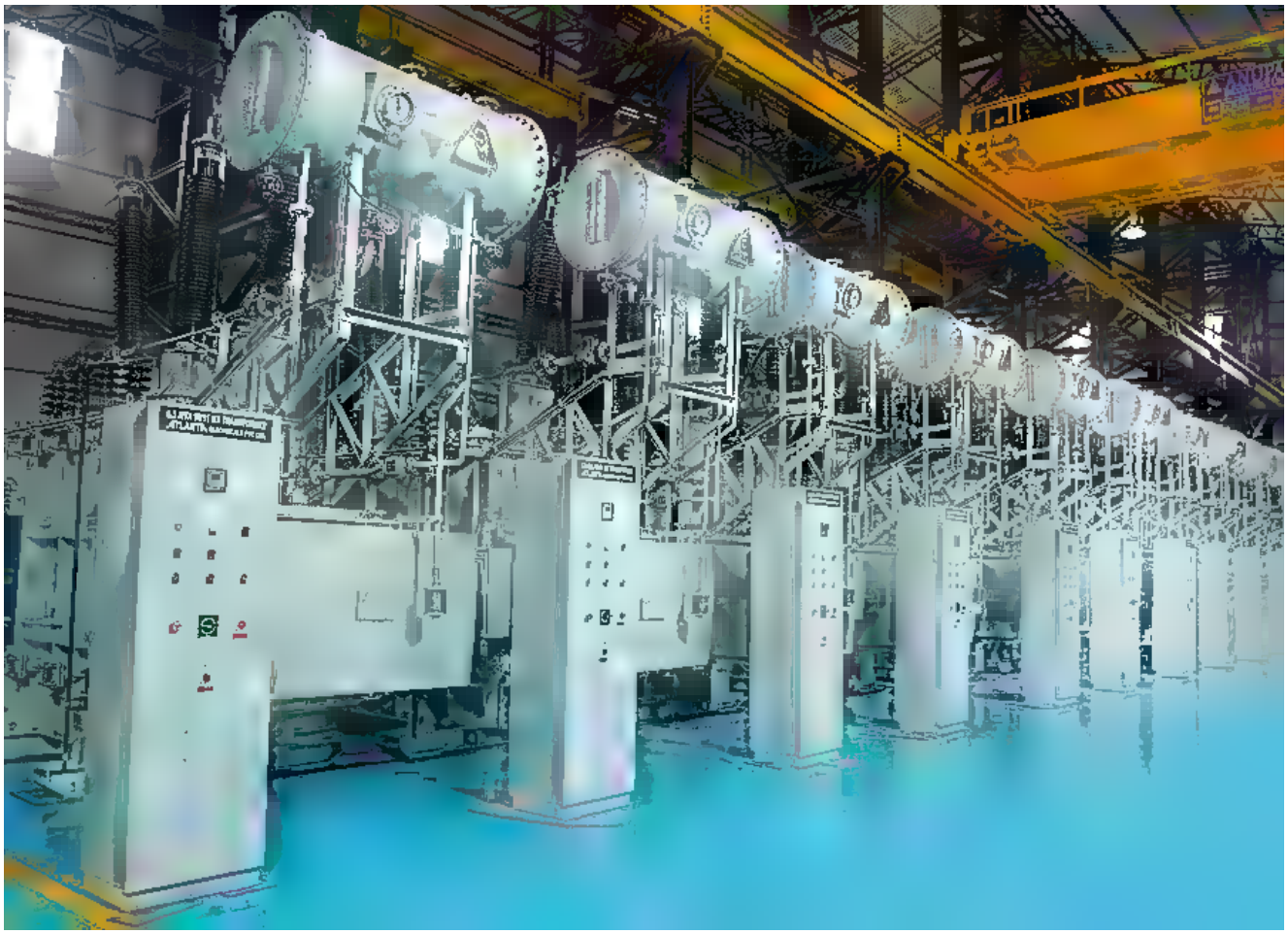
Crisil
Intelligence

Atlanta Electricals Limited

Strategic assessment of Transformer market

Final report

August 26, 2025



by S&P Global

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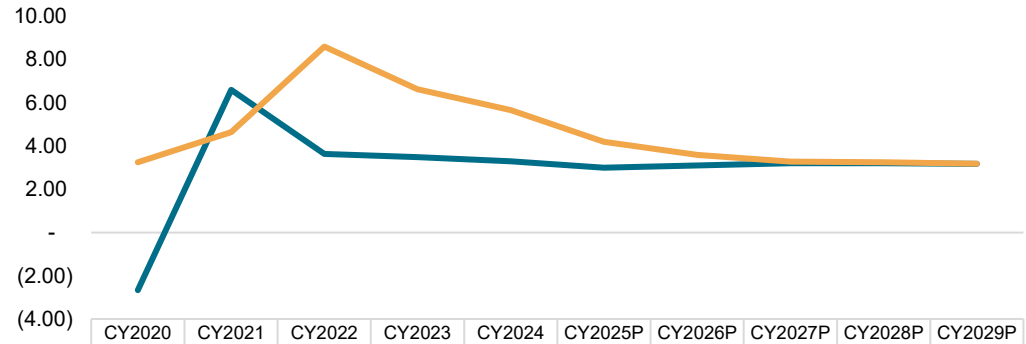
1.1 Global macroeconomics

1.1.1 Overview and outlook of global GDP trends

As per the International Monetary Fund (IMF) World Economic Outlook (July 2025), global growth is expected to decelerate, with apparent resilience due to trade-related distortions waning. At 3.0% in 2025 and 3.1% in 2026, the forecasts are below the 2024 outcome of 3.3% and the pre-pandemic historical average of 3.7%, even though they are higher than the April 2025 forecast by IMF.

As per IMF, global inflation is expected to continue to decline, with headline inflation falling to 4.2% in 2025 and 3.6% in 2026. This is virtually unchanged from the April 2025 outlook, with trends of cooling demand and falling energy prices remaining in place. The overall picture hides cross country variation in forecasts, however. The tariffs, acting as a supply shock, are expected to pass through to US consumer prices gradually and hit inflation in the second half of 2025.

Figure 1: Global GDP and inflation projections by IMF



	CY2020	CY2021	CY2022	CY2023	CY2024	CY2025P	CY2026P	CY2027P	CY2028P	CY2029P
GDP product, constant prices	(2.67)	6.61	3.65	3.49	3.29	3.00	3.10	3.22	3.22	3.18
Inflation, average consumer prices	3.25	4.65	8.61	6.63	5.67	4.20	3.60	3.29	3.25	3.19

Source: IMF World Economic Outlook database: (April and July 2025); Crisil Intelligence

1.1.2 Overview of GDP for key economies

Indian gross domestic product (GDP) has been growing consistently. In the last ten years, except for years affected by COVID-19 pandemic, India's growth has been highest amongst the top ten economies and other emerging countries as well. With the receding risk of global recession, India has been identified as an economic growth center by various international agencies as well as global rating firms.

Table 1: Historical growth of real GDP for major economies (figures in %)

Country	CY15	CY16	CY17	CY18	CY19	CY20	CY21	CY22	CY23	CY24
India*	8.00	8.26	6.80	6.45	3.87	(5.78)	9.69	7.61	9.20	6.50
Brazil	(3.55)	(3.28)	1.32	1.78	1.22	(3.28)	4.76	3.02	3.20	3.40
Canada	0.65	1.04	3.03	2.74	1.91	(5.04)	5.29	4.19	1.50	1.60
China	7.02	6.85	6.95	6.75	5.95	2.24	8.45	3.11	5.40	5.00
France	0.99	0.72	2.29	1.59	2.08	(7.59)	6.83	2.62	1.60	1.10
Germany	1.66	2.29	2.71	1.12	0.99	(4.10)	3.67	1.37	(0.30)	(0.20)
Italy	0.89	1.24	1.60	0.83	0.43	(8.87)	8.93	4.82	0.70	0.70
Japan	1.56	0.75	1.68	0.64	(0.40)	(4.17)	2.71	0.94	1.40	0.20
United Kingdom	2.22	1.92	2.66	1.41	1.62	(10.30)	8.58	4.84	0.40	1.10

Country	CY15	CY16	CY17	CY18	CY19	CY20	CY21	CY22	CY23	CY24
United States	2.95	1.82	2.46	2.97	2.58	(2.16)	6.06	2.51	2.90	2.80

**India Financial Year,*

Source: World Economic Outlook Database (April and July 2025) by IMF; Crisil Intelligence

S&P Global forecasts that the US economy will lose momentum in the second half of the calendar year, with growth slowing and unemployment rising. While a recession is not expected in the near term, the risk of one is higher than usual because of uncertainties surrounding US trade policies, immigration and government spending. The ongoing trade concerns, including the possibility of higher tariffs, have increased the likelihood of a recession in the next 12 months. The passage of the One Big Beautiful Bill Act (OBBBA) has raised concerns about the long-term sustainability of US fiscal policy.

On the tariff front, US President Donald Trump announced a 25% tariff on imports from India starting August 7, 2025, and an additional 25% effective August 27, 2025, if India continues to buy crude oil from Russia. In contrast, other Asian countries such as Bangladesh, Vietnam, South Korea, Taiwan and Japan will face tariffs ranging from 15% to 20%.
Meanwhile, Canada will face a tariff rate of 35%, up from 25%, on non-exempt goods under the Unites States-Mexico-Canada Agreement.

These developments have led to a significant increase in global uncertainty, with the World Uncertainty Index nearly doubling sequentially in the second quarter of calendar year 2025 and increasing five-fold on-year.

- **The US Federal Reserve maintains rates, job growth slows**

The US real GDP grew by an annualised 3.0% in the second quarter of 2025, a significant rebound from the 0.5% contraction in the previous quarter. A decrease in imports and an increase in consumer spending were key growth drivers, partially offset by a decline in investment and exports. However, S&P Global Ratings (Economic Outlook U.S. Q3 2025) expects the US economy to slow down to 1.7% in 2025, compared with 2.8% in 2024, because of higher tariffs and government spending cuts, among other factors.

The US manufacturing sector experienced a decline in July 2025, with the S&P Global US Manufacturing PMI falling to 49.8 in July 2025 from 52.9 in June 2025, ending six consecutive months of growth. In contrast, the services sector performed well, with the S&P Global US Services PMI Business Activity Index reaching a seven-month high of 55.7 in July 2025, up from 52.9 in June 2025. The US Federal Reserve maintained its policy rate at 4.25-4.50% in July 2025, citing the need to monitor incoming economic data amid building inflationary pressures due to increased tariffs.

The US trade deficit narrowed to a seasonally adjusted $60.2 billion in June 2025 (from deficit of $71.7 billion in May 2025 and $73.9 billion in June last year), because of a decrease in the goods trade deficit and an increase in the services surplus.

- **Eurozone growth slows**

The eurozone economy's growth slowed to 0.1% on-quarter in the second quarter of CY 2025 compared with 0.6% in the previous quarter. Germany and Italy, two of the region's largest economies, contracted 0.1% each compared with 0.3% growth in the previous quarter. However, Spain's economy grew mildly faster at 0.7% compared with 0.6% in the previous quarter.

The eurozone's manufacturing sector improved slightly in July 2025, with the HCOB Eurozone Manufacturing PMI rising to 49.8 from 49.5 in June 2025. Although the sector is still experiencing a decline, the latest data suggests a stabilisation of operating conditions. The HCOB Eurozone Services PMI increased to 51 in July 2025 from 50.5 in June 2025, indicating a faster growth in services output.

Inflation in the eurozone remained unchanged at 2.0% in July 2025. While food, alcohol and tobacco prices increased (3.3% in July vs 3.1% in June), as did non-energy industrial goods prices (0.8% vs 0.5%), a decline in services prices (3.1% vs 3.3%) kept the overall inflation rate steady. Energy prices continued to decline, with inflation at -2.5% in July 2025 compared with -2.6% in June 2025.

The European Central Bank, in its July 2025 meeting, kept the deposit facility, main refinancing operations, and marginal lending facility rates unchanged at 2.00%, 2.15% and 2.40%, respectively.

- **Growth in the UK slackens**

The UK economy grew at a slower pace of 0.3% on-quarter in the second quarter of CY 2025, compared with 0.7% in the previous quarter. The services (0.4% vs 0.7% previous quarter) and construction sectors (1.2% vs 0.3%) led the growth, even as production output (-0.3% vs 1.1%) declined. On the expenditure front, increases in gross fixed capital formation, household consumption and net trade were growth drivers.

The manufacturing sector has been experiencing a decline for the past 10 months but improved slightly in July 2025. The S&P Global UK Manufacturing PMI rose to 48 in July 2025 from 47.7 in June 2025. It still indicated a contraction in the sector, albeit lower than the previous month. In contrast, the services sector remained strong, with the S&P Global UK Services PMI at 51.8 in July 2025, indicating expansion. However, it was down from 52.8 in June 2025.

The Bank of England reduced its policy rate 25 basis points to 4.00% in its August meeting, citing ongoing disinflationary pressures over the past two-and-a-half years. Despite this, the bank acknowledged that there were upside risks to inflation. The bank noted that the deflation over the past two years was largely driven by external shocks, which were exacerbated by the restrictive monetary policy stance at the time.

The trade deficit widened to £5.0 billion (seasonally adjusted) in June 2025 compared with a deficit of £4.5 billion in May 2025.

- **Japan records trade surplus, inflation eases mildly**

Japan's economy showed mixed signals in July 2025, with manufacturing output weakening and the services sector strengthening. The au Jibun Bank Japan Manufacturing PMI fell to 48.9 in July 2025 from 50.1 in June 2025, whereas the au Jibun Bank Japan Services Business Activity Index rose to 53.6 from 51.7.

Inflation based on the consumer price index eased to 3.2% in June 2025 from 3.4% in May 2025. The decline was driven by a sharp drop in energy inflation to 2.9% in June 2025 from 8.1% in the previous month and a softening in core inflation, which excludes fresh food, to 3.3% from 3.6%. However, food inflation accelerated to 7.1% from 6.5%.

On the trade front, Japan recorded a surplus of ¥152.1 billion in June 2025, though it was lower than the ¥221.3 billion surplus in June 2024. The Bank of Japan decided by a unanimous vote to keep its policy rate steady at 0.5% at its meeting on July 31,2025.

- **Trade surplus widens in China**

China's economy grew 5.2% on-year in the second quarter of calendar year 2025, slightly slower than 5.4% in the previous quarter. While growth increased in the primary and tertiary industries, the secondary industries category experienced a decline.

China's manufacturing sector contracted in July 2025, with the Caixin China General Manufacturing PMI falling to 49.5 from 50.4 in June 2025. However, the services sector was resilient, with the Caixin China General Services Business Activity Index rising to 52.6 in July 2025 from 50.6 in June 2025.

On the inflation front, China's Consumer Price Index declined further in July to -0.5% from -0.1% in June. The main causes of this decline were food and tobacco inflation, which eased to -1% from 1.2% in June, and consumer goods inflation, which fell to -0.9% from -0.1% in June. Services sector inflation remained in the negative territory at -0.1%, while core inflation picked up to 0.4% from 0.1% on-year.

China's trade surplus decreased to $98.24 billion in July 2025 from $114.8 billion in June 2025, according to preliminary estimates, led by a 1% on-month decline in exports and a 6.2% increase in imports.

1.1.3 Outlook on GDP for key economies

As per IMF World Economic Outlook (July 2025), global growth reflects stronger-than-expected front-loading in anticipation of higher tariffs; lower average effective US tariff rates than announced in April 2025; an improvement in financial conditions, including due to a weaker US dollar; and fiscal expansion in some major jurisdictions. In the United States, with tariff rates settling at lower levels than those announced on April 2,2025 and looser financial conditions, the economy is projected to expand at a rate of 1.9% in 2025. In India, growth is projected to be 6.4% in 2025 and 2026, with both numbers revised slightly upward, reflecting a more benign external environment than assumed in the April reference forecast

Table 2: Real GDP annual growth forecast of major economies (figures in %)

Country	CY25 (P)	CY26 (P)	CY27 (P)	CY28 (P)	CY29 (P)	CY30 (P)
India*	6.40	6.40	6.47	6.48	6.49	6.50
Brazil	2.30	2.10	2.19	2.31	2.43	2.49
Canada	1.60	1.90	1.71	1.58	1.64	1.52
China	5.10	4.70	4.22	4.06	3.70	3.38
France	0.60	1.00	1.19	1.26	1.21	1.21
Germany	0.10	0.90	1.45	1.20	0.95	0.69
Italy	0.50	0.80	0.57	0.68	0.70	0.70
Japan	0.70	0.50	0.63	0.59	0.52	0.53
United Kingdom	1.20	1.40	1.54	1.46	1.44	1.44
United States	1.90	2.00	1.98	2.12	2.12	2.12

**For India financial Year. (P): Projected*

Source: World Economic Outlook Database (April and July 2025) by IMF; Crisil Intelligence

1.1.4 India as preferred manufacturing destination

India has various advantages which makes it an attractive destination for global manufacturing investments. Some of these advantages are summarised below:

Government initiatives: The Central government has launched various initiatives such as "Make in India", "Startup India", and "Digital India" to promote manufacturing. These initiatives aim to create a business-friendly environment, improve infrastructure, and provide incentives for manufacturers.

Economic growth: India is one of the key large economies which is showing encouraging economic indicators. India is projected to become the fourth largest economy in the world in fiscal 2026, according to the IMF's World Economic Outlook April 2025. IMF has further estimated that India will be the world's third-largest economy by fiscal 2028 surpassing both Japan and Germany.

Demographic dividend: India has an added advantage of young population. It has a large and young population, with more than 65% of its population below the age of 35. This can help in providing the significant workforce required for the manufacturing sector.

Infrastructure development: The Indian government is investing heavily in infrastructure development, including roads, ports, and airports, which can improve connectivity and reduce logistics costs for manufacturers.

Increasing domestic demand: India's growing middle class and increasing consumer spending power are driving demand for manufactured goods, creating opportunities for domestic manufacturers.

Sunrise sectors: Sunrise sectors such as mobiles, computers and information technology, telecommunication devices, consumer electronics, aerospace and defence industries, automobiles are pushing the investment in

manufacturing. Technological advancements and increased consumer demand for new and innovative products are driving the investments.

Competitive labour cost: India has a competitive labor cost advantage compared to other countries (special western countries), making it an attractive destination for manufacturers looking to set up production facilities.

Digitalisation and Industry 4.0: The adoption of digital technologies like artificial intelligence, robotics, and the Internet of Things (IoT) can improve manufacturing efficiency, productivity, and competitiveness, driving growth in the sector.

Skilled workforce: India has a large pool of skilled engineers and technicians, which can support the growth of the manufacturing sector. Indian Government also focusing on skill development through various initiatives such as National Policy on Skill Development & Entrepreneurship, Pradhan Mantri Kaushal Vikas Yojana, Craftsmen Training Scheme, National Apprenticeship Promotion Scheme, Entrepreneurship Training, Skill India Digital Hub platform etc.

Ease of doing business (EoDB): The Central government has taken various steps to provide simpler regulatory environment, compliance requirements, single window clearance and improve the ease of doing business. This helps manufacturers to set up and operate in the country efficiently. Improved EoDB (from 132nd rank in 2013 to 63rd rank in 2020) make it a favourable destination for manufacturing.

Growing exports: According to recent data from the Commerce Ministry, India's export competitiveness has witnessed notable advancements over the last five years, particularly in petroleum, precious stones, agrochemicals, and sugar. This growth has been marked by a surge in the country's share in global trade across these sectors, alongside other segments like electrical goods, tyres, and semiconductor devices.

As a result of these, India's manufacturing sector has seen some the new investments in production facilities (both greenfield as well as brownfield) by leading MNCs like Siemens, GE, Philips, Samsung, PepsiCo, ABB etc.

- Siemens Limited has planned the expansion of two Indian factories, augmenting its manufacturing capabilities namely Power Transformer factory in Kalwa and Vacuum Interrupter factory in Goa. The total Capex investment is projected to surpass Rs 10 billion.
- GE Aerospace has set up Multi-Modal Facility (MMF) in Pune with an investment of USD 200 million.
- Philips India inaugurated its innovation campus in Yelahanka, Bengaluru; It also planned a new R&D centre to expand its Healthcare Innovation Centre (HIC) in Pune, Maharashtra.
- On June 7, 2017, Samsung announced an investment of INR 49.15 billion to add new capacity at the Noida plant in Uttar Pradesh.
- ABB India in February 2023, inaugurated its new state-of-the-art factory in Nashik, Maharashtra doubling its Gas Insulated Switchgear (GIS) production capacity.
- In April 2024, PepsiCo India, a leading global consumer packaged goods company, announced an investment of Rs. 12.66 billion in India to establish a state-of-the-art flavour manufacturing facility in Ujjain, Madhya Pradesh.
- Jaguar Land Rover, a subsidiary of Tata Motors has started production from Pune Plant
- Mercedes-Benz India's production facility in Chakan near Pune
- Rolls-Royce Engineering Centre (Aerospace) at Bangalore and Engineering Centre (Power Systems) at Pune

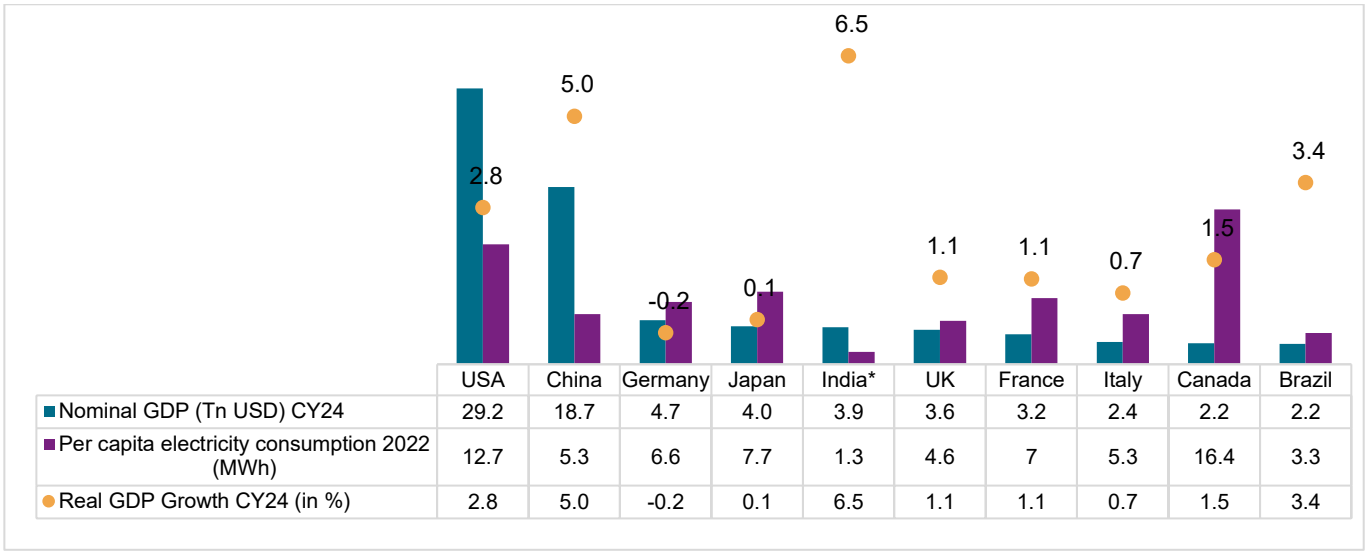
1.2 Domestics macroeconomics

1.2.1 Real GDP growth in India

India's GDP at constant (fiscal 2012) prices was Rs. 187.97 trillion (provisional estimates) for fiscal 2025, vis-a-vis INR 176.5 trillion (first revised estimates) for fiscal 2024 as per data released by the National Statistical Office (NSO) in May 2025. This translates into a growth of 6.5% over fiscal 2024.

India is expected to become the fourth largest economy in the world in fiscal 2026, according to the IMF World Economic Outlook (July 2025). As per IMF GDP Forecasts, India's GDP growth is estimated at 6.4% in fiscal 2026 and fiscal 2027, the highest amongst the top 10 economies. Additionally, World Bank has estimated India's GDP to grow at 6.3% in fiscal 2026.

