

Industry assessment for electrical and electronics components used in automotive industry

Dhoot Transmission Ltd.

July 2026



Crisil

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Macroeconomic Overview of the Global & Indian Economy

Overview of the Global Economy

Review and Outlook of Global GDP

The ongoing conflict in the Middle East is exerting significant pressure on the global economy, primarily through humanitarian crises, infrastructure damage, and transport disruptions. It is driving up commodity prices, inflation, and market volatility, hitting import-dependent developing nations hardest. The overall impact depends on the conflict's duration and spread.

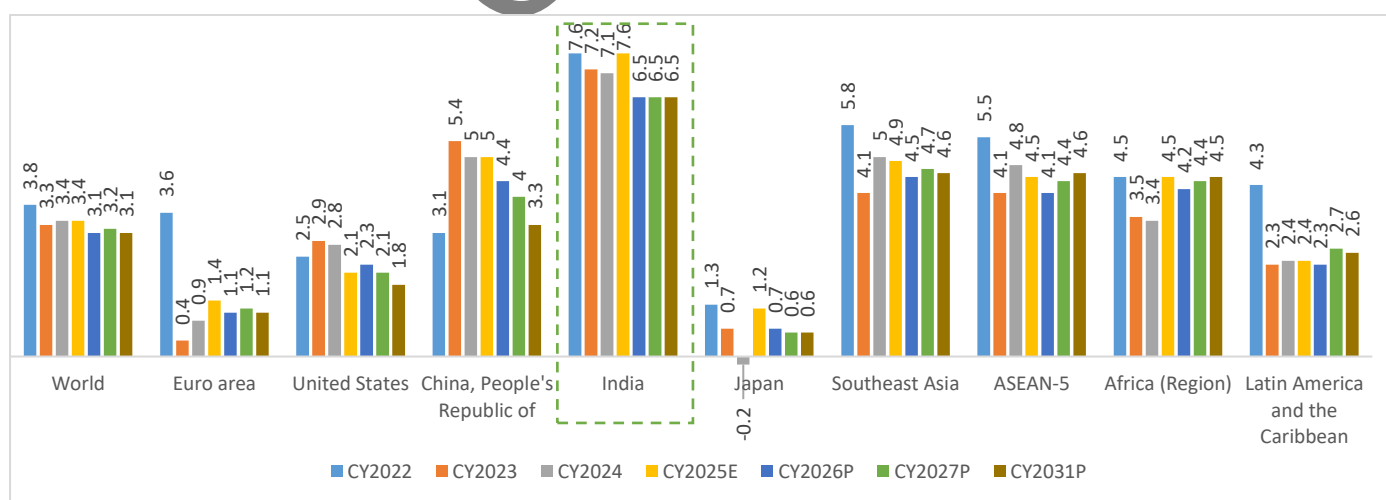
Before the outbreak of the conflict, the global economy was expected to follow a stable growth path, with growth estimated at 3.3% in CY2026 and 3.2% in CY2027, according to the IMF's January 2026 World Economic Outlook estimates.

Global economic growth is now expected to slow. Assuming the conflict remains short-term, revised growth forecasts stand at 3.1% for CY2026 and 3.2% for CY2027, compared with 3.4% in CY2025. Growth in advanced economies; including the US, UK, euro area and Japan are estimated at 1.9% in CY2025 and is projected to moderate to 1.8% in CY2026 and 1.7% in CY2027.

In emerging markets and developing economies, growth is expected to slow to 3.9% in CY2026 before recovering to 4.2% in CY2027. The impact of the conflict is expected to vary by geography, financial linkages, remittance dependence and energy exposure.

The growth outlook is relatively more stable for India, despite global environment uncertainty. The steady expansion of the economy is supported by private consumption, rising investments and increased infrastructure spending.

GDP growth (% y-o-y) of key economies



Note: On Calendar Year (CY) basis

* Euro area comprises 19 member countries of the EU, * ASEAN-5 (Indonesia, Malaysia, The Philippines, Singapore, and Thailand)

Source: International Monetary Fund (IMF); World Economic Outlook (WEO) – April 2026 update, Crisil Intelligence

- The IMF projects global growth at 3.1% in CY2026 and 3.2% in CY2027, slower than the 3.4% growth recorded in CY2024 and CY2025. The forecast has been revised downward due to

geopolitical tensions, energy-market risks, shifts in trade policy and higher commodity prices. Advanced economies: The U.S. growth is estimated at 2.1% in CY2025 (lower than 2024), and projected to expand to 2.3% in CY2026 driven by reduced policy rate and supportive fiscal policy. Moreover, as the initial shock of higher trade barriers since April 2025 wears off their negative effects are expected to fade, allowing for a more stable economic outlook. The war has a small negative effect on the US, however it's offset by a rebound in activity in early 2026.

- Emerging markets and Asia: Emerging markets and Asia are expected to face pressure from geopolitical tensions, financial flows, remittance exposure and energy dependence. China's GDP growth is estimated at 5.0% in CY2025 and is projected to moderate to 4.4% in CY2026 and 4.0% in CY2027, reflecting property-sector weakness, demographic pressures, lower returns on investment and slower productivity growth. The economic growth expected to decline 4.4% CY2026 and 4.0% in CY2027, as the Middle East conflicts causes a negative shocks and other factors such as downturn in property sector, shrinking labour force lower return on investment and slower productive growth.
- Other regions: Latin America and the Caribbean are expected to record steady growth of 2.4% in CY2025 and 2.3% in CY2026, with mixed prospects for Mexico and Brazil due to US tariffs. Growth is expected to improve to 2.7% in CY2027, supported by lower interest rates and improved export demand. Africa's growth is estimated to rise to 4.5% in CY2025, led by Nigeria, before moderating to 4.2% in CY2026 due to commodity-price shocks and supply disruptions.

India's growth outlook remains relatively stable despite uncertainty in the global environment. Growth is estimated at 7.6% in CY2025, compared with 7.1% in CY2024, supported by domestic consumption, healthy growth in services activity and improved investment. On this elevated base, growth is projected to moderate to 6.5% in CY2026 and CY2027. On this elevated base, growth is projected to be moderate to 6.5% in CY2026 and CY2027.

Overview of the Indian Economy

Review of GDP growth over fiscals 2019-2026 and Outlook for fiscals 2027

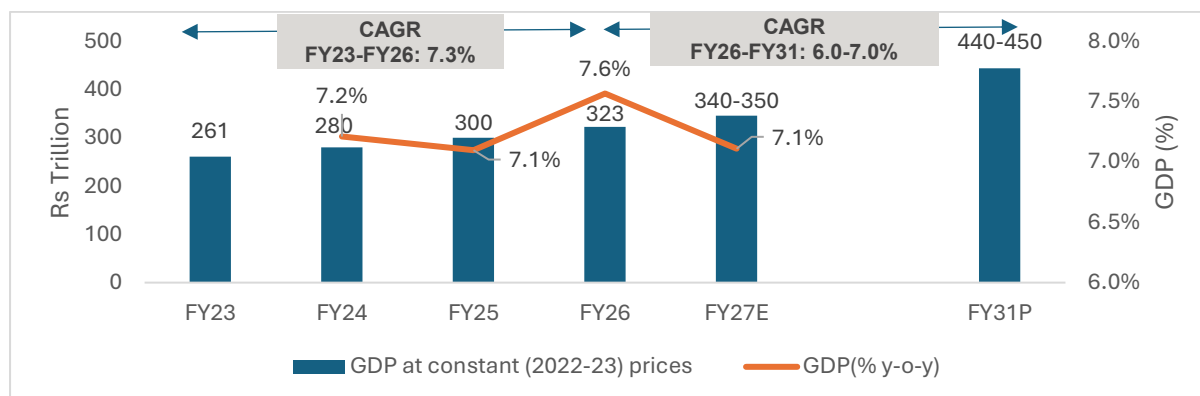
As per the IMF's World Economic Outlook, April 2026, India is placed as the sixth-largest economy, behind the UK and Japan, compared with earlier expectations of a higher ranking. The change is driven by depreciation of the Indian rupee against the US dollar and downward revision to GDP estimates. Despite this, India remains among the world's fastest-growing major economies, with real GDP growth projected at 6–7%, outpacing major global peers. The Indian economy logged 7.3% CAGR between fiscals 2023 and 2026. Economic growth was supported by benign crude oil prices, soft interest rates and low current account deficit. The Indian government also undertook key reforms and initiatives, such as Saptarishi priorities focused on infrastructure, green growth (economic growth ensuring sustainable use of natural resources), youth empowerment financial inclusion initiatives, and gradual opening of sectors such as retail, e-commerce, defense, railways, and insurance for foreign direct investments (FDIs).

Growth exceeded expectations in fiscal 2024 supported by higher public capex and strong industrial activity. According to the National Statistics Offices (NSO), second advance estimates (SAE) projects India's real gross domestic product (GDP) growth at 7.6% for the fiscal 2026, slightly higher than first advance estimates of 7.4%. The GDP growth accelerated by private consumption followed by fiscal support such as tax cuts, GST cuts and lower interest rates. The sentiments improved in private investments with recovery in private capex underway, driven by emerging sectors like green hydrogen, semiconductor, battery manufacturing and data centers are the key growth areas.

The real GDP growth is projected to be 7.1% for fiscal 2027 around estimated potential growth rate of 7% as per economic survey for 2025-26. Growth will be supported by robust private consumption and a mild pick-up private investment. The positive effects on private consumption from fiscal support includes tax cuts, GST cuts, unconditional cash transfers by states, lower interest rates and benign inflation will spill over into the next fiscal.

Moreover, CRISIL forecast assumes normal monsoon and crude oil prices at USD 75-80 per barrel. However, ongoing tensions in West Asia pose a significant risk to the global economy and could adversely affect India's GDP projections through higher commodity prices if the conflict persists. Reports of a possible El Niño condition forming beyond August 2026, according to the National Oceanic and Atmospheric Administration, remain monitorable for the rural economy.

India's GDP growth trend and outlook



Note 1: E- estimated, P – projected

Note 2: A new national accounts series has been released with 2022-23 as the base year, superseding the 2011-12 series, with figures available FY23 onwards

Source: National Statistical Office (NSO), IMF, Crisil Intelligence estimates

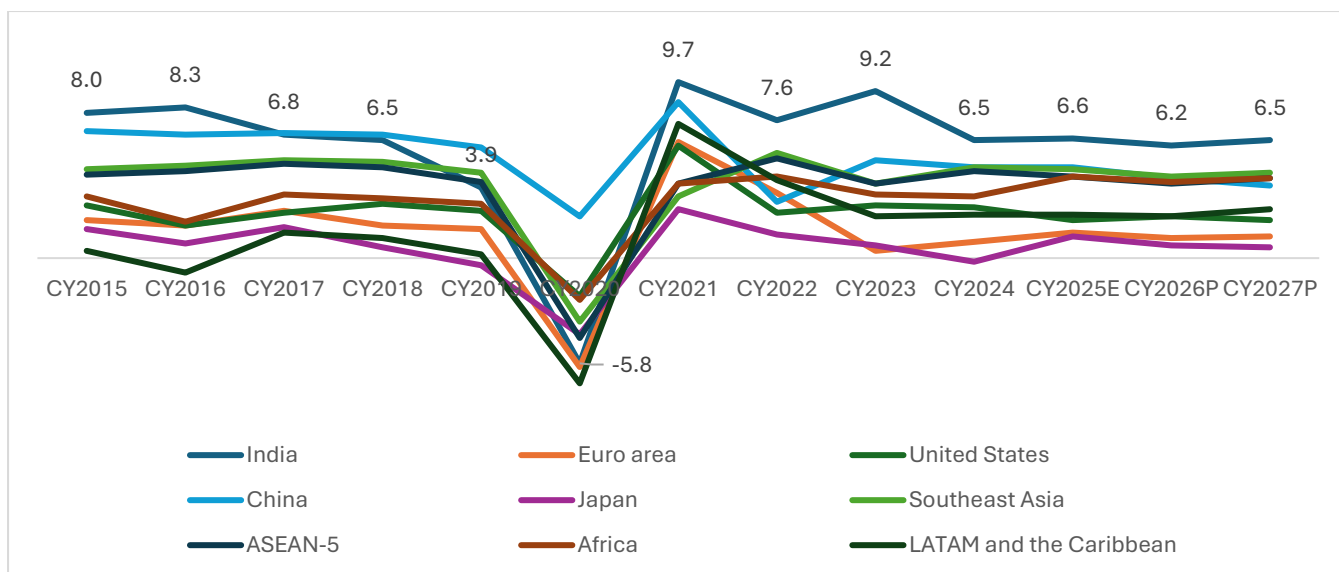
As per the new NSO series with 2022–23 as the base year, nominal GDP growth slowed to 8.6% in fiscal 2026 from 9.7% in fiscal 2025. The average share of gross fixed capital formation in nominal GDP increased to 31.9% during fiscals 2023–2026 under the new series, compared with 30.4% under the old series. The size of economy in fiscal 2026 is smaller in new series compared to old series mainly due to small size of private consumption. On the supply side the size of the services sector was revised down significantly while the manufacturing and agriculture sectors increased a tad in size relative to the old series.

Inflation eased at 3.2% in fiscal 2026 and borrowing costs decreased, it gave significant boost to consumer spending. Domestic private consumption growth strengthened despite a high base effect, boosting both manufacturing and services. However, inflation is expected to rise 4.5% on average for fiscal 2027 due to west Asia conflicts and its adverse effect on energy prices. Though higher crude oil prices are being absorbed by the government, a persistent rise in global prices could foresee uptick in retail fuel prices for cooking and transportation. Additionally, the adverse impact of heatwave and increased risks from below normal southwest monsoon are upside risks to food inflation.

India to remain growth outperformer globally

India's growth is expected to outperform over the other emerging economies in the medium run. India's steady growth momentum has been further accelerated by strong domestic demand. A healthy monsoon, benign inflation, the Reserve Bank of India's (RBI) rate cuts, and tax relief by government are expected to strengthen domestic consumer demand. Rural consumption is strengthening after significant improvement throughout CY2024 continuing into CY2025, rising urban spending and an increasing pace of private investment. CRISIL Intelligence estimated GDP growth for fiscal 2026 to be 7.66%.

India is one of the fastest growing economies (GDP growth, % year-on-year)



E: estimated; P: projected

Note: On Calendar Year (CY) basis

* Euro area comprises 19 member countries of the EU, * ASEAN-5 (Indonesia, Malaysia, The Philippines, Singapore, and Thailand)

Note: GDP growth based on constant prices

Source: IMF (World Economic Outlook – April 2026 update), Crisil Intelligence

Key drivers for economic growth

MPC actions The Repo rate cuts by the Monetary Policy Committee (MPC) of the Reserve Bank of India (RBI), supported lower interest rates in the economy. The MPC has kept repo rate unchanged at 5.25% during CY2026 maintaining a neutral stance to balance growth and inflation.

Spending on roads to remain elevated

Road's capex growth is expected to normalize to 6% CAGR between fiscal 2024-26. The progress of national highways in India has been remarkable over the past decade, with significant growth in terms of length and infrastructure development. The Pradhan Mantri Gramin Sadak Yojana (PMGSY), a long-running rural road construction program initiated in 2000, aims to provide all-weather road connectivity to unconnected habitations. To date, a total of 7.97 lakh kilometers of roads have been sanctioned under the scheme. Building on this momentum, Phase IV of PMGSY was sanctioned in September 2024, with an ambitious plan to construct 62,500 kilometers of new roads at a total investment of Rs 70,125 crore, further expanding rural road connectivity and bridging the infrastructure gap in rural areas.

India boasts the highest population of young people

India's median age is about 28 years, and it has largest working population among major global economies. It is expected to add ~70 million to the workforce (15-64 age group) by 2030. This benefit allows greater engagement in productive labor, thus bolstering national income. India's youthful demographic not only strengthens the country's competitive edge in the services and manufacturing sectors but also unlocks the spending potential of a young population towards discretionary expenses.

Key economic indicators: Real GDP for fiscal 2025 -2026

GDP growth for fiscal 2025 was estimated to be 6.5% slower than 9.2% in the previous fiscal year. However, growth remained steady and close to the pre-pandemic decadal average of 6.6% between fiscal 2011 and fiscal 2021 to retain India's status as the fastest growing large economy.

GDP growth (Q-o-Q SA annualized, %)

	Q4-CY23	Q1-CY24	Q2-CY24	Q3-CY24	Q4-CY24	Q1-CY25	Q2-CY25	Q3-CY25	Q4-CY25
US	3.4	0.8	3.6	3.3	1.9	(0.6)	3.8	3.8	0.7
UK	(0.3)	0.8	0.6	0.2	0.2	0.7	0.3	0.1	0.1
Euro area	0.0	0.3	0.2	0.4	0.4	0.6	0.1	0.2	0.2

	Q4-CY23	Q1-CY24	Q2-CY24	Q3-CY24	Q4-CY24	Q1-CY25	Q2-CY25	Q3-CY25	Q4-CY25
Japan	(0.5)	(0.9)	1.9	2.3	2.1	0.3	2.3	(1.8)	1.3
China	5.2	5.3	4.7	4.6	5.4	5.4	5.2	4.8	4.5
India	4.4	7.6	(7.1)	1.2	5.2	8.6	(6.7)	1.6	-

Note: India* data based on fiscal year (Q4CY2024:Q3FY2024)

Source: Statistical bureau of respective countries

Going forward, CRISIL forecasts India's GDP growth in fiscal 2027 to be 7.1% supported by healthy consumption, supportive monetary policy, a mild pick up in private investment. The positive effect on private consumption from fiscal support via income tax cuts, GST cuts, unconditional cash transfers by states, lower interest rates and benign inflation will spill over into next fiscal.

CIRSIL Intelligence expects the investment momentum to continue as the private investment sentiments is improving with a recovery in private capex underway driven by emerging sectors. The central government's capex thrust will continue, with budgetary or effective capex budget to grow 22.1% in next fiscal compared with 6% in the revised estimates for this fiscal. Normal southwest monsoon predicted and crude oil prices at USD 75-80 per barrel, However the risks to downside given by the Middle east conflict and recent surge in commodity prices. Reports of possible developing of El nino conditions forming beyond August 2026, according to the National Oceanic and Atmospheric Administration, remain monitorable for the rural economy.

GST reforms to accelerate consumption and support domestic sales.

- The Government of India has revamped the Goods and Services Tax (GST) structure with three slabs of 5%, 18% and 40%.
- In the automobile industry, electric vehicles will continue to be taxed at 5%, while other segments have undergone a rate revision to either 18% or 40% (see tables below).
- For the small cars and compact utility vehicles, which contribute around 55% of the passenger vehicle industry volume. The rate cut is expected to result in 8-9% price reduction, leading to a 200-bps improvement in volume to 4-6% compared with our earlier estimates of 2-4%.
- Prices for LCVs, MHCVs and buses will reduce by about ~7.8%. However, it does not consider any pass-through that may happen from automotive component manufacturers to original equipment manufacturers (OEMs) in the form of GST reduction. From a domestic sales perspective, in fiscal 2026, CVs may see flattish-to-marginal-positive growth.

GST Rate on Automobiles (CVs)

Category	Old GST Rate	New GST Rate	Impact on prices for end-user
2W (<350cc)	28%	18%	• <350cc 2Ws have become more affordable as the tax savings have been passed on to the customers • Improved demand in entry and mid segments
2W (>350cc)	31%	40%	• These vehicles became more expensive • Demand softened
3W	28%	18%	• Auto drivers and fleet owners benefit due to lower EMIs • Improved profitability per km
PV (smaller PVs)	29%	18%	• Reduction in prices led to affordable segments car cheaper • Encouraging first time buyers
PV (large PVs)	28%+ variable compensation cess	40% with no cess	• Removal of additional cess simplify taxation • Larger cars are more affordable for aspirational buyers
CVs	28%	18%	• Reduction in prices, making CVs more affordable for buyers

Note:

1. CVs include LCVs, MHCVs and Buses

2. Small cars: include petrol engine cars of <1200 cc and not exceeding 4 meters in length and diesel cars of <1500 cc and not exceeding 4 meters in length)

Source: Press release document by MoF dated 8th Sep 2025

New GST Rate on Auto components (CVs)

Category	Criteria	New GST Rate	Impact on prices for end-user
Auto Parts and Components	Tyres	18%	Price reduction leads to positive impact on end users' savings
	Batteries (lithium-ion batteries & other batteries under heading 8507)	18%	Lower retail prices of batteries and related products
	Engine Components	18%	Cheaper prices to lower down the overall cost of vehicle ownership and repair work

Source: Press release document by MoF dated 8th Sep 2025

The auto parts previously had different rates, which caused classification dispute. However, the new rates are expected to simplify tax structure, and lower down costs for manufacturers and suppliers. It is also expected to accelerate the demand and provide positive impact across the entire supply chain.

Impact on the Auto Industry due to US tariffs

Auto-component exports accounted for 17% of production in fiscal 2026 and are expected to grow by 6–8% in fiscal 2027 and 8–10% in fiscal 2028. However, tariff volatility is expected to temper market growth, resulting in relatively modest expansion. The US tariffs are more of a slowdown in the short to medium term: they can disrupt export revenues, force reconfiguration of supply chains, and squeeze margins. The critical component constitutes 78% of the India's overall auto component production, out of which 28% is exported to US and within this 28%, around 60% of the export basket fall under key parts category which is subject to either 25% or 50% tariff category announced by the US. Hence the new tariff is expected to be unfavorable for the Indian exports.

Impact on the Auto Industry due to UK FTA

The UK-India FTA is more of a medium to long-term opportunity: it lowers entry barriers, especially for premium vehicles, but there are qualifications and gradual implementation that temper its immediate effects. The FTA opens doors for Indian component makers and EV related firms to export to UK markets under more favorable duty structures. For consumers, the FTA may bring down the cost of imported luxury/premium/UK-manufactured cars gradually. At present India imposes a high import duty on fully assembled cars from the range of 60-110% depending on the engine size and other factors. Under the FTA, India will allow a limited number of UK-made cars to be imported at a 10% duty in a phased manner over five years. A quota has also been defined for ICE models eligible for reduced tariff rates. However, quota has also been defined for the number of ICE models at a reduced rate. The total quota for the number of ICE imports at a reduced tariff rate will increase from 20,000-37,000 in the first five years but then it gradually decreases over the next 10 years to just 15,000.

Further over the period of 10 years, the import duty will reduce from 110% to 50% for large capacity Petrol /diesel cars, from 66% to 50% for medium capacity ICE cars and from 66% to 45% for small capacity cars.

Impact of Iran-US conflict on the Indian Auto Industry

The ongoing tensions between Iran and the United States are impacting India's auto industry mainly through oil prices and input costs. India imports the majority of its crude oil; therefore, an increase in global crude prices to USD 90–100 per barrel could raise fuel prices and affect vehicle demand, particularly for two-wheelers and entry-level cars.

On the supply side, key raw materials such as steel, aluminum, and petrochemical derivatives have seen cost pressures, often rising in the range of 5 to 10% during periods of geopolitical disruption, which squeezes automaker margins and can lead to vehicle price hikes of about 2 to 4%. In addition, any disruption in the Strait of Hormuz, through which nearly 20% of global oil supply passes, increases freight and logistics costs, adding further pressure. While demand has remained relatively stable so far, sustained high oil prices and inflation could slow growth.

Overview of Government policies and trends on automotive industry

Atmanirbhar Bharat Campaign

Atmanirbhar Bharat Abhiyan or the self-reliant India campaign was launched in May 2020 amid the Covid-19 pandemic, with a special and comprehensive economic package of Rs 20 trillion, equivalent to 10% of the country's GDP. The scheme was launched with the primary intent of fighting the pandemic and making the country self-reliant based on five pillars: economy, infrastructure, technology-driven system, demography, and demand.

Lowering supply chain dependency on China

India including other nations are actively pursuing strategies to reduce supply chain dependency on China in the wake of pandemic and growing geo-political tensions.

This includes diversifying the supply chain by sourcing inputs from various countries with a goal of reducing the risk of relying on a single country. Furthermore, India is also trying to strengthen the domestic manufacturing environment through various policy initiatives. Key strategies adopted by India to diversify the supply chain includes attracting foreign investment via tax benefits and incentive schemes, pushing domestic manufacturing and diversification of trade partners.

PLI scheme provides boosts to industrial investments in the short-to-medium term.

PLI schemes provide a boost to industrial investment in the short to medium term. The scheme aims to make manufacturing in India globally competitive by addressing sectoral constraints, creating economies of scale and improving efficiency. It is designed to create a complete component ecosystem in India and make the country an integral part of the global supply chain. The PLI scheme is a time-bound incentive scheme by the government which rewards companies in the 5-15% range of their annual revenue based on the companies meeting pre-decided targets for incremental production and/or exports and capex over a base year.

The government has more than doubled the PLI scheme allocation for fiscal 2026 to Rs 19.5 thousand crores, significant increase of 76% from the fiscal 2025 outlay, aimed at driving growth across industries and enhancing competitiveness. Capex is expected to peak in the next two fiscals, followed by incentive payouts, which will support the growth of Indian businesses and reduce import dependence.

The Automobile sector saw a sharp increase in the allocation in the last few years- from Rs 2.63 crore in fiscal 2024 to Rs 346.87 crore in fiscal 2025 to Rs 2,818.85 crore for fiscal 2026 and to Rs 5,940 crore for fiscal 2027. The allocation for Automobile and Auto component industry for fiscal 2026 was the second largest amongst all sectors. Similarly for Advance Chemistry cell, the allocation rose from Rs 7.73 crore in fiscal 2024 to Rs 15.42 crore in fiscal 2025 to Rs 155.76 crore for fiscal 2026 and now, seen a drop to Rs 86 crore for fiscal 2027.

Budgeted incentives for each sector under the PLI scheme in budget 2026-27

Sector	Segment	FY27 Budget Estimates (Rs Crore) *	
Automobile	Advance chemistry cell (ACC) battery	86	6,026
	Automobiles and auto components	5,940	

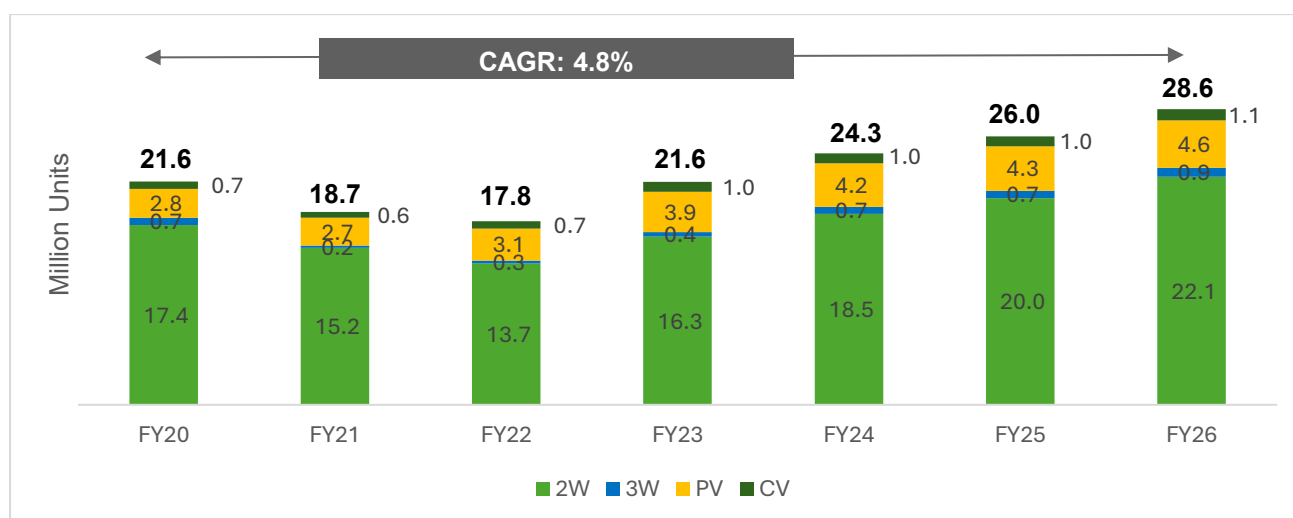
Source: Budget Document 2026-27, Crisil Intelligence

An outlay in the Union Budget 2026-27 of Rs 6,026 crore has been made for automobiles, auto components and ACC which is the second highest allocation amongst all sectors:

- Rs 5,940 Crore allotted for enhancing India's manufacturing capabilities or automobile and auto component industry - Advanced Automotive Products (AAT). The scheme has two components, viz. Champion OEM Incentive Scheme and Component Champion Incentive Scheme. A total of 95 applicants have been approved under this PLI scheme.
- Rs 86 Crore under the 'National Programme on Advanced Chemistry Cell (ACC) Battery Storage' for achieving manufacturing capacity of 50 Giga Watt Hour (GWh) of ACC. Four companies have been selected till date for incentive under the PLI Scheme for ACC battery storage

Trend of Indian automotive industry (fiscal 2020-fiscal 2026)

Split by vehicle segment

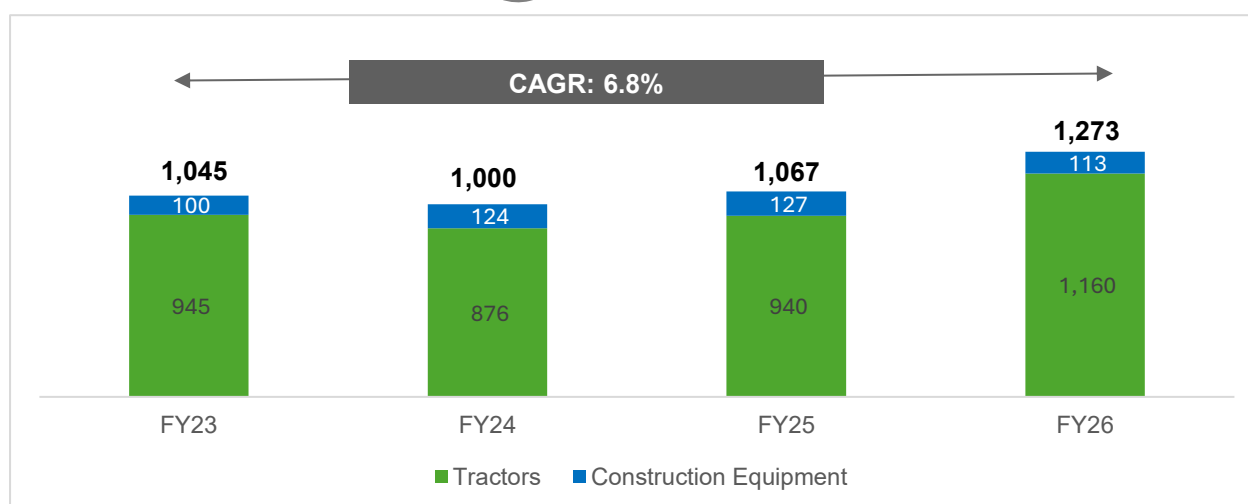


Source: Vahan, SIAM, CRISIL Intelligence

Segment	Sales (FY20)	Sales (FY26)	CAGR (FY20-26)	Volume Share in FY26
Two-wheeler (2W)	17.4 million	22.1 million	4.1%	77.2%
Passenger vehicle (PV)	2.8 million	4.6 million	8.6%	16.1%
Three-wheeler (3W)	0.7 million	0.9 million	2.8%	3.0%
Commercial vehicle (CV)	0.7 million	1.1 million	7.0%	3.8%
Overall	21.6 million	28.6 million	4.6%	

The automotive industry's FY20–FY26 CAGR appears muted because volumes were significantly affected during the COVID-19 period. The low base during the pandemic distorted the growth trend; however, volumes recovered sharply from fiscal 2023 onwards.

Split by segment (OH)



Source: TMA, Industry, CRISIL Intelligence

The overall OH industry volume has shown an upward trend, rising from 1,045 thousand units in fiscal 2023 to 1,273 thousand units in fiscal 2026 with a dip in fiscal 2024. Tractors continue to dominate the segment, accounting for the bulk of sales. Construction equipment, on the other hand, has witnessed a consistent increase from 100 thousand units in fiscal 2023 to 113 thousand units in fiscal 2026, growing at a notable CAGR of ~4.2%.

Industry growth drivers

Rising disposable income and urbanization: Rising household incomes, expanding urban middle class, and improving affordability are driving higher vehicle ownership across segments. Urbanization is increasing personal mobility needs, while Tier 2 and Tier 3 cities are emerging as new growth centers for two-wheelers and compact cars. Rural markets, supported by improving farm income and access to finance, are also contributing to sustained demand momentum.

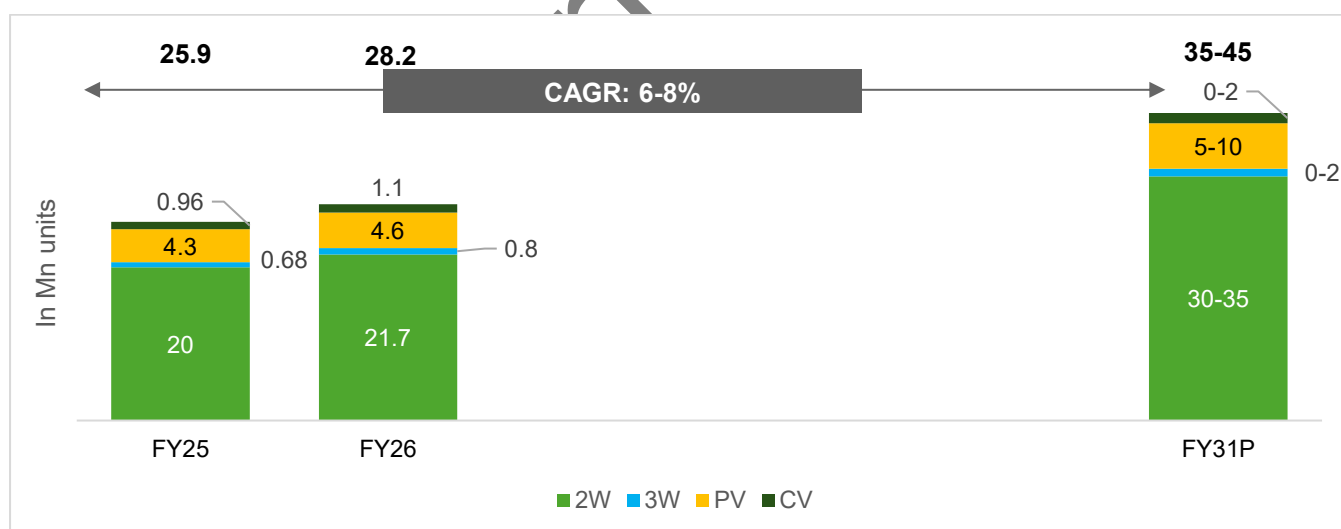
Infrastructure development: The expansion of highways, expressways, and rural roads supports higher freight movement and boosts demand for commercial vehicles. Improved connectivity also promotes penetration of passenger and two-wheelers into semi-urban and rural markets.

Policy Support and Incentives: Government initiatives such as FAME-II, PLI for Auto & Advanced Chemistry Cells, and Scrappage Policy are encouraging both traditional and electric vehicle production and adoption. Lower GST on EVs and incentives for localization of components are further driving the industry.

Financing and leasing ecosystem: Enhanced financing access has improved vehicle affordability and penetration. Banks, NBFCs, and fintech players offer faster approvals and competitive interest rates, expanding credit reach across urban and rural segments. Emerging models such as vehicle subscription and leasing are appealing to buyers, especially in metro markets, and helping boost new vehicle registrations.

Electrification Push: India's move toward green mobility is reshaping the industry landscape. EV penetration is accelerating, especially in the two- and three-wheeler segments, supported by incentives under FAME-II, declining battery costs, and private investment in charging infrastructure. OEMs are committing to net-zero targets, and state EV policies (e.g., Delhi, Maharashtra, Tamil Nadu) offer additional purchase and manufacturing incentives.

Outlook on Automotive industry



Source: Vahan, CRISIL Intelligence

The Indian automotive industry is projected to grow from 28.2 million units in FY26 to about 35-45 million units by FY31, registering a healthy CAGR of around 6-8%. Two-wheelers will remain the largest segment, rising from 21.7 to 30-35 million units (8-10% CAGR), supported by strong rural recovery, affordability, and rapid EV adoption. Passenger vehicles are expected to grow from 4.6 to 5-10 million units (5-7% CAGR) driven by sustained SUV demand, premiumization, and improved financing access. Three-wheelers and commercial vehicles are set to expand at 3-5% and 4-6% CAGR respectively, backed by last-mile connectivity, e-commerce fleet demand, and infrastructure-driven freight growth.

CRISIL Intelligence projects domestic tractor sales to expand at 5-7% CAGR during fiscals 2025 to 2031, after factoring in one to two years of erratic monsoon during the period along with healthy sales expected in the remaining years.

The construction industry in India is also expected to grow steadily at an annual rate of 5-7% between fiscal years 2026 and 2030. This growth will be mainly driven by increased spending on infrastructure projects such as roads and railways, supported by both central and state government investments.

Electrification

EV penetration in India has witnessed a steady and significant rise over this period, growing from a minimal 0.1% in FY20 to 6.9% in FY26, after reaching 5.7% in FY25, indicating a strong consumer and policy-driven shift toward electrification. The sharp acceleration post-FY22 can be attributed to several factors including enhanced government incentives under FAME-II, state EV policies, improved charging infrastructure, and rising fuel prices that have made EVs more cost-competitive. Growing private sector participation, OEM investments in localized manufacturing, and increased availability of financing options have further accelerated this transition.

EV penetration across segments

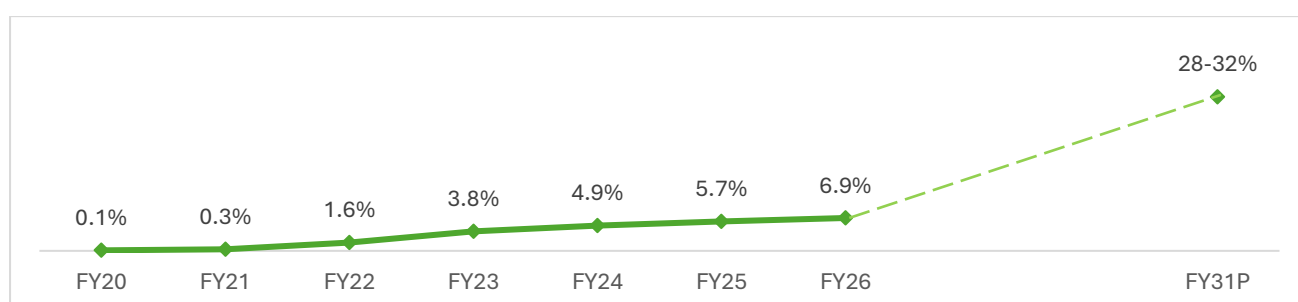
Segment	FY20	FY21	FY22	FY23	FY24	FY25	FY26
Two-wheeler (2W)	0.2%	0.3%	1.9%	4.7%	5.4%	6.0%	6.6%
Three-wheeler (3W)	0.3%	1.3%	4.7%	7.5%	15.3%	22.5%	31.6%
Passenger vehicle (PV)	0.1%	0.2%	0.6%	1.4%	2.4%	2.7%	4.6%
Commercial vehicle (CV)	0.1%	0.1%	0.3%	0.3%	0.9%	1%	1.9%
Overall	0.1%	0.3%	1.6%	3.8%	4.9%	5.7%	6.9%

EV penetration outlook of automotive industry

EV penetration across the automotive industry is poised for a sharp rise from 6.9% in fiscal 2026 to nearly 28-32% by FY31, led by strong policy incentives, improved charging infrastructure, and increasing model availability. Electrification will be dominated by two- and three-wheelers due to favourable cost economics and higher daily usage, while passenger and light commercial vehicles will see gradual adoption. Overall, the sector is entering a transformative phase marked by technological advancement, sustainability focus, and strong domestic consumption momentum.

E-3W have seen the fastest adoption, rising sharply from just 1.2% in FY21 to 31.6% in FY26, driven by favourable economics for last-mile delivery, supportive government policies like FAME II, and increasing fleet electrification by logistics and e-commerce players. The two-wheeler (2W) segment also shows steady growth from 0.2% in FY20 to 6.6% in FY26, supported by expanding product portfolios, battery technology improvements, and rising consumer acceptance for urban commuting. Electric passenger vehicles (PV) have recorded a gradual rise, reaching 4.6% penetration in FY26, aided by OEM launches in the compact SUV and other categories, improved charging infrastructure, and state-level incentives. Meanwhile, commercial vehicles (CV) continue to show minimal penetration (around 1.9% in FY26), constrained by high upfront costs, limited charging infrastructure for heavy-duty operations, and the nascent stage of technology in this segment.

EV penetration outlook for automotive industry



Note: It includes 2W, 3W, PV and CV
Source: Vahan, CRISIL Intelligence

Despite the broader push for electrification across the automotive and commercial vehicle sectors, EV adoption in the construction equipment (CE) industry remains minimal with current penetration of electric construction machinery estimated to be less than 1%, largely limited to pilot deployments of compact equipment such as electric mini-excavators and loaders. Key barriers include the lack of high-capacity battery technology for heavy-duty use, limited charging infrastructure on construction sites, and high upfront costs. Given these structural challenges, the industry's transition to electric equipment is expected to remain slow in the near term.

However, OEMs are gradually ramping up R&D and collaborating with global partners to localize electric variants. EV penetration in CE is likely to see meaningful traction only post FY2027, once supporting ecosystem and policy incentives are in place.

Review and outlook of Indian two-wheeler industry

Review of Indian two-wheeler industry (fiscal 2020 to fiscal 2026)

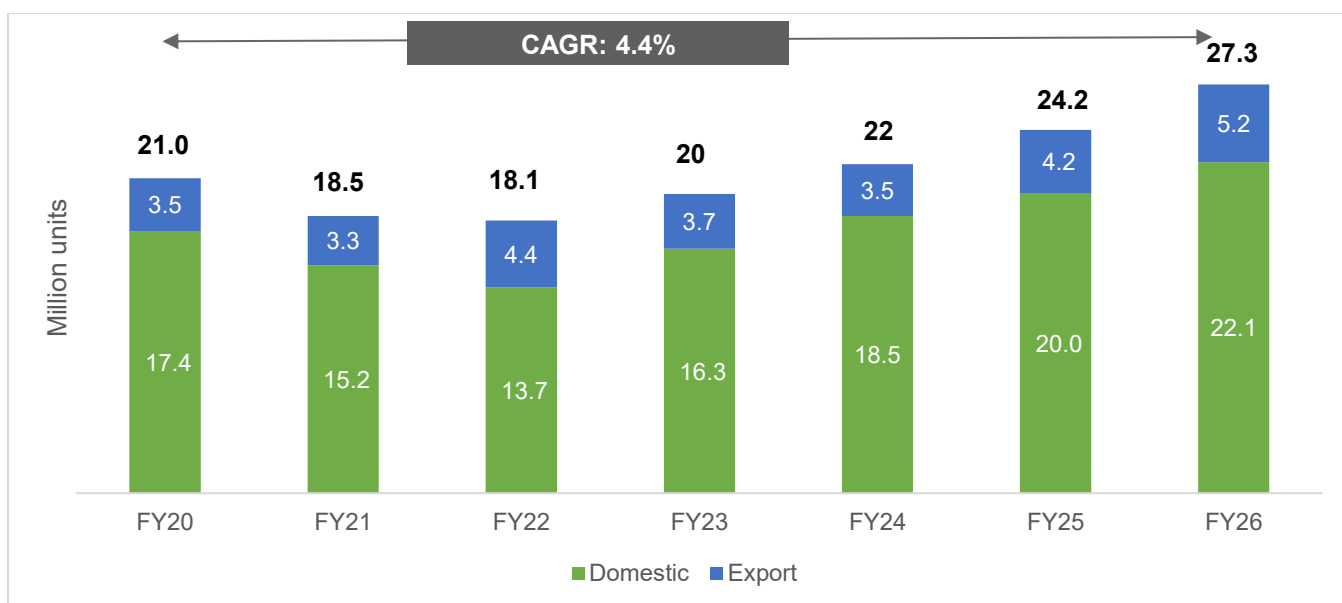
Domestic two-wheeler industry

The two-wheeler industry enjoys healthy demand in India, as two-wheelers are preferred by a significant share of the population for regular commuting. This is primarily due to lower acquisition cost, better mileage, lower maintenance cost, ease of navigation in traffic, hassle-free parking and suitability for rugged roads.

Following the pandemic-induced slowdown in fiscal 2022, India's two-wheeler industry rebounded strongly in fiscal 2023, recording an 18.8% growth driven by improving consumer sentiment, normalization of economic activities, increased mobility, and pent-up demand. The reopening of colleges and offices boosted scooter demand, while the need for last-mile mobility remained strong despite the restoration of public transport services. Rapid growth in electric vehicle sales further supported overall industry performance. Building on this momentum, the two-wheeler market expanded at a CAGR of 7.8% between fiscal 2021 and fiscal 2026, aided by an improving macroeconomic environment, stronger rural demand, and sustained preference for motorcycles with engine capacities of 125cc and above, along with scooters. In fiscal 2025, industry sales reached 20 million units, reflecting an 8.3% year-on-year increase, while retail sales grew by 7.6%.

Fiscal 2026 recorded sales of 22.1 million units, supported by GST cuts in September 2025 along with continued rural market momentum with improved rural productivity, diversification towards horticultural crops, government income support schemes and structural measures taken by the government such as PM-KISAN, eNAM, Pradhan Mantri Fasal Bima Yojna (PMFBY) to name a few, aided rural income.

Domestic sales and exports of two-wheeler (fiscals 2020 – fiscal 2026)



Note: Data for ICE and EVs are the retail data based on Vahan; Exports are based on the SIAM reported numbers.
Source: SIAM, VAHAN, CRISIL Intelligence

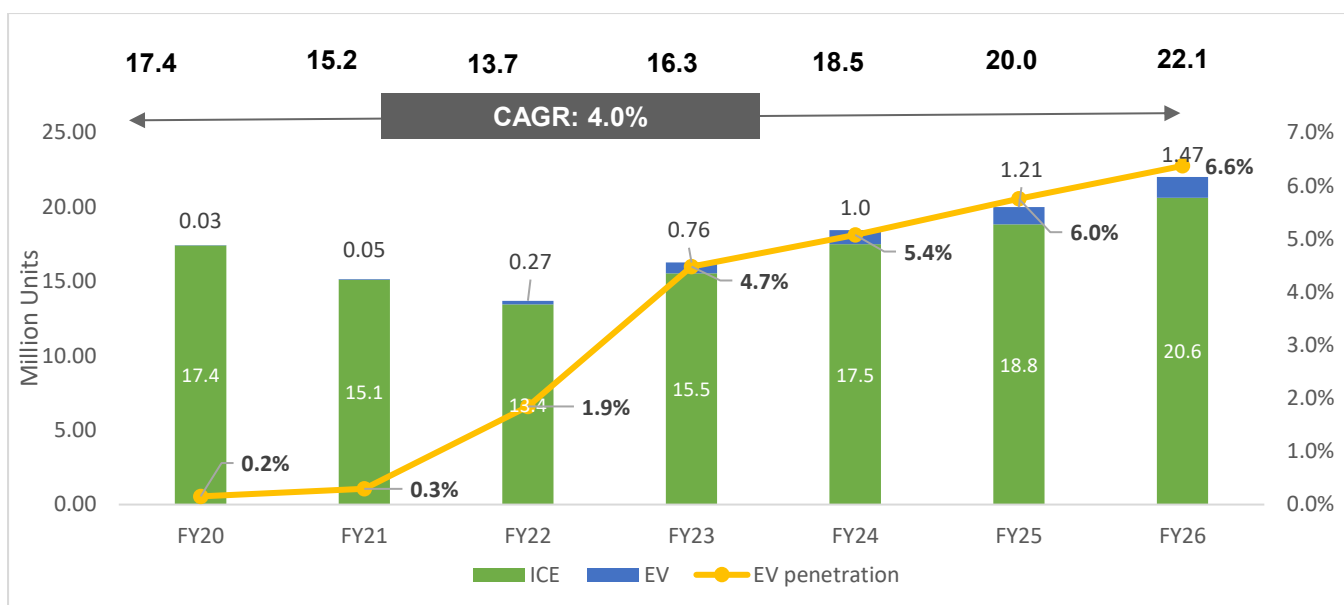
Y-o-Y growth	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY20-26 CAGR
Domestic sales	-17.8%	-12.6%	-9.9%	19.0%	13.5%	8.1%	10.5%	4.1%
Exports	7.3%	-5.7%	33.3%	-15.9%	-5.4%	20.0%	23.8%	6.8%
Total	-14.4%	-11.5%	-2.2%	10.5%	10.0%	10.0%	12.8%	4.6%

In fiscal 2024, the domestic sales grew by 13%, supported by further improvement in the macroeconomic scenario, rural support, continued traction for premium motorcycles as well as scooters. In addition, continued demand for electric two-wheelers despite the subsidy cut supported the growth in fiscal 2024. The new launches, especially in the premium segments provided an added support to the demand.

