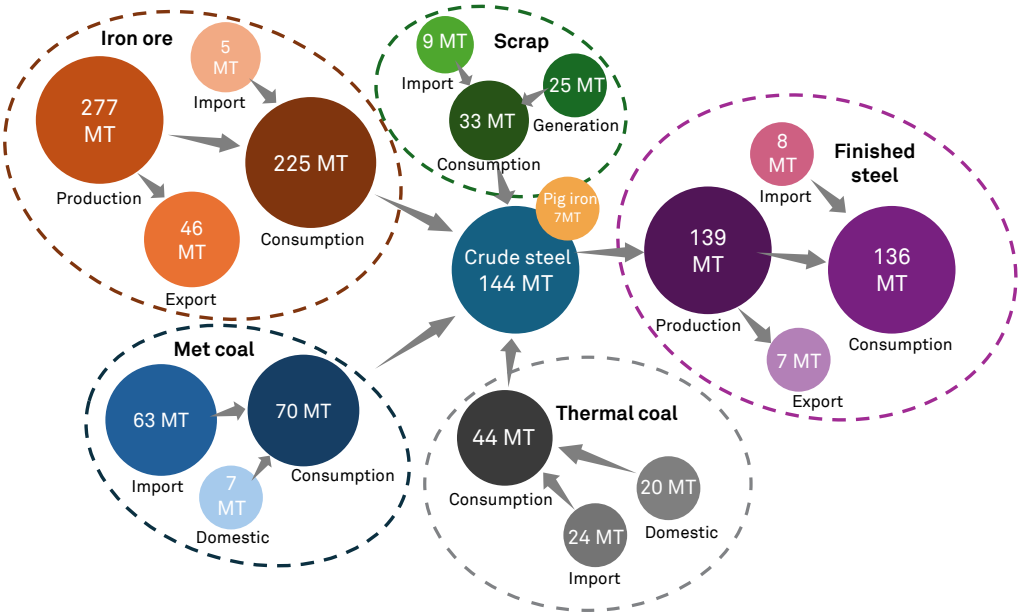
But while the sector benefits from robust government support, innovative financing mechanisms and sustainability practices, it also faces significant challenges such as land acquisition, environmental clearances and regulatory approvals. Geopolitical and geographical challenges pose potential disruptions to project timelines, too.

Addressing these issues effectively through continued policy refinement and adaptive strategies will be crucial for maintaining the momentum of India's infrastructural development and ensuring long-term resilience and efficiency in the roads sector.

Steel: Emerging prospects

The Indian iron and steel industry is the second-largest steel producer globally. It is a crucial sector in the country's industrial and economic framework. In fiscal 2024, crude steel production in the country stood at ~144 million tonne (MT), contributing 1.7% to the GDP. Despite the challenges posed by the global overcapacity and economic weakness, the industry has maintained a robust growth over last three fiscals, driven by demand from the domestic building and construction, infrastructure and automotive sectors.

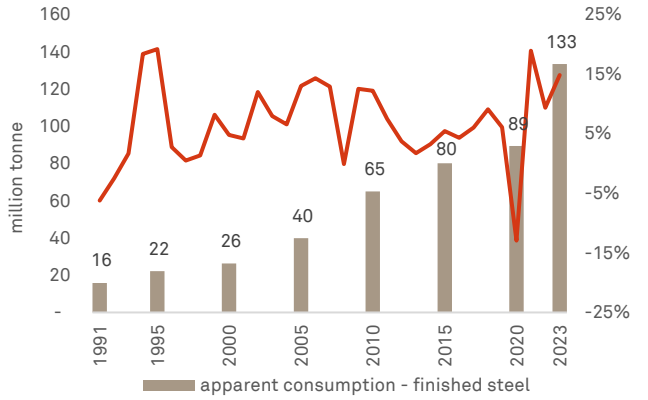
Iron and steel ecosystem in India (fiscal 2024)



Sources: JPC Steel, Ministry of Mines, DGFT, CRISIL MI&A Research

- The industry houses a comprehensive ecosystem — an expansive value chain including mining, processing, manufacturing and distribution. This makes it a critical component of the country's economy
- The sector is well supported by abundant availability of iron ore, a critical mineral resource used in steel production. Further, it is a major employment generator, given its extensive operations and supply chain.
- To meet the growing domestic demand, the Ministry of Steel aims to increase steel capacity from179.5 MT in fiscal 2024 to 300 MT by the end of the decade
- In fiscal 2024, the industry produced finished steel worth ~Rs 8.5 lakh crore, logging a CAGR of 11% over the last 10 years
- The steel industry is inherently capital-intensive, requiring substantial investments in heavy machinery, plant infrastructure and technology upgrades. Even by conservative estimates, to meet the ambitious 300 MT steel capacity target, the country requires an investment of around Rs 4.5 lakh crore over seven years from fiscal 2024. The sector will need significant investments in constructing new facilities, expanding existing ones and in advanced technologies that enhance production efficiency and environmental compliance

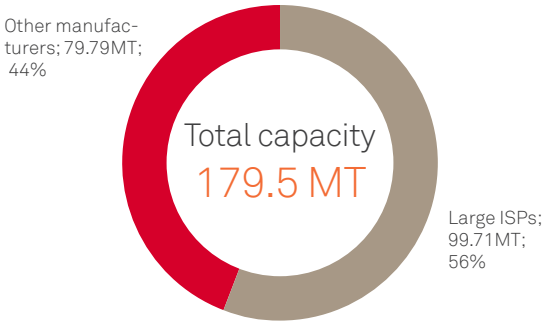
Indian finished steel consumption



Source: CRISIL MI&A Research

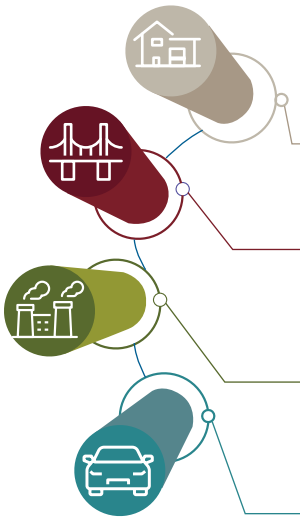
- Owing to the substantial logistics requirement, the iron and steel industry contributes more than 20% to the freight revenue of the Indian Railways
- The primary steel industry has more than 1,200 players. However, the top seven players account for 56% of the capacity, thus holding significant sway over the market dynamics
- In terms of raw material consumption, the sector consumed 225 MT of iron ore, 33 MT of steel scrap and 114 MT of coal in fiscal 2024

Steel production capacity in India



Note: Large integrated steel producers (ISP) include top seven companies
Sources: JPC, Ministry of steel

Four pillars of steel demand in India: Building and construction, government infrastructure, industrial growth and automotive advancements



Building and construction:
- The sector is the largest consumer of steel in India, driven by the country's rapidly growing population and urbanisation.
- Urbanisation and a relatively younger population boost the demand for residential and commercial buildings, which require significant amount of steel for construction

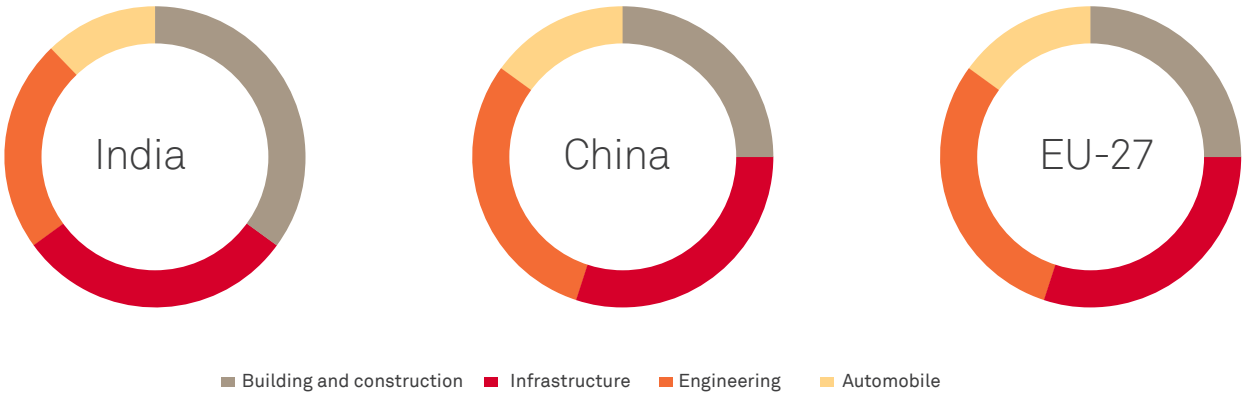
Infrastructure:
- Government initiatives and spending on infrastructure are crucial drivers of steel demand
- Steel funds heavy usage in the construction and expansion of highways, railways, airports and energy facilities

Industrial:
- This segment includes heavy engineering and manufacturing industries that use steel to build machinery, equipment and factories
- As India aims to boost its manufacturing capabilities with initiatives such as Make in India, the demand for steel, as a core component of industrial infrastructure, is expected to rise

Automobiles:
- The automobile sector utilises steel for everything from chassis and engines to various other smaller components
- Increasing income levels and the thrust on electric vehicles and more sustainable transportation options potentially lead to innovative uses and new steel products