Figure 2: Comparison of India's economy with other major nations



	USA	China	Germany	Japan	India*	UK	France	Italy	Canada	Brazil
Nominal GDP (Tn USD) CY24	29.2	18.7	4.7	4.0	3.9	3.6	3.2	2.4	2.2	2.2
Per capita electricity consumption 2022 (MWh)	12.7	5.3	6.6	7.7	1.3	4.6	7	5.3	16.4	3.3
Real GDP Growth CY24 (in %)	2.8	5.0	-0.2	0.1	6.5	1.1	1.1	0.7	1.5	3.4

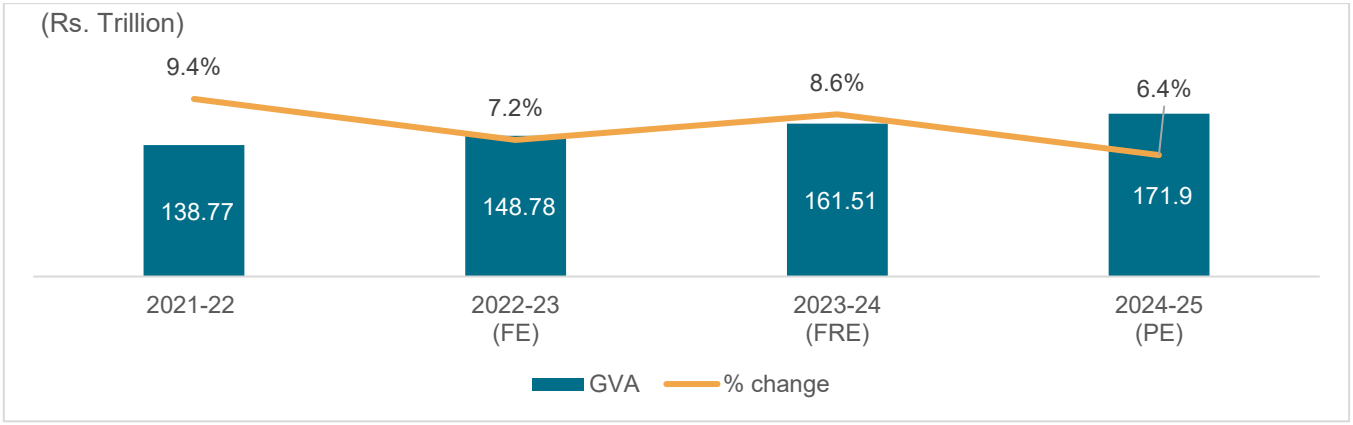
**India GDP data as per NSO for Financial Year 2025,*

Source: World Economic Outlook Database (April and July 2025) by IMF; IEA, CEA, Crisil Intelligence

1.2.2 GVA performance

The real GVA has grown by 6.4% in fiscal 2025 compared to 8.6% in fiscal 2024. This GVA growth has been mainly due to a significant growth of 6.1% in the secondary sector, 7.2% in the tertiary sector in fiscal 2025.

Figure 3: GVA at basic prices



FRE: first revised estimates; FE: Final estimates; PE: Provisional estimates

Source: Ministry of Statistics and Programme Implementation, Crisil Intelligence

1.2.3 India's GDP recovered with subsiding of the pandemic

In the past 12 years (during fiscal 2014 to 2025), India's GDP at constant (fiscal 2012) prices grew at a CAGR of ~6.0%.

After strong GDP print in the past three years, Crisil Intelligence [1] expects growth in fiscal 2026 at 6.5%, but with risks on the downside owing to external headwinds. Nevertheless, improving domestic consumption is likely to support industrial activity. We expect domestic consumption demand to improve, driven by (1) healthy agricultural growth (2) easing inflation supporting discretionary spend (3) rate cuts by the Reserve Bank of India (RBI)'s Monetary Policy Committee (MPC) and (4) income tax relief this fiscal. Reflecting this, the latest RBI Consumer Confidence Survey indicated that households' outlook for the year ahead picked up, remaining firmly optimistic.

Figure 4: Crisil's key projections

Paramete18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26P
GDP growth (%)	6.5%	3.9%	-5.8%	9.7%	7.0%	9.2%	6.5%	6.5%
CPI (%, average)	3.4%	4.8%	6.2%	5.5%	6.7%	5.4%	4.6%	3.5%
CAD/GDP (%)	-2.1%	-0.9%	0.9%	-1.2%	-2.0%	-0.7%	-0.6%	-1.3%
FAD/GDP (%)	3.4%	4.6%	9.2%	6.7%	6.4%	5.5%	4.8%	4.4%#
Exchange rate (Rs/$ March-end)	69.5	74.4	72.8	76.2	82.3	83.0	86.6	87.5
10-year G-sec yield (%, March-end)	7.5%	6.2%	6.2%	6.8%	7.4%	7.1%	6.7%	6.3%

P: Projected; CPI: Consumer Price Index-linked; CAD: Current account deficit; G-sec: Government security; FAD: Fiscal account deficit; #Budget estimates

Source: CSO, Reserve Bank of India (RBI), Crisil estimates

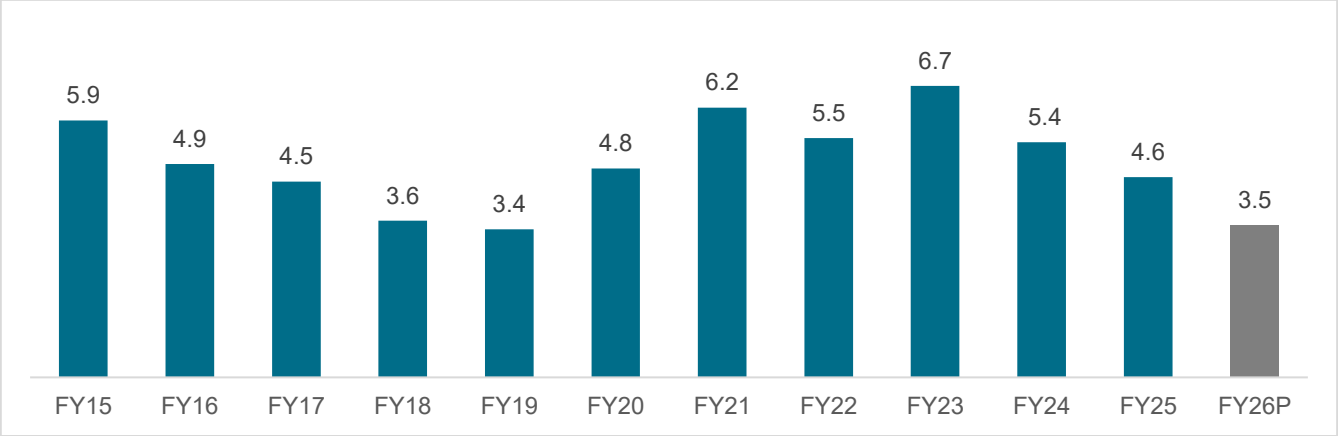
1.2.4 Outlook

1.2.4.1 Consumer Price Index

India's retail inflation rate has more than halved over the past year, slipping even below the lower end of the Reserve Bank of India's tolerance band (2%). It slid to 1.6% in July 2025 from 2.1% in June 2025. A year ago, it stood at 3.6%. Crisil Intelligence expects retail inflation to average 3.5% this fiscal 2026 compared with 4.6% in the last. Healthy agricultural production is expected to keep food inflation in check. As on August 15, 2025, kharif sowing was up a healthy 4.0% on-year and adequate soil moisture is expected to benefit the rabi crop. Assuming geopolitical uncertainties remain under control, Brent crude oil prices are projected to be subdued at $60-65 per barrel in the current fiscal 2026, which should help contain non-food inflation.

[1] Based on Crisil Centre for Economic Research (C-CER) projections
Projections of key economic indicators for India in this Chapter are as per the C-CER

Figure 5:CPI inflation (%, y-o-y)



P: Projected;
Source: NSO, CEIC, Crisil Intelligence

1.2.4.2 Current Account Deficit

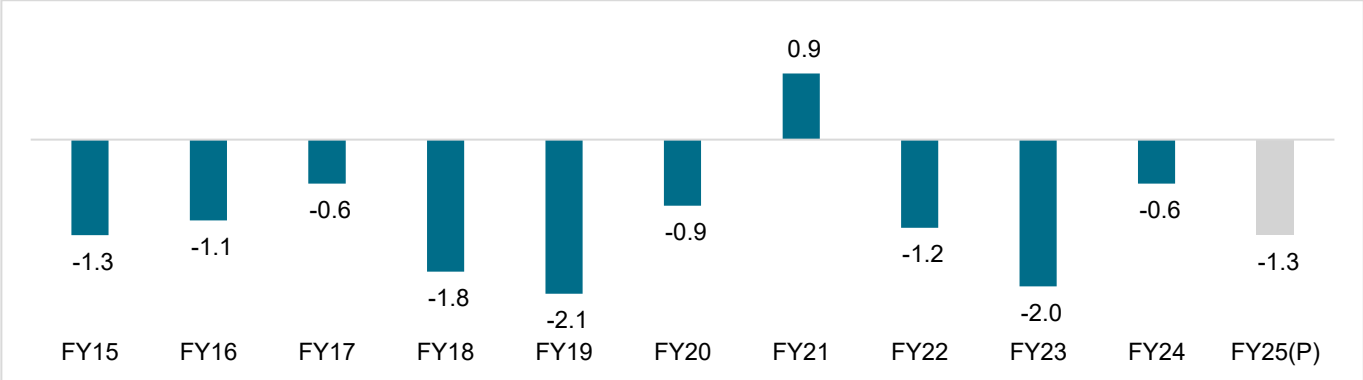
India's merchandise trade deficit has come under pressure this fiscal 2026 due to tariff hikes and slowing global growth. As on August 18, 2025, the US has announced an additional 25% tariff on Indian exports effective August 27,2025 as a penalty for purchases of Russian oil, in addition to the 25% reciprocal tariff imposed earlier. Where the tariffs will eventually settle is not clear yet given negotiations are ongoing. The reciprocal tariffs are expected to affect India's exports. Alongside, India is also expediting negotiations of trade deals with other trade partners.

The tariffs and lingering geopolitical uncertainties are expected to weigh on growth across the world this year. S&P Global expects global growth at 2.9% in 2025, lower than the 3.3% in 2024. Growth in the US, currently our largest export destination, is projected to slow to 1.7% from 2.8%.

The World Trade Organisation expects the volume of global merchandise trade to fall 0.2% in 2025 (vs growth of 2.9% in 2024).

However, India's current account deficit (CAD) is expected to remain manageable, supported by the surplus in services trade, healthy remittances and soft crude oil prices. Crisil Intelligence expects CAD to be at 1.3% of GDP this fiscal, compared with 0.6% last fiscal.

Figure 6: Current account deficit (As a % of GDP)

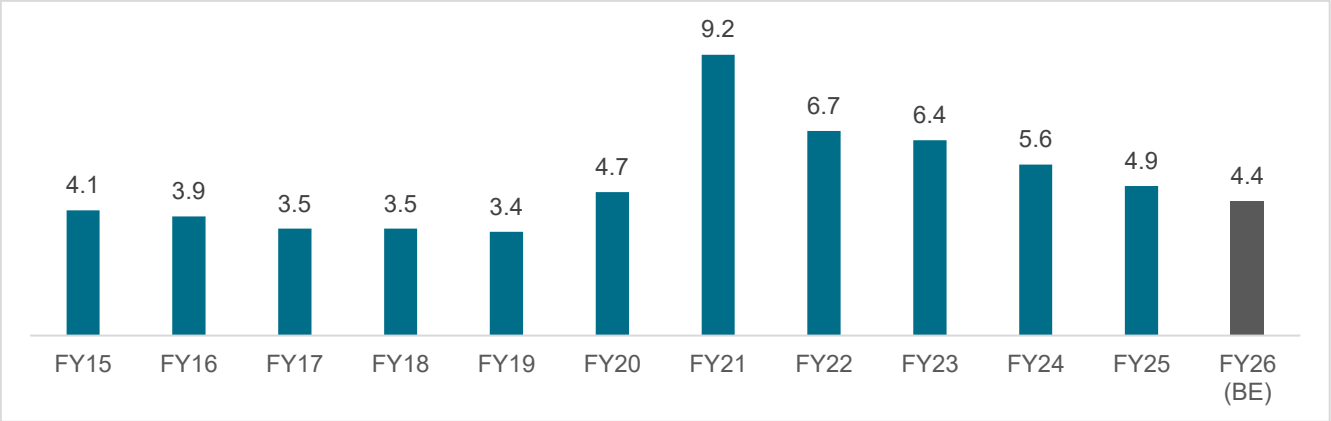


(P) Projected;
Source: RBI, SBI, Crisil Intelligence

1.2.4.3 Fiscal deficit

The fiscal deficit in 2020 reached a high of 9.2% of GDP during the pandemic. It has since decreased significantly. The fiscal deficit for fiscal 2025 was 4.9% of GDP according to the monthly accounts dashboard by Controller General of Accounts (CGA). The CGA data showed that the fiscal deficit in actual terms was Rs 15.77 trillion. In the budget for fiscal 2026, the fiscal deficit is estimated to be 4.4% of GDP.

Figure 7: Fiscal Deficit as % of the GDP



BE: Budget estimates

Source: RBI, Controller General of Accounts, Crisil Intelligence

1.2.4.4 Interest rates

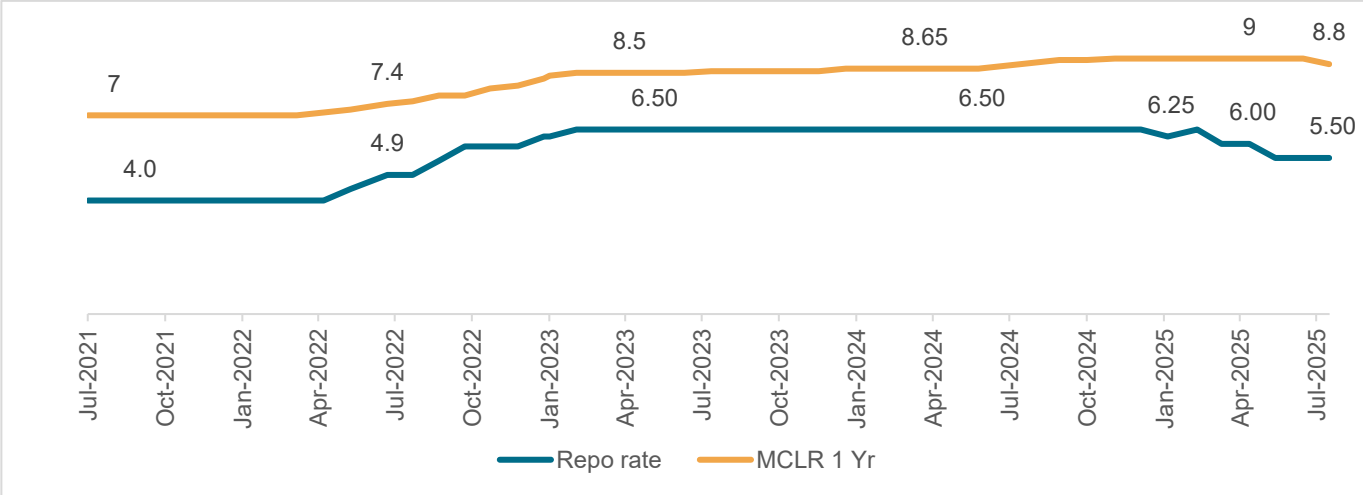
The MPC kept policy rates unchanged during its review meeting on August 6,2025. Besides, it maintained a neutral policy stance, which implies future monetary policy actions will be data-dependent amid global uncertainties. The MPC had frontloaded monetary easing this year by cutting the repo rate by 100 basis points (bps) between February and June 2025.

Amid uncertainties, major central banks remain cautious about easing rates. The US Federal Reserve (Fed) has not cut policy rates in 2025 so far. S&P Global expects a 50-bps cut by the Fed towards the end of 2025, possibly starting in September if the labour market weakens.

Crisil Intelligence expects one more repo rate cut by the MPC this fiscal 2026. The trajectory of inflation and growth risks from higher US tariffs and weaker global trade will bear watching in this regard.

Compared to March 2023, the SBI's 1-year marginal cost of lending rate (MCLR) has seen an increase of 30 bps. It has risen 180 bps since March 2022. A slower decline in bank rates, such as the marginal cost of funds-based lending rate (MCLR), weighted average lending rate (WALR), and auto, housing and deposit rates, relative to the repo rate suggests transmission to the banking sector is still in progress.

Figure 8: RBI rate cuts are pushing market interest rates lower (%)

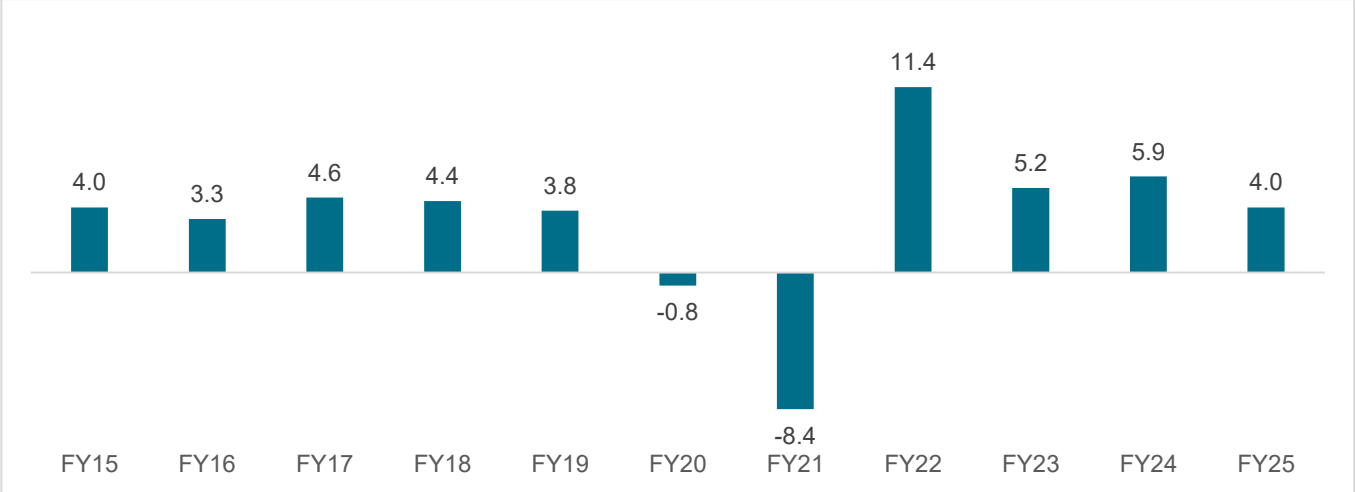


Source: RBI, SBI, Crisil Intelligence

1.2.4.5 PMI and IIP trend

The Index of Industrial Production (IIP) is an indicator that measures the changes in the volume of production of industrial products during a given period. IIP growth rate for fiscal 2025 over fiscal 2024 stood at 4.0%. The cumulative growth rates of the three sectors, Mining, Manufacturing and Electricity for the fiscal 2025 over the corresponding period of the previous year were 3.0%, 4.1% and 5.2%, respectively.

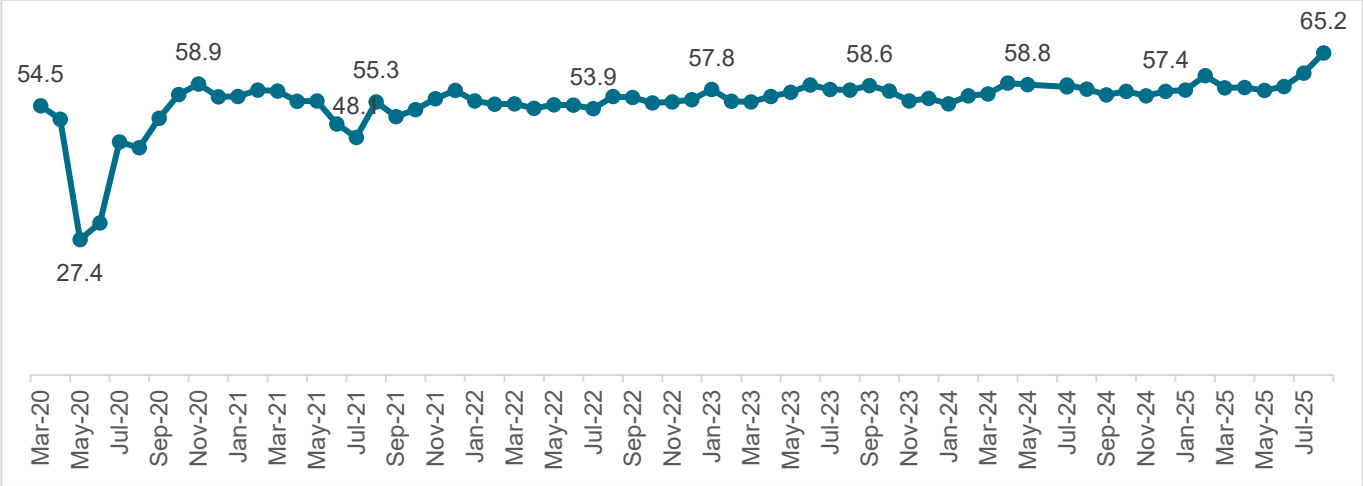
Figure 9: Trend of Index of Industrial Production



Source: NSO, MOSPI, Crisil Intelligence

The HSBC Flash India Composite* Output Index – a seasonally adjusted index that measures the month-on-month change in the combined output of India's manufacturing and service sectors – rose by over four points in August 2025 to 65.2, from 61.1 in July 2025, signalling a rapid expansion in private sector business activity that was the quickest on record.

Figure 10: Manufacturing PMI



Source: Industry, HSBC, S&P Global, Crisil Intelligence

Going forward, Crisil Intelligence expects robust domestic consumption to underpin industrial activity. The agricultural sector will benefit from the southwest monsoon, which is progressing well. The resultant easing of food inflation should create space in household budgets for discretionary spending.

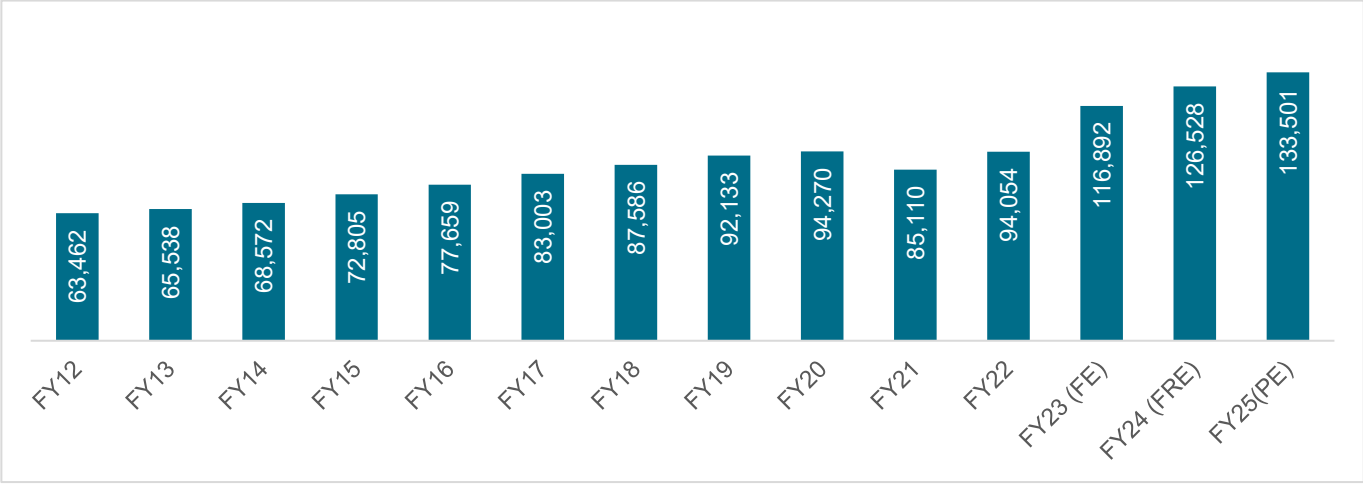
The 100-bps cut in the repo rate by the MPC in calendar year 2025 is gradually softening bank lending rates, which will also support domestic demand. Crisil Intelligence expects another rate cut this fiscal, followed by a pause. Additionally, the income tax relief announced in the Union Budget is expected to support private consumption.

1.2.4.6 Per capita GDP

As per NSO's revised estimates, India's per capita income has increased to Rs 126,528 in fiscal 2024 from Rs 68,572 in fiscal 2014 with a CAGR of 6.3%. In fiscal 2025, per capita income increased by 5.5% and reached Rs. 133,501.

Some reasons for India's poor national income are its large population, largely agrarian economy, lack of industrial development as well as difference in socioeconomic conditions across the states. However, recent fiscal measures, emphasis on manufacturing through 'Make in India' and various packages for economic revival have helped India grow faster. Opportunities for employment, increased private consumption, along with positive consumer sentiments, are expected to support higher GDP growth and per capita national income in future.

Figure 11: All-India per capita net national income (at constant prices) (Rs.)