In the fiscal 2025, domestic industry sales clocked 20 million units, an increase of 8% over the previous year. As per Federation of Automobile Dealer Association (FADA) two-wheeler market grew by 8.4% in rural area compared to 6.8% in urban areas in the fiscal 2025. The growth has been driven by recovery in the rural market aided by healthy crop prices, rising incomes and rising demand for scooters. Continued demand for premium vehicles as well as electrification provided an added support to the domestic market during the year.

During fiscal 2026, domestic sales clocked healthy y-o-y growth of 10% reaching 22.1 million units, supported by GST 2.0 led price rationalization. On the other hand, exports clocked a steep 23% y-o-y growth.

Domestic two-wheeler ICE-EV sales split trend (ICE vs EV)



Source: SIAM, VAHAN, CRISIL Intelligence

Y-o-Y growth	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY20-26 CAGR
ICE	-17.8%	-13.2%	-11.1%	15.5%	12.7%	7.5%	9.5%	2.9%
EV	-4.1%	74.8%	466.0%	186.9%	31.3%	21.0%	21.2%	91.3%

Source: SIAM, VAHAN, CRISIL Intelligence; N.M. Not meaningful

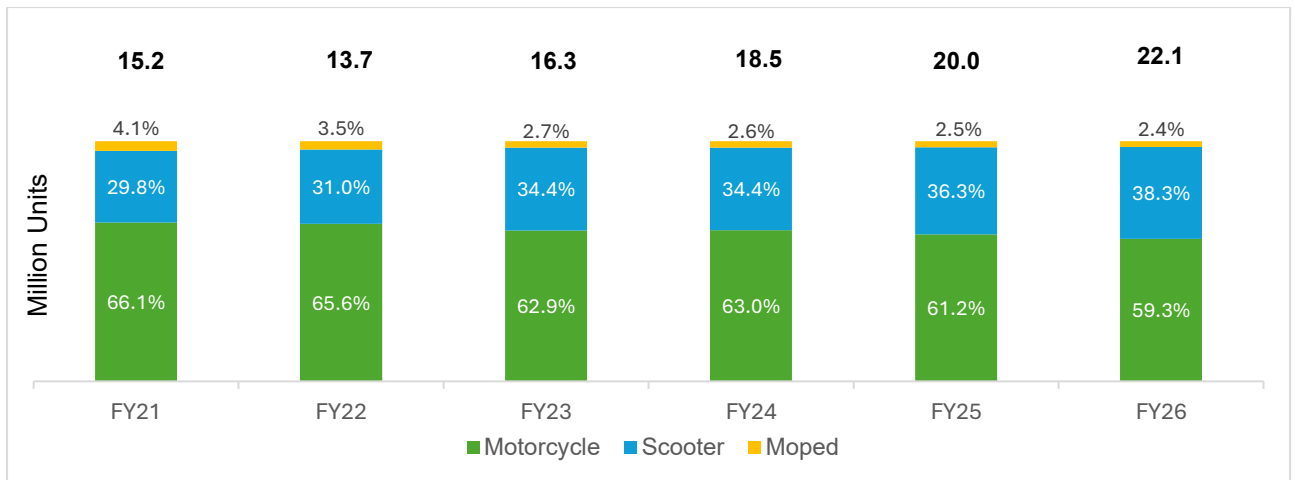
Over the past six years, electrification has contributed meaningfully to overall industry growth. In years when ICE vehicle sales declined or grew slowly, the sharp rise in EV retails helped cushion the impact on total two-wheeler sales.

During fiscal 2020 to 2026, ICE segment grew at a moderate 2.9% CAGR. However, EV retails grew with 91.3% CAGR for the same period. For fiscal 2026, EV penetration reached around 6.6% and EV volumes recorded 1.47 million units.

Segment wise domestic sales trend

Motorcycles dominate the domestic two-wheeler industry sales with approximately 60% contribution to the annual domestic sales volumes. However, their contribution gradually contracted over the years, from 66.1% in fiscal 2021 to 59.3% by fiscal 2026. On the other hand, the scooters segment expanded its presence over the long-term horizon; from 29.8% in fiscal 2021 to 38.3% in fiscal 2026. The mopeds segment also lost some ground to scooters over the years, from 4.1% share in fiscal 2021 to 2.4% in fiscal 2026.

Domestic two-wheeler sales trend – fiscals 2020 to fiscal 2026



Note: Data includes ICE and EVs; EV retail data from VAHAN has been considered
Source: SIAM, VAHAN, CRISIL Intelligence

Scooters

In the last 5 years, scooters witnessed gradual expansion, and their share increased from 29.8% in fiscal 2021 to 38.3% in fiscal 2026. The strong demand for new model launches (like the Hero Destini 110, Jupiter 113, upgraded Jupiter/Activa, Access, Dio 125, and Ntorq), increasing usage of scooters by working professionals, especially women in urban areas (due to high convenience) and a growing preference as a second vehicle in households coupled with sharp rise in EV sales supported the expansion in scooter share.

Earlier, the scooter was positioned primarily as an urban vehicle. However, they are being increasingly accepted in rural areas with increasing road penetration and utility purposes.

During fiscals 2021–2026, the scooter segment registered a 13.3% CAGR, compared with 5.5% for motorcycles and a 2.8% contraction for mopeds.

During the pandemic, reduced need for mobility due to lockdowns, closure of schools/ colleges and offices impacted the scooter demand significantly. Sales of scooters (ICE+ EV) witnessed a sharp drop of 19% in fiscal 2021 and a further drop of 6% in fiscal 2022. However, scooter sales rebounded in fiscal 2023 led by reopening of offices, schools & colleges. Pent up demand from the last two years provided a boost to scooters sales. Moreover, the increased retails of e-scooters provided an additional boost to the scooter sales during the year. Scooters segment grew at a faster pace of 32% y-o-y compared to 14% growth witnessed in motorcycles, thus backing the share expansion of scooters during the fiscal 2023.

During fiscal 2024, both motorcycles and scooters increased at a healthy pace of around 14% keeping the share near steady. Growth pace of scooters normalised in fiscal 2024, from the increased pace seen in fiscal 2023.

In fiscal 2025 the share of scooters increased to 36% from 34% during the same period last year, driven by the added push for scooters across OEMs, new variants like Jupiter 113 getting traction from customers. With continued increase in women participation in the workforce, the demand for scooters has been on the rise.

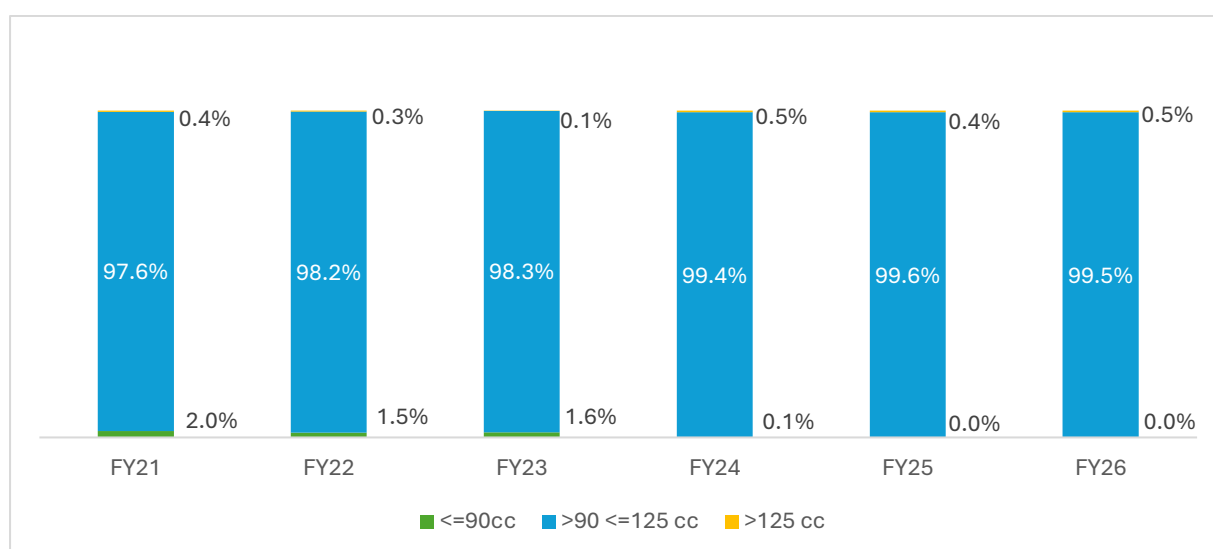
In fiscal 2026 the share of scooters increased to 38% from 36% during the same period last year. This upward trend can be attributed to several other factors, including the rising participation of women in the workforce and a growing preference for automatic transmission vehicles. Notably, even in semi-urban and rural areas, where traditional gender roles are more pronounced, women are increasingly taking to scooters as a mode of transportation. The launch of scooter models that cater to the needs

and preferences of this demographic, with a focus on aesthetics and utility, has also contributed to the segment's growth. Additionally, improvements in rural road infrastructure and the introduction of a wide range of models have helped bridge the price gap, making scooters more accessible to a broader audience.

Within the scooters segment, e-scooters witnessed growth at an accelerated pace and contributed a sizeable share of 16-17% to overall scooter sales in fiscal 2026. Launch of new models, government incentives, rising awareness, increased acquisition & operating costs for the ICE equivalents provided a boost to the EV sales during the fiscal 2021-2026 period. E-scooters clocked growth at 99.4% CAGR in the last 5 years and their penetration within the scooters segment rose from 1% in fiscal 2021 to 16-17% in fiscal 2026.

On the other hand, the ICE scooter segment witnessed relatively slower growth amidst the increased vehicle prices (due to BS VI emission norms compliance), higher operating costs (fuel price hike), increased interest outgo as well as increased competition from EVs. During fiscal 2021 to fiscal 2026 period, ICE scooter sales grew at 9.4% CAGR.

ICE scooters domestic sales split– fiscals 2021 fiscal 2026



Source: SIAM, Crisil Intelligence

Within ICE scooters, majority of the market by volumes fell under the >90cc and <=125cc subsegment, consistently since fiscal 2021, with over 99.5% of the volumes in fiscal 2026. The <=90cc subsegment which had a 2% volume share in fiscal 2021, reduced at a CAGR of 48% and has dropped to 0.0% volume share in fiscal 2026. This subsegment has seen only one model, the TVS Pep+, in this period, whose sales have declined over the years as customers are now preferring higher cc scooters, increasing adoption of electric two-wheelers and rising fuel and maintenance costs.

Based on Crisil Intelligence's estimates and market understanding, there has also been a lot of shifting within the >90cc and <=125cc subsegment in terms of customers purchasing higher cc scooters. The 110 cc scooters held almost ~64% share in fiscal 2021. However, their volumes have seen a sharp decline in recent times. The customer base for these scooters is relatively price conscious. Increased ownership and operating costs as well as reduced usage requirements during the pandemic years led to significant postponement of purchase from this customer base. Additionally, the shift towards higher cc ICE scooters (=>125cc) as well as EVs exacerbated the situation for this subsegment. As per Crisil Intelligence's estimates, the share of 110 cc scooters within the ICE scooter segment slid from ~64% in fiscal 2021 to 51-54% in fiscal 2026.

Conversely, the 125cc scooter volumes have grown significantly during the period, albeit from a smaller

base. A relatively price agnostic customer base, feature-rich vehicles and young buyers that prefer high performance and advanced features have led to a premiumization trend in scooters causing OEM to increase focus with multiple vehicles launches in this subsegment, which has in turn has aided the growth. The share of 125cc scooters within the ICE scooter segment rose from ~36% in fiscal 2021 to 46-49% by fiscal 2026.

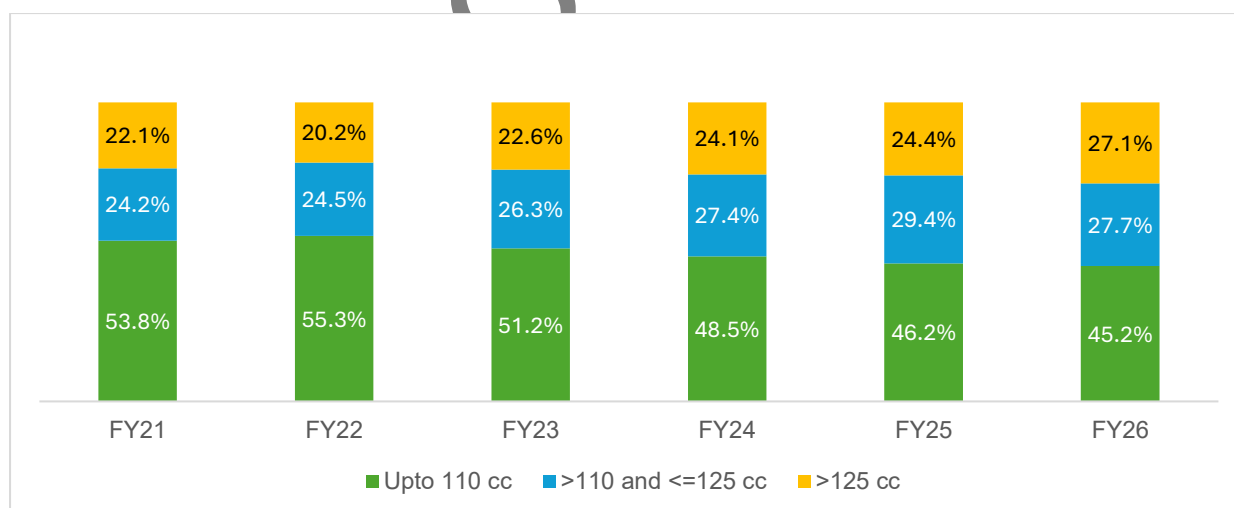
Motorcycles

In the overall domestic sales, motorcycles have maintained their leading position in the last 5 years, however, they lost some ground to scooters during the period. During the pandemic period of fiscal 2021 and fiscal 2022, amidst the lack of availability of public transportation, requirement of motorcycles continued especially for daily commute, thereby restricting their drop.

During the pandemic, limited availability of public transportation and shared mobility sustained demand for motorcycles, particularly for daily commuting among blue-collar workers, essential-services employees and rural consumers. Whereas most white-collar workers were utilizing the work from home option or their four wheelers during the period, limiting the requirement of two wheelers during that period. This led to a moderate market share expansion of motorcycles during fiscal 2021. Post pandemic, improving mobility and gradual rise in scooters demand caused the share of motorcycles to contract in the next 5 fiscals and reach ~59.2% by fiscal 2026 from 66.1% in fiscal 2021.

Notably, the electric vehicle (EV) contribution within the motorcycle segment has been negligible, primarily due to the limited availability of EV options. Although manufacturers like Revolt, Tork, and Ultraviolette introduced EV motorcycles, and more recently, Ola, Royal Enfield launched its electric motorcycle, the adoption of EVs has been gradual. The motorcycle category has seen limited EV options, and concerns regarding range anxiety and higher acquisition costs have hindered widespread adoption. As a result, EVs are estimated to account for less than 1% of overall motorcycle sales by fiscal 2026, with ICE variants continuing to dominate the market.

ICE motorcycles domestic sales split– fiscals 2021 to fiscal 2026



Source: SIAM, Crisil Intelligence

Within the ICE motorcycles segment, the 125 cc subsegment has witnessed 8.3% CAGR growth during fiscal 2021-2026 period while the <=110 cc subsegment has grown at a marginal pace of 1.9% CAGR. The >125cc subsegment has grown by 9.8% CAGR during this period.

Within the ICE motorcycles segment, the 125cc and above (>110 and <=125cc and > 125 cc) subsegments together hold 54.8% of the market share by volume in fiscal 2026 as against 46.3% in fiscal 2021, thereby indicating a shift towards higher cc motorcycles.

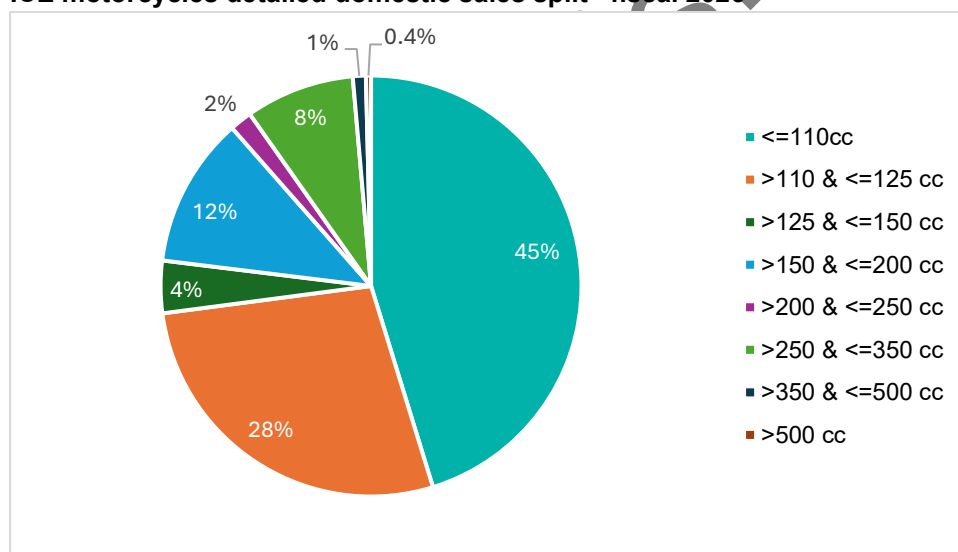
The price sensitive <=110cc subsegment (53.8% share in fiscal 2021) has been under pressure amidst the sharp rise in vehicle prices due to emission and safety norms, increased insurance costs, hike in fuel prices, escalated interest costs coupled with pressure on incomes of this customer group especially during the pandemic. This subsegment has witnessed 3 years of consecutive contraction between fiscal 2020 to fiscal 2022 (16% CAGR drop till fiscal 2022).

On this lowered base, <=110cc motorcycles subsegment saw some growth during fiscals 2023 and 2024 aided by the pent-up demand and added support from OEMs in the form of discounts and other incentives. However, for the complete 5-year period (fiscals 2021-2026), the <=110cc subsegment witnessed marginal growth at 1.9% CAGR.

On the other hand, the 125cc and >125cc motorcycles subsegments together witnessed growth at 9.1% CAGR backed by the financially resilient customer base that was less impacted by the pandemic, higher OEM focus with increased vehicle launches, feature rich vehicle introductions and entry of global players like Harley Davidson, KTM, Triumph and Husqvarna with India focused models. High performance tech enabled vehicles are seeing higher acceptance amongst the rising younger buyer base. Thus, the share of 125cc and >125cc motorcycles, within the ICE motorcycles segment, increased from 46.3% in fiscal 2021 to 54.8% in fiscal 2026.

Within the ICE motorcycles, the premium motorcycles segment (>=150 cc) has witnessed 6% CAGR growth during fiscal 2020-2026 period while the commuter motorcycles segment (<=110 cc) contracted at 1% CAGR. By fiscal 2031, ICE premium motorcycle (150 and above) segment is forecasted to grow at a CAGR of 6-9% as compared to ICE motorcycle industry which is forecasted to grow at a CAGR of 4-6%.

ICE motorcycles detailed domestic sales split– fiscal 2026



Source: SIAM, Crisil Intelligence

Mopeds

The smallest segment of mopeds witnessed a contraction during fiscal 2021-2026, amidst the increasing adoption of scooters in the semi-urban and rural markets which are historically major markets for mopeds. Limited product portfolio and no new launches also impacted the sales of mopeds. Moreover, the pressure on the income of the bottom of the pyramid customer base of mopeds as well as increased operating expenses due to increased fuel costs and higher interest outgo, impacted the demand for mopeds. In turn, the share of mopeds dropped from 4.1% in fiscal 2021 to 2.4% in fiscal 2026.

Segmental growth within the industry in the last 5 years

Segment	FY21-FY26 CAGR	FY21 share	FY26 share
Motorcycles	5.5%	66.1%	59.3%
ICE	5.4%	66.1%	59.2%
EV	78.8%	0.0%	0.1%
Scooters	13.3%	29.8%	38.3%
ICE	9.4%	29.5%	31.8%
EV	99.4%	0.3%	6.4%
Mopeds	(2.8) %	4.1%	2.4%
Total	7.8%	100%	100%

Note: Figures in bracket to be read as negative (Eg. (10) to be read as minus 10), EV retail data from VAHAN has been considered.

Source: SIAM, Crisil Intelligence

Competitive landscape of the domestic two-wheeler industry

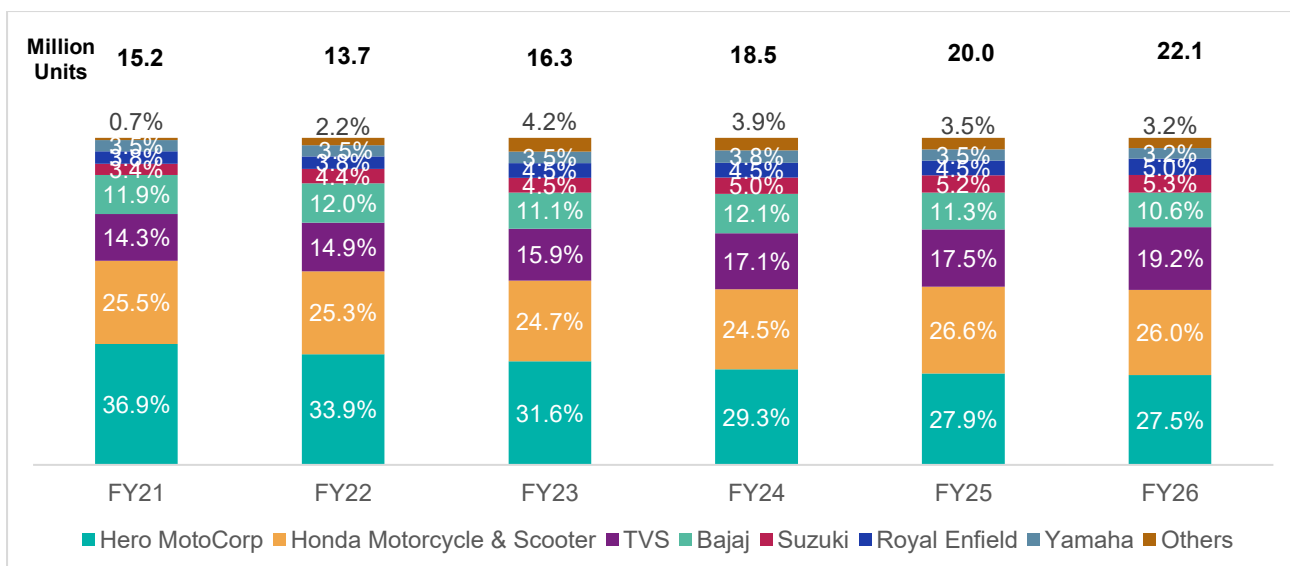
India's Two-wheeler industry has traditionally been a market with only few major players, wherein the top 4 players have contributed to more than 80% of the annual sales. However, over the years, competition has intensified within the industry, especially, with the entry of new age players in the electric scooter segment like Ola, Ather energy and Ampere (Greaves Electric Mobility) catering to the fast-expanding segment of EVs.

Hero MotoCorp (HMCL) leads the market, with a market share of 27.5% in fiscal 2026. The second largest contributor, Honda Motorcycle & Scooter (HMSI), gained some ground during fiscal 2025, but lost minor share in fiscal 2026.

With the continued traction for its ≥ 125 cc motorcycles and scooters- especially Jupiter, coupled with rising adoption of its e-scooter model iQube, TVS has gained ground in the market during the period. Bajaj's share has dropped in last 5 years from 11.9% in fiscal 2021 to 10.6% in fiscal 2026. Rising sales of 125cc scooters backed Suzuki's share expansion while multitude of launches in the growing ≥ 125 cc motorcycles segment led to share expansion for Royal Enfield.

Relatively recent entrants like Ola and Ather have also grabbed notable share led by the rising electrification within the domestic two-wheeler market. As of fiscal 2026, Ola & Ather contributed 0.7% and 1.1% respectively to two-wheeler annual domestic sales.

OEM wise contribution to overall two-wheeler domestic sales – fiscals 2020 to fiscal 2026



Note: Data includes ICE and EVs; EV retail data from VAHAN has been considered.
Source: SIAM, VAHAN, CRISIL Intelligence

Demand drivers and trends in the domestic two-wheeler market

The performance of the Indian two-wheeler industry is dependent on numerous social and economic factors, including demographic trends and preferences, income levels, affordability of two-wheelers for customers, changes in government policies, overall economic conditions and the availability of finance and interest rates. Certain factors, such as general macroeconomic and consumer trends, have a direct impact on the demand of two-wheelers.

- Two-wheeler penetration:** CRISIL Intelligence estimates 2W penetration in India is 150-155 two-wheelers for every 1000 people as of fiscal 2026 compared to ~145 two-wheelers for every 1000 people as of fiscal 2024. This two-wheeler penetration of India is much lower than many of the countries like Indonesia (473 per thousand people), Thailand (315), Sri Lanka (275), and Brazil (157) as of CY2023. This provides a sizeable headroom for the two-wheeler industry to grow going forward. Some of the key drivers aiding India's domestic two-wheeler industry demand are rising rural income, premiumization and electrification.
- Macroeconomic support:** Macroeconomic growth has been a key enabler of two-wheeler demand by improving affordability, disposable incomes, and consumer spending. During fiscals 2023-2026, India's GDP grew at a 7.3% CAGR, supporting a corresponding rise in private consumption expenditure and driving the domestic two-wheeler industry to grow at an 6.3% CAGR. Looking ahead, India's GDP is expected to expand at 6.0-7.0% CAGR through fiscal 2026-2031, providing sustained support for long-term growth in two-wheeler sales.
- Private consumption:** Private Final Consumption Expenditure (PFCE), a key indicator of household spending capacity, plays a crucial role in driving two-wheeler demand. Rising per capita incomes and discretionary spending have increased consumer expenditure on automobiles and premium products, supporting higher two-wheeler penetration and premiumization trends. Continued growth in household consumption sustained demand, with PFCE growing by 7.7% in fiscal 2026, following 5.8% growth in fiscal 2025, thereby providing a strong foundation for future industry expansion.
- Rising per capita income:** It is expected to be a major driver of two-wheeler demand by enhancing disposable income, purchasing power, and consumer spending on personal mobility. While per capita income is expected to grow by 8.3% in calendar year 2026 following 4.6% growth in calendar year 2025, the IMF projects it to expand at a 6.7% CAGR during 2025-

2031. Supported by India's expected GDP growth of 6-7% and the economy crossing the USD 5 trillion-mark, per capita income is projected to reach around USD 4,500 by fiscal 2031, elevating India into the upper middle-income category. This income growth is likely to accelerate vehicle ownership, increase two-wheeler penetration, and support premiumization as consumers upgrade to higher-value models with advanced features.

- **Finance availability:** Financing has emerged as a key demand driver for the Indian two-wheeler industry, supported by the expanding reach of banks, NBFCs, and fintech players across urban and rural markets. Increased finance penetration has improved affordability, broadened access to vehicle ownership, and reduced lending risks through digital tracking and credit assessment capabilities. As financing becomes more accessible across customer segments, it is expected to continue supporting growth and profitability in the two-wheeler market.
- **Growing gig economy:** The growing gig economy and rapid expansion of e-commerce have emerged as significant demand drivers for the two-wheeler industry, particularly for last-mile delivery applications. As per NITI Aayog, India had nearly 7.7 million gig workers in fiscal 2021, a figure expected to rise to 23.5 million by fiscal 2030, driven by growth in food delivery, grocery, electronics, and e-commerce services.

The Indian e-commerce market, estimated at ~Rs 5.5-6.0 trillion in fiscal 2026, has expanded by more than 2.5 times between fiscal 2021 and 2026 and is projected to reach `Rs 11.5-12.5 trillion by fiscal 2030, growing at a 20-25% CAGR. Supported by increasing internet penetration, rising online shopping adoption, improving consumer sentiment, and moderating inflation, this growth is creating substantial opportunities for the two-wheeler industry, particularly electric vehicles (EVs), in the rapidly expanding last-mile mobility segment.

- **Inflation:** High inflation adversely affects consumers' disposable income and affordability, thereby constraining overall demand. In India, however, inflation has moderated significantly in recent years after peaking during the post-pandemic recovery phase, when supply chain disruptions, elevated commodity prices, and geopolitical uncertainties exerted upward pressure on costs.

Over the past two years, inflation has followed a favorable trajectory, declining to approximately 2.1% in fiscal 2026. This relatively stable inflationary environment has supported consumer spending, strengthened purchasing power, and created a more conducive backdrop for economic growth and demand across sectors.

While ongoing geopolitical tensions in West Asia may exert some upward pressure on inflation expectations for fiscal 2027, a gradual normalization of inflation over the medium to long term is anticipated. Such stability is expected to provide sustained support to growth in the two-wheeler industry by improving affordability and encouraging demand expansion over the longer horizon.

- **Shrinking replacement cycles:** Shortening replacement cycles have emerged as a significant growth driver for the two-wheeler industry, supported by broader product portfolios, frequent model refreshes, technological advancements, improved access to financing, and evolving consumer preferences. The increasing popularity of scooters, along with rising premiumization and the transition toward electrification, has further incentivized customers to upgrade more frequently.

Consequently, the average replacement cycle has declined from approximately 10–12 years to 7–8 years over the past decade. This shift has contributed to higher sales volumes and sustained industry growth by accelerating the adoption of newer, feature-rich, and technologically advanced vehicles.

- **Rising rural incomes:** Rural India remains a critical growth engine for the two-wheeler industry, contributing 55-60% of total sales, with demand supported by improving rural infrastructure, road connectivity, agricultural income growth, and government-led rural development initiatives. Enhanced affordability and connectivity have increased two-wheeler penetration in Tier 3 and Tier 4 markets, while electrification has further expanded demand in rural regions. As agriculture remains heavily dependent on monsoons, favorable rainfall continues to play a key role in supporting farm incomes and vehicle purchases. Following a weak monsoon in fiscal 2024, rainfall improved significantly in fiscal 2025 and 2026 with an 8% positive deviation from the long-term average, boosting crop output, farm profitability, and rural purchasing power, thereby strengthening two-wheeler demand.
- **Rural infrastructure:** Rural infrastructure development continues to be a key enabler of two-wheeler demand by improving connectivity, mobility, and economic activity in rural regions. Government initiatives such as the Pradhan Mantri Gram Sadak Yojana (PMGSY) have significantly expanded the rural road network, with 26,000 km of roads constructed in fiscal 2024 (89% of the annual target) and an additional 18,000 km and 16,000 km completed in fiscal 2025 and fiscal 2026, respectively. Improved infrastructure supports two-wheeler sales by generating rural employment and income during road construction, while also enhancing accessibility and transportation needs, thereby creating a strong foundation for long-term demand growth in rural markets.
- **Women participation in the workforce:** The increasing participation of women in India's workforce has emerged as a significant demand driver for the two-wheeler industry, particularly the scooter segment. Scooters have gained popularity among working women due to their ease of use, lightweight design, maneuverability, and practicality. Rising female employment, supported by corporate initiatives and greater workforce inclusion, has not only boosted direct demand for personal mobility solutions but has also increased household incomes, further supporting overall two-wheeler sales growth in the country.
- **Advancement in vehicle technology:** Advancements in vehicle technology are increasingly shaping demand in the two-wheeler industry, particularly among younger, tech-savvy consumers who seek connected features, modern designs, enhanced performance, and personalized mobility solutions. In response, OEMs have significantly increased investments in R&D, spending nearly 2% of their annual operating income over the past six years to develop advanced technologies, improve safety, and introduce innovative features. Both ICE and EV models now offer digital instrument clusters, navigation, Bluetooth connectivity, USB charging ports, cruise control, and other smart features, making vehicles safer, more efficient, and more appealing. Continuous technological innovation, coupled with shorter replacement cycles and frequent new product launches, is expected to remain a key driver of long-term growth in the two-wheeler industry.
- **Electrification in 2W industry:** Electrification is emerging as a key growth driver for the Indian two-wheeler industry, supported by government initiatives such as PM eDrive incentives, tax benefits, increasing environmental awareness, and the need to reduce pollution. EV adoption has accelerated significantly in the post-pandemic period, driven by expanding product portfolios, rising consumer acceptance, and strong participation from new-age manufacturers such as Ola, Ather and Ampere. With continued policy support, technological advancements, and growing consumer preference for sustainable mobility, electrification is expected to contribute substantially to the long-term growth and transformation of the two-wheeler market.
- **R&D support:** R&D investment has become increasingly critical in the two-wheeler industry, driven by the evolving expectations of younger, technology-oriented consumers who demand advanced features, connected capabilities, enhanced safety, and regular product innovation.

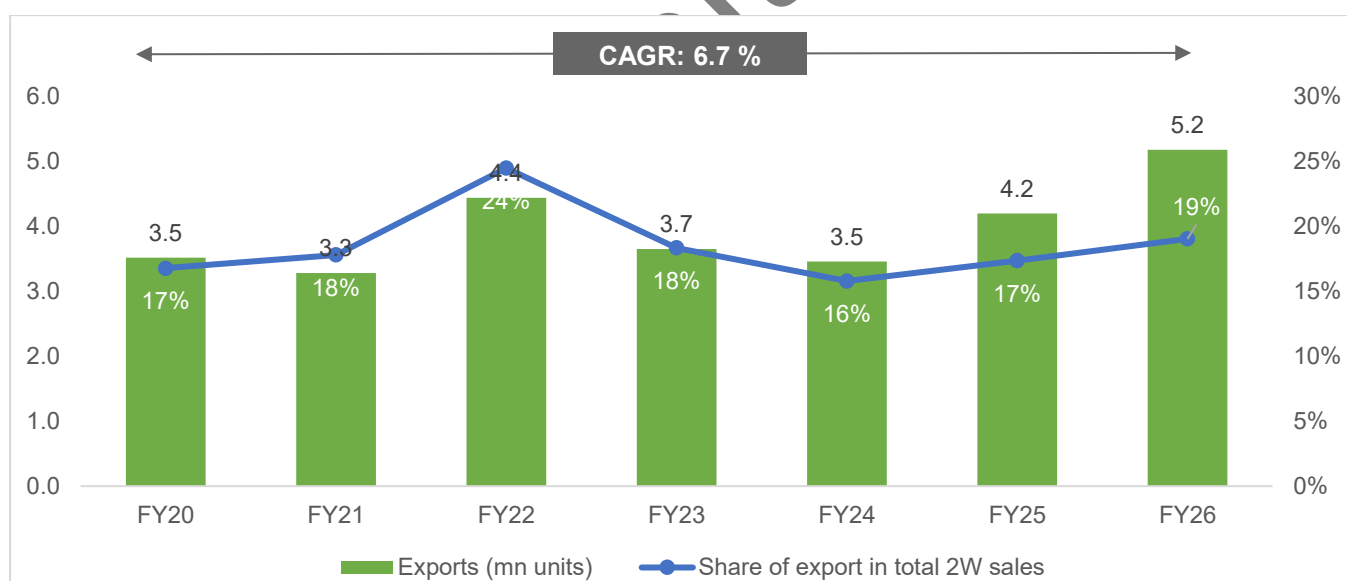
To remain competitive and effectively respond to shortening replacement cycles, OEMs typically allocate around 1–2% of their revenues toward research and development.

These investments are directed at improving vehicle design, integrating innovative technologies, enhancing rider safety, and supporting a steady pipeline of new product launches. Sustained focus on R&D is therefore essential for driving innovation, aligning with evolving consumer preferences, and ensuring long-term growth and competitiveness within the industry.

- Incremental growth through accessories:** Over the years, traditional ICE two-wheeler OEMs have expanded their offerings to include company-branded accessories and merchandise such as mirrors, vehicle covers, seat covers, helmets, and apparel, which have become an integral part of the industry. Premium brands, in particular, have leveraged merchandising to strengthen brand image and foster long-term customer loyalty—exemplified by players like Royal Enfield—while generating additional revenue streams.

Typically, accessories, merchandise, and spare parts together contribute around 10–15% of overall revenues for ICE OEMs. Following this trend, new-age EV two-wheeler players have also entered the segment, offering both conventional accessories and technologically advanced products such as smart helmets, portable chargers, fast chargers, and tyre pressure monitoring solutions. These tech-enabled accessories command premium pricing and cater specifically to EV users, with demand expected to grow alongside the expansion of the e2W market. Notably, accessories and merchandise remain high-margin products (25–30%), supporting both topline growth and profitability while reinforcing brand engagement.

Two-wheeler exports trend

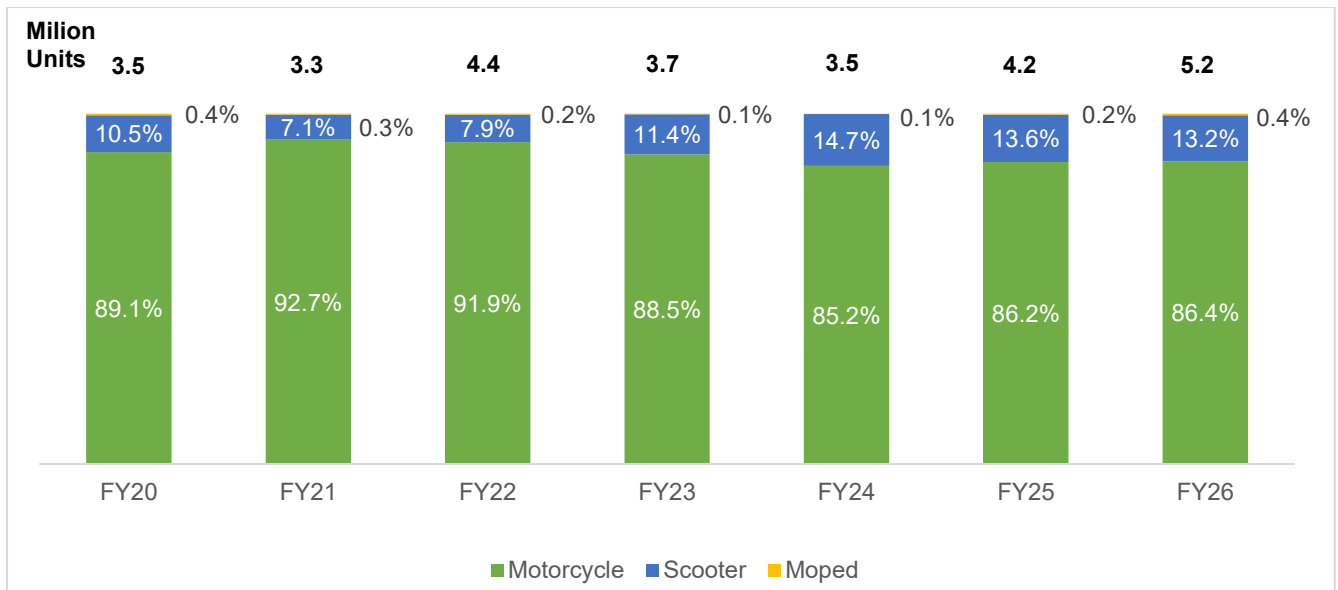


Source: SIAM, CRISIL Intelligence

Segment wise exports trend

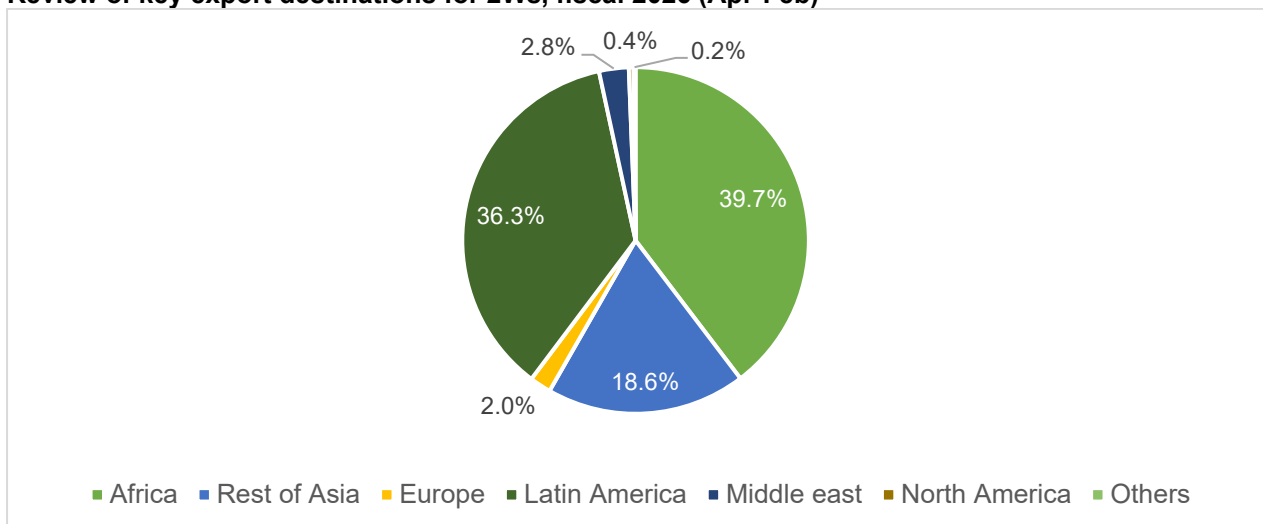
Motorcycles dominate the exports segment with more than 85% share in overall exports. However, they lost some ground to scooters, especially in the last 3 years. Motorcycle exports grew at a modest pace of 6% CAGR during fiscal 2020-2026 while scooters clocked a faster 11% CAGR during the same period, albeit from a smaller base. Increased push from HMSI as well as TVS with further geographical expansion in Latin American and Southeast Asian countries aided the faster growth of scooter exports.

Segmental split within exports



Source: SIAM, CRISIL Intelligence

Review of key export destinations for 2Ws, fiscal 2026 (Apr-Feb)

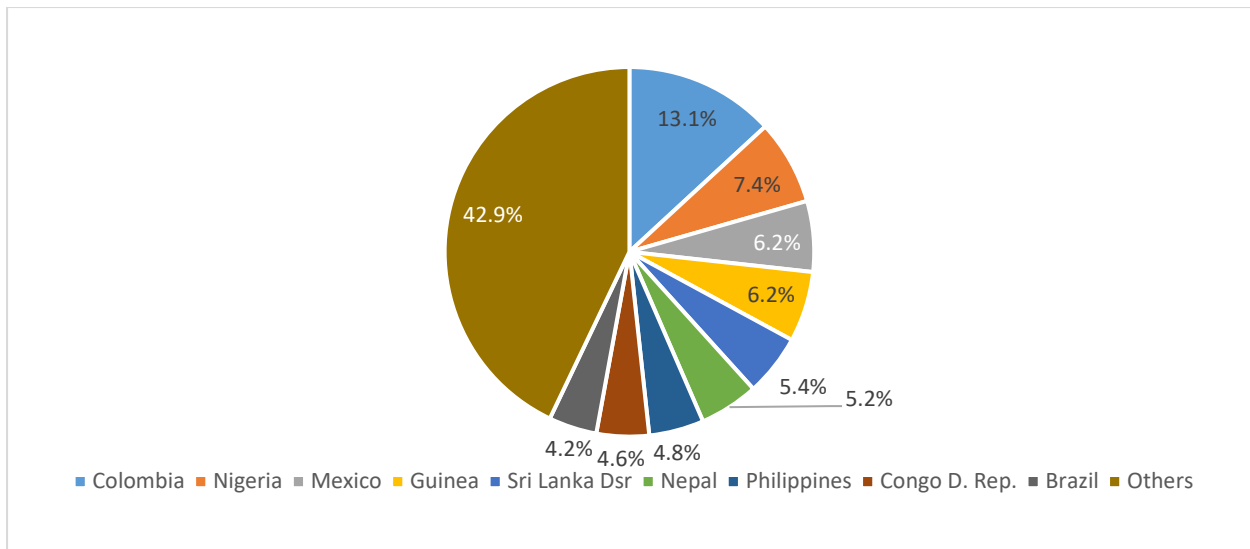


Note: Fiscal 2026 YTD (Apr – Feb) Rest of Asia includes Asia excluding Middle East

Source: DGFT, CRISIL Intelligence

Africa and Latin America continue to be the dominant destinations for India's two-wheeler exports, accounting for nearly 39.7% and 36.3% of total shipments respectively in FY26 (Apr–Feb). Countries such as Colombia, Mexico, and Brazil remain key Latin American hubs, while Guinea, Nigeria, and Congo D. Republic drive volumes in Africa. These markets also benefit from favourable bilateral trade ties, low import duties, and limited local manufacturing, making India a preferred sourcing base. Exports to Rest of Asia (19%) are led by neighbouring nations like Nepal, Sri Lanka, and the Philippines, supported by proximity and similar consumer segments. Europe and North America contribute marginally due to stricter emission norms, higher safety standards, and competition from Japanese and European brands.

Key 2W export markets

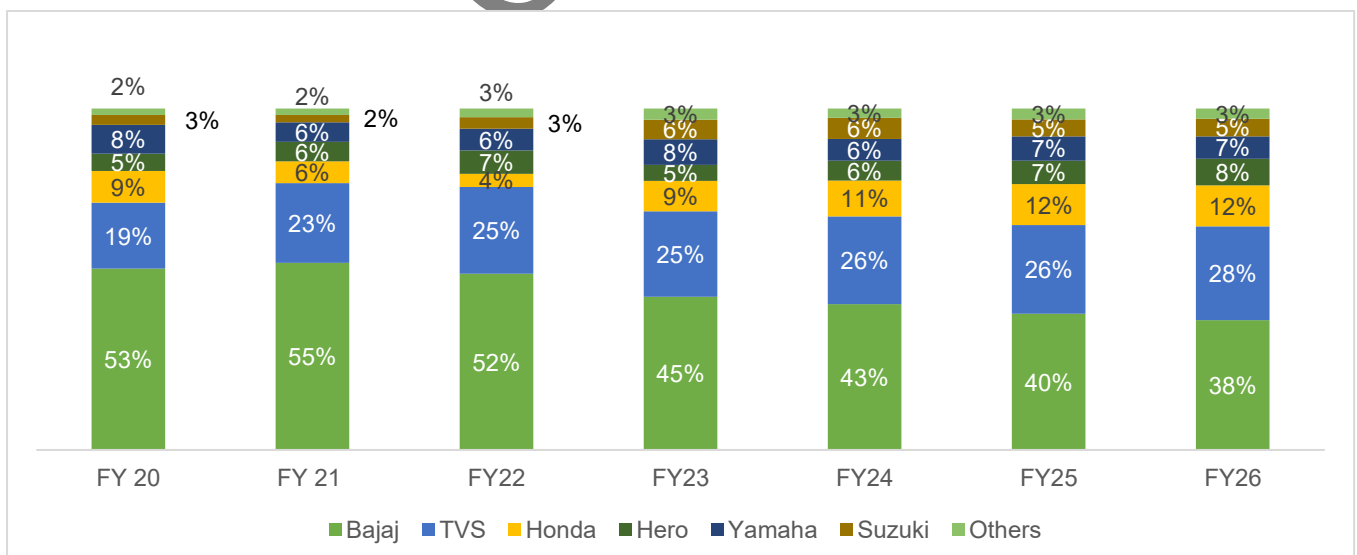


Note: Chart indicates share of countries in fiscal 2026 (April-Feb)
Source: DGFT, CRISIL Intelligence

Market share of key players in the export market

Bajaj Auto continues to dominate India's two-wheeler export market, though its share has declined from 53% in FY20 to around 38% in FY26, as other OEMs gained traction. TVS Motor has steadily expanded its global presence, with its share rising from 19% in FY20 to 28% in FY26, driven by growing demand in Africa and Latin America. Yamaha and Honda have also increased their export contributions, aided by product localization and new market entries. Hero MotoCorp, while traditionally focused on the domestic market, has maintained a modest export presence. The "Others" category has seen a slight rise, reflecting the entry of smaller players and EV startups tapping emerging markets. Overall, India's export mix is becoming more diversified, with Bajaj and TVS jointly accounting for nearly two-thirds of the total export volume in FY26.