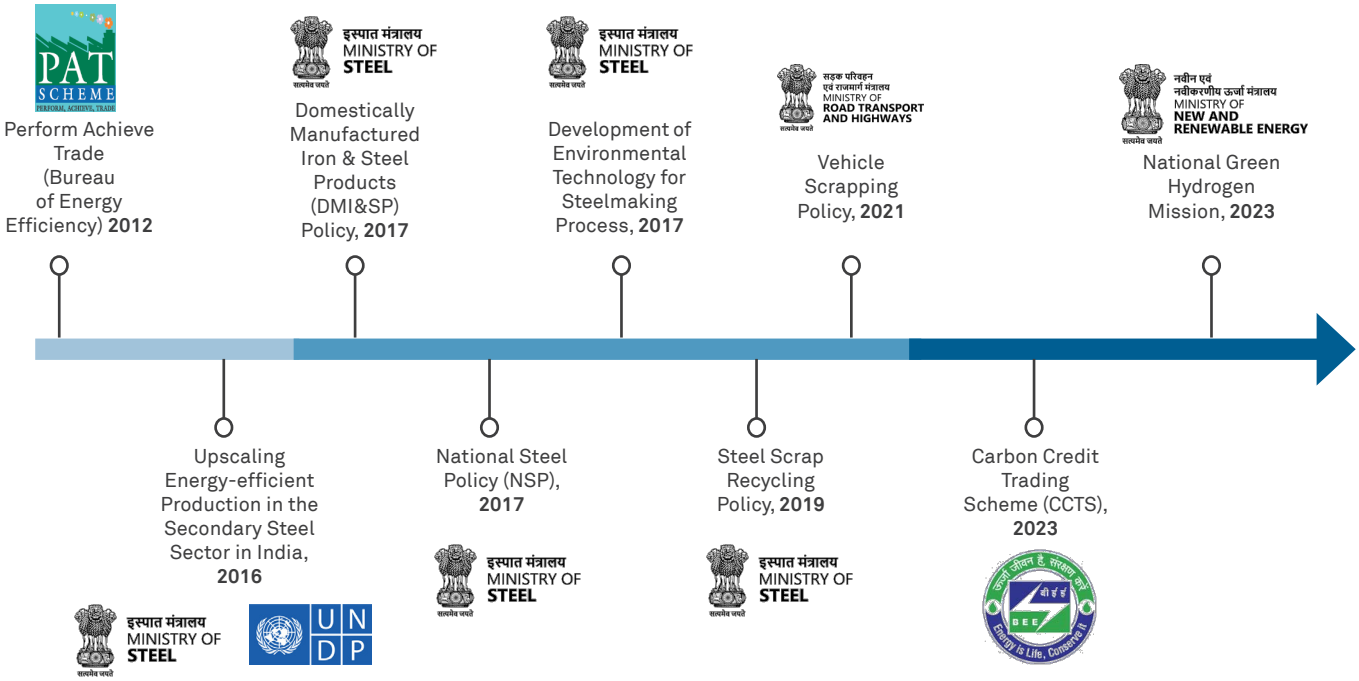
Indian steel demand is more construction-oriented. This is unlike the global trend. Going forward, the domestic steel demand is also expected to see a gradual shift towards value-added products such as automobiles and engineering goods, in line with the global trend.

Steel end-use sectors



Sources: WSA, CRISIL MI&A Research

As the country strives for a sustainable future, the steel sector also needs to prioritise decarbonisation to meet national and global climate goals. The government is collaborating with companies to achieve its net-zero target set for 2070. As a significant contributor to greenhouse gas emissions (10-12% of India's total), the industry must adopt cleaner technologies and practices. These include transitioning to renewable energy, enhancing energy efficiency and investing in green hydrogen and carbon capture solutions. Mounting regulatory pressure and the climate-oriented shift in global consumption are nudging the Indian steel sector to innovate and adopt low-carbon production methods to remain competitive.

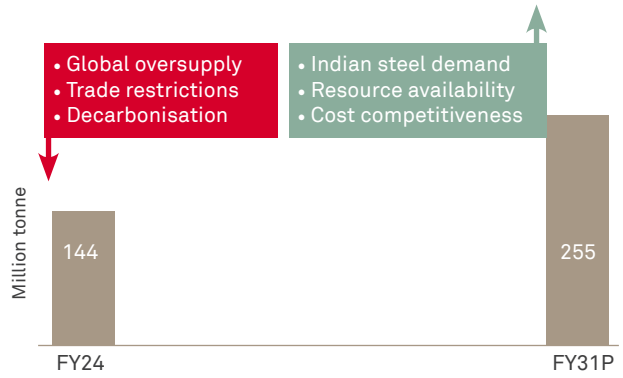


Source: Ministry of steel

Prospects and challenges

- India has huge potential to boost steel consumption. For one, it is one of the world's fastest growing economies in the world. It is also home to 17% of the global population. Keeping these factors in mind, the National Steel Policy, 2017, has set a target to increase per capita steel consumption to 160 kg by 2030 from the current 93.4 kg. Given this, the country's steel sector is expected to grow rapidly.

Steel production by fiscal 2031



Source: CRISIL MI&A Research

- However, the journey ahead is not without challenges. The sector faces the pressing issues of decarbonisation, global overcapacity that is impacting profitability and lower investment in raw material production. Furthermore, innovation is necessary to keep pace with demand for new-age materials and alloys.
- Reaching 300 MT of capacity and 255 MT of production by fiscal 2031 is a tall target which will require around Rs 4.5 lakh crore of investment. The decarbonisation targets will further increase the capex requirement. Although the cyclical nature is a challenge for the players, the commodity super cycle of 2022 has helped them deleverage their balance sheets. Corporate balance sheets in India are currently robust and well-positioned for a new round of significant capital expansion. Over the past few years, strategic deleveraging and enhanced profitability have led to healthier balance sheets, with many companies reducing their debt-to-equity ratios to historically low levels. The financial stability thus achieved and consistent revenue growth are expected to provide a foundation for future investments. In conclusion a combination of policy push, strong domestic demand, structural enhancement, funding availability and strong investment intent are well placed to achieve the targeted growth in steel manufacturing.

Textile: A blend of tradition and innovation

The textile industry plays an important role in India's economic growth, with significant contribution to employment, value addition and export earnings.

The industry is one of India's largest employers in the unorganised and non-agrarian segment and contributes 2% to overall gross value added. According to the Ministry of Textiles, the textile industry workforce stood at 45 million in fiscal 2022. Traditional sectors in the textile industry, such as handloom, handicrafts and power looms, are the largest employers in rural and semi-urban areas.

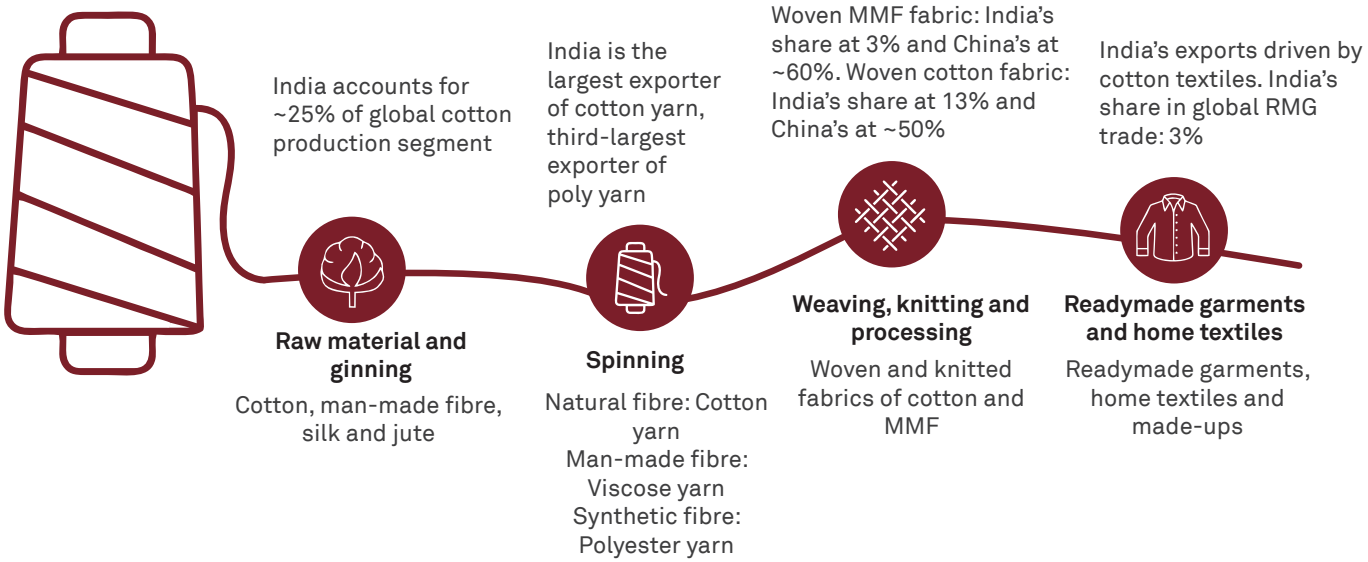
Small and medium-sized enterprises (SMEs) account for about three-fourth of the textile industry, which is a major source of livelihood for many women as well.

The industry includes segments such as cotton and synthetic yarn, cloth, readymade garments (RMG) and home textiles. The value chain in India encompasses the entire life cycle of textiles, starting from the cotton crop to end-use segments such as RMG and home furnishings.

The market size of the cotton yarn and ready-made garment industry estimated to have crossed Rs 6,000 billion in fiscal 2024.

The industry has reeled through a tough time in the past two years because of weakened discretionary demand in the West and volatility in cotton prices, as evidenced by successive years of contraction in RMG exports and moderation in domestic demand. However, abundant availability of cotton, self-sufficiency in polyester and viscose yarn production and its vast and stable value chain in India offer support and stability.

Textile value chain in India



Source: CRISIL MI&A Research, Industry

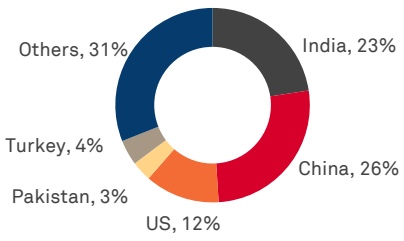
Roadmap to $100 billion textile exports

The government has envisaged a target of $100 billion in textile exports by 2030, marking a steep jump from $44 billion in fiscal 2022.

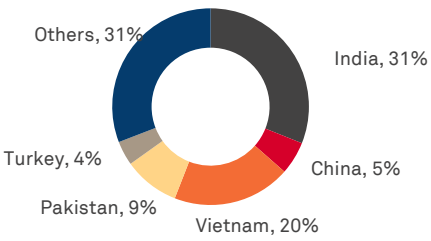
To achieve that milestone, India must take on dominant textile exporters such as China and Bangladesh and improve its global market share, which will depend on its ability to overcome challenges such as fluctuating global demand, absence of trade pacts with major markets, cotton price volatility and labour cost increases. Further, it needs to be competitive in quality, pricing and innovation on the global stage.

India's divergent export share along value chain

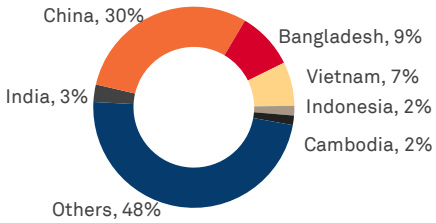
Share of cotton producers (%)



Share of cotton yarn exporters (%)



Share of RMG exporters (%)



Note: Data for cotton production is for cotton season 2023, and for cotton yarn and RMG exports is for calendar year 2023
Source: ITC Trade Map, USDA, CRISIL MI&A Research

Export trends over the past two decades underscore India's pole position in cotton production and cotton yarn exports. India is globally competitive in raw material production, accounting for 23% of global cotton output, and in spinning, it is the largest exporter of cotton yarn and the third-largest in polyester yarn exports.