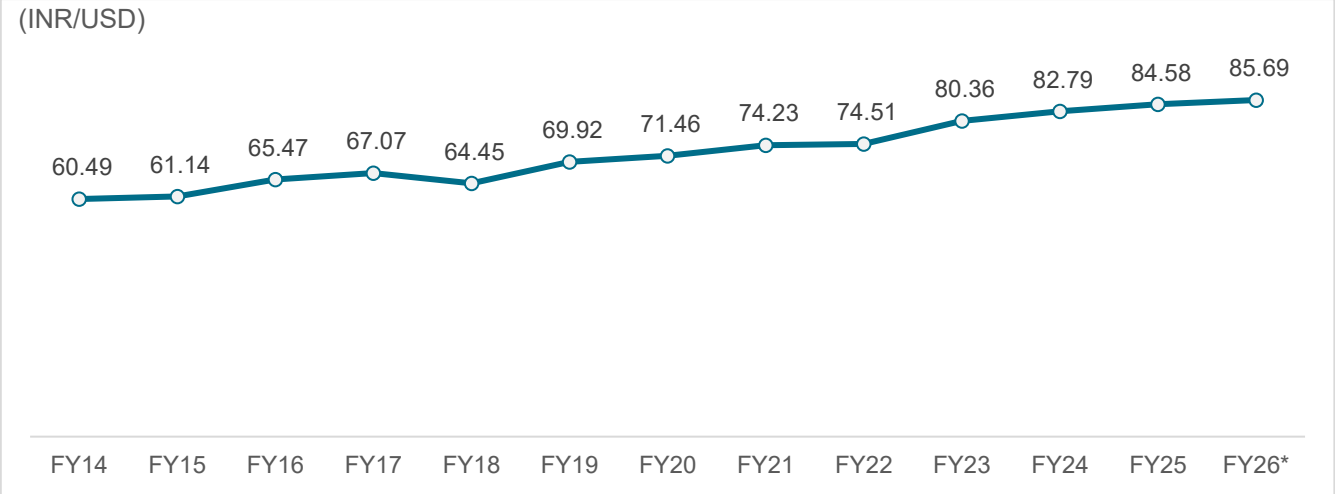
FE: Final estimates, FRE: first revised estimates; PE: provisional estimates

Source: Economic Survey, NSO, MOSPI, Crisil Intelligence

1.2.4.7 Exchange rates

The rupee depreciated by a mild 0.2% on-month on average in July 2025 against the dollar, averaging 86.1 vs 85.9 in June. The currency is down 3.0% on-year. The rupee came under the pressure of foreign investor outflows amid escalating India-US trade tensions amidst a pending trade deal as well as a widening of the merchandise trade deficit in July 2025, despite easing crude oil prices and a weakening dollar. The rupee's performance in July 2025 was range-bound in comparison with other emerging market currencies. While the Turkish lira and Vietnamese dong suffered steeper depreciations and the Russian rouble remained stable, other emerging market currencies gained against the dollar. Among the advanced economies, the euro appreciated while the Japanese yen and British pound depreciated

Figure 12: Trend in the exchange rate (annual average)



**FY 26 as of July 2025;*

Source: Financial Benchmarks India Pvt Ltd, CEIC, Crisil Intelligence

Crisil Intelligence expects the rupee to remain volatile in the near term, settling at ~87.50/$ by March 2026. While the current account deficit is expected to remain manageable, there could be risks, especially to capital flow, because of disruptions in global growth and geopolitical uncertainties. Indian exports to the US could lose some comparative advantage vis-a-vis those of other countries due to the imposition of relatively higher import tariffs by the US. While India's healthy macroeconomic parameters provide the rupee some cushion against these shocks, the domestic currency is not immune.

1.2.5 Aatmanirbhar Bharat Abhiyan

Production Linked Incentives (PLIs) in the 14 sectors for the *Aatmanirbhar Bharat* vision received an outstanding response, with the potential to create 6 million new jobs (as per government estimates).

The five focus points of the *Aatmanirbhar Bharat Abhiyan* are economy, infrastructure, system, vibrant demography, and demand. Its five phases are:

- Phase I: Businesses including MSMEs
  - Phase II: Poor, including migrants and farmers.
  - Phase III: Agriculture
  - Phase IV: New horizons of growth
  - Phase V: Government reforms and enablers

Table 3: Sector-wise focus of *Aatmanirbhar Bharat* Vision

Sector	Government spends	Key schemes
Renewable energy	~Rs 1300 billion	• Rs 45 billion Production Linked Incentive Scheme 'National Programme on High Efficiency Solar PV Modules'. This was further increased by Rs 195 billion in the budget for fiscal 2023, taking it to Rs 240 billion; in Tranche I 8.7 GW and in Tranche II 39.6 GW capacity were allocated for domestic solar module manufacturing capacity under PLI. • PM Surya Ghar Muft Bijli Yojna: This scheme has a proposed outlay of Rs. 750 billion and aims to light up 10 million households (rooftop solar) by providing up to 300 units of free electricity every month. • Public procurement (Preference for 'Make in India') to provide for purchase preference (linked with local content) in respect of renewable energy (RE) sector • Implementation of Pradhan Mantri Kisan Urja Suraksha Utthan Mahabhiyan (PM KUSUM) scheme; MNRE, in November 2020, scaled up and expanded the PM KUSUM scheme to add 30.8 GW by 2022 with central financial support of Rs 344.22 billion. The scheme has been extended till March 31, 2026 • Approved Models & Manufacturers of Solar Photovoltaic Modules (Requirement for Compulsory Registration) Order, 2019 • List of manufacturers and models of solar PV modules recommended under ALMM Order • Scheme of grid connected wind-solar hybrid power projects • Basic customs duty (BCD) of 25% on solar cells and 40% on modules, respectively, effective April 1, 2022
Power distribution companies (discoms)	~Rs.970 billion	• Rs 1.35 trillion liquidity infusion for discoms via Power Finance Corporation/ Rural Electrification Corporation (PFC/ REC) against receivables • Rebate for payment to be received by generation companies (gencos) to be passed on to industrial customers. • Revamped Distribution Sector Scheme (RDSS) to help discoms improve their operational efficiencies and financial sustainability by providing result-linked financial assistance; outlay of Rs 3037.58 billion over 5 years i.e., fiscals 2022 to 2026. The outlay includes an estimated Government Budgetary Support (GBS) of Rs 976.31 billion.
Agriculture procurement and sales	Rs 40 billion	• Amendment in the Essential Commodities Act for deregulation of sales of agricultural produce, including field crops, onions, and potatoes. • Working capital limit of Rs 67 billion sanctioned for procurement of food grains to state government entities. • Rs 35 billion was allocated for the distribution of 5 kg rice/wheat and 1 kg pulses to 80 million non-card holder migrants. • Rs 5 billion allocated under Operation Greens for facilitation of sales of horticulture produce through a 50% subsidy on storage and transport

Sector	Government spends	Key schemes
Agri-allied	Rs 725 billion	• Additional allocation of Rs 400 billion for Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) • Rs 200 billion for fishermen over the next five years under Pradhan Mantri Matsya Sampada Yojana • Rs 133.43 billion for eradication of foot and mouth disease in Indian livestock population • Rs 150 billion for Animal Husbandry Infrastructure Development Fund (AHIDF) • Rs 40 billion for enhanced cultivation of herbal and medicinal plants • Rs 5 billion for the Indian apiculture industry • Rs 100 billion for the formulation of micro food enterprises
Mining	Nil	• Expected to offer 500 mineral blocks, including 50 coal. • Promoting commercial coal mining (ordinance to remove captive end-use restriction passed in January 2020); government to expedite policy formulation and auction process. • Government to allow composite exploration/auction of coal bed methane reserves for extraction. • Rebate offered on revenue sharing quantum to incentivise early operationalisation/ higher produce. • Provision of Rs 500 billion for evacuation infrastructure
New Energy	Rs. ~388 billion	• Rs 181 billion under the PLI scheme for Advanced Chemistry Cell (ACC) Battery Storage in India launched in October to achieve 50 GWh manufacturing capacity. • The Green Hydrogen Policy was launched in February 2022 to facilitate the production of green hydrogen/green ammonia. • PLI scheme on green hydrogen manufacturing with an initial outlay of Rs 197.44 billion with an aim to boost domestic production of green hydrogen

Source: Official portal of the Government of India; various ministries, PIB press releases, Crisil Intelligence

1.2.6 Tailwinds for growth in manufacturing in India

Some of the tailwinds for growth in manufacturing in India are summarised below:

- **Make in India:** The Make in India initiative was launched by Prime Minister in September 2014 to encourage foreign companies to set up manufacturing units in India. The initiative's focus on developing a robust manufacturing sector promises to elevate India's economic trajectory and generate employment opportunities for its vast young workforce. Now, with the "Make in India 2.0" phase encompassing 27 sectors, the program continues to drive forward with significant achievements and renewed vigour, reinforcing India's position as a major player in the global manufacturing landscape.
- **Startup ecosystem/ Startup India:** Startup India, launched on January 16, 2016. is an initiative by the Government of India to promote entrepreneurship and startup ecosystem in the country. The initiative aims to foster a culture of innovation and entrepreneurship in India, and to create a supportive ecosystem for startups to grow and thrive. Under this initiative, eligible companies can get recognised as Startups by Department for Promotion of Industry and Internal Trade (DPIIT), to access a host of tax benefits, easier compliance, IPR fast-tracking and more.
- **Digital India:** Digital India, launched on July 1, 2015, with the vision to transform India into a digitally empowered society and knowledge economy. Digital India has been improving the lives of all citizens through the digital delivery of services, expanding the digital economy and employment opportunities.

- **PLI Scheme:** Production Linked Incentive (PLI) Schemes for 14 key sectors have been announced with an outlay of Rs. 1.97 trillion (over US$26 billion) to enhance India's Manufacturing capabilities and Exports. The purpose of the PLI Schemes is to attract investments in key sectors and cutting-edge technology; ensure efficiency and bring economies of size and scale in the manufacturing sector and make Indian companies and manufacturers globally competitive.
- **National Manufacturing policy:** The Government of India has announced a national manufacturing policy with the objective of enhancing the share of manufacturing in GDP to 25% within a decade and creating 100 million jobs. It also seeks to empower rural youth by imparting necessary skill sets to make them employable.
- **GST Reforms:** In July 2017, India implemented the Goods and Services Tax (GST). GST replaced a fragmented and complex indirect tax regime and simplified taxation and optimised logistical costs.
- **Increasing FDI:** As per World Investment Report 2023 by IMF, India remains one of the most popular FDI destinations in the world, ranking as the eighth-largest recipient of FDI in 2023, the third-highest recipient of FDI in greenfield projects and the second-highest recipient of FDI in international project finance deals according to the World Investment Report 2023.
- **R&D:** Research and development (R&D) in manufacturing in India has gained significant importance in recent years, driven by the government's initiatives to promote innovation and entrepreneurship in the country, infrastructure development, and a growing demand for innovative products and services.
- **Logistical Advantages:** Due to its strategic location, India has access to major markets, trade routes, ports. India's infrastructure is upgrading to improve logistics and warehousing. Also, with free trade agreements with various countries, there have been enhanced trade relations.

1.2.7 Budget 2025

The Union Budget for fiscal 2025-26 has announced several significant initiatives for boosting the manufacturing sector. Some of the areas aimed at improving competitiveness, enhancing participation in the global value chain, attracting investments, increasing employment generation and providing continued support for sectors identified under PLI schemes.

. Some key budget announcements for these areas include:

- **Manufacturing Mission - Furthering "Make in India"**
  - A National Manufacturing Mission covering small, medium and large industries for furthering "Make in India" announced.
- **Support to Domestic Manufacturing and Value addition**
  - Critical minerals such as cobalt powder and waste, the scrap of lithium-ion battery, Lead, Zinc and 12 more critical minerals are fully exempted from BCD.
  - 35 additional capital goods for EV battery manufacturing, and 28 additional capital goods for mobile phone battery manufacturing were exempted from BCD.
  - Exemption of BCD on raw materials, components, consumables or parts for the manufacture of ships extended for another ten years; the same dispensation to continue for ship breaking.
- **Tax certainty for electronics manufacturing Schemes**
  - Presumptive taxation regime for non-residents who provide services to a resident company that is establishing or operating an electronics manufacturing facility.
  - Introduction of a safe harbour for tax certainty for non-residents who store components for supply to specified electronics manufacturing units.
- **National Centres of Excellence for Skilling**
  - 5 National Centres of Excellence for skilling to be set up with global expertise and partnerships to equip our youth with the skills required for "Make for India, Make for the World" manufacturing.
- **An Investment Friendliness Index of States**

- An Investment Friendliness Index of States will be launched in 2025 to further the spirit of competitive cooperative federalism.

- **A Push for Domestic and Global Competitiveness**
  - In a strong push to accelerate industrial growth, the Government has significantly increased budget allocations for key sectors under the PLI Scheme in 2025-26.
  - Several sectors have witnessed substantial hikes, with allocations for electronics and IT hardware soaring from Rs. 57.77 billion (revised estimate for 2024-25) to Rs. 90.00 billion, and automobiles and auto Components seeing a remarkable jump from Rs. 3.47 billion to Rs. 28.19 billion. The Textile sector has also received a major boost, with its allocation surging from Rs. 450 million to Rs.11.48 billion.

1.2.8 Impact of the current geopolitical situation

Geopolitical situations can have a significant impact on the manufacturing sector, affecting supply chains, labour availability, access to technology, production and ultimately, the overall economy. Some of the impacts include:

Raw Material Availability: Geopolitical situations can impact on the access, availability and pricing of key raw materials (especially concentrated in a certain region), such as metals and minerals. This can affect the manufacturing processes and lead to an increase in production costs.

Supply Chain Disruptions: Geopolitical tensions can disrupt supply chains, particularly if they involve countries with complex international relationships resulting in delays, shortages, and increased costs.

Investment and expansion: Geopolitical uncertainty can discourage investors/companies from investing in new manufacturing facilities, expansion projects, or research and development, as they may be hesitant to commit resources to uncertain markets.

Workforce and Labour: Geopolitical uncertainty can affect the availability and movement of skilled workers which may impact the manufacturing productivity and efficiency.

Infrastructure and Logistics: Geopolitical situations can impact the development and maintenance of infrastructure, such as ports, roads, and bridges, which are critical to manufacturing and logistics.

Some of the current geopolitical situations include:

The ongoing trade war between the West and China is changing the Global supply chain scenario. The USA and the EU employ trade policies, tariffs, and negotiations to counterbalance China's economic influence, driven by concerns over unfair trade practices, market access, and intellectual property rights. This has led to tariffs on billions of dollars' worth of goods and disrupted global supply chains. However, this has also provided an opportunity for other Countries to increase their exports to the USA and the EU.

The conflict in Ukraine, which has led to a global supply chain disruption. The war has resulted in rising prices for energy, commodities and food, thereby leading to a rise in global inflation.

2 Transformer market overview and outlook

2.1 Global transformer market

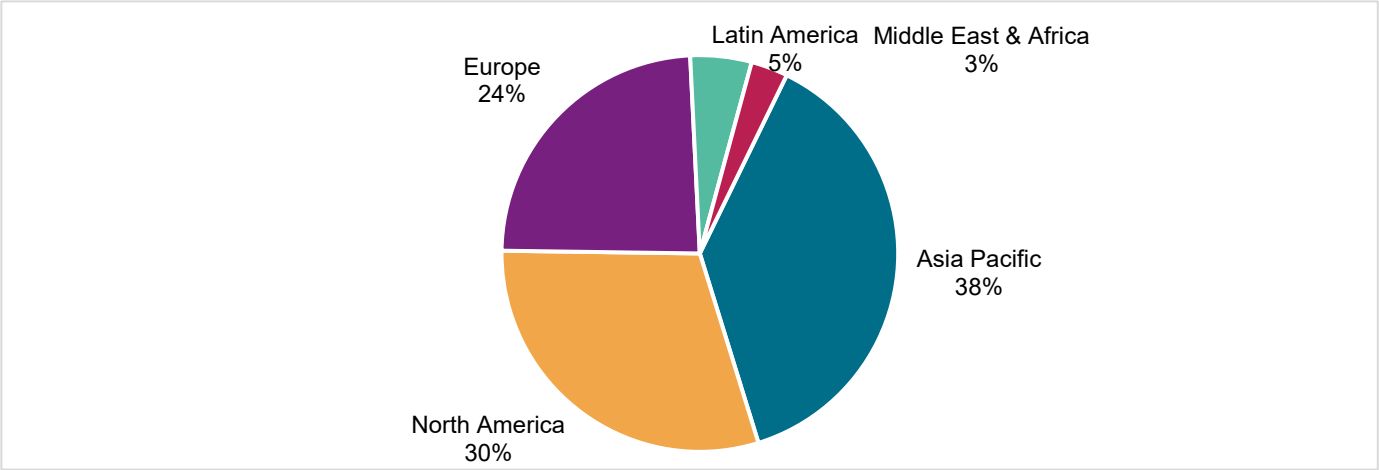
The global transformers market is experiencing accelerated growth, driven by the increasing demand for power and rapid industrialisation worldwide. As economies prioritise energy efficiency and reduced carbon emissions, the need to upgrade and expand power infrastructure has become paramount. Notably, emerging economies are witnessing significant investments in power generation and transmission, which is expected to further stimulate the transformer market.

Furthermore, government initiatives aimed at modernising existing power grids and installing advanced power transformers are anticipated to have a positive impact on the market in the coming years. Advances in transformer design and technology, including the integration of smart grids and digital monitoring systems, are enhancing operational efficiency and reliability. Additionally, the growing demand for electric vehicles and charging infrastructure is also contributing to the increased demand for transformers.

2.1.1 Major transformer-producing regions

The Asia-Pacific region, particularly China and India, has been a significant contributor to the growth of the transformer manufacturing industry, driven by rapid industrialisation and infrastructure development. Companies like ABB, General Electric, Mitsubishi Electric, Schneider Electric, Siemens, and TBEA.

Figure 13: Major transformer producing regions

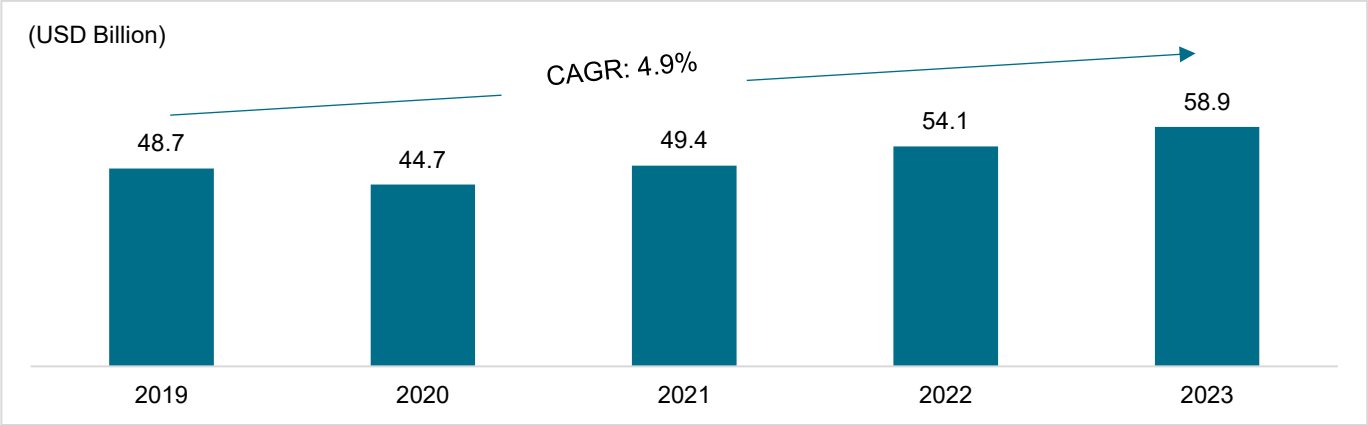


Source: Industry, Crisil Intelligence

2.1.2 Total market size actuals and estimates

Escalating infrastructural spending supported by favorable norms pertaining to the refurbishment and expansion of existing grid networks have instilled an upsurge in the demand for power transformers. Rapid urbanisation along with ongoing industrial expansion across the developing economies will further augment business growth. Increasing demand for the upgradation and replacement of aging electric network across the North America & Europe region have instituted a favorable industrial scenario. During the last five years (2019-2023), the global transformer market has grown at a CAGR of ~4.9%.

Figure 14: Global historical market size of transformers



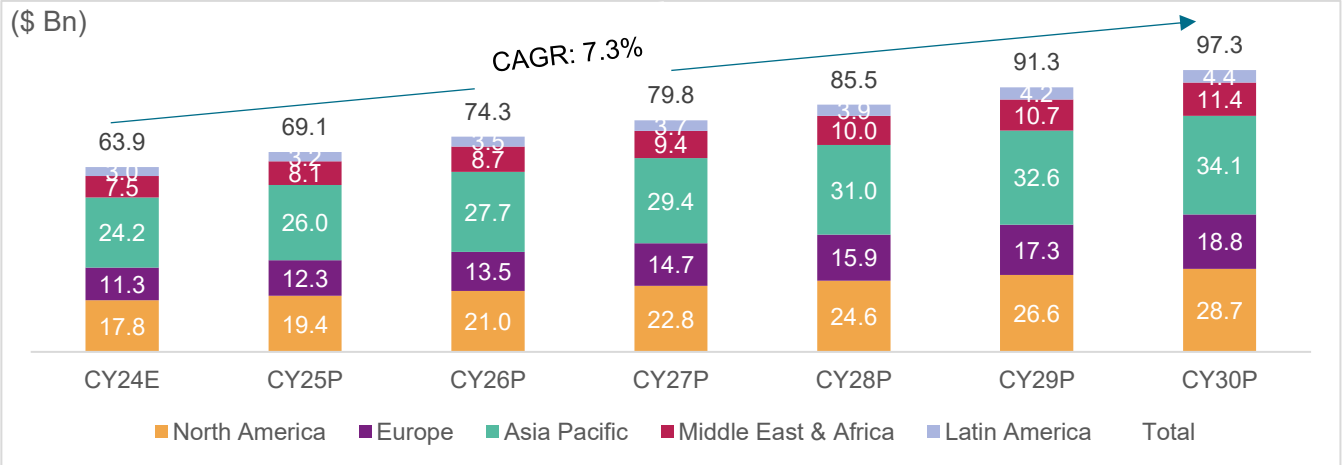
Source: Global Market Insights, Crisil Intelligence

The growing focus toward replacement of the existing electrical equipment with advanced high-quality systems will further fuel the product demand. In addition, an upsurge in the electricity demand coupled with favourable regulatory reforms toward the expansion of the existing grid infrastructure will drive the transformer market. The provision of affordable uninterrupted electricity has been a major thrust area for the regulators, which clearly drives the reforms and policies undertaken. Government efforts to enhance energy efficiency coupled with an increased focus on the addition of power generation capacity will further boost the industry growth. Moreover, the U.S. government has introduced policies and incentive schemes with an aim to integrate sustainable resources and improve the conventional electrical networks across the rural areas.

Shifting trends toward energy-efficient technologies will drive the transformer market size in Europe. T&D retrofitting industry plays a vital role in raising the transformer demand across the region. Over half of the installed transformers in the region have been operating for over 25 years and need to be replaced. The rising electricity demand will significantly impact the investments in Europe T&D retrofitting industry, which will also influence the transformer market size in the coming years.

As per the above-mentioned growth drivers the global transformer market is expected to reach over USD 97 billion by 2030 at an annual growth rate of ~7.3% between 2024 -2030. India's current share in total global transformer market as of December 2024 was about 8-10% which is expected to increase to 10-12% by 2030. However, India's share in Asia Pacific market is in the range of 24-26%. North America and Asia Pacific regions constitute over 65% of the global market share and would continue to dominate the market.

Figure 15: Global region wise transformer market outlook



(E): Estimated; (P): Projected;

Source: Global Market Insights, Crisil Intelligence

2.2 Domestic transformer market overview and outlook

2.2.1 Growth drivers, restraints, and success factors

Growth drivers:

- **Increasing electricity demand –** India's transformer market is driven by the relentless growth in electricity demand, with per capita consumption surging by over 50% in the last decade. As the population expands and the economy grows, the country's energy needs are on a steady upward trend. The government's efforts to electrify rural areas and provide uninterrupted power supply to urban regions have further accelerated the demand for transformers. These devices play a crucial role in transmitting power efficiently, stepping up voltage from generation stations and stepping it down for distribution to end-users. As electricity demand continues to soar, the need for reliable and efficient transformers becomes increasingly critical to ensure uninterrupted power delivery across the country.
- **Rapid industrialisation and urbanisation** – The rapid industrialisation and urbanisation of India are key factors propelling the growth of the country's transformer market. As the economy continues to expand, new industries are emerging and existing ones are scaling up, creating a surge in demand for reliable power supply to support manufacturing and other industrial activities. Efficient power transmission over long distances, minimal energy losses, and grid stability are critical, making transformers an essential component. Furthermore, urbanisation is driving up electricity demand in residential, commercial, and infrastructure projects, necessitating the use of advanced power transformers to manage the increasing load on the electrical grid.
- **RE integration –** A significant trend shaping India's high voltage power transmission market is the increasing adoption of renewable energy sources. With the country aiming to reach 500 GW of non-fossil capacity by 2030, there is a growing requirement for high voltage power transformers that can accommodate the variable and intermittent nature of renewable energy generation. As per Central Electricity Authority (CEA), the need for significant investments in India's transmission infrastructure to integrate over 500 GW of renewable energy capacity by 2030. Approximately 162,646 ckm of transmission lines and 1,159,805 MVA of substation capacity will be required to connect additional generation capacity including wind, solar, energy storage and potential RE zones to the grid between fiscal 2025-32 which are located in remote areas and are concentrated in a few states. The majority of this new transmission investment will focus on long-distance RE connectivity at voltage levels above 220 kV. A total expenditure of Rs 9.16 trillion has been planned to augment power transmission infrastructure capacity in the country by 2032.