Key players market share in exports (Fiscal 2020 – fiscal 2026)



Source: SIAM, CRISIL Intelligence

Key growth drivers and policies supporting the vehicle exports from India

- India offers a large-scale, cost-competitive manufacturing base with extensive OEM and supplier networks, providing volume, cost, and localization advantages for global buyers.

- Rising global demand for affordable two-wheelers and scooters from emerging markets (Africa, Latin America, Asia) due to Indian manufacturers' specialization in low-cost, reliable models.
- Electrification and domestic initiatives (FAME, PLI scheme) have boosted production capabilities and export opportunities for EV two-wheelers and components, enhancing competitiveness.
- Recent trade deals and FTAs (e.g., India-UK pact) are lowering tariff barriers and improving market access for 2W and auto-component exports.
- Export reimbursement schemes like RoDTEP (Remission of Duties and Taxes on Exported Products) help neutralize duties and taxes, increasing the global competitiveness of Indian exports.
- Indian OEMs are increasingly adopting international standards and certifications (CE, UNECE), facilitating easier entry into regulated global markets.

Outlook for Indian two-wheeler industry (fiscal 2025 to 2031P)

The industry is expected to maintain growth momentum over the long term, supported by a favourable macroeconomic environment, rural demand, premiumization, periodic launches, shorter replacement cycles and continued financing support. Moreover, continued R&D investments by the OEMs and the technological advancements in the industry to provide added support to the growth of the industry over the long-term horizon.

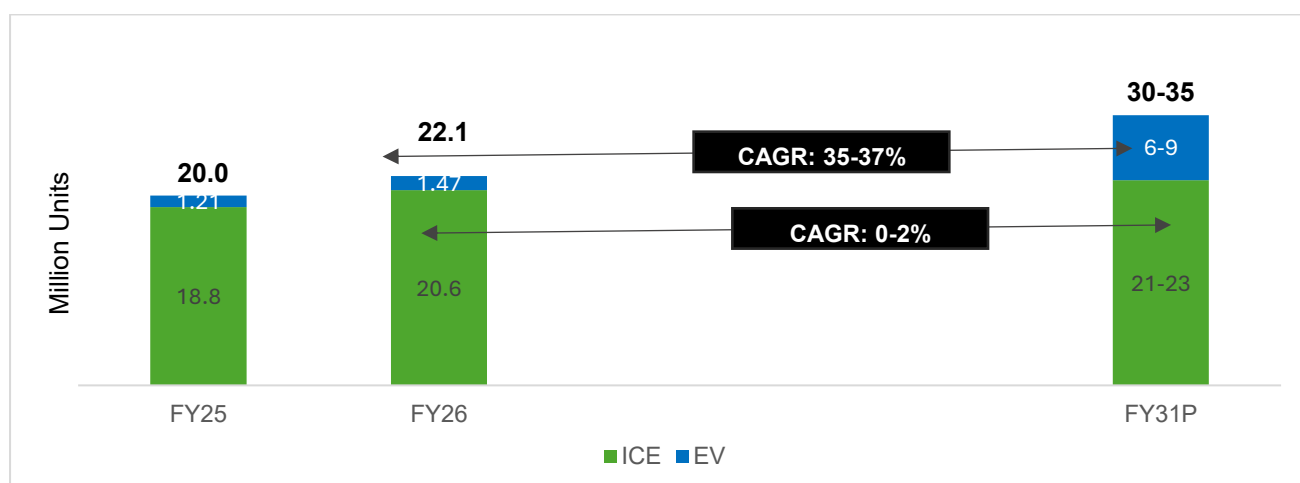
Additionally, the fast-rising EV segment, with EV portfolio expansion by legacy players, capacity expansion by new age players will accelerate industry growth. Entry of Legacy players like HMTI, Suzuki, Yamaha and Royal Enfield in the EV space will provide further thrust to the segment growth.

Introduction of CNG powertrain motorcycle by Bajaj and TVS also announced CNG scooter, which will offer lower operating costs compared to petrol variants, will push the two-wheeler industry further growth.

Led by these positive industry drivers, the two-wheeler industry sales are projected to grow at 6-8% CAGR and reach volumes of 30-35 million by fiscal 2031. Of this, the e2W segment is projected to clock a healthy CAGR of 35-37% during the period and the ICE 2W vehicle segment is expected to grow at a moderate pace of 0-2% CAGR on an elevated base.

With the growth in e2Ws, the EV penetration is expected to reach 25-30% of overall 2W industry sales by fiscal 2031.

Domestic Segmental Split Outlook



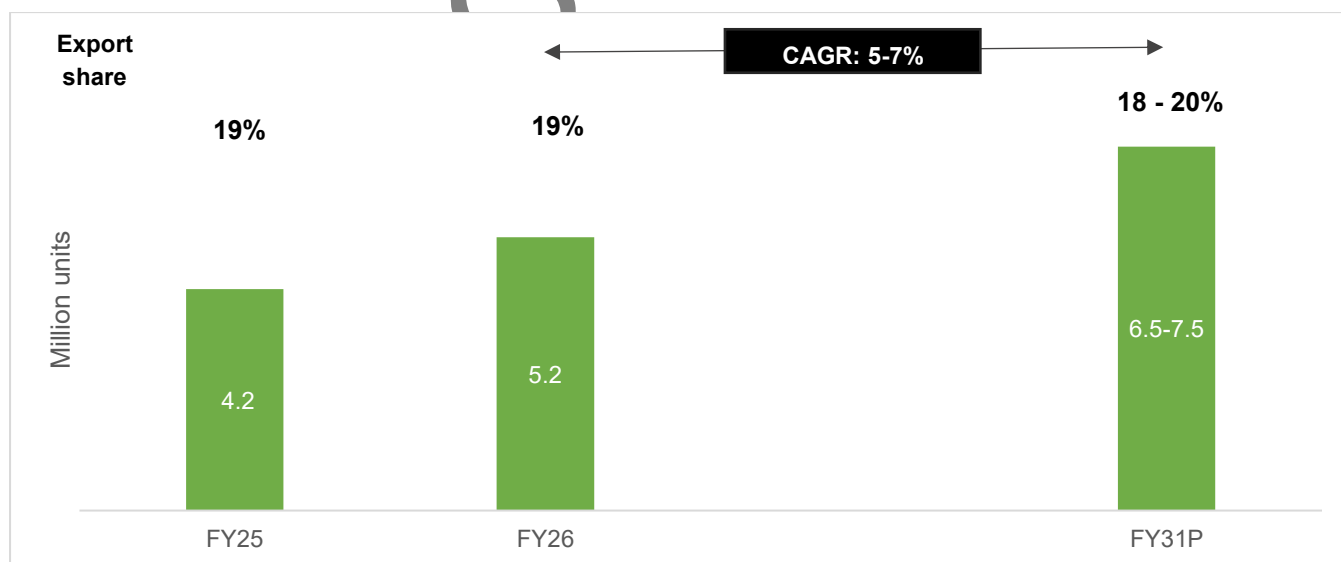
Source: SIAM, CRISIL Intelligence

Growth in the industry will be supported by increased EV launches, favorable government support, faster momentum in infrastructure development, reduced battery prices, easing supply chain constraints, localized value chain and faster consumer shift towards electrification.

Outlook for Indian two-wheeler exports

Two-wheeler exports from India grew at a pace of 6.7% CAGR during fiscal 2020 to fiscal 2026. Going ahead, CRISIL Intelligence expects two-wheeler exports to grow at a growth of 5-7% CAGR between fiscals 2026 -2031 to reach volume of 6.5-7.5 million by fiscal 2031. The share of exports in the overall two-wheeler industry sales is expected to rise to 18-20% in fiscal 2031 from the export share of 19% in fiscal 2026.

Exports outlook



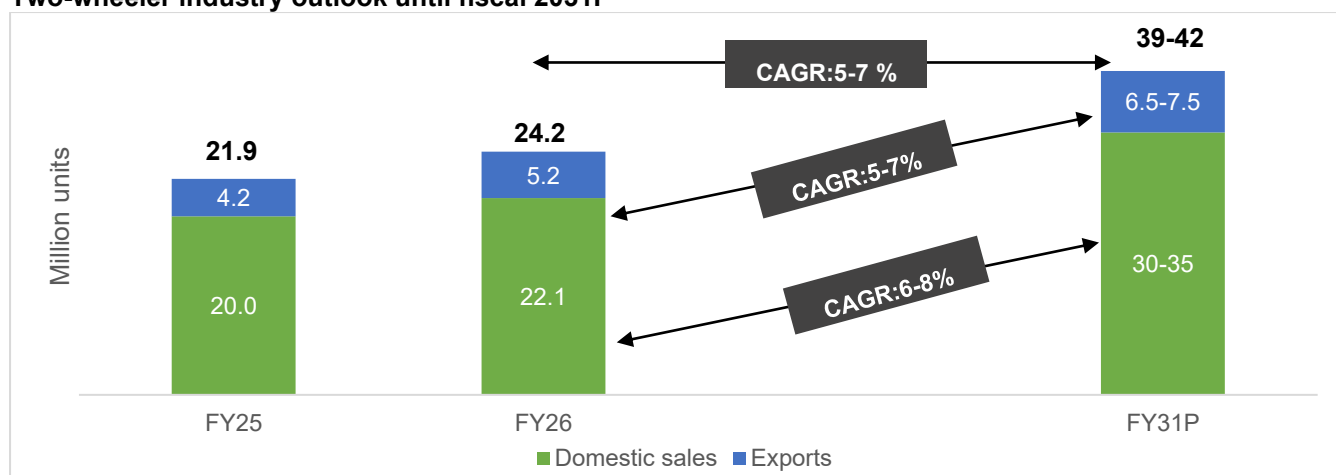
Source: SIAM, CRISIL Intelligence

The growth will be propelled by macro-economic improvement in exports markets, expansion in geographical coverage by the OEMs and more vehicle models getting shipped. Moreover, the fast-growing EV segment is expected to contribute meaningfully to exports amid the capacity expansion by players, sharpening focus on exports and sharp rise in the number of EV models.

Being one of the largest two-wheeler markets, India has a unique opportunity to leverage its scale and manufacturing competitiveness to produce electric two-wheelers not just for the domestic market but also for the exports markets. Moreover, India's trade agreements with major global economies would help the domestic OEMs enhance the exports of automobiles and related components.

Nonetheless, geopolitical flare-ups can have a negative impact on oil prices, thereby increasing the inflationary pressure in major importing countries. This can, in turn, impact demand for vehicles in the near term. The on-going global conflicts and tariff war also remain a key monitorable.

Two-wheeler industry outlook until fiscal 2031P



Source: SIAM, CRISIL Intelligence

Review and outlook of Indian electric two-wheeler industry

Electrification in the 2W industry

The global momentum toward Electric Vehicles (EVs) is accelerating as countries increasingly prioritize sustainability and pollution reduction. In India, EV adoption is gaining significant traction, supported by a range of government initiatives, including the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME II) scheme, EMPS subsidies, and the PM E-Drive program, along with various state-level incentives and tax benefits. Rising environmental awareness and stricter emission norms are also expected to further drive EV penetration in the country.

The COVID-19 pandemic has acted as a catalyst for EV adoption in India, with increased consumer awareness, supportive policy measures, and a growing portfolio of EV offerings contributing to higher sales. Additionally, the entry of new-age, non-traditional players such as Ola Electric, Ather Energy, and Ampere has invigorated the ecosystem, fostering innovation, enhancing competition, and accelerating the development and adoption of electric mobility solutions.

Schemes supporting the growth of EVs

- As part of the National Electric Mobility Mission Plan (NEMMP) 2020, the Department of Heavy Industry formulated the FAME I policy in 2015 with a budget outlay of Rs 895 crore. The FAME I policy was aimed at promoting EV ecosystem through technology development, demand creation, pilot project, and charging infrastructure thereby ensuring its sustainable growth. In the FAME 1, about 2.78 lakh EVs were supported via demand incentives.
- Phase-II of the FAME policy was implemented with an outlay of Rs 10,000 Crore in 2019 for a period of 5 years, with the aim to support demand for EVs by supporting 10 lakh e-2 Wheelers (including commercial & private). In June 2021, demand incentive for 2Ws was increased to Rs 15,000 per kWh capped at 40% of the vehicle cost. In June 2023, this was again revised and

reduced to Rs 10,000 per kWh of battery from Rs 15,000 per kWh earlier and the maximum subsidy cap was reduced from 40% to 15%.

- With the expiry of FAME II in fiscal 2024, the government introduced Electric Mobility Promotion Scheme 2024 (EMPS) to support the adoption of EV 2Ws and 3Ws.

EMPS 2024 scheme incentive on 2W

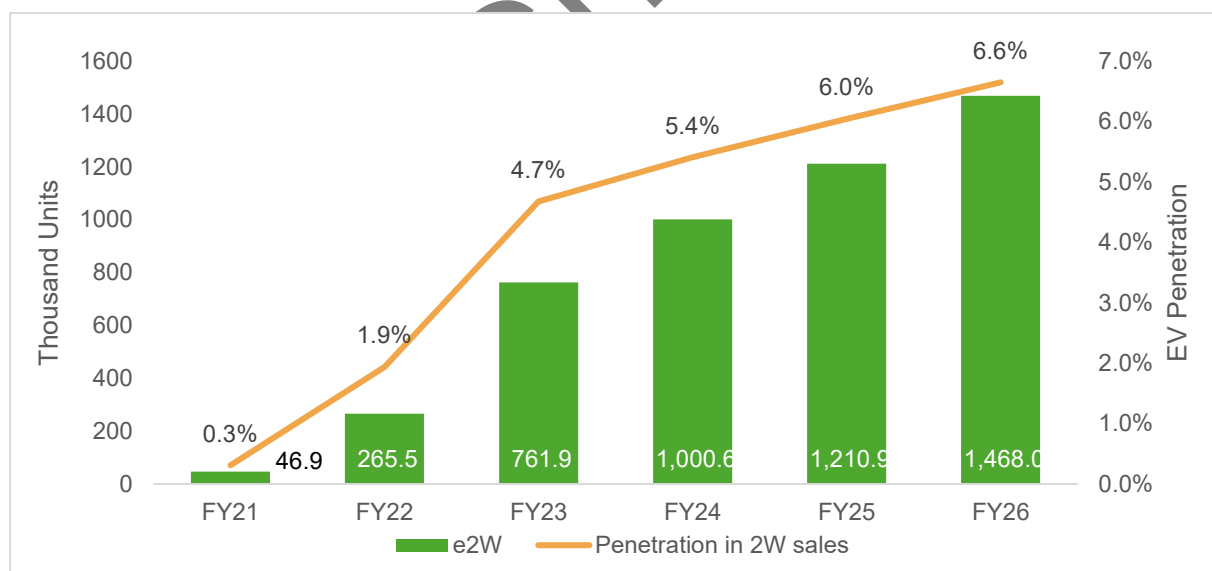
Segment	Maximum vehicles supported	Approx size of battery (kWh)	Incentive offered (Rs/kWh)	Maximum Ex-factory price to avail incentive (Rs)
2W	10,00,000	2	10,000	1.5 lakhs

- MHI introduced EMPS 2024 in March 2024 with a budget outlay of Rs 500 crore for four months, from 1 April 2024 to 31 July 2024. The scheme was later extended until September 2024. e2Ws got a subsidy of Rs 5,000 per kWh with a maximum limit of Rs 10,000 per vehicle under the scheme
- PM E-DRIVE was introduced after the EMPS scheme with Rs. 10,900 crore outlay; effective from October 2024. Revised scheme duration implemented until 31 March 2028.

Incentives under PM E-DRIVE Scheme for e2W

Vehicle Segment	No. of vehicles to be supported		Incentives for vehicles		Maximum ex-factory price
	FY25	FY26	FY25	FY26	
e2W	1,064,000	1,415,120	Rs. 5,000/- kWh capped at Rs. 10,000 max	Rs. 2,500/- kWh capped at Rs. 5,000 max	Rs. 1.5 Lakhs

2W EV retails trend (high speed) (fiscals 2020 – fiscal 2026)



Source: SIAM, VAHAN, CRISIL Intelligence

Over the last 6 years, high speed e2W have propelled momentum in e2W sales, having increased at a rapid pace from 47k retails in fiscal 2021 to 1468k retails in fiscal 2026. The healthy growth in electrification was propelled by rising awareness, continued government support, lower total cost of ownership of EVs compared to their ICE counterparts, narrowing gap between acquisition cost of EV and ICE parallels, lower maintenance, new age advanced features and expanding EV portfolio of the industry. The entry of the new age non-traditional OEMs like Ola, Ather and Ampere has enabled the

growth of the e2W segment in India.

E2W retails grew at a moderate pace until fiscal 2021 due to limited model availability, low awareness, range anxiety and inadequate charging infrastructure, despite the FAME incentive of Rs 10,000 per kWh.

This heightened FAME incentive coupled with expansion in vehicle portfolio by players as well as entry of Ola provided an additional thrust to the e2W retails in fiscal 2022.

Additionally, ICE vehicles witnessed a steep rise in prices in fiscal 2021 due to the BSVI implementation and a further hike during fiscal 2022 amidst the hike in raw material prices. This price hike was much higher than the normal 3-4% annual hike undertaken by the industry. Over and above, this increase in vehicle acquisition costs, the sharp rise in petrol prices (petrol prices crossing Rs 100 mark) during the year provided an additional incentive to customers to shift from ICE vehicles to e2Ws. During fiscal 2022, amidst the much severe Covid second wave, pressure on incomes and increased medical expenses; limiting other expenses was a priority for most of the customer base.

Thus, the increased subsidy on e2W, vehicle portfolio expansion coupled with increased acquisition and operating costs of ICE 2Ws led to the sharp growth in e2W retails during fiscal 2022. e2W retails rose 5.7x from 47k in fiscal 2021 to ~266 k in fiscal 2022.

Growth momentum continued for the e2W segment in fiscal 2023. During the year, sharp push from new age EV players supported the growth in e2W. The legacy OEMs also scaled up their EV production, providing an added push to the EV retails during the year.

Fiscal 2024 began on a very strong growth trajectory. However, On June 1, 2023, the government reduced the FAME subsidy incentive cap from 40% of a vehicle's value to 15% and capped the subsidy at Rs 10,000 per kWh of battery from Rs 15,000 per kWh earlier. Due to this, manufacturers have had to increase the prices of electric scooters, which led to a 57% sequential slowdown in sales in June. This sharp sequential contraction was on an elevated base of May 2023, where sizeable pre-buying was done by the customers due to the price rise from June.

However, after the initial hiatus in June and July, EV retails witnessed gradual momentum in the later months, especially during the festive period. Many OEMs also incentivized customers with additional discounts during the festive period. Additionally, OEMs also introduced competitively priced vehicles like Ola S1 Air, Ather 450S, Chetak Urbane, TVS X etc. in the second half of the year aiding overall demand.

However, the government discontinued the FAME II subsidy from fiscal 2025 (April 2024). The announcement of the subsidy discontinuation pushed e2W retails during March. For the complete year fiscal 2024, e2W retails rose 31% further to 1001k units.

At the start of fiscal 2025 in April, retail sales were initially lower due to pre-buying in March 2024, prompted by the discontinuation of the FAME II subsidy. However, retail sales reached 115.9k units in July as pre-buying happened in anticipation of the EMPS subsidy ending on July 31, which was then extended to September 30, 2024. The EMPS was subsequently replaced by the PM e-drive subsidy starting on October 1, 2024.

For fiscal 2025 initially, the government introduced Electric Mobility Promotion Scheme 2024 (EMPS 2024). The scheme ended on September 30, 2024 offered support of up to Rs 10,000 per two-wheeler for about 3.33 lakh two-wheelers, which continue to aid e2W demand, at least in the short term.

New PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE) Scheme for promotion of electric mobility in the country has been implemented from October 1, 2024, to July 31, 2026 which was then revised till March 31, 2028. The scheme has an outlay of Rs 10,900 crore over a

period of two years. The scheme aims to incentivize approximately 24.79 lakh electric two-wheelers (e2Ws). Only e2Ws equipped with advanced batteries are eligible for this incentive. Both commercially registered and privately owned e2Ws can benefit from the scheme. The demand incentive is proposed at Rs. 5,000 per kWh for e2Ws registered in fiscal 2025 and Rs. 2,500 per kWh for fiscal 2026. Incentives will be capped per vehicle or at 15% of the ex-factory price, whichever is lower.

However, there has been a rise in acceptance of higher EV prices amongst customers, and these increased prices have become the new normal for the industry. The dependence on EV subsidy to drive the EV demand is expected to be limited going forward.

The fiscal year 2026 witnessed a modest beginning for electric vehicle (EV) penetration, commencing from a relatively low base in April, amidst a reduced subsidy. However, EV penetration gradually increased until September, driven by rising EV sales, although growth was somewhat constrained by the limited availability of rare earth magnets. The introduction of GST 2.0 led to a reduction in GST on internal combustion engines (ICE) vehicles, providing an additional boost to ICE vehicle sales during the festive months of October and November.

Conversely, the GST on EVs remained at 5%, widening the price gap between ICE and EVs, which negatively impacted EV penetration during this period. Nevertheless, December saw a gradual uptick in EV penetration.

In fiscal 2026, EV penetration reached 6.6% to 1468k retails, indicating steady, albeit gradual, progress towards increased adoption of electric vehicles.

EV Competitive Scenario

The e2W segment has been highly concentrated with a few players primarily catering to the entire segment. During fiscal 2021, a few OEMs like Hero Electric and Okinawa completely dominated the market with more than 50% of the market share. Over the years, with the entry of new players, EV launches from legacy ICE OEMs as well as expansion in EV portfolio of players, competition intensified within the EV space.

High speed vehicles offered initially by Hero Electric and Okinawa offered relatively lower speed and acceleration compared to the ICE counterparts. Ather Energy entered the market in fiscal 2019 with its 450 model which offered comparable power and acceleration as an ICE vehicle along with internet connectivity and “smart” features. This helped Ather achieve ~10% market share in fiscal 2021, although it has lost some share and achieved ~8% market share in fiscal 2022 post which they have managed to maintain that share through multiple updates to the Ather 450 line, despite the intensifying competition in the next 4 years. Ather Energy had a 17.1% market share in fiscal 2026 emerging as the third largest player by volumes during the year. Intermittent launches, technology rich products, expansion in retail network and development of the overall e2W ecosystem have helped the company maintain its momentum in the market.

Ola entered the EV market in fiscal 2022 and expanded rapidly, becoming a leading contributor to EV retails in India. However, its market share declined to 11.5% in fiscal 2026 from 29.7% in fiscal 2025, amid service-network constraints, consumer complaints and increased competition from legacy manufacturers.

Ola entered the EV market in fiscal 2022 and expanded rapidly, becoming a leading contributor to EV retails in India. However, its market share declined to 11.5% in fiscal 2026 from 29.7% in fiscal 2025, amid service-network constraints, consumer complaints and increased competition from legacy manufacturers.

The legacy OEMs have also entered the EV space. TVS introduced the iQube model in fiscal 2020 and has gradually increased its supply over the years. Its model iQube received healthy traction helping

them clock highest retails during fiscal 2026, with TVS gaining the market share of 24.4% in fiscal 2026 and became the top player.

Bajaj's Chetak EV was introduced in Q4 of fiscal 2019. The company gradually expanded its presence across the country in the next few years. With increased company focus, coverage expansion and higher production, the company's share increased to ~20% in fiscal 2025 and 2026 from ~11 in fiscal 2024.

HMCL entered the EV segment with VIDA in fiscal 2023. In the two years, the company's contribution has increased to ~2% by fiscal 2024. Its share increased to ~10% in fiscal 2026 amidst increased traction for its VIDA models.

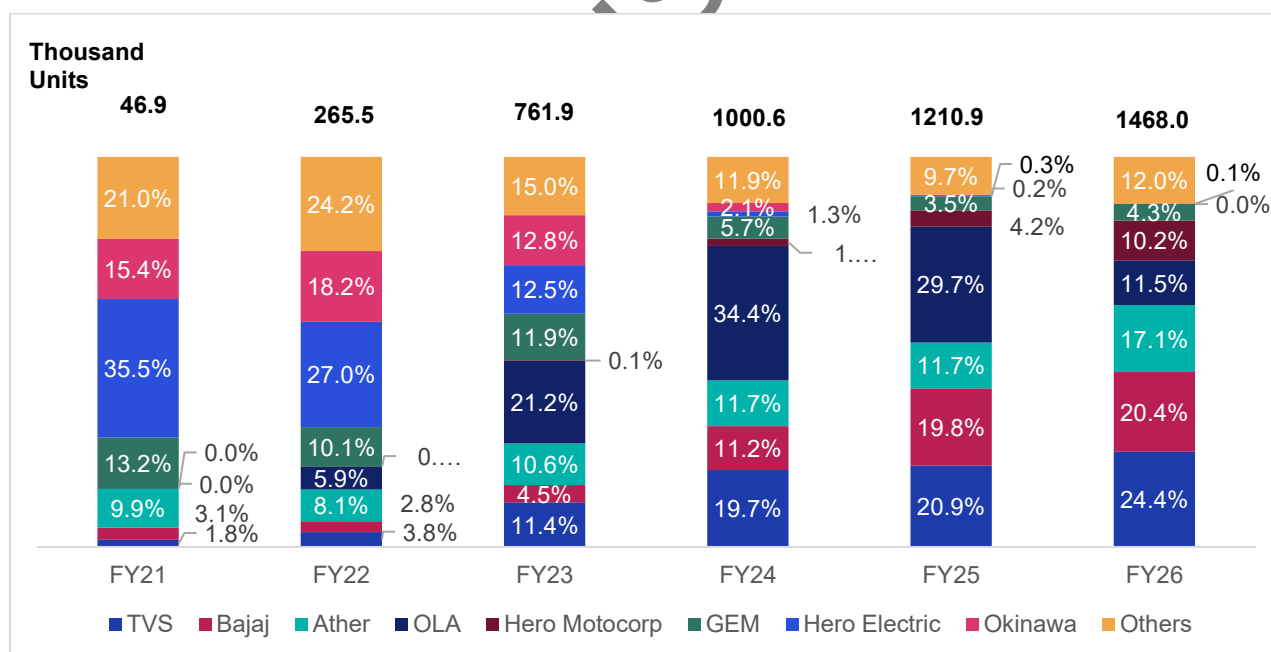
In late November 2024, HMSI entered the electric scooter market with the launch of the Activa e model featuring swappable batteries, and the QC1 model equipped with a fixed battery system.

Erstwhile leading contributors in the e2W industry, Hero Electric and Okinawa faced stiff competition from newer entrants and increased focus from other legacy two-wheeler manufacturers. From a high base, their share contracted in the next 3 years.

The industry has also experienced a phase of consolidation in recent years, with the top three players TVS Motor, Bajaj Auto, and Ather Energy accounting for over 60% of total industry sales in fiscal 2026.

The ability of leading companies to expand their market presence has been driven by their focus on delivering high-quality, reliable products, complemented by strong after-sales service networks and customer support.

OEM wise contribution to e-2W retails



Note: EV retail data from VAHAN has been considered

Source: VAHAN, Crisil Intelligence

Drivers for Electrification

For the Total cost of ownership (TCO) calculation, an annual running of 8000 km is considered, i.e., 25 km per day for 325 days of operation per year. A 7-year holding period is considered, assuming no battery replacement happens during the ownership period.

In fiscal 2026, the total cost of ownership (TCO) of an e2W, with subsidy till fiscal 2027, was 43% lower than that of an ICE 2W for an annual running of 8,000 km.

Going ahead, by fiscal 2031, e2W ownership is expected to become financially more lucrative. For an annual running of 8,000 km, the e2W TCO is projected to be 50% lower than its petrol counterpart with subsidy considering only till fiscal 2027. Total cost of ownership for e2W is decreasing over the years amidst the lowering global battery prices, economies of scale and improving technology resulting in higher manufacturing efficiency of the electric vehicles.

TCO for seven-year ownership with subsidy till fiscal 2027

Year/Annual Running	3,000 km	6,000 km	8,000 km	10,000 km	12,000 km
Fiscal 2026	14% lower cost than petrol	34% lower cost than petrol	43% lower cost than petrol	49% lower cost than petrol	53% lower cost than petrol
Fiscal 2031	29% lower cost than petrol	44% lower cost than petrol	50% lower cost than petrol	55% lower cost than petrol	59% lower cost than petrol

Note:

- Convenience ICE scooter and Convenience E-scooter have been considered for the comparison
- In both the above scenarios, the GST and road tax structure have been assumed to be constant as per current structure.
- Above analysis is done without considering battery replacement
- According to Ather Energy, battery packs will not need a replacement in 7 years, however, the battery can degrade in case of extreme use cases such as excessive use of fast charging, accidental damages, lack of periodic maintenance, use of unauthorized chargers, extended exposure to temperatures higher than 50 degrees Celsius and prologued idle periods.

Source: Crisil Intelligence

Expanding Portfolio offerings

Electrification began with low-speed e-2Ws (≤ 25 kmph), used for short commutes and requiring no registration. This segment was largely unorganized, with Indian players assembling imported parts from China. The real momentum came with high-speed e-2Ws (> 25 kmph), offering performance comparable to ICE vehicles and bringing structure and trust to the market. In 2019, Ather Energy launched India's first smart electric scooter with features like touchscreen dashboard, 3G connectivity, and navigation, marking a major technological leap.

Over the last six years, battery tech improved with LFP, NMC, and NCA chemistries, enabling higher energy density and range. Software advancements in motor controllers and battery management systems enhanced efficiency and fast charging. Range doubled from 60–75 km per charge (2018) to 100–150 km today. Performance models like Ather 450, Ola S1 Pro, and TVS X now exceed 80 km/hr. Manufacturers have also expanded features, price brackets, and product offerings (e.g., e-Activa, e-Access), making e-2Ws attractive to tech-savvy buyers and accelerating adoption.

Expanding sales network

The expansion of the sales and service network plays a pivotal role in driving the demand for electric vehicles (EVs) across segments—two-wheelers, three-wheelers, passenger vehicles, and commercial vehicles. OEMs expand dealerships and experience centers in non-metro areas, awareness and accessibility of electric two-wheelers increase. Example: Ola Electric and Ather Energy expanding retail footprint aggressively into semi-urban areas. The OEMs are also opening captive pure EV dealerships across India.

The expanding sales network for dealerships has improved accessibility across Tier1, Tier2 and Tier 3 cities. Also, the expanding after-sales support through authorized service centres has improved customer confidence.

Competitive pricing through technological advancements

Over the past few years, improvement in battery technology has significantly impacted and reduced the manufacturing costs. In particular, the development of high-density lithium-ion batteries, and innovations in motor efficiency usage of lightweight materials have enabled the manufacturers to offer e2Ws at comparable prices with that of ICE vehicles.

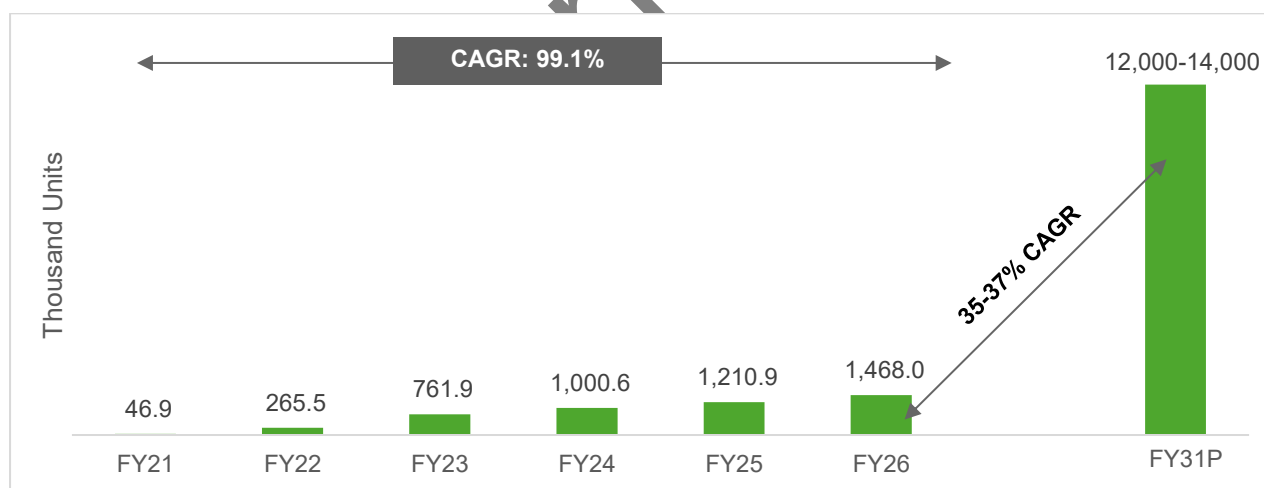
Many companies are shifting towards Lithium Iron Phosphate (LFP) batteries. LFP batteries are cheaper to produce than traditional NMC batteries. They also have a longer lifecycle helping manufacturers to cut costs without compromising on performance. OEMs have also invested in designing and producing their own electric motors. This in-turn reduces reliance on expensive imports and lowers the production costs. Advancements in the Battery Management Systems (BMS) have made batteries more reliable and efficient. Also, instead of importing costly parts, companies have started localizing significant portion of supply chains in India. This has reduced import duties and logistics costs, in turn making e2Ws cheaper for the end consumers.

Outlook of e-2W segment

The electric two-wheeler retails rose at a sharp growth pace of 99.1% CAGR between fiscal 2021 to fiscal 2026, albeit off the small base of fiscal 2021. Going ahead, the growth momentum in the industry is expected to continue over the long-term horizon led by increasing acceptance of EVs, rising awareness, improving TCO for electric vehicles, bridging acquisition cost gap between EV and ICE counterparts, larger vehicle portfolio, expanding charging infrastructure, furthering financing support, increasing EV manufacturing capacity, and continued government support.

Crisil Intelligence expects the EV retails to rise at a healthy pace of 35-37% CAGR and reach volumes of 12-14 million in fiscal 2031. And the EV penetration to reach 25-30% by fiscal 2031. Such expansion will make e2Ws one of the fastest growing segments in the automotive industry in India.

e-2W Outlook



Note: Only high-speed electric two-wheelers have been considered for analysis, P - Projected
Source: SIAM, VAHAN, Crisil Intelligence

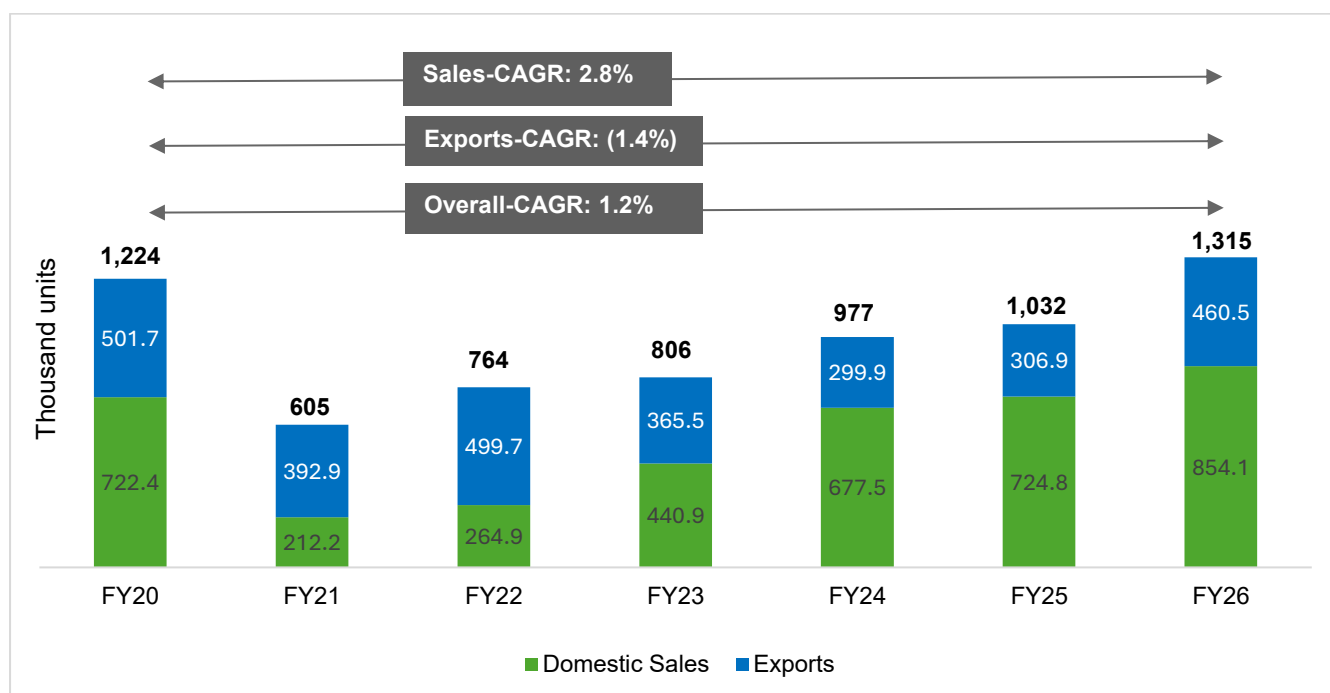
Review and outlook on the Indian Three-Wheeler industry

Review of the Indian Three-Wheeler Industry

India is one of the largest three-wheeler markets globally. Three-wheeler industry was one of the worst hit segments within automobile sector as drastic fall in last mile transport requirement and increased vehicle prices for BS VI vehicles affected the industry sales during the pandemic years. The three-wheeler industry suffered a downturn, with sales contracting at a 2.8% compound annual growth rate (CAGR) between fiscal 2020 and 2026. However, the industry demonstrated remarkable resilience and

rebounded strongly, achieving a robust 13.8% CAGR growth from the pandemic-induced low in fiscal 2021 to reach a notable 1,315 thousand units by fiscal 2026.

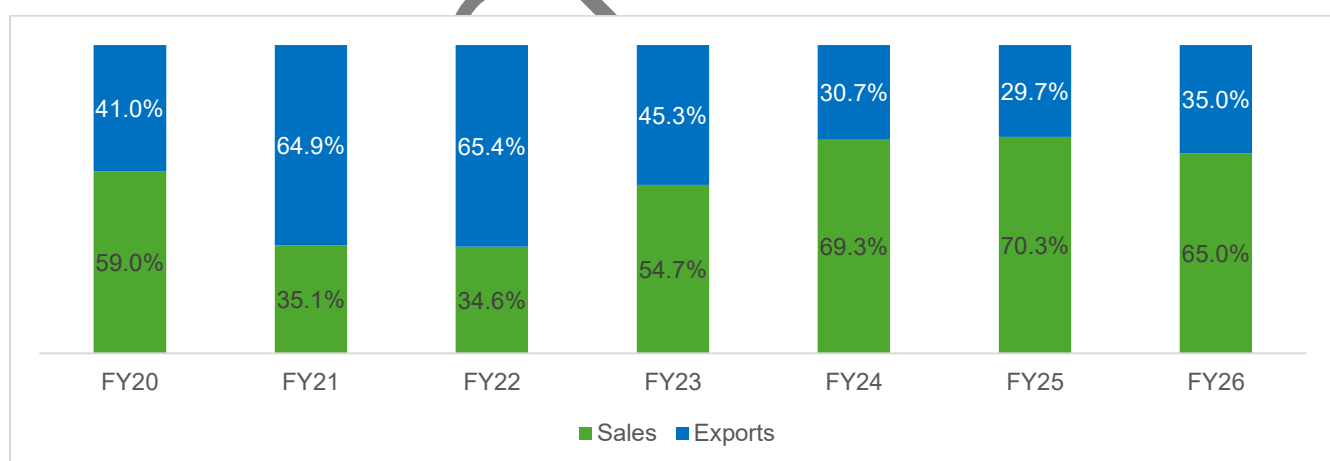
Three-wheelers industry sales trend



Note: Retails of L5 segment from VAHAN have been considered for domestic sales

Source: SIAM, Vahan, CRISIL Intelligence

Three-wheelers industry split



Note: Retails of L5 segment from VAHAN have been considered for domestic sales.

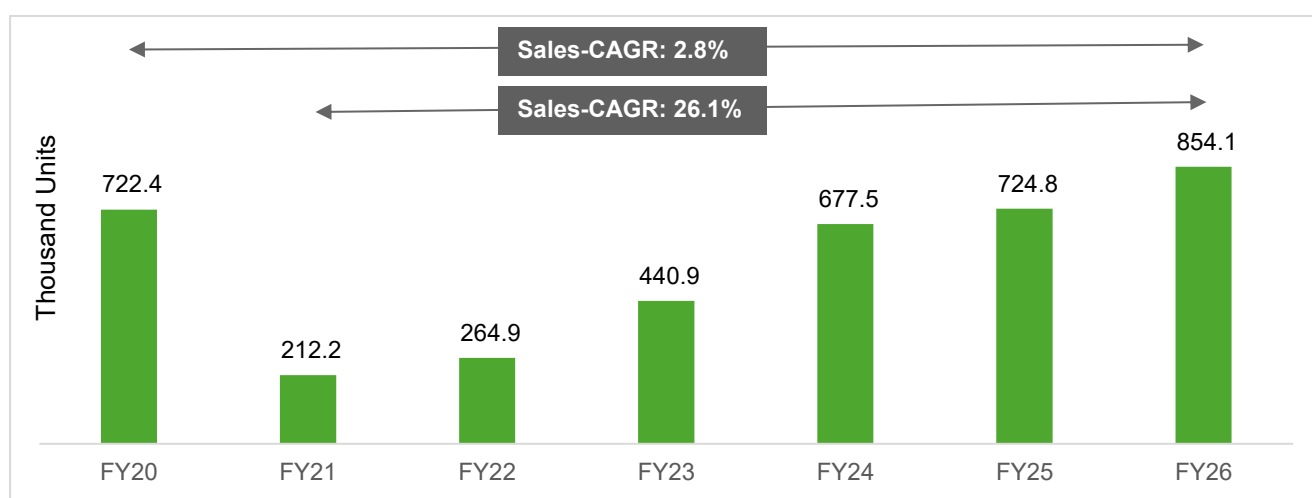
Source: SIAM, Vahan, CRISIL Intelligence

The domestic segment has expanded its share in industry sales. In contrast to the domestic market, the exports industry's sales registered a (1.4)% CAGR decline between fiscal 2020 and 2026. This downward trend is evident in the numbers, with exports dropping from 501.7 thousand units in fiscal 2020 to 460.5 thousand units in fiscal 2026. After consecutive years of decline, the three-wheeler industry's exports saw a 50% growth in fiscal 2026, driven by an improvement in the macroeconomic environment in importing countries, as well as the OEMs' efforts to expand their geographical presence and product portfolios. In fiscal 2026, domestic retail sales demonstrated growth, albeit at a more modest pace of 17.8%. Led by this fast growth, the share of exports surged to 35% in fiscal 2026.

Domestic three-wheeler Industry

The domestic three-wheeler (3W) segment, which accounted for 65% of total industry sales during fiscal 2026, experienced a nominal growth rate of 2.8% compound annual growth rate (CAGR) during the fiscal 2020-2026 period. The segment's sales increased to 722.4 thousand units in fiscal 2020 (from 647 thousand in fiscal 2019) but subsequently declined by 70% in fiscal 2021 due to the reduced mobility requirements imposed by the COVID-19 pandemic. However, as the economy gradually normalized and offices, colleges, and schools reopened, the demand for three-wheelers rebounded at a healthy pace of approximately 26.1% CAGR during the fiscal 2021-2026 period. Furthermore, the rise in electric vehicles provided an added boost to the growth of the domestic three-wheeler industry during the last five years.

Three-wheelers industry domestic retails trend



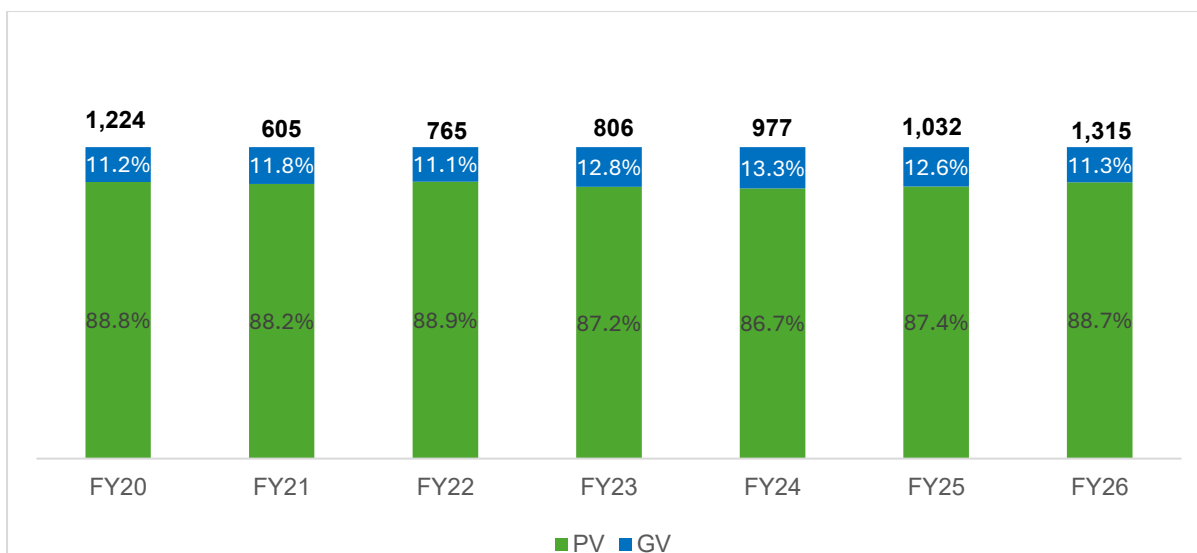
Note: Retails of L5 segment from VAHAN have been considered for domestic sales.

Source: Vahan, CRISIL Intelligence

The passenger carrier segment, which typically accounts for over 75% of domestic sales, dominates the three-wheeler industry. However, the share of the passenger carrier segment declined during the pandemic years due to the sharp drop in mobility requirements, resulting in reduced ridership and a significant decline in segment sales. From a low base in fiscal 2021, the passenger carrier segment experienced a sharp growth rate of 16.9% CAGR till fiscal 2026.

In contrast, the decline in the goods carrier segment was relatively limited, given the continued need for last-mile delivery, even during the pandemic. The increased traction for e-commerce during the epidemic also restricted the fall in goods segment sales.

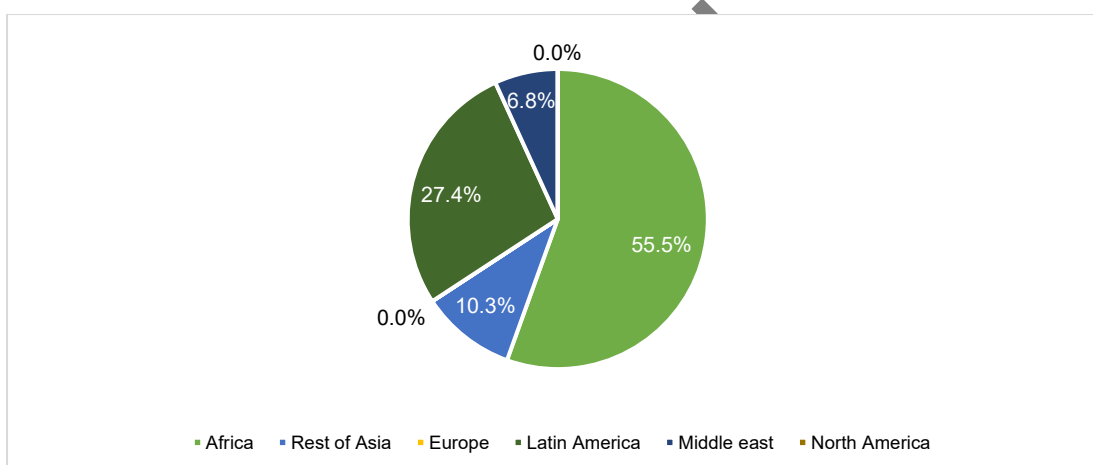
Segment-wise sales share, total volume for fiscal 2020-2026



Segment	FY20-26 CAGR
Passenger	1.2%
Goods	1.4%

Source: Vahan, CRISIL Intelligence

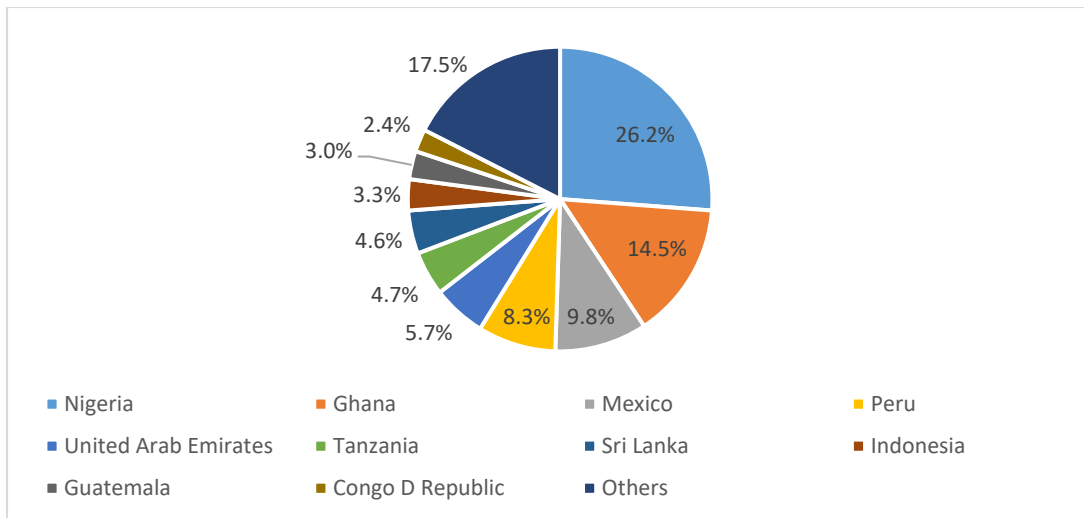
Review of key export destinations



Note: Fiscal 2026 YTD (Apr – Jul 2025) Rest of Asia includes Asia excluding Middle East

Source: DGFT, CRISIL Intelligence

Key 3W export markets



Note: Chart indicates share of countries in fiscal 2026 (April-July)
Source: DGFT, CRISIL Intelligence

Three wheelers are primarily exported to countries in Africa, which accounts for around 50% of the total exports. The share of total exports to Africa rose from 50.2% in FY25 (Apr-Jul) to 55.5% in fiscal 2026 same period. The share of Africa in exports increased due to increased shipments to Nigeria, Ghana where three-wheelers serve as a cost-effective mobility solution.