India faces stiff competition in weaving, knitting and processing and holds a minor share in the global trade compared with China. In the RMG segment, India's share in the global trade is a mere 3%, far behind competitors such as China, which reflects its limited ability towards value addition. Moreover, India has been unable to capitalise on the shift away from China. While India's share in the global trade continues to hover at 3% over the past two decades, erstwhile smaller peers, such as Vietnam and Bangladesh, who lack domestic availability of cotton and polyester yarn, have now surpassed India in RMG exports as these nations benefit from either lower costs, superior technology, or scale of operations.

Strategic focus areas to propel India's exports

Source: CRISIL MI&A Research

Therefore, achieving $100 billion in exports is a tall order due to absence of trade pacts, which render Indian garments less competitive in the price-sensitive apparel segment, marked by high-competitive intensity.

Countries such as Bangladesh, which enjoy duty-free access to the European Union, have surged ahead, while India faces tariffs as high as 9.6%. To compete on an even playing field, India needs more free trade agreements (FTAs). These agreements will not only help Indian exports reach major markets but also open doors to newer regions with significant potential.

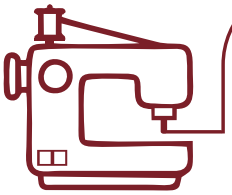
The FTA signed with Australia in December 2022 has proven beneficial — exports to Australia saw a 98% increase in fiscal 2024 compared with fiscal 2019, and Australia's share in India's RMG export basket nearly doubled to 2.2% over the same period. This momentum can be further accelerated by continuation of export-friendly schemes that remit duties and taxes, giving Indian exports a much-needed competitive edge.

However, India's reliance on cotton textiles poses a challenge in a global market that is increasingly leaning toward synthetic fibres such as polyester. Nearly 60% of the global textile consumption is driven by man-made fibres, yet India accounts for just 5% of this segment. This imbalance in production has slowed India's growth in international markets, where demand for synthetic textiles continues to rise.

One promising avenue for diversification is technical textiles, which are gaining traction across industries such as automotive, agriculture, healthcare, and protective wear. The demand for these high-performance fabrics, valued for their strength, durability and reliability, is increasing worldwide. With a growing focus on safety, sustainability and advanced materials, the global market for technical textiles is expanding rapidly, presenting India with a significant opportunity to tap into this high-growth sector.

There is also a growing global appreciation for Indian textiles, particularly in the luxury and slow fashion sectors, where traditional Indian weaves are being celebrated for their cultural heritage, unique designs, and sustainability. This renewed interest is not only driven by prominent designers but is also supported by government efforts to preserve traditional weaving skills. In the medium term, the increasing demand for sustainable and artisanal products will likely bolster the export of traditional Indian weaves, helping India move closer to its $100 billion export target.

Major policy interventions by the government



2016

Duty drawback scheme

Duty drawback rates for cotton yarn were increased from 1.2% to 1.7%, while those for made-ups were increased from 2% to 2.6%

2019

RoSCTL

The Rebate on State Levies (ROSL) was replaced with Rebate of State and Central Taxes Levies (RoSCTL) to provide rebate for state and central level taxes

Labour reforms

In 2019 and 2020, 29 central labour laws, rationalised and simplified under 4 labour codes

Corporate tax reform

The government lowered the corporate tax rate from 30% to 22% for existing companies and to 15% for companies established between October 1, 2019, and March 31, 2023

2020

Covid-19 relief

Credit support: Moratorium of 6 months for repayment of loans with a provision of `no change' in credit rating. Norms of declaring NPAs by banks extended to 180 days

Interest rate subvention on loans to healthy SMEs

2021

RoDTEP

Remission of Duties and Taxes on Export Products (RoDTEP) applicable from January 1, 2021, to compensate exporters for input taxes not refunded under existing schemes

PLI 1.0

Incentives tied to investments and revenue generation of companies with an aim to reduce reliance on imports

Applications of 64 textile entities approved under two investment categories. Incentives to be claimed during FY26-30 based on performance during FY25-29

2022

PM Mitra Park

Conceptualised with an aim to achieve self-sufficiency in textiles and helping India compete effectively in global markets

Will create integrated value chain thereby reducing logistics costs and providing infrastructure to SMEs

FTAs

FTA inked with Australia, an emerging market for RMG exports, improved competitiveness of exporters by 5%

Comprehensive scheme guidelines for development of knitting and knitwear sector

Creation of new service centres on PPP model by industry or association in knitting and knitwear clusters

Modernisation and upgradation of existing institutions in knitting and knitwear clusters

Government initiatives, such as the PM MITRA Parks scheme, which offers plug-and-play infrastructure, will play a crucial role in ensuring the development of small enterprises that face challenges due to absence of efficient transport networks, infrastructure for e-commerce, lack of certification centres and interruptions in power supply. Such initiatives will help narrow the gap between small manufacturers and their global peers.

In addition, efforts to address the lack of information flow to smaller firms will go a long way. SMEs grapple with technological limitations, outdated processes and lack of innovation, which result in low productivity. The absence of adequate knowledge and expertise also restricts their ability to adapt to new trends, restricting their competitiveness.

Prospects and challenges

India is likely to retain its pole position as the leading supplier of cotton yarn, backed by abundant domestic availability, which, in turn, will benefit from geographical advantage, large area under cultivation and support from the government in terms of the minimum support price for the crop.

Overall yarn exports are poised to gain from steady growth in the underlying RMG demand, which will result in higher offtake of Indian yarn by other RMG producers

The global shift in sourcing away from China and Bangladesh is likely to continue, offering support over the medium to long term. In addition, trade pacts with key markets will offer scope for improvement in the market share.

Despite the prospects, India faces several challenges. For one, trade agreements give a competitive edge to other countries in the low-cost apparel segment, especially because they cater to demand for synthetic textiles of export markets.

Further, the Indian textile industry, which is predominantly MSME-driven, struggles with limited funding and technical expertise, hindering modernisation and improvement in efficiency.

In addition, the fragmented nature of the industry limits the ability of MSMEs to explore new product categories or growth avenues, which impacts their competitiveness.

There are labour issues, too. The high level of industry fragmentation reduces awareness of labour rights and benefits, leading to challenging working conditions. Women working in the RMG sector face difficulties due to inadequate accommodation facilities and restrictive work shifts. Addressing these issues is essential to ensure a safer, more supportive work environment and promote inclusive growth in the sector.

Demand for Indian textiles is expected to log significant growth over the next decade, driven by sustained improvement in domestic demand and increased competitiveness of India's textile industry in the global market.

Rising discretionary spending, expanding middle class, brand awareness among consumers and demand for workwear and athleisure are likely to contribute to domestic demand.

Demand will also be supported by steady improvement in export markets, with regulatory initiatives further strengthening domestic capabilities.

Food processing: Adding value to agriculture

The food processing industry contributes significantly to economic growth and development in India, which has a vast agricultural base and is one of the largest producers of food grains, fruits, vegetables and milk.

Food processors add value to these raw materials, transforming these into consumable goods with enhanced flavour, texture, appearance, quality and shelf life, thereby increasing their marketability. This is important as food is often transported over long distances and stored for extended periods. Processing also enables manufacturers to remove contaminants, reduce spoilage and prevent foodborne illnesses, thereby aiding public health.

The industry employs over 75 lakh people directly, and over a crore indirectly, particularly in rural areas, according to data from the Ministry of Food Processing.

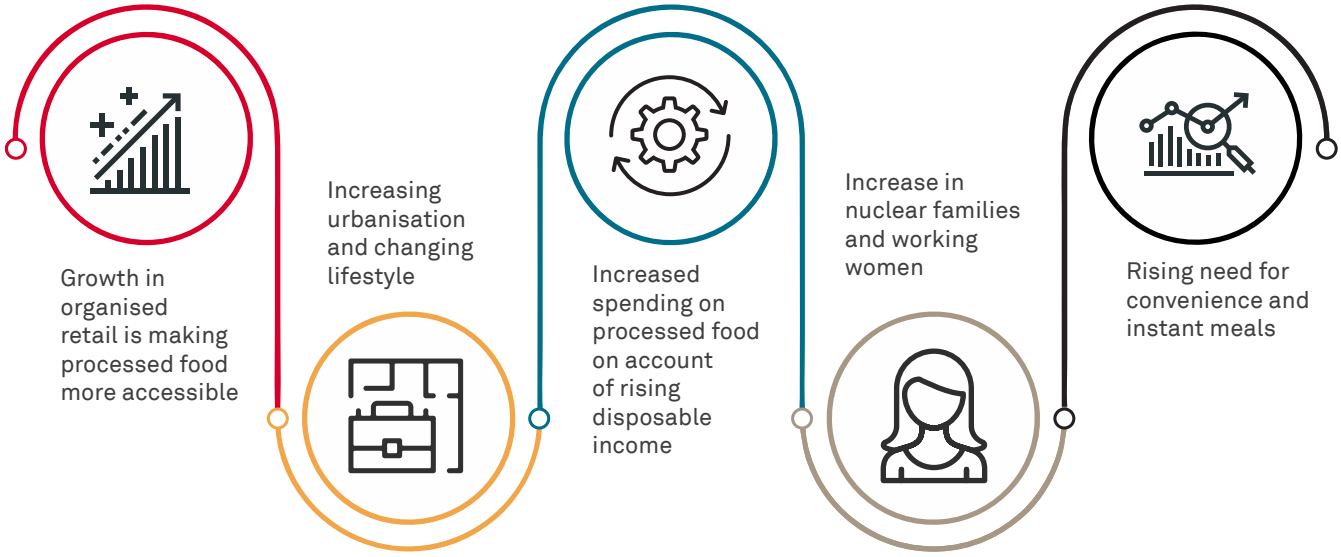
The sector recorded a compound annual growth rate (CAGR) of 9% between fiscal 2019 and fiscal 2024. The ready-to-cook and ready-to-eat sub-segment posted a CAGR of 13-14%. This sub-segment includes biscuits, cakes, breakfast mixes, and instant foods.