  As per CEA's National Electricity Plan, the Interstate transmission system for 82.2 GW RE capacity is under construction and for 55 GW capacity is under bidding. Furthermore, under the Green Energy Corridor (GEC) scheme, a total of 52,426 MVA of substation capacity and 17,341 ckm of transmission lines have been envisaged to cater for over 44 GW of RE capacity. Of this, 9,161 ckm of transmission lines have been constructed and 21,925 MVA of substation capacity have been charged as of March 2025. About 30,500 MVA of substation capacity is expected to be constructed/commissioned by March 2026.

  As India transitions towards its renewable energy goals, the demand for advanced transformers that can efficiently manage the intermittent nature of renewable power generation is expected to rise sharply. This shift will require transformers equipped with smart grid technologies, phase-shifting capabilities, and voltage regulation features, which will significantly reshape the market dynamics for transformers in India.
- **Increasing thermal and hydro generation capacities –** As per CEA's National Electricity Plan, the projected peak demand of India to reach 277 GW by fiscal 2027 and 366 GW by fiscal 2032. To meet the rising demand, the government has planned to add over 80 GW of thermal and over 15 GW of hydro plants by 2032. This would increase the transformer requirements in India including auxiliary transformers and service transformers.

- **Government initiatives –** Government initiatives have played a crucial role in driving the growth of the transformer market in India. Schemes such as GEC initiative and the Revamped Distribution Sector Scheme (RDSS) have been instrumental in accelerating electrification, upgrading transmission infrastructure, and ensuring reliable last-mile connectivity. The GEC-II scheme aims to integrate about 19.4 GW of RE capacity into the intra-state system, thereby creating a significant demand for transformers. These initiatives not only stimulate demand for transformers but also encourage investments in modernisation and capacity enhancement across the power sector value chain, ultimately driving the growth of the transformer market in India**.**
- **EV charging infrastructure, railways and data centres –** The Indian power sector is poised for significant growth, driven by strong demand from high-growth end markets such as data centers and EV charging networks. As these industries expand, they will place additional pressure on grid capacity and resiliency, necessitating the deployment of new, modern transformers. Furthermore, the Indian Railways' shift towards high-speed trains has created a surge in demand for transformers operating between 66 kV and 133 kV voltage levels. The accelerated roll-out of high-speed trains, metro lines, and freight corridors is expected to fuel a significant increase in transformer demand in India over the next few years, presenting opportunities for the transformer industry to grow and evolve.
- **Smart grid development –** A key trend driving the market is the focus on grid modernisation and the development of smart grids. The adoption of smart grid technologies, which rely on digital communications and automation, necessitates the use of advanced transformers that can support intelligent grid management. These smart grids optimise power distribution, enable faster fault detection and response, and facilitate better power flow management. The integration of high-voltage transformers with smart grid capabilities is critical for building a resilient and responsive power infrastructure. The Indian government's national smart grid mission, for instance, aims to accelerate the deployment of smart grids across the country, further underscoring the importance of these advanced transformers.
- **Enhanced steel production targets by Government of India:** National Steel Policy (NSP) 2017 had set ambitious targets to achieve a crude steel capacity of 300 million tonnes (MT) by 2030-31, with an expected production of 255 MT of crude steel and 230 MT of finished steel. Additionally, the government has set a target of 500 MT of steel production by 2034. This should drive the demand for furnace transformers which are used to feed electric furnaces used to melt and refine materials. With very high secondary current and wide voltage regulations, the furnace transformers are best suited for furnace requirements.
- **Increased focus on HVDS:** To improve quality (Voltage profile) of electric supply, reducing theft and reducing the losses in the system, high voltage distribution system (HVDS) is used by the Discoms as an alternate to low voltage distribution systems (LVDS). In this system,11 KV lines are extended up to or as nearer as possible, to the load center, and small size single phase distribution transformers ranging from 10KVA to 50KVA depending on load requirement are installed on poles to supply power to consumers. However, safety clearances are to be taken into account during the laying of 11 KV lines in the narrow streets. The HVDS system has more 11 KV Line and more DTs but virtually no LT lines or very less LT lines as compared to LVDS system. This is also expected to drive the demand for transformers.
- **Micro grid –** Microgrids are small-scale, local energy systems that can operate in isolation from the main grid, providing reliable and efficient energy to remote or off-grid communities. Microgrids have gained significant attention in recent years as a means to promote renewable energy, energy access, and rural development. The distributed energy systems, including rooftop solar and microgrids, are growing in India due to both policy incentives and economic viability. As a result, there has been a notable expansion of micro-grid networks which will drive demand for small-scale specialty transformers suited for localised applications.

Restraints:

- **High initial investment –** One of the key challenges hindering the growth of the Indian transformer market is the high upfront investment required for the manufacturing, installation, and maintenance of transformers. The substantial financial resources needed can be a significant barrier for smaller utilities and companies with limited budgets, making it difficult for them to adopt advanced transformer technologies. Furthermore, the long payback period associated with these investments can also deter stakeholders from committing power transformers, thereby limiting the widespread adoption of these technologies.
- **Technical and operational challenges –** Power transformers in India are susceptible to various technical and operational challenges that can compromise their performance and reliability. Common issues such as overheating, insulation failure, and electromagnetic interference can cause transformer malfunctions and outages, leading to significant disruptions. The intricate nature of these transformers demands specialised expertise for their operation and maintenance, and the shortage of skilled professionals can exacerbate these technical challenges. Furthermore, the increasing integration of renewable energy sources adds complexity to transformer operations, as they must adapt to fluctuating power loads and maintain grid stability, posing additional technical hurdles.
- **Supply chain disruptions –** The Indian power transformer market faces significant challenges due to supply chain disruptions and raw material shortages. The production of high voltage transformers relies heavily on the availability of critical raw materials such as copper, steel, and specialised insulating materials. Any disruption in the supply of these materials, whether due to geopolitical tensions, trade restrictions, or natural disasters, can lead to production delays and increased costs. Moreover, the global competition for these materials can result in price volatility, which can have a ripple effect on the overall cost structure of transformer manufacturing, ultimately impacting the industry's competitiveness and profitability.
- **Aging infrastructure –** India's power infrastructure is facing significant challenges, with many existing transmission and distribution networks being outdated and unable to support the increased load and advanced technology required for modern transformers. The need to upgrade these aging infrastructures requires substantial investment and collaborative efforts between government agencies and private stakeholders. The slow pace of infrastructure modernisation can hinder the deployment of new transformers, limit the market's growth potential and create a bottleneck for the adoption of advanced technologies. As a result, the power transformer market in India is constrained by the need for infrastructure upgrades, which can impact its overall development and expansion.

2.2.2 Key Government Initiatives to boost transformer manufacturing in India

The Indian government is giving significant attention to the transformer market. The promotion of 'Make in India,' a government initiative, encourages the manufacturing of transformer equipment within India. It aims to make India a global manufacturing hub for the transformer industry by providing numerous incentives to local and foreign manufacturers. The government is also investing in the renewable energy sector and expanding the power transmission network, which will create opportunities for the transformer market's growth.

Under the Budget 2025, the government has launched National Manufacturing Mission covering large, medium and small industries to bolster the Make in India initiative. The budget focuses on investments in power transmission, renewable energy, and infrastructure, which are expected to increase demand for transformers, particularly in high-voltage and specialised applications.

2.2.3 Domestic transformer market regulatory framework

There are various regulatory authorities and standards oversee transformer safety and compliance in India, guaranteeing safe design, manufacture, and operating procedures throughout the electrical sector.

- **Bureau of Indian Standards (BIS):** In India, the mandatory BIS certification for transformers has led to a significant improvement in product quality and a reduction in failure rates. The BIS, India's national standards organisation, is responsible for establishing and enforcing guidelines for various products, including transformers.

By publishing standards that outline performance norms, testing protocols, and safety requirements, the BIS ensures that transformers meet rigorous quality and safety benchmarks. The implementation of BIS standards has resulted in a standardised product, which has enhanced the overall quality and reliability of transformers produced in the country. Some of the fundamental requirements are:

- *IS 2026 (Power Transformers)* - It is a comprehensive standard that sets out the specifications for power transformers, encompassing performance, testing, design, and construction. The standard covers a range of critical aspects, including dielectric testing, temperature increase limitations, insulation levels, and short-circuit withstand capacity. By adhering to IS 2026, power transformers are ensured to meet stringent performance standards and operate safely in diverse environments, providing users with confidence in their reliability and functionality.
- *IS 1180 (Distribution Transformers)* - This standard specifically designed for distribution transformers, outlines essential criteria for energy efficiency, insulation, temperature rise, and mechanical strength. Additionally, this standard provides guidelines for the eco-friendly design of distribution transformers, which not only enhance energy efficiency but also minimise their environmental impact.
- *IS 3024 (Electrical Steel)* – It sets forth specifications for electrical steel used in transformer cores, emphasizing the importance of high-quality materials in achieving optimal transformer performance. By adhering to this standard, transformer core materials must demonstrate the necessary magnetic and mechanical properties, ultimately leading to improved transformer efficiency and reduced core losses.

- **Central Electricity Authority (CEA):** CEA plays a crucial role in regulating India's electrical industry, issuing rules and guidelines for the installation, operation, and maintenance of various electrical equipment, including transformers. To ensure accident-free and reliable operation, electrical installations must comply with the CEA's stringent safety regulations. The CEA's comprehensive requirements provide a framework for the safe installation, use, and maintenance of transformers, thereby guaranteeing a secure and efficient electrical infrastructure provided by the CEA's Safety Regulations which are as follows:
  - *Installation requirements:* The specifications provide detailed installation requirements for transformers, covering essential aspects such as site selection, foundation design, grounding, and clearances. Adherence to these guidelines ensures that transformer installations are safe and reliable, minimising the risk of electrical failures, fires, and other hazards, and thereby providing a secure operating environment.
  - *Operational safety:* It stipulate essential operational safety precautions for transformer operation, including the implementation of routine checks, continuous monitoring of operational parameters, and the installation of protective devices such as relays and circuit breakers. By following these guidelines, potential issues can be identified and addressed proactively, preventing them from escalating into more severe problems and ensuring the safe and reliable operation of transformers.
  - *Maintenance practices:* This involves periodic checks on oil quality, thermal performance, and insulating resistance to identify potential issues before they become major problems. By detecting and addressing issues such as oil contamination, overheating, and insulation degradation through proactive maintenance, transformer failures can be prevented, and optimal performance can be sustained.

  Further, CEA had issued Guidelines for the Periodicity of Type Tests for Major Equipment used in Electrical Power System, 2022 to set uniformity in the periodicity of type tests in respect of various equipment. However, to to address inconsistencies in type test requirements for equipment across generation, transmission, and distribution segments, the CEA has released revised draft Guidelines in Nov 2024. It includes provisions for extending the validity of type test reports for equipment of similar design and stress levels, ensuring uniformity in periodicity, and rationalising the conditions under which type tests need to be repeated. The draft also outlines specific conditions under which repeated testing may be waived, such as cases where there are no significant changes in design, materials, or manufacturing processes.

2.2.4 Import-exports of transformers in India

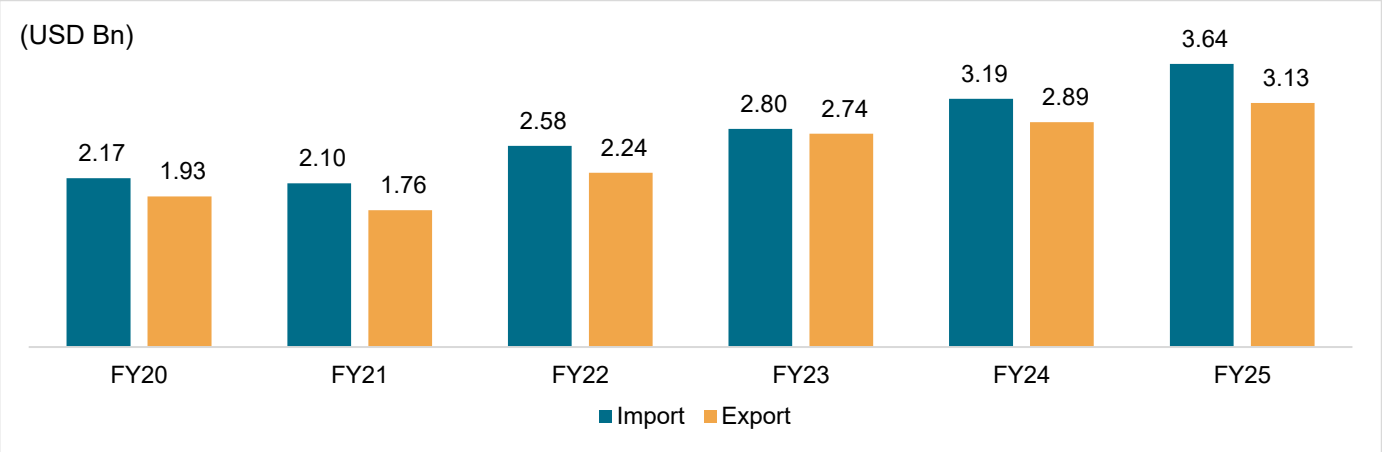
India's electrical transformer trade is a significant aspect of its economy, showcasing its dual role as a global supplier and consumer. The value of exports of transformers (incl. related HS codes) from India was USD 3.13 billion in fiscal 2025. The exports of transformers went up by 8.6% compared to fiscal 2024. During fiscal 2025, key export destinations for transformers include USA, UK, China, UAE, European Countries etc.

Similarly, the value of imports of transformers (incl. related HS codes) to India was USD 3.64 billion in fiscal 2025. The imports of transformers went up by 14.1% compared to fiscal 2024. During fiscal 2025, key import partners countries for transformers include China, Japan, European Countries, Korea etc.

This near parity in trade indicates India's robust engagement in the global transformer market, driven by domestic industrial needs and international demand for Indian-manufactured transformers. India is emerging as a preferred supplier of transformers to the US and European markets, as global tensions between Ukraine and Russia continue to escalate, highlighting the country's growing importance as a reliable and trusted transformer manufacturer.

In terms of imports, China is a significant supplier of cost-effective specialty transformers for industrial automation and renewable energy. Germany and Japan are known for high-quality, precision-engineered transformers for medical and specialised industrial applications, whereas US supplies advanced products for defence and high-end industrial requirements.

Figure 16: Historical import export of transformers – India



HSN Codes: 850410; 850421; 850422; 850423; 850431; 850433; 850434; 850440; 850450 & 850490
Source: Ministry of Commerce, Crisil Intelligence

2.2.5 Total market size - actuals and estimates

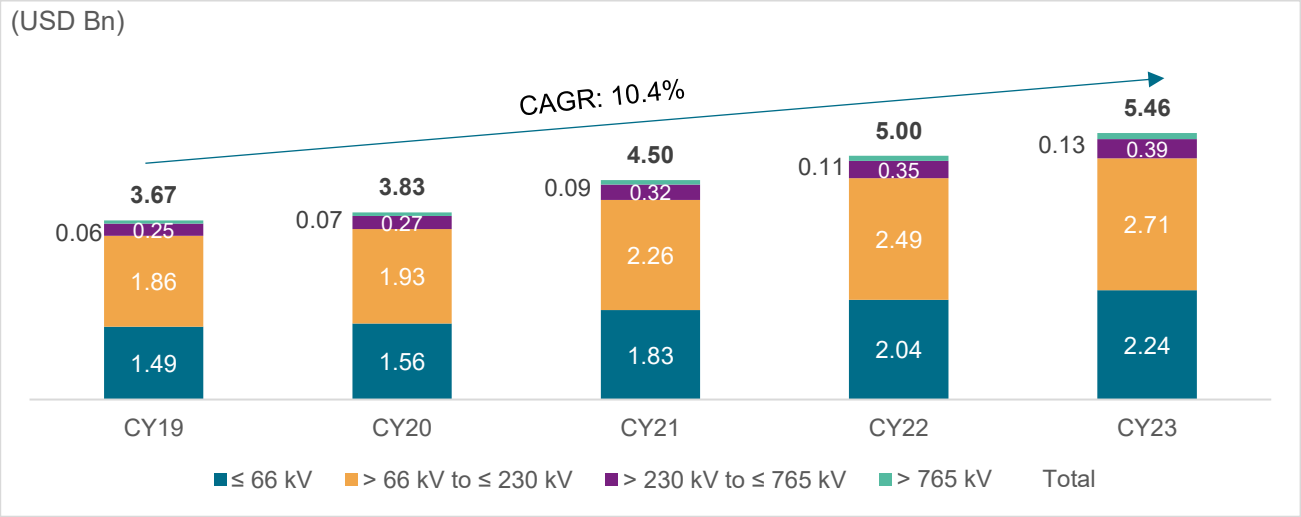
The transformer market is experiencing a significant surge in demand, primarily driven by the rapid expansion of the transmission and distribution sector. India's growing power demand, manufacturing push, and electrification efforts, as well as the country's ambitious green energy transition goal of 500 GW by 2030, are all contributing to a revival of transmission and distribution capital expenditure (capex) activity. According to the CEA's National Electricity Plan, the power transmission segment alone is expected to see a capex of Rs. 4.25 trillion by 2027, underscoring the immense opportunities for transformer manufacturers in this space.

India's AC transformation capacity has been steadily increasing, reaching 1,304 GVA across the 220-765 kV levels as of March 2025. Over the six-year period from fiscal 2019 to 2025, the AC transformation capacity grew at a CAGR of 5.8%.

During fiscal 2025, the total market for transformers (power and distribution) upto and including 200 MVA/ 220 kV was estimated around USD 1.6 – 1.8 billion.

The domestic transformer market is expected to grow by 7-8% in 2025. The transformer segment has registered growth of 10.4% between 2019-23 and is expected to grow at CAGR of ~6-7% from 2024-30. Historically, transformer growth benefitted from aggressive push on electrification, renewable integration, rural grid expansion under SAUBHAGYA, DDUGJY, Power for All and other government schemes, resulting in robust demand. However, during the forecast period, the demand drivers such as renewables, EV integration, grid modernisation, urbanisation, will remain strong but rising material cost, supply chain volatility, and execution delays may affect the growth rate compared to the historical years.

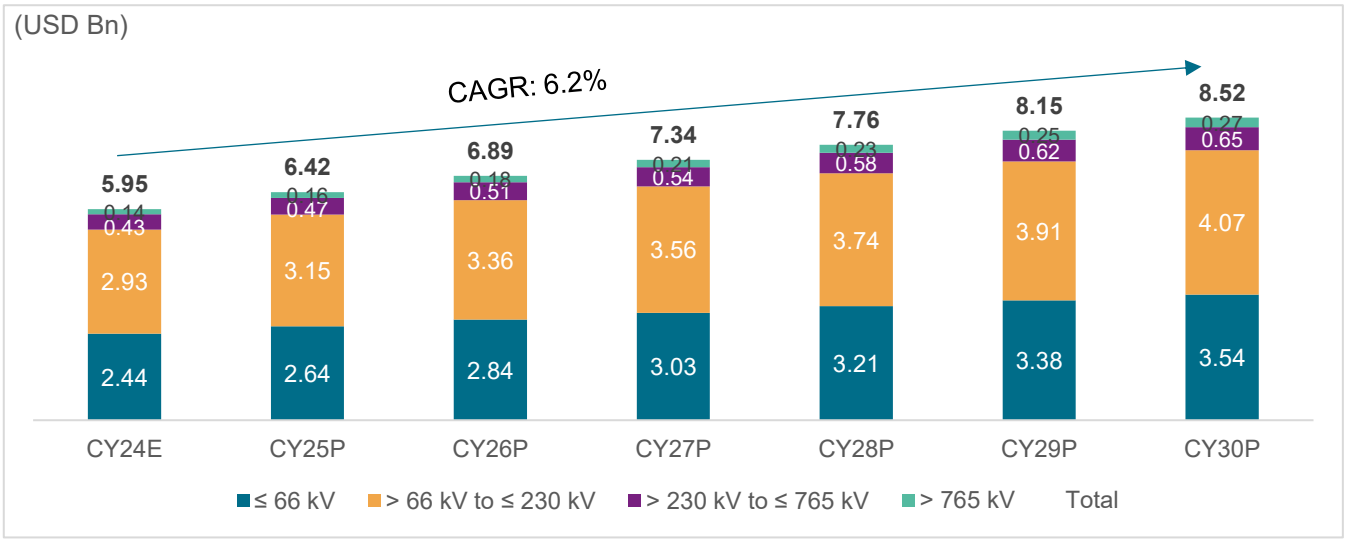
Figure 17: India historical market size of transformers



Note: This includes all type of transformers such as power transformers, distribution transformers, instrument transformers, Auto-transformers, specialty transformers, etc.

Source: Global Market Insights, Crisil Intelligence

Figure 18: India transformer market outlook



Note: This includes all type of transformers such as power transformers, distribution transformers, instrument transformers, Auto-transformers, specialty transformers, etc.

(E): Estimated; (P): Projected

Source: Global Market Insights, Crisil Intelligence

2.3 Transformer technology and innovations

The transformer industry is undergoing a transformative shift, driven by technological innovations that are enhancing efficiency, reliability, and grid resilience. As electricity demand continues to rise, the EHV and UHV power transformer market is poised for significant growth. These transformers play a crucial role in transmitting electricity over long distances with minimal losses, making them essential for efficient power distribution networks. HVDC transformers are particularly important for efficient long-distance power transmission, converting AC to DC in converter stations and enabling the seamless integration of renewable energy sources. By combining transformers with flexible AC transmission systems, utilities can achieve precise control and bidirectional power flow between grids and devices, such as static synchronous compensators, thereby enhancing system efficiency and stability.

Smart transformers, enabled by IoT, AI, and predictive analytics, are revolutionising maintenance practices by providing real-time monitoring, remote diagnostics, and proactive maintenance, thereby optimising asset performance and minimising downtime. Advances in insulation materials, cooling systems, and design optimisation techniques are also driving the development of compact, energy-efficient transformers that can operate in diverse conditions.

Energy efficiency has become a top priority for utilities and industries seeking to reduce their environmental footprint and optimise operational costs. Energy-efficient transformers and eco-friendly ester-filled transformers are gaining popularity due to their superior performance, reduced losses, and lower carbon footprint.

The transition of steel mills using glass furnaces to arc furnace transformers due to pollution regulations is also expected to drive demand for suppliers. The range of transformer types, including distribution transformers, autotransformers, and mobile transformers, ensures that utilities and industries can find the right solution for their specific needs.

As renewable energy sources continue to expand, transformers are being adapted to handle the unique challenges of variable and intermittent power generation, contributing to the integration of clean energy into the grid. Additionally, miniaturisation and modularisation trends enable the development of more compact and scalable transformer designs, catering to space-constrained environments and facilitating rapid deployment. Environmental sustainability considerations are shaping transformer materials and fluids, with a growing emphasis on eco-friendly solutions and lifecycle management practices.

The digital transformation of the energy sector is giving rise to a new era of transformer management, marked by data-driven decision-making, predictive maintenance, and autonomous operation. Advanced monitoring systems, integrated with supervisory control and data acquisition, and cloud-based platforms, enable utilities to tap into vast amounts of operational data, optimising asset utilisation, enhancing grid stability, and streamlining maintenance workflows. As distributed energy resources and microgrids become increasingly prevalent, the need for agile, adaptive transformers that can dynamically manage bidirectional power flows and voltage fluctuations has become more pressing, driving the development of innovative solutions that can meet these evolving demands.

2.4 R&D and the importance of having a strong R&D setup

Research and Development (R&D) facilities play a crucial role for transformer manufacturing companies in India, especially given the country's growing energy needs and rapid industrialisation. The importance of R&D in this sector and ongoing progress by Indian manufacturers can be summarised as follows:

R&D enables manufacturers to design transformers with improved efficiency, reduced losses, and enhanced performance. New materials and advanced insulating materials can be developed to meet global standards. Further, with the rapid growth of solar and wind energy in India, transformers need to be designed to handle variable loads and integrate seamlessly with renewable energy sources.

India’s diverse climate, varying grid conditions, and high population density necessitate transformers tailored to local requirements. R&D helps design transformers resistant to extreme weather, voltage fluctuations, and overloading.

R&D also enables the development of smart transformers equipped with sensors, IoT capabilities, and predictive maintenance technologies, essential for the implementation of smart grids.