Latin America's total exports increased in volume, though its share reduced a bit. Increased shipments to Mexico, Colombia, Peru compared to the same period in the previous fiscal has led to increased volumes for Latin America.

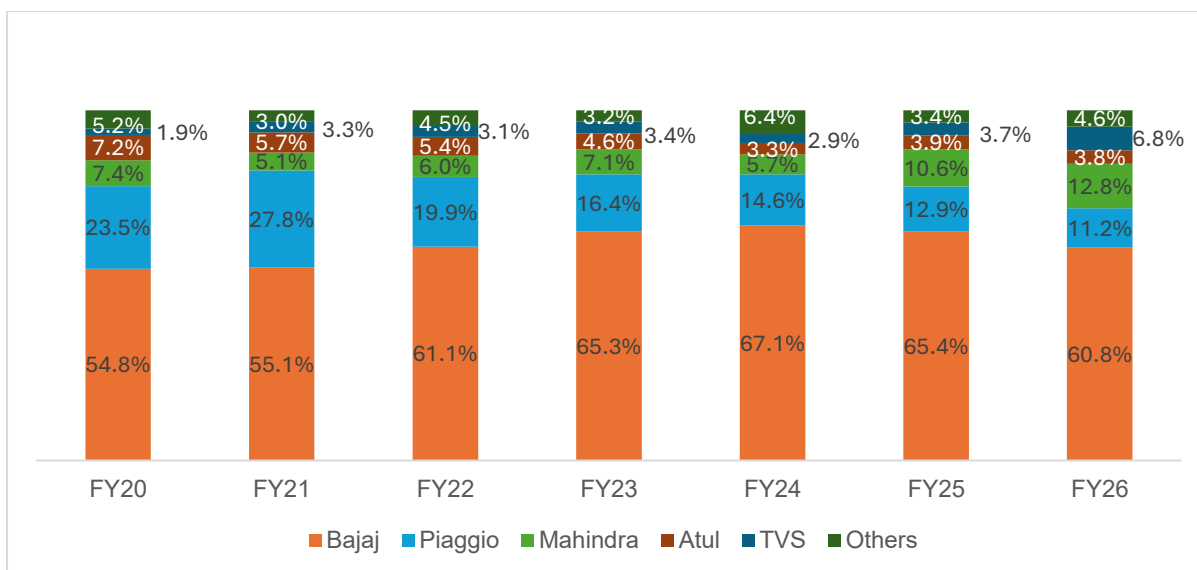
Exports to Rest of Asia rose with increased exports to Sri Lanka, Nepal, Indonesia. The exports to Sri Lanka increased followed by policy normalization and easing of import restrictions after the recent economic crisis. Despite the rise in exports, the share of Asia dropped with faster rise in other regions, especially Africa

Competitive Landscape within the domestic three-wheeler industry

The domestic three-wheeler industry is characterized by a high degree of concentration, with a limited number of large players accounting for more than 90% of the industry's demand. The leading players, comprising Bajaj, Piaggio, Mahindra, and Atul Auto, are the primary contributors to the industry's sales, collectively accounting for approximately 87% of the market share in fiscal 2026.

While the larger players dominate the industry, smaller players such as TVS and new entrants like Omega Seiki and TI Clean Mobility have been gradually increasing their presence in the market. Bajaj, however, remains the industry leader, with a market share exceeding 50%. Over the past five years, the company has further expanded its presence, commanding a significant share of approximately 60.8% in fiscal 2026.

Player wise contribution within the three-wheeler industry – overall



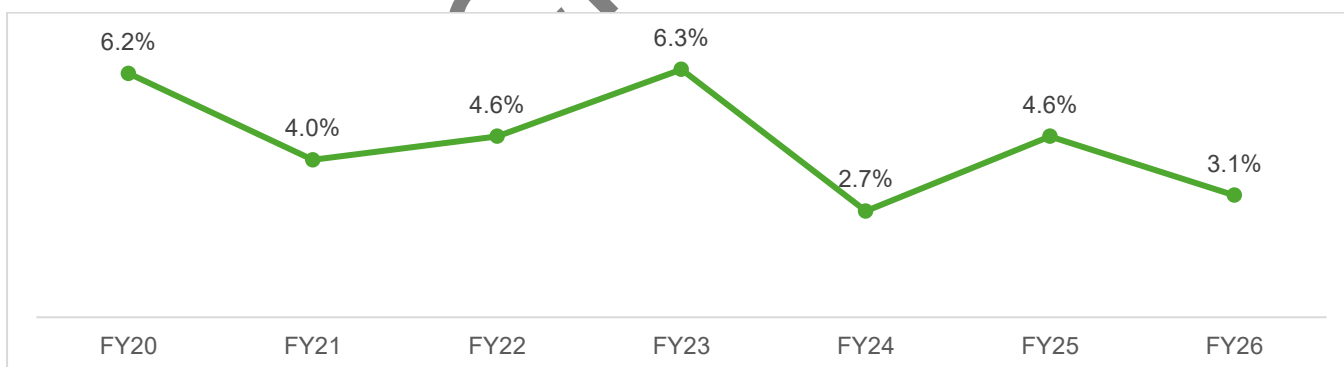
Note: Includes E Auto (L5) subsegment sales data.
Source: VAHAN

Bajaj's dominance is particularly pronounced in the passenger segment, where it has consistently maintained a share of over 60% throughout the last five years. The company's increased presence in the E Auto segment has further bolstered its position in the passenger segment, enabling it to extend its share to approximately 60.8% by fiscal 2026.

Key demand drivers for 3W

Stable agricultural output

Agri GVA trend



Source: MOSPI

The rural economy, which accounts for over 50% of three-wheeler demand, is expected to drive growth in industry. Agri GVA growth remained positive from fiscal 2020-2026 but showed volatility. After strong growth in fiscal 2020 and a peak in fiscal 2023, it slowed sharply in fiscal 2024, recovered in fiscal 2025, and moderated to 3.1% in fiscal 2026. The fiscal 2026 decline was likely a combination of a high base effect, sharp drop in food inflation as crop production remained positive, higher input costs, and weak crop mandi prices, indicating continued resilience but near-term sectoral headwinds.

Steady growth in industrial and Services GVA

The Indian industry sector plays a vital role in the economy, accounting for 29% of the total Gross Value Added (GVA) as of fiscal 2026, with a compound annual growth rate (CAGR) of 6.1% over fiscal 2020-2025. The services sector, which constitutes 56% of the total GVA, also demonstrated robust growth,

with a CAGR of 5.2% over the same period. In fiscal 2026, the services sector GVA grew at a rate of 11%, indicating a positive trend for the overall economy.

The growth in the Industry and Services sector GVA is expected to drive demand for three-wheelers, as the increasing needs of these sectors will lead to a rise in businesses, industries, and services, resulting in higher demand for transportation and logistics. The expansion of the services sector will also lead to increased employment and driving personal transportation demand, while the growth in the industry sector will boost cargo transportation demand.

Growth in Gig Worker Economy and e-commerce Industry

The gig economy and e-commerce sector are driving demand for three-wheelers, particularly for last-mile delivery vehicles. The gig workforce in India is expected to grow from 6.8 million in fiscal 2020 to 23.5 million by fiscal 2030, driven by the growth of e-commerce and food delivery services. The Indian e-commerce sector has experienced rapid growth, with the market size estimated to be around Rs 4.3 trillion in fiscal 2025 and is expected to reach Rs 8 trillion by fiscal 2028, with a CAGR of 20-25%.

This growth presents a significant opportunity for the three-wheeler industry, particularly in the middle- and last connectivity space, where electric three-wheelers can play a crucial role. As the e-commerce industry continues to expand, the demand for efficient and environmentally friendly last-mile delivery vehicles is likely to increase, driving growth in the three-wheeler sector.

Availability of finance

The three-wheeler industry is heavily reliant on finance availability, with approximately 95% of sales being financed. The ease of finance availability, competitive interest rates, and higher funding from banks and non-banking financial companies (NBFCs) have driven growth in the segment. The expansion of financiers' presence, particularly in non-metro areas and with a focus on electric vehicle (EV) financing, has further aided the industry's growth. Looking ahead, continued support from financiers is expected to play a crucial role in the industry's long-term growth, particularly as the industry shifts towards electric vehicles, with the government's focus on promoting EVs and reducing emissions making financiers' support even more critical.

Outlook on three-wheeler industry (Fiscal 2025 to Fiscal 2031P)

Outlook for Domestic sales

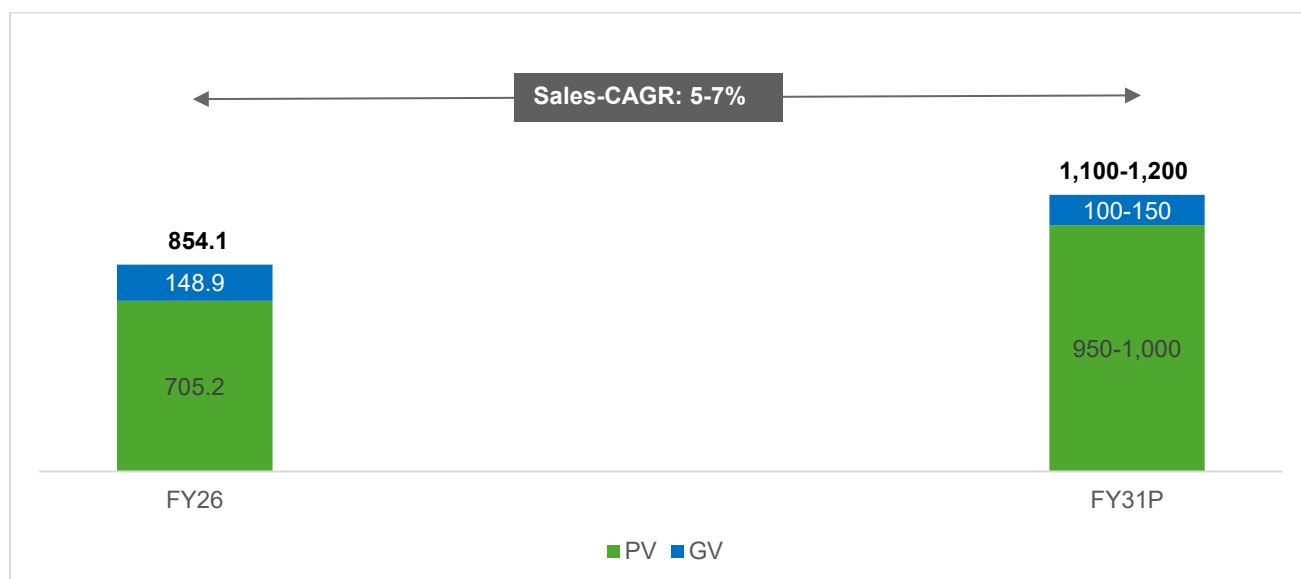
The domestic three-wheeler industry has exhibited a modest growth trajectory over the past six years, with a compound annual growth rate (CAGR) of 2.8%. However, the growth momentum between fiscal 2021 and fiscal 2026 was relatively robust, a CAGR of 32.1%.

Over the long-term horizon, domestic retail sales are expected to expand at a slightly moderate pace of 5-7% CAGR, reaching 1,100-1,200 thousand units by fiscal 2031. As industry continues to evolve, the growth pace is expected to slightly taper in the coming years, from an elevated base. The primary driver of growth for the domestic industry is expected to be the electric vehicle (EV) subsegment.

EV sales are projected to grow at a healthy pace of 17-20% CAGR, while internal combustion engine (ICE) segment sales are expected to contract at 0-3% CAGR. This will lead to an increase in EV penetration within the segment, from 31.6% in fiscal 2026 to 53-58% by fiscal 2031. Notably, the EV penetration within the L5 segment has already demonstrated significant growth, rising from insignificant levels from 0.3% in fiscal 2020 to 31.6% by fiscal 2026.

The passenger carrier segment is anticipated to drive the electrification trend and clock a faster growth rate of 5-7% per annum, outpacing the goods segment, which is expected to experience a more modest growth of 2-4% per annum over the fiscal 2026-2031 period.

Domestic sales outlook



Note: P-Projected

Source: Vahan, CRISIL Intelligence

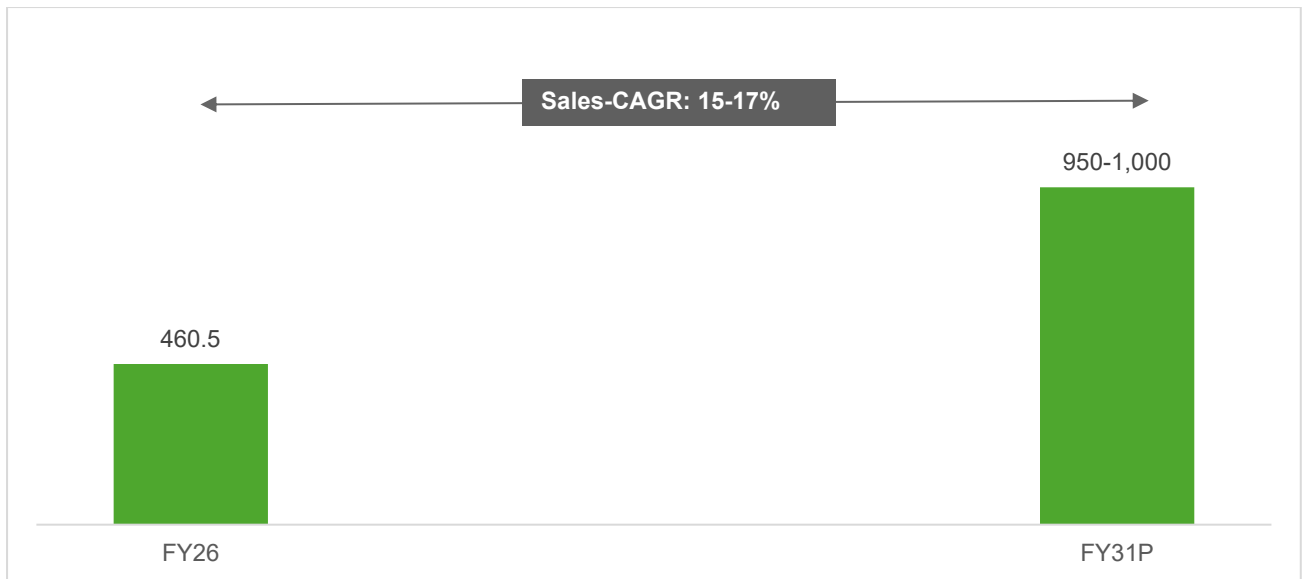
Outlook for exports of 3W

After experiencing two consecutive years of decline in the fiscal year 2023 and 2024, exports grew at a pace of 2% in fiscal 2025 and 50% in fiscal 2026, driven by some improvement in the macroeconomic scenario in the importing countries as well as geographical and portfolio expansion by original equipment manufacturers (OEMs).

In the current fiscal year 2026, the demand from African and Latin American countries is showing positive momentum, with neighboring countries such as Bangladesh, Nepal, and Sri Lanka also experiencing some recovery. In the first half of fiscal 2026, 3W exports experienced a robust 43% y-o-y surge. The continued expansion of OEMs' geographical presence and product portfolios is also expected to provide an added boost to industry exports.

Over the long-term horizon, between fiscal 2026 and 2031, CRISIL Intelligence expects the industry exports to clock a healthy growth at 15-17% compound annual growth rate (CAGR), off the low base of fiscal 2026. However, the ongoing trade war and its impact on global economies remain key monitorable that could potentially affect the industry's export growth.

Exports outlook



Source: SIAM, Vahan, CRISIL Intelligence

Review and outlook on the Indian electric three-wheeler industry

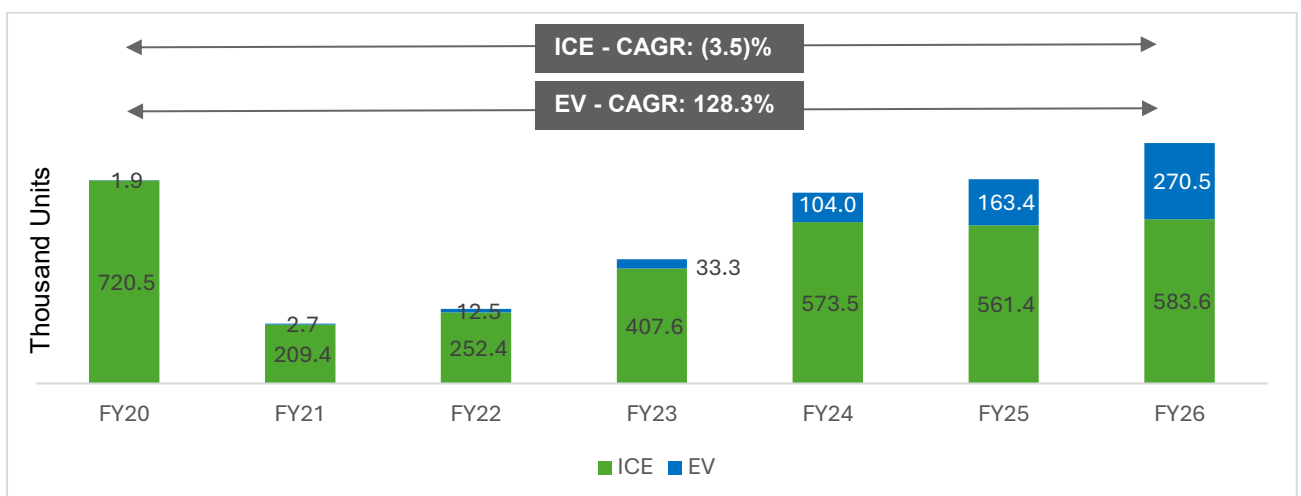
Review of Indian electric three-wheeler industry (fiscal 2020 to fiscal 2026)

E Auto retails have grown at a remarkable pace of 128.3% compound annual growth rate (CAGR) during the fiscal 2020-2026 period. From a relatively low base of 1.9 thousand in fiscal 2020, the sales of E Autos (L5 segment) have experienced exponential growth over the past six years, surpassing the 100 thousand retail mark during fiscal 2024 and maintaining a healthy growth trajectory in fiscal 2025.

The growth of E Autos has been driven by factors such as increasing offerings from OEMs, improving EV supply, rising EV awareness, expanding charging infrastructure, lower operating costs, reduced range anxiety, and the convenience of home charging.

Additionally, the growing e-commerce segment and the preference of large e-commerce players for electric three-wheelers have provided an added boost to EV sales. This category of usage requires vehicles with higher ranges and reliability, as well as better operating efficiencies that support income generation.

Electrification within the three-wheeler industry



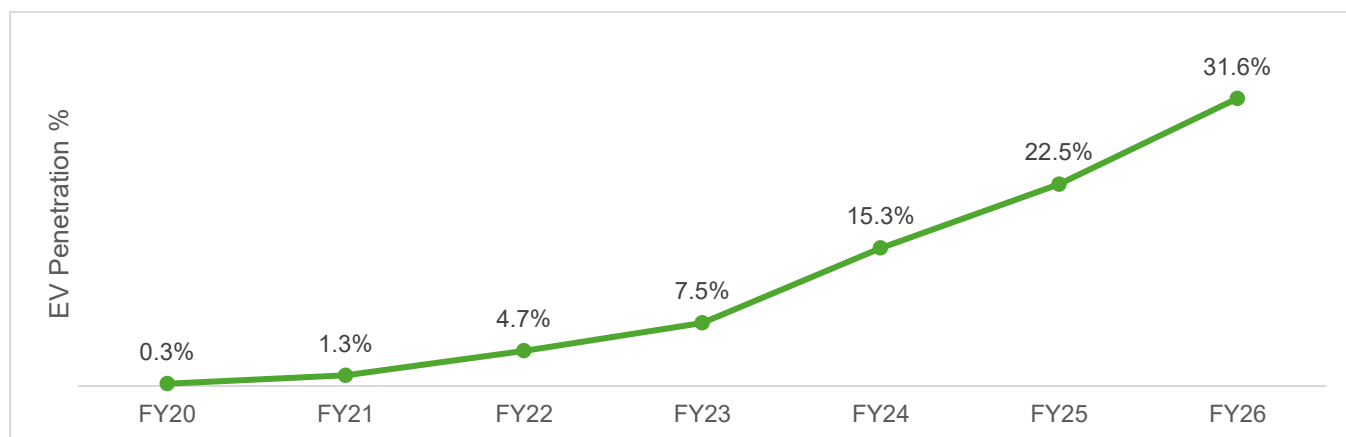
Note: Includes E Auto (L5) subsegment sales data, does not include E rickshaw (L3) subsegment data.

Source: Vahan

In contrast, the sales of internal combustion engine (ICE) vehicles have contracted at approximately (3.5%) during the same period, supporting the sharp growth in E Auto penetration from a negligible 0.3% in fiscal 2020 to 31.6% by fiscal 2026.

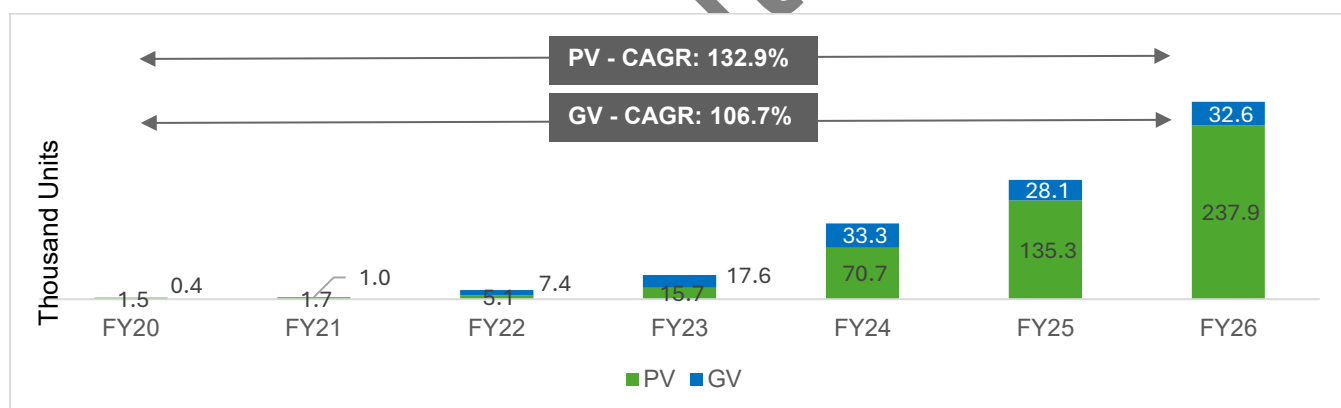
This significant shift towards EVs is expected to continue, driven by the ongoing efforts of the government, industry players, and other stakeholders to promote the adoption of sustainable and environment friendly transportation solutions.

EV penetration in 3Ws (E Autos)



Source: SIAM, Vahan, CRISIL Intelligence

Electrification split by segment (Passenger Vehicle (PV) vs Goods Vehicle (GV))



Source: Vahan, CRISIL Intelligence

The electric three-wheeler market in India continues to be dominated by passenger vehicles, which account for nearly 85-90% of total E-3W volumes as of fiscal 2026. From just about 1,900 units in fiscal 2020, the segment has scaled rapidly to over 237 thousand units in fiscal 2026, driven by expanding adoption in Tier 2–3 cities and state-level e-3W support policies. In contrast, electric goods carriers, though smaller in base, have started to gain traction since fiscal 2023. Their adoption is being propelled by e-commerce, hyperlocal delivery, and logistics companies seeking to meet net-zero goals and reduce delivery costs.

Competitive Landscape within the E-Auto segment

The E-Auto (L5 segment) remains fragmented, though market concentration has increased post-COVID. Among the larger players in the industry, Mahindra and Atul Auto had a significant presence in this segment. However, over the last five years, the share of other large players like TVS, Bajaj and Piaggio has increased, driven by factors such as expanded portfolios and supply networks. Mahindra has consistently maintained its dominance in the E Auto space, with a significant contribution of approximately 37% to the E Auto retails during fiscal 2025. The company's strong presence in this

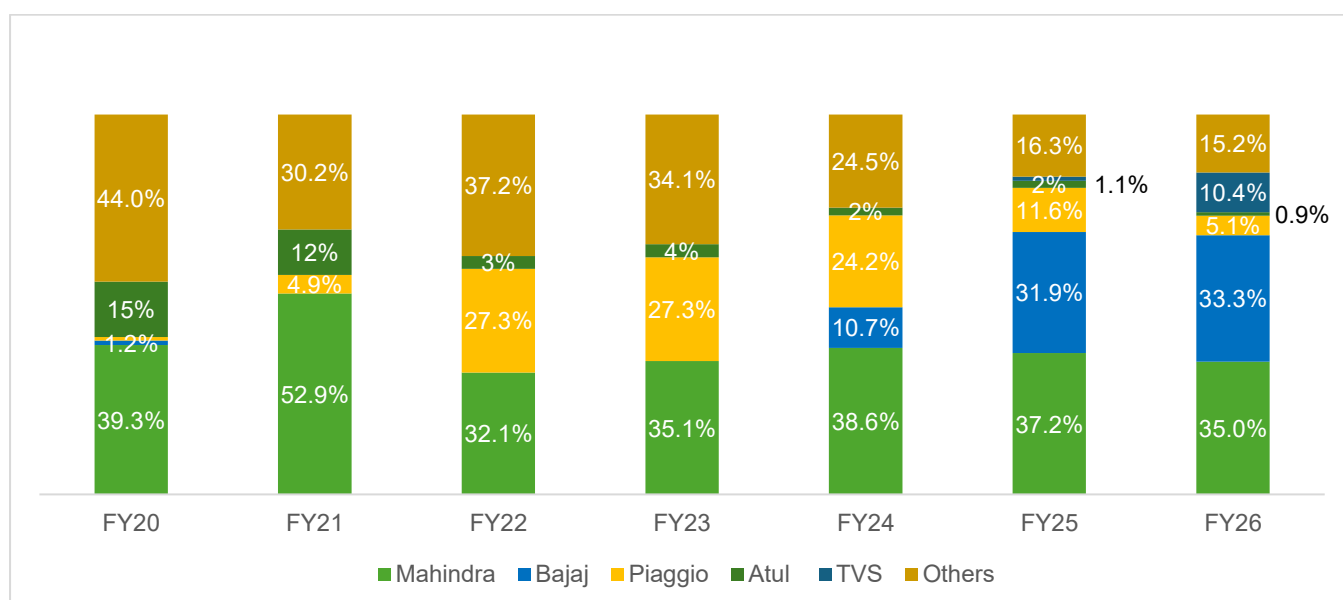
segment can be attributed to its early mover advantage, robust product offerings, and extensive distribution network.

Bajaj, on the other hand, has made significant inroads in the E Auto segment over the last two years, driven by improved supply and expanded reach of its E Auto models. The company's aggressive product launch strategy and focus on electrification have enabled it to gain a significant market share in this segment.

Piaggio has also expanded its presence in E Auto space, with increased offerings in the last few years. As a result, its market share has risen from 0.9% in fiscal 2020 to approximately 12% by fiscal 2025. However, the company lost some ground to Bajaj in fiscal 2025, highlighting the intense competition in the E Auto segment.

Atul Auto, one of the early contributors to the E Auto segment, has been losing ground to other large players amidst the intensified competition. Despite its initial advantage, the company has struggled to maintain its market share in the face of increasing competition from other players, including Mahindra, Bajaj, and Piaggio. TVS has recently gained market share of around 9.7% in H1 FY26

Player wise contribution within the domestic three-wheeler industry- EV segment



Note: Includes E Auto (L5) subsegment sales data.
Source: VAHAN

In the PC e-3W segment, Mahindra maintains a dominant position, but saw its share gradually decline from 39% in fiscal 2020 to about 35% by fiscal 2026, reflecting rising competition. Whereas Bajaj, Piaggio, and TVS have steadily increased their presence.

Drivers for electrification

Over the long-term horizon, the rise in electrification is expected to provide a boost to the overall three-wheeler segment. Below are the factors aiding electrification.

Total cost of ownership (TCO) for L5 segment

The TCO for an E-Auto is 49% lower than that of a petrol 3W and 30% lower than that of a CNG 3W for 30,000km in Fiscal 2025. These lower operating costs are considering the subsidy provided by the government through schemes like PM E-DRIVE, EMPS, FAME etc. Even without subsidies, declining

battery prices and improving efficiency are expected to keep EV operating costs below ICE and CNG three wheelers, ensuring long term viability for commercial use.

Additionally, unlike ICE vehicles, PC e-3W do not fall under the ambit of the permit system, leading to a shift in customer preference towards e-3Ws.

TCO for L5 3Ws in FY25 for four-year ownership (with subsidy)

Annual running	30,000 km	35,000 km	40,000 km
Petrol-equivalent 3W EV	~55% lower cost than petrol	57.5% lower cost than petrol	59.5% lower cost than petrol
	Petrol: Rs. 7.5/km	Petrol: Rs. 7.3/km	Petrol: Rs. 7.3/km
	Electric: Rs. 3.4/km	Electric: Rs. 3.1/km	Electric: Rs. 2.9/km
CNG-equivalent 3W EV	35% lower cost than CNG	38% lower than CNG cost	40% lower cost than CNG
	CNG: Rs. 5.2/km	CNG: Rs. 5.0/km	CNG: Rs. 4.8/km
	Electric: Rs. 3.4/km	Electric: Rs. 3.1/km	Electric: Rs. 2.9/km

TCO for 3W in FY31 for a four-year ownership (without subsidy)

Annual running	30,000 km	35,000 km	40,000 km
Petrol-equivalent 3W EV	49.0% lower cost than petrol	53.0% lower cost than petrol	56.0% lower cost than petrol
	Petrol: Rs. 7.5/km	Petrol: Rs. 7.3/km	Petrol: Rs. 7.1/km
	Electric: Rs. 3.8/km	Electric: Rs. 3.4/km	Electric: Rs. 3.1/km
CNG-equivalent 3W EV	30.0% lower cost than CNG	35.0% lower cost than CNG	38.0% lower cost than CNG
	CNG: Rs. 5.5/km	CNG: Rs. 5.2/km	CNG: Rs. 5.0/km
	Electric: Rs. 3.8/km	Electric: Rs. 3.4/km	Electric: Rs. 3.1/km

Note: Total cost of ownership analysis framework takes into consideration down payment/ initial payment, Incentive/subsidies, EMI, fuel cost, maintenance cost over the ownership period adjusted for the resale value. Inclusive of PM E-DRIVE subsidy and State subsidy for Delhi, E Autos have been considered for the calculation. No subsidy is considered for fiscal 2031. Fuel costs have been considered consistent across the time period.

Source: Industry, CRISIL Intelligence

GST tax structure

To promote the adoption of electric vehicles (EVs), the government has maintained a favorable Goods and Services Tax (GST) rate of 5%, significantly lower than the GST levied on internal combustion engine (ICE) vehicles. In a notable move, the government reduced the GST rates on 3Ws in September 2025, resulting in a decrease in vehicle prices and subsequently stimulating demand. The GST Council slashed the tax rates on cycle-rickshaws and ICE three-wheelers from 28% to 18%. The rate cut covers both passenger and goods 3Ws.

Battery swapping

Battery Swapping reduces downtime for high-utilization e-3Ws by enabling quick battery replacement. Advances in battery tech have improved range and life, increasing buyer appeal. Companies like SUN Mobility, Gogoro, Piaggio, and Ola Electric are investing in swapping networks and interoperable battery platforms, allowing drivers to pay per swap or through energy subscriptions.

The Battery Swapping Policy promotes interoperability and standardized battery designs, which will further lower costs and simplify adoption. Battery swapping is still nascent in India but gaining ground

especially for commercial and fleet operations. The Bureau of Energy Efficiency reports 2,611 battery-swapping stations (BSS) deployed, with the majority in Delhi, according to the India Battery Swapping Association as of Jan 2025. India is likely to require more than 26,000 swapping kiosks by the end of the current fiscal year, which runs through March 2026, and roughly 111,000 kiosks by FY2030.

Replacement opportunity

The replacement market for 3Ws has expanded after the pandemic as customers are upgrading and replacing old fleet for higher uptime and cleaner vehicles. Replacement demand should strengthen as e-3W penetration rises and upfront cost falls via central/state incentives (purchase support, tax/fee waivers). Lower running costs keep EV TCO below diesel/CNG, making the shift attractive.

Increase in charging infrastructure

The charging infrastructure in India has entered a strong growth phase. The number of public chargers has increased sharply, utilization is rising, and geographic penetration is expanding. For the 3W segment, this infrastructure growth is a critical enabler. This reduces range anxiety, improves vehicle uptime, lowers operating cost, and supports replacement demand. However, the infrastructure gap (vehicles per charger still high) is still persistent. Scaling up charging density (especially in urban/ peri-urban zones) remains a key requirement for full commercial viability of e-3Ws.

Demand incentives

Under the PM E-drive scheme, demand incentives for cargo e-3Ws in fiscal 2025-26 were rationalized to Rs. 2,500 per kWh, with the cap reduced to Rs. 25,000 per vehicle; the target volume was increased to ~1.25 lakh units, compared to Rs. 5,000 per kWh (cap of Rs. 50,000 per vehicle) and a target of around 80,546 units in fiscal 2024-2025, reflecting a calibrated shift toward scale-driven adoption with lower per-unit subsidy support.

Growth in Gig Worker Economy and e-commerce Industry

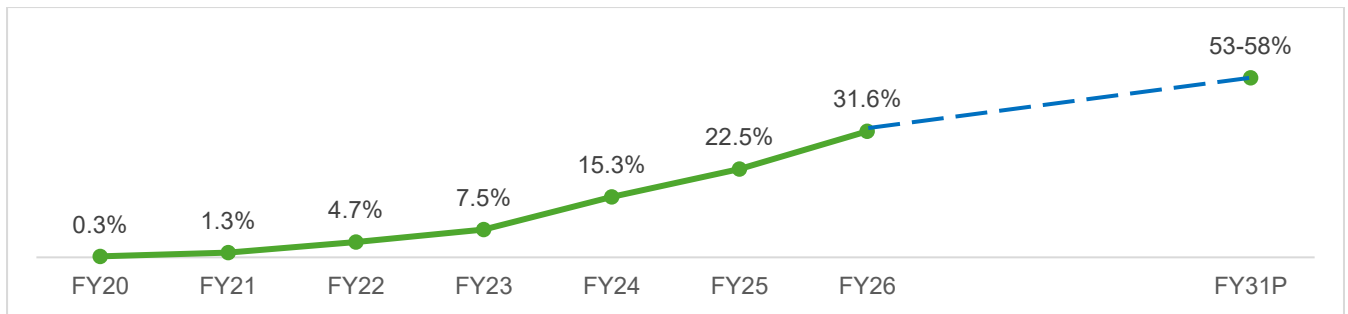
E-commerce delivery is an important application in e-3W sales. An improving economy amid low-to-moderate inflation is expected to drive consumer spending and propel retail industry growth, thereby driving up sales of e-3W. Many manufacturers are already investing in electric vehicle (EV) technology and expanding their product offerings to cater to the growing demand for sustainable mobility solutions.

Outlook on e-3W segment

The primary driver of growth for the domestic 3W industry is expected to be the e-3W segment, which is poised to gain momentum due to various factors, including increasing portfolio expansion, government support, technological enhancements coupled with expansion in charging infrastructure.

As a result, e-auto sales are projected to grow at a healthy pace of 17-20% CAGR. This growth will be accompanied by an increase in EV penetration within the L5 segment, which is expected to rise from 31.6% in fiscal 2026 to 53-58% by fiscal 2031.

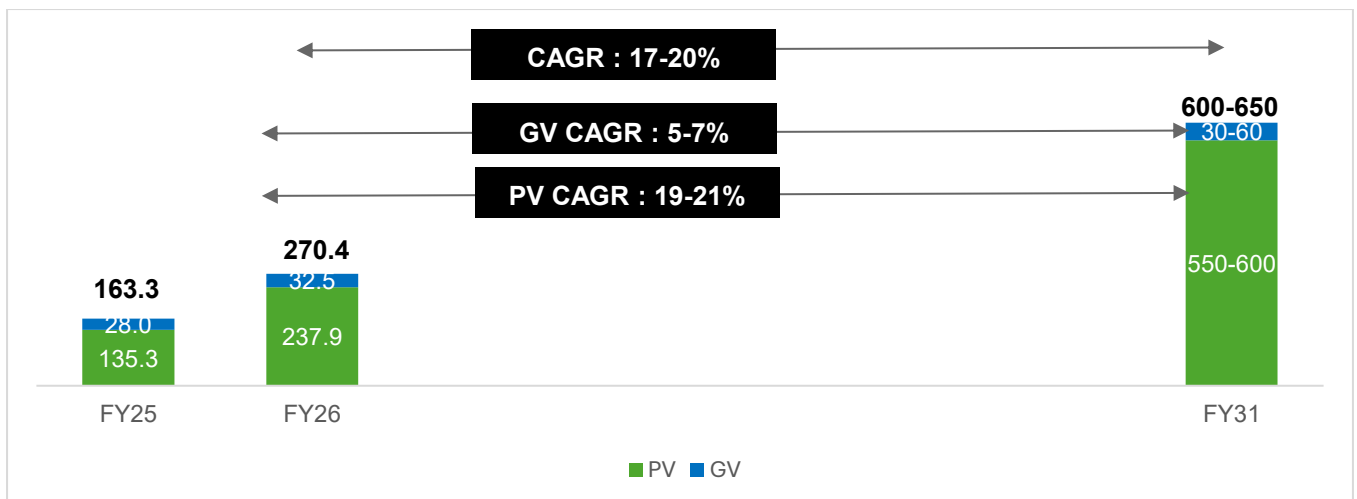
E-Auto penetration outlook for FY26-31P



Note: Retail sales data from VAHAN has been considered for analysis. VAHAN data does not include retails for Telangana state
Source: CRISIL Intelligence, VAHAN

The electric three-wheeler industry is expected to grow from 270 thousand units in fiscal 2026 to around 600-650 thousand units by fiscal 2031, driven by a 19–21% CAGR in PV three-wheelers and 5-7% CAGR in GV supported by e-commerce growth, urban delivery needs, and increasing electrification. Overall, the market mix is expected to tilt decisively toward PV applications, which could form nearly 90% of total sales by fiscal 2031.

Outlook on Goods vs passenger split (by volume)



Note: Retail sales data from Vahan has been considered for analysis.

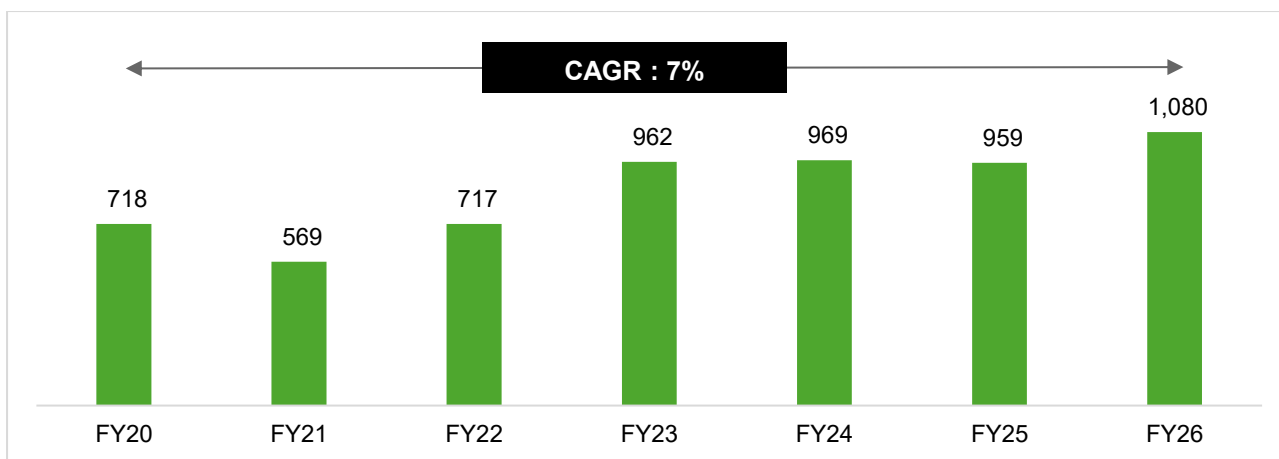
Source: CRISIL Intelligence, Vahan

Review and outlook of Indian Commercial vehicle industry

Review of Indian domestic CV industry (fiscal 2020 to 2026)

India is the third-largest commercial vehicle market in the world, with total production volumes recording 1.17 million units in fiscal 2026. The volumes have consistently been over 1 million units over the past four fiscals, indicating healthy demand in the market, albeit steadily. The market logged a CAGR of 7% over the past six years, driven by an e-commerce surge in the country and the increasing number of infrastructure development projects. The industry particularly in fiscal 2026, grew at 12.6% over fiscal 2025 and this underscores the sector's resilience and its critical role as a barometer for India's broader macroeconomic expansion and industrial activity.

Overall CV sales trend



Note: Data includes domestic sales of LCV – light commercial vehicles, IMHCV – intermediate medium and heavy commercial vehicles and buses

Source: SIAM, CRISIL Intelligence

Segmental Trends

The market is broadly split into LCV (gross vehicle weight less than 7.5 tonne), IMHCV (more than 7.5 tonne) and Buses.

LCV segment grew by 12.5% in fiscal 2026, after a decline in fiscal 2025 by 4%. The resurgence in FY26 was primarily underpinned by stable end-use sectors such as agriculture, e-commerce, consumer goods, and a broader revival in construction. A primary growth catalyst was the implementation of GST 2.0, which reduced vehicle acquisition costs by ₹30,000 to ₹1,00,000. This improved affordability lowered EMIs, enhanced asset quality trends, and revived lender confidence, thereby easing credit access for first-time buyers and small fleet operators. Furthermore, product interventions, including alternate fuel options and new launches like the Tata Ace LNT, Ace Pro, Ashok Leyland Saathi, and Euler models, expanded customer choice and witnessed strong pan-India traction. Demand in the sub-1 tonne and pickup categories was consistently bolstered by captive-led last-mile logistics and a healthy rabi harvest. Additionally, the discontinuation of electric three-wheeler subsidies prompted fleet operators to pivot toward electric sub-1 tonne models for intra-city deliveries, while the 3.8 tonne category steadily emerged as a standout growth segment due to its superior payload and loading area dynamics.

The IMHCV industry recorded a robust expansion of 16% in fiscal 2026, demonstrating a sharp acceleration compared to the decline of 4% witnessed in fiscal 2025. This was supported by strong growth in ICV and MCV segments, primarily underpinned by the versatility and strong linkage with industrial, utility, and bulk material movement. Intermediate and Medium Commercial Vehicles benefited from stable tender-led demand, institutional fleet requirements, and broad cargo relevance across e-commerce, liquid petroleum gas, containers, cement, and raw material transportation. The implementation of GST 2.0 stimulated consumption growth in fast-moving consumer goods and durables, further driving market load transportation. Additionally, a favorable agricultural outlook and an increasing preference for compressed natural gas vehicles supported this category, with the Intermediate Commercial Vehicle segment poised for accelerated growth as it increasingly caters to traditional medium commercial applications through 18 to 18.49 tonne models. Concurrently, Heavy Commercial Vehicles, including multi-axle vehicles and tractor-trailers, witnessed a structural shift toward higher gross vehicle weight configurations, particularly 48 tonne and 55 tonne models, as fleet operators prioritized payload economics and fleet productivity. Demand remained robust across core sectors, including mining, coal, steel, cement, and car carriers. Across the broader segment, the GST 2.0 framework lowered acquisition costs and equated monthly instalments, unlocking replacement cycles that had been delayed by one to two years.

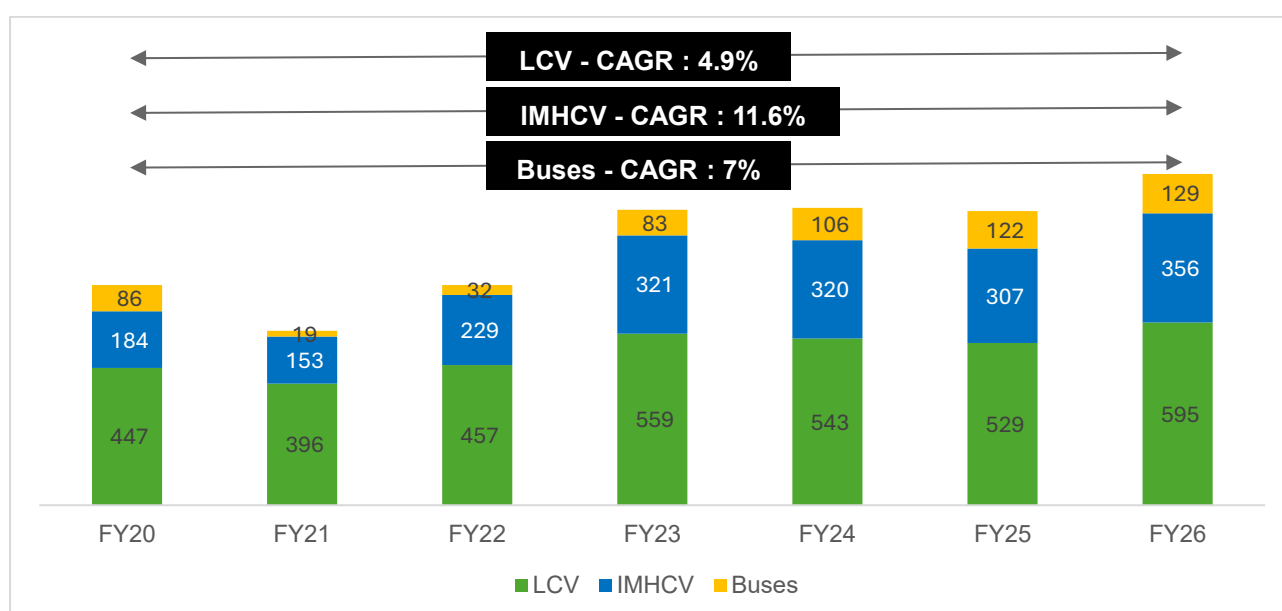
The bus segment witnessed significant volatility during FY20–FY26, reflecting its high dependence on

public transport demand, institutional purchases, and replacement cycles. Sales declined sharply from 86 thousand units in FY20 to 19 thousand units in FY21, registering a 77% YoY decline, primarily due to COVID-19-led lockdowns, restrictions on public mobility, closure of schools/colleges, and deferment of fleet purchases by state transport undertakings and private operators.