Sector snapshot

9%	**Share of food products** in total manufacturing GVA as of fiscal 2023
11%	**Share of people employed in** the food processing sector, against all employed in organised manufacturing. 21 lakh people in organised food processing vs over 60 lakh in the unorganised food processing sector
20-25%	**Share of women** among those employed across the food processing industry (organised + unorganised)
Rs 7,194 crore	**Foreign direct investment** in the sector as of fiscal 2023. The investments increased by a sharp 36% on-year to Rs 7,194 crore

Source: MoSPI, Annual Survey of industries 2023, DPIIT, CRISIL MI&A Research

Key factors driving growth of food processing industry



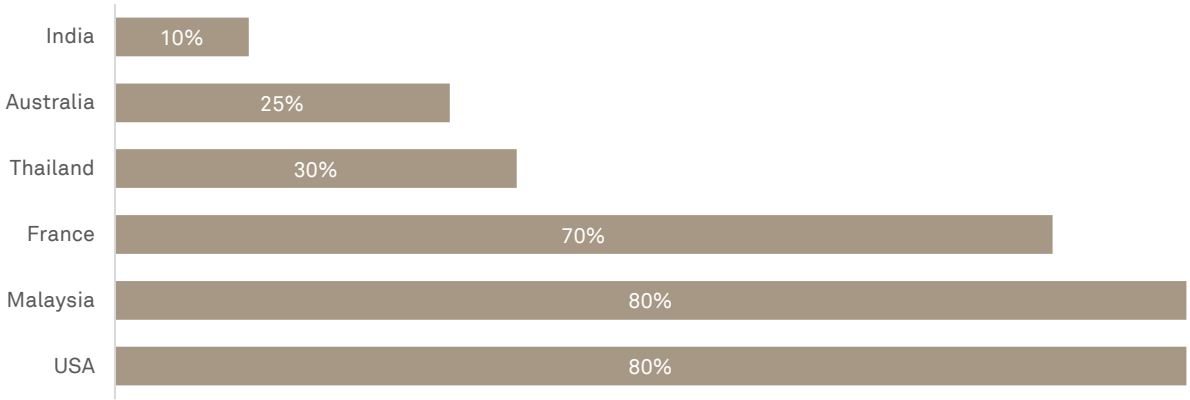
Source: MoSPI, Annual Survey of Industries 2023, DPIIT, CRISIL MI&A Research

Processing level low despite India being one of the largest food producers

India lags in food processing despite abundant availability of agricultural commodities. The key reasons are:

- Limited farm-gate infrastructure for sorting, grading and packing
- Supply chain gap between farmers and food processors
- Consumer preference for fresh produce over processed foods
- Limited ability of most consumers to pay a premium for processed food products

Level of food processing in India versus other key producers of agricultural commodities

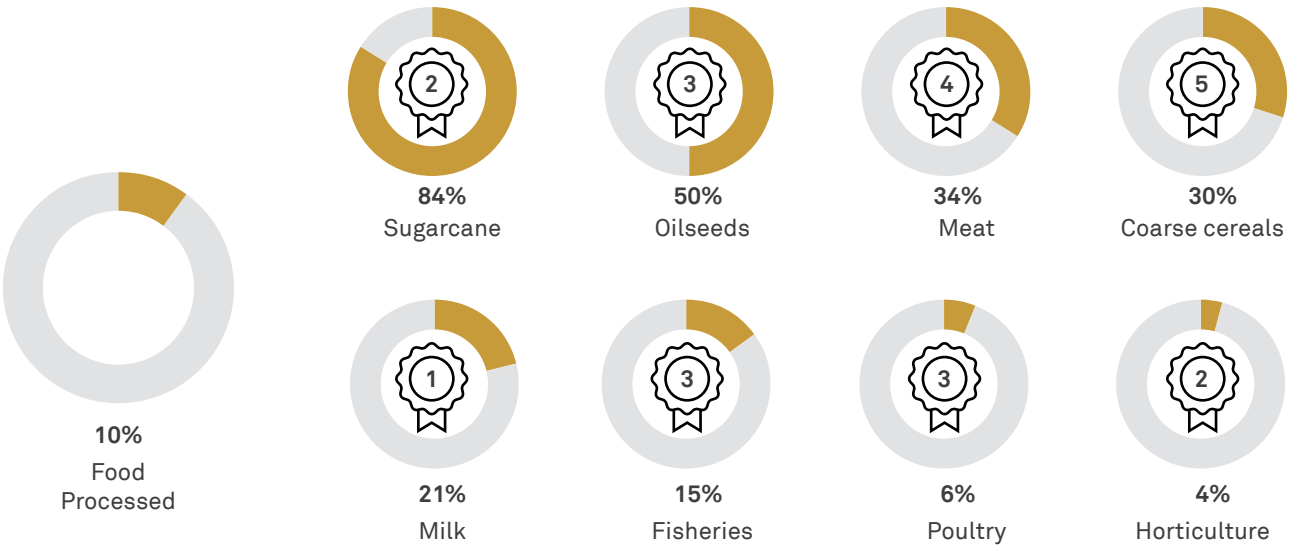


Source: MoFPI Annual Report 2022

Sugarcane processing is highly organised and regulated in India. Hence, its processing is extensive. As of fiscal 2024, 84% of the sugarcane produced is diverted to processing given the demand for its byproducts such as molasses and bagasse, according to industry experts.

Processing of coarse cereals is limited on account of the highly fragmented nature of the segment and the dominance of unorganised units. Preference for freshness and lower demand for processed poultry, seafood and horticulture products have kept the share of processing in these segments low as well.

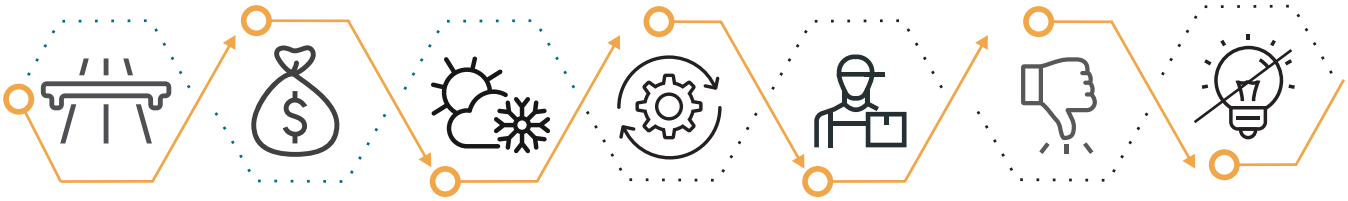
Extent of processing across food categories



Source: CRISIL MI&A Research

represents India's rank in world production

Key challenges facing the food processing industry in India



Lack of infrastructure

Inadequate primary processing, including sorting and grading, leads to ~40% wastage of food across sectors

Limited credit flow

The highly unorganised nature of the industry and seasonality of the operations lead to lower returns. Hence, credit facilities from formal channels remain limited

Seasonality of operations

Seasonal availability of raw materials leads to lower capacity utilisation of processing units

Inefficiencies in supply chain

Absence of cold chain logistics, smart logistics and a digitalised supply chain has led to wastage and inefficiency

Lack of skilled labour

Just about 10% of the demand for skilled labour in the food processing industry is being met

Poor quality enforcement

Since ~98% of the processing centres fall in the unorganised segment, enforcement of quality and safety standards is poor

Lack of innovation

Limited innovation in food technology that can increase the shelf life of products and improve processing is leading to high wastage

Source:FICCI, MoFPI Annual Report 2022, FICCI study - Rising Skill Demand: A Major Challenge for Indian Food Industry

The road ahead

Formalisation of the unorganised sector

To bring unregistered processing units under the formal sector and ensure they adhere to food safety regulations. This will help subsidise their capital and operational costs

Increase capital affordability

Introduction of measures to lower the cost of capital for the projects and reduce the cost of formal credit to make it affordable to both organised and unorganised sectors

Increase skilled labour

Promoting institutes of national importance to offer formal courses on food processing and create a pool of technical manpower and skilled workforce to meet the growing needs of the sector

Investment in research and development

Provide government grants for in-depth research to devise plans to improve the quality of food products and operational processes to minimise wastage

Establish robust linkages between farmers and processors

To promote processing clusters in production areas and create strong backward and forward linkages between farm gates and retail outlets, with logistics support and timely sale of agriculture commodities

Incorporate sustainability

Using environmentally friendly ways of production and packaging as food processing falls under the ‘orange’ category in the pollution index

Source: MoFPI Annual Report 2022

Automobiles: OEMs to put sector in fast lane

The automobile industry, an early success story of manufacturing in India, is gearing up for a transition to EVs.

The industry has gone from strength to strength over the decades. As of fiscal 2023, it accounted for 10.6% of India's manufacturing gross value added and ~6.5% of overall employment.

Automobiles can be broadly classified as commercial vehicles (CVs), passenger vehicles (PVs), tractors, two-wheelers, three-wheelers and automotive components.

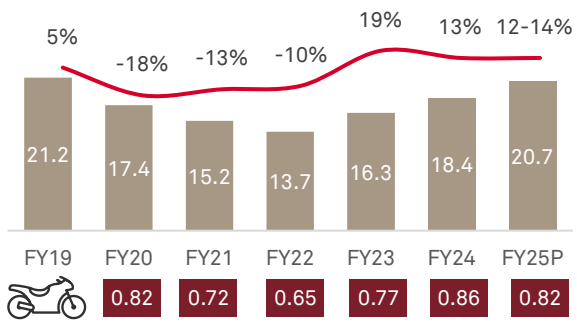
In fiscal 2024, the industry witnessed mixed growth across segments. PV sales volume grew 8% to 4.2 million units on the back of launches in the growing utility vehicles category.

Two-wheelers recorded a 13% on-year growth as pent-up demand drove up motorcycle sales in rural and semi-urban markets. CVs, too, sold 1.02 million units as pent-up demand drove up bus deliveries; sales of light commercial vehicles (LCVs) and medium and heavy commercial vehicles (MHCVs) were at similar levels. Tractor sales, however, declined 7% due to weak demand as below normal monsoon, low reservoir levels and depressed farmer sentiments.

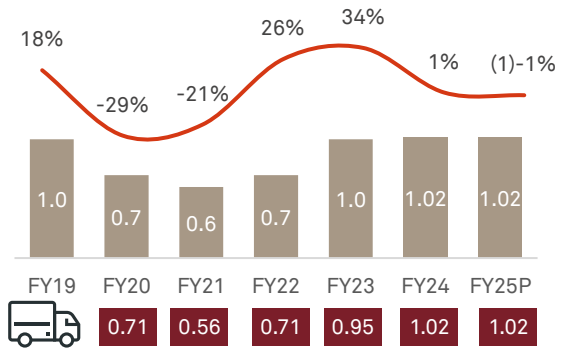
The auto components industry has been chugging along, aided by healthy OEM sales, realisation of deferred replacement demand and exports.

