



CREDESCENCE CAPITAL

(Investment Club of IIM Lucknow)

Indian Automobile Industry

Introduction

The Indian automobile industry is currently the world's 4th largest automobile market, poised to become the world's 3rd largest by 2030. It contributes 7.5% to GDP & ~49% to manufacturing output. This sector has been one of the largest recipients of FDI with an inflow of \$32.8 billion in the last two decades, accounting for ~6.0% of the total FDI inflows to the country in the last 7 years. India holds a strong position in the international heavy vehicles arena as it is the largest tractor manufacturer, second-largest bus manufacturer, and third-largest heavy-trucks manufacturer in the world.

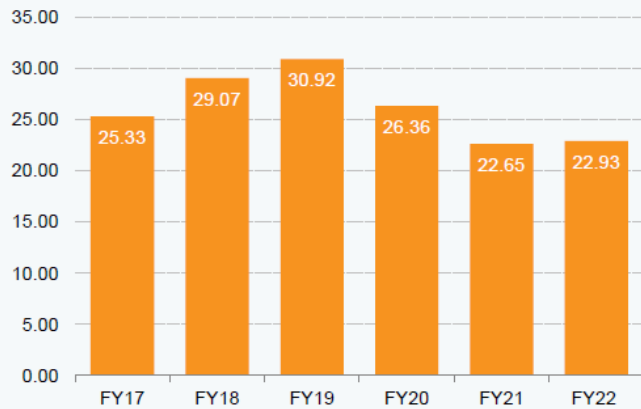
The Indian Automobile industry has been seeing a slowdown since late 2018, when it witnessed the steepest plunge of 18.71% in 19 years in July 2019. This slowdown has been driven by many factors, including demonetization, NBFC crisis, low GDP growth, GST implementation, increasing fuel costs, the COVID-19 pandemic, and anxiety about the BS6 norms.

The industry has picked up a lot post it faced zero sales in April 2020 (national lockdown days). The partnership between the government and industry has been the driving factor. The timely reopening of manufacturing plants, favorable monetary policies, and government support further supported demand revival.

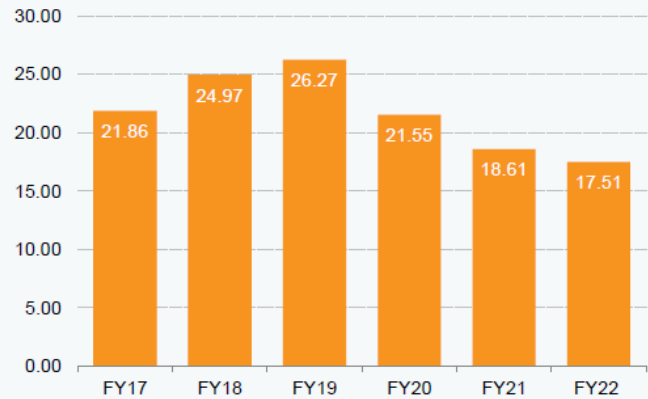
- FY21 faced a 14.9% YoY decline in auto sales while FY21 faced a 13.5% YoY decline. For the first time negative growth for two consecutive years. However, post the opening up of the economies the sales have picked up and FY22 has witnessed a 1.7% YoY growth
- The EV market is expected to grow at a CAGR of 49% between 2022-2030 and is expected to hit 10 million units of annual sales by 2030. The EV industry will create 50 million direct and indirect jobs by 2030
- Passenger vehicles posted the highest-ever sales at 25,04,084 units in FY 2022-23 as on November 2022. The industry is expected to post a growth of 16% in FY23
- India's trucking market is expected to grow over 4x by 2050. The number of trucks is expected to more than quadruple, from 4 million in 2022 to roughly 17 million by 2050
- There is a shift in preferences of the customers as they have started to move towards larger/ more powerful vehicles across all segments:
 - Utility Vehicles – 49% in FY22 (vs. 39% in FY21)
 - Medium & Heavy Commercial Vehicles – 33% in FY22 (vs. 28% in FY21)



Number of Automobiles Produced in India (in million)



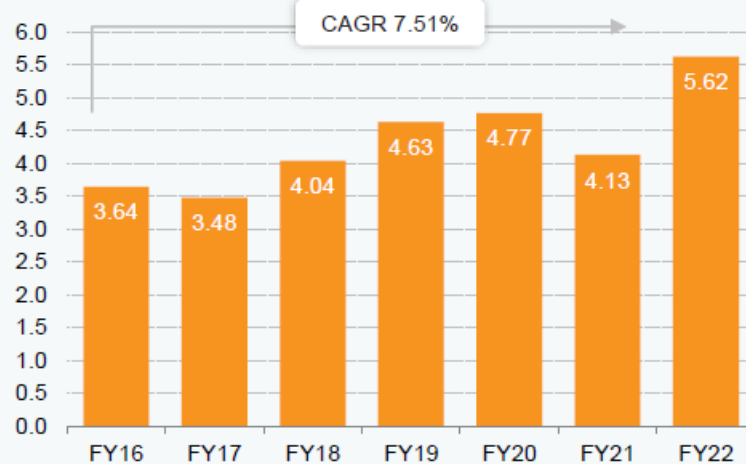
Number of Automobiles Sold in India (in million)



Indian Car Sales Figures - July 2022

OEM	July 2022	July 2021	Growth
Maruti Suzuki	98,318	114,607	-14.21%
Hyundai	40,056	45,081	-11.15%
Tata Motors	36,048	25,110	43.56%
Mahindra	19,307	16,465	17.26%
Kia	17,303	16,072	7.66%

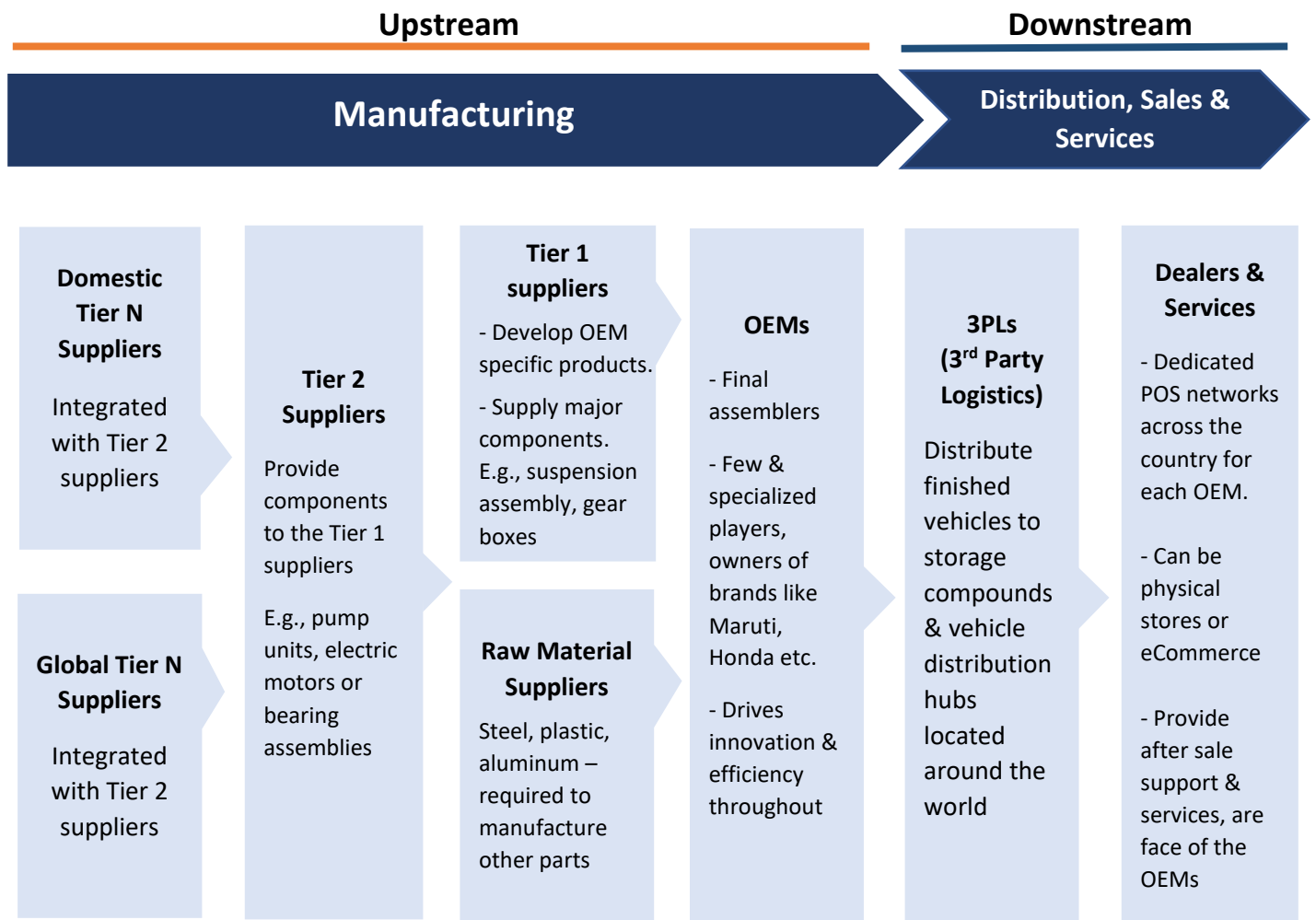
Number of Automobiles Exported (in millions)