The segment began recovering in FY22, with production increasing 64.5% YoY, supported by the gradual reopening of economic activity and partial revival in public and staff transportation. A stronger rebound was seen in FY23, when bus sales rose 160% YoY to 83 thousand units, as mobility normalized, supported by renewed procurement from state transport bodies, educational institutions, employee transport operators, and tourism-related fleet owners. Replacement demand also picked up as operators began refreshing ageing fleets that had been deferred during the pandemic.

Growth moderated in FY25 to 16% YoY, with sales reaching 122 thousand units, indicating normalization after the sharp post-pandemic recovery. By FY26, bus sales increased further to 129 thousand units, reflecting 5% YoY growth. Overall, the bus segment recovered strongly from its pandemic lows and surpassed pre-COVID production levels, supported by revival in passenger mobility, institutional demand, replacement cycles, and increasing focus on public transportation infrastructure.

Segment-wise share in domestic sales



Note: Data includes domestic sales and exports of LCV – light commercial vehicles, IMHCV – intermediate medium and heavy commercial vehicles and buses

Source: SIAM, CRISIL Intelligence

CAGR growth (segment wise)

CAGRs	LCV	IMHCV	Buses
CAGR (FY2020 - FY2022)	1%	11.4%	-39.1%
CAGR (FY2023 - FY2026)	2.1%	3.5%	15.9%
CAGR (FY2020 - FY2026)	4.9%	11.6%	7%

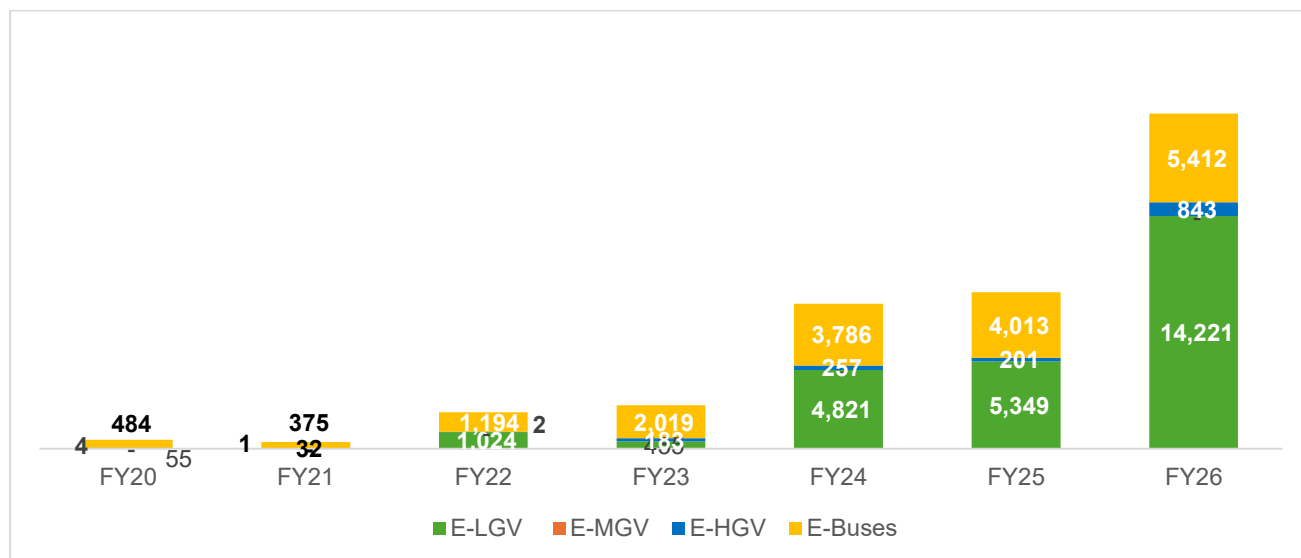
Electrification in the Domestic Commercial Vehicle Industry

Electrification in the Commercial Vehicle Industry has been on the slower side as compared to other vehicle segments due to higher up-front costs, lack of charging infrastructure on key long-distance corridors, etc. Within domestic CVs, Buses were the first segment to be electrified, followed by LCVs. During the last 5 years, EV penetration within overall CVs increased from 0.005% in fiscal 2020 to almost 1.98% by fiscal 2026.

The electric Light Commercial Vehicle (e-LCV) segment witnessed exponential growth, with volumes

surging from 5,349 units in fiscal 2025 to 14,221 units in fiscal 2026, translating to a remarkable year-on-year growth of 166%. This accelerated adoption is primarily driven by the increasingly favourable Total Cost of Ownership (TCO) for intra-city operations, alongside supportive government policies/subsidies, and the expanding charging infrastructure network. Furthermore, the aggressive push by e-commerce, quick-commerce, and FMCG companies to meet their ESG (Environmental, Social, and Governance) targets has significantly catalysed the deployment of e-LCVs in last-mile delivery fleets

Segment-wise electric vehicle sale



Note: Light Goods Vehicle (LGV): 0-7.5T GVW; Medium Goods Vehicle (MGV)/Medium Passenger Vehicle (MPV): 7.5-12T GVW; Heavy Goods Vehicle (HGV)/Heavy Passenger Vehicle (HPV): >12T GVW

Source: VAHAN

Policies supporting the adoption of Electric Commercial Vehicles Going Forward

ADAS & AC Mandates

The Ministry of Road Transport and Highways (MoRTH) is prioritizing road safety and driver welfare, which have historically been neglected in the Indian CV space.

Starting January 2027, newly introduced models of trucks and buses (N2, N3, M2, M3 categories) must be equipped with Advanced Driver Assistance Systems (ADAS). This includes Emergency Braking (AEBS), Driver Drowsiness Warning (DDAW), and Blind Spot Information Systems. This will significantly increase the BOM (Bill of Materials) cost. For fleet operators, the perceived impact is a reduction in insurance premiums and accident-related downtime, though the initial acquisition cost will rise.

Emission Standards: BS-VII and Beyond

While India only recently transitioned to BS-VI (OBD-II), the next leap is already on the horizon. BS-VII Norms (Expected 2026–2028) which is expected to be modeled after Euro 7, these norms will likely be fuel-agnostic (same limits for petrol and diesel). A critical addition is On-Board Monitoring (OBM), which tracks real-world emissions throughout the vehicle's life, not just at the time of sale. BS-VII will make diesel after-treatment systems (ATS) extremely complex and expensive. This is expected to trigger a segment shift where Light Commercial Vehicles (LCVs) migrate toward Electric and Heavy Commercial Vehicles (HCVs) move toward LNG or Hydrogen to avoid the high compliance costs of diesel.

CAFE/CAFC Norms for CVs

A new draft released on 28 July 2025 proposes taking fuel efficiency norms into Phase 2, where in model specific fuel efficiency norms will be replaced by CAFE norms. The proposed implementation window is from 2027 to 2032. Some of the key proposed aspects are mentioned below.

1. **Shift from per-vehicle Minimum Energy Performance (MEP) to fleet-wide CAFE standard:** Previously, every type /mode of vehicle had different efficiency requirements. But the new proposal says, efficiency targets need to be met on average across all models sold by the manufacturer cumulatively.
2. **Stricter target:** OEMs will now have to ensure 30% fleet-wide improvement in fuel efficiency compared to 2022-23 levels. Earlier fuel efficiency varied by model.
3. **Scope expanded:** Covers light, medium, and heavy-duty vehicles, across all fuels and not just diesel which was the case until now. Previously, it covered only medium and heavy-duty vehicles.
4. **Super-credits introduced:** under this concept, for every Hydrogen and EV vehicle sold, the manufacturer gets a certain number of credits,

OEMs will be forced to balance their portfolio. To meet fleet-average CO2 targets, they will need to sell a specific percentage of Zero Emission Vehicles (ZEVs). This creates a Super Credit system where one electric truck sold can offset the emissions of multiple diesel trucks, accelerating the push for electrification by manufacturers.

Modernization: Scrappage Policy

Commercial vehicles older than 15 years must undergo mandatory fitness tests; failure results in de-registration. Government-owned CVs older than 15 years are being scrapped starting 2024–25. This policy will create a replacement cycle tailwind. As enforcement tightens inefficient CVs will need to be replaced, providing a steady platform for new vehicle demand through 2030.

Alternative Fuels: Green Hydrogen & LNG

National Green Hydrogen Mission targets 1,000+ hydrogen-powered heavy trucks on the road by 2030. The government is incentivizing the setup of LNG stations every 200–300 km on major highways. For long-haul (1,000+ km) applications where batteries are too heavy, LNG and Hydrogen are positioned as the primary diesel alternatives.

Competitive Scenario

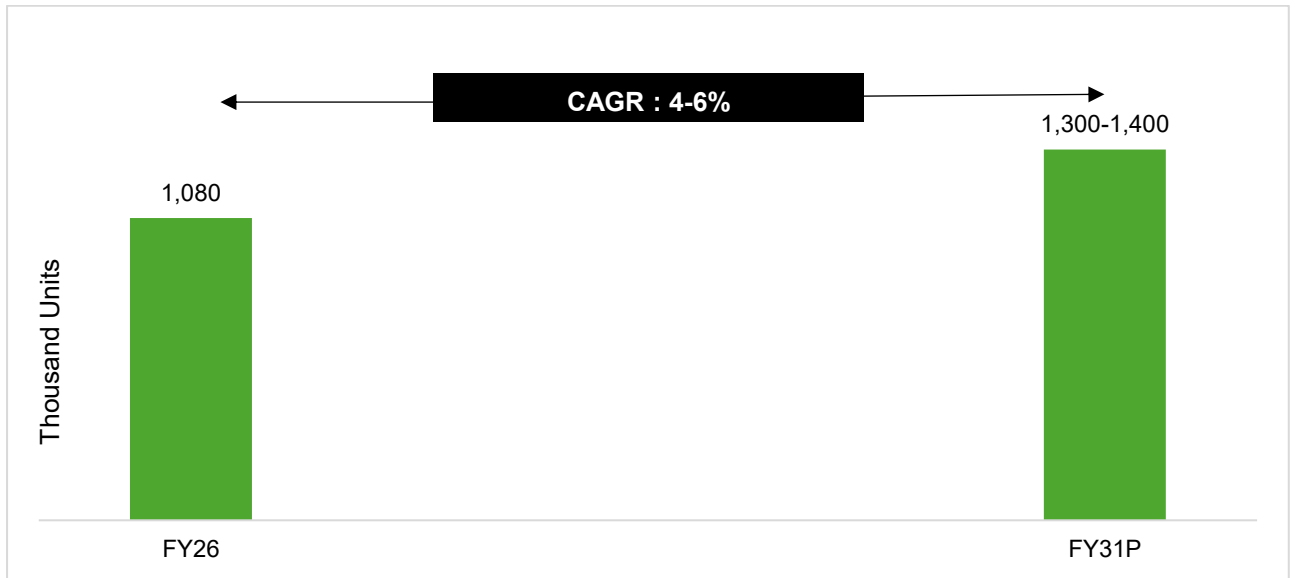
In the domestic CV industry Tata Motors leads the market with 35% share in fiscal 2026. While the company has lost some share over the last few fiscals, to its competitors, the company continues to dominate the domestic market. Mahindra & Mahindra is the second largest player in the market, majorly due to contribution from the LCV segment, where they contribute almost 45% of the entire segment. Ashok Leyland contributes about 19% of the overall market and contributes across all segments of the industry. VECV has gradually increased its presence in the CV market aided by increased IMHCV sales.

Outlook of Indian commercial vehicle industry

With increasing infrastructure development and rising freight demand from multiple sectors, the Indian CV industry is poised for long-term expansion, projected to grow at a CAGR of 4-6% over the next five years, from 1.17 Mn units in fiscal 2026 to 1.4-1.5 Mn units by fiscal 2031.

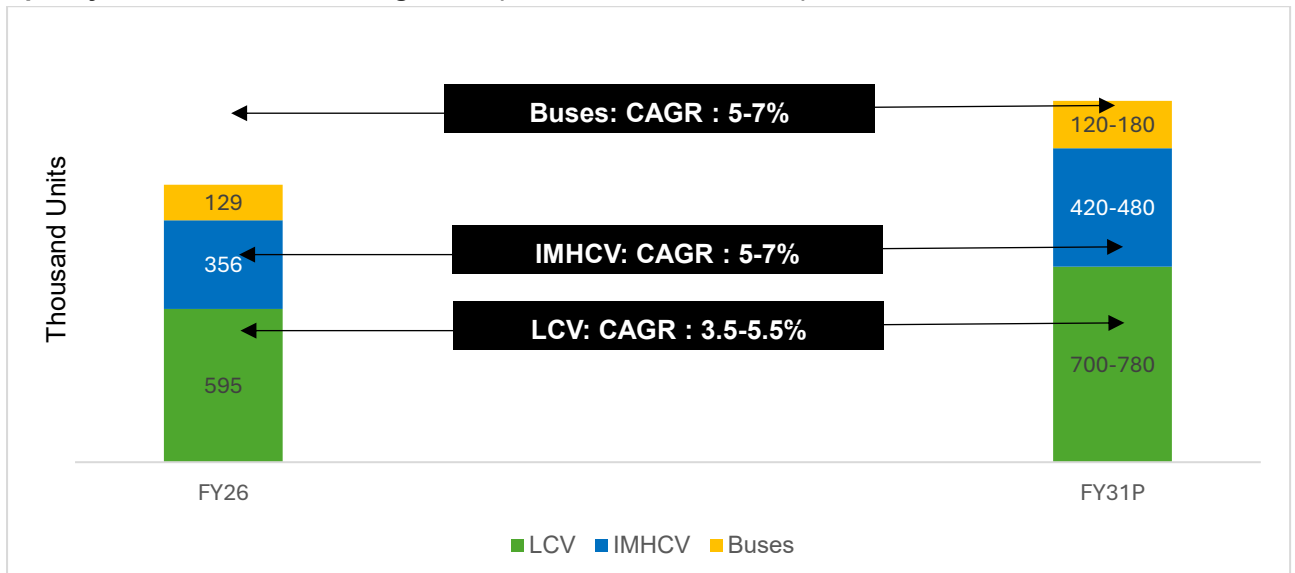
Domestic sales are expected to grow at a CAGR of 4-6% and the exports segment is expected to grow at a CAGR of 5-7% during the period between fiscal 2026 and 2031.

Overall commercial vehicle domestic sales outlook



Source: SIAM, VAHAN, and CRISIL Intelligence

Split by commercial vehicle segments (LCV, IMHCV and Buses)



LCV is expected to clock a CAGR of 3.5-5.5% from fiscal 2026 to 2031. During fiscals 2021 to 2026, the industry exhibited a 9% CAGR. Demand sustained despite the impact of the pandemic because of the expansion of e-commerce activity during the period.

In fiscal 2027, the LCV segment is projected to grow 3-5%, driven by increased economic and commercial activities. This growth is expected to be driven by replacement volumes from healthy sales over fiscals 2017 to 2019 and the resumption of government spending to usual levels. Additionally, the lowering of the repo rate, revision of GST structure and higher loan disbursements are expected to contribute to this growth.

The IMHCV segment has seen a fluctuating yet resilient performance in recent years. In fiscal 2025, growth slowed, reflecting the impact of economic headwinds and supply-side challenges, but the industry grew by 16% in fiscal 2026, indicating strong demand.

The sustained push for infrastructure development, increased logistics digitisation and policy-driven fleet modernisation is expected to shape the segment-wise trends in the coming years. The increased

construction and mining activity will be supported by a 9-11% higher budgeted construction capex.

The IMHCV segment is expected to clock healthy growth with a projected CAGR of 5-7% from fiscals 2026 to 2031. Long-term IMHCV sales are likely to be driven by improving industrial activity, consistent agricultural output and the government's continued emphasis on infrastructure development, among other factors. However, volume growth may be limited by efficiencies gained from the implementation and rationalisation of the GST, the development of improved road infrastructure and the commissioning of the dedicated goods corridors. Nonetheless, the industry remains on a promising growth trajectory.

The buses segment growth is expected to be gradual with a projected CAGR of 5-7% as STUs and private operators incrementally replace aging bus fleets and respond to growing urban and intercity transportation needs. Central and state-led procurement schemes are expected to boost the momentum in the segment, on the back of a stronger push for cleaner public transport. However, slower penetration of electric buses outside STUs and higher acquisition costs could result in modest growth compared with goods vehicles.

Review and outlook of the electrification in commercial vehicles (fiscal 2020 to 2031)

Electrification in commercial vehicles

Over the past five to six years, electrification in the truck segment has progressed far more cautiously compared to other parts of the commercial vehicle market, largely due to the complexity of use cases and stricter operating requirements. In the initial phase, activity was limited to pilots and proof-of-concept deployments, typically led by OEMs, logistics companies, and a few early adopters. These efforts were primarily focused on testing vehicle performance, range reliability, and suitability for Indian road and load conditions rather than scaling commercial operations.

As the ecosystem evolved, the focus gradually shifted toward identifying viable use cases rather than pursuing broad-based adoption. Electrification began to find relevance in specific applications such as short-haul and intra-city logistics, port operations, mining, and dedicated industrial routes where duty cycles are predictable and vehicles can return to base for charging. This marked an important shift from technology experimentation to use-case validation, with operators evaluating electric trucks based on total cost of ownership rather than upfront cost alone.

In recent years, there has been a noticeable increase in OEM participation, with both established manufacturers and new-age players introducing electric truck platforms across LGV and HGV categories. At the same time, partnerships between vehicle manufacturers, logistics companies, and energy providers have started to emerge, reflecting a more integrated approach to deployment. The business model is also evolving, with growing interest in leasing, fleet-as-a-service, and pay-per-use structures to mitigate high upfront investment and technology risk.

Despite these developments, large-scale adoption remains limited, particularly in the MGCV and HGV truck segments. Key barriers continue to include range constraints for long-haul operations, battery weight impacting payload capacity, long charging times, and the lack of widespread fast-charging infrastructure along freight corridors. Financing also remains selective, with lenders preferring contracts with assured utilization or strong counterparties.

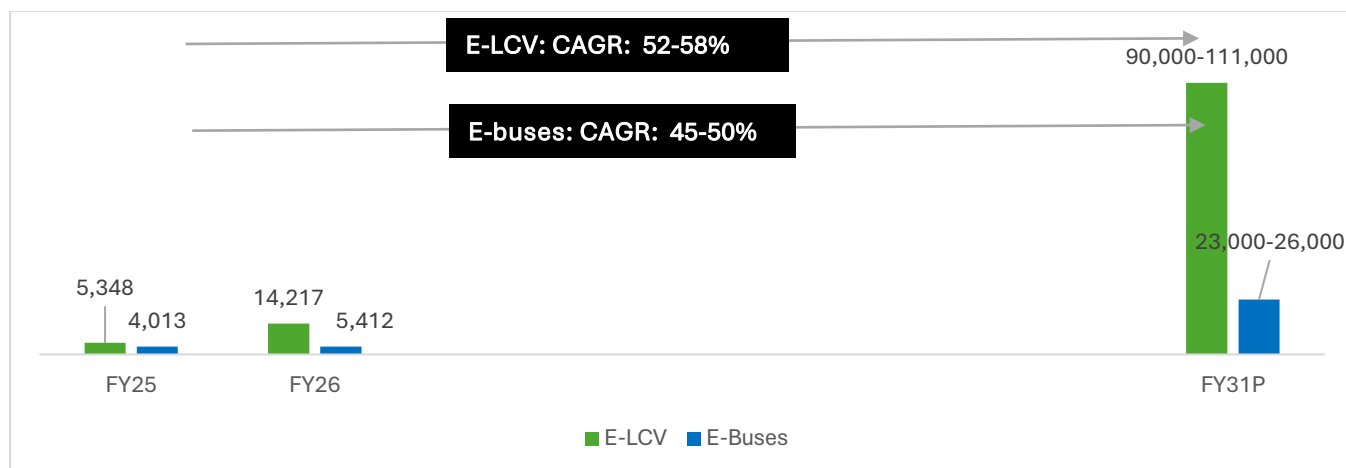
Charging infrastructure development for trucks is still at a nascent stage and is largely concentrated around captive or depot-based setups. While there is increasing discussion around corridor-based charging networks and battery swapping for certain applications, these models are yet to achieve meaningful scale. As a result, electrification in trucking today is largely confined to controlled environments rather than open, long-distance freight movement.

Note:

LGV: Light Goods Vehicle (GVW <7.5T)

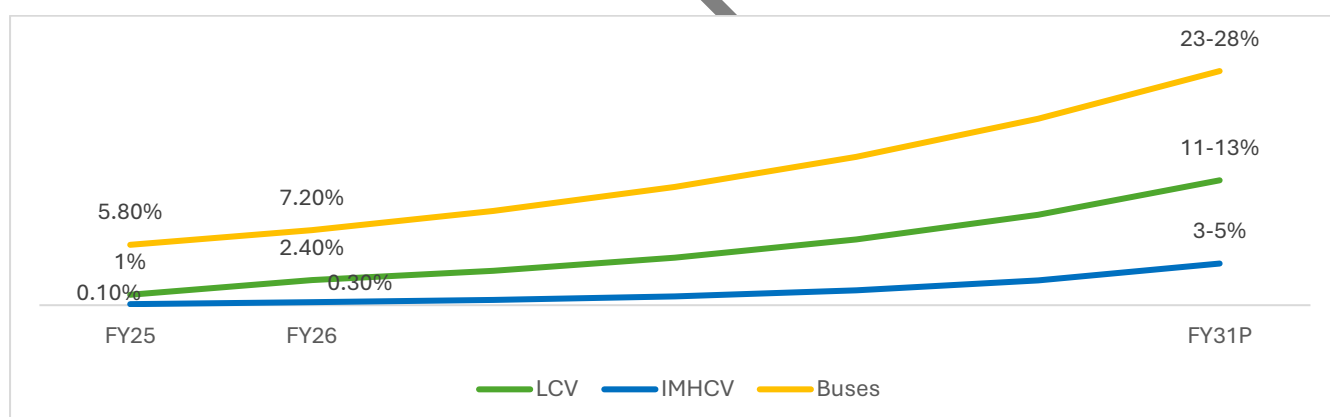
MGV: Medium Goods Vehicle (GVW 7.5 – 12T)
HGV: Heavy Goods Vehicle (>12T)

EV sales by segment (FY2020-FY2031P)



Source: Crisil Intelligence

EV penetration in CVs (FY2025-FY2031P)



Source: CRISIL Intelligence, VAHAN

TCO assessment

A comparison of TCO of various CV types will provide a view as to how much a vehicle costs to own and operate over a period. Commercial operation of any vehicle will be viable only if the cost of operating it is below the revenue earned. A vehicle with a significantly higher cost of operation will not be viable due to competition from other vehicle categories and varying powertrains.

TCO between fiscals 2026 and 2030P for sub-segments LCV and Bus:

LCV (Sub 1 ton category)

The LCV segment demonstrates the fastest convergence in TCO between electric and ICE vehicles over FY26 to FY30. In FY26, electric vehicles are already broadly comparable to diesel across ownership horizons, while petrol remains structurally higher due to fuel costs. By FY30, electrics marginally outperform diesel in longer ownership periods, indicating that higher utilization and asset life are key levers driving EV viability in this segment.

This early parity is driven by relatively lower upfront cost differentials, high urban utilization, and superior operating cost economics of EVs. The sensitivity to ownership duration highlights that fleet

operators with predictable, high-frequency usage profiles are best positioned to realize economic benefits, making LCVs the most commercially viable entry point for electrification.

TCO analysis for LCV – without subsidy

FY26				FY30P			
TCO period (years)	4 years	6 years	8 years	TCO period (years)	4 years	6 years	8 years
Diesel	22.3	21.7	21.3	Diesel	26.7	26	25.5
Petrol	23.5	22.9	22.6	Petrol	28.3	27.6	27.2
Electric	22.6	21.4	20.7	Electric	26.8	25.5	24.8

Note: Numbers denote TCO in Rs per km, TCO period units in years, this is for Tata ACE vehicle without subsidy

Bus

The cost of ownership of an electric bus is in the range of a standard diesel bus over the long term. Commercial operation of any vehicle will be viable only if the cost of operating it is below the revenue earned. A vehicle with a significantly higher cost of operation will not be viable due to competition from other vehicle categories and varying powertrains.

The cost of ownership of an electric bus is like that of a standard diesel bus. In the bus segment, owing to the excessively high battery cost, there is a 4-5x difference in the initial purchase cost of a diesel/CNG bus and an electric bus. Because of this large differential, the gap in the break-even period between electric and diesel powertrains is more than 20 years despite a 30-35% lower operating cost for EVs. Hence, we believe capital subsidy would be needed to make electric buses viable by fiscal 2031, which, in turn, may limit their penetration to the public transport (STU) segment.

TCO analysis for MCV buses – without subsidy

FY25				FY31P			
TCO period (years)	8 years	10 years	12 years	TCO period (years)	8 years	10 years	12 years
Diesel	58.0	56.3	55.1	Diesel	62.5	60.6	59.2
CNG	53.0	51.3	50.0	CNG	58.1	56.1	54.5
Electric	47.0	44.2	42.1	Electric	50.1	47.1	44.8

Note: Numbers denote TCO in Rs per km, TCO period units in years

Review and Outlook of Indian Construction Equipment (CE) Industry (Earth moving and material handling)

Review of the domestic demand (fiscals 2026)

CE are largely used for construction and infrastructure activity

CE are engineering machines and vehicles used for construction (industrial & infrastructure), agriculture, mining, waste management, and logging activities. They are also used to prepare the ground, excavation, haulage of material, and dumping/laying in a specified manner. The various types of machines used are backhoe loaders, excavators, wheeled loaders, skid steer loaders, graders, cranes, dozers and compactors.

Industry structure

Earthmoving Equipment	Material Handling Equipment	Road Equipment
Backhoe Loader	Pick & Carry cranes	Compactors
Excavator	Crusher & Screener	Pavers
Wheel Loader		
Motor Grader		

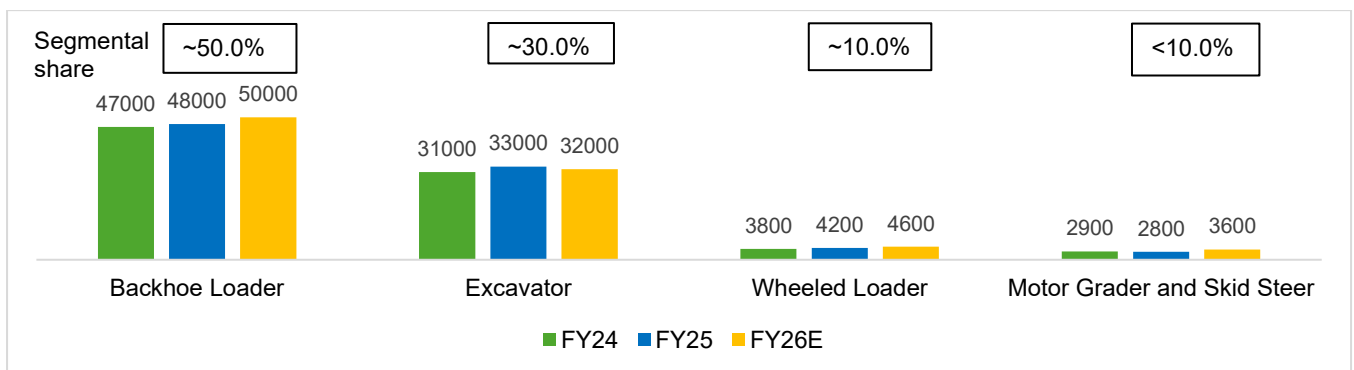
Skid-steer Loader		
Track-type Loader		
Off-highway Truck		

Source: CRISIL Intelligence

Excavators, backhoe loaders, pick & carry cranes and compactors account for ~73% of the CE industry's revenue. In the construction sector, CE is mainly used in infrastructure and industrial construction.

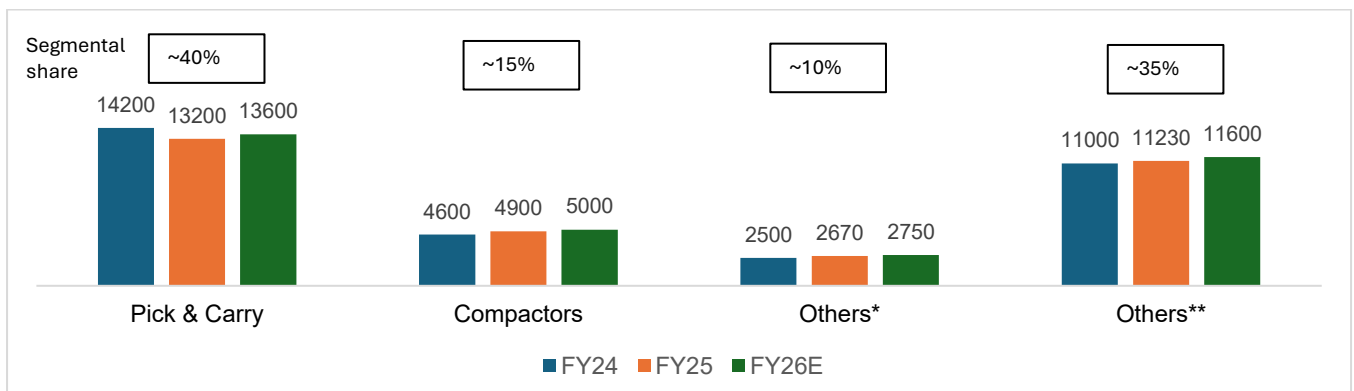
Construction equipment has an average life of about 7-8 years, depending on frequency of the usage. However, various components need to be regularly serviced and replaced and hence, after-sales service forms a critical part of the manufacturers' offering. Hirers and small contractors are the major end-users of CE. Large engineering, procurement & construction (EPC) companies account for only about 10% of total demand. Backhoe loaders are most popular in the Indian market as they are multi-functional (i.e. excavation and loading), relatively low on maintenance and easy to mobilize. It accounted for ~50% (volume) of the CE market, followed by excavators ~35% (volume) and ~47% (value) which have a specialized usage pattern.

Earth moving equipment industry volume: ~104k



Source: CRISIL Intelligence; E: Estimated

Material handling and road equipment industry volume: ~33k



Note:

Others*: include crushers & screeners and pavers

Others**: include Material processing, Mixers, Crawler

Source: CRISIL Intelligence

Growth drivers

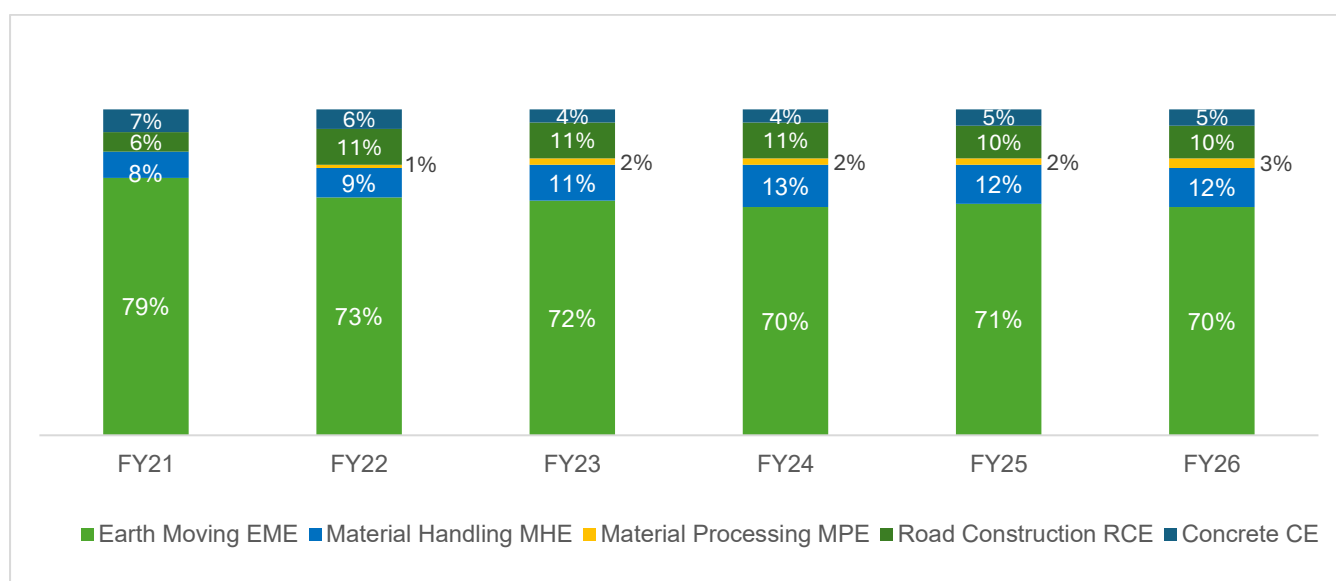
Indicators for construction equipment industry on a rise

Quarterly movement in the sales of the equipment can be easily tracked through a host of factors as in the chart below. Execution of projects was robust in fiscal 2023 especially for mining activities. To be sure these parameters were on a high base of fiscal 2022. The momentum had further continued in fiscal 2024. However, normalisation in overall construction activity was observed in fiscal 2025, the quarterly indicators for the current fiscal reaffirm the same.

With all High Frequency Indicators showing positive signs, CE industry sales are at all-time high, and sales volume expected to observe moderation in growth

	Q4 FY24	Q1 FY25	Q2 FY25	Q3 FY25	Q4 FY25	Q1 FY26	Q2 FY26	Q3 FY26	Q4 FY26
GFCF									
Cement Production									
Bitumen Production									
Steel Demand									
Power Demand									
Rural Road Execution									
National Highway Execution									

Legend: <0% on- year growth, 0-10% on- year growth, >10% on-year growth
Source: CRISIL Intelligence



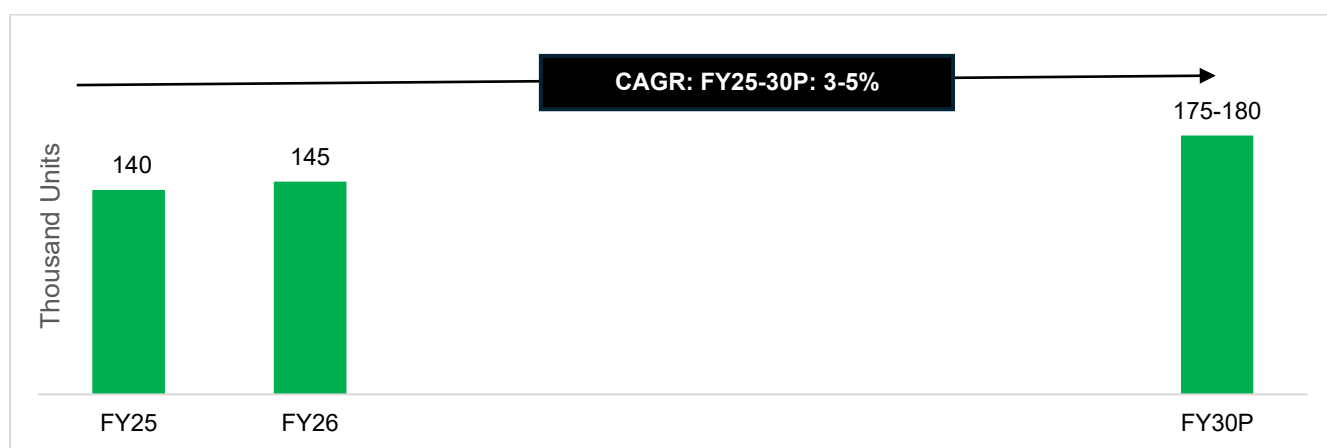
Source: Industry, ICEMA – 2025, Crisil Intelligence

The EME category continued to anchor the off-highway vehicles market, accounting nearly 70% of total industry volumes. The segment recorded sales of 91.5 thousand units, reflecting a healthy 4% growth

over the previous year. Within this category, backhoe loaders remained the dominant product type, contributing 50.1 thousand units and capturing more than half of the segment's share at 55%. Crawler excavators followed with 35% of the EME segment, underlining sustained demand for heavy-duty excavation solutions across infrastructure and development projects.

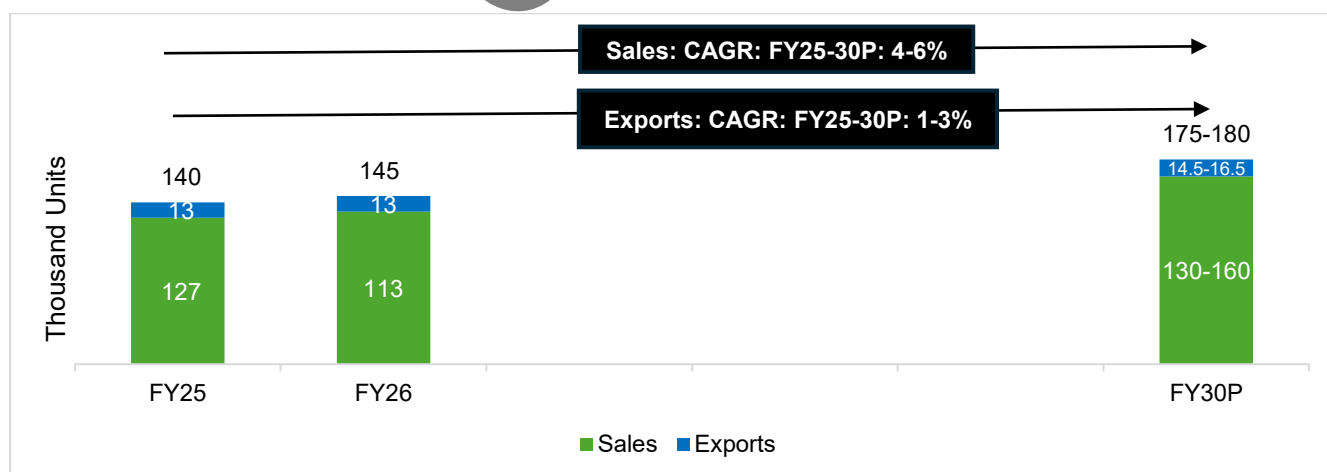
Material handling equipment sustained its position as the second-largest segment with 33.2 thousand units sold. Meanwhile concrete equipment recorded 7.2 thousand units with a 4% increase, supported by ongoing urban development and infrastructure activities. Road construction equipment contributed 14.5 thousand units, reflecting continued investment in highways and connectivity projects, and material processing equipment added 4.3 thousand units, serving demand from aggregates and mining applications. Together, these segments underline steady and broad-based demand across infrastructure-linked categories, complementing the dominance of EME in fiscal 2026.

Outlook for industry (fiscal 2025-30P) (Production)



Source: Industry, CRISIL Intelligence
Note: E-Estimated, P-Projected

Split by Domestic Sales and Exports (fiscal 2025-30P)



Source: Industry, CRISIL Intelligence
Note: E-Estimated, P-Projected

The industry is expected to witness steady medium-term growth, with volumes projected to reach 175-180 thousand units by fiscal 2030, implying a CAGR of 4-6% over fiscal 2025 to 2030. After a sharp contraction of 16% in fiscal 2022 due to pandemic-related disruptions and supply chain constraints, the industry rebounded strongly in fiscal 2023 (22%) and fiscal 2024 (26%), supported by robust infrastructure spending and revival in construction activity.

Growth was moderate in fiscal 2025-2026 (3% to 2-4%) due to high base effect, election-led execution

slowdown, and moderation in private capex. However, structural drivers remain intact. Government-led infrastructure pushes across roads, railways, metros, irrigation, and urban development continues to anchor demand. Increased budgetary allocation toward capital expenditure, focus on logistics efficiency, and large-scale projects under national infrastructure programs provide long-term visibility.

Additionally, rising mechanization in construction, replacement demand, equipment financing availability, and growing rental markets support industry resilience. Mining activity, rural infrastructure development, and housing demand are also expected to contribute to steady equipment utilization levels.

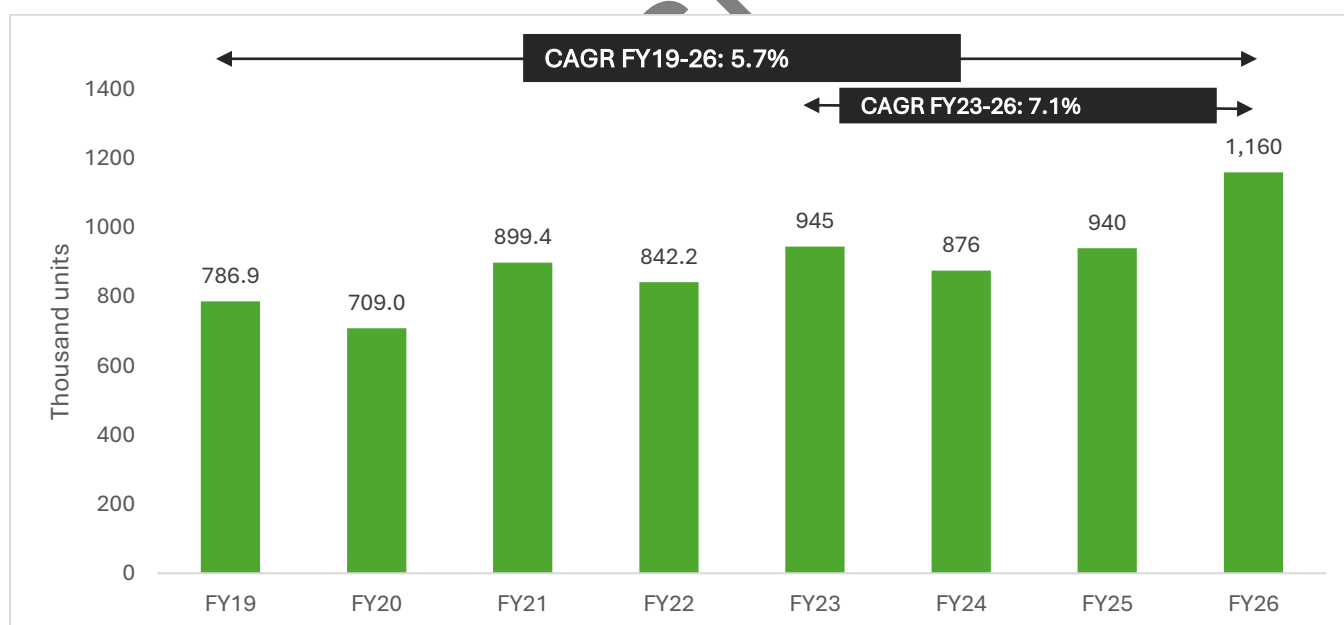
Review and outlook of Indian tractor industry

Review of Indian tractor industry

In fiscal 2022, domestic tractor demand dropped 6.4% on year after growing 26.6% in fiscal 2021. Price hikes by OEMs, higher inventory at dealerships, lower commercial demand, negative farmer sentiment owing to rising cost of cultivation, low fertiliser availability and increase in other expenditure (such as marriages and other social occasions) hampered the demand.

In fiscal 2023, tractor sales grew 12.2% on year to an all-time high of ~945,000 units. Healthy crop prices, sound reservoir levels owing to above-normal monsoon, higher MSPs announced by the government and better rabi acreage, all led to positive farmer sentiment. Healthy festival demand because of various schemes and discounts supported the retail growth momentum. Commercial demand during the fiscal, however, remained rangebound in fiscal 2023 owing to slower retail momentum in eastern states and a complete ban on sandmining.

Domestic tractor industry logged 5.7% CAGR between fiscals 2019 and 2026



Source: TMA, CRISIL Intelligence

In fiscal 2024, domestic tractor sales dropped by 7.4% on year to ~875,724 units, on account of lower reservoir levels and negative farmer sentiments. Uneven rainfall distribution with monsoon being 6% below normal for the season led to slower pick-up in the retail market. Erratic monsoon, lower reservoir levels, decline in rabi acreage contributed towards a 7.4% on-year decline in tractor sales for fiscal 2024.

A large part of domestic tractor sales is driven by replacement demand. The typical holding period for a tractor is 6-9 years. Most of the tractors in the country are replaced within 7-8 years. Of the domestic demand, 50-60% constitute replacement demand.

In fiscal 2025, with an above normal monsoon season aiding farmer sentiments, the domestic tractor sales rose by 7.3% after declining in fiscal 2024. The growth revival was majorly supported by favourable rainfall that boosted kharif crop output and higher reservoir levels aiding rabi crop profitability which further supported sales. Government measures, including increased crop procurement and higher minimum support prices (MSP) for the rabi season, have boosted farmers' cash flow thereby leading to healthy retail momentum.

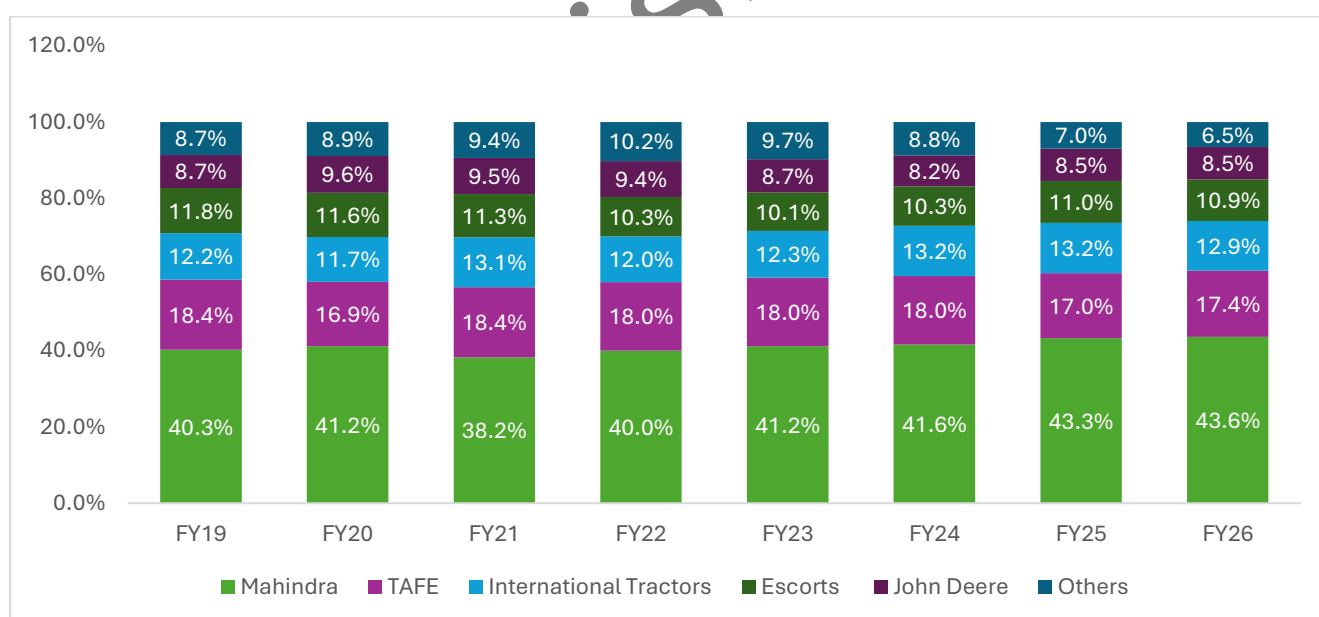
In fiscal 2026, tractor industry grew by 23.4% on year to an all-time high of ~1,160,000 units which was supported by multiple tailwinds. An above-average monsoon, with rainfall 8% above normal as of September 30, 2025, improved farm cashflows and sentiment, aiding tractor purchases. In addition, the GST cut on tractors (12% to 5%), along with continued government financing schemes, has further supported the demand. Higher reservoir storage levels likely aided Rabi prospects, while higher MSPs, stronger Kharif acreage, and expectations of higher government procurement provided incremental support to rural incomes and purchase intent.

Competition

The structure of the domestic tractor industry has remained largely steady over the years. The top five players continue to account for 85-90% of the industry by volume. A strong distribution network, brand recall, captive financiers and diverse product range are critical to maintain market position in the tractor industry.

Mahindra & Mahindra (M&M) dominates the domestic market and continued to lead with 44% market share and Tractors and Farm Equipment Ltd (TAFE) remaining at second with 17% market share as of fiscal 2026. A strong pan-India network reach, strategic location of manufacturing facilities, good brand equity and a comprehensive product range from <20 horsepower (hp) to >50 hp have been the major factors behind M&M's consistent dominance of the industry.

Player-wise domestic market share (volume-wise):



Source: CRISIL Intelligence

Note: Others include players like New Holland India, SAME DEUTZ-FAHR, Captain, VST, Preet, Action-construction etc.

