

Analyzing the Future of Automobiles

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ENVIRONMENT

Potential Environmental Challenges

01

02

03

Resource Depletion: Most vehicles are primarily composed of steel, plastic, aluminum, and iron. Mining, manufacturing, and unsustainably utilizing these resources have significant environmental consequences, including habitat destruction, water pollution, and soil degradation. Another concern is the disposal of traditional vehicles, which often end up in landfills, contributing to waste and pollution. Discarding these vehicles also requires significant energy, further depleting valuable resources.

Carbon Monoxide: Impairs the cardiovascular and nervous systems

Nitrogen Oxides: Increases susceptibility to infections and pulmonary diseases, impairs lung function, and causes eye, nose, and throat irritation

Sulphur Dioxide : Impairs lung function

Particulate Matter and Respirable Particulate Matter (SPM and RPM): Potentially toxic or carcinogenic, causes long-term lung problems, and impairs the immune system

Lead: Impairs liver and kidney function, and causes brain damage in children

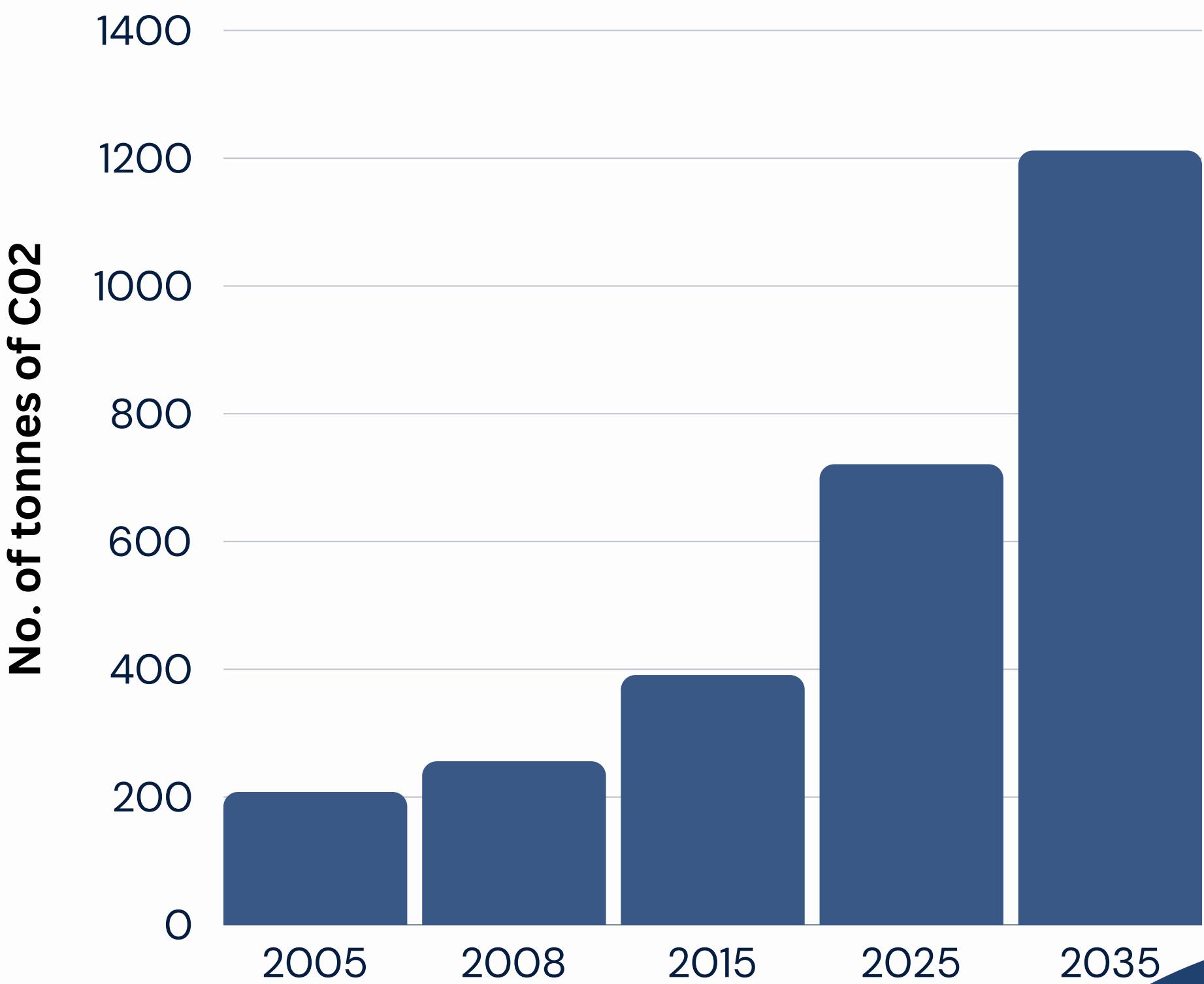
Climate Change

India ranks as the third largest greenhouse gas emitter in the world. The transportation sector significantly contributes to these emissions, with vehicular pollution causing high levels of carbon dioxide and nitrous oxide in particularly congested cities like New Delhi, Mumbai, and Bengaluru. The transportation sector is also responsible for a third of India's particulate matter pollution, which traps heat and further drives climate change.

Environmental and financial benefits of EV adoption

- 17% reduction in nitrogen oxide and particulate matter emissions
- 18% lower carbon monoxide emission
- A reduction of 846.3 million tons of carbon dioxide every year
- 40% of cumulative electric power from renewable sources to power EVs can reduce the burning of fossil fuels
- A reduction of 474 million tonnes of oil equivalent and a net savings of ₹15.21 trillion