Key Stakeholders & the Supply Chain

The automobile industry has a connected supply chain with multiple stakeholders impacting the final production at different levels. The auto ancillary industries include component manufacturers like BOSCH, Sundaram and tyre manufacturers like CEAT, MRF, Apollo.



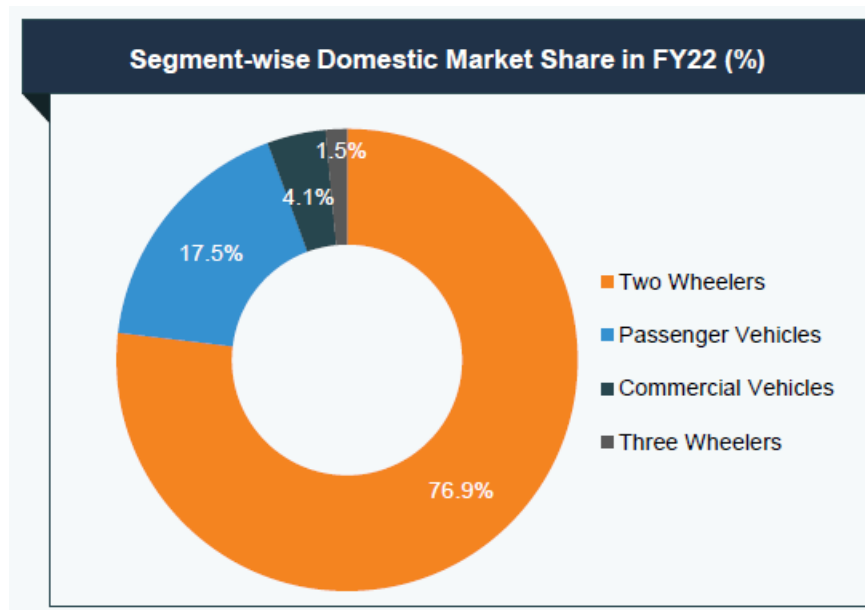
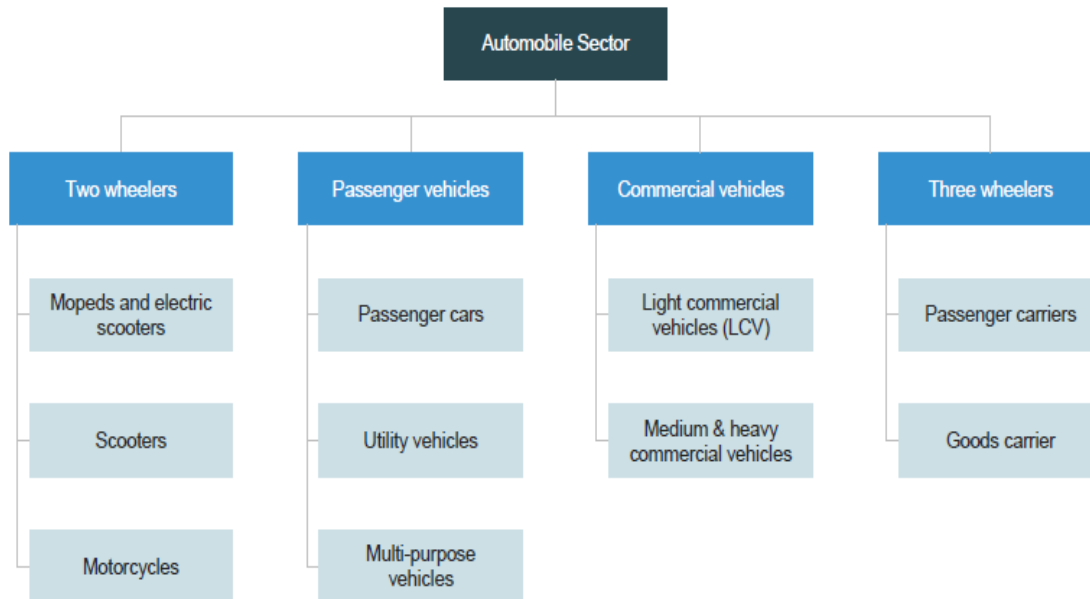
Industry Value Chain





Major segments

It comprises of commercial vehicles, passenger cars, three & two-wheelers with the two-wheelers and passenger vehicles contributing to a majority of the domestic demand.



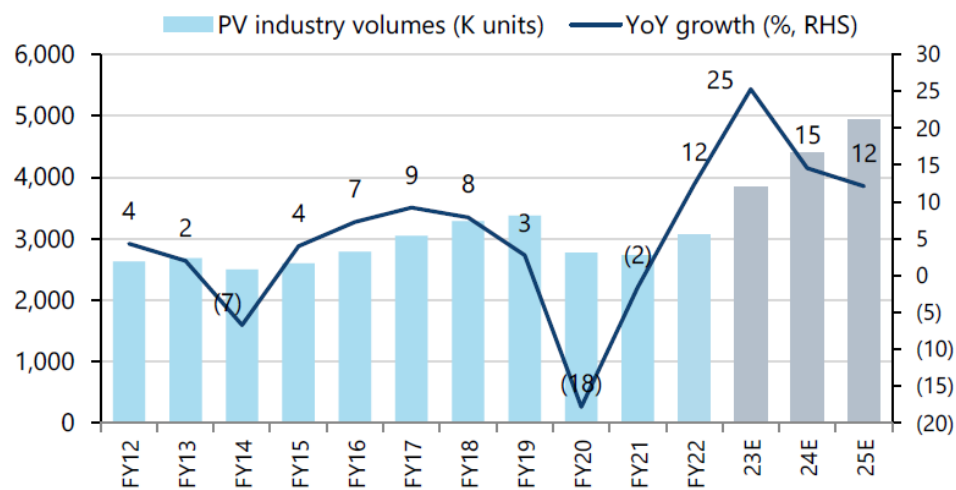
These segments can further be either of the following types – Internal combustion engines, Electric Vehicles & Hybrid vehicles. The auto market can be largely divided into – New Vehicles & Used vehicle markets