Outlook of Indian tractor industry

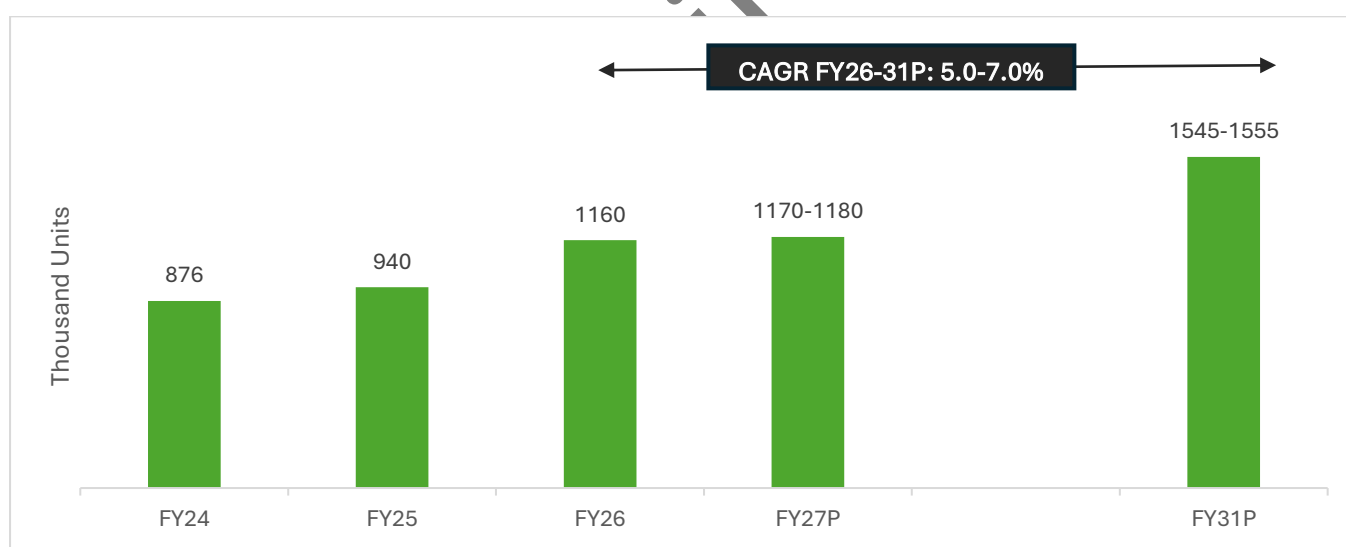
Domestic demand to grow 5-7% over next five years on a high base (fiscals 2026 – 2031P)

CRISIL Intelligence projects domestic tractor sales to expand at 5-7% CAGR during fiscals 2026 to 2031, after factoring in one to two years of erratic monsoon during the period along with healthy sales expected in the remaining years. From fiscal 2020 to 2026, the industry registered a CAGR of 8.6% off the low base of fiscal 2020 and healthy sales numbers in fiscal years 2021 through to 2026.

In fiscal 2026, tractor demand is grew by 23.4% on-year, considering an above average monsoon season with a long-term departure of 8% and stable agricultural conditions supported by replacement demand. The growth was driven by healthy reservoir storage levels, increase in farmers' disposable income, supported by a strong rabi harvest, higher Minimum Support Prices (MSPs), anticipated rise in government crop procurement and healthy replacement demand, further being supported by new GST rates implementation from 22nd September 2026. Favourable rural liquidity, aided by timely payments to farmers and improved credit availability, is also expected to support tractor sales. Additionally, sustained investment in rural infrastructure and mechanization trends may provide further momentum to demand. Tractor demand is expected to register modest growth of 0-2% in fiscal 2027, largely led by stronger demand in H1FY27 aided by the GST rejig. Replacement demand that was deferred in fiscal 2026 is now likely to materialize in fiscal 2027, as GST rationalization has put pressure on pre-owned tractor prices, improving the relative attractiveness of new purchases. El Niño risk remains a key monitorable, with NOAA indicating a 62% probability of El Niño during June–August 2026, which could weigh on farm sentiment if it results in an uneven monsoon. Overall growth, however, is expected to be moderated by the high base of fiscal 2026.

In fiscal 2026, CRISIL Intelligence estimates commercial demand to rise to 17-19% of total tractor demand which can be attributed to an uptick in PMAY and PMGSY expenditures. Furthermore, CRISIL Intelligence continues to monitor updates on the implementation of the TREM V emission norms, which are set to take effect from October 1, 2026. These regulations could influence buying patterns, potentially leading to pre-buying ahead of the deadline as farmers and dealers look to purchase tractors before price increases. However, the final impact will depend on clarity around regulatory timelines, OEM preparedness, and cost implications for end-users.

Tractor industry sales expected to increase 5-7% between fiscals 2026 and 2031P



Note – E: Estimated; P: Projected

Source: CRISIL Intelligence

Growth up to fiscal 2031 will be on the back of low tractor penetration in the country (three tractors per 100-hectare area), government's focus on improving farm incomes through various schemes, promotion of farm mechanisation, and investments to improve rural infrastructure.

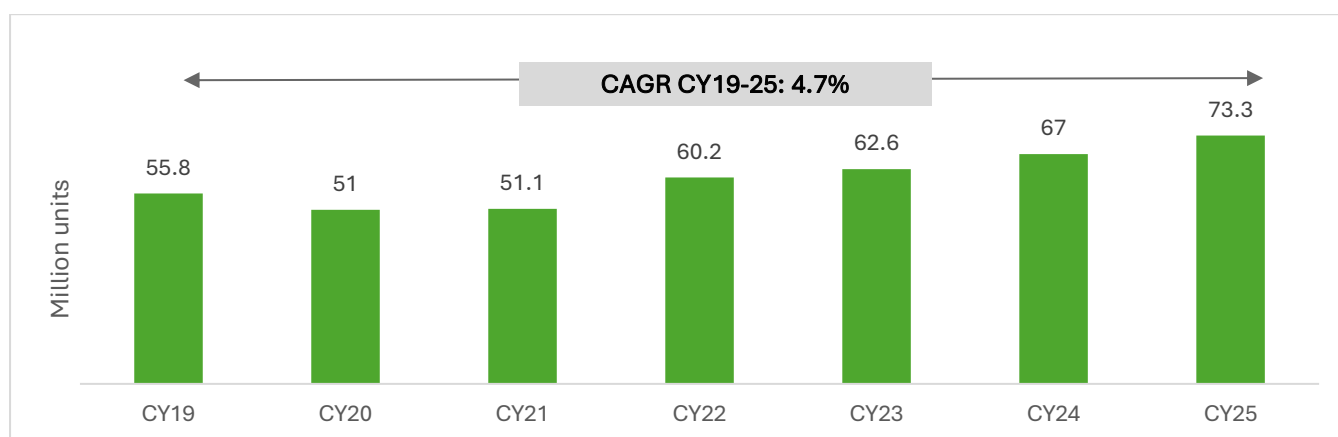
Review and outlook for global two-wheeler industry

The global two-wheeler market is closely linked to broader macroeconomic and geopolitical events. Current issues such as US-China trade tensions, the Russia-Ukraine war, and fluctuating oil prices have impacted global supply chains, commodity prices, and consumer purchasing behavior. In the CY2025 India was the largest 2W (high-speed) market globally and the second largest 3W (L3 and L5) market globally as per Nexdigm analysis.

Review and outlook of the global two-wheeler industry (CY19-CY25)

The global two-wheeler market includes motorcycles, scooters, and mopeds that serve a wide range of mobility needs across urban and rural areas. These vehicles vary in engine capacity, design, and usage. The industry grew at 4.7% CAGR during CY2019 to CY2025 period. The industry witnessed a sharp contraction during the pandemic period amidst the lockdowns, factory closures, supply chain disruptions, and reduced travel. With gradual improvement in the pandemic scenario, normalization in economic activity, resumption in travel, ironing out of supply chain disruptions and supported by the pent-up demand, the industry bounced back and witnessed a healthy 9.4% CAGR growth between CY2021 to CY2025.

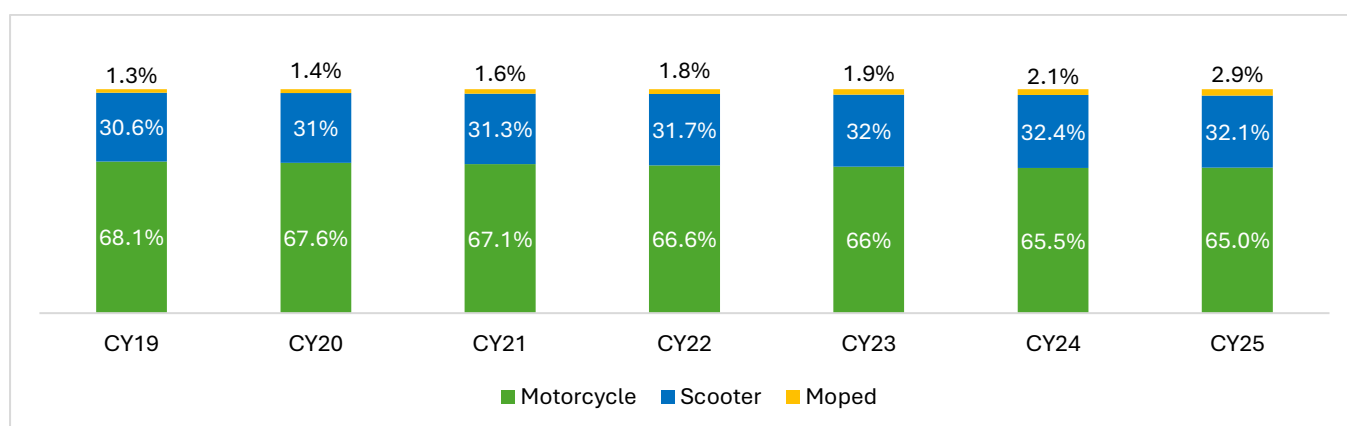
Global two-wheeler industry sales trend (CY19-CY24)



Note: The above two-wheeler market does not include the low-speed vehicles
Source: Nexdigm, Crisil Intelligence

Increasing electrification, which is more prominent in scooters, has aided the growth of scooters segment which clocked a faster growth at 5.3% CAGR compared to motorcycles segment which witnessed 3.8% CAGR growth between CY2019 to CY2025. Globally, motorcycles continued to dominate the industry with 65% share, although, their share dropped from 68.1% in CY2019 to 65% in CY2025. On the other hand, the share of the second largest segment, scooters, expanded during the same period from 30.6% in CY2019 to 32.1% in CY2025.

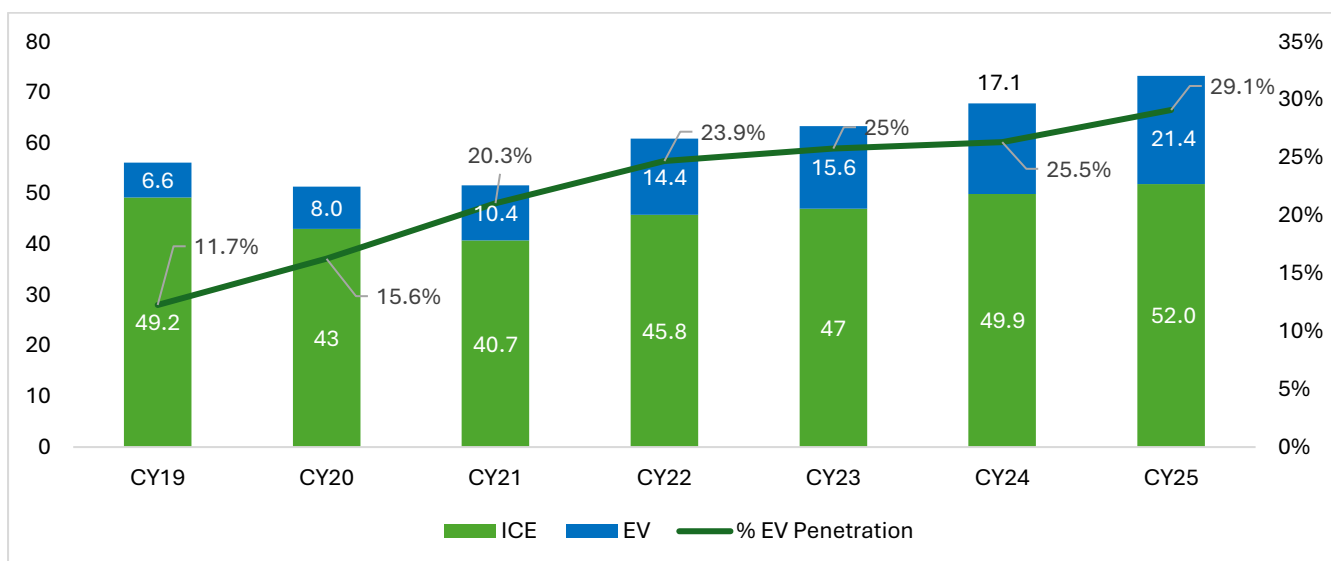
Global two-wheeler industry segmental split



Note: The above two-wheeler data does not include the low-speed vehicles
Source: Nexdigm, Crisil Intelligence

Moreover, the rising electrification provided an additional push to the global two-wheeler demand during the CY 2019 to 2025 period. E 2Ws clocked a sizeable 20.7% CAGR during the same period and reached 21.3 million units by CY2025. With the faster rise in EV sales, the EV penetration increased from 11.7% in CY2019 to 29.1% by CY2025.

Global two-wheeler sales powertrain split

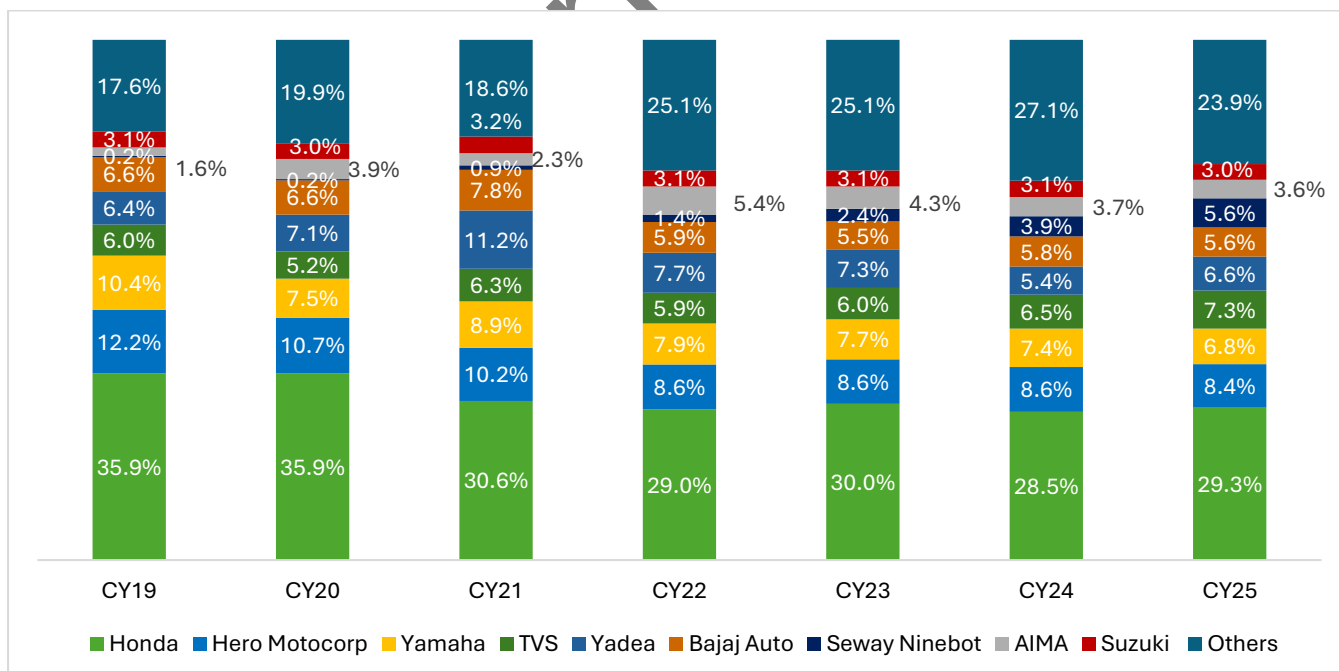


Note: The above two-wheeler data does not include the low-speed vehicles
Source: Nexdigm, Crisil Intelligence

Competitive Landscape

Honda leads the global two-wheelers market, followed by Hero MotoCorp, Yamaha, TVS, Yadea and Bajaj Auto. Together, these six manufacturers account for more than 60% of the global market. Amidst the intensifying competition, especially from the emerging EV players, the share of these 6 players has dropped from ~77.5% in CY2019 to ~63.9% in CY2025.

OEM wise contribution in global 2W sales

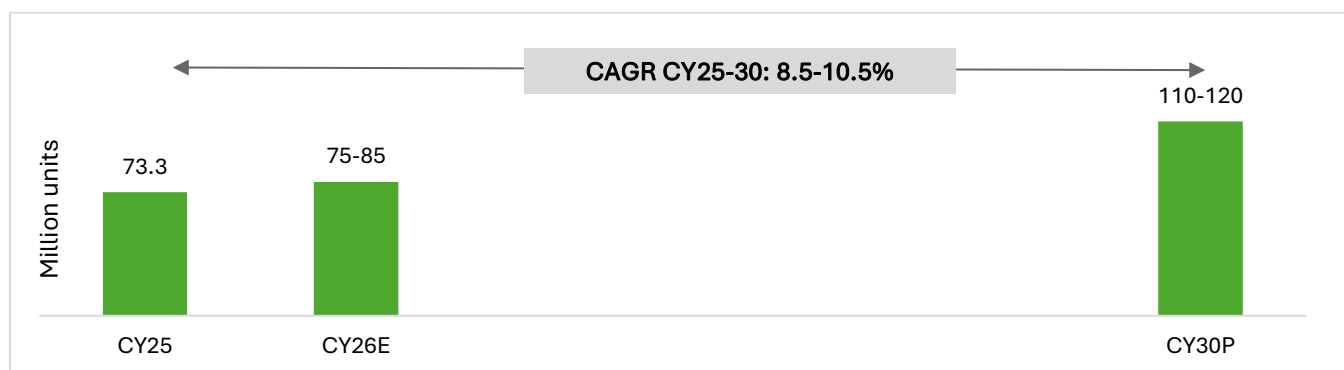


Note: The above two-wheeler data does not include the low-speed vehicles
Others include companies like Kawasaki, Okinawa, Piaggio and other Chinese, European and Japanese players etc. Does not include Skutta and E-Balance Bike sales,
Source: Nexdigm, Crisil Intelligence

Global two-wheeler Industry Outlook CY25-CY30P

The global two-wheeler industry is projected to grow at 8.5-10.5% CAGR to reach 110-120 million units by CY2030. This growth will be led by the increasing two-wheeler sales in India, China and the Southeast Asia. Improvement in economic conditions, rising demand from underlying segments like e-commerce, ride hailing coupled with increased traction for EVs to support this demand growth.

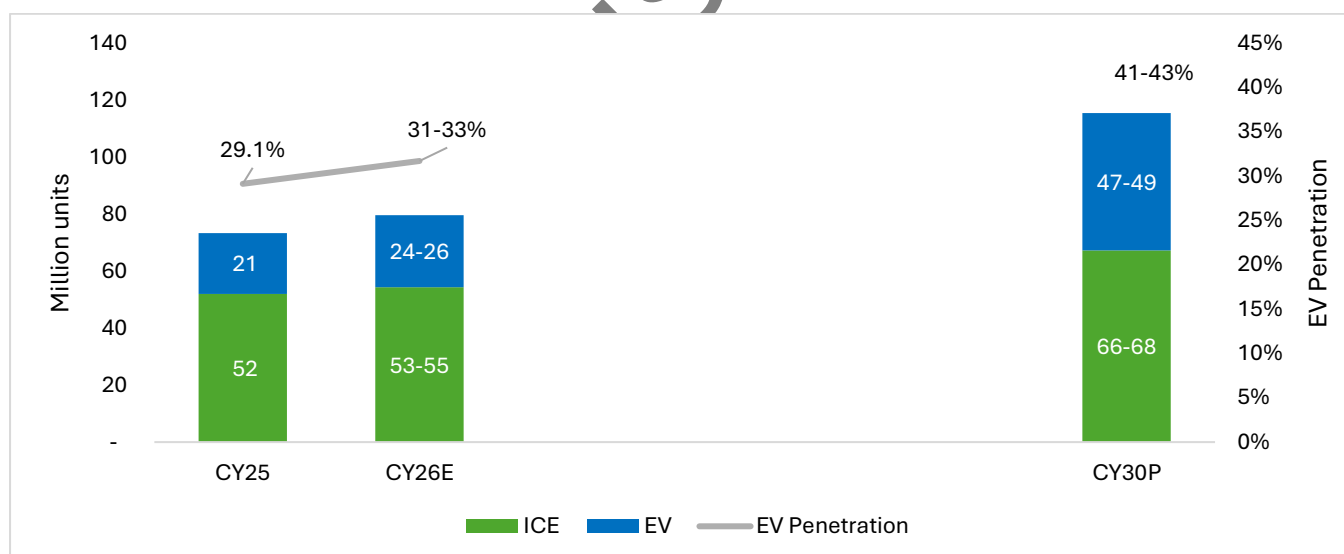
Global two-wheeler industry sales outlook



Note: The above two-wheeler data does not include the low-speed vehicles, E: Estimated, P: Projected
Source: Nexdigm, Crisil Intelligence

EVs are projected to clock a much faster growth at 16-18% CAGR while off the larger base, the ICE vehicle sales are expected to grow at a relatively slower pace of 4-6% CAGR between CY2025 TO CY2030. In turn, globally, the EV penetration is expected to reach 41-43% levels by CY2030 from the 29.1% penetration levels witnessed in CY2025.

Global two-wheeler sales powertrain split outlook



Note: The above two-wheeler data does not include the low-speed vehicles.
E: Estimated, P: Projected
Source: Nexdigm, Crisil Intelligence

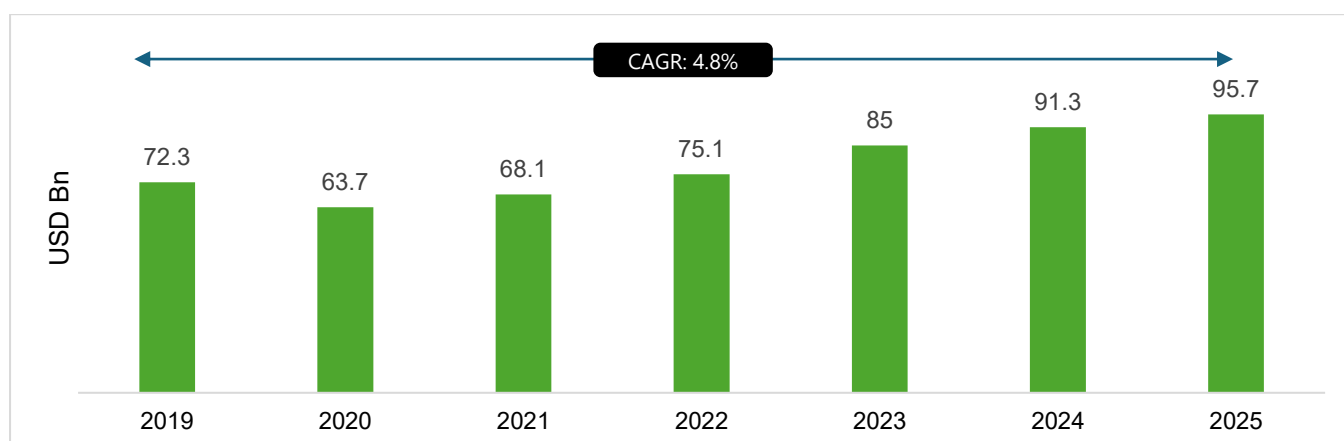
By 2030, India is expected to remain the global leader in the two-wheeler market, followed by China and other Southeast Asian countries such as Thailand, Indonesia, and the Philippines. These markets will continue to dominate due to their large populations, growing middle class, and heavy reliance on two-wheelers for daily mobility.

Review and outlook of the global wiring harness industry (CY19-30)

Review of the current market size (CY24)

The global wire harness market is witnessing sustained growth, underpinned by rising population, increasing industrial output, and greater electronic integration across sectors. With the global population surpassing 8 Bn in 2024 and expanding middle-class consumption, the demand for vehicles, appliances, and connected devices has grown exponentially. The number of vehicles per population continues to rise, particularly in emerging economies such as India, Vietnam, and Mexico, where rapid urbanization and improved affordability are driving large-scale motorization. Simultaneously, electrification and digitalization trends across automotive, consumer electronics, aerospace, and industrial equipment are substantially increasing the volume and complexity of wire harness systems.

Market Size of Global Wire Harness Market



Definition: Global Wire Harness Market represents the total revenue generated from the sale of wire harnesses by manufacturers to OEMs engaged in the production of automobiles, electronics, industrial equipment, and other applications globally. It reflects manufacture to OEM sales and does not include aftermarket sales

Source: Nexdigm

	2020	2021	2022	2023	2024	2025
YoY change	-11.9%	6.9%	10.3%	13.2%	7.4%	4.8%

The global wire harness market experienced a period of gradual transformation between 2019 and 2023, reflecting the combined impact of production realignments, evolving vehicle technologies, and changing regional manufacturing dynamics. Valued at around USD 72.3 Bn in 2019, the market contracted sharply by 11.8% in 2020 to USD 63.7 Bn as pandemic-led shutdowns and semiconductor shortages disrupted global automotive supply chains. Recovery began in 2021, with a 6.8% increase to USD 68.1 Bn, driven by renewed OEM production and demand for personal mobility. In 2022, the market expanded further by 10.4% to USD 75.1 Bn, supported by rising vehicle output driven by the demand for mild and strong hybrids and stronger adoption of electric mobility platforms. By 2023, global demand surged 13.2% to reach nearly USD 85.0 Bn, signaling a full rebound and laying the foundation for sustained growth. This surge was propelled by the expanding penetration of electric and hybrid vehicles, which require high-voltage and high voltage wiring systems, thereby elevating the overall harness value per vehicle. The automotive sector remained the principal consumer, complemented by stable contributions from industrial, aerospace, and telecom segments. With the increase in the vehicle population and trend of electrification has led to an increase in the global wire harness market, which stood at USD 95.7 Bn in the year 2025.

Wiring harness content across vehicle segments

Segment	Wiring Harness Complexity	Content Per Vehicle/ Unit
2W ICE	Medium	Low
2W EV	Medium	Medium
3W ICE	Low	Medium
3W EV	Medium	Medium
PV ICE	High	High
PV EV	High	High
CV ICE	Low	Medium
CV EV	High	High

Segment	Wiring Harness Complexity	Content Per Vehicle/ Unit
Off Highway	Medium	Medium

Industry trends

The automotive wiring harness industry is undergoing a significant transformation, driven by the increasing adoption of new energy vehicles (NEVs), autonomous driving, and advanced driver-assistance systems (ADAS). Key trends are shaping the industry: the polarization between high-voltage (HV) and low-voltage (LV) harnesses, transition to modular and zonal electrical architectures, transition to communicating signal and high-speed data harnesses, rising EMC, thermal, and technical validation requirements, and digitalization and smart harness integration.

Polarization between High Voltage (HV) and Low-Voltage (LV) Harnesses

The growing demand for NEVs has led to an increase in the use of HV harnesses, which require thicker cross-sections, high-temperature insulation, advanced shielding, and reinforced protective conduits to ensure safety and performance at voltages exceeding 600V. As a result, according to Nexdigm the average cost of HV harnesses per passenger vehicle has increased to between USD 600 to 700, approximately 2 times higher than traditional LV harnesses, which average USD 300 to 400 per vehicle globally. The global HV harness market is expected to grow at a CAGR of over 12% through 2030, outpacing total vehicle growth.

Transition to Communicating Signal and High-Speed Data Harnesses

The industry is also witnessing a shift from traditional CAN/LIN bus systems to high-speed Ethernet-based communication topologies, driven by the increasing demand for bandwidth-intensive applications such as ADAS, autonomous driving, and infotainment systems. This has led to the adoption of single-pair Ethernet (SPE) and flexible flat cables (FFC/FPC) for compact, high-density signal distribution, requiring tight impedance control, crosstalk suppression, and high signal integrity.

Rising EMC, Thermal, and Technical Validation Requirements

The convergence of power and signal lines has made electromagnetic compatibility (EMC) a critical design constraint, with harnesses now required to include shielded braided layers, drain wires, metallized conduits, and grounded aluminum tubes to prevent interference between power and data circuits. The industry is also witnessing a shift towards stricter thermal class ratings, dielectric breakdown thresholds, and environmental sealing performance, as specified by the ISO 19642 and ISO 6722 standards for automotive cables.

Modular and Zonal Electrical Architectures

Original equipment manufacturers (OEMs) are transitioning from traditional centralized wiring systems to zonal architectures, which consolidate control functions into localized modules connected via data and power. This transition is expected to reduce harness length by up to 20 to 25%, simplify assembly, and enable flexible platform reuse. Though the length decreases, zonal harnesses add more value and hence margin often improves. Leading OEMs such as Tesla, BMW, and Volkswagen are implementing zonal harness strategies in their next-generation EV platforms.

Digitalization and Smart Harness Integration

The industry is also witnessing a shift towards digitalization, with harness suppliers deploying AI-driven layout optimization, digital twin validation, and automated 3D routing simulation to manage increasing system complexity. Embedded sensors and smart connectors capable of monitoring voltage drop, temperature, and continuity in real-time are emerging as differentiators in EV, enabling predictive maintenance and reducing prototype cycles.

These trends and developments are expected to shape the future of the automotive wiring harness industry, with global suppliers well-positioned to capitalize on the growing demand for HV harnesses, high-speed data harnesses, and zonal electrical architectures.

Growth drivers

Rapid Electrification of the Vehicle Fleet

The rapid adoption of new energy vehicles (NEVs) has emerged as a significant growth driver for the global wire harness market. NEVs require a substantially higher number of wiring harnesses due to the integration of advanced electrical and electronic systems, including high-voltage power transmission, battery management systems (BMS), energy recovery systems, and intelligent control units (ECUs). The increasing use of lightweight and high-temperature-resistant materials in NEV harnesses supports improved vehicle range and performance. As NEV penetration accelerates worldwide, the demand for high-voltage and data transmission harnesses is expected to rise sharply across the global automotive supply chain.

The ongoing electrification of passenger and commercial vehicles remains the most powerful long-term demand catalyst for the wire harness market. Every battery electric vehicle (BEV) or plug-in hybrid adds incremental harness value, particularly for high-voltage cabling, battery management harnesses, and thermal control lines, expanding the addressable market by up to 2 to 3 times compared to conventional internal combustion engine (ICE) models. Leading suppliers are advancing high-voltage harness designs to accommodate increasing motor power in hybrids and full EVs, while achieving weight reduction and improved current capacity.

Shift towards premiumization in the global automotive landscape

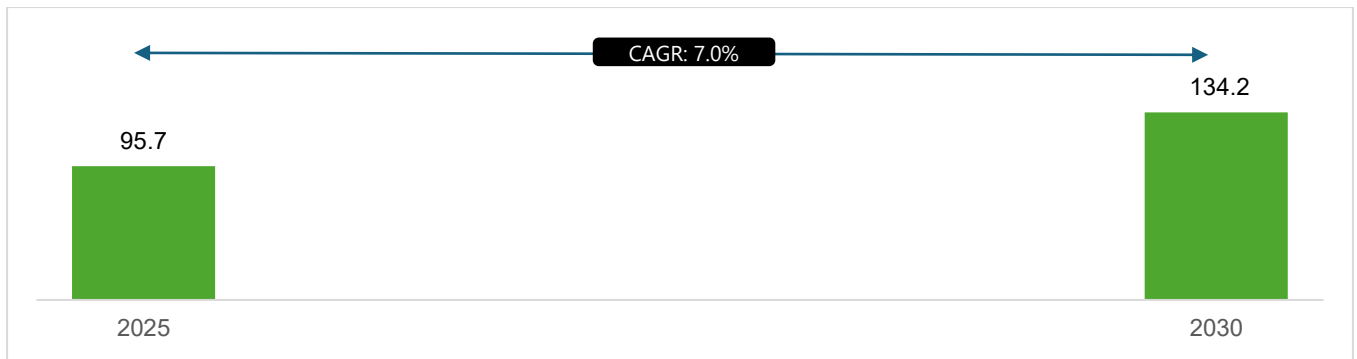
- **Rising Electronic Content and Data-Signal Density:** Global OEM platforms now embed a significantly higher number of sensors, cameras, radar, and domain controllers per vehicle, multiplying signal pathways and shielding requirements. The shift toward advanced driver-assistance systems (ADAS), connected infotainment, and autonomous features is driving the demand for high-speed data transmission harnesses. Suppliers are commercializing Ethernet-based harnesses that support multi-gigabit in-vehicle data transfer, reinforcing the link between electronic content growth and harness value-add.
- **Emergence of High-Voltage and Dual-Voltage Architectures:** Next-generation BEVs are adopting dual-voltage systems (12 V + 400 V/800 V) to power both propulsion and onboard electronics, demanding precision-engineered high-voltage harnesses with advanced insulation, shielding, and electromagnetic-compatibility (EMC) compliance. Manufacturers such as Aptiv and Leoni have developed complete HV harness families with high thermal endurance, liquid-cooled conduits, and improved Equated Monthly Installment performance, aligning with ISO 6722 and ISO 19642 cable standards.

Transition to Zonal and Modular Electrical Architectures

The automotive industry is gradually shifting from domain-based to zonal architecture, consolidating control units and reducing cable length, allowing shorter harness runs, fewer connectors, and easier modular assembly, lowering weight and improving serviceability. Suppliers are capturing early opportunities in EV and ADAS-intensive platforms with flexible modular systems, positioning themselves for growth in the evolving automotive landscape.

Outlook (CY25-30)

The global wire harness market is anticipated to experience a significant surge in growth, with a projected Compound Annual Growth Rate (CAGR) of approximately 7.0% between 2024 and 2030. The market is expected to expand from \$91.3 billion in 2024 to \$136.8 billion by 2030, driven by the increasing adoption of electric and hybrid vehicles, which will lead to a higher demand for high-voltage harness systems. Additionally, the growing use of advanced technologies such as ADAS, infotainment, and connectivity features will also contribute to the market's growth. The industry's continued focus on innovation, including the development of lightweight materials, automation, and modular harness architectures, will further improve manufacturing efficiency and product performance, setting the stage for sustained growth over the next decade.



Definition: Global Wire Harness Market represents the total revenue generated from the sale of wire harnesses by manufacturers to OEMs engaged in the production of automobiles, electronics, industrial equipment, and other applications globally. It reflects manufacturer to OEM sales and does not include aftermarket sales.

Source: Nexdigm

Review and outlook of the domestic electrical and electronics systems market

An Electrical and Electronics (E&E) company is an enterprise involved in the design, manufacture, and supply of electronic systems, components, and equipment for industrial, automotive, infrastructure, and consumer applications. The range of E&E systems can include motors, cables, harnesses, control panels/systems, switches, circuit boards, sensors, and other related systems used for generating, transmitting, and utilizing electrical power. The two-wheeler and three-wheeler markets have grown rapidly, driven by demand for affordable, efficient transport. Traditionally dominated by mechanical systems, these segments are now adopting advanced electronic and electrical products to improve performance, safety, and efficiency.

Key Drivers:

- Emission regulations
- Safety requirements
- Performance needs
- Connected mobility
- Electrification

Electrification further accelerates this trend, as EVs rely heavily on electronic systems for propulsion, battery management, and connectivity. Premium models increasingly feature telematics, touch interfaces, and advanced safety features like Anti-lock Braking Systems (ABS) etc. This shift toward electrification and connected mobility will continue to boost demand for electronics in 2W and 3W segments.

Premiumization leading to the content for electrical and electronics systems in modern vehicles

Historically, domestic vehicle buyers have prioritized affordability, with fuel efficiency and initial purchase cost being the primary considerations. A notable increase in awareness and preference for factors beyond fuel efficiency and cost is observed among Indian consumers. Driving experience, safety, advanced features, aesthetics, and comfort have become essential considerations, shift is attributed to the growing exposure of Indian consumers to global markets and their increasing expectations for a superior driving experience.

As a result, the Indian market is witnessing a shift towards premium vehicles, with consumers opting for mid-range or high-end models that offer enhanced comfort, seamless connectivity, and improved performance. The traditional budget-friendly models are being replaced by feature-rich models. The market is shifting towards premium vehicles with improved comfort, accessories, and aesthetics, including value-enhancing features such as USB C-type chargers, LED flashers, advanced lighting and these features require dedicated power and signal distribution and connectors, which increase the complexity and value of wiring harness products. These features require dedicated power and signal distribution and connectors, which increase the complexity and value of electrical & electronics (E&E) products.

The demand for advanced technologies, high-performance products, and electronic components is expected to increase, driving the market for content per vehicle (CPV) of electrical and electronics

systems. Automation and safety upgrades for 2W and 3W vehicles such as ABS, cruise control and Electronic Fuel Injection (EFI) require increasing sensors and controller content, including lean-angle sensors and ABS-related sensor suites, which increase the complexity and value of the products.

Industry trends and drivers

The Indian automotive market is undergoing a significant transformation, driven by the adoption of ECUs, regulatory-driven safety and emission upgrades, and the integration of advanced sensor technologies. This trend is shaped by government mandates, evolving consumer expectations, and the structural shift towards electrification and connectivity in mobility. As a result, the demand for automotive sensors and controllers is experiencing robust growth, creating opportunities and driving innovation across various mobility segments.

The push towards electrification, supported by initiatives such as FAME and PM E-DRIVE, has resulted in strong adoption of electric vehicles across segments. Electrification increases the need for sensors in battery management, drive control, energy storage system monitoring, and safety compliance. Connected mobility, powered by telematics and integrated sensors (GPS modules, accelerometers, gyroscopes), is becoming central to logistics, driver behavior monitoring, and predictive maintenance. Additionally, the explosive growth in e-commerce and last-mile delivery has concentrated telematics and sensor and controller adoption in two wheelers and three-wheelers, especially EVs.

Overview of Domestic Sensors & Controllers Market

Overview

Sensors play a critical role in modern two-wheelers and three-wheelers, supporting a wide range of functions from safety and vehicle control to emissions monitoring and performance optimization. As vehicle technology advances and regulations tighten, the integration of diverse sensor systems has become fundamental for meeting both commercial and regulatory demands in the automotive sector. Automotive sensors act as the sensory interface for a vehicle's control units, providing essential real-time data on parameters such as temperature, pressure, position, and speed. Common sensor categories deployed in two-wheelers and three-wheelers include engine management sensors, safety-related sensors, environmental sensors, and auxiliary/smart feature sensors. Some of the key players in sensors and controllers' market are Dhoot Transmission, Uno Minda, Denso, Varroc and Spark Minda.

ABS Sensor

ABS (Anti-lock Braking Systems) sensors, commonly referred to as wheel speed sensors, are a crucial component in modern automotive braking systems, playing a vital role in vehicle safety. The regulatory adoption of ABS across vehicle segments (PV and 2W above 125 cc) has been instrumental in emphasizing their importance. ABS sensors measure the rotational speed of each wheel and transmit this data to the ABS control module, which modulates brake pressure to prevent wheel lock during emergency braking, thereby maintaining steering control, stability, and vehicle safety, while preventing skidding.

The implementation of mandatory ABS for two-wheelers above 125 cc, as per the Ministry of Road Transport and Highways (MoRTH) regulations, which came into effect in April 2019, has propelled local demand for ABS systems. Furthermore, in June 2025, MoRTH published draft amendments to the Central Motor Vehicle Rules (CMVR), mandating that all two-wheelers manufactured on or after January 1, 2026, must be fitted with ABS. Additionally, India's growing electric vehicle (EV) sector is accelerating the adoption of ABS sensors, as EVs require precise wheel speed sensing for regenerative braking systems. As a result, the demand for ABS sensors in India is expected to continue to rise, driven by regulatory requirements, growing vehicle production, and the increasing popularity of electric vehicles.

Lean angle sensor

Lean angle sensors are essential components in modern two-wheelers, playing a crucial role in enhancing vehicle safety and stability during cornering and dynamic riding scenarios. These sensors measure the tilt or lean angle of the motorcycle relative to the vertical axis, providing critical data to electronic control units (ECUs) for systems such as ABS, Traction Control System (TCS), Electronic

Stability Control (ESC), and Electronic Fuel Injection (EFI). The sensor data enables these systems to operate efficiently by adjusting braking force or engine torque based on the lean angle.

In India, lean angle sensors are a critical component integral to modern motorcycle safety and performance enhancement systems. The country is witnessing an increasing integration of lean angle sensors and 6-axis IMUs in two-wheelers, driven by consumer demand for safer vehicles and growing adoption of advanced safety systems.

Temperature sensor

Temperature sensors play a vital role in the operation and thermal safety of two- and three-wheelers, ensuring efficient combustion, prolonged component life, and regulatory compliance with Bharat Stage (BS 6) emission norms. These sensors are an integral part of the engine management system, monitoring critical parameters to maintain optimal performance and fuel efficiency.

In conventional ICE vehicles, temperature sensors monitor parameters such as engine coolant, lubricating oil, and intake-air temperature. This data is used to maintain optimal performance, prevent overheating, and ensure regulatory compliance. In electric two- and three-wheelers, temperature sensors monitor motor winding and battery pack temperatures, safeguarding them against overheating and thermal-runaway conditions.

In India's climate-intensive environment, temperature sensors are indispensable for ensuring the reliability, emission control, and safety of two- and three-wheelers. As the Indian automotive industry continues to evolve, the importance of temperature sensors will only continue to grow.

Side stand sensor

The side stand sensor is a critical safety component integrated into modern two-wheeler designs in India, playing a vital role in preventing accidents that may occur when the side stand is engaged while riding. This sensor detects the physical position of the motorcycle's side stand and communicates this information to the vehicle's Electronic Control unit (ECU)/engine controller/engine control ECU. If the stand is down, the sensor sends a signal that disables the engine ignition or cuts power to the starter relay, thereby preventing the motorcycle from starting or moving forward. This eliminates the risk of the stand scraping the ground or destabilizing the rider during acceleration, ensuring a safer riding experience.

The importance of the side stand sensor in two-wheeler functional safety architecture will continue to grow. The integration of this sensor is expected to become a standard feature in the Indian two-wheeler market.

Gear position sensor

The gear position sensor for two-wheelers is a pivotal electronic component that detects and communicates the current gear engaged by the rider to the vehicle's ECU or dashboard display. This sensor plays an essential role in optimizing riding convenience, enhancing fuel efficiency, and supporting emission control by enabling precise engine management. The primary function of the gear position sensor is to accurately monitor the position of the gear lever or the rotation angle of the gear shift drum and translate this mechanical movement into an electrical signal.

By informing the rider and vehicle ECU about gear status, the sensor assists in:

- Facilitating smoother gear shifts
- Preventing gear mismatch and engine lugging
- Improving fuel economy through optimized engine tuning
- Providing real-time gear position display on dashboards

Oxygen sensor

The oxygen sensor, also known as the lambda sensor, is a crucial emission control component in two-wheelers in India. It monitors the oxygen content in the exhaust gases and provides real-time feedback to the vehicle's ECU to optimize the air-fuel mixture for efficient combustion. This sensor is instrumental in achieving compliance with BS VI emission norms, improving fuel efficiency, and minimizing harmful exhaust emissions. By maintaining an ideal mixture, the oxygen sensor helps reduce hydrocarbon (HC), carbon monoxide (CO), and nitrogen oxide (NOx) emissions and improve mileage. It also enables better throttle response and reduces engine wear.

The sensor connects electrically to the ECU through the harness and is paired with the catalytic converter to meet emission standards.

Tyre Pressure Monitoring System (TPMS)

TPMS for two-wheelers is an advanced safety and maintenance technology designed to continuously monitor the air pressure inside tyres and provide real-time alerts to the rider. With the increasing emphasis on road safety, fuel efficiency, and tyre longevity, TPMS adoption is emerging in two-wheelers, especially in premium and performance segments. TPMS aims to ensure tyres maintain optimal inflation pressure by detecting underinflation or overinflation conditions that could compromise vehicle handling and safety by transmitting pressure data wirelessly to a receiver module or the vehicle's dashboard unit for instant rider notification.

TPMS is increasingly being installed on premium motorcycles and scooters in India. Bluetooth-enabled TPMS allow seamless pairing with smartphones through dedicated apps for real-time insights and historical logging. TPMS in two-wheelers represent a significant advancement in rider safety, operational efficiency, and tyre maintenance in India's complex riding environment.

24V flasher

A 24-volt flasher unit is an essential electronic device used in commercial vehicles (CVs such as trucks, buses, and trailers) to control the blinking of turn indicators and hazard warning lights. It ensures consistent flash frequency, and high visibility.

LED flasher

The LED flasher relay for two-wheelers is an advanced electronic switching device designed to control the blinking operation of LED turn indicators and hazard lights. It replaces the traditional thermal or electromechanical flasher used with halogen bulbs, offering precise flash frequency control, load insensitivity, and compatibility with low-current LED systems.

Diode assembly

A diode assembly in two-wheelers and three-wheelers is a compact electronic unit comprising one or more semiconductor diodes arranged to control current direction, protect circuits, and ensure stable electrical operation. This assembly plays a critical role in preventing reverse current flow, enabling AC–DC rectification, and managing isolated electrical sub-circuits such as indicator lights, charging systems, and self-start circuits.

Industry trends and drivers

The Indian automotive market is undergoing a significant transformation, driven by the adoption of ECUs, regulatory-driven safety and emission upgrades, and the integration of advanced sensor technologies. This trend is shaped by government mandates, evolving consumer expectations, and the structural shift towards electrification and connectivity in mobility. As a result, the demand for automotive sensors and controllers is experiencing robust growth, creating opportunities and driving innovation across various mobility segments.

Transition to ECU-Based Controls

The transition to electronic control systems (ECU-based controls) is a notable trend in India's automotive industry, particularly in the two-wheeler and three-wheeler segments. ECUs are now being used for engine management, brake systems (ABS), telematics, and connectivity features, supporting the shift from mechanical controls to sensor-managed electronic architectures.

ICE vehicles primarily use ECUs for engine transmission and basic safety management. However, post-BS VI, multi-functional ECUs also support fuel efficiency, emission levels, and basic entry-level telematics. For example, the introduction of BS VI has mandated the use of EFI, thereby driving the market for EFI ECUs. Also, On-board diagnostics (OBD II) necessitates the use of various sensors including oxygen and temperature sensors, which in turn necessitates the need for engine control ECUs in the vehicle. In contrast, EVs require a broader and more complex array of ECUs for battery management systems (BMS), motor controllers, on-board chargers, communication modules, and infotainment/connectivity ECUs. Electrified vehicles demand highly customizable ECUs to manage current, thermal loads, and drive patterns.

Regulatory drivers

Regulatory developments are also driving the adoption of sensors and controllers in 2W and 3W segments. Rising emission norms and safety requirements have made advanced sensors as compulsory components in the automotive industry. Furthermore, the Ministry of Road Transport and Highways (MoRTH) has mandated ABS for all two-wheelers manufactured from January 1, 2026, which was previously only applicable to two-wheelers above 125cc. This has directly increased the demand for ABS sensor modules.

Advanced Safety Features

Advanced safety features are also becoming increasingly important, with sensor-driven features steadily becoming standard in mass-market vehicles. ABS, electronic braking distribution, and traction control are now core features for new two-wheelers, as mandated by MoRTH. Tire Pressure Monitoring Systems (TPMS) and early-stage Advanced Driver Assistance Systems (ADAS) pilots are contributing to market growth for additional sensor arrays. Telematics deployment in vehicles represents emerging areas for expanded sensor integration, promoting pedestrian safety and emergency access.

Consumer Awareness and Comfort

Consumer awareness and comfort are driving OEMs to expand functionality through sensor-driven adaptive systems, such as personalized suspension, rider data analysis, and anti-theft modules. As consumers increasingly value smart features, connectivity, and enhanced comfort, the demand for automotive sensors and controllers is expected to continue growing, driving innovation and growth in the Indian automotive market.