Most of the major transformer manufacturers in India had collaborations with reputed international companies, such as Associated Electrical Industries (AEI) U.K.; Alstom, France; Hawker Siddely, U.K.; Hitachi, Japan and Siemens, Germany. Presently, Indian manufacturers have the know-how to design and manufacture transformers upto 400 kV indigenously.

3 Power transformers market overview and outlook

3.1 Global power transformer market

The global rise in infrastructural spending is significantly bolstering the power transformer market. Governments and private sectors worldwide are heavily investing in infrastructure projects, including transportation, residential, and industrial developments, which require robust electrical networks to support growing energy demands. Urbanisation, particularly in emerging economies, is a key factor driving this trend. Expanding cities and the establishment of smart cities demand reliable electricity infrastructure, where power transformers are integral for efficient energy distribution and transmission.

The power transformer market is also fueled by extensive upgrades to existing grid networks. Aging infrastructure, particularly in developed regions like North America and Europe, has led to grid inefficiencies, higher maintenance costs, and increased risks of power outages. Many power systems were built decades ago and struggle to handle modern-day electricity demands due to aging equipment and outdated technology. Grid upgrades address these challenges, improving energy reliability, stability, and efficiency—qualities essential for meeting current and future energy demands.

Renewable energy sources like wind and solar energy are inherently variable, depending on weather and time of day. This intermittent nature presents challenges for grid stability, requiring sophisticated solutions to balance supply and demand. Power transformers equipped with advanced monitoring and control systems help address this by managing voltage fluctuations and maintaining a stable power flow. They also support load balancing, which is essential in grids with high penetration of renewables. This flexibility is particularly important in regions with aggressive renewable energy targets, such as the European Union, the United States, and China.

The global shift toward renewable energy is another major factor driving demand for power transformers. As countries aim to reduce carbon emissions and transition to cleaner energy sources, large-scale renewable energy projects have become increasingly common. Power transformers play a crucial role in integrating these renewable sources into existing grid networks, converting electricity generated from wind, solar, and hydro sources into voltages suitable for transmission and distribution.

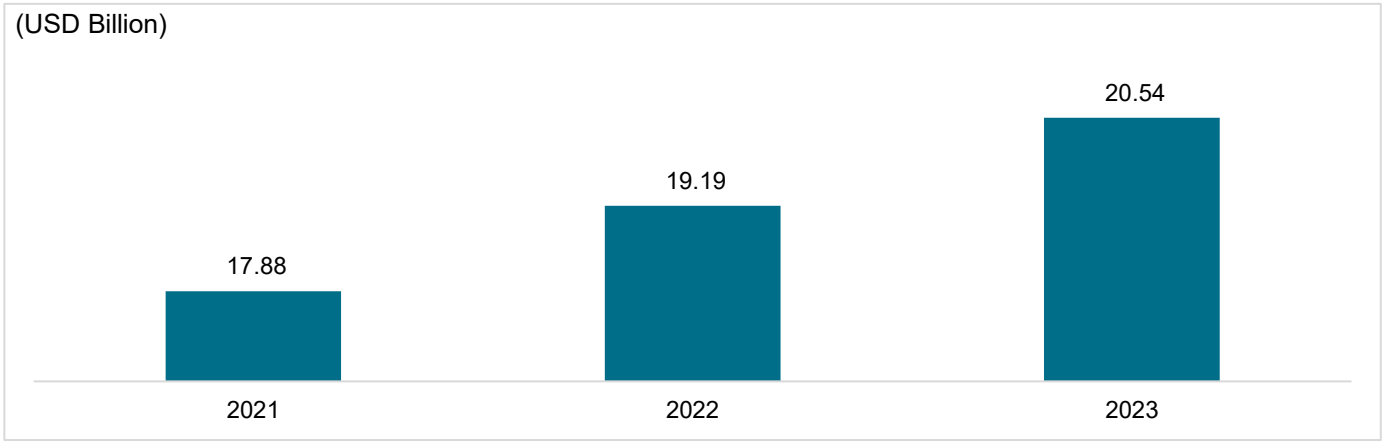
In the Asia Pacific region, renewable energy integration is accelerating, with countries like India, Japan, and Australia investing in large-scale solar and wind projects. India, for instance, has ambitious plans to increase its renewable energy capacity significantly in the coming years. Power transformers that support grid stability, high voltage transmission, and efficient energy conversion are essential for these developments, as they enable seamless integration of renewable sources into the national grid. In addition, developing countries are significantly adopting clean energy solutions to combat climate change demand for advanced transformers that facilitate stable and efficient integration of renewable power will continue to rise, cementing their importance in the future energy landscape.

3.1.1 Total global market size in value

The industrial sector's growing shift towards automation and electrification, driven by Industry 4.0, increases energy demand for manufacturing, logistics, and data centers. Power transformers play a vital role in powering high-capacity machinery and ensuring stable voltage for complex industrial processes. Automation requires consistent, high-quality power supply, which transformers help achieve. Sectors like data centers, which demand large amounts of uninterrupted power, are increasingly investing in high-capacity transformers to support operations, ensuring system reliability and enhancing power distribution networks.

Technological advancements, including improved transformer designs with reduced losses, efficient cooling systems, and higher voltage capacities, are driving market growth. Transformer manufacturers are also integrating digital sensors to allow real-time monitoring, helping to detect issues early and extend the equipment's operational life. As governments and industries prioritise sustainable and high-efficiency solutions, investments in advanced transformer technology are expected to continue growing.

Figure 19: Global historical market size of power transformers

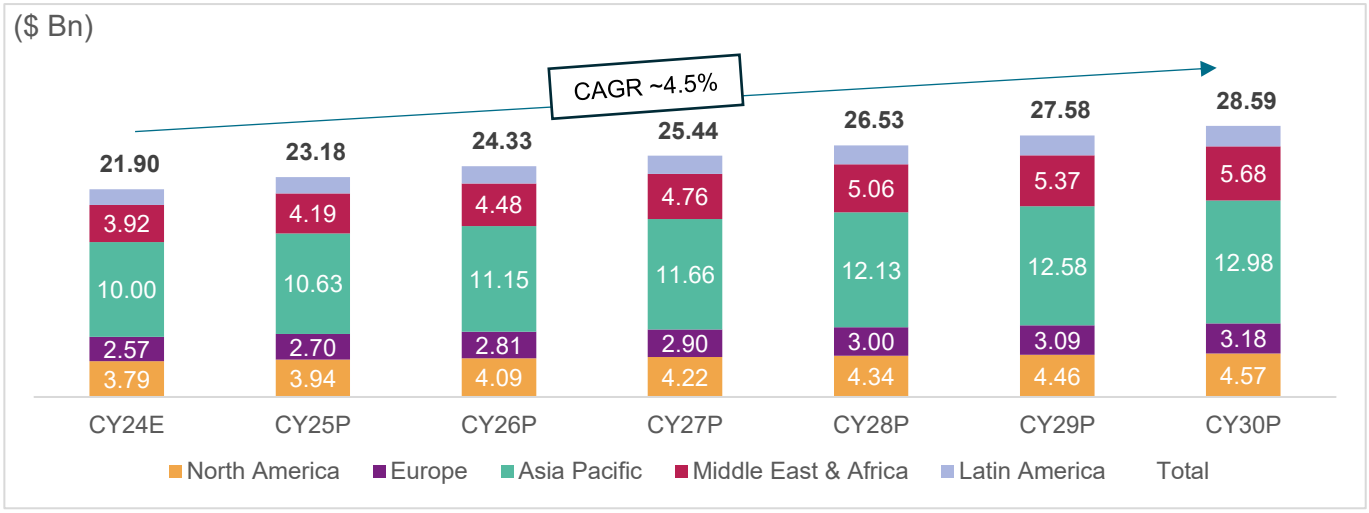


Source: Global Market Insights, Crisil Intelligence

3.1.2 Market segmentation by geography

The Asia pacific region accounts for over 45% of the total power transformer requirement followed by MEA region at 18-20%. North America and Europe cumulatively account for ~27-30% share and the rest by Latin America (7-8%).

Figure 20: Global region wise power transformer market outlook

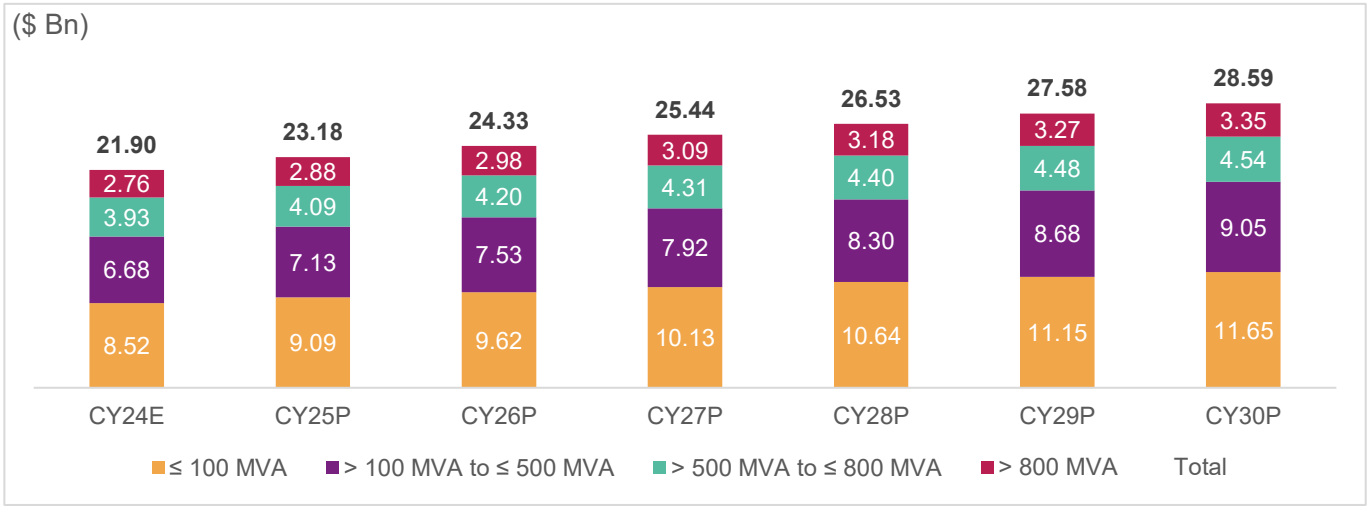


(E): Estimated; (P): Projected;
Source: Global Market Insights, Crisil Intelligence

3.1.3 Market segmentation by Power ratings (KVA/ MVA)

The global power transformer market is expected to grow at a CAGR of 4.5% between 2024-30. Transformers with a power rating <500 MVA would drive the market and is expected to grow at a CAGR of 5.0-5.5%. About 70-75% of the total market share is from power transformers rating upto 500 MVA.

Figure 21: Global power ratings wise power transformer market outlook

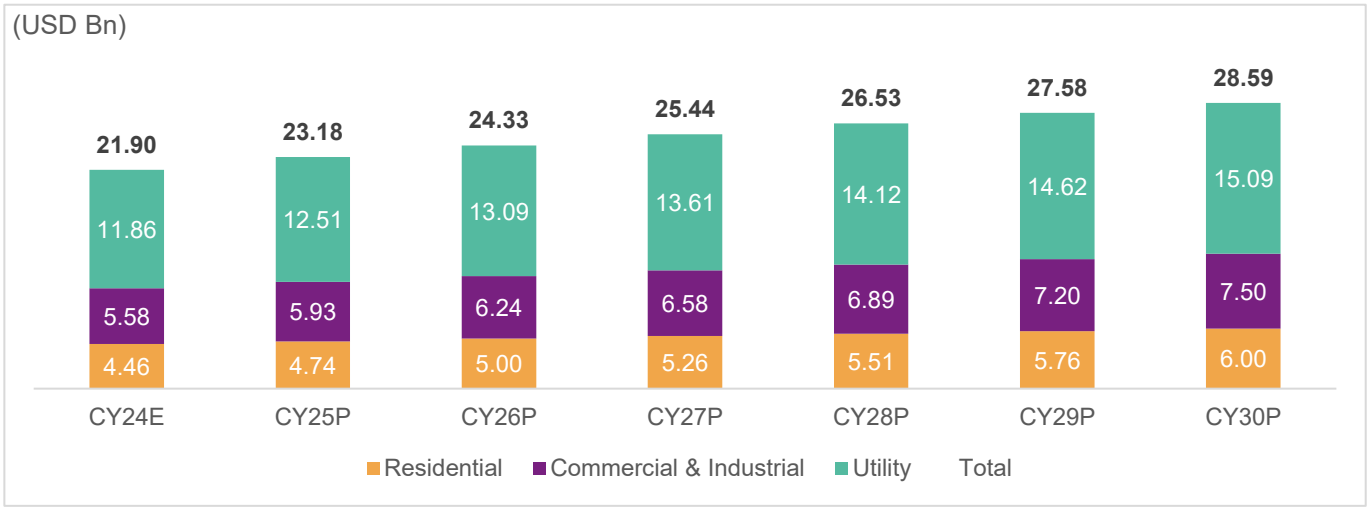


(E): Estimated; (P): Projected;
Source: Global Market Insights, Crisil Intelligence

3.1.4 Market segmentation by application

By 2030, the utility segment is expected to be a major contributor with over 50% share followed by C&I and residential with 20-25%, each.

Figure 22: Global application wise power transformer market outlook



(E): Estimated; (P): Projected;
Source: Global Market Insights, Crisil Intelligence

3.2 Domestic power transformers market overview

The Indian power transformer market has grown significantly over the past decade, driven by sustained investments in electricity infrastructure, renewable energy expansion, and increasing demand for reliable power distribution. The power transformer segment forms the backbone of India's transmission and distribution (T&D) sector, with its applications spanning power generation, transmission, distribution, and industrial usage.

3.2.1 Market segmentation by voltage levels (kV)

In India, the Generation, transmission and Distribution happens at various voltage levels. Power generation in conventional power plants typically produces electricity at voltage level between 11 kV and 25 kV. HV and EHV transmission lines transport power from the power plant over long distances at voltages like 132 kV, 220 kV, 400 kV and 760 kV. Power from transmission network is delivered to sub-transmission network after stepping down the voltage to 66 kV or 33 kV through 220/132/66/33 kV Grid substations. The T&D system in India operates at several voltage levels:

- Extra high voltage (EHV): 765 kV, 400 kV and 220 kV
- High voltage: 132 kV and 66 kV
- Medium voltage: 33 kV, 11 kV, 6.6 kV and 3.3 kV
- Low voltage: 1.1 kV, 220 volts and below

The voltage level above 66 kV to ≤ 220 kV transformers serve sub-transmission and small-to-medium power transmission lines that interconnect regional grids. Industrial growth, especially in sectors like manufacturing, mining, and construction, drives demand in this category as facilities require reliable power delivery. Additionally, as urban centres expand, utilities are upgrading transmission infrastructure, often using this voltage range for effective load management. Renewable integration also drives this market, with many wind and solar farms requiring transformers in this range to transfer generated electricity into the main grid.

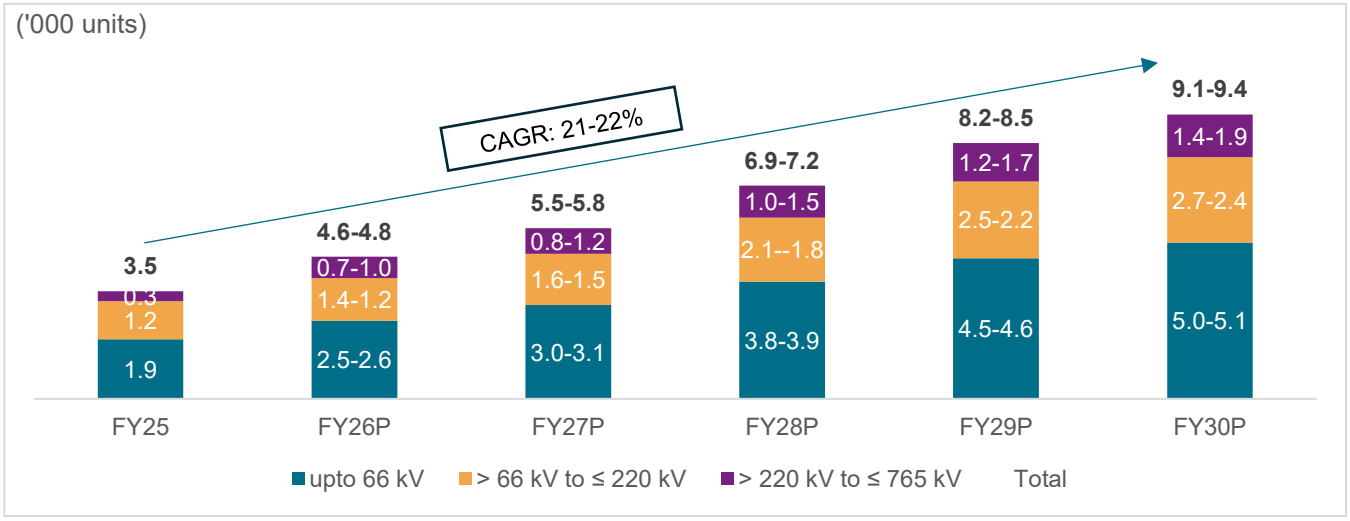
Above 220 kV to ≤ 765 kV transformers support major transmission networks that transport power across long distances, often from remote generation sites to urban and industrial centres. Growing investments in cross-border interconnections and regional grid stability drive demand for transformers within this range. Additionally, expansion in renewable energy capacity, particularly from offshore wind and large solar farms, contributes to the need for high-voltage transformers to transmit power efficiently over distances. Grid modernisation initiatives and efforts to reduce transmission losses further support demand in this voltage category.

Transformers above 765 kV are critical for ultra-high voltage transmission (UHV), which is increasingly essential in densely populated or geographically vast regions where electricity must be transported over very long distances. The shift to large-scale renewable energy generation in remote areas drives growth in this category, as these high-voltage transformers help integrate large energy blocks into national grids. Additionally, energy demand growth in rapidly developing regions supports investment in UHV networks, helping to minimise transmission losses and ensuring reliable, high-capacity electricity supply to metropolitan centres.

Below 66 kV rated transformers is primarily used in distribution networks for local power delivery, where urbanisation and expansion of residential areas drive demand. Increased electrification, especially in emerging economies, boosts requirements for distribution transformers. Growing demand for decentralised renewable energy sources like rooftop solar also supports this market segment, as these systems require lower voltage transformers to connect to local grids. Additionally, government initiatives aimed at rural electrification and improving access to reliable electricity continue to propel the deployment of ≤ 66 kV transformers.

As per Crisil Intelligence estimates, about 32,000- 35,000 units of total power transformers are expected between fiscal 2026-30 in various sectors such as power generation, T&D, renewable energy, mobility sector, commercial & industrial segment, etc. The growth of power transformers in India is estimated at 21-22% between fiscal 2025-30.

Figure 23: India voltage wise annual power transformer market outlook



P: Projected;

Source: Indian Electrical and Electronic Manufacturer Association (IEEMA), Crisil Intelligence

3.2.2 Market segmentation by application

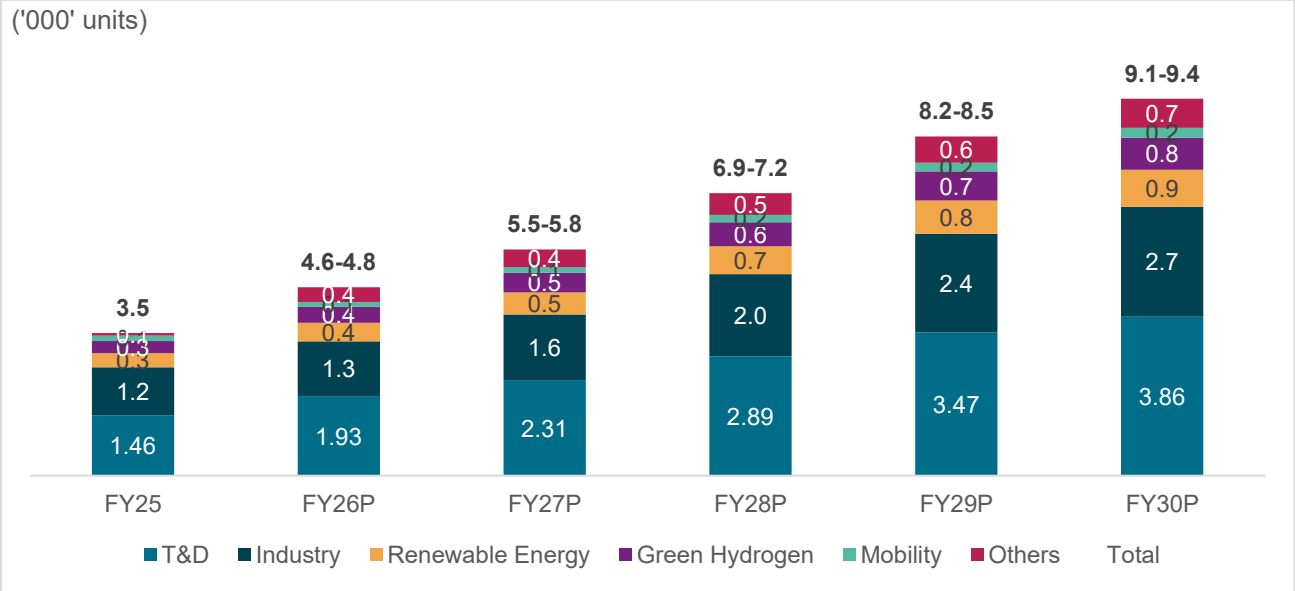
The domestic market for Power Transformers in India is segmented primarily by applications driven by the country's diverse industrial and infrastructure requirements. Major application areas include T&D, renewable energy, mobility sectors and specialised uses in the manufacturing industry for captive power and other purposes. Each segment is shaped by specific demands, technological requirements and government policies.

In the T&D sector, Transformers play a pivotal role in National Grid, supporting the high voltage transmission of electricity over vast distances and then subsequent distribution to urban and rural areas. Power transformers in this sector are set to grow due to government schemes. Additionally, the utility sector is a major growth driver supported by government investments in grid modernisation, renewable energy integration, and rural electrification projects. Large-scale utility projects, particularly renewable energy installations like solar and wind farms, are spurring the need for high-capacity transformers capable of managing fluctuating power loads. These varied applications underline the critical role of power transformers in supporting India's economic growth and energy transition.

The industrial sector is witnessing significant growth due to advancements in manufacturing, railways, and other energy-intensive industries, requiring high-capacity transformers for consistent power supply. The Indian Railways has committed to 100% electrification as part of its objective of being a net zero carbon emitter by 2030. The capacity addition pertaining to the electrification, gauge conversion and new line addition, high speed rail corridors, addition of metro rail lines across India would increase the transformer demand in the medium term.

The industrial sector is witnessing significant growth due to advancements in manufacturing, and other energy-intensive industries, requiring high-capacity transformers for consistent power supply. The increasing demand for steel and other metals in various industries, as well as the growing adoption of electric-arc furnaces over traditional methods, are key factors driving market growth.

Figure 24: India application wise annual power transformer requirement outlook



(P): Projected;
Source: Crisil Intelligence

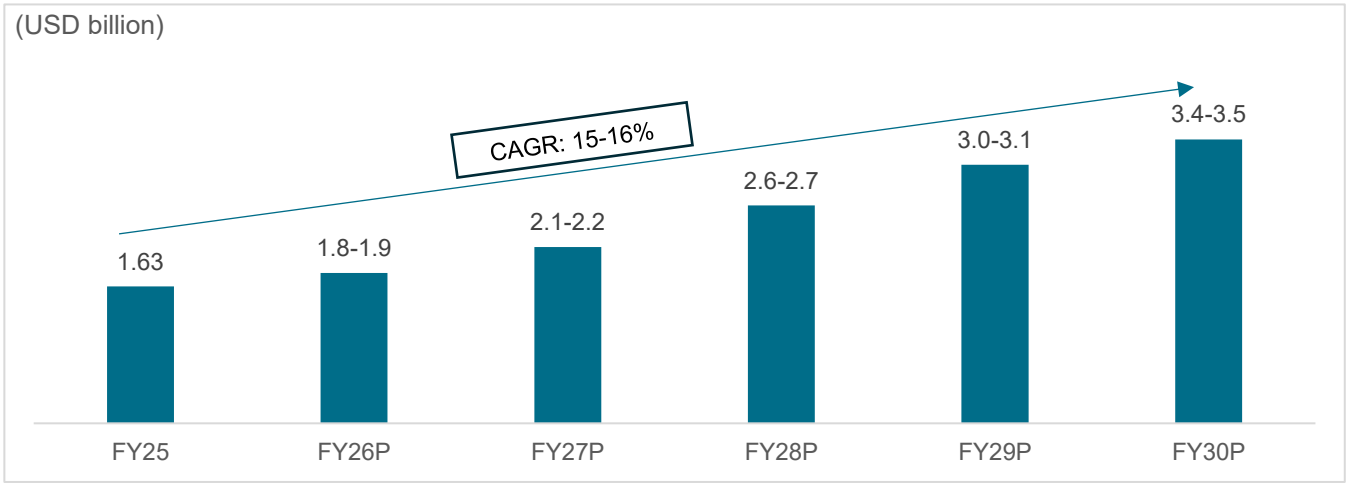
3.2.3 Total market size in value

India's power transformer market has consistently expanded in terms of installed capacity, reflecting the growing demand for electricity and the government's commitment to infrastructure development. Total annual domestic power transformer market is estimated to reach USD 3.5 billion in fiscal 2030. This growth is fueled by investments in renewable energy, industrialisation, urbanisation, and rural electrification programs. The annual growth rate of ~8.4% highlights the rising focus on improving transmission efficiency and addressing India's electricity deficit.