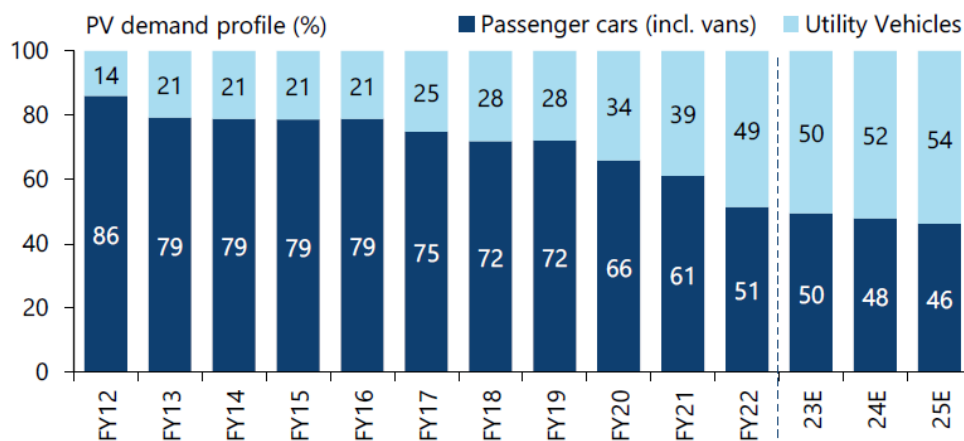
SEGMENT WISE ANALYSIS

Passenger Cars & Utility Vehicles

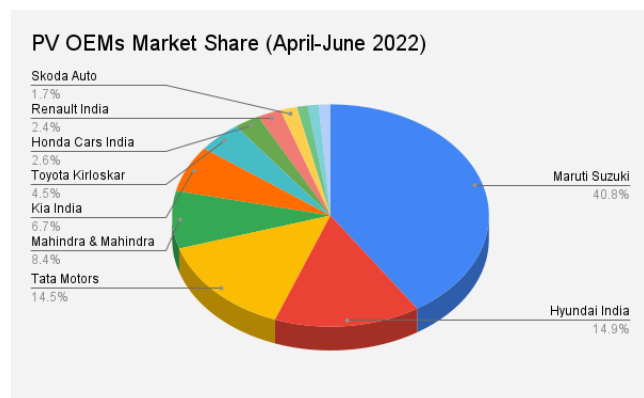
- In FY22, the total automobile production reached 22,933,230. In 2019-20, the total production was ~26 million, while ~23 million units were produced in FY21
- Sales for FY22 for the Passenger Vehicle segment is still lower than the level of 2017-18
- Two-wheelers and passenger vehicles dominate the domestic Indian auto market. Passenger car sales are dominated by small and mid-sized cars. Two-wheelers and passenger cars accounted for 76.9% and 17.5% market shares, respectively, in FY22
- Passenger car sales are dominated by small and mid-sized cars
- There is a step increase in the market share and demand for Utility Vehicles (UVs)



Source: Jefferies



Source: Jefferies



Maruti has remained the undisputed market leader in this segment with other players like Hyundai, Renault, and Ford trying to gain share. Maruti's market share has been declining in the recent past, which is majorly due to increasing sales of UVs by brands like Kia Motors and MG Motors.

SUVs: The SUV upward demand trend was visible before the pandemic & has now solidified into an across-the-categories preference at the expense of sedans, the car category conventionally considered the centerpiece in any brand's offering.

Many carmakers got into the compact SUV category initially because market leader Maruti Suzuki did not have a presence in that segment. After the pandemic hit, consumers now see added value in buying an SUV instead of a sedan, as they are more suitable for family mobility, long trips and even weekend getaways. Hyundai's Creta, for instance, was selling just above 6,000 units a month two years ago; now it is selling nearly 12,000.

"The kind of growth compact SUV has seen is not present in any other segment"
- President of the Federation of Automobile Dealers Association

Factors that have affected this segment in COVID

- Global semi-conductor shortage
- Steep rise in commodity prices – e.g., steel
- Capacity of labor for production – due to social distancing restrictions, migration back to hometowns, etc.
- Keeping a close eye on the onset of a 3rd wave in India and across the world
- Consumer Behavior / Pent up-demand
- Substitute of buying a new car – leasing, renting, or used cars

Change in Consumer Behavior: Social distancing norms have resulted in a higher share of first-time buyers as well as salaried buyer since financier wants higher income certainty; Share of replacement buyers have been on a decline on account of the postponement of purchasing decisions amid income uncertainty. Low-priced petrol variants share increased due to lower cost compared to diesel variants



Raw materials cost has softened due to the drop in commodity prices which has been led by the decreased demand due to major economies not recovering completely from COVID-19

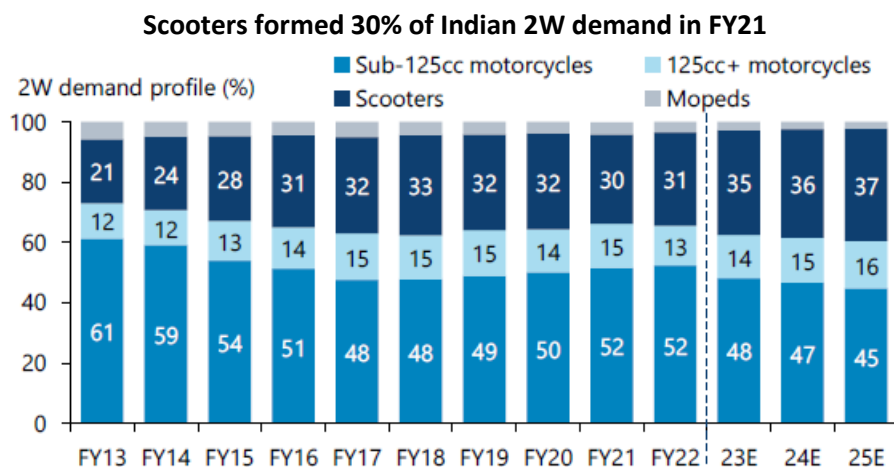
Low penetration: India's car market is highly underpenetrated compared with most developed economies and some developing nations. As of FY2019, India had ~23 passenger vehicles per 1,000 people. This is significantly lower than both developed nations and even other nations in the BRIC block (Brazil, Russia, and China) when compared to GDP per capita. The vehicle penetration is expected to reach 72 vehicles per 1000 people by 2025

Electric Vehicles: In order to curb pollution levels, electric vehicles are gaining global interest. In India as well, electric vehicles are gaining popularity as the government is extending support via FAME (Faster Adoption and Manufacturing of Hybrid and Electric vehicles) and tax rate cuts in order to give a boost to EV adoption. At current prices, the total cost for an EV Personal car is higher due to low running whereas for taxi segments it is lesser. The taxi segment accounts for ~10-15% of sales within passenger cars and within the taxi segment, cab aggregators are expected to lead the adoption of electric vehicles

Two Wheelers

The Indian 2W industry has emerged as the world's largest 2W market (~13 million domestic sales and ~4 million export volumes respectively in FY22) and ~60% of the total miles driven in India are traveled on two-wheels.

The demand in the two-wheeler segment is majorly dominated by motorcycles (~65% sales), scooters (~30%), and mopeds (~5%). Major players include market leader Hero MotorCorp, followed by Honda Motor & Scooters, TVS, Bajaj, Suzuki, Yamaha.