All segments except two-wheelers to cross pre-Covid sales in fiscal 2025

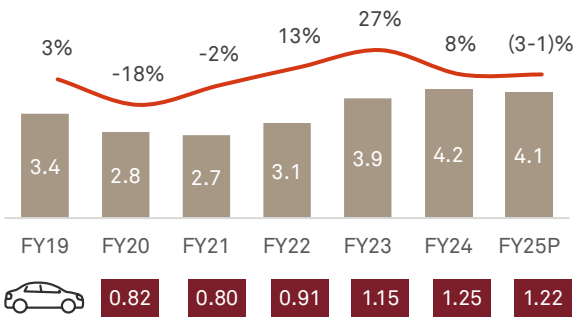
Two-wheeler sales



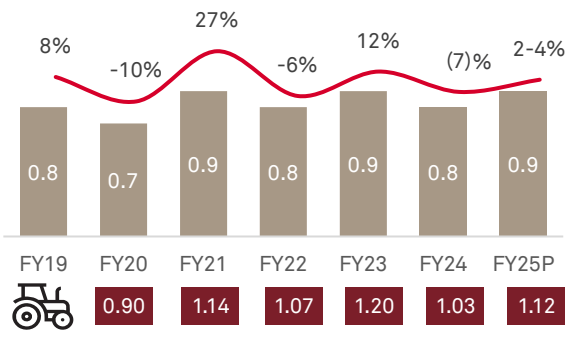
CV sales



PV sales



Tractor sales



Source: SIAM, TMA, CRISIL MI&A Research

In the past six years (fiscals 2019-2024), the auto industry faced numerous challenges owing to the pandemic, emission norms, the commodity super cycle and geopolitical crises. The two-wheeler segment was the worst hit, with sales declining at 3% CAGR as Covid-19 affected the incomes of first-time buyers and vehicle prices shot up 35-40%. CV sales, too, logged 1% negative CAGR, affected by the triple whammy of the pandemic, regulations such as axle loading and emission norms and the commodity super cycle.

On the other hand, tractor sales grew at a 2% CAGR in the past five years, aided by a shift towards mechanisation and labour migration during the pandemic. The PV segment expanded at a 5% CAGR owing to healthy demand for UVs, especially the premium category, and new model launches by OEMs. Sales of auto parts clocked a 7.5% CAGR, aided by strong automobile demand and preference for advanced in-vehicle features.

In fiscal 2024, India's automobile OEM exports faced headwinds owing to economic slowdown in many countries. The tightening of fiscal policies, geopolitical tensions and economic turmoil in neighbouring countries and African nations weighed down overseas despatches. Exports of two-wheelers, tractors and commercial vehicles declined 5%, 21% and 16%, respectively, while those of passenger vehicles edged up a mere 1%.

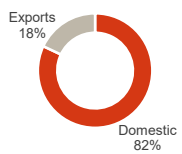
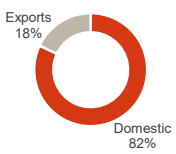
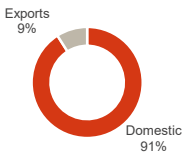
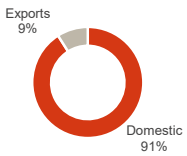
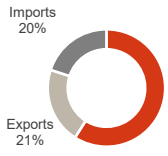
Auto part exports, meanwhile, grew 12% to a record Rs1,106 billion, aided by a shift to critical components being exported from India and auto OEMs diversifying their supplier base.

The automobile industry is now on the cusp of one of its largest ever disruptions given the impending transition to electric mobility. OEMs across automobile sub-segments as well as component manufacturers have launched EV models and components. The adoption of electric two-wheelers is growing owing to a more suitable cost benefit trade-off, with near parity between internal combustion engine (ICE) variants and the cost of ownership[14], followed by passenger vehicles.

In contrast, the transition to electric models in CVs and tractors has been limited on account of differing use cases. ICE vehicles are still preferred given the total cost of ownership compared with their EV counterparts.

Given this demand cycle, auto component players are at the forefront of the transition to EVs, supplying critical components such as motors and inverters not only to domestic players but also to developed nations.

Fiscal 2024 snapshot

Passenger vehicles	Two- wheelers	Commercial vehicles	Tractors	Auto components
13 OEMs 90+ models with 4.2 million domestic sales	Largest two-wheeler market with 14 OEMs, over 180 models and 18.4 million sales	12 OEMs with over 1 million in domestic sales	14 OEMs with over 0.8 million domestic sales	~Rs 5,324 billion Domestic production revenue for fiscal 2024
5% CAGR over fiscals 2019-2024	-3% production CAGR over fiscals 2019-2024	-1% CAGR over fiscals 2019-2024	2% CAGR over fiscals 2019-2024	12% production revenue CAGR over fiscals 2019-2024
0.67 million exports with ~1% growth in fiscal 2024; accounted for 15% of total production	3.4 million units in fiscal 2024; a decline of 5% in fiscal 2024	Exports of 0.09 million accounting for ~9% of production as of fiscal 2024	Exports of 0.09 million accounting for ~10% of production as of fiscal 2024	Rs 1,106 billion exports Rs 1,042 billion imports in fiscal 2024
				
EV sales at 90K units; ~2% penetration in fiscal 2024	Highest EV penetration of 5% in fiscal 2024 with annual sales of 940K units	~9K EVs sold in fiscal 2024; penetration of less than 1%	Annual EV penetration at less than 1% in fiscal 2024	4-6% EV parts market size in fiscal 2024

[14]Cost of ownership represents total amount spent over the holding period of a vehicle including acquisition and operational cost

Major policies and norms

2016

Automotive Mission Plan 2016-26

Envisions the Indian automotive industry will be among the top three of the world in engineering, manufacturing and export of vehicles and auto components

2017

Corporate Average Fuel Efficiency regulations

Aim to promote energy conservation, reduce greenhouse gas emissions and enhance fuel efficiency in the automotive sector with onus on OEMs to meet stricter emission norms

2018

Axle norms

Regulations and restrictions impos the maximum wei vehicle's axles car on road

2019

Faster Adoption and Manufacturing of EV (FAME-II)

Aimed to incentivise the production and purchase of electric vehicles, establish charging infrastructure and encourage the development of the EV market in India

2020

Bharat Stage-VI

These stricter standards have encouraged the adoption of advanced emission control technologies and the availability of cleaner and more fuel-efficient vehicles in the market

2021

Real Driving Emission norms

Regulations that govern the measurement and control of pollutant emissions from vehicles during real-world driving conditions, as opposed to laboratory testing

2022

PLI

Provides financial incentives to boost the domestic manufacturing of advanced automotive technology products in the automotive manufacturing value chain and of advanced chemistry cell batteries

2023

Voluntary Vehicle Fleet Modernisation Programme

Aimed at encouraging the voluntary scrapping of old vehicles by providing incentives and promoting the adoption of newer and more fuel-efficient vehicles

2024

Scheme to Promote Manufacturing of Electric Passenger Cars in India

The scheme allows for the import of EV passenger cars (e-4W) with a minimum CIF value of $35,000 at a reduced duty rate of 15% for a period of 5 years, with a cap of 8,000 units per year, and permits the carryover of unutilised annual import limits

PM e-Drive

The PM e-Drive scheme offers subsidies to encourage the adoption of EVs and charging infrastructure

Source: SIAM, DGFT, Vahan, CRISIL MI&A Research

Key growth drivers

Government initiatives and schemes

The government's 'Make in India' initiative, along with policies such as PLI, Phased Manufacturing Programme and National Automotive Testing and R&D Infrastructure Project aim to increase manufacturing's share in India's GDP from 17% to 20%. This, along with infrastructure schemes such as Bharatmala Pariyojana and Sagarmala, will drive demand—especially in the commercial segment

Demographic dividend

The 20-40 age group, that is the crucial demographic of first-time PV buyers, is projected to reach ~483 million by 2031, supporting the automobile market's growth. This age group's expansion will continue, leading to higher demand

Stable commodity prices and lower price hikes

TCA grew at a CAGR of 8% for small cars and at 5% for UVs over fiscals 2019-2024 due to commodity price surges. However, with commodity prices trending downward, TCA is expected to grow at a CAGR of 2% for both cars and UVs over fiscals 2024-2029, with TCO rising by 1% for small cars and by 2% for UVs

Rural demand and improving incomes

Deeper penetration due to wider distribution networks and improving incomes, supported by three consecutive normal monsoons, will drive two-wheeler demand in the long run. Road connectivity will also aid two-wheeler sales, increasing rural economic activity

Financing support

Captive NBFCs and new players will support two-wheeler sales, especially in rural markets, with attractive financing schemes and promotions. These financiers will offer low down payments, attractive EMI options, and no charges on processing fees to attract more customers

Note: TCA or Total Cost of Acquisition is the cost paid at the time of a vehicle's delivery, including down payment and insurance, and TCO or Total Cost of Operation is the yearly operational cost, including fuel and maintenance cost.

The automobile sector investments have been on an upswing on account of shortening product cycles, stricter regulatory and emission norms and the ongoing shift towards alternative fuels, led by electrification. Capex over fiscals 2020-2024 is estimated to be Rs 3.0-3.1 lakh crore, up a third from Rs 2.31 lakh crore during fiscals 2015-2019. EV-specific capex accounted for about 10% of the overall capex during fiscals 2020-2024. The EV capex is supported by government initiatives, such as Faster Adoption and Manufacturing of Hybrid and Electric Vehicle (FAME II) and low GST of 5% on EVs compared with a minimum of 28% on ICE vehicles. The government has also introduced a PLI scheme that has led to EV adoption by helping reduce the price difference between EVs and ICE variants. The ongoing transition to EVs is expected to boost EV-specific capex.

While overall automobile capex is projected to rise 40% over fiscals 2025-2029, ICE capex is expected to decline and EV-specific capex is expected to rise and account for about 45-50% of the overall capex compared with 10% in the last five fiscals.

Indian OEMs being cash-rich with strong balance sheets, investments in the past were mostly backed by internal accruals. With private equity and sovereign wealth funds evincing interest in the EV segment, many new OEMs have entered the electric two-wheeler and three-wheeler markets. These funds have also pumped captial into traditional OEMs for their EV businesses. This is well supported by growing demand for sustainable transportation solutions.