During fiscal 2025, the total market for power transformers upto and including 200 MVA/ 220 kV was estimated around 3,462 (in terms of no. of units) and USD 1.63 billion (in value terms).

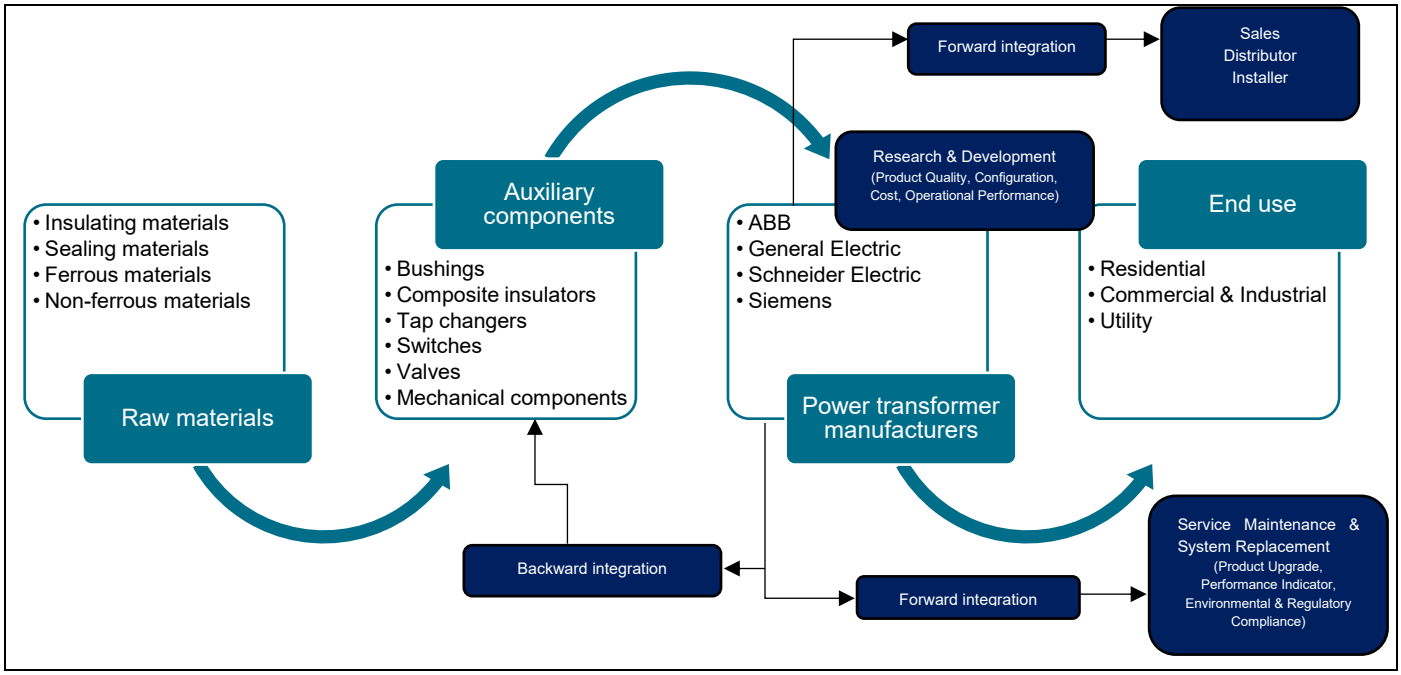
The projected market share of power transformers upto and including 200 MVA/ 220 kV is around 85-90% (in terms of no. of units) and 70-75% (in value terms) during the forecast period.

Figure 25: India annual market size of power transformers



P: Projected;
Source: Crisil Intelligence

3.3 Value chain analysis



Source: Global Market Insights, Crisil Intelligence

Power transformers are essential electrical devices used to transfer electrical energy between circuits through electromagnetic induction. They play a critical role in altering alternating voltage levels for power applications by either stepping up or stepping down the voltage. The power transformer value chain begins with sourcing raw materials, which primarily include copper, steel, insulation materials, transformer oils, and other critical components like bushings and tap changers. Copper and aluminum are essential for transformer windings, while steel is used in core construction to enhance magnetic properties and reduce losses. Insulation materials and oils are used to prevent short circuits and manage heat within the transformer.

The power transformer market ecosystem includes raw material and component suppliers, manufacturers, distributors, and end-users. Key components used in transformer manufacturing include copper, aluminum, iron/steel, bushings, radiators, composite insulators, oil, switches, breathers, relays, and valves. These components are vital throughout the value chain, accounting for over 60% of the total transformer cost. Fluctuations in the prices of these materials can significantly affect the overall revenue of the power transformer market.

Manufacturers and assemblers integrate these components and assemble them based on specific requirements. In many cases, there is forward integration, with component suppliers working directly with manufacturers and manufacturers engaging with distributors. Power transformers are widely used across various sectors, including utilities, residential, commercial, and industrial applications.

Power transformers serve various end-users, including utilities, industrial facilities, commercial buildings, and renewable energy installations. The usage conditions vary significantly across these applications, with some requiring high voltage capacity and others needing specialised cooling or insulation solutions. Feedback from these end users is essential in the value chain, as it helps manufacturers innovate and refine product offerings to meet evolving needs. Additionally, the market is dominated by prominent players like Hitachi ABB Power Grids, GE, Siemens, and Schneider Electric. However, numerous regional and smaller companies also have a strong presence in several countries, thanks to their robust distribution networks.

4 Specialty Transformers Market Overview

4.1 Key segments by product type

4.1.1 Furnace Transformer

- Furnace transformers are used to feed electric furnaces for melting and refining materials. Furnace transformers are associated with very high secondary currents and wide output voltage regulation in order to cope with the furnace needs in the steel and cement industries. These transformers are designed to resist the high levels of electrical, thermal and mechanical stresses to which they are subject to during utilisation.
- The furnace transformer is specially designed to withstand frequent short circuits on the secondary side. Currents drawn in the arc furnace are characterised by wide fluctuations and unbalanced conditions, leading to voltage drops, harmonics, etc. These effects can be reduced by supplying furnaces directly from a high capacity, high voltage transmission line through a furnace transformer.
- There are different types of furnace transformers such as Arc Furnace, Submerged Arc Furnace, Ladle Furnace and Induction Furnace. Arc Furnace demand for steel in sectors like construction and automotive has driven the adoption of electric arc furnace (EAF) technology. EAF transformers are crucial for providing the high power needed for the electric arc process, supporting market growth.
- Continuous improvements in EAF technology, including the development of more efficient transformers, have reduced energy consumption and operational costs. Innovations focus on higher energy efficiency and lower maintenance requirements, making these transformers more attractive.
- With a rise in scrap-based steel production, particularly in emerging economies, the need for reliable and efficient EAF transformers is increasing. These transformers are pivotal in managing the high voltage fluctuations typically in scrap-based steel production.
- EAF technology is seen as more environmentally friendly compared to traditional blast furnaces, generating less CO2. This shift is promoting the use of EAF transformers in the steel industry as part of sustainability efforts

4.1.2 Rectifier duty transformer

- Rectifier Duty Transformers, also known as pulse transformers, are designed to handle non-linear, non-sinusoidal loads resulting from their use with a variety of power electronic applications. These are classified based on rectification systems they support and their design from 6, 12, 24, 36, 48, or 60 pulse configurations.
- These transformers act as a link between the grid and the AC-DC converters. It provides the required number of phases, voltage shifts needed to realize the conversion and to adjust the rectifier input to vary the DC output voltage.
- They are usually used in various applications such as electrolysis process, aluminium smelting, graphitizing etc. India's green hydrogen mission to achieve 5 MMTPA of production by 2030 would require electrolysers, which is the core component in green hydrogen production, operate on DC power. It requires power conditioning to feed electrolysers, which is driving demand for specialised transformers designed for rectification.
- The growing electrochemical industries, particularly in the production of aluminum and chemical processes as well, are driving demand for rectifier transformers due to their crucial role in providing stable DC power for electrolysis processes.

- Advances in transformer design, such as the introduction of high-efficiency and compact models, have contributed to the wider adoption of rectifier transformers in industries requiring precise power conversion.

4.1.3 Inverter duty transformer

- These are used to transfer electrical energy without changing frequency and are mostly suitable for solar and wind applications. They are specialised, high-efficiency transformers with high overload capability, reduced noise and vibration levels, designed for RE applications, VFDs.
- As the inverter converts direct current to alternating current at a lower voltage, this kind of transformer is used to step up this voltage to a higher voltage level. Inverters usually produce high-frequency signals that are difficult for regular transformers to handle, it is built to handle high-frequency and high-voltage transmissions transmitted by inverters.
- Inverter transformers are essential for solar and wind power plants to convert DC into AC for grid integration. As the renewable energy sector grows, the demand for inverter transformers has surged.
- The rise in electric vehicle adoption is pushing the demand for inverter transformers, which are used in charging stations and EV power systems to ensure smooth DC to AC conversion for efficient charging.
- With advancements in inverter technology, such as the development of more compact, efficient, and reliable inverters, inverter transformers are evolving. These transformers are increasingly being designed to handle higher power outputs and improve overall system efficiency.
- As battery energy storage systems (BESS) become more widespread, the need for inverter transformers has risen. They play a critical role in managing the DC power from storage units and converting it into AC for distribution.

4.1.4 Phase Shifting transformers

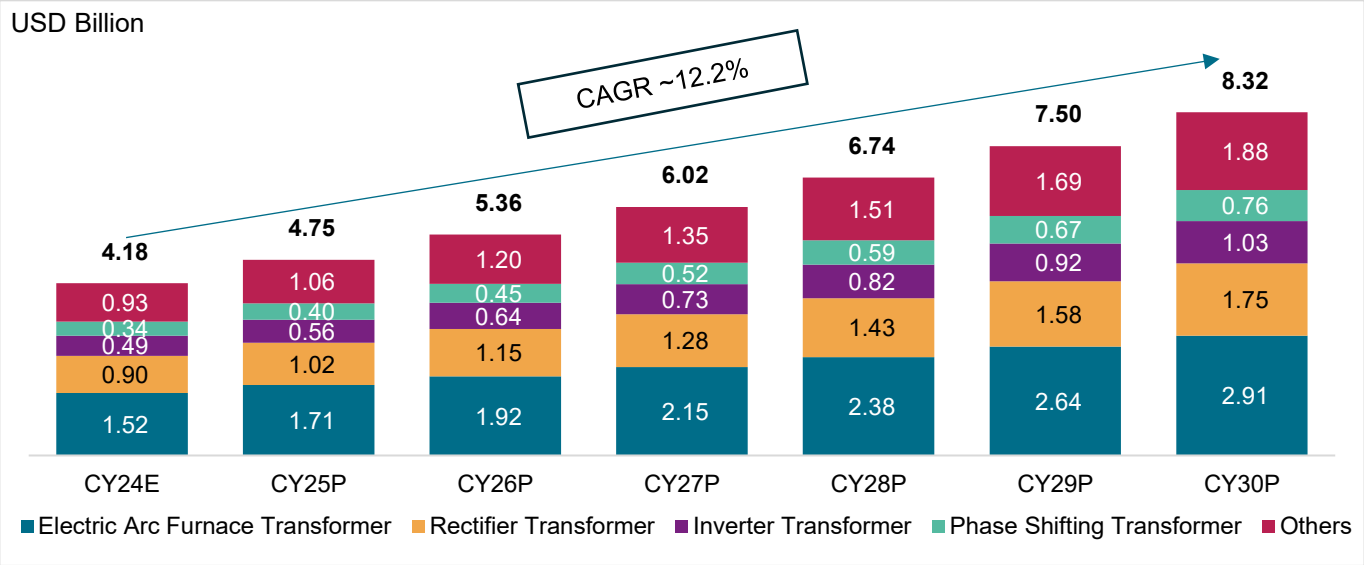
- Phase shifting transformers (PSTs) are used to enhance grid stability by controlling the flow of active and reactive power. As grid interconnections increase and more renewable energy sources are integrated, the demand for PSTs has risen to manage power flows more efficiently.
- The growing penetration of renewable energy in the power grid requires more flexible power flow management. PSTs help to stabilise power systems by adjusting phase angles between transmission lines, which is crucial for integrating intermittent renewable energy sources.
- Phase shifting transformers are part of the FACTS systems, which are becoming more essential as utilities seek to increase grid capacity and reliability. The need for such systems is pushing the demand for PSTs in power transmission networks.
- Research into improving the efficiency and size of phase shifting transformers, such as the development of digital PSTs and those capable of handling higher voltage levels, is fueling growth in the market, allowing for better integration with modern electrical grids.

4.1.5 Others

- Specialty transformers such as high-voltage transformers, isolation transformers, and distribution transformers for specific industries (e.g., oil & gas, chemical, and mining) are experiencing increased demand. These sectors require transformers designed for unique operational conditions, pushing growth in the specialty transformer market.
- With the increasing need to expand power distribution into rural and remote areas, specialty transformers are being designed to withstand harsh environmental conditions. This market is growing as governments and companies invest in infrastructure development.

- Many industries are seeking custom-built specialty transformers tailored to specific power requirements. These transformers often find use in smaller-scale applications, from laboratory setups to small industrial plants, driving demand for specialised designs and higher customisation.
- As industries increasingly demand long-lasting, energy-efficient transformers with low maintenance requirements, manufacturers are focusing on durable materials, advanced cooling systems, and improved efficiency to meet these needs, further driving the growth of specialty transformers.

Figure 26: Global product type wise specialty transformer market outlook



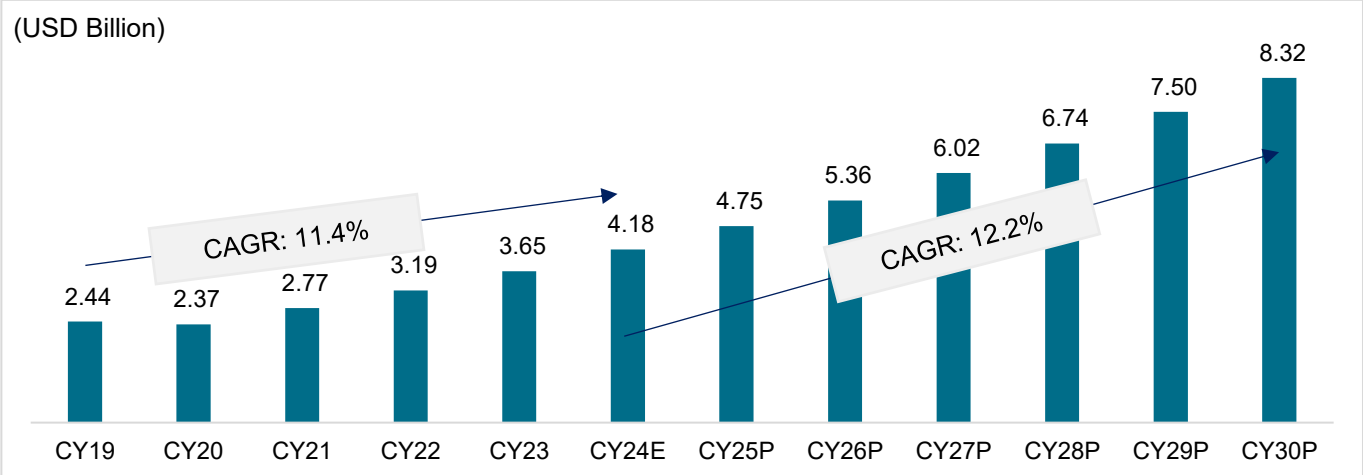
E: Estimated; P: Projected;

Source: Global Market Insights, Crisil Intelligence

4.2 Global Specialty Transformers market

The global speciality transformer market has witnessed a growth of ~11.4% (CAGR for 2019-2024). The specialty transformer market is experiencing rapid growth due to innovations across various industries. The shift towards renewable energy sources, such as solar and wind power, has created a need for customised transformers that can handle specific voltage and load requirements. The expansion of electric vehicle charging infrastructure has also driven demand for high-capacity specialty transformers that ensure reliability and efficiency. Furthermore, the adoption of smart transformers with IoT capabilities and remote monitoring is on the rise, improving energy management and reducing downtime in digital substations. Specialty transformers are also being increasingly used in industrial applications, such as data centers and oil & gas operations, due to their ability to meet specific voltage and environmental requirements. The focus on sustainability has led to the development of eco-friendly transformer designs, featuring low-loss cores and biodegradable oils. Finally, the rapid urbanisation and infrastructure development in emerging economies have increased demand for compact and customised transformer solutions in utilities and commercial buildings, solidifying their importance in modern energy systems. The global specialty transformer market is expected to grow at a CAGR of 12.2% by 2030 (CAGR for 2024-2030).

Figure 27: Global market size of specialty transformers



E: Estimated; P: Projected;
Source: Global Market Insights, Crisil Intelligence

4.2.1 Market segmentation by geography

Latin America

- Countries like Brazil, Chile, and Mexico are leading renewable energy adoption in Latin America, driving demand for specialty transformers tailored to renewable applications. These transformers support efficient energy conversion and transmission in wind and solar farms, contributing to the region's sustainable energy goals.
- Efforts to modernise aging grid infrastructure and improve power reliability are encouraging investments in advanced transformer solutions. Specialty transformers with real-time monitoring and control capabilities are becoming essential for reducing power losses and enhancing grid efficiency.
- Expanding industrial bases in sectors like mining, automotive, and agriculture are fueling the demand for high-performance specialty transformers. These sectors require transformers with custom specifications to meet specific operational demands and ensure optimal energy usage.
- Growing cross-border electricity trade is increasing the need for transformers designed for high voltage transmission networks. These transformers facilitate efficient power transfer across countries, strengthening the regional power grid and enabling greater energy integration

North America

- The increasing adoption of smart grid infrastructure and energy-efficient solutions is fostering innovation in specialty transformers. Advanced features, such as improved insulation materials, enhanced cooling systems, and integration with digital monitoring technologies, are being widely incorporated to comply with stringent efficiency standards and support grid modernisation initiatives.
- Rising investments in renewable energy projects, particularly in wind and solar farms, are driving the demand for custom-designed specialty transformers. These transformers are crucial for efficient energy conversion, such as step-up transformers for solar power plants and specialised units for wind turbines, ensuring seamless integration with the existing grid.
- Urban expansion and the need to modernise aging grid infrastructure are creating robust demand for specialty transformers in commercial and industrial sectors. These transformers are increasingly used in high-demand applications, including data centers, healthcare facilities, and manufacturing plants, where reliability and efficiency are critical.

- Government regulations, such as the Department of Energy (DOE) efficiency standards, are pushing manufacturers toward eco-friendly solutions. Transformers with reduced energy losses, biodegradable insulation oils, and lower carbon footprints are gaining traction as utilities and industries strive to meet environmental goals.

Asia Pacific (APAC)

- Massive urbanisation and industrialisation across countries like China and India are escalating the demand for specialty transformers. These transformers are critical for meeting the energy needs of expanding cities, industrial parks, and infrastructure projects, especially in construction, manufacturing, and transportation sectors.
- The region's rising electricity consumption, driven by economic growth and population expansion, is encouraging investments in advanced transformer technologies. Specialty transformers designed for high reliability and efficiency are essential for optimising transmission and distribution networks.
- Asia-Pacific leads global renewable energy capacity additions, significantly boosting the demand for transformers suited for solar, wind, and hydropower projects. Customised solutions are often required to address specific environmental and operational challenges in these applications.
- Government initiatives promoting grid modernisation and rural electrification are accelerating the adoption of advanced transformer solutions. Policies encouraging renewable energy development, coupled with substantial investments in grid infrastructure, are key drivers of market growth.
- Government of India in its NDC target has committed to reduce the emissions intensity of its GDP by 45% by 2030 from 2005 level and to increase the share of non-fossil power capacity to 50% by 2030 by adding 500 GW of non-fossil-based capacity.

Europe

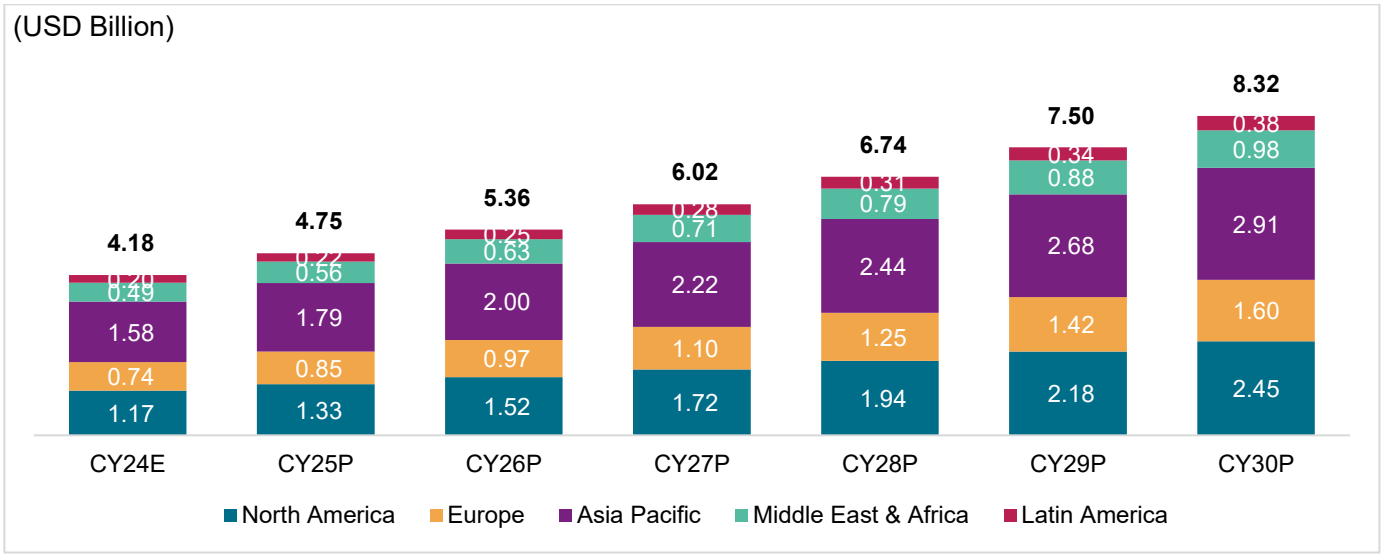
- The EU's ambitious energy transition and climate targets, including achieving net-zero emissions by 2050, are driving demand for specialty transformers tailored for renewable energy generation and storage. These transformers support wind, solar, and energy storage systems, ensuring efficient power conversion and grid stability.
- The rapid deployment of smart cities and advanced grid solutions is increasing the need for digital specialty transformers equipped with sensors and IoT capabilities. Countries like Germany, the UK, and France are leveraging these transformers for real-time monitoring and optimisation of power distribution networks.
- Growth in cross-border electricity trade and the expansion of HVDC systems are fueling demand for high-performance specialty transformers. These transformers are designed to handle higher voltage levels and ensure minimal energy loss over long distances, crucial for linking renewable energy sources across nations.
- Environmental regulations are prompting manufacturers to adopt green technologies. Features such as biodegradable insulation oils, noise reduction designs, and energy-efficient operations align with Europe's sustainability goals and attract widespread adoption.

Middle East & Africa (MEA)

- The region's reliance on the oil and gas sector underpins the demand for explosion-proof and highly durable specialty transformers. These transformers are essential for ensuring operational safety and reliability in hazardous environments like refineries, offshore platforms, and processing plants.
- Renewable energy projects are gaining momentum, particularly in countries like Saudi Arabia and the UAE, which are heavily investing in solar and wind power. Specialty transformers, customised for harsh environmental conditions such as extreme heat and sand exposure, play a pivotal role in these developments.

- Expanding industrial activities, including petrochemicals, mining, and manufacturing, are driving demand for high-capacity specialty transformers. These industries require transformers with enhanced cooling and high thermal stability to support energy-intensive operations.
- Africa's electrification goals, backed by international funding and government initiatives, are spurring investments in specialty transformers for remote and off-grid applications. These transformers enable efficient power delivery in rural areas, contributing to the region's socioeconomic development.