Source: Jefferies

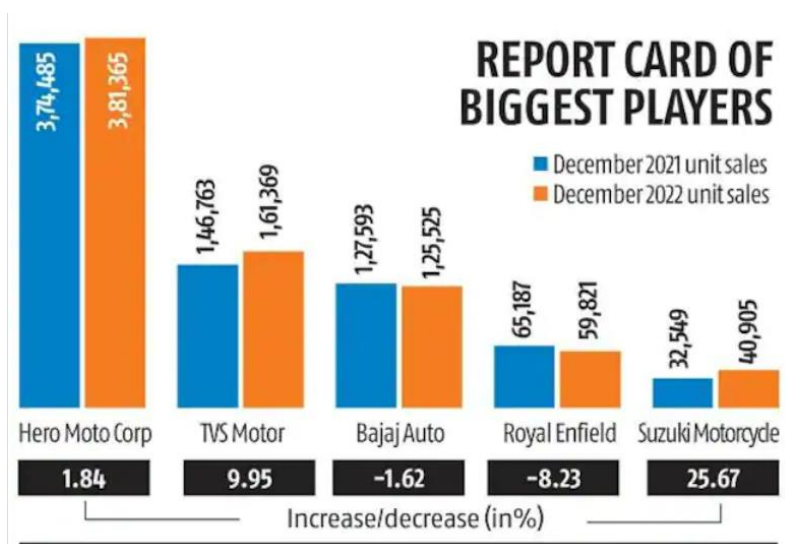


In FY22, two-wheeler sales in India saw a decrease from the previous years to 13.5 million units. Post the first wave of the pandemic and lockdown, 2-wheeler sales were driven by pent-up demand coming from - wedding season, rabi harvest, and non-availability of public transport.

In Q1 of 2022-23, According to SIAM, the sales of scooters of up to 125cc saw a drop of 36% in Q1 FY23 as against the corresponding quarter of FY19. Even the sales of mass segment motorcycles of up to 110cc dropped 42% in Q1 FY23 compared to the peak of Q1 FY19. This was majorly due to a significant increase in input cost, multiple price hike by OEMs and high fuel prices.

December 2022: Sales growth at the country's top two-wheeler makers was muted in December 2022 primarily due to tepid rural sentiment amid uneven monsoon, high inflation and slow post-pandemic recovery.

Five major two-wheeler makers - Hero MotoCorp, TVS Motor, Bajaj Auto, Royal Enfield and Suzuki Motorcycle-- cumulatively sold 768,985 units domestically in December 2022, which is just three per cent more than in December 2021



Electric Vehicles: For FY22, the E2W segment sales stood at 2,31,338 units was a significant 460% growth over 41,046 units sold in FY21. Leading the pack was Hero Electric whose sales increased from 14,771 units in FY21 to 65,303 units in FY22

Analysts believe that a meaningful shift towards EV would happen in a phased manner and Ola's capacity expansion would not have any sudden disruption on the ICE-based 2Ws. Moreover, OEMs have planned a slew of new EV launches over the next couple of years, rollouts for which would happen in conjunction with the development of adequate charging stations in India. This would enable them to grab a sizable pie of the E2W market.



Electric Two-Wheeler OEM	FY'22	MarketShare(%), FY'22	FY'21	Market Share(%),FY'21
HERO ELECTRIC VEHICLES PVT. LTD	65,303	28.23%	14,771	35.99%
OKINAWA AUTOTECH PVT LTD	46,447	20.08%	6,972	16.99%
AMPERE VEHICLES PRIVATELIMITED	24,648	10.65%	5,903	14.38%
ATHER ENERGY PVT LTD	19,971	8.63%	4,401	10.72%
PUR ENERGY PVT LTD	14,862	6.42%	2,079	5.07%
OLA ELECTRIC TECHNOLOGIES PVTLTD	14,371	6.21%	-	0.00%
TVS MOTOR COMPANY LTD	9,458	4.09%	837	2.04%
REVOLT INTELLICORP PVT LTD	7,623	3.30%	1,793	4.37%
BENLING INDIA ENERGY AND TECHNOLOGY PVT LTD	7,084	3.06%	1,108	2.70%
BAJAJ AUTO LTD	7,012	3.03%	1,470	3.58%
JITENDRA NEW EV-TECH PVT. LTD	3,788	1.64%	619	1.51%
MEW ELECTRICALS LIMITED	2,760	1.19%	327	0.80%
GOREEN E-MOBILITY PVT LTD	2,741	1.18%	227	0.55%
KLB KOMAKI PVT LTD	1,882	0.81%	38	0.09%
RGM BUSINESS PLUS PVT LTD	791	0.34%	-	0.00%
ELTHOR ENERGY PRIVATE LIMITED	525	0.23%	57	0.14%
ECO FUEL SYSTEMS (I) PVT LTD	439	0.19%	48	0.12%
BOOMA INNOVATIVE TRANSPORT SULUTIONSPVT LTD	241	0.10%	-	0.00%
CHANDANA CORPORATION	233	0.10%	-	0.00%
Others	1,159	0.50%	396	0.96%
Total	2,31,338	100.00%	41,046	100.00%

What can drive growth - In rural areas, rising penetration due to deeper distribution network and improving incomes of the farmer, with a good monsoon this season it is expected to support two-wheeler demand. Rural road connectivity plays an important role in driving two-wheeler sales. It acts as an income multiplier in the rural economy- aiding incomes while roads are constructed and enabling mobility and connectivity once the construction is over.

Tractors

Indian tractor industry is relatively young but now has become the largest market worldwide, accounting for one-third of the global production. The other major tractor markets in the world are China and US.

Apart from their primary application in agriculture operations, tractors are also used to haul bricks, sand, and farm produce. Currently, non-farm usage accounts for ~30% of the total demand. The domestic tractor sales declined 6.4% YoY in FY22 (~850k units)

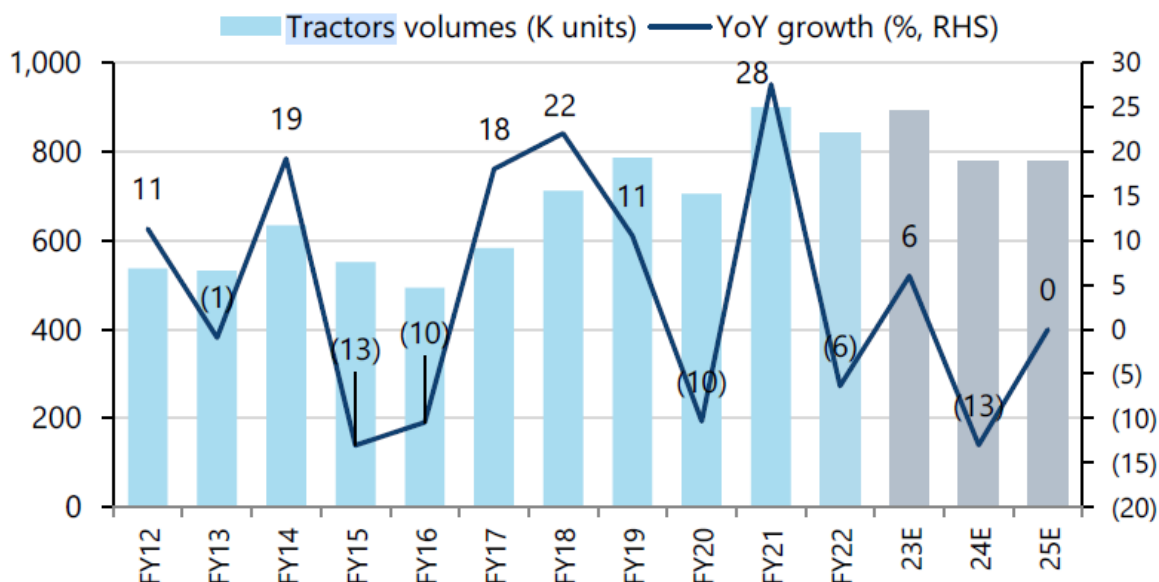


WholeSale: Domestic Tractor Industry FY'22 (Apr'21-Mar'22)						
Manufacturer	FY'22	FY'21	% Change	MS FY'22	MS FY'21	% Change
M&M Group	337052	343833	-1.97	40.02	38.23	1.79
Tafe Group	151481	165795	-8.63	17.98	18.43	-0.45
Sonalika	101060	117503	-13.99	12.00	13.06	-1.07
Escorts	87168	101849	-14.41	10.35	11.32	-0.97
John Deere	79308	85602	-7.35	9.42	9.52	-0.10
New Holland	32053	35828	-10.54	3.81	3.98	-0.18
Kubota	21104	16809	25.55	2.51	1.87	0.64
Preet	7152	6014	18.92	0.85	0.67	0.18
Indo Farm	6930	4611	50.29	0.82	0.51	0.31
VST	6633	8162	-18.73	0.79	0.91	-0.12
Force	4516	4001	12.87	0.54	0.44	0.09
Captain	3716	4446	-16.42	0.44	0.49	-0.05
ACE	2426	2540	-4.49	0.29	0.28	0.01
SDF	1667	2418	-31.06	0.20	0.27	-0.07
Total	842266	899411	-6.35	100.00	100.00	