Review and outlook of domestic sensors and controllers

Segment	Component	Market	Channel
2W ICE	ABS Wheel Speed Sensor, Lean Angle Sensor, Temperature Sensor, Side stand IC, LED Flasher, Diode Assembly, Gear Position Sensor, Oxygen Sensor, TPMS	Domestic	OE
3W ICE	Temperature Sensor, Diode Assembly	Domestic	OE
2W EV	ABS Wheel Speed Sensor, Side stand IC, LED Flasher, TPMS	Domestic	OE
CV	24V Flasher	Domestic	OE

Sensors and controllers market size (fiscals 2026-31P)



Note: E: Estimated, P: Projected
Source: CRISIL Intelligence

- The sensors and controllers' market is estimated to be worth INR 32,036 million in fiscal 2026. It is expected to grow at a CAGR of 17-19% between fiscal 2026 and fiscal 2031, reaching INR 73,000-75,000 million.
- The rising popularity of LED-based lighting systems in vehicles is also expected to boost the market for sensors and controllers. These systems require the use of LED flashers, which are an essential component in ensuring the safe and efficient operation of LED lighting. The increasing use of LED-based lighting systems also mandates the use of LED flashers.
- Automation and safety: Automation and safety upgrades for 2Ws, such as ABS and cruise control require increasing sensors and controller content, including lean-angle sensors and ABS-related sensor suites, which increase the complexity and value of our products.

Overview of Domestic Electric Vehicle Products Market

Overview

The rapid shift toward sustainable mobility has accelerated the adoption of electric two-wheelers and three-wheelers in India and other global markets. Core subsystems include traction motors, battery, power electronics (DC-DC converter) and Electric Vehicle Supply Equipment (EVSE). Together, these components form the backbone of the vehicle's electrical architecture, enabling seamless energy flow from grid to motor. Each of these elements plays a critical role in enhancing energy efficiency, and vehicle reliability. Some of the key players in electric vehicle products market are Dhoot Transmission, Exicom, Uno Minda, Sona Comstar, Varroc, Delta Electronics, Exide and Amara Raja among others.

Electric Vehicle Supply Equipment (EVSE)

Electric Vehicle Supply Equipment (EVSE), also known as an EV charger, is a crucial component of the Electric Vehicle Charging Infrastructure (EVCI)/home charging that supplies electrical energy for recharging the battery of EVs. EVSE manufacturers cater to the demand for EV chargers by supplying OEMs with charging equipment for retail EV consumers and charge point operators who install charging stations in public places. Typically, EVSE for two-wheelers and three-wheelers consists of a power supply unit, charging connector/plug, communication interface, metering system, control system, and protective enclosures.

EV charging involves the supply of direct current (DC) to the battery. Since electricity distribution systems supply alternating current (AC) power, a converter is required to provide DC power to the battery. There are two types of EVSE based on the type of current supplied:

- AC EVSE: In this type, the AC power is delivered to the onboard charger of the EV, which converts it to DC power.
- DC EVSE: This type of charger converts the power externally and supplies DC power directly to the battery, by passing the onboard charger.

EV chargers can be classified into different levels based on their charging speed:

- Level 1 Charging: This is a slow type of charging for EVs, where the charger plugs directly into a standard 230-volt AC outlet. The average power output of an L1 charger is less than 3.3 kW. L1 charging primarily occurs in residential settings, and there are very few L1 chargers built for public use.
- Level 2 Charging: This is the most prevalent type of charger, operating at 208-240 volts and outputting anywhere from 7 kW to 22 kW of AC power. L2 charging provides a faster charging speed compared to L1, allowing for quicker replenishment of the EV's battery. L2 chargers can be found in residential townships, public locations such as parking garages, oil marketing company (OMC) retail outlets, grocery stores, malls, hotels, and workplaces.
- Level 3 Charging: Also known as DC fast charging or rapid charging, this is the fastest charging option for EVs. L3 chargers operate at higher voltages and currents, allowing significantly faster charging times. They can provide a substantial amount of range in a short period, typically

ranging from 30 minutes to an hour for an 80% charge. L3 chargers are commonly found at public charging stations along highways, rest areas, depots, and other high-traffic locations.

Off-board chargers play a vital role in charging infrastructure of electric vehicles. They are responsible for charging the vehicle's lithium-ion battery and are external charging units located outside the vehicle. Off-board chargers supply regulated DC power and are used for charging using standard power outlets. Unlike on-board chargers, which reside within the vehicle and utilize AC power, off-board chargers facilitate faster and higher power charging.

Battery

Batteries are crucial components in the EV drivetrain that stores energy necessary to power the EVs. The type, capacity, and efficiency of the battery significantly influence the range, and performance of EVs. The EVs in India use lithium-ion batteries due to their high energy density, lightweight construction, and longer lifespan compared to traditional lead-acid batteries. Different lithium-ion battery chemistries, such as Nickel Manganese Cobalt (NMC), Nickel Cobalt Aluminium (NCA), and Lithium Iron Phosphate (LFP), are used by OEMs. Each chemistry has its own merits and demerits related to energy density, thermal stability, and cost.

The battery pack's voltage is determined by the arrangement of individual cells. Battery packs are typically configured using a combination of series and parallel arrangements of individual battery cells to achieve the desired voltage and capacity. Cells are often grouped into modules, and these modules are then assembled into packs for easier maintenance and replacement. Thermal management system and BMS are part of the battery packs. The design of pack and cooling strategy of battery enables to deliver required performance to Indian drive cycles and wide operating temperatures. Major suppliers are Exide, Amara Raja, Ola, Log9 Materials, Lucas TVS, and Battrix.

DC-DC Converter

DC-DC converters are essential power electronic components in electric two-wheelers and three-wheelers, responsible for transforming high-voltage DC supplied by the main battery pack to lower-voltage DC required for auxiliary devices and control systems. This step-down conversion ensures reliable operation of lighting, displays, controllers, and other electronics, while supporting vehicle safety and functionality. A DC-to-DC converter is a type of power converter that changes the voltage level of a DC power source. It can be either unidirectional, transferring power in one direction, or bidirectional, transferring power in both directions. A DC-DC converter serves as a mediator between the high-voltage battery and the low-voltage systems in a vehicle.

Industry trends and drivers

Evolving battery chemistries

Lithium-ion battery is the most critical component of the EV powertrain that stores and distributes energy necessary for the operation of a vehicle along with powering other systems. Battery chemistry plays a key role in delivering optimal performance in automotive applications. India compared to developed markets, has a different climate, terrain and driving conditions and hence demands a chemistry that is best in terms of reliability, safety, and performance. Further, an ideal battery chemistry should offer higher energy density, long cycle life, and fast charging capability. The five large-scale commercialized chemistries are LCO, LMO, LFP, NMC, and NCA. The most common versions of lithium-ion batteries that have proven to be the most suitable and viable for India are LFP, NMC and NCA.

Li-ion batteries currently dominate the automotive industry. Demand for these batteries is growing at a faster pace as there is a growing adoption of EVs. Even though chemistries like NCA, NMC and LFP have received wide acceptance in the industry, companies are experimenting with unique designs and technologies that could lower cost, improve energy density, quicker charging periods and hence the range.

Growth of electric vehicles

EVs are gaining global attention amidst the need to curb pollution. In India, too, EVs are gaining popularity, as the government is extending support through initiatives such as the Faster Adoption and Manufacturing of Hybrid and Electric vehicles (FAME II) scheme, the EMPS subsidy, and the latest PM

E-DRIVE subsidy, as well as state subsidies and tax rate cuts to encourage EV adoption. Furthermore, growing awareness and concerns about environmental issues are likely to drive electrification in India.

EV sales have grown significantly, especially post-pandemic, aided by rising awareness, government support, and an expanding EV portfolio from the industry. The entry of new-age, non-traditional Original Equipment Manufacturers (OEMs) like Ola, Ather, and Ampere has provided an additional boost to the EV segment in India. High-speed electric two-wheelers have propelled momentum in the electric two-wheeler market, which has increased at a rapid pace from 27,000 retails in fiscal 2020 to 1.15 million units in fiscal 2025, marking a significant growth of 112% CAGR during the period.

While EV adoption in India is currently led by two-wheelers and three-wheelers, Passenger Vehicles (PVs) are catching up fast. EV penetration in the PV segment was insignificant until fiscal 2021, amid a limited vehicle portfolio and lower customer awareness. However, the fast expansion of the portfolio, rising environmental awareness, government support, and expanding EV infrastructure have led to a sharp rise in EV adoption. As a result, the penetration of EVs within the retail industry rose from 0.1% in fiscal 2020 to 2.6% by fiscal 2025.

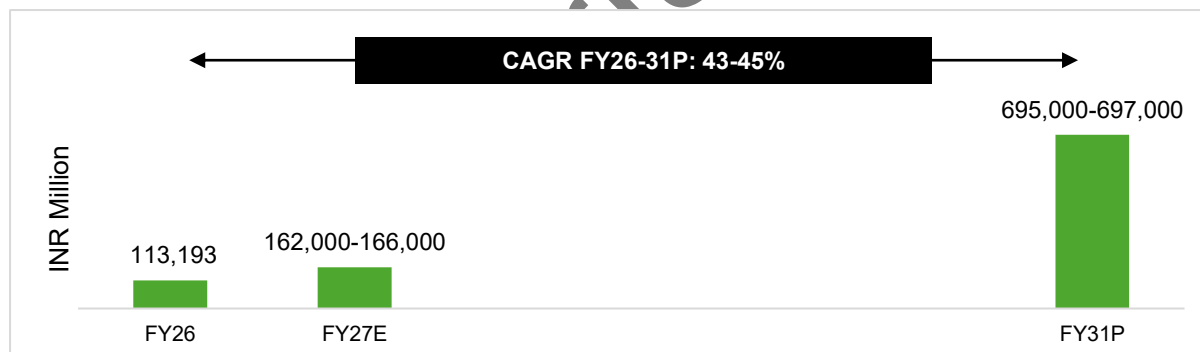
EV penetration across segments is expected to increase owing to favorable factors such as a favorable Total Cost of Ownership (TCO), growing EV infrastructure, lowering battery prices, and the launch of mainstream EV models. As the Indian government continues to support the growth of the EV industry, and consumer awareness and adoption increase, the country is likely to witness a significant shift towards electrification in the coming years.

Review and outlook of domestic electric vehicle products

Segment	Component	Market	Channel
2W EV	EVSE, off-board charger, DC-DC Converter, Battery	Domestic	OE
3W EV	EVSE, DC-DC Converter, Battery	Domestic	OE

Note: The EVSE mentioned is for the home charging, not for public charging

Electric vehicle products market size (fiscals 2026-31P)



Note: E: Estimated, P: Projected

Source: CRISIL Intelligence

The electric vehicle products market is anticipated to experience rapid growth, with an estimated value of INR 113,193 million in fiscal 2026. Over the forecast period, the market is expected to expand at a CAGR of 43-45%, reaching a staggering 695,000-697,000 million by fiscal 2031. The growth of EV components is inextricably linked to the growth of the EV market, as these components are crucial for the EV powertrain. Any fluctuations in EV adoption or regulatory changes will have a direct impact on the demand for these components.

The growth of the EV-specific auto components market will be driven primarily by electrical and electronic parts, as well as powertrain components. The domestic electric two-wheeler market is expected to experience a remarkable 35-37% CAGR from fiscal 2026 to fiscal 2031, with e-two-wheeler penetration projected to reach 25-30% by fiscal 2031. The electric three-wheeler (e-3W) market is anticipated to grow at a CAGR of 17-20% between fiscal 2026 and fiscal 2031, with penetration expected to reach 53-58% by fiscal 2031. This, in turn, will drive demand for EV-based components. Electric vehicle adoption in the two-wheeler segment is expected to be driven largely by urban scooter buyers, as the cost of ownership for electric scooters will be lower than that of internal combustion

engine (ICE) scooters. E-3Ws with high utilization rates are more profitable for businesses, as they become economical to operate at higher utilization levels.

Overview of Domestic Connection System and Automotive Switches Market

Overview

Automotive switches play a vital role in the control and operation of commercial and off-highway vehicles by serving as the primary interface between the driver and various electrical systems. These components enable safe and efficient management of lighting, ignition, power windows, wipers, HVAC functions, and auxiliary equipment. In commercial vehicles such as trucks, buses, and construction machinery, switches are designed for high durability, reliability, and ease of operation under demanding environmental conditions. Off-highway vehicles, including agricultural tractors, earth movers and construction equipment, require switches that can withstand vibration, dust, moisture, and extreme temperatures. A variety of switches are used in commercial and off-highway vehicles to facilitate control, safety and power transmission for auxiliary systems. As the industry transitions toward electric and connected platforms, the role of switches in power distribution, safety control, and user interaction continues to expand, making them a crucial component in modern vehicle architecture. Some of the key players in automotive switches market are Dhoot Transmission, Viney Corporation, Uno Minda, and Progressive Automotives.

Automotive switches

Type	Description
PTP PRP switches	Power Take-Off (PTO) and Power Request Panel (PRP) switches are critical control components integrated within commercial vehicles to activate auxiliary power systems by diverting engine power to external equipment, such as hydraulic pumps or compressors. PTO switches typically feature on-off or constant speed switching, allowing the operator to select and maintain required output speeds for the attached device.
Power sockets	Power sockets in commercial and off-highway vehicles are designed to supply DC power for accessories, maintenance tools, and specialized electronic devices. Typical sockets in truck cabs or utility vehicles deliver 12 V DC.
Brake switches	Brake switches are spring-loaded, electrical switches mounted on the brake pedal bracket of commercial vehicles. Their operation is straightforward: when the pedal is pressed, internal contacts close, sending a signal to the ECU indicating brake application. This signal performs multiple roles, such as activating brake lights, disengaging cruise control, and transmitting relevant signals to transmission controls in vehicles with automatic gear systems.
Push type switches	Push type switches are mechanical devices enabling direct control over circuits, commonly used for vehicle ignition systems, starter circuits, lighting, and dashboard controls. They operate by spring-loaded contact actuation, available in momentary or latching configurations. These switches are active only for the duration they are being pressed and return to their original state once released.
Ball & Plunger Type Switches	Ball and plunger type switches are employed for robust position detection and interlock functions in off-highway and commercial vehicle applications. A ball and plunger switch is a type of mechanical electrical switch that uses a spring-loaded ball and plunger mechanism to detect the position of a component. When an object presses against the ball, it overcomes the spring force, causing the plunger to move and activate the electrical contacts, thereby completing or breaking a circuit. Built for extreme environments, these switches feature waterproof and high-temperature resistance construction.

Industry drivers and trends

- **Electrification:** The shift toward electric and hybrid vehicles is driving the need for switches that can handle high-voltage environments and complex electronic control systems. PTO PRP switches adapted for electric powertrains and power sockets rated for EV accessories are in growing demand
- **Commercial and off-highway vehicles** operate in extreme conditions such as dust, mud, vibration, and temperature variations. Switch types such as ball & plunger switches designed

for ruggedness and long service life are witnessing heightened demand due to their proven reliability in such environments.

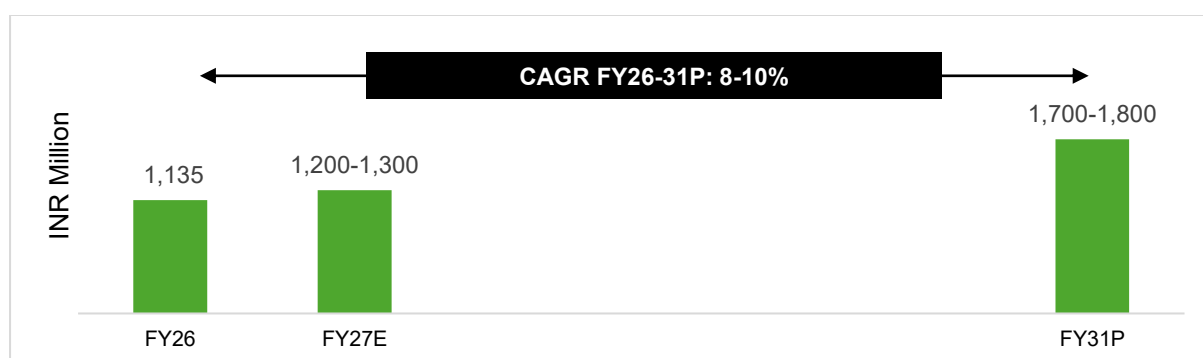
- Modern vehicles are integrating more electronic systems for improved control and comfort. Traditional mechanical systems are being replaced by electronic controls for various functions including ignition, transmission and auxiliary/hydraulics systems, necessitating specialized electronic switches. As vehicles become more reliant on electronics/software, the physical switches need to be highly compatible and integrated with the underlying ECUs.

Review and outlook of domestic automotive switches

Segment	Component	Market	Channel
CV	PTO PRP switches, Power socket, Brake switch, Push type switch, Ball & plunger	Domestic	OE
OH	Power socket, Brake switch, Push type switch, Ball & plunger	Domestic	OE

Note: OH, includes tractors and construction equipment

Automotive switches market size (fiscals 2026-31P)



Note: E: Estimated, P: Projected, OH includes tractors and construction equipment
Source: CRISIL Intelligence

The automotive switches market is expected to witness significant growth in the coming years, driven by the increasing demand for reliable and efficient electrical systems in vehicles. The market, valued at INR 1,135 million in fiscal 2026, is projected to reach INR 1,700-1,800 million by fiscal 2031, growing at a CAGR of 8-10%. This growth will be largely driven by the rising demand for various types of switches, including PTO/PRP switches, Power Sockets, Brake Switches, Push-type switches, Ball switches, and Plunger switches, particularly in the Commercial Vehicle (CV) and Off-Highway (OH) segments. In the CV segment, the demand for switches like PTO/PRP and Power Sockets is expected to increase, driven by the growing need for efficient and reliable electrical systems in trucks, buses, and other commercial vehicles. The Brake Switch, a critical component in the safety system of CVs, is also expected to see significant growth, driven by the increasing focus on safety and regulatory compliance. In the OH segment, the demand for switches like Push-type, Ball, and Plunger switches is expected to rise, driven by the growing need for durable and reliable electrical systems in construction, mining, and agricultural equipment. The increasing use of automation and electronic systems in OH equipment is also expected to drive the demand for these switches.

Overview of Domestic Wiring Harness Market

Overview

The wiring harness is the combination of electrical cables, or assembly of wires, that connects all electrical and electronic (E/E) components in a vehicle, like sensors, electronic control units, batteries, and actuators. The wiring harness handles the energy and information flow within the E/E system interconnecting various electrical and electronic components such as sensors, actuators, lighting systems, infotainment systems and control modules. Instead of running individual wires to each component, the harness bundles and organizes them into structured assemblies, improving efficiency, reliability, and ease of installation. A typical commuter motorcycle may only contain 70-100 meters of cumulative wiring including all strands, while premium and performance motorcycles can have wiring in length of 100 to 200 meters, since it offers advanced features like Ride by Wire, ABS systems, TFT screens and Bluetooth connectivity by binding them into a cable harness, they can be better secured

against the adverse effects of vibrations, abrasions, and moisture. Constricting the wires into a non-flexing bundle optimizes usage of space while decreasing the risk of a short.

For decades, Indian motorcycles relied on basic, analog harnesses with fewer than 15 circuits solely for lighting and ignition, however, the transition to BS6 emission norms in 2020 marked a watershed moment, necessitating the integration of Electronic Fuel Injection (EFI) and ECUs, which effectively doubled the harness complexity and length to accommodate a web of mandatory sensors. This trajectory has steepened further with the recent EV revolution, where the normal wiring harness has transformed into a sophisticated, high-voltage data network capable of handling 48V+ power delivery and complex telematics, shifting its role from passive electrical routing to active vehicle management. Some of the key players in the automotive wiring harness market are Dhoot Transmission, Motherson Sumi Wiring, Spark Minda etc.

Premiumization & Regulatory Impact on the Wiring Harness Industry

Over the last five years (2020–2025), the Indian two-wheeler industry has witnessed a significant surge in wiring harness content per vehicle, primarily driven by three transformative shifts: the mandatory BS-VI transition, the rise of Electric Vehicles (EVs), and connected premium features. The shift from BS-IV to BS-VI in 2020 was the initial catalyst, necessitating the replacement of mechanical carburetors with electronic Fuel Injection (FI) systems, which instantly added a complex network of sensors (O₂, throttle position, temperature) and Electronic Control Units (ECUs) requiring intricate, data-transmitting engine harnesses. Simultaneously, the rapid adoption of EVs introduced entirely new high-voltage wiring architectures and Battery Management Systems (BMS) that demand heavier-gauge, heat-resistant cables distinct from traditional Internal Combustion Engine (ICE) setups. Furthermore, the mass-market democratization of premium features such as Bluetooth connectivity, digital instrument clusters, LED lighting, and safety mandates like ABS/CBS has multiplied the number of circuits and connectors required, effectively transforming the humble wiring harness from a simple power conduit into a high value, complex nervous system that now commands a larger share of the vehicle's bill of materials.

Case Study I: Increase in wiring content per vehicle from BS-IV to BS-VI transition

The transition from BS-IV to BS-VI in the Indian two-wheeler (2W) segment represented a seismic shift in vehicle architecture. While BS-IV vehicles (mostly carbureted) had relatively simple electrical needs, BS-VI necessitated a move to Electronic Fuel Injection (EFI) and sophisticated On-Board Diagnostics (OBD).

- a) **Shift from Mechanical to Electronic Fuel Systems:** In BS-IV, fuel delivery was largely mechanical (carburetor), but in BS-VI, the adoption of Electronic Fuel Injection (EFI) added new components like fuel injectors and electric fuel pump that requires new wiring. Unlike the mechanical cables of BS-IV, BS-VI throttle bodies often include a Throttle Position Sensor (TPS) and an Idle Air Control (IAC) valve, both needing dedicated wiring.
- b) **Increasing sensor count:** To meet the stringent reduction in NO_x and HC emissions, the ECU needs real-time data from across the vehicle. Oxygen sensors were mounted on the exhaust to monitor air-fuel ratios. Sensors like lean angle sensors, sensors related to ISG, smart-key system, all increased the number of sensors in a BS-VI vehicle. Furthermore, a sensor module to house large number of sensors were also included in vehicles.
- c) **Increased ECUs:** Vehicles moved from a simple CDI (Capacitor Discharge Ignition) box with 4–6 pins to a full-fledged Engine Control Unit (ECU) with 24 to 36+ pins. This resulted in significantly thicker wiring harnesses, requiring more copper as well.
- d) **Battery fuse:** In most BS-IV two-wheelers, the fuse box was barely a box, as it was just a single glass tube fuse or 2-3 blade fuses tucked into a small plastic holder near the battery. In BS-VI, these have grown into sophisticated, multi-slot units that are indeed roughly three times larger in terms of both physical footprint and circuit count.
- e) **Protection:** The mechanical protection of the sensors and wiring is even more pivotal with increasing content and functionality in a vehicle. Sophisticated PVC sheets, tubes and clamps were used, which all increased the overall cost of the wiring harness.

Based on the advancements and increasing components in a BS-VI vehicle, the wiring content per vehicle increased about 2.5x to 3.5x during the transition from BS-IV.

Case study II: Increasing wiring content in an EV

EV wiring harnesses are more complex and heavier than ICE harnesses because they must include high-voltage wiring for the battery, motor, and inverter, in addition to the standard low-voltage harness for auxiliary systems. This requires specialized, shielded cables to handle higher voltages safely and manage electromagnetic interference (EMI), while ICE vehicles primarily use low-voltage wiring for engine components, lights, and infotainment. The complexity of EV wiring harnesses starts with multiple high-voltage (HV) domains. HV domains include the motor harness, battery pack harness, and separate harnesses for fast charging and regenerative braking. Each of these HV harnesses must be designed to handle high currents efficiently. In addition to efficiently carrying high currents and providing insulation for high voltages, these harnesses must handle high temperatures and high temperatures, which require large wire diameters, HV connectors, and cable protection. The BMS harness requires more number of pins, requiring high-precision connectors which are more expensive than the standard connectors. An electric scooter typically requires 1.5x–2.5x more wiring content by value compared to an entry-level ICE scooter due to the need for shielded cables (to prevent electromagnetic interference) and higher-grade connectors for thermal management.

With the rapid growth of EVs, specifically in the 2W, 3W and CV industry, demand for HV wiring harness is expected to increase. While traditional ICE 2Ws and 3Ws have one assembly of wiring harness, EVs require two wiring harnesses, both LV to power the auxiliaries and the HV wiring harness for the battery, motor and inverter. As a result, wiring harness content per 2W EVs is approximately 1.5x-2.5x that of an 2W ICE, with further upside from integrated battery assemblies, off-board/on-board chargers and DC-DC converters.

Applications of Wiring Harness

Powertrain and Engine Management: One of the major applications of wiring harness is to enable precise control, energy distribution, and communication between various powertrain components. All the key sensors play a key role in engine functionality like crankshaft position sensors, oxygen sensors, throttle sensors, wiring for transmission control, clutch actuation sensors, cables for alternator and starter systems. Before 2020, the entry level motorcycles were still carburetor based, and post BS-VI norms in April 2020, all manufacturers shifted to Electronic Fuel Injection systems, which brought usage of new mandatory sensors to all the vehicles' harness.

Chassis and Safety Systems: Connects the wiring harness of safety-critical systems and ensures effective communication under all conditions. ABS braking systems require separate cable assemblies. With more vehicles being offered with ABS in motorcycles, it adds to the increased functionality offered by the wiring harness kit.

Body and Interior System: To power and coordinate user-facing comfort, lighting, and control systems. The lighting systems offered by OEMs have started to become more complex with increasing LED penetration across all vehicle segments and inclusion of separate DRL assemblies also making the wiring harness more sophisticated.

Infotainment, Communication, and Telematics: To enable connectivity, information flow, for the rider. The premium segment in motorcycles and most EVs also offer TFT screens as compared to the regular digital or analogue for the instrument cluster, which also increases the cost and complexity of wiring harnesses. Additionally, the premium motorcycles and some EV models also offer GPS modules and TCUs for OTA updates and connected services.

Electric and Hybrid Vehicles: To safely transmit high-voltage power and control signals between propulsion and energy management systems. High-voltage harnesses connecting battery modules, fuses, and BMS (Battery Management System), transmitting current between inverters and electric motors, AC/DC charge port harnesses and on-board charger interfaces and thermal management harnesses are all used depending on the vehicle model.

Advanced ADAS Systems: To enable real-time data exchange between vehicle sensors, cameras, radar, and control units for driver assistance and automation. Since these systems have significant

number of sensors and hence data cables, communication modules, which increases the sophistication and cost of wiring harness.

Content per vehicle Trends

The shift from ICE to Electric Vehicles (EVs) has triggered a massive value expansion in wiring harnesses, with the 2-Wheeler (2W) segment estimated to have a 2-3x increase in harness content value for EVs compared to ICE models. This disparity exists because a traditional ICE scooter has a rudimentary electrical architecture, whereas an electric scooter requires complex high-voltage cables, battery management harnesses, and intelligent controller wiring. For Passenger Vehicles (PVs), the jump is substantial, with EV wiring content valued at approximately 2-4x that of a comparable ICE car, driven by the need for heavy-gauge, shielded high-voltage cables (often orange-colored) to handle 400V+ systems, alongside significantly higher copper usage. Hybrid Vehicles (HEVs) sit as a middle ground, commanding roughly 1-1.5x the content of standard ICE vehicles. In the 3-Wheeler (3W) segment, trends mirror the 2W sector, where the transition from simple mechanical engines to electric powertrains necessitates a complete architectural overhaul, significantly boosting the per-vehicle harness value.

Key Growth Drivers

Electrification: Unlike Internal Combustion Engine (ICE) vehicles which rely on 12V low-voltage systems, e-2Ws) and e-3Ws require complex high-voltage wiring harnesses (60V and above) to handle battery packs, Battery Management Systems (BMS), and motor controllers.

Increasing sensor content per vehicle: Post implementation of BS-VI norms in April 2020, all two-wheelers shifted to electronic fuel injection system requiring mandatory sensors, along with wheel speed sensors with ABS systems implementation. Lean angle sensor in premium vehicles and mandatory gear position sensor and side stand sensor, all contributed to increasing the complexity and volume of wiring harnesses in motorcycles and scooters. An electric scooter typically requires 2-3x more wiring content by value compared to an entry-level ICE scooter due to the need for shielded cables (to prevent electromagnetic interference) and higher-grade connectors for thermal management.

Proliferation of ADAS: Features like adaptive cruise control, blind-spot detection, lane-keeping assist, and automated emergency braking rely on a complex network of sensors. Each sensor requires a dedicated, high-reliability harness to transmit data to central processing units, driving demand for more intricate and shielded wiring.

Electronification and Premiumization: The shift from analog to digital TFT clusters with Bluetooth/LTE connectivity (navigation, call alerts) has necessitated data-transmission cables and complex connector interfaces previously seen only in passenger cars. Keyless entry, immobilization, and side-stand cut-off sensors have moved from premium to mass-market features, increasing the number of circuits per harness:

ABS Mandate: From January 1, 2026, it has been mandated by the government that all new two-wheelers must be manufactured with an anti-lock braking system (ABS). This new rule expands the previous requirement, which only applied to two-wheelers over 125cc, to include all models, such as scooters and motorcycles under 125cc. Addition of these functionality increases a new wiring harness to the overall assembly, which increases the overall volume and value for a wiring harness manufacturer.

OBD-2 Norms: The recent implementation of OBD-2 norms requires real-time monitoring of emissions and fault codes, necessitating higher data transfer speeds and diagnostic ports, further complicating the wiring architecture.

Flame Retardant Cable as an opportunity due to regulation: While there has been introduction of few automotive standards for extremely HV, there are still no clear mandates for usage of Flame-Retardant cables, which is being pushed by BIS and ARAI, which will enable increased safety in the event of an accidental fire. If regulated, cost of cables and specific manufacturers with potential to manufacture to scale will benefit.

Threats and Challenges

Raw material price volatility: Copper is the primary conductor used in most harnesses, and it can account for over 50-60% of the total bill-of-materials cost. Global copper prices are subject to significant volatility based on geopolitical events, mining disruptions, and financial market speculation.

Lack of Automation in the Industry: Majority of the wiring harness assembly is still performed manually, which is a production bottleneck. The intricate, non-rigid nature of a harness makes it notoriously difficult to automate tasks like routing wires, taping, and fitting connectors. Manual assembly of increasingly complex harnesses is highly susceptible to human errors leading to additional costs for the company. While India does have relatively cheap labor, however this industry also requires large number of skilled technicians.

Increased cost and R&D: The materials, manufacturing processes, and rigorous testing required for HV harnesses are significantly more expensive. This new domain requires a skillset in high-voltage engineering, thermal management, and material science that many traditional suppliers may not possess, and the cost of validation and testing can be prohibitive.

Automotive Cables

Overview

Automotive cables are essential components in two-wheeler and three-wheeler electrical and control systems, ensuring reliable transmission of power, signals, and mechanical movement between critical subsystems. These cables play a vital role in vehicle functionality, enabling smooth operation of ignition systems, lighting, braking, throttle, clutch, speedometer, and various electronic features. For evolving vehicle technologies and with growing electrification, cable design and material selection have become increasingly important to ensure durability, flexibility, heat resistance, and compliance with environmental and safety standards.

Two-wheelers and three-wheelers employ several types of cables, broadly classified into control cables, battery and power supply cables, sensor and communication harnesses, and charging cables in electric variants. Control cables transmit mechanical force to operate brakes or throttles, while electrical harnesses distribute current to lighting, sensors, and control modules. With the automotive industry increasingly focused on technology upgradation, and electrification, manufacturers are adopting advanced insulation materials, modular harness architectures, and high-efficiency copper or aluminum conductors.

Types of Cables

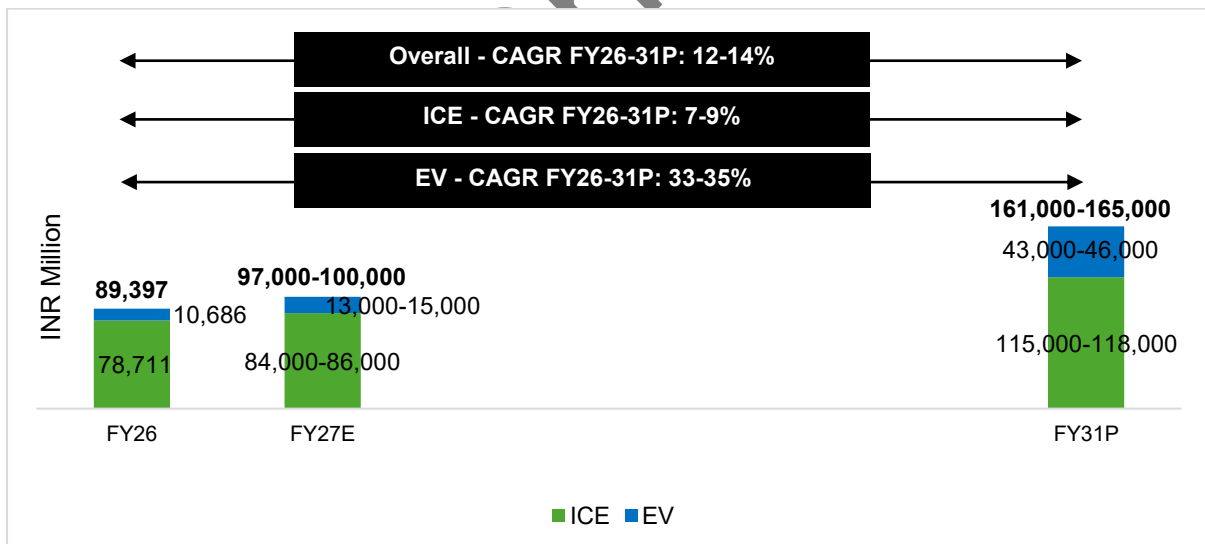
Type	Description
Automotive cables	Automotive cables used in two-wheelers and three-wheelers mainly enable wiring harnesses that connect various electrical and electronic components. These cables are constructed with high-purity copper conductors, typically stranded for flexibility, and insulated with specialized polymers like PVC to provide durability, resistance to abrasion, oil, chemicals, and high temperature.
Battery cables	Battery cables carry high current between the battery and starter motor. They are characterized by low conductor resistance and high thermal and chemical resistance to withstand harsh operating environments. Typically, they use thick stranded copper conductors with robust insulation to handle high current demands and exposure to engine fluids and temperature variations.
Braided and shielded cables	Braided cables include protective braided sleeving made from materials such as polyester or nylon, offering enhanced abrasion resistance, chemical protection, and mechanical strength while maintaining flexibility. Shielded cables incorporate an additional conductive shield to prevent electromagnetic interference (EMI), essential for signal cables in electronic control units and sensors. Braided sleeves facilitate efficient wire harness management in complex vehicle architectures.
Flame Retardant (FR) electric charger cables	FR electric charger cables are designed for safe and reliable connection between charging infrastructure and electric vehicles. These cables feature flame-retardant insulation materials to meet safety standards and ensure durability under continuous charging cycles. They provide high flexibility, UV resistance, and are tested for thermal shock and oil resistance.
High temperature cables	High temperature cables are engineered to withstand extreme thermal conditions ranging from -40°C up to +250°C. They use specialized insulation materials and conductors plated with silver, or nickel to resist oxidation. These cables are essential in areas near the engine or

Type	Description
	exhaust systems of two-wheelers and three-wheelers, ensuring electrical integrity despite heat exposure.
Anti-capillary cables	Anti-capillary cables are barrier-sealed cables that prevent fluid ingress due to capillary action, which is a critical feature for cables deployed in fluid-rich engine compartments or SCR systems. These barrier-sealed cores prevent fluid transmission, protecting sensors and electronics from damage without the need for additional external sealing.
ABS wheel speed sensor (WSS) cables	ABS WSS cables are sensor leads designed with high mechanical strength and flex resistance to endure vibrations, steering flex, and harsh road debris. They are manufactured with materials providing long service life and stable signal transmission across operating temperatures from -40°C to +150°C.
Flat cables	Flat cables, consisting of flat rectangular conductors arranged in parallel sandwiched between resin films, offer high density wiring in compact and confined spaces. They are increasingly adopted in vehicle battery packs, inverters, and electronic modules due to reduced weight, better thermal management, and improved space efficiency. Their flexibility and modular design align with emerging zonal wiring architectures in modern vehicles.
Single and multi-core flexible cables	Single and multi-core flexible cables are widely used in control circuits and power transmission within two and three-wheelers. These cables feature stranded copper conductors for flexibility and are insulated with materials providing abrasion resistance, oil resistance, and thermal stability. Multi-core cables allow bundled wiring solutions that reduce harness complexity and enable efficient signal and power routing. These wires are used in appliances like refrigerators, air conditioners, machine tools and control panel wirings.

Review and outlook of domestic wiring harness

Segment	Component	Market	Channel
2W (ICE & EV)	Integrated wiring harness	Domestic	OE
3W (ICE & EV)	Integrated wiring harness	Domestic	OE
CV	Integrated wiring harness, pig tail wiring	Domestic	OE

Domestic wiring harness market size (fiscals 2026-31P)



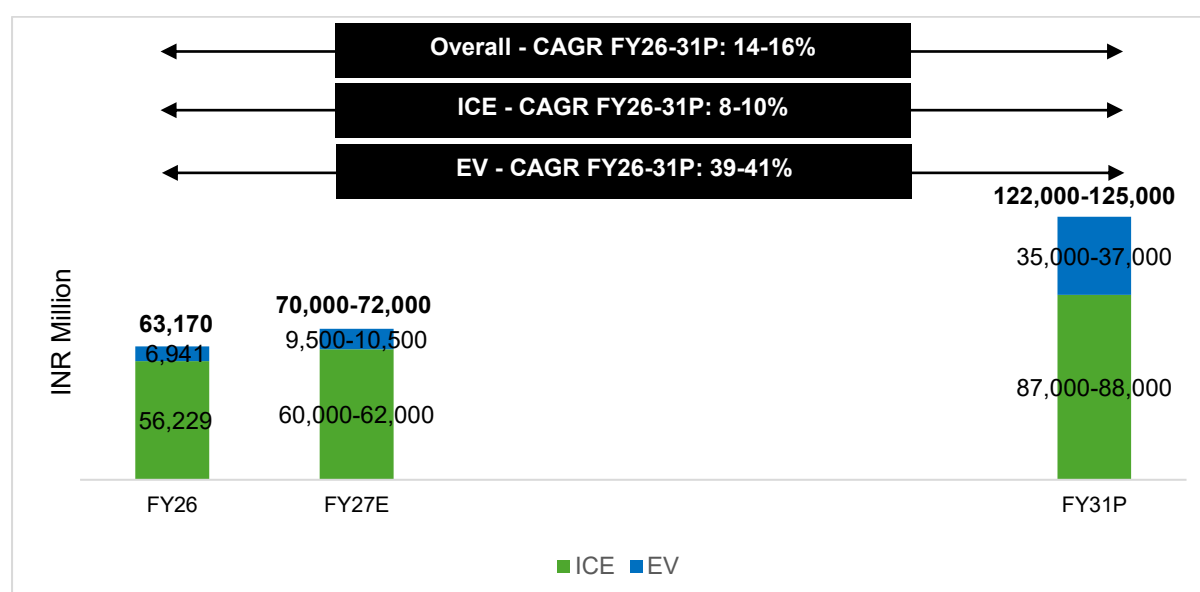
Note: E: Estimated, P: Projected, Vehicle segments included are 2W, 3W and CV
Source: CRISIL Intelligence

The automotive wiring harness market is expected to witness significant growth in the coming years, driven by the increasing penetration of electric vehicles across 2W, 3W and CV segments, enabling the demand for HV wiring harness. The ICE wiring harness market, valued at INR 78,711 million in fiscal 2026, is projected to reach INR 115,000-118,000 million by fiscal 2031, growing at a CAGR of 7-9%. This growth will be largely driven by the increasing functionalities in ICE and EVs, expected to add to the complexity and cost of LV wiring harness in vehicles. Shift towards premiumization also enables vehicle segments is also expected to augment this growth. Proliferation of ADAS due to high emphasis on safety, advancements in infotainment system and the ABS mandate are all expected to increase the

complexity and cost of LV wiring harness. For HV wiring harness, the increasing penetration across vehicle segments will increase the demand for HV wiring harness and further expected safety regulations and implementation of flame-retardant cable will enable growth even further. The EV HV wiring harness, valued at INR 10,686 million, is projected to reach INR 43,000-46,000 million by fiscal 2031.

Wiring harnesses, which incorporate high-voltage interconnections, sensors/controllers and data cables are foundational to power distribution, signal integrity and control in electrified and software-defined vehicle architectures. The 2W segment is the largest automotive segment in India by volume in fiscal 2025. The EV volume in the 2W segment is the highest among automotive segments in India. For the 2W segment, EV penetration is forecasted to increase from 6.6% in fiscal 2026 to 25-30% in fiscal 2031. Additionally, the EV penetration in the 3W segment is the highest among automotive segments in India. The 3W segment electrification is forecasted to increase from 31.6% in fiscal 2026 to 53-58% in fiscal 2031.

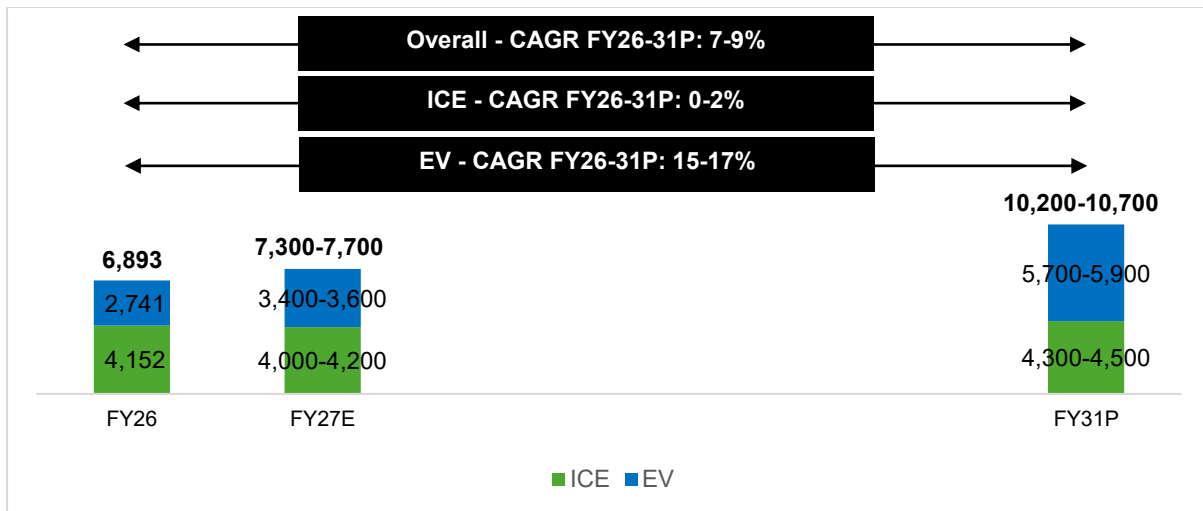
Domestic wiring harness market size of two-wheeler segment (fiscals 2026-31P)



Note: E: Estimated, P: Projected
Source: CRISIL Intelligence

The ICE wiring harness market in two-wheeler segment is valued currently at INR 56,229 million and is projected to reach INR 87,000-88,000 million by fiscal 2031, driven by increasing premiumization in the 2W market. The share of sales in the premium segment is expected to be a significant growth driver, along with increasing features offered in the 150cc segment and above, like TFT display, coupled with added sensors are all expected to contribute to increased sophistication of wiring harnesses, contributing to the overall growth. In the EV specific wiring harnesses, the market is expected to grow at 39-41% CAGR until fiscal 2031 driven by the increasing EV penetration and further expected safety regulations and implementation of flame-retardant cable will enable growth even further.

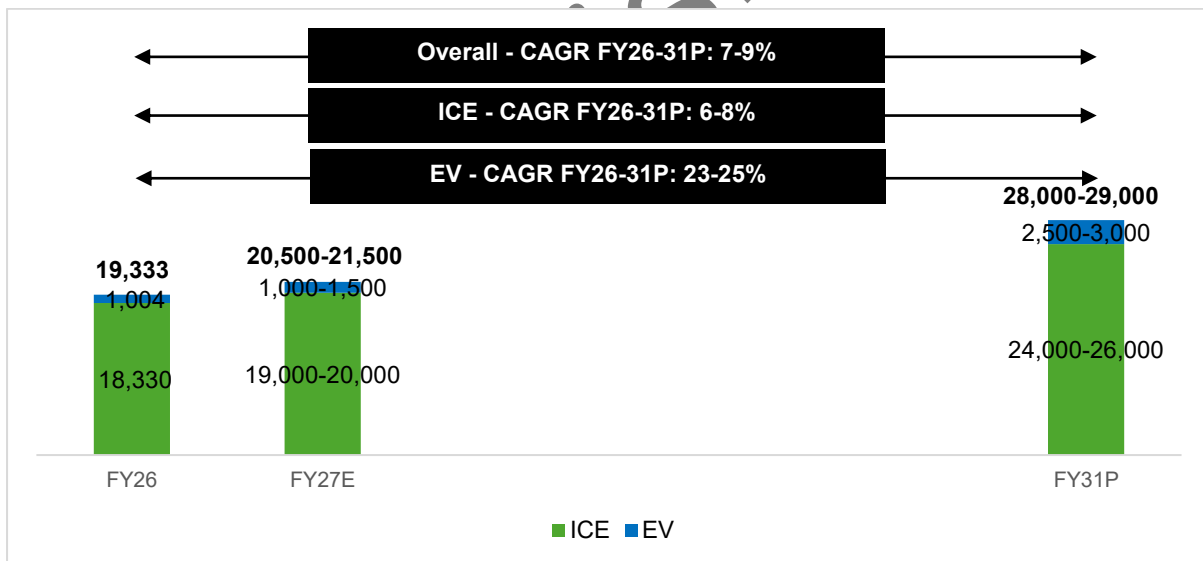
Domestic wiring harness market size of three-wheeler segment (fiscals 2026-31P)



Note: E: Estimated, P: Projected
Source: CRISIL Intelligence

In the 3W segment, the growth in ICE segment is subdued primarily due to high electrification penetration expected in the segment. The ICE volumes in 3W are expected to decline from fiscal 2026, whereas the EV volumes are expected to grow significantly, contributing to the high CAGR of 15-17% from fiscal 2026 to fiscal 2031. The existing ICE 3W also only requires basic wiring harness due to limited additional features in the vehicles. However, the EV models of 3Ws are expected to be relatively feature-rich with LED lights, instrumentation display panel etc. adding complexity and contributing to the growth in the segment.

Domestic wiring harness market size of commercial vehicle segment (fiscals 2026-31P)



Note: E: Estimated, P: Projected
Source: CRISIL Intelligence

In the CV segment, the wiring harness in the ICE segment currently valued at INR 18,330 million is expected to grow and reach 24,000-26,000 million by fiscal 2031. This growth will be augmented by increasing functionalities in the CV segment driven by regulations and premiumization. All the new medium and heavy-duty trucks sold after October 2025 must be manufactured with factory-fitted air-conditioned cabins to improve driver comfort, safety and well-being. From April 2026, Ministry of Road Transport and Highways (MoRTH) is making ADAS (Advanced Emergency Braking (AEBS) and Driver Drowsiness & Attention Warning (DDAWS)) mandatory for new trucks in the heavy-duty category, which is expected to increase complexity and content of wiring harness in the segment. Electrification is expected to be significant in the CV segment too and the associated HV wiring harnesses will contribute to the growth in the market from INR 1,004 in fiscal 2026 to INR 2,500-3,000 million in fiscal 2031.

Tailwinds for E&E products

Core Products	ICE	Electrification (EV & Hybrids)	Premiumization	Automation & Safety	Connected Vehicles
Wiring Harnesses	=	++	+	++	++
Battery Packs	=	++	=	=	=
Sensors & Electronic Controllers	+	+	+	++	++
Automotive Switches	=	+	+	+	+
Power Supply Cords	=	++	=	+	=
Onboard Chargers	NA	++	=	=	=
DC-DC converters	NA	++	=	=	=

NA- Not applicable, = No impact/stagnant market, + positive impact, ++ significant impact, - negative impact

The automotive industry is undergoing significant transformation as every segment shift towards electrification. This transition is driven by the unique requirements of the electric vehicle (EV) market, including the need for lightweight components, new powertrains, and innovative component segments such as high-power electronics and batteries. As a result, traditional internal combustion engine (ICE) vehicle manufacturers are facing a rapid transformation of the entire ecosystem. One of the key changes is the increased focus on electronics and associated components in vehicles. EVs have a distinct powertrain and propulsion technology, which replaces traditional ICE components such as engine parts, operating mechanisms, and fuel systems. Instead, EVs feature specialized components like batteries, motors, inverters, and their associated assemblies. The electrification of vehicles has led to a significant shift in industry, with manufacturers needing to adapt quickly to changing market demands.