Key risks and challenges

Competition from alternative modes of transport

The rise of alternative modes of transport, such as ride-hailing services (e.g. Ola and Uber) vehicle subscription model and public transport, can reduce demand for personal vehicles—particularly younger generations may prefer shared transport over owning cars

Rural distress

Given rural areas account for 45-55% of two-wheeler demand, more than 40% of PV sales and over 90% of the tractor market, any distress caused by factors such as drought, crop failure and low agricultural prices can weigh down the industry

Limited localisation in EV market

With EVs and other advanced technology still in early stages of rollout, critical components required for manufacturing, such as lithium battery cells, PMS motors and semiconductors, are imported—they make up more than 50% of a vehicle's cost

Regulatory uncertainty

The adoption of stricter norms, similar to those in Europe, can impact demand as witnessed during the transition to BSVI and safety norms in 2020 transition where in 10-20% increase in cost of two-wheelers severely impacted consumer sentiment

Low alternative fuel stations

While there is a strong push for development and production of newer drivetrain, the limited availability of refuelling stations across India curbs its growth. Around 79% of CNG refuelling stations are in the top 10 states with wider adoption and diversification still underway

Electronics: Demand on the upswing

Electronics is one of the largest and fastest-growing sectors worldwide, permeating all areas of the economy. Valued at $4.3 trillion as of 2023, the global electronics market is dominated by China, which accounts for over 50% of global exports.

The key drivers of the export market are smartphones and electronic components, led by integrated circuits and micro-assemblies.

India's electronics market is relatively nascent, constituting only 4% of the global market. NITI Aayog projects the share to touch 6% by 2030.

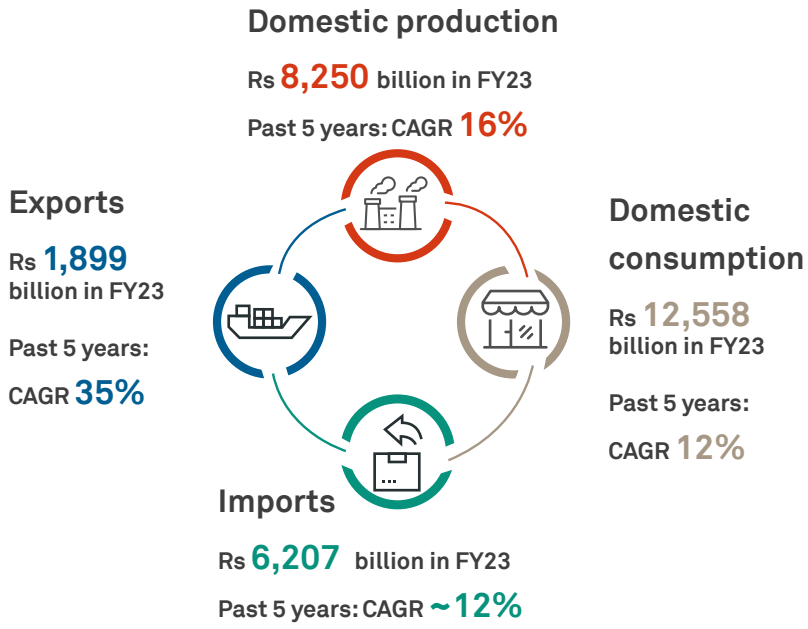
In the global electronics value chain, India's share is less than 1%.

Snapshot of the electronics sector

India's electronics industry was resilient in fiscal 2023, characterised by rising domestic production and exports, indicating lower dependence on imports.

The sector contributed ~3% to India's gross domestic product (GDP) in fiscal 2023. It has been instrumental in job creation, employing nearly 1 million people, i.e., 5-6% of the country's manufacturing workforce.

Notably, India's electronics production is largely centred on the final assembly of electronic goods.



Source: Ministry of Electronics and Information Technology, CRISIL MI&A Research

Electronic components: Import-dependent ecosystem

In India, electronic components constitute a significant share of major imports. Between fiscals 2018 and 2023, electronics imports clocked a compound annual growth rate (CAGR) of 12%. Electronic components, including integrated circuits and micro-assemblies, are crucial for manufacturing mobile phones, consumer durables, IT hardware and other electronic goods. Their share in electronics imports surged from 5-7% in fiscal 2018 to 20-23% in fiscal 2023. China, with a consistent share of 70-75%, remains a major exporter.

Shifting trends: Smartphones drive export surge

India's electronics export market is dominated by smartphones, which account for over 40% of total exports. Between fiscals 2019 and 2023, smartphone exports logged an impressive CAGR of 50%. India has now become the world's second-largest manufacturer of mobile handsets by volume. The number of units manufacturing mobile phones and their components has surged from two in 2014 to over 200 today.

In fiscal 2023, India's mobile phone production was valued at ~$44 billion, according to industry associations. **In fiscal 2024, mobile phone exports jumped ~40% on-year to ~$15 billion**, driven by low-end smartphones priced ~Rs 9,000.

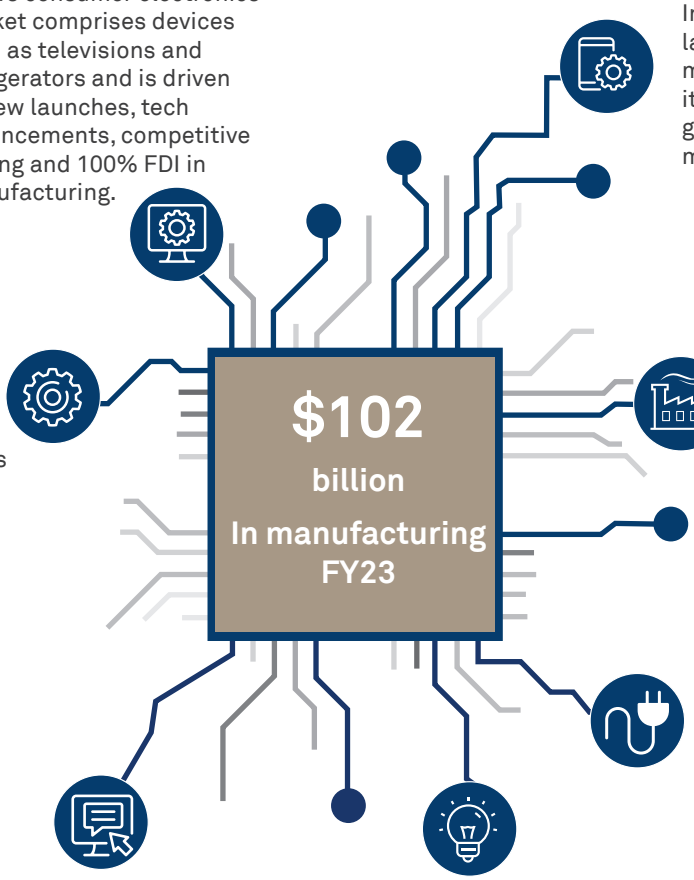
Mobile phones lead electronics manufacturing

Consumer electronics, 12%

India's consumer electronics market comprises devices such as televisions and refrigerators and is driven by new launches, tech advancements, competitive pricing and 100% FDI in manufacturing.

Mobile phones, 43%

India is the world's second-largest mobile handset manufacturer, driven by its position as the fastest-growing smartphone market.



Others, 16%

This segment includes strategic electronics, wearables and hearables and auto electronics.

Industrial electronics, 12%

This segment includes power electronics, automation and industrial robots, serving industries such as process control, testing and power equipment, fuelling growth in advanced industrial solutions.

Electronic components, 11%

Electronic components such as resistors and transistors are in high demand, driven by the mobile, consumer and industrial electronics sectors, making up 82% of the market.

IT hardware, 4%

India's IT hardware industry is expanding, driven by advancements in AI and IoT, coupled with government incentives such as the PLI scheme, positioning the country as a global leader in hardware manufacturing.

LED lighting, 3%

LED lighting is rapidly replacing conventional lighting due to energy efficiency, cost savings and longer lifespans, with applications ranging from homes to industrial products.

Source: Ministry of Electronics and Information Technology, CRISIL MI&A Research

Mapping India's position in the electronics value chain

	Design players/ ODM	Component makers	Assembler/ EMS	Brand owner/ OEM
Description	Strong design and prototype capabilities, often selling products to multiple clients for marketing under their brands	Two models: B2P (build components as per OEM specs) and B2S (co-design with OEMs)	Provides contract manufacturing services to OEMs/ ODMs, focusing on assembly, testing and packaging	Core capabilities in product innovation, marketing, and ownership of product IP, retaining control of finished products
India's current footprint	**No major** scaled players; opportunity to attract start-ups and scaled EMS	**Small presence** in low-complexity components; yet to take off	**Assembly ecosystem** is booming across segments	**Presence of major global** brands and home-grown OEMs

Value chain

Government's major policy interventions to steer the sector

2019 — National Policy on Electronics (NPE)

2020 — Modified Electronics Manufacturing Clusters (EMC 2.0) scheme

2020 — PLI scheme: Large-scale electronics manufacturing

2020 — Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS)

2023 — PLI scheme 2.0 for IT hardware

Source: Ministry of Electronics and Information Technology, CRISIL MI&A Research

PLI schemes propel India's electronics story

India's electronics industry is experiencing strong growth through PLI scheme introduced under the NPE 2019. The PLI scheme for large-scale electronics manufacturing, launched in 2020, has attracted 32 companies with a total investment commitment of Rs 11,324 crore. By June 2024, these companies had invested Rs 8,282 crore, with contributions from greenfield companies at Rs 3,136 crore and brownfield companies at Rs 5,146 crore.

The PLI scheme for IT hardware, launched in 2021 and expanded with a second phase in 2023, have also garnered considerable investments. A total of 27 companies committed Rs 2,955 crore toward IT hardware production. By June 2024, these companies had invested Rs 464.66 crore, with contributions from brownfield companies at Rs 386.09 crore and greenfield companies at Rs 78.57 crore. This investment reflects the growing confidence in India's electronics manufacturing capabilities.

Growth and sustainability in India's electronics sector

The rapid growth of electronics manufacturing and consumption in India has resulted in a significant increase in e-waste generation. India is now one of the largest producers of e-waste globally, ranking third after China and the US. In 2022, the country generated approximately 4,137 million kg of e-waste, but only about 59.6 million kg was collected and processed.

Recognising the seriousness of this issue, the Indian government announced the new E-Waste (Management) Rules, 2022, in November 2022. These new rules expand the scope of covered items to include over 100 types of electronic equipment across seven categories, addressing the evolving landscape of electronic consumption and aiming to improve e-waste management in the country.

Overcoming hiccups in the electronics industry

Subsidy challenges and complex tariff structure

Indian manufacturers rely on imported electronic components due to the absence of a local ecosystem. This raises costs as global suppliers in India price parts on par with imports, making Indian electronic products less competitive globally. The country has high average import tariff rate at 7.5%, compared with China's ~4% and Malaysia's ~3.5%.

Challenges in R&D and technology transfer

R&D and technology transfer are key challenges for India's electronics manufacturing sector. India's R&D subsidy at just 0.15% (Vietnam has it at 0.4-1% and China at 2%) reduces the sector's competitiveness in this industry.