Wholesale: Domestic Tractor Industry Dec 2022						
Manufacturer	Dec'22	Dec'21	% Growth	MS Dec'22	MS Dec'21	MS YoY
M&M Group	21640	16687	29.7	38.78	37.56	1.22
Tafe Group	10303	8157	26.3	18.47	18.36	0.10
Sonalika	6862	4841	41.7	12.30	10.90	1.40
John Deere	5443	4663	16.7	9.76	10.50	-0.74
Escorts	4979	4080	22.0	8.92	9.18	-0.26
Kubota	2261	1992	13.5	4.05	4.48	-0.43
New Holland	1972	1747	12.9	3.53	3.93	-0.40
Indo Farm	519	519	0.0	0.93	1.17	-0.24
Preet	435	430	1.2	0.78	0.97	-0.19
VST	414	407	1.7	0.74	0.92	-0.17
Force	405	404	0.2	0.73	0.91	-0.18
Captain	272	208	30.8	0.49	0.47	0.02
ACE	228	211	8.1	0.41	0.47	-0.07
SDF	62	80	-22.5	0.11	0.18	-0.07
Total	55795	44426	25.6	100.00	100.00	

Tractors is a cyclical industry, and as a trend in the last 15 years, each year of degrowth is followed by a few years of growth. The industry has grown by ~8.5% in the last 15 years. Monsoons remain the key driver for tractor demand.

The tractors market is dominated by Mahindra & Mahindra, maintaining a market share of more than 40%. Other players include Tafe Group, Sonalika, Escorts, etc.



Source: Jefferies

Tractors had a strong up-cycle in FY17-21, with volumes growing at 13% CAGR over five years. Industry volumes fell 6% in FY22 but have again grown 9% YoY in Apr-Nov '22

Reasons for future increase in Tractor production and sales:

- Monsoon trend points towards a robust FY22-23 period
- Farm income supported by higher agricultural output and increased MSP
- Increased grain procurement by Government

Government Initiatives: The government's objective of doubling farm income via initiatives such as e-NAM (National Agriculture Market), expansion of crop insurance coverage, direct income support, and improvement in land productivity via soil health cards. These measures should improve farmers' crop yields and affordability, and boost tractor penetration

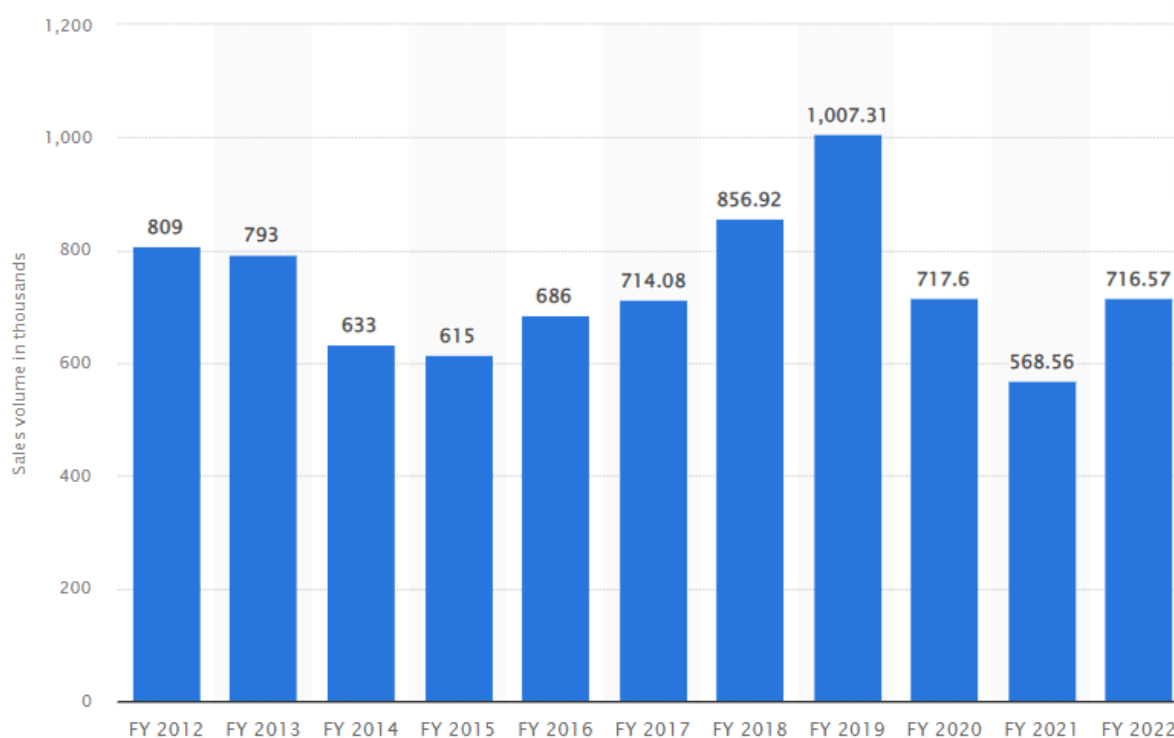
Irrigation investments have risen considerably in past 10 years, resulting in a consistent increase in irrigation intensity. This, in turn, heightened cropping intensity and led to higher and stable farm incomes over the period. Irrigation intensity is expected to continue to improve over the medium term, supporting tractor sales

Non-farm use: Tractor usage in non-farm activities has been increasing, with the government's focus on improving rural infrastructure. Tractors are used for carrying construction material such as bricks, cement and pipes, mining. Tractors are also being looked at as a better alternative to commercial vehicles, as tractors are more economical, can carry heavy weight, and easily used on rough, rural roads



COMMERCIAL VEHICLES

Based on the product type, the commercial vehicle market in India can be segmented into Light Commercial Vehicles (LCVs) and Medium & Heavy Commercial Vehicles (M&HCV). Tata Motors dominates the domestic commercial vehicle market across India with a share of about 44 percent followed by Mahindra & Mahindra (25%), Ashok Leyland (18%), VE Commercial (6%).



Source: Statista

Industry trends

- **Low impact of rising interest rates**
Interest rates have been rising continuously in CY2022, impacting financing costs and in turn EMIs of the operators. However, as long as freight rates remain steady and utilization remains high, the impact of higher interest rates shall not impact CV industry volumes
- **Easy availability of credit**
Controlled NPAs posted by all banks and NBFCs provide immense opportunities for them to disburse funds. The Loan to Value (LTV) ratios for CV buyers have become attractive
- **Lower demand for CNG vehicles**
The penetration of CNG trucks in SCVs has grown to nearly 30% of the overall CV industry, starting from Q2 and Q3 FY22. Reducing price difference is the major contributor to this statistic



Axle norm to lead to a shift from T-Trailers to MAVs The Ministry of Road Transport and Highways had notified new axle load norms for commercial vehicles, which allow for an increase in the load-bearing capacity of trucks by ~20%. The new axle norms will be applicable to the entire lot of freight-moving trucks, which might lead to lower truck purchases.