Figure 28: Global region wise specialty transformer market outlook



E: Estimated; P: Projected;

Source: Global Market Insights, Crisil Intelligence

4.3 Domestic Specialty Transformers Market

4.3.1 Growth drivers, restraints, and success factors

Growth Drivers

- **Increasing investments in renewable energy projects**

India's renewable energy sector is experiencing unprecedented growth, driven by the government's commitment to reducing carbon emissions and increasing the share of clean energy in the power mix. The target of achieving 500 GW of non-fossil fuel-based capacity by 2030 has catalyzed large-scale investments in solar, wind, and hybrid energy projects. The Indian government's Interim Budget for 2024-2025 allocated USD 1.02 billion for solar power grid infrastructure, up from $0.60 billion the previous year. Moreover, the Green Hydrogen Mission and the Strategic Interventions for Green Hydrogen Transition (SIGHT) Program received USD 2.10 billion, which further proliferates the market statistics. Specialty transformers play a critical role in renewable energy infrastructure, as they are designed to handle the unique challenges posed by renewable energy sources, such as variable power generation and harmonic distortion.

Step-up transformers, for instance, are essential in solar and wind power plants to elevate the voltage of the electricity generated for transmission to the grid. Additionally, inverter duty transformers are crucial for mitigating harmonics and ensuring smooth integration with grid networks. The Indian government's flagship programs, such as the National Solar Mission and state-level renewable energy initiatives, are further driving the demand for these specialised products.

Private sector investments in utility-scale solar farms, offshore wind farms, and distributed renewable systems are on the rise, boosting the need for efficient and reliable specialty transformers. Furthermore, initiatives like the Green

Energy Corridor, which focuses on strengthening the transmission infrastructure for renewable power, emphasize the importance of advanced transformer technology. As renewable energy adoption expands to remote and challenging terrains, there is also growing demand for compact, lightweight, and robust transformer solutions. The increasing penetration of renewable energy in India's energy landscape is a significant growth driver for the specialty transformer market. By supporting the integration of variable renewable energy sources into the grid and enabling efficient power transmission, these transformers are indispensable for achieving India's clean energy goals.

- **Rapid industrialisation and infrastructure development**

India's ongoing industrialisation and infrastructure development are pivotal in shaping the specialty transformer market. As the nation strives to become a global manufacturing hub under initiatives like "Make in India," the demand for industrial-grade transformers is increasing. Specialty transformers are critical for powering heavy machinery, industrial processes, and customised applications across sectors such as steel, cement, oil & gas, and manufacturing.

Furnace transformers, for example, are indispensable in industries like steel and aluminum, where they power high-temperature operations like arc furnaces and smelters. Similarly, rectifier transformers are widely used in processes requiring DC power, such as electrolysis in the chemical and metallurgy industries. The growth of these industries directly correlates with the demand for specialty transformers tailored to their specific needs.

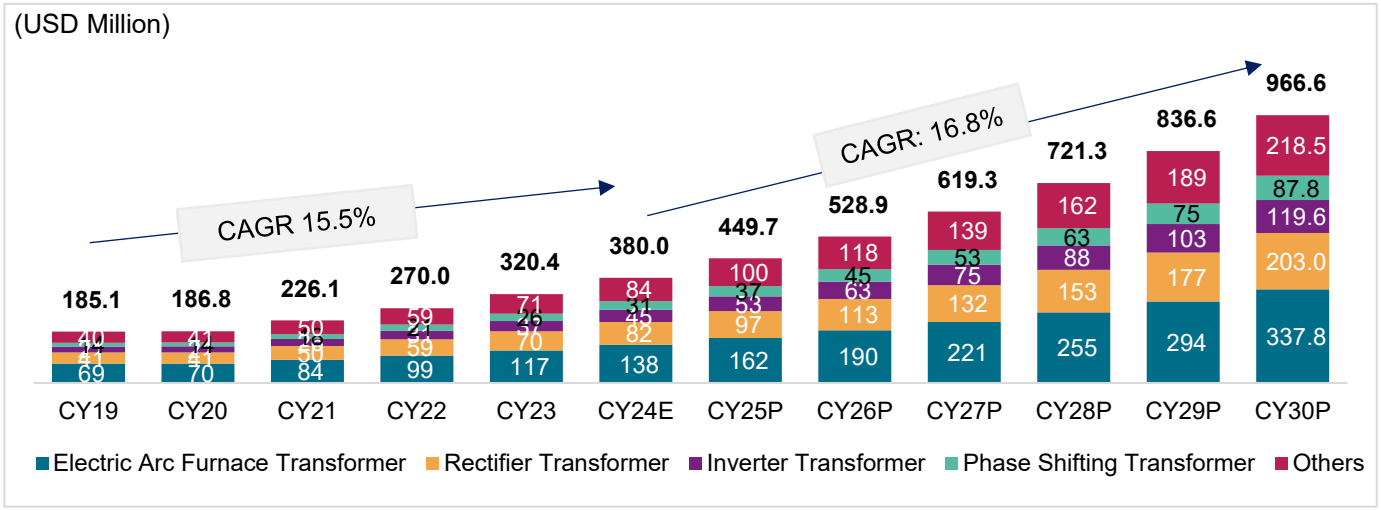
Infrastructure projects, including metro rail expansions, highways, airports, and smart cities, also drive market growth. Metro systems require traction transformers to ensure efficient and reliable operation of rail networks. India's urbanisation is further boosting the demand for energy-efficient, compact transformers suited to dense urban environments.

Government-backed programs such as the National Infrastructure Pipeline (NIP), aimed at attracting investments across multiple sectors, add momentum to this growth. Additionally, with rising industrial automation and the adoption of advanced manufacturing technologies, the need for transformers with high precision, reliability, and digital monitoring capabilities is increasing. Therefore, rapid industrialisation and infrastructure development are key drivers of the specialty transformer market in India. The sector's growth is fueled by both public and private investments, underscoring the critical role of specialised transformers in meeting the nation's industrial and infrastructural power demands. This trend is expected to sustain as India continues its journey toward economic expansion and technological advancement.

4.3.2 Total market size in quantity and value

The global speciality transformer market has witnessed a growth of ~15.5% (CAGR for 2019-2024). The country's rapid industrialisation, urbanisation, and increasing focus on renewable energy have created a huge requirement for specialised transformers that can cater to specific application needs. As a result, the domestic specialty transformers market in India has been experiencing steady growth, driven by the need for efficient, reliable, and customised transformer solutions. The specialty transformer market in India is expected to grow at a CAGR of 16.8% until 2030 (CAGR 2024-2030).

Figure 29: India historical market size and outlook of specialty transformers



E: Estimated; P: Projected;

Source: Global Market Insights, Crisil Intelligence

4.3.3 Indian specialty transformers market split between exports and imports

India's trade dynamics in the specialty transformer sector are influenced by its rapid industrialisation, electrification initiatives, and infrastructure development. Specialty transformers, including those used in specific applications like industrial machinery, railways, renewable energy systems, and medical equipment, play a crucial role in supporting the country's growing energy and industrial needs. Here is an in-depth analysis of the imports and exports of specialty transformers in India:

Imports of specialty transformers

India imports specialty transformers to meet the demands of advanced applications where domestic manufacturing capabilities are still developing. Key factors driving imports include:

Advanced technologies and applications

- Indian manufacturers primarily focus on standard transformers, leaving a gap in high-tech specialty transformers for applications like healthcare (MRI and X-ray equipment), renewable energy (solar inverters), and specialised industrial uses.
- Imported transformers from technologically advanced countries like Germany, Japan, South Korea, and the United States cater to these needs

- **Major import partners**
  - China: A significant supplier of cost-effective specialty transformers for industrial automation and renewable energy.
  - Germany and Japan: Known for high-quality, precision-engineered transformers for medical and specialised industrial applications.
  - United States: Supplies advanced products for defense and high-end industrial requirements.
- **Key applications**
  - Renewable energy integration, especially inverters and step-up transformers for solar and wind power.
  - Specialised machinery in industries like automotive, electronics, and heavy manufacturing.
- **Challenges**
  - Dependence on imports for certain high-tech products increases the trade deficit.
  - High import duties and logistical costs affect affordability for local buyers

Exports of specialty transformers

India's exports of specialty transformers have grown as local manufacturers enhance their production capabilities and explore international markets. Key highlights include:

- **Growing export base**
  - Indian companies are leveraging cost advantages to supply competitive products to emerging markets in Asia, Africa, and South America.
  - Exported products primarily include dry-type transformers, instrument transformers, and products for renewable energy applications.
- **Key export destinations**
  - Middle East and Africa: Growing demand for transformers driven by electrification projects.
  - Southeast Asia: Rapid industrialisation and renewable energy projects boost imports from India.
  - Europe and North America: While smaller in volume, niche high-quality products are finding acceptance in these markets.
- **Competitive advantages**
  - Cost-effective manufacturing combined with skilled labor and improved production standards.
  - Government support through various policies and export promotion schemes
- **Challenges**
  - Stringent quality and safety standards in developed markets.
  - Limited brand recognition of Indian manufacturers compared to established global players.

4.4 India- Shunt reactor market

Shunt reactors (bus reactors or line reactors) are connected to the transmission system for reactive power compensation in long high voltage power transmission lines and cables. These are also capable of controlling the dynamic over-voltage occurring in the system due to load rejection.

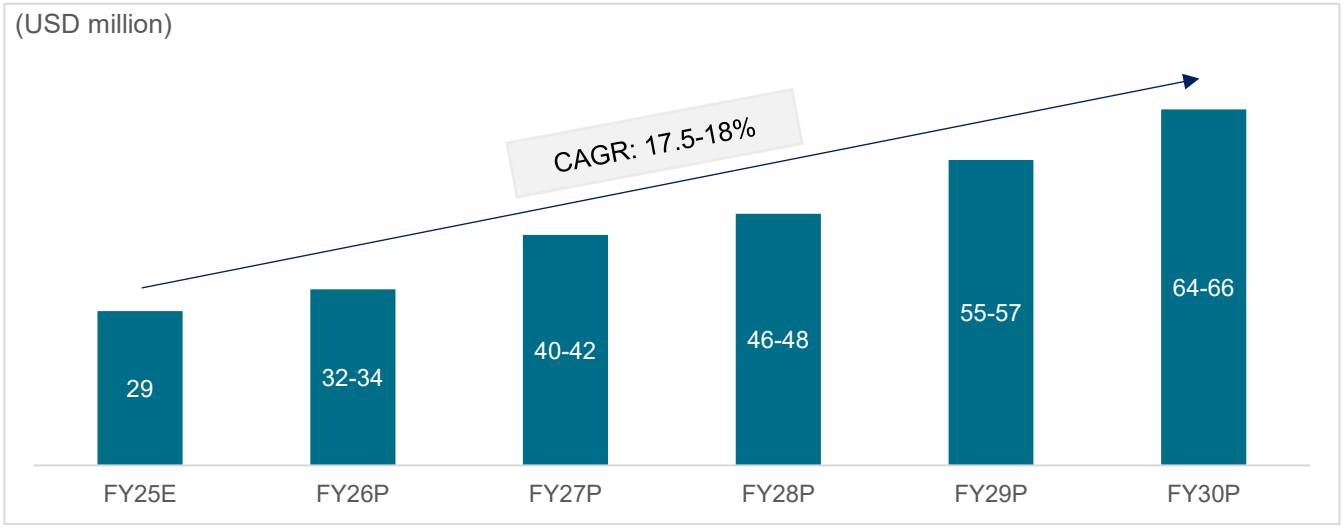
Shunt reactors increase efficiency in overhead lines by absorbing the reactive power and also improve voltage stability within the desired limits at low loads. Variable shunt reactors are beneficial in renewable energy system like wind and solar energy. Compared to conventional power. These RE projects can experience reactive power imbalance due to long transmission distance (projects are often located in remote areas), unpredictable and fluctuating active power.

Further, modern grids have strict requirements for power quality and voltage control. Shunt reactors enable power system to comply with grid codes by ensuring proper reactive power management. It also reduces the transmission losses, enhance system capacity and provides equipment protection by mitigating overvoltage.

As per CEA's National Electricity Plan, the infrastructure addition pertaining to reactors between fiscal 2022-27 is about 123 GVAr and 61 GVAr from 2028-32 including bus and line reactors for 400 kV and 765 kV. Furthermore, as per CEA's report on Transmission system for Integration of 500 GW RE capacity by 2030, the reactive power compensation capacity addition of 67.5 GVAr has been envisaged until 2030.

As per the planned requirements, the shunt reactor market is expected to grow at a CAGR of 17.5-18.0% between fiscal 2025-30 and reach to about USD 64-66 million by fiscal 2030.

Figure 30: Shunt reactor market forecast



E: Estimated; P: Projected

Source: CEA, Crisil Intelligence

5 Distribution transformers market overview

5.1 Introduction

The rapid urbanisation and expanding rural electrification programs, especially in developing regions, are driving the demand for distribution transformers. These transformers play a vital role in bringing electricity from high-voltage transmission lines to residential and commercial end-users, supporting infrastructure expansion and economic development.

Distribution transformers are essential for integrating renewable energy sources, such as solar and wind, into the grid at localised levels. As governments and utilities focus on clean energy solutions, the demand for distribution transformers capable of handling fluctuating loads increases, further supported by subsidies and incentives.

In mature markets, many existing distribution transformers are reaching the end of their operational life. As a result, there is a strong push for replacement and upgrades to newer, more efficient models. This replacement cycle is critical to enhancing reliability and reducing transmission losses.

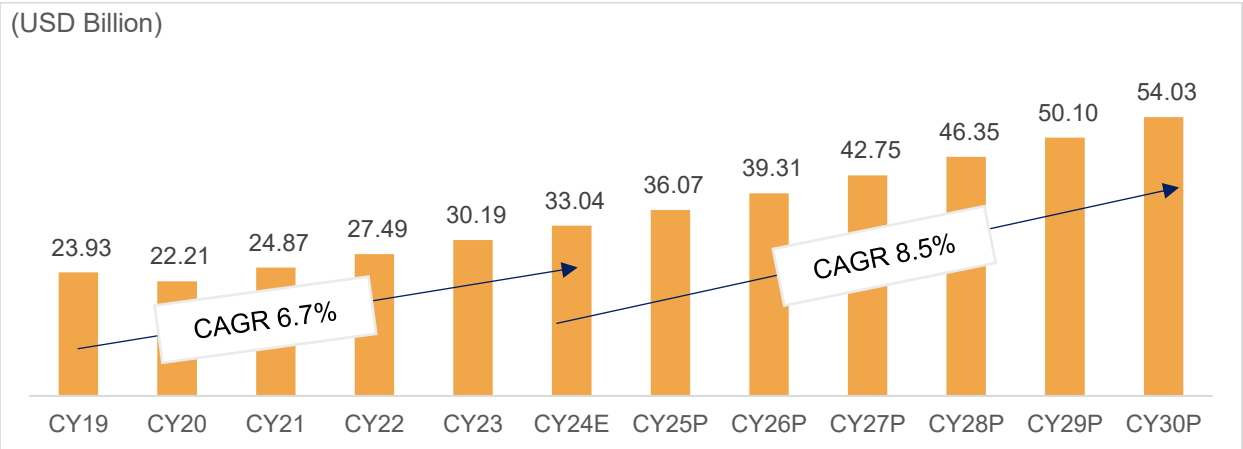
With the rise of smart grid infrastructure, there is a need for intelligent, efficient distribution transformers. These transformers support advanced monitoring and control, allowing utilities to improve load management, reduce outages, and respond swiftly to power demand variations.

5.2 Overview of global distribution transformer market

5.2.1 Total market size in quantity and value

The global distribution transformer market has witnessed a growth of ~6.7% (CAGR for 2019-2024) supported by rise in demand for electricity. Urbanisation and expansion of residential areas drive demand for distribution transformers. Increased electrification, especially in emerging economies, boosts requirements for distribution transformers. Growing demand for decentralised renewable energy sources like rooftop solar also supports this market segment, as these systems require lower voltage transformers to connect to local grids. Additionally, government initiatives aimed at rural electrification and improving access to reliable electricity continue to propel the deployment of distribution transformers. The global distribution transformer market is expected to grow at a rate of ~8.5% (CAGR for 2024-2030) supported by increased demand.

Figure 31: Global market size of distribution transformers



E: Estimated; P: Projected;

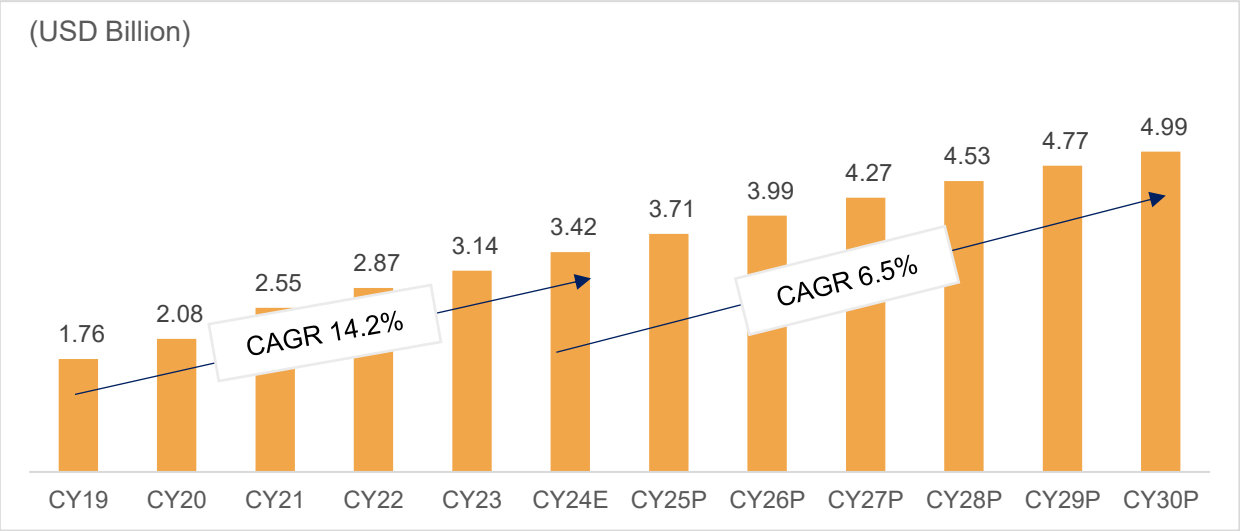
Source: Global Market Insights, Crisil Intelligence

5.3 Overview on Indian distribution transformer market

5.3.1 Total market size in quantity and value

The Indian distribution transformer market size is valued at USD ~3.42 billion registering a growth of 14.2% (CAGR 2019-2024). Increasing demand for power, rapid urbanisation and industrialisation, government's initiative to achieve 100% electrification and rapidly growing economy driving the Indian distribution transformer market. The Indian distribution transformer market is expected to grow at a rate of ~6.5% (CAGR for 2024-2030) supported by increased demand.

Figure 32: India market size of distribution transformers



E: Estimated; P: Projected;
Source: Global Market Insights, Crisil Intelligence

Rising energy requirements from industries and the expansion of transmission and distribution networks, coupled with the growth of the renewable energy sector, are anticipated to propel the Indian distribution transformer market.

6 Assessment of transformer components industry

6.1 Overview of global market size

The rise in global electricity demand, driven by rapid urbanisation, industrial growth, and population expansion, has necessitated significant grid expansion and modernisation. Developing economies are particularly focused on enhancing their electricity distribution networks, which boosts demand for transformer components like bushings, cores, and windings. Additionally, increasing renewable energy integration requires transformers to efficiently transmit power generated from variable sources, further driving the need for advanced components.

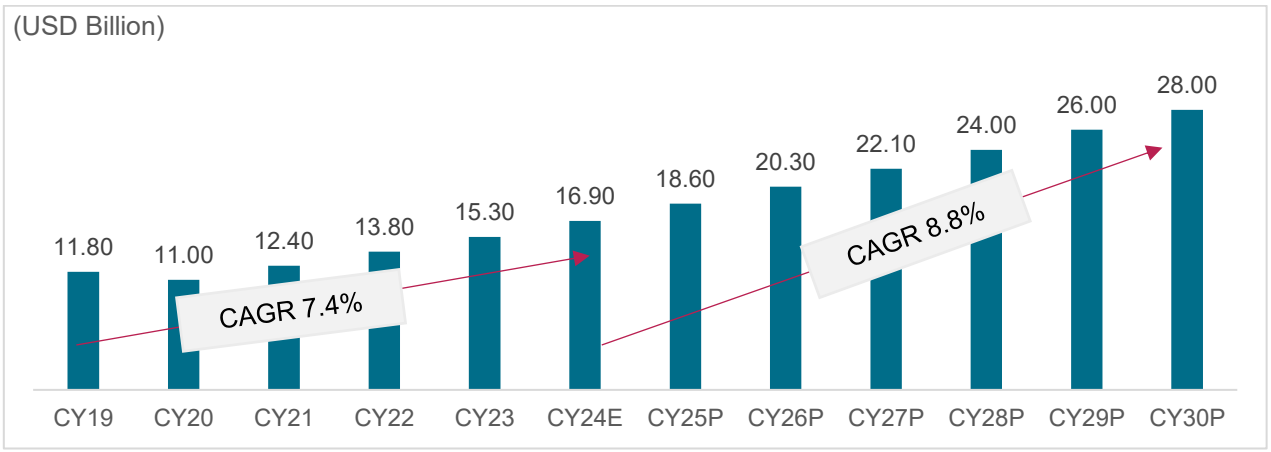
The shift towards smart grid technologies is a major growth driver for the transformer component market. Governments and utilities worldwide are investing in digital substations and advanced monitoring systems that require high-quality transformer components with integrated sensors and monitoring capabilities. These advancements enable real-time diagnostics, predictive maintenance, and improved energy efficiency, creating opportunities for manufacturers to supply innovative, smart components.

Stricter energy efficiency standards and environmental regulations are driving the adoption of transformers with reduced energy losses and lower carbon footprints. Transformer components, such as energy-efficient cores and eco-friendly insulating materials, are being developed to meet these requirements. Growing awareness of sustainability among industries and utilities is further propelling the demand for components that enhance transformer performance while adhering to environmental standards.

In developed markets, aging electrical infrastructure is a critical concern. Many transformers and their components have exceeded their operational lifespans, leading to frequent maintenance, upgrades, or replacements. Governments and utilities are allocating substantial budgets for the refurbishment of existing systems, creating a steady demand for replacement components. This trend is particularly prominent in regions like North America and Europe, where grid infrastructure modernisation projects are underway.

Between 2019-24, the global transformer component market grown at a CAGR of 7.4% and reached USD 16.9 billion. It is expected to increase up to USD 28 billion between 2024 and 2030 at a CAGR of 8.8%.

Figure 33: Global market size of transformer components



E: Estimated; P: Projected;
Source: Global Market Insights, Crisil Intelligence

6.2 Overview on Indian market

Unlike some of the developed countries, Indian transformer manufacturers have a low degree of backward integration making them rely heavily on component manufacturers for their production needs. This heavy dependence can increase costs and may affect the competitiveness of Indian manufacturers. Many large Indian transformer manufacturers have made significant strides in manufacturing high-voltage transformers domestically, yet the industry still faces challenges in achieving full backward integration.

Indian transformer manufacturers are heavily dependent on imports for critical components like electrical steel and insulation materials, which are primarily produced by global multinational corporations (MNCs). Many a times, these MNCs prioritize exports to the EU and US, where they can command better prices, leaving a void in the Indian supply chain and making it challenging for Indian manufacturers to access these essential components.

Since most of the products are fabricated as per the design given by transformer manufactures, the fabrication process can be easily scalable. However, due to shortage of skilled workforce, the Indian transformer Industry faces challenges in scaling up and there is restricted scaling up. The labour shortage can limit growth potential of Indian transformer manufacturers and hinder their ability to meet increasing demand.

The Indian market for transformer components, including parts of electrical transformers and inductors, is significant, reflecting the country's role as a global participant in the power and electronics industries. In 2022, India exported USD 468 million worth of these components, ranking it the 6th largest exporter globally. Key export destinations include the United States, Kuwait, and Oman, with notable growth in markets like Kuwait. Concurrently, India imported USD 538 million worth of components, primarily from China, Germany, and Vietnam. This trade highlights India's dual role as both a producer and consumer in the transformer component market.

India’s ambitious programs like SAUBHAGYA (Pradhan Mantri Sahaj Bijli Har Ghar Yojana) and the Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) have accelerated rural electrification, driving the demand for transformers and their components. The push to provide electricity to the most remote areas requires the installation of new transformers and upgrading existing infrastructure, boosting the market for components like bushings, tap changers, and insulation materials.