High financing costs

Electronics manufacturing requires large upfront investments and significant working capital. As per the NITI Aayog report, India's high financing costs, ranging from 9% to 13%, are a big challenge for the players. In comparison, countries such as China, Vietnam and Taiwan benefit from lower interest rates of 2% to 7%, aided by targeted subsidies for the electronics sector.

Infrastructure barriers

The government launched the Electronics Manufacturing Clusters (EMC) scheme in 2012 and EMC 2.0 in 2020 to boost the domestic electronics sector. However, the infrastructure available in the country falls short compared with Asian peers. Existing EMCs are unattractive for both SMEs and larger companies as there are no essential shared facilities (tool rooms and warehouses), which are critical for reducing operational costs.

Way forward

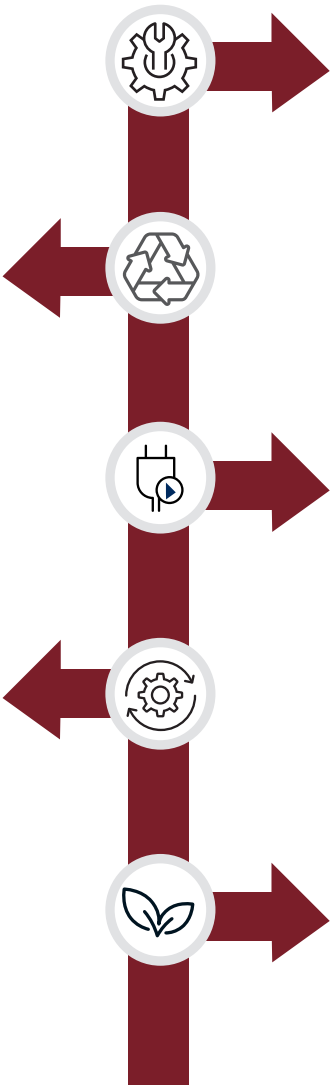
Enhancing e-waste management

Further strengthening e-waste management infrastructure to align with global standards will be another step in the right direction. Efficient recycling and disposal systems address environmental concerns, boost recovery of valuable materials and support sustainable growth. This can uplift India's position in global electronics manufacturing and make its products more acceptable.

Technology transfer initiatives

Facilitate technology transfer agreements with established global electronics manufacturers, enabling the acquisition of advanced manufacturing technologies and processes to enhance India's capabilities in the sector.

The collaboration with Japan that started in July 2023 for semiconductor development is such an initiative, which has effectively enhanced India's capabilities.



Creating a technology brand image for India

A collective branding approach will strengthen the sector's credibility and fuel its global growth.

Plug-and-play models

Implementing plug-and-play models like in China and Vietnam will streamline regulatory processes, offering readymade facilities to manufacturers. As per a report by the Indian Cellular & Electronics Association, the absence of such a plug-and-play model hampers the attractiveness of the Indian electronics sector and may discourage manufacturers from setting up units in the country.

Strengthen the component ecosystem

Building a strong electronics component manufacturing base in India will reduce reliance on imports and make the sector more competitive.

As per the trade data from Ministry of Commerce, around 49% of the total electronics component imports of the country are from China.

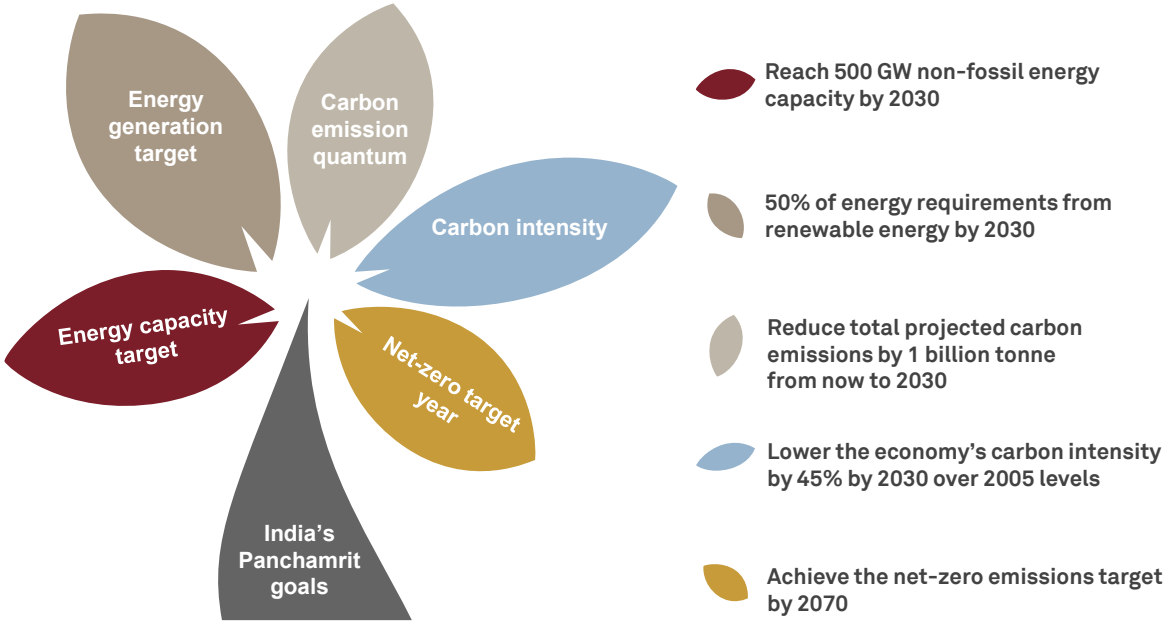
Focusing on local production and securing essential raw materials can attract significant investments, giving India an edge globally.

Renewable energy: Powering the future

India, the world's third-largest electricity consumer, has historically relied on coal to meet its power demands, akin to its Asian counterparts. Coal has accounted for an average 54% of installed capacity and 73% of generation over the past decade, with its share in the latter increasing in recent years due to the surge in power requirements following the pandemic.

The shift to clean energy capacity will take place when India's power demand likely grows at 5-7% CAGR till fiscal 2030 because of the push towards manufacturing, increase in per capita power consumption and vagaries of the weather. The government targets to gradually offset fossil fuel usage by rapidly scaling up clean energy capacity, which has grown at 10% CAGR between fiscals 2014 and 2024, demonstrating the potential for a greener power grid. As India moves forward, it is poised to significantly boost its clean energy capacity, augmented by a mix of balancing elements such as energy storage, fulfilling its global commitments and achieving substantial reduction in power sector emissions.

Panchamrit goals



Source: Ministry of Environment, Forest and Climate Change

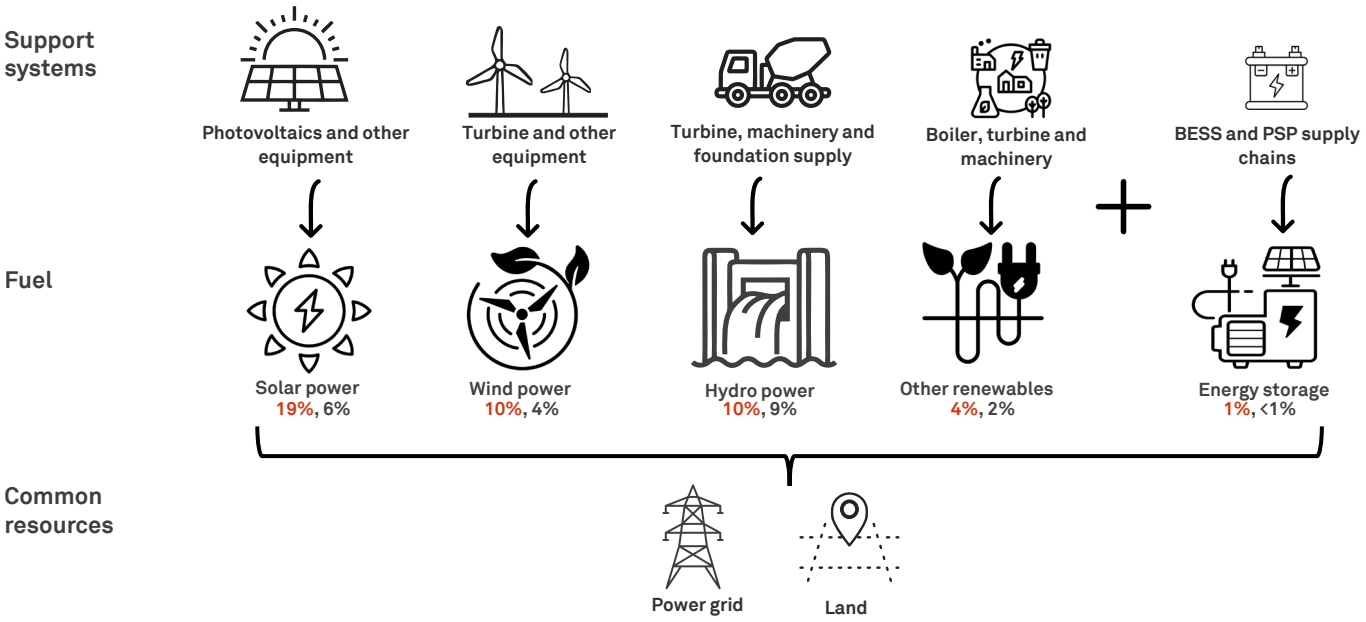
With the Indian government pursuing decarbonisation and clean energy, as pledged at the COP 26 conference, it has identified the power sector as a key focus area. The ambitious targets entail reducing India's carbon emission intensity, achieving net-zero emissions by a specified year, and charting a trajectory for the power sector's transition to clean energy, thereby outlining a roadmap for a sustainable future.

The Indian power sector is expected to grow significantly, with demand projected to increase at 5-7% CAGR until fiscal 2030. The government's initiatives to promote the manufacturing sector through the Make in India and PLI initiatives are expected to power demand from the industrial segment. Furthermore, the ongoing urbanisation, coupled with rising per capita gross capital product, is likely to boost per capita power consumption, driven by the growing use of consumer goods. Additionally, unpredictable weather patterns, including rising temperatures and uneven rainfall, are expected to further spur demand as consumers rely more heavily on electric appliances to cope with these conditions.