Historical + Outlook

The commercial vehicle (CV) industry is set to record a volume growth of 20-22 percent in FY23, benefitting from the strong demand and supply cycle while cost pressure remains high. Post recording the highest volume growth in fiscal 2019 since fiscal 2001, the CV industry went into a downturn, recording a sharp volume de-growth of around 29.7% and around 20.4% in FY20 and FY21, respectively. Reasons include multiple headwinds like the non-banking financial company (NBFC) liquidity crisis, easing of axle norms, increased vehicle cost (BS-VI transition and higher insurance premium), high fuel prices and economic contraction. Making it worse, the Covid-19 pandemic acted as the last nail in the coffin, resulting in the lowest volume in FY20 over the last decade.

A similar trend was seen in CV exports, which declined by 39.6% in FY20 and 16.6% in FY21, before recovering by 83.4% in FY22. The CV passenger segment (which contributed 20-22% of CV sales volume pre-Covid) was the worst hit during the pandemic, given the work-from-home norms and travel restrictions.

The strong growth traction, driven by an overall improvement in economic activities, rapidly growing infrastructure development with private and public capex, higher fleet utilization levels, the thriving e-commerce sector, and a rebound in replacement demand augurs well for the industry. While the LCV segment continued to sustain the growth momentum with an increase of 59% in volumes on a YoY basis in H1FY23, the MHCV segment recorded a substantial growth of 88 percent with improving industrial and infrastructure activities and higher fleet utilization.

Electric Vehicles

India represents the fourth largest automobile market in the world and the second largest two-wheeler market with ~22 million units. It is also a country with massive dependency on oil imports, with a USD 157 billion oil import bill in FY22. Pollution in many Indian cities has reached alarming levels. All these factors put together make a strong case for EV adoption in India. Pricing and infrastructure, though, continue to remain a challenge.

The electric vehicles industry is at a nascent stage in India. It is less than 1% of the total vehicle sales however has the potential to grow to more than 5% in a few years. At present, there are more than 5 lac electric two-wheelers and a few thousand electric cars on Indian roads. The



industry volumes have been fluctuating, mostly depending on the incentives offered by the government. Many serious players (Hero Eco, Ather, Electrotherm, Avon, Lohia, Ampere, etc) are continuing with the mission and trying to enforce a positive change under the banner of SMEV.

More than 90% of electric vehicles on Indian roads are low-speed electric scooters (less than 25km/hr) that do not require registration and licenses. Almost all electric scooters run on lead batteries to keep the prices low, however, battery failures and low life of batteries have become major limiting factors for sales besides government subsidies. Many manufacturers have taken the initiatives to install the charging station with limited success. Players like Lohia and Electrotherm have developed Electric three-wheelers. Ampere and Hero have entered the Electric Cycles segments. There are numbers of E-Rickshaw players mushrooming across the country and selling good numbers of E-rickshaws for last-mile connectivity.

The industry is almost ready for take-off but for the incentives. It is expected that with FAME-2 the industry may witness a quantum leap in volumes and technology. SMEV sees a great opportunity with EVs in reducing the Carbon footprint, and dependence on Crude oil imports, creating jobs and building a new Technology knowledge hub in India.

Electric Vehicle Sale - Dashboard (fig in Nos)									
Category	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23 (till 1st Jan'23)	Nov'22	Dec'22	Grand Total
E-2 Wheelers	1974	27254	26385	44166	247380	507113	76598	64348	854272
E-3 Wheelers	90411	114135	140754	88497	178171	276727	38727	33949	888695
E-4 Wheelers	2426	2452	2733	5931	20076	30628	3978	3788	64246
E-Buses	27	53	363	217	1066	1582	117	127	3308
Grand Total	94838	143894	170235	138811	446693	816050	119420	102212	1810521

Source: VAHAN

The details of demand incentives given under Faster Adoption and Manufacturing of (Hybrid and) Electric Vehicles in India (FAME) scheme phase-II till October '22, category-wise are as under:

Category	Amount
E-2 Wheelers	Rs. 2464.27 Cr. approx.
E-3 Wheelers	Rs. 351.21 Cr. approx.
E-4 Wheelers	Rs. 114.65 Cr. approx.
E-Buses	Rs. 687.93 Cr. approx.

Source: VAHAN



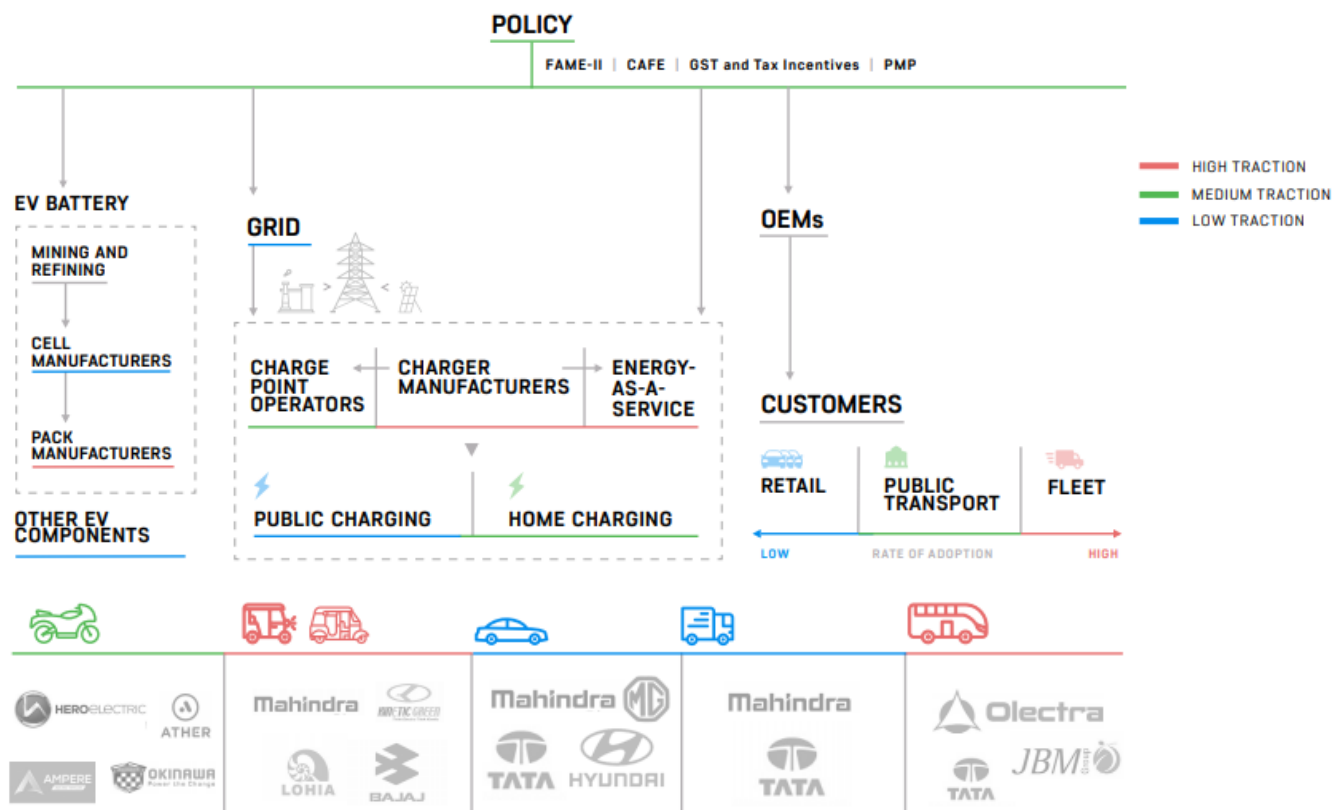
In the EV industry, 2-wheelers have seen major adoption in India. Available at low price points, it has become easier for the masses to make a shift to electric 2-wheelers than to electric cars.