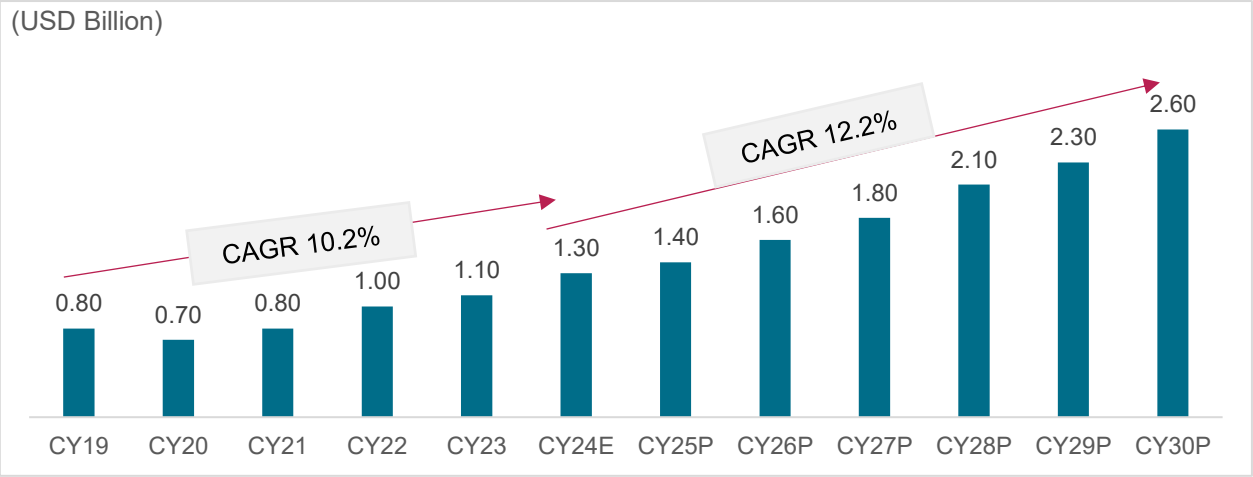
Industrial growth and urbanisation are fuelling a surge in electricity consumption in India. Expanding manufacturing hubs, infrastructure projects like Smart Cities Mission, and the growth of urban centres have led to increased installation of high-capacity transformers. These developments directly impact the demand for advanced transformer components, particularly those tailored for heavy-duty and high-efficiency performance.

Country's commitment to achieving 500 GW of non-fossil fuel energy capacity by 2030 underlines its focus on renewable energy. Large-scale solar parks, wind farms, and hybrid renewable installations require transformers with specialised components for handling variable loads and voltage fluctuations. This shift drives demand for components like on-load tap changers, high-temperature conductors, and eco-friendly insulating fluids tailored to renewable energy requirements.

With increasing investments in T&D networks under schemes like RDSS, India is focusing on reducing power losses and improving grid reliability. This requires upgrading existing substations and installing new ones, creating substantial demand for high-quality transformer components. Innovations like high-voltage bushings, advanced cooling systems, and efficient winding materials are gaining traction as part of efforts to modernize India's grid infrastructure.

Between 2019-24, the Indian transformer component market grown at a CAGR of 10.2% and reached USD 1.3 billion. It is further expected to increase up to USD 2.6 billion in 2030 at a CAGR of ~12.2%.

Figure 34: India market size of transformer components



E: Estimated; P: Projected;

Source: Global Market Insights, Crisil Intelligence

7 Vendor registration as a barrier

7.1 Advantages of vendor registration

Various Corporates, State and Central Government Companies conduct vendor registration as a part of their procurement process to ensure transparency, accountability, and efficiency in their dealings with external suppliers. Some of the advantages of getting registered with Government Companies include:

Increased Business Opportunities: Registered Vendors do get new business opportunities by participating in tenders, bids and contracts leading to substantial revenue growth. Registration can also provide vendors with opportunities for growth, both in terms of revenue and capabilities since they work on complex projects and services.

Access to Government Contracts: Registered Vendors, especially with State and Central Government Companies, get access to government contracts, which can be a significant source of revenue. Government Companies continuously work on various infrastructure projects. Registered vendors may have access to government-funded projects, which can provide a significant source of revenue and opportunities for growth.

Credibility and Reputation: Registration with reputable companies (Private or Government) enhances a vendor's credibility and reputation in the market. It also proves their ability to meet the stringent requirements and standards expected by these companies.

Competitive Advantage: Registration with reputable companies can be a competitive advantage, as it sets vendors apart from their competitors and demonstrates their commitment to working with reputable companies, especially government companies. Registered vendors are often given priority in the procurement process, increasing their chances of winning contracts and tenders.

Long-term Partnerships: Registration can also lead to long-term partnerships with government companies, providing vendors with a stable source of revenue and opportunities for growth.

Reduced Administrative Efforts: Registration reduces the administrative efforts of vendors, as they only need to provide documentation and information once, rather than repeatedly for each tender or bid.

Increased Transparency and visibility: Registration promotes transparency in the procurement process, reducing the risk of corruption and ensuring that vendors are treated fairly and equally. Registration also increases a vendor's visibility in the market, making it easier for them to attract new customers and business opportunities.

By getting registered with reputed companies (both government as well as private), vendors can unlock these advantages and improve their chances of success in the market. At the same time, the new entrants may lose some of these advantages due to lack of registration with reputable companies.

7.2 Typical process followed for vendor registration

Normally the following process is followed for vendor registration by various companies.

Figure 35: Typical vendor registration process

Source: Industry; Crisil Intelligence

The interested Vendors are required to fill (online) or submit their registration forms (offline) along with necessary supporting documents. The Forms received from the vendors are scrutinized and in case of any deficiency, additional documents are sought. Typically, Government Companies may ask for some Registration Fees from interested vendors.

Once the documentation is complete, the vendors are evaluated by a committee based on the competence, capability, available infrastructure, quality assurance system, current business profile and financial status of the interested vendors. Depending on the products, if required, committee members may visit the manufacturing facility of the vendors for assessment of infrastructure, quality assurance measures and other aspects.

Once, the approval of manufacturing capabilities, the Vendors are required to submit samples along with an Internal test report / factory test report. The samples submitted by the vendors are evaluated by Quality control Department of the Company. After successful evaluation of vendor capability as well as the sample

approval by the Quality Control, registration of vendors is recommended by the committee and after due approval, vendors are registered and are accordingly conveyed by way of Vendor Registration Letter.

7.3 Various document requirements

Some of the key documents required for vendor registration include.

- Partnership agreement/certificate of incorporation
- PAN Card
- Bank account details
- GST Registration certificate
- Adress proof
- Directors PAN Card, DIN Certificate and Address Proof
- Factory details
- Financial details
- Quality control, Test and equipment details
- Other certifications/registrations (Accreditation/ISO/Internation certifications etc.)

7.4 Vendor registration as entry barrier

Most of the Government agencies, large corporations conduct vendor registrations to ensure compliance with regulatory requirements, maintaining transparency and accountability, evaluating vendor capabilities, streamlining procurement processes and improving overall contract management. Vendor registration provides reduced procurement costs and cycle times, improved vendor quality and performance along with enhanced transparency and accountability.

Vendor registration can act as an entry barrier for competitors by creating complexity, cost, and resource requirements that can be difficult for new entrants to overcome. Various government agencies empanel vendors for various jobs after following a complex and tedious process of vendor registration. Many times, the vendor registration process can be lengthy, complex, and bureaucratic, requiring significant time and resources. Vendor registration also requires certifications, licenses, or insurance which can be daunting. With stringent qualification criteria, such as experience, revenue, or certification requirements and limited number of approved vendors, it can be difficult for new entrants to meet these requirements. Additionally, the incumbent vendors may have an advantage in understanding the registration process and meeting the necessary requirements, making it harder for new competitors to enter the market.

8 Competitive landscape of domestic transformer manufacturing companies

Competitive mapping covers the details of companies, their products and services within a given market to understand competitive intensity. Some of the key players in the domestic transformer manufacturing industry in India are summarised in following table. These players cater to the needs of various industries, including power, transmission, and distribution of electricity.

Table 4: Key players in the domestic transformer manufacturing industry in India (present in less than 220 kV)

Company Name	Business segments	No. of Mfg. Units	Mfg Capacity	Power	Furnace	IDT	Rectifier	Reactor	Traction
Atlanta Electricals Ltd.	• Power, distribution and special application transformers	4 and 1* proposed	Current: ~47,280 MVA Proposed: 15,780*	YES	YES	YES	NO	NO	YES
Voltamp Transformers Ltd.	• Transformers • Substations • Switchgear etc.	2	Current: ~14,000 MVA Proposed: ~6,000 MVA	YES	YES	NO	NO	NO	NO
ECE Industries Ltd.	• Transformers • Elevators • Energy Meters • Switchgears • EPC etc.	2	Current: 13,000 MVA	YES	NO	NO	NO	NO	NO
Technical Associates Ltd.	• Transformers	1	Current: 20,000 MVA	YES	NO	NO	NO	NO	YES
Indotech Transformers Ltd.	• Transformers Substations	1	Current: 9,684 MVA Proposed: 6,500 MVA	YES	NO	NO	NO	NO	NO
Bharat Bijlee Ltd.	• Transformers Turnkey projects Motors Technology for elevators Drives and automation	1	Current: ~18,000 MVA Proposed: ~10,000 MVA	YES	YES	NO	NO	NO	YES
Vishvas Power Engineering Services Pvt. Ltd.	• Transformers • EPC- Substations	1	NA	NO	NO	NO	NO	NO	YES

Company Name	Business segments	No. of Mfg. Units	Mfg Capacity	Power	Furnace	IDT	Rectifier	Reactor	Traction
Danish Power Ltd.	• Transformers • Panels • Substation automation services	2	Current: 4,681 MVA Proposed ~6,319	Yes	Yes	Yes	Yes	No	No

*Note: *On account of acquisition of BTW post which manufacturing capacity will be 63,060 MVA*

IDT: Inverter Duty Transformer; NA: Not available, S/s: Sub-station, EPC: Engineering procurement and construction;

Source: Industry, Company Websites, Press Releases, Crisil Intelligence

Table 5: Key players in the domestic transformer manufacturing industry in India (also present in above 220 kV)

Company Name	Business segments	No. of Mfg. Units	Mfg Capacity	Power	Furnace	IDT	Rectifier	Reactor	Traction
Transformers & Rectifiers Ltd.	• Transformers • Switchgear	3	Current: ~40,200 MVA Proposed: ~37,000 MVA	YES	YES	NO	YES	YES	YES
Meiden T&D (India) Ltd.	• 3 Phase Distribution Transformers • Vacuum Circuit breakers • Power feeding for railway systems • Automotive Test Systems • Plant Construction Works • Maintenance	1	Current: ~15,000 MVA	YES	NO	NO	NO	YES	YES
Siemens Ltd.	• Energy incl. EPC • Smart Infrastructure • Mobility • Digital Industries	1	Current: ~15,000 MVA Proposed: ~15,000 MVA	YES	NO	NO	YES	YES	YES
TBEA Energy (India) Pvt Ltd.	• Power Transmission incl. Transformers & Reactors • Cables and wires • Advanced Material • New Energy	1	Current: ~20,000 MVA	YES	NO	NO	NO	YES	NO

Company Name	Business segments	No. of Mfg. Units	Mfg Capacity	Power	Furnace	IDT	Rectifier	Reactor	Traction
CG Power & Industrial Solutions Ltd.	• Industrial: Motors, Generators, Alternators etc. • Power: Transformers and reactors, switchgear etc. • Railways: Motors, Signaling etc.	2	Current: ~25,000 MVA Proposed: ~60,000 MVA	YES	YES	YES	NO	YES	YES
Toshiba Transmission & Distribution Systems (India) Pvt Ltd.	• Energy: Thermal, Hydro and T&D systems (incl. S/s, Transformer) • Infra systems: Railway systems, battery, elevator, water treatment • Storage: Chips • Office: Printers etc.	1	NA	YES	NO	YES	NO	YES	YES
Kanohar Electricals Ltd.	• Power Transformers • Gas Insulated Switchgear • EPC Projects • Transmission Lines	1	Current: ~10,500 MVA	YES	YES	NO	NO	YES	YES
Shirdi Sai Electricals Ltd.	• Transformers • EPC- S/s & line works • Distribution Systems, • Rural Electrification	3	Current: ~35,000 MVA Proposed: ~15,000 MVA	YES	YES	NO	NO	YES	YES
Hitachi Energy India Ltd.	• Transformers • Substations & Electrification and other solutions incl. software etc.	2	NA	YES	YES	YES	YES	YES	YES

IDT: Inverter Duty Transformer; NA: Not available, S/s: Sub-station, EPC: Engineering procurement and construction;

Source: Industry, Company Websites, Press Releases, Crisil Intelligence

Following table summarises the competitive analysis of Atlanta Electricals with some of the leading Indian transformer manufacturers. Atlanta Electricals Ltd. competes with different players including BHEL, Siemens Ltd., CG Power and Industrial Solutions Ltd., Indotech Transformers Ltd., ECE Industries Ltd., etc. However, considering their diverse product portfolio and resultant revenue mix, they are not considered for comparison purposes.

Table 6: Competitive analysis with leading Indian transformer manufacturers (present in less than 220 kV)

Particulars (Rs. Mn, unless noted otherwise)	Atlanta Electricals Ltd.			Voltamp Transformers Ltd.*			Danish Power Ltd.#			Technical Associates Ltd.		
	FY25 (A)	FY24 (A)	FY23 (A)	FY25 (A)	FY24 (A)	FY23 (A)	FY25 (A)	FY24 (A)	FY23 (A)	FY25 (A)	FY24 (A)	FY23 (A)
Revenue from operations	12,441.80	8,675.53	8,738.83	19,342.30	16,162.23	13,851.04	4,267.10	3,324.77	1,887.01	NA	7,060.21	5,238.84
Revenue Growth	43.41%	(0.72%)	39.67%	19.68%	16.69%	22.88%	28.34%	76.19%	26.96%	NA	34.77%	103.49%
EBITDA	1,998.82	1,231.58	1,431.15	4,509.17	4,113.28	2,709.52	890.39	572.97	169.04	NA	1,355.95	762.61
EBITDA Margin	16.07%	14.20%	16.38%	23.31%	25.45%	19.56%	20.87%	17.23%	8.96%	NA	19.21%	14.56%
PAT	1,186.47	635.21	874.73	3,254.13	3,073.61	1,999.43	575.91	377.20	85.71	NA	899.15	485.16
PAT Margin	9.54%	7.32%	10.01%	16.82%	19.02%	14.44%	13.50%	11.35%	4.54%	NA	12.74%	9.26%
ROE	33.91%	27.80%	53.05%	20.50%	22.71%	18.06%	18.00%	45.79%	19.45%	NA	24.97%	17.96%
ROCE	39.43%	42.34%	57.99%	27.57%	29.55%	23.60%	25.97%	56.65%	26.16%	NA	35.60%	22.50%
Net Working Capital	2,207.59	1,586.34	1,365.52	5,133.02	3,693.47	3,799.09	1,168.60	399.35	211.50	NA	109.60	351.72
Net Working Capital (days)	65	67	57	97	83	100	100	44	41	NA	6	25
Order Book (Rs. Mn)	16,429.58	12,713.80	5,340.62	11,290.00	8,406.60	NA	~4,500.00	NA	NA	NA	NA	NA
Order Book break-up												
Orders from government and public sector entities	13,485.20	9,375.23	3,306.68	NA	NA	NA	NA	NA	NA	NA	NA	NA
Private sector entities	2,944.38	3,338.57	2,033.94	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 7: Competitive analysis with leading Indian transformer manufacturers (also present in above 220 kV)

Particulars (Rs. Mn, unless noted otherwise)	Transformers & Rectifiers Ltd.			TBEA Energy (India) Pvt Ltd.			Meiden T&D (India) Ltd.*		
	FY25 (A)	FY24 (A)	FY23 (A)	FY25 (A)	FY24 (A)	FY23 (A)	FY25 (A)	FY24 (A)	FY23 (A)
Revenue from operations	20,193.82	12,946.76	13,959.70	NA	14,840.80	10,483.62	NA	2,818.40	1,343.53
Revenue Growth	55.98%	(7.26%)	20.16%	NA	41.56%	(22.80%)	NA	109.78%	5.23%
EBITDA	3,591.56	1,399.24	1,295.63	NA	143.18	(1,429.77)	NA	110.65	(184.09)
EBITDA Margin	17.79%	10.81%	9.28%	NA	0.96%	(13.64%)	NA	3.93%	(13.70%)
PAT	2,142.73	444.97	407.39	NA	(979.50)	(3,417.16)	NA	(124.83)	(314.87)

Particulars (Rs. Mn, unless noted otherwise)	Transformers & Rectifiers Ltd.			TBEA Energy (India) Pvt Ltd.			Meiden T&D (India) Ltd.*		
	FY25 (A)	FY24 (A)	FY23 (A)	FY25 (A)	FY24 (A)	FY23 (A)	FY25 (A)	FY24 (A)	FY23 (A)
PAT Margin	10.61%	3.44%	2.92%	NA	(6.60%)	(32.60%)	NA	(4.43%)	(23.44%)
ROE	17.12%	8.03%	10.34%	NA	52.90%	392.01%	NA	(14.70%)	(34.57%)
ROCE	21.57%	14.07%	14.38%	NA	(4.05%)	(20.56%)	NA	(0.09%)	(10.30%)
Net Working Capital	6,270.28	6,246.27	5,248.23	NA	622.29	421.41	NA	623.42	715.71
Net Working Capital (days)	113	176	137	NA	15	15	NA	81	194
Order Book (Rs. Mn)	51,328.00	25,817.10	17,973.40	NA	NA	NA	NA	NA	NA
Order Book break-up									
Orders from government and public sector entities	26,320.00	16,756.50	10,198.60	NA	NA	NA	NA	NA	NA
Private sector entities	25,008.00	9,060.60	7,774.80	NA	NA	NA	NA	NA	NA

Particulars (Rs. Mn, unless noted otherwise)	Toshiba Transmission & Distribution Systems (India) Pvt Ltd.*			Kanohar Electricals Ltd.*		
	FY25 (A)	FY24 (A)	FY23 (A)	FY25 (A)	FY24 (A)	FY23 (A)
Revenue from operations	NA	40,631.00	32,477.00	NA	3,016.38	3,108.32
Revenue Growth	NA	25.11%	31.34%	NA	(2.96%)	31.68%
EBITDA	NA	7,314.00	3,516.00	NA	374.16	376.34
EBITDA Margin	NA	18.00%	10.83%	NA	12.40%	12.11%
PAT	NA	5,004.00	2,024.00	NA	207.69	223.02
PAT Margin	NA	12.32%	6.23%	NA	6.89%	7.17%
ROE	NA	22.96%	12.03%	NA	10.81%	13.00%
ROCE	NA	31.42%	16.59%	NA	14.81%	18.25%
Net Working Capital	NA	13,966.10	11,193.10	NA	1,167.29	724.22
Net Working Capital (days)	NA	125	126	NA	141	85
Order Book (Rs. Mn)	NA	NA	NA	NA	NA	NA
Order Book break-up						
Orders from government and public sector entities	NA	NA	NA	NA	NA	NA
Private sector entities	NA	NA	NA	NA	NA	NA

A: Audited; NA: Not available

*On Consolidated basis *On Standalone basis; #FY24 & FY25 Consolidated and FY23 on standalone basis as per Red Herring Prospectus dated October 15, 2024*

Source: Annual Reports, Company Websites, Crisil Intelligence

Formula used:
EBITDA: Earnings before interest, tax, depreciation, and amortization (Profit before tax + Finance cost + Depreciation and amortization expense)
EBITDA margin: EBITDA / Revenue from operations for the period
PAT: Profit for the year attributable to owners
PAT margin: PAT / Revenue from operations for the period
ROE=Profit attributable to owners for the period /Equity excluding non-controlling interest
ROCE: EBIT/ Capital employed
EBIT=PAT + Tax+ Finance cost
Capital Employed = Total Debt + Equity
Net working capital = (Current assets- cash and cash equivalents) –(Current liabilities-current borrowings)
*Net Working capital days= Net working capital/Revenue from operations*no. of days in the period/year*

- Atlanta Electricals is one of the leading manufacturers of power, auto, and inverter duty transformers in India in terms of production volume as of Fiscal 2025.
- As of March 31, 2025, Atlanta Electricals had a market share[2] of about 12% in terms of total production of transformers in India ranging from 5 MVA to 200 MVA and voltage up to 220 kV.
- Atlanta Electricals has a manufacturing capacity of 47,280 MVA transformers per annum up to and including 200 MVA/220 kV as of Fiscal 2025.

[2] Market share refers to the percentage of total transformer production reported by the company (in MVA) during a specific period/year, out of the total transformer production reported by IEEMA during the same period/year.

9 Threats and challenges for transformer Industry

9.1 Threats

- **Regulatory changes:** The transformer market faces significant challenges due to uncertainties in regulations and policies, affecting investment choices, market dynamics, and technological progress. Conflicting policies, regulatory hurdles, and project approval delays lead to uncertainty and impede the progress of the industry. e.g. increasing push from governments and customers for greater localization and local content may impact on the supply chain, tariffs and sanctions by foreign countries (e.g. USA) may impact on the raw material prices which the Company imports.
- **Competition:** The Indian transformer industry faces intense competition from global players, particularly from China, who offer competitive pricing and advanced technology. Competition from Unorganized Players' is another challenge, as many small manufacturers are entering the market, increasing competition and putting pressure on prices. e.g. Competition from large international players who may have more resources than the Company may lead to price erosion which can lead to margin dilution in certain contracts.
- **Raw material availability and price volatility:** India faces issue of availability of cold rolled grain-oriented (CRGO) steel, a critical material necessary for manufacturing distribution and power transformers. Reliance on imports of CRGO can lead to delays and increased costs. Fluctuations in the prices of raw materials such as copper, steel, and oil can also impact the industry's profitability. e.g. due to Ukraine war and Red Sea conflict, there can be delays in import of certain raw materials.
- **Currency Fluctuations:** Due to various global geopolitical as well as economics activities, currency rate fluctuates. Exchange rate fluctuations can affect the industry's exports and imports, making it challenging to maintain profitability. e.g. In February 2025, the sharp depreciation in the rupee against the dollar (by 1.5% on-month and 3.8% on-year) add pressure on imports and exports.

9.2 Challenges

- **Quality and reliability:** Transformers are critical and complex products which are required to meet precise and specific requirements in terms of quality, measurements and tolerances. Failure to achieve or maintain compliance requirements or quality standards may disrupt the Company's ability to supply products of desired quality and standards.
- **Compliance with standards:** Ensuring compliance with national and international standards, such as IS, BIS, IEC, and IEEE, can be a challenge for transformer manufacturers. Adherence to predetermined performance requirements, insulation levels, and technical specifications for safe and effective functioning of transformers can be challenging with pricing pressure. e.g. Under the CEA (Measures Relating to Safety and Electric Supply) Regulations, 2023, it is mandatory for every transformer of 10 MVA or higher, and for every reactor of 10 MVAr or higher, to be provided with an automatic fire fighting system. CEA also proposed Nitrogen Injection Fire Prevention and Extinguishing System (NIFPES) for the transformer/ reactor is one of the automatic fire fighting systems which is installed by the respective users for enhanced safety of these equipment. Indian Standard (IS) for NIFPES is under formulation by the Bureau of Indian Standards (BIS) and as of now, no Indian or International Standards on NIFPES exist.
- **Technology upgradation:** The growing use of variable renewable energy sources will require the installation of advanced transformers that can effectively handle the intermittent output of renewable

energy sources. With the country progressing towards its renewable energy objectives, there is anticipated growth in the demand for transformers incorporating smart grid technologies, phase-shifting abilities, and voltage regulation features. This surge is poised to alter market dynamics significantly.

e.g. smart transformers and digital substation integration, eco-friendly transformer designs, developments in solid-state transformers would play a key role in the formulation of the future power systems' efficiency, reliability, and sustainability.

- **Price sensitivity:** Presence of multiple small players including unorganized players make Indian transformer market more aggressive and price sensitive rather than quality. Being highly price-sensitive, it is challenging for manufacturers to balance quality and cost. As per Indian Transformer Manufacturers Association (ITMA), it has about 250 members located in various states of India and represents the maximum production capacity of power/distribution transformers in the country. This indicates the degree of competition in the transformer industry.
- **Long lead times:** Increasing demand from RE sector, Railways and Metros, power transmission and distribution requirements, issues in raw material availability, dependence on imports, and manufacturing capacity constraints contributing to longer lead times for transformers. Longer lead times can affect the industry as well as the power ambitions of India.
- **Working capital management:** The Transformer Industry requires relatively higher working capital, primarily because of the extended production cycle of transformers compared to other industrial products. Additionally, there is a requirement to incur significant expenses for raw materials such as copper and CRGO at the initial stage of the production process. Hence, effective working capital management is essential. Transformer business requires a significant amount of working capital for day-to-day operations, raw materials and production. The period between raw material purchase and revenue realisation from sales is significantly higher. E.g. the Company's net working capital requirement during ending March 31, 2025 was Rs. 2,207.59 Mn.

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