Hence, a rapid increase in scale in greening the power grid will be critical, for which the focus is on specific technologies. India has primarily relied on wind and solar power in its clean energy endeavours, with solar power being more prominent due to the country's proximity to the Equator, which provides an average 300 sunny days per year. While wind power has also gained significant traction, its deployment is more concentrated in regions with highly favourable wind speeds. As a result, the renewable energy ecosystem has largely focused on solar and wind technologies, supply chains, and associated policy frameworks over the past 15 years. However, with the increasing penetration of these intermittent

energy sources, which are weather-dependent and have uncontrollable generation output, sector stakeholders have begun to prioritise the integration of storage elements into the grid. This will enable better management of supply volatility from renewables in the future, ensuring a more stable and reliable energy supply.

Indian renewable energy ecosystem



Note: X% = Share in capacity; X% = Share in generation. Data as of fiscal 2024
BESS – Battery energy storage solutions, PSP – Pumped storage plants
Other renewables include technologies such as biomass, bagasse, small hydro power (<25 MW) and waste to energy
Source: CRISIL MI&A Research

Since the turn of the decade, the government has demonstrated a keen focus on the renewable energy sector, regularly refining policy frameworks to provide stimulus and address the sector's requisite challenges. Key initiatives have included the provision of targeted capital subsidies, tax benefit measures and infrastructure facilitation through direct schemes. Additionally, the government has consistently revised sectoral regulations to ensure their relevance to market challenges as well as supported the scaling of domestic supply chains.

Key policy initiatives for renewables

Tax measures

- Accelerated depreciation allowed
- Beneficial CIT rate for electricity generation companies since fiscal 2021

Infrastructure support

- Solar park infrastructure with a target capacity of 40 GW planned under plug-and-play model
- Green energy corridor at identified renewable energy-dense regions to facilitate grid infrastructure. Scheme planned in two phases at both inter-state and intra-state levels
- Total outlay of ~Rs 125 billion set aside for supporting ancillary infrastructure of hydro projects

Domestic supply chains

- PLI scheme introduced for high-efficiency modules and associated value chain as well as advanced chemistry cells
- Approved List of Module Makers (ALMM) and Revised List of Models and Manufacturers (RLMM) introduced to maintain equipment quality
- Tariff protection from dumping in key equipment categories and from key regions
- Reduction in customs duty on key minerals for battery technology companies

Direct monetary support

- Viability gap funding introduced to lower tariff rates, removed once technology turns viable
- Generation-based incentive given to wind farms till March 2017
- Subsidy support from the Centre and states to under-penetrated segments such as rooftop and agriculture continues

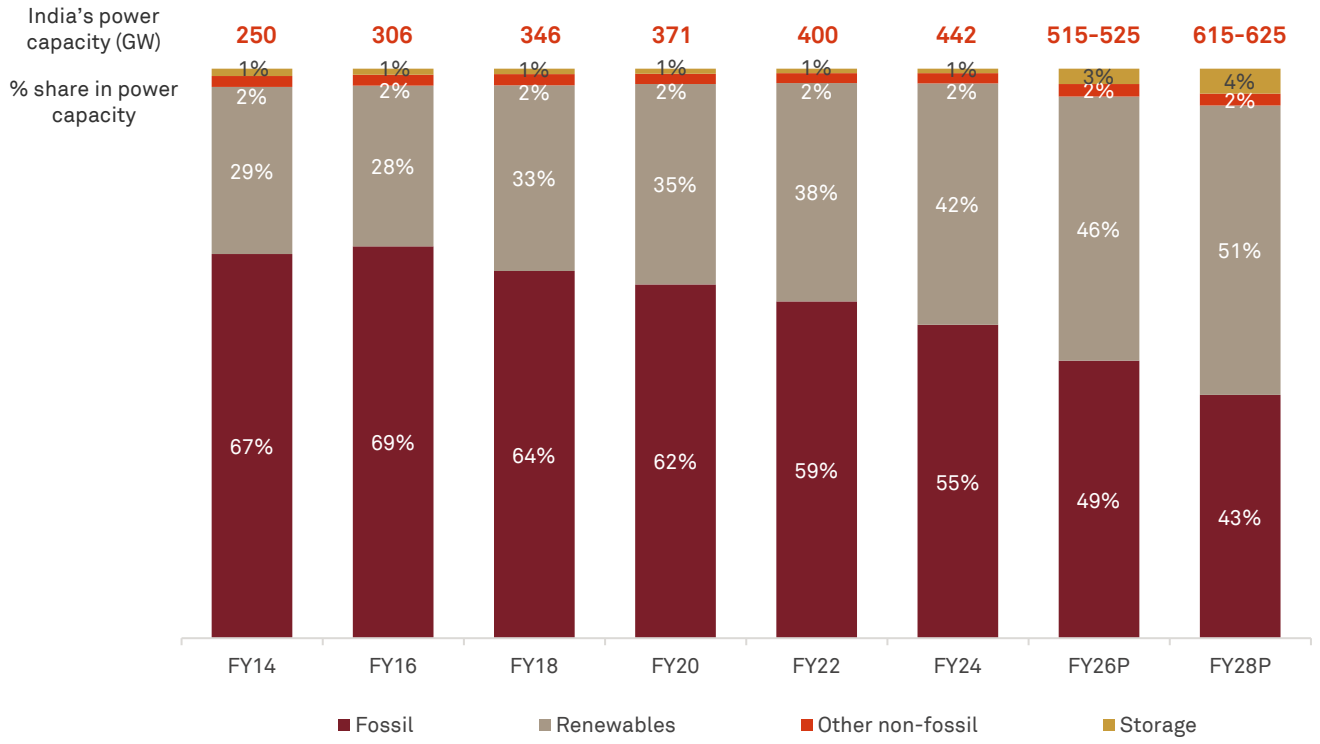
Policy agility

- Creation of nodal agencies to ensure high focus to sector growth and facilitate quick resolution of issues
- Multi-tier payment security mechanisms for the utility scale segment to spur attractiveness and mitigate discom risk to developers
- Continuous revision in bidding guidelines to tackle key issues, improve relevance and cover new technologies
- Time extensions where needed for commissioning, such as during Covid
- ISTS charges waiver and concessions in the open access market to help private trade of green power

Note: CIT – Corporate income tax; ISTS – Inter-state transmission system
Source: MoP, MNRE, GoI, CRISIL MI&A Research

As a result, the share of renewable energy in the total energy mix has consistently improved over the past decade. The installed base of renewable energy has grown at 10% CAGR between fiscals 2014 and 2024. The establishment of key nodal agencies has also provided targeted policy support, facilitating the sector's growth. Furthermore, the government's emphasis on maximising private sector participation from the outset, particularly through competitive bidding mechanisms, has enabled the emergence of a thriving private sector, accounting for most capacity additions in solar and wind energy. Non-fossil fuel generation primarily includes renewable generation, in which investments are set to nearly triple to Rs 18-19 lakh crore over fiscals 2025-2030, compared with Rs 5.4 lakh crore over fiscals 2019-2024. Consequently, the industry has now achieved sufficient scale to make a significant impact on electricity generation and is expected to grow exponentially until decade-end and beyond.

Segment grew at rapid scale over the past decade



Source: MoP, MNRE, CRISIL MI&A Research

The rapid expansion of renewable energy capacity presents opportunities for growth in the transmission segment since the integration of new renewable energy sources into the grid becomes a critical requirement. To facilitate the transmission of renewable energy to consumption centres, the central government has announced two phases of the Green Energy Corridor (GEC) initiative. This ambitious programme aims to create dedicated transmission infrastructure for renewable energy, enabling the efficient evacuation of power from remote renewable energy generation sites to load centres, ensuring a reliable and sustainable supply of green energy to meet growing demand. Several other transmission schemes are also underway to connect renewable energy generating stations to the grid.

With increased adoption of solar rooftop in the domestic segment, the grid will become more decentralised. The flow of power will no longer be unidirectional, i.e. from the grid to the consumer. More investment will be needed in the distribution segment to fund smart grid technologies such as smart inverters and grid management systems to manage the variable output of renewable energy sources and ensure a reliable power supply. In response to the growing demand for environment-friendly energy sources, distribution companies have also begun to offer green energy options to consumers at a premium rate.

To support the development of infrastructure projects, NITI Aayog has set an ambitious target of Rs 6 lakh crore for asset monetisation over a four-year period, spanning fiscals 2022 to 2025. As part of this initiative, NITI Aayog aims to achieve asset monetisation of Rs 1.9 lakh crore across various infrastructure sectors, including power, by this fiscal. Furthermore, leading renewable energy project developers, manufacturing companies, banks and financial institutions have made significant commitments to the development of renewable energy projects, and there is a keen interest in the sector from the global community at large as well. This substantial investment is expected to play a crucial role in driving India's transition towards a low-carbon economy. In addition, the government is exploring opportunities to promote transition finance, which aims to facilitate the shift towards decarbonisation at lower interest rates. This initiative is expected to provide a significant boost to the development of renewable energy projects, enabling India to achieve its ambitious climate change mitigation goals.

Despite the sector's positive momentum, the scale of additions must rapidly accelerate to achieve the ambitious Panchamrit goals set by the country. Several key challenges facing the sector will need to be addressed to ensure unimpeded growth. Some of the critical hurdles to be overcome include ensuring timely commissioning of requisite grid infrastructure, providing policy support for the identification and easy acquisition of land resources with clear titles, promoting technological advancements in associated manufacturing, and facilitating concessional and easy access to financing.

Key challenges faced by the Indian renewable energy segment

Easy and affordable access to land resources

- Private developers are often tasked with securing land for projects. This means negotiating with a large number of smaller landowners, sometimes leading to social issues. Land titles may not be clear and there may be other economic challenges
- The solar park scheme has also not progressed as rapidly as envisaged

Timely implementation of associated grid networks

- With rapid addition of renewable energy fuels, the government has planned Rs 300-350 billion investment under the GEC initiative
- While the capacity planned and the regions identified indicate sufficient planning, timely implementation, especially with the long gestation of transmission projects, is critical

Funding availability

- The financial community is veered towards this sector, with the Indian market attracting interest from global investors and issuing overseas bonds
- However, with capacity and, hence, investments expected to grow multi-fold, more avenues of concessional financing are needed to support the sector

Technological advancement

- Ensuring new technologies are adopted and the requisite technical know how is acquired in the Indian project development as well as manufacturing segments is important for ensuring quality of power as well as equipment

Source: CRISIL MI&A Research

With India's steadfast focus on greenification of the power grid, CRISIL MI&A Research expects renewable energy capacity addition to grow almost 3.5 times over the next five fiscals compared with the previous five. This is expected to take its share in capacity to 60-65% and serve almost half of India's power demand needs.

This multifold increase in generation capacity would also mean concomitant investments flowing into the segment. Adequate policy focus, a vibrant private renewable energy sector and sustainability agenda are all expected to be major drivers going ahead as well.

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