Electric Two-Wheeler Sales FY 23													
S No	Maker	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Total	Market Share
1	Ola Electric	12708	9268	5897	3863	3475	9894	16346	16363	17280	16	95110	19%
2	Okinawa Autotech	11012	9308	6984	8098	8678	8496	14941	9063	5279	35	81894	16%
3	Hero Electric	6799	2964	6785	9281	10784	8206	8869	9025	8091	46	70850	14%
4	Ampere Vehicles	6790	6104	6875	6755	6733	6478	10076	12258	4409	12	66490	13%
5	Ather Energy	2451	3338	3830	1289	5377	6281	7357	7834	7646	7	45410	9%
6	TVS	1475	456	1972	4302	6386	3992	5811	8126	9317	176	42013	8%
7	Bajaj	1223	1803	1822	2483	2614	2605	3466	3029	3207	16	22268	4%
8	Revolt	1240	1586	2424	2319	1662	865	1041	525	37	0	11699	2%
9	Pure EV	1756	1464	1125	1000	881	790	1047	925	780	11	9779	2%
10	Benling	820	792	959	1167	1063	976	1422	1216	966	12	9393	2%
11	Okaya	0	19	760	1076	905	954	1967	1785	1449	3	8918	2%
12	Jitendra	915	626	549	847	647	661	1111	1255	669	2	7282	1%
13	Others	5097	3890	3775	3625	2696	2886	3570	5194	5218	56	36007	7%
Total		52286	41618	43757	46105	51901	53084	77024	76598	64348	392	507113	

Electric Two-Wheeler Sales			
FY 22	Market Share	FY 21	Market Share
14398	6%	0	0%
46452	19%	6972	16%
68757	28%	15921	36%
25297	10%	5997	14%
19980	8%	4401	10%
9667	4%	837	2%
7111	3%	1470	3%
7640	3%	1793	4%
14869	6%	2080	5%
7085	3%	1108	3%
0	0%	0	0%
3788	2%	619	1%
22336	9%	2968	7%
247380		44166	

This data is as per VAHAN Portal as on 02nd January 2023, it excludes Telangana & Lakshwadeep. This data does not include Low Speed Sales

EVs Ecosystem





- **Policy:** The role of policymakers is central to the evolution of electric vehicles. China has taken a massive lead over the rest of the world in EV adoption, with strong backing from its New Electric Vehicle Policy. The lack of economic parity is a major hurdle in the adoption of EVs today. Policymakers are trying to bridge this gap through subsidies to encourage EV adoption. They need to simultaneously adopt other levers also to encourage EV adoption further. The Indian policy has taken a number of positive steps toward promoting EV adoption, and FAME II is a significant leap among those. Mandated adoption targets, localization of key components, clear guidelines on regulations and standards, and EV adoption in public transport are some of the key levers.
- **Battery:** The battery not only constitutes 30-40% of the cost of the vehicle but is also the key to solving other hurdles like range anxiety, charge time reduction, the safety of EVs, etc. The availability of battery's raw material is a critical hurdle for the Indian EV industry. India does not have any meaningful reserves of key raw materials like Lithium and Cobalt. Cell manufacturing is highly cost and R&D intensive and requires scale. For now, India is completely dependent on cell imports and the role of the domestic industry is limited.
- **GRID:** There are two key considerations for the grid
 - Its ability to handle the increase in the peak load
 - Its composition – Fossil fuel-based vs renewable based

While the generation and transmission part of the grid is capable of handling the increase in peak electricity demand driven by EV adoption, the distribution part of the grid will have to undergo structural changes to handle peak loads at high EV adoption. The majority of households in India are connected through 200 kVA transformers which cannot handle more than 20 cars being simultaneously charged by a 7.4 kWh AC charger. Also, the composition of the grid must shift towards renewables for EVs to truly address the pollution problem. India's coal-dependent grid is amongst the most inefficient ones in the world and that makes this shift even more important, as inefficient fossil fuel-based power plants also mean higher carbon emissions.

- **OEMs:** OEMs have a strong influence on the future of EVs and they are the ultimate drivers of this disruption. The 2W segment has seen a lot of activity, with the emergence of new players as well as increased activity by the incumbents. In the case of 3W, the e-rick segment has grown rapidly and has even started to shift to Li-ion batteries. E-autos have also been launched. The 4W market was largely being driven by Mahindra and Tata Motors with their fleet-targeted variants. In 2019, Hyundai, MG Motors, and Tata Motors came up with new EV models aimed at the retail segment. In CVs, the bus segment is seeing the most action, mainly on account of public sector demand.



- **Infrastructure:** Charging infrastructure development in India is still slow, mainly because the adoption of EVs (especially 4Ws) has not gained enough momentum. Innovative business models have come up that offer energy-as-a-service (most of them are based on battery swapping). Home charging will be the primary method in the near term as public charging infrastructure will get developed in sync with the overall EV adoption.
- **Customers:** Finally, the most important stakeholder in the ecosystem – is the end customer. Customers need economic parity and a good product. TCO parity is imperative and the upfront cost differential needs to go down to attract customers to adopt EVs. Fleets and public transport systems are gaining traction rapidly but the retail customer is still slightly further away from EV adoption – especially in segments where the upfront cost differential is very high.

Opportunities

The electric vehicle market in India would present opportunities worth USD 206 billion by 2030.

- It is estimated that the EV market in India is likely to grow at a CAGR of 36% until 2026. Also, the EV battery market is likely to expand at a CAGR of 30% in the same period
- A cumulative investment of over USD 180 billion is required in vehicle production and charging infrastructure
- OEMs have placed big bets on all-electric fleets and batteries
- This transition is likely to save Indian crude oil imports worth INR 1,07,566 crore
- Increased consumer readiness. Across use cases, more consumers must be willing to opt for EVs over ICE vehicles

Challenges

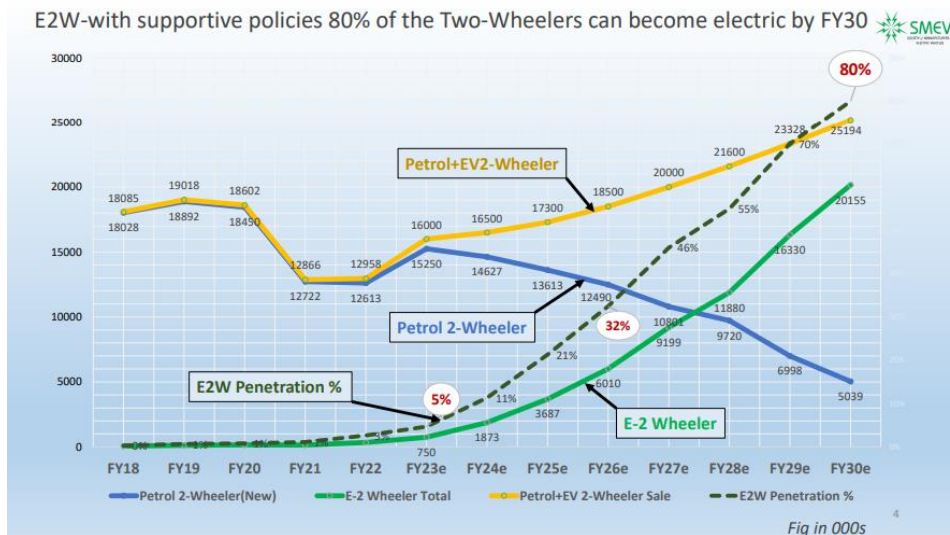
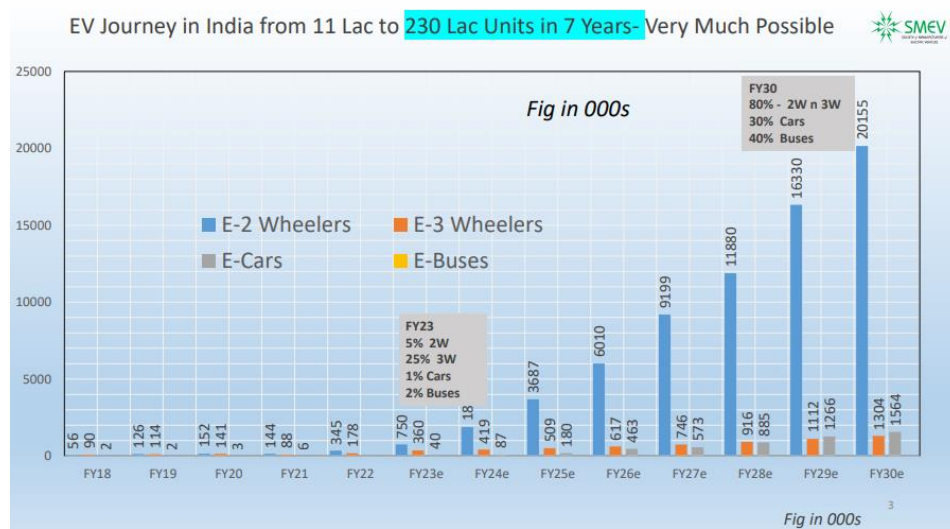
- **High costs:** With the increase in research and development activities and market competitiveness, EV prices will be rationalized considering the price sensitivity of consumers
- **Higher dependence on imports:** Reliance on imports of batteries as well as other components is also one of the factors adding to the cost of EVs in India
- **Insufficient charging infrastructure:** Establishing the charging infrastructure is necessary for large-scale EV adoption. It is an enormous but essential undertaking for widespread adoption
- **Range anxiety (km/charge):** With compatible charging stations along the EV route, this challenge will be taken care of
- **Grid challenges:** Increasing methods of power generation are necessary to meet the expected growth in electricity demand once EVs become mainstream