The trend towards electrification is being accompanied by a growing demand for connected systems and premium products in the automotive industry. EVs are equipped with advanced features such as connectivity, touch screen panels, in-vehicle navigation, and safety features like ABS. As a result, the need for sophisticated safety systems and connectivity solutions is becoming increasingly important, not only for EVs but also for ICE vehicles. This convergence of trends is driving up the demand for E&E components across the industry. As consumers increasingly expect a more premium and connected driving experience, vehicle manufacturers are being compelled to integrate advanced safety and connectivity features into their vehicles, regardless of whether they are ICE or EV. This shift is creating new opportunities for suppliers of E&E components, as they play a critical role in enabling the development of these advanced features and systems.

The traditional ICE platforms offer largely stagnant demand for most core E&E products, with wiring harnesses and battery packs showing neutral impact as OEMs prioritize cost optimization over content growth in conventional vehicles. At the same time, electrification, premiumization, automation and connectivity are emerging as the primary growth vectors, structurally reshaping volumes and value realization across the portfolio of wiring, power electronics and electronic control products in both passenger and commercial segments.

Core products such as wiring harnesses and battery packs see the strongest upside from the shift toward electric and hybrid architectures. High voltage and low voltage harness content increases materially in EVs versus ICE, while battery packs become a new high value subsystem, even though they record neutral impact under other themes like premiumization, automation and connected vehicles in this mapping.

On the downstream E&E side, sensors and electronic controllers show a broad-based positive impact across all four megatrends, with incremental improvement under ICE and further upside under automation, safety and connectivity. This reflects rising electronic control unit penetration for ADAS, vehicle dynamics, energy management and telematics, positioning this category as a key beneficiary of the electronics led transformation of the vehicle.

Automotive switches and power supply cords exhibit moderate to strong improvement, particularly under electrification and premiumization, indicating higher feature content (comfort, infotainment, lighting) and additional power interfaces in EVs and high trim models. However, their role in automation and connected vehicles is more supportive than central, leading to a more balanced impact profile relative to sensors or harnesses.

New age EV specific components such as onboard chargers and DC-DC converters are expected to register a significantly positive realization under electrification, confirming their status as purely EV driven opportunities. Their contribution under premiumization, automation and connectivity remain neutral in the table, suggesting that their growth is primarily volume linked to EV penetration rather than to feature or software content per vehicle.

Competitive profiling of key players

Key player profiles

Key players in the wiring harness segment are Dhoot Transmissions, Motherson Sumi Wiring India Limited, Minda Corporation Limited, Yazaki India Private Limited Uno Minda Limited and Sona BLW Precision Forgings Limited (Sona Comstar)

Dhoot Transmission

Key facts	Brief profile
Year of incorporation: 1998 HQ: Aurangabad, Maharashtra	Dhoot Transmission is one of India's leading electrical and electronics (E&E) companies. They are engaged in the design, engineering, manufacturing and supply of critical, wiring harnesses that integrate electronic sensors and controllers, switches, terminals, connectors, junction boxes, high-voltage interconnection systems and data cables, delivering robust, application-specific architectures across platforms. - Dhoot Transmission is one of the largest manufacturers of wiring harnesses for the 2W and 3W segments. - Dhoot Transmission are amongst the top two players in the wiring harnesses for two-wheelers (2W) and three-wheelers (3W) in India. Their market share in fiscal 2026 was 41% (value terms) in the 2W and 3W market in India. - In fiscal 2026 the company is ranked among the top 2 manufacturers of wiring harnesses of 2Ws and 3Ws in India. - In India, company is a leader in wiring harnesses for the electric 2W and 3W segments, with a market share close to 70% in fiscal 2026. Dhoot Transmission (DTPL) is a large Indian company specializing in automotive and consumer durable components, founded in 1999. It is a leading manufacturer of wiring harnesses and also produces a range of other products, including automotive switches, electronic sensors, cables, and power cords for both the domestic and international markets. The company has a significant presence in the automotive industry, supplying to major original equipment manufacturers (OEMs), and has recently expanded into the electric vehicle (EV) sector. Product mix: - Integrated Wiring Harnesses: Full wiring systems for automotive and appliances, manufactured using automated cutting, crimping, sealing, twisting and electrical testing. - Automotive Cables: Includes thin-wall and thick-wall PVC-insulated cables (e.g., AVS) for battery, signal, and power applications. - Connectors & Terminals: Core wiring components such as terminals, connectors, fuse-boxes, and in-house tooling / moulding. - Power Supply Cords: Power cords, sockets, and certified plugs (BIS, VDE, BS, etc.) made with fully automatic molding and validated in-house labs. - Electronic Sensors & Controllers: In-house development of automotive sensors, control units, and PCB-level electronics. - Automotive Switches: Switches for vehicles (via their JV), used for user interfaces or control functions.

Key facts	Brief profile
	- Corrugated Tubes / PVC Sleeves (COT Tube): Protective plastic corrugated pipes and sleeves for wiring insulation, available in various sizes and materials. - IoT Solutions: Industrial-grade IoT for wiring harness manufacturing includes sensors, an IoTLYNX gateway, and cloud software for production monitoring, alerting, and analytics. Installed Capacity: Dhoot Transmission has 22 manufacturing facilities globally, with a focus on automotive wiring harnesses and components. The company has facilities in the UK, Slovakia, Thailand, Japan, and South Korea, in addition to 17 facilities in India.

Key clients

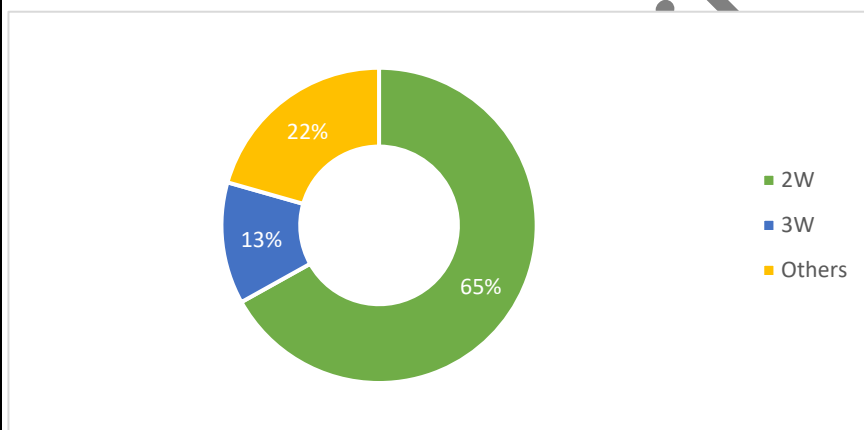
Key clients include prominent two-wheeler, three-wheeler and commercial vehicle OEMs, including Bajaj Auto Ltd, TVS Motor Company Ltd, Honda Motorcycle & Scooter India Pvt Ltd and Royal Enfield. DTPL caters to a wide range of clients, both in India and overseas.

Revenue mix by Geography:

Dhoot Transmissions Private Limited consistently derives 15-20% of its revenue from overseas units.

EV Revenue as a % of total Revenue: EV revenue contributed around 22.8% of DTPL's revenue in FY2025-26

Vehicle segment wise revenue mix (FY 2025-26):



Note: Others include commercial vehicle, off-road, farm vehicle and non-auto sectors etc

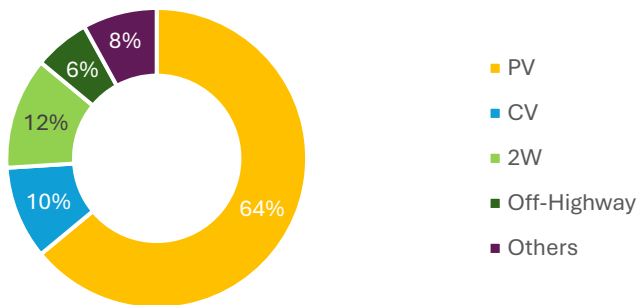
Source: Company reports, CRISIL Intelligence

Table of Ranking – Basis FY2026 (in terms of value) (revenue)

Category/vehicle segment	Market Share	Market Ranking
Wiring Harness		
2W	37.58%	Top 2
3W	More than 70.00%	Leader
2W and 3W	41.03%	Top 2

Motherson Sumi Wiring India Limited

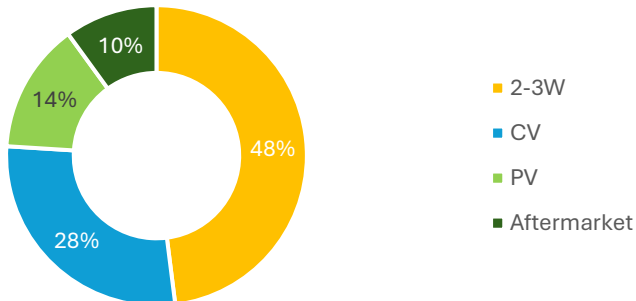
Key facts	Brief profile
Year of incorporation: 2020 HQ: Noida, UP	MSWIL is one of the leading wiring-harness and full-system solutions supplier to OEMs, formed in 2020 through the reorganization of Motherson Sumi Systems Limited (MSSL). The new company was established as a joint venture between Samvardhana Motherson International Limited (SAMIL) and Sumitomo Wiring Systems, Ltd. (Japan), to house the demerged Indian automotive wiring harness business. MSWIL was then

Key facts	Brief profile												
	officially listed on the BSE and NSE stock exchanges in March 2022, completing the group's reorganization. Product mix: - Core: wiring harness assemblies (low-voltage and instrument /engine /door /roof harnesses), cable & wires, connectors, terminals, protective tubing and assemblies. - Value add / systems: integrated electrical & electronic distribution systems, in-vehicle sequenced supplies, and testing/validation services (central quality lab). - EV / future portfolio: high-voltage wiring harnesses, battery management connectors/components, and other EV-specific harness modules. Installed Capacity: In past three years, MSWIL has launched 7 new greenfield projects, 3 of which are already operational. They now operate 30 operational facilities across India. These facilities include manufacturing and assembly plants, as well as technical centres that are strategically located for faster response and reduce logistics cost.												
Key clients - Four-wheeler OEM: Maruti Suzuki, TATA Motors, Toyota, Mahindra. - Two-wheeler OEMs: Royal Enfield, Yamaha, Honda Motorcycle, Suzuki Motorcycle. - Others: Daimler Truck, Ashok Leyland, Kobelco, Caterpillar, Denso, JCB, Bobcat, Toyota Industries Engine India, Honda India Power Products, Hyundai Construction Equipment. Revenue mix by Geography: The company's revenue comes from domestic business. Its parent company Samvardhana Motherson International Ltd. (SAMIL) looks after overseas business. EV Revenue as a % of total Revenue: EVs contributed around 6.6% of MSWIL's revenue in FY2025-26. Further the company is proactively scaling its capabilities for future growth. Vehicle segment wise revenue mix (FY 2025-26):  <table border="1"> <caption>Vehicle segment wise revenue mix (FY 2025-26)</caption> <thead> <tr> <th>Segment</th> <th>Revenue Mix (%)</th> </tr> </thead> <tbody> <tr> <td>PV</td> <td>64%</td> </tr> <tr> <td>CV</td> <td>10%</td> </tr> <tr> <td>2W</td> <td>12%</td> </tr> <tr> <td>Off-Highway</td> <td>6%</td> </tr> <tr> <td>Others</td> <td>8%</td> </tr> </tbody> </table>		Segment	Revenue Mix (%)	PV	64%	CV	10%	2W	12%	Off-Highway	6%	Others	8%
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Source: Company reports, CRISIL Intelligence

Minda Corporation Limited

Key facts	Brief profile								
Year of incorporation: 1985 HQ: Noida, Uttar Pradesh	Minda Corporation, also known as Spark Minda, was originally incorporated on 11 March 1985 as Minda Switch Auto Pvt Ltd and later renamed 'Minda Corporation Limited'. It is part of the Ashok Minda Group/ Spark Minda Group. Over decades it has grown from primarily mechanical security products (locks, ignition switches) into a diversified auto-component business covering electronics, wiring, plastics, interiors and EV / mobility systems. Product mix • Safety & Security Systems: Ignition switches, steering locks, smart key systems, keyless entry, and immobilizers for 2-wheelers and 4-wheelers. • Mechatronics & Die-Casting: Aluminium and zinc die-cast parts, brackets, engine housings, and other mechanical components. • Information & Connected Systems: Wiring harnesses, instrument clusters, sensors, and connected-vehicle electronics. • Plastics & Interiors: Interior plastic parts like glove boxes, consoles, air vents, and decorative trim. • Aftermarket & Exports: Supplies replacement parts to aftermarket customers and exports globally. • EV & New Mobility Components: EV wiring harnesses, powertrain electronics, and advanced access systems. Installed Capacity There are 30 manufacturing facilities, 2 advanced R&D centers, 1 group corporate office and 7 offices of Minda Corporation Limited nationwide. The company also has 2 manufacturing facilities and 2 offices internationally.								
Key clients Key clients of Minda Corporation Limited are TVS, Ashok Leyland, M&M, Bajaj Auto, Honda Motorcycles & Scooters, Hero MotoCorp, Piaggio, Tata Motors, M&M, Bajaj Auto, TVS, Daimler, Stellantis, Ashok Leyland, HMTI Revenue by Geography: Out of total revenue of FY26, about 11% of the revenue came from overseas activities and 89% of the revenue was from domestic activities. <table border="1"> <caption>Revenue by Geography Data</caption> <thead> <tr> <th>Geography</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>India</td> <td>89%</td> </tr> <tr> <td>Europe & North America</td> <td>6%</td> </tr> <tr> <td>SE Asia</td> <td>5%</td> </tr> </tbody> </table> EV Revenue:		Geography	Percentage	India	89%	Europe & North America	6%	SE Asia	5%
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Key facts	Brief profile										
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PV	14%										
Aftermarket	10%										

Source: Company reports, CRISIL Intelligence

Yazaki India Private Limited

Key facts	Brief profile
Year of incorporation: 1997 HQ: Pune	Yazaki India Private Limited (YIPL) was incorporated in 1997 as an equal joint venture between Tata Autocomp Systems Limited (TACO) and Yazaki Corporation (YC), Japan. The company began commercial production in 1999. YC acquired the 50% stake from TACO in December 2012, making YIPL a wholly owned subsidiary. Product mix - Wiring harnesses, automotive wiring systems. - Components of wiring harnesses (injection-moulded parts, connectors, terminals). - Automotive wires and cables (single-core, multi-core, shielded cables, high voltage cables, battery cables). - Power distribution & junction boxes and power management modules for vehicles. - HMI (human-machine interface) components for vehicles. with a particular focus on Augmented Reality Head-Up Displays (AR-HUD) and digital instrument clusters. - Charging connectors, battery disconnect units, high voltage connectors. - Electrification / high-voltage related products (given the global parent's emphasis on wiring, high-voltage, and EV/HEV components). Installed Capacity Yazaki India Private Limited has 13 Plants and 3 Technical centre, 1 Software Centre with close to 20,000 employees.
Key clients Key clients include major OEMs such as Maruti Suzuki India Ltd, Tata Motors Ltd, Mahindra & Mahindra, Toyota Kirloskar Motors Ltd, Honda Cars India Ltd and Ashok Leyland Ltd.	

Key facts	Brief profile
Revenue by Geography: They are primarily focused on the domestic market with ~ 85–90% share in the total revenue, with growing export presence. EV Revenue as a % of total Revenue: NA Vehicle segment wise revenue mix: NA	

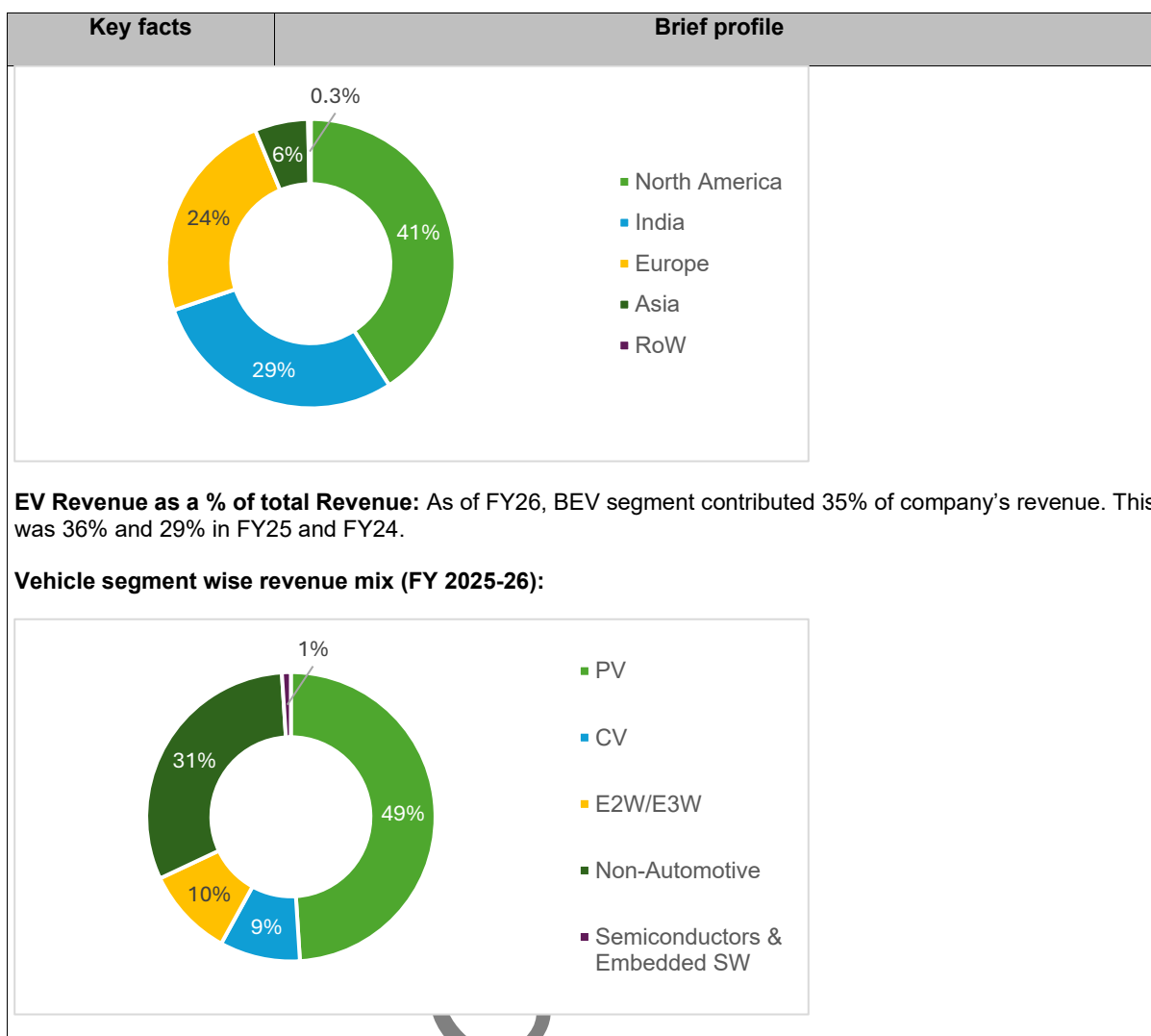
Source: Company reports, CRISIL Intelligence

Uno Minda Limited

Key facts	Brief profile
Year of incorporation: 1992 HQ: Gurgaon, Haryana	Uno Minda Limited, formerly known as Minda Industries Limited is a leading global Tier-1 automotive components and systems supplier, headquartered in India, with six decades of experience and a diversified product portfolio spanning many vehicle segments. The company serves both domestic and global OEMs across two-wheelers (2W), four-wheelers (4W), passenger vehicles (PV), commercial vehicles (CV), off-road serving both internal combustion engines (ICE) and electric/hybrid vehicles. Uno Minda's PACE (Personalization, Autonomous, Connected and Electrified) strategy guides its shift toward advanced, electronics-driven mobility solutions. Product mix: • Personalisation (Components that allow enhanced comfort, style, or user-specific features): Ambient lighting systems, Advanced switches & HMI (touch, gesture, capacitive), Premium seating systems & comfort modules, Smart control units. • Autonomous (Components supporting ADAS and driver-assistance): ADAS sensors (ultrasonic, radar partnerships, cameras with partners), Parking assistance systems, Driver monitoring sensors, Safety & alert modules. • Connected (Components enabling connectivity and communication inside the vehicle): Telematics units, Connected gateways & controllers, Vehicle communication modules, In-vehicle networking & electronics. • Electrified (EV-specific and electrification-friendly components): EV chargers (on-board charger), DC-DC converters, Motor controllers, Battery management-related electronics, EV sensors & powertrain components. Installed Capacity As of FY2024-25, Uno Minda Limited operates 76 manufacturing plants globally, comprising 70 facilities in India and 6 overseas plants across regions such as ASEAN, Europe, North America, and Latin America. The company manages a diversified base of 28 product lines, serving major vehicle segments including two-wheelers, passenger vehicles, commercial vehicles, and off-road applications.
Key clients Major clients of Uno Minda Limited are Maruti Suzuki, Hero MotoCorp, Honda Motorcycles, Mahindra & Mahindra, Hyundai, Tata Motors, Bajaj Auto. Revenue by Geography: Uno Minda's overseas revenue contributes to a small but growing share of 11.2% of total revenue. The remaining 88.8% was the domestic revenue in FY25. EV Revenue as a % of total Revenue: NA Vehicle segment wise revenue mix (FY 2024-25):	

Sona BLW Precision Forgings Limited (Sona Comstar)

Key facts	Brief profile
Year of incorporation: 1995 HQ: Gurugram, Haryana	Sona BLW Precision Forgings Limited, commonly known as Sona Comstar, is a leading global automotive technology company headquartered in Gurugram, India. The company specializes in designing, manufacturing, and supplying mission-critical automotive components and systems, with a focus on both electrified and non-electrified powertrain segments. The company is engaged in manufacture of precision forged bevel gears and differential case assemblies, conventional and micro-hybrid starter motors, EV traction motors for automotive and other applications. Their products are used in passenger vehicles, commercial vehicles, off-highway vehicles, electric two-wheelers and electric three-wheelers, as well as non-automotive applications. Product mix: - Passenger vehicle: Spool gears, Electronically Locking Differential (EDL), integrated motor controller module, starter motor, rotor shaft, differential assembly, differential bevel gears, intermediate gear, epicyclic geartrain - Commercial vehicle: Inter axle gear set, coupling/sleeves, intermediate gears, epicyclic geartrain, differential bevel gear, differential assembly, rotor shaft - Off-highway vehicles: Spiral bevel gears, portal axle gears, differential assembly, differential bevel gear - Electric two-wheeler: Hub wheel motor, integrated driver motor and controller, drive motor - Electric three-wheeler: Drive motors - Non-automotive: Zone monitoring sensors, axle mounted disc brake system, microprocessor-controlled brake system, electro-pneumatic brake system, automatic coupler, semi-automatic coupler, dampers Installed Capacity As of FY2025-26, company operates 12 manufacturing plants, 5 R&D centers, 3 engineering centers and 1 tool and die shop globally. The company has an installed gear production capacity of 64.1 million gears. In early 2026, the board approved an expansion to add 4.1 million gears, bringing to 68.2 million gears upon completion. The current capacity utilization sits at approximately 80%.
Key clients Tata Motors, Maruti Suzuki, Ashok Leyland, American Axle & Manufacturing (AAM), Daimler, Escorts, Mahindra & Mahindra and others. Revenue by Geography:	



Source: Company reports, CRISIL Intelligence

Peer Comparison

Rationale for selecting listed peers disclosed in the Draft Red Herring Prospectus

Dhoot Transmission is a specialized manufacturer of wiring harnesses, electronic sensors, and controllers, primarily serving the two-wheeler, passenger vehicle, and consumer durables segments. The selected listed peer set, comprising Motherson Sumi Wiring India Limited, Minda Corporation Limited, Uno Minda Limited, and Sona BLW Precision Forgings Limited, represents companies with significant business model alignment to Dhoot Transmission for the following reasons:

- Core Product Alignment (Wiring Harness & Electricals):** Motherson Sumi Wiring India and Minda Corp are direct peers in the electrical distribution systems (EDS) and wiring harness segment, which constitutes a core revenue stream for our company while Sona Comstar BLW focuses on 2&3 wheeler EVSE components.
- Segment Specialization:** These companies maintain a heavy focus on automotive electricals and electronics, including sensors and controllers, mirroring Dhoot Transmission's integrated technology setup.
- OEM Customer Profiles:** All selected peers, like Dhoot Transmission, are Tier-1 suppliers with deep-rooted relationships with major global and Indian OEMs across two-wheelers and passenger vehicles.

- d. **Operational and Financial Comparability:** These entities operate under similar market dynamics, including raw material price volatility (e.g. copper) and the transition toward electric vehicle (EV) electronics, ensuring their financial and operating metrics provide a representative benchmark.

Rationale for non-inclusion of other listed companies in the automotive sector

Unlisted Entity Status: Several key product-level competitors are unlisted private companies or divisions of foreign parents not independently listed in India. These include:

- a. **Wiring Harness & Cables:** Yazaki India, HTL, and Sunchirin Autoparts. Sensors: Sensata India and Denso India. Switches & EV Products: Anupam Industries, Rapidtron and Delta.
- b. Certain listed companies such as Exide Industries and Amara Raja Energy & Mobility were excluded as they are primarily battery manufacturers. Their financial drivers, capital expenditure requirements, and asset turnover ratios are dictated by the lead-acid battery markets, which differ fundamentally from Dhoot Transmission's focus on wiring harnesses and electronic controllers.

FY26

	Dhoot Transmission	Minda Corporation Limited	Uno Minda	Motherson Sumi Wiring	Sona BLW Precision Forgings Limited	Average
Revenue from Operations (Rs mn)	45,249.55	61,853.4	196,575.90	114,775.8	44,751.48	-
Revenue Growth (%)	31.35%	22.33%	17.19%	23.15%	25.90%	23.98%
EBITDA (Rs mn)	7,109.89	7210.90	21,820.00	11,880.00	11,069.00	-
EBITDA Margin (%)	15.71%	11.66%	11.10%	10.35%	24.73%	14.71%
PAT (Rs mn)	3,968.42	3,582.20	12,840.60	6,251.80	6,402.00	-
PAT Margin (%)	8.70%	5.79%	6.53%	5.45%	14.31%	8.16%
Return on Capital Employed (ROCE %)	19.14%	23.10%	18.30%	NA	15.40%	18.96%
Return on Equity (ROE %)	16.30%	NA	18.60%	NA	13.20%	16.03%
Return on Net Assets (RONA %)	30.37%	NA	NA	NA	NA	-
Net debt to EBITDA	-0.25	1.2	NA	0.1	-0.9	-
Count of Manufacturing Plants	22	42	78	30	12	-

Revenue from operation by user segment						-
2W	65.47%	48%	42%	12%	10%	-
3W	12.86%		3%	NA		-
Others	21.67%	52%	55%	88%	90%	-

Source: Company Annual Reports, CRISIL Intelligence

1. The KPIs for MSWIL, Minda Corporation Limited, Uno Minda and Sona BLW Precision Forgings Limited are reported as stated in the annual report. Dhoot Transmission KPIs are calculated using the below definitions
2. *Represents x (times)
3. Yazaki India Private Limited's financials for FY26 have not been published and therefore have not been included in the peer comparison
4. All financials are consolidated unless stated otherwise.
5. Revenue from Operations comprises the revenue from contracts with customers and other operating revenue such as sale of scrap.
6. Growth in revenue from operations (%) is calculated as a percentage of revenue from operations of the relevant year minus revenue from operations of the preceding year, divided by revenue from operations of the preceding year.
7. EBITDA refers to earnings before interest, taxes, depreciation and amortization, exceptional items and is calculated as restated profit before tax, exceptional items and share of profit of investments accounted for using equity method plus depreciation and amortization expense plus finance cost less other income.
8. EBITDA Margin (%) is the percentage of EBITDA divided by revenue from operations.
9. Profit after tax for the year ("PAT") as appearing in the Restated Consolidated Financial Information.
10. PAT Margin (%) is calculated as Profit after tax for the year as a % of Total Income.
11. RoE is calculated as PAT for the year divided by Total Equity as at the end of year/period.
12. RoCE is calculated as Earnings before interest and taxes (EBIT) divided by Capital Employed. EBIT is calculated as restated profit before tax and exceptional items plus finance cost. Capital Employed is computed as sum of Total Equity plus borrowings shown under non-current liabilities and other borrowings shown under current liabilities.
13. Return on Net Assets is calculated as Earnings before interest & taxes (EBIT) divided by sum of net property, plant & equipment, inventory trade receivables less trade payables.
14. Net Debt to EBITDA is calculated as Net debt divided by EBITDA, Net Debt is Total Debt minus Cash & Cash equivalent & Other Bank Balances. Total debt is calculated as sum of borrowings and lease liabilities shown under non-current liabilities and other borrowings and lease liabilities shown under current liabilities
15. **Other include passenger car, commercial vehicles, Special products groups such as off road vehicles, tractors etc and Others including tier 1/ 2 suppliers
16. ^Sona BLW Precision Forgings Limited reports 2W and 3W revenue as E2W/E3W revenue
17. ^^Others include PV, CV, non-automotive, semiconductors & Embedded SW
18. *Others include 4W, CV and OR
19. ^XOthers include After Market, passenger vehicles, and commercial vehicles
20. The above stated peer average may not be representative of the industry average. This average is calculated for the above listed sample set only.

9MFY26

	Dhoot Transmission	Minda Corporation Limited	Uno Minda	Motherson Sumi Wiring	Sona BLW Precision Forgings Limited	Average
Revenue from Operations (Rs mn)	32,476.74	44,815.30	143211.8	81,429.6.00	31,919.62.00	-
Revenue Growth (%)	NA@	19.99%	16.94%	19.56%	19.05%	18.74%
EBITDA (Rs mn)	5,305.70	5177.2	16,484.00	7,862.5	7,853.16.00	-
EBITDA Margin (%)	16.34%	11.55%	11.51%	9.66%	24.60%	14.32%

PAT (Rs mn)	3,026.74	2342.2	9323	4578.8	4,423.31.00	-
PAT Margin (%)	9.23%	5.22%	6.51%	5.62%	13.86%	7.38%
Return on Capital Employed (ROCE %)	22.26%	NA	NA	NA	15.60%	-
Return on Equity (ROE %)	23.11%	NA	NA	NA	13.00%	-
Return on Net Assets (RONA %)	25.76%	NA	NA	NA	NA	-
Net debt to EBITDA	1.51	NA	NA	NA	-1.04	-
Count of Manufacturing Plants	22	32	76	NA	12	-
Revenue from operation by user segment						-
2W	66.45%	Q1- 47.00% Q2- 45.00% Q3- 45.00%	Q1- 46.00% Q2-48.00% Q3-42.00%	NA	10.00%^	-
3W	13.20%		Q1- 2.00% Q2-3.00% Q3-3.00%	NA		-
Others	20.36%	Q1- 53.00% ^{xx} Q2-55.00% ^{xx} Q3-55.00% ^{xx}	Q1- 52.00% [#] Q2-49.00% [#] Q3-55.00% [#]	NA	90.00% ^{^^}	-

Source: Company Annual Reports, CRISIL Intelligence

1. The KPIs for MSWL, Minda Corporation Limited, Uno Minda and Sona BLW Precision Forgings Limited are reported as stated in the investor presentation. Dhoot Transmission KPIs are calculated using the below definitions.
2. *Represents x (times)
3. The figures are not annualised
4. Yazaki India Private Limited's financials for 9MFY26 have not been published and therefore have not been included in the peer comparison
5. All financials are consolidated unless stated otherwise.
6. Revenue from Operations comprises the revenue from contracts with customers and other operating revenue such as sale of scrap.
7. Growth in revenue from operations (%) is calculated as a percentage of revenue from operations of the relevant year minus revenue from operations of the preceding year, divided by revenue from operations of the preceding year.
8. EBITDA refers to earnings before interest, taxes, depreciation and amortization, exceptional items and is calculated as restated profit before tax, exceptional items and share of profit of investments accounted for using equity method plus depreciation and amortization expense plus finance cost less other income.
9. EBITDA Margin (%) is the percentage of EBITDA divided by revenue from operations.
10. Profit after tax for the year ("PAT") as appearing in the Restated Consolidated Financial Information.
11. PAT Margin (%) is calculated as Profit after tax for the year as a % of Total Income.
12. RoE is calculated as PAT for the year divided by Total Equity as at the end of the year/period. Total Equity is calculated as equity share capital plus other equity.

13. *RoCE is calculated as Earnings before interest and taxes (EBIT) divided by Capital Employed. EBIT is calculated as restated profit before tax and exceptional items plus finance cost. Capital Employed is computed as sum of Total equity plus borrowings shown under non-current liabilities and other borrowings shown under current liabilities.*
14. *Return on Net Assets is calculated as Earnings before interest & taxes (EBIT) divided by sum of net property, plant & equipment, inventory trade receivables less trade payables.*
15. *Net Debt to EBITDA is calculated as Net debt divided by EBITDA, Net Debt is Total Debt minus Cash & Cash equivalent & Other Bank Balances. Total debt is calculated as sum of borrowings and lease liabilities shown under non-current liabilities and other borrowings and lease liabilities shown under current liabilities*
16. *^Sona BLW Precision Forgings Limited reports 2W and 3W revenue as E2W/E3W revenue*
17. *^^Others include PV, CV, non-automotive, semiconductors & Embedded SW*
18. *xxOthers include After Market, passenger vehicles, and commercial vehicles*
19. *#Others include 4W, CV and OR*
20. *@Previous comparable period not part of the audited restated financial statements and as such comparative numbers are not included in the above table*
21. *The above stated peer average may not be representative of the industry average. This average is calculated for the above listed sample set only.*

FY25

	Dhoot Transmission	Minda Corporation Limited	Uno Minda	Motherson Sumi Wiring	Sona BLW Precision Forgings Limited	Average
Revenue from Operations (Rs mn)	34,448.63	50,562.00	1,67,746.10	93,194.00	35,545.35	-
Revenue Growth (%)	23.13%	8.71%	19.55%	11.91%	12.00%	15.06%
EBITDA (Rs mn)	5,909.63	5,748.00	18,737.80	11,190.00	9,753.00	-
EBITDA Margin (%)	17.15%	11.37%	11.17%	12.01%	27.40%	15.89%
PAT (Rs mn)	3,538.87	2,554.00	9,429.50	6059	6,012.00	-
PAT Margin (%)	10.19%	5.05%	5.62%	6.50%	16.90%	8.87%
Return on Capital Employed (ROCE %)	29.66%	20.00%	18.90%	42.00%	18.40%	25.85%
Return on Equity (ROE %)	35.60%	NA	17.70%	0.36*	17.70%	-
Return on Net Assets (RONA %)	37.43%	NA	NA	NA	NA	-
Net debt to EBITDA	1.29	1.8	NA	0.3	-2.73	-
Count of Manufacturing Plants	22	32	76	30	12	-
Revenue from operation by user segment						-
2W	66.91%	47.00%	45.00%	13.00%	8.00%^	-

3W	12.50%		2.00%	NA		-
Others	20.59%	53.00% ^{xx}	53.00% [#]	87.00% ^{**}	92.00% ^{^^}	-

Source: Company Annual Reports, CRISIL Intelligence

21. The KPIs for MSWIL, Minda Corporation Limited, Uno Minda and Sona BLW Precision Forgings Limited are reported as stated in the annual report. Dhoot Transmission KPIs are calculated using the below definitions

22. *Represents x (times)

23. Yazaki India Private Limited's financials for FY25 have not been published and therefore have not been included in the peer comparison

24. All financials are consolidated unless stated otherwise.

25. Revenue from Operations comprises the revenue from contracts with customers and other operating revenue such as sale of scrap.

26. Growth in revenue from operations (%) is calculated as a percentage of revenue from operations of the relevant year minus revenue from operations of the preceding year, divided by revenue from operations of the preceding year.

27. EBITDA refers to earnings before interest, taxes, depreciation and amortization, exceptional items and is calculated as restated profit before tax, exceptional items and share of profit of investments accounted for using equity method plus depreciation and amortization expense plus finance cost less other income.

28. EBITDA Margin (%) is the percentage of EBITDA divided by revenue from operations.

29. Profit after tax for the year ("PAT") as appearing in the Restated Consolidated Financial Information.

30. PAT Margin (%) is calculated as Profit after tax for the year as a % of Total Income.

31. RoE is calculated as PAT for the year divided by Total Equity as at the end of year/period.

32. RoCE is calculated as Earnings before interest and taxes (EBIT) divided by Capital Employed. EBIT is calculated as restated profit before tax and exceptional items plus finance cost. Capital Employed is computed as sum of Total Equity plus borrowings shown under non-current liabilities and other borrowings shown under current liabilities.

33. Return on Net Assets is calculated as Earnings before interest & taxes (EBIT) divided by sum of net property, plant & equipment, inventory trade receivables less trade payables.

34. Net Debt to EBITDA is calculated as Net debt divided by EBITDA, Net Debt is Total Debt minus Cash & Cash equivalent & Other Bank Balances. Total debt is calculated as sum of borrowings and lease liabilities shown under non-current liabilities and other borrowings and lease liabilities shown under current liabilities

35. **Other include passenger car, commercial vehicles, Special products groups such as off road vehicles, tractors etc and Others including tier 1/ 2 suppliers

36. ^Sona BLW Precision Forgings Limited reports 2W and 3W revenue as E2W/E3W revenue

37. ^^Others include PV, CV, non-automotive, semiconductors & Embedded SW

38. #Others include 4W, CV and OR

39. ^{xx}Others include After Market, passenger vehicles, and commercial vehicles

40. The above stated peer average may not be representative of the industry average. This average is calculated for the above listed sample set only.

FY24

	Dhoot Transmission	Minda Corporation Limited	Uno Minda	Motherson Sumi Wiring	Yazaki India Private Limited	Sona BLW Precision Forgings Limited	Average
Revenue from Operations (Rs mn)	27,977.26	46,511.00	1,40,308.90	83,274.00	41,221.61	31,847.82	-
Revenue Growth (%)	31.60%	8.16%	24.87%	17.82%	19.86%	19.00%	20.22%
EBITDA (Rs mn)	5,123.98	5,144.00	15,852.60	10133	2,340.80	9,021.00	-
EBITDA Margin (%)	18.31%	11.06%	11.30%	12.17%	5.68%	28.30%	14.47%
PAT (Rs mn)	2,987.48	2,272.00	8,754.20	6383	1,161.94	5,173.00	-
PAT Margin (%)	10.67%	4.88%	6.24%	7.67%	2.82%	16.30%	8.10%

Return on Capital Employed (ROCE %)	33.56%	20.00%	19.80%	48.00%	15.21%	31.00%	28.00%
Return on Equity (ROE %)	39.88%	NA	19.30%	0.42*	32.08%	28.50%	-
Return on Net Assets (RONA %)	41.05%	NA	NA	NA	16.07%	NA	-
Net debt to EBITDA	0.99	0.3	NA	0.1	5.34	-0.08	-
Count of Manufacturing Plants	20	29	74	26	NA	10	-
Revenue from operation by user segment							-
2W	64.53%	47.00%	46.00%	14.00%	NA	5.00%^	-
3W	11.71%		NA	NA	NA		-
Others	23.76%	53.00% ^{xx}	54.00% [#]	86.00% ^{**}	NA	95.00% ^{^^}	-

Source: Company Annual Reports, MCA, CRISIL Intelligence

- The KPIs for MSWIL, Minda Corporation Limited, Uno Minda, Sona BLW Precision Forgings Limited and Yazaki India Private Limited are reported as stated in the annual report. Dhoot Transmission KPIs are calculated using the below definitions.
- *Represents x (times)
- Yazaki India Private Limited financials are calculated using the below definitions and MCA reported financials
- All financials are consolidated unless stated otherwise.
- Revenue from Operations comprises the revenue from contracts with customers and other operating revenue such as sale of scrap .
- Growth in revenue from operations (%) is calculated as a percentage of revenue from operations of the relevant year minus revenue from operations of the preceding year, divided by revenue from operations of the preceding year.
- EBITDA refers to earnings before interest, taxes, depreciation and amortization, exceptional items and is calculated as restated profit before tax, exceptional items and share of profit of investments accounted for using equity method plus depreciation and amortization expense plus finance cost less other income.
- EBITDA Margin (%) is the percentage of EBITDA divided by revenue from operations .
- Profit after tax for the year ("PAT") as appearing in the Restated Consolidated Financial Information .
- PAT Margin (%) is calculated as Profit after tax for the year as a % of Total Income .
- RoE is calculated as PAT for the year divided by Total Equity as at the end of year/period .
- RoCE is calculated as Earnings before interest and taxes (EBIT) divided by Capital Employed. EBIT is calculated as restated profit before tax and exceptional items plus finance cost. Capital Employed is computed as sum of Total Equity plus borrowings shown under non-current liabilities and other borrowings shown under current liabilities.
- Return on Net Assets is calculated as Earnings before interest & taxes (EBIT) divided by sum of net property, plant & equipment, inventory trade receivables less trade payables .
- Net Debt to EBITDA is calculated as net Debt divided by EBITDA, Net Debt is Total Debt minus Cash & Cash equivalent & Other Bank Balances. Total debt is calculated as sum of borrowings and lease liabilities shown under non-current liabilities and other borrowings and lease liabilities shown under current liabilities.
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Threats and Challenges

Demand Side Challenges

Economic Slowdown and Industrial Output Decline

The automotive Industry and within it the two-wheeler, three-wheeler, passenger vehicle, and commercial vehicle industry are very closely linked to the performance of the economy. Economic slowdowns result in reduced industrial activities and lower consumer spending, directly affecting automotive segments such as two-wheelers, three-wheelers, passenger vehicles and commercial vehicle sales. We have projected real GDP growth to be 6.5% for fiscal 2026. Any moderation to GDP growth may have an impact on Industrial output and investment and consequentially on the automotive and auto-component Industry.

Impact of changing interest rates scenario

A sustained high level of inflation could lead to rate hikes by the central bank thereby impacting interest rates. The transmission of past rate hikes by the Monetary Policy Committee (MPC) have largely played out amid tight liquidity conditions. There could be further rise in market lending rates in the near term on account of many other macroeconomic conditions thereby leading to an increase in lending rates impacting cost of purchase.

The two-wheeler industry has a large contribution of sales from the rural areas primarily for motorcycles. Purchases in these areas are largely cash driven, but we are witnessing a decline in cash transactions as access to financing options has significantly improved in the last few years. Moreover, both public and private players offer attractive interest rates and schemes to promote more sales. If interest rates firm up, there is expected to be pressure on the industry in terms of consumers postponing their purchase decisions.

Increase in vehicle cost of ownership

A vehicle's cost of ownership is determined by its cost of acquisition and cost of operations, and both have a significant impact on the demand. The cost of vehicle acquisition rises when OEMs transfer the impact of increased manufacturing costs to the customers. In the past, industry has seen price hikes owing to several reasons like implementation of emission norms, increase in raw material prices and general inflationary hikes. These are also likely to push vehicle prices upwards going forward. Auto finance rates are also pivotal in determining affordability. The cost of operations for a customer is directly impacted by fluctuations in crude oil prices and INR USD exchange rates, that cause rise in fuel import costs and overall fuel prices. Geopolitical issues like the Middle East and Russia-Ukraine war, etc. could also impact fuel prices thereby having a bearing on the vehicle demand and in turn for the metal product suppliers.

Price escalations on account of regulatory push

Based on European emission standards, the Indian government has implemented stricter emission standards across the 2W, 3W, PV, CV and industrial markets such as BS VI, Tractor Emission Norms Stage IV (TREM IV), Bharat stage CEV and CPCB IV+. For the BS-VI stage 2 norms, applicable from fiscal 2024, companies have invested in the relevant technology, research, and development, and signed joint ventures (JVs) with global players. These norms have resulted in price hikes for vehicles across segments owing to the introduction of new technologies to meet new emission regulations. India and other countries are expected to continue implementing stricter emission standards across the 2W, 3W, PV, CV and OH markets, such as CAFÉ III which could potentially raise vehicle prices. Furthermore, the ABS mandate for all two-wheelers from January 2026, are likely to increase the vehicle price owing to the additional ABS fitment.

Inherent cyclicity of the domestic 2W, 3W and PV industry

The two-wheeler and passenger vehicle industry has close linkages with growth in GDP as well as business cycles impacting incomes of probable customers thereby making the industry susceptible/vulnerable to these changes. This cyclical nature of the two-wheeler and passenger vehicle industry poses constant challenges to the industry players and component suppliers as they have to constantly manage inventory optimally and profitably.

Increasing Complexity of Wiring Harnesses in Electric Vehicles

Modern vehicles including EVs and hybrids demand superior/high performance wiring harnesses compared to the traditional ones. Higher wiring densities, advanced materials, and electromagnetic interference (EMI) concerns require specialized designs and testing. Manufacturers must invest in design tools, develop new materials, and enhance testing to ensure high-quality, flame retardant, reliable harnesses that meet safety and performance standards, mitigating risks and supporting the growth of the EV market effectively.

Supply Side Challenges

Raw Material Availability and Cost

Cost Management: Fluctuating prices of raw materials like aluminium, iron and steel pose significant challenges to managing costs. A sudden spike in prices, such as the increase in iron ore prices, can erode profit margins and make it difficult to offer competitive pricing to customers. Metal product manufacturers must either absorb these costs, reducing profitability, or pass them on to customers, potentially losing business to cheaper alternatives.

Supply Chain Disruptions: Volatile raw material prices can also lead to supply chain disruptions if suppliers are unable to secure consistent and affordable supplies. This inconsistency can result in production delays and missed deadlines, damaging relationships with OEMs and other key clients.

For instance, the outbreak of the Russia-Ukraine war sent the commodities market into a frenzy, as regions that sourced materials from these countries went into panic mode, with surge in input costs and finished product prices for metal and steel products. The surge in export realizations sent domestic prices on a rally as well, thus impacting on procurement prices for domestic consumption. Also, key raw materials including lithium and rare earth magnets used in EV components manufacturing are majorly imported. Supply chain disruption and any escalations/geo-political tensions can impact this.

Skilled Labour Shortage

Skilled labour is one of the most important supply side aspects in the manufacturing sector. Training and retaining skilled workers in areas such as welding, fabricated assembly, surface finishing, precision manufacturing and power electronics industry is a key driving factor for success of any segment of the industry. Thus, inadequate availability of skilled labour can be one of the significant challenges impacting the power electronics manufacturing industry in India. This shortage can span across various facets, from production to maintenance and innovation, ultimately affecting the industry's growth and global competitiveness.

Technological Obsolescence

Technological obsolescence refers to the phase-out of technologies as newer, more efficient, and advanced technologies emerge. In India's manufacturing sector, technological obsolescence can be a potential challenge, affecting competitiveness, productivity, and innovation capacity.

Increasing Competition

A surge in new entrants and portfolio expansions by legacy players intensifies competition, making customer acquisition challenging. Further, the availability of inexpensive alternatives in the domestic market through imports from countries like China is a major challenge for domestic component makes.

Policy and Regulatory Challenges

Changes in tax and duties regime

Changes in duties and tax structures present significant threats to the automotive industry. These changes can have multifaceted impacts on cost structures, supply chains, and overall competitiveness. This threat is particularly significant due to India's evolving tax landscape and the government's periodic adjustments to import duties and other taxes. For instance, the initial phase of GST implementation saw significant disruption. Many businesses faced challenges adapting to the new tax structure, leading to temporary slowdowns in the manufacturing value chain.

The Indian government periodically revises import duties on raw materials such as steel and aluminium, which are essential. Increased costs due to higher import duties are often difficult to pass on to customers, especially in a highly competitive market. This squeeze in profit margins forces manufacturers to absorb the additional costs, potentially reducing their financial health and capacity to invest in new technologies or expansion. Hence, changes in duty and tax structures across the automotive value chain pose significant threats by increasing costs, complicating compliance, and creating market instability.

Ad hoc changes in policies

A challenge that the industry is facing is frequent changes in policies which make it difficult for auto industry stakeholders not only to ensure adherence but also commit investments. Overall policy stability and transparency will be required going forward to ensure smooth technology transition and localization in the country.

Crisil

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Crisil Intelligence is a leading provider of research, consulting, risk solutions and advanced data analytics, serving clients across government, private and public enterprises. We leverage our expertise in data-driven insights and strong benchmarking capabilities to help clients navigate complex external ecosystems, identify opportunities and mitigate risks. By combining cutting-edge analytics, machine learning and AI capabilities with deep industry knowledge, we empower our clients to make informed decisions, drive business growth and build resilient capacities.

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About Crisil

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A large, light gray watermark of the word "Crisil" is oriented diagonally from the bottom left towards the top right, spanning across the middle of the page.