Growth

Some drivers:

- Adoption by B2B players – Fleet, logistics & delivery players are adopting EV vehicles for their fleet. electric vehicles are cheaper to maintain compared to ICE vehicles
- Federal subsidies - Favorable policies with deeper discounts for Indian-made electric vehicles. Favorable policies for setting up manufacturing in this segment, and even for end consumers – suffering subsidies as per state policy
- Boost for localized ACC battery storage production through the PLI scheme
- Consumer preference is also now seen tilting towards EVs from ICE (internal combustion engine) vehicles





Government policies

Vehicle Scrappage Policy

The vehicle scrappage policy is a government-funded programme to replace old vehicles from Indian roads. The policy is expected to reduce pollution, create job opportunities and boost demand for new vehicles.

CVs of >15 years and passenger vehicles of >20 years will have to be mandatorily scrapped if they do not pass the fitness and emission tests. The idea is to phase out cars and CVs older than 15-20 years to slash urban pollution levels and stimulate automotive sales. Additionally, the vehicle scrappage policy is also said to be a part of a stimulus package majorly requested by the original equipment manufacturers (OEMs) to infuse their demand. Challenge is to build the infra for testing and collecting scrap

BS VI Norms

The Indian Government has mandated PAN India implementation of the BS6 emission norms from 1st April 2020 for all the vehicles with the objective to reduce automobile emissions by treating harmful pollutants like CO (Carbon monoxide), PM (particulate matter) and Nox (Nitrous Oxide). To treat these various pollutants, there are components to be added/modified in the current vehicle portfolio across asset classes in order to comply with the BS VI emission norms. Diesel platform which is more polluting and hence requires more components to treat the emissions as compared to petrol variants.

NATRIP (NATIONAL AUTOMOTIVE TESTING AND R&D INFRASTRUCTURE PROJECT)

The project has been set up at a total cost of USD 573 Mn to enable the industry to adopt and implement global performance standards. It aims at converging India's unparalleled strengths in IT and electronics with automotive engineering sectors. The main area of focus is on providing low-cost manufacturing and product development solutions. It will provide the essential impetus to Indian auto industry which will help drive it to a position where it will cater not only to the ever-challenging and increasing indigenous demands but also it will be looked upon by the world to provide solutions for globally present challenges in the Auto Industry.

FAME-II

The FAME India (Faster Adoption and Manufacture of (Hybrid and) Electric Vehicles) Scheme is an incentive scheme for the promotion of electric and hybrid vehicles in the country. Ultimate objective of the scheme is to promote electric mobility and the scheme gives financial incentives for enhancing electric vehicle production and creation of electric transportation infrastructure. Over 27,000 electric vehicles have been supported till September 10 this year by way of demand incentive amounting to about Rs 95 crore



The Automotive Mission Plan 2016-26 (AMP 2026)

The Automotive Mission Plan 2016-26 (AMP 2026) is the vision of the Government of India on where the vehicles, auto components, and tractor industries should reach over the next 10 years in terms of size, contribution to India's development, global footprint, technological maturity, competitiveness, and institutional structure and capabilities. AMP 2026 seeks to enhance the industry's contribution to GDP and employment.

Production-Linked Incentive (PLI) Scheme

In September 2021, the Indian government issued a notification regarding a PLI scheme for automobile and auto components worth Rs. 25,938 crores (US\$ 3.49 billion). This scheme is expected to bring investments of over Rs. 42,500 (US\$ 5.74 billion) by 2026. The Union Cabinet outlaid Rs. 57,042 crores (US\$ 7.81 billion) for the automobiles & auto components sector under the Department of Heavy Industries. In November 2021, under the production-linked incentive (PLI) scheme for automobiles, the Union Government added >100 advanced technologies, including alternate fuel systems such as compressed natural gas (CNG), Bharat Stage VI compliant flex-fuel engines, electronic control units (ECU) for safety, advanced driver assist systems and e-quadricycles. In May 2021, the Central Government approved a PLI scheme for manufacturing Advanced Chemistry Cells (ACC) with a budget of Rs. 18,100 crores (US\$ 2.33 billion). In March 2022, four firms, namely Reliance New Energy Solar Limited, Ola Electric Mobility Private Limited, Hyundai Global Motors Company Limited, and Rajesh Exports Limited, were elected to receive the incentives.

Industry growth drivers

- **Growing income:** 3X increase in average household income from \$6,393 in 2010 to \$18,448 in 2020
- **'Youngest Nation' by 2025:** India to become the youngest nation by 2025 with an average age of 25 years
- **Vehicle penetration:** Expected to reach 72 vehicles per 1000 people by 2025
- **Expanding R&D hub:** India accounts for 40% of total \$31 bn of global engineering and R&D spend. 8% of the country's R&D expenditure is in the automotive sector
- **Atmanirbhar Bharat Abhiyaan - Self Reliant India:** Special economic and comprehensive package of INR 20 lakh crores towards promoting manufacturing in India

Industry trends

- **Transitioning towards electric vehicles:** Right policy environment to promote EVs
- **Voluntary Vehicle Fleet Modernization Programme (V-VMP):** Tax benefits and discounts on replacing old vehicles with new ones
- **Bharat Stage VI norms by 2020:** Aim to reduce carbon footprints by 30-35% by 2030
- **Positive GST impact:** Gradual reduction in the overall cost structure of this industry



Key metrics for performance assessment of an automobile company

COMPANY STRATEGY

- Number of new models introduced
- Response of consumers to the new models introduced
- Distribution Network and model
- Waiting time for consumers
- Is the company entering a new market in terms of design, cost etc. (For example; Introduction of motorcycle with high cc engine, when company is well known for low cc bikes and scooters)

OPERATIONS

- Number of units produced and capacity utilization rate
- Manufacturing cycle time: It refers to the time taken to manufacture a single complete vehicle
- Dependency on imports for components
- Labor union-related issues like strikes
- Aid being received by govt. – subsidies, presence in SEZs

FINANCIALS

- Sales volume: The data is released on a monthly basis
- Market share
- EBITDA (Operating profit)
- Profitability ratios (since it is a 'product selling' company, margins are very important)
- Working capital (cash ratio)
- Debt-equity ratio as companies are capital intensive
- Price to Sales price multiple as sales for automobile companies cannot be manipulated as compared to earnings and book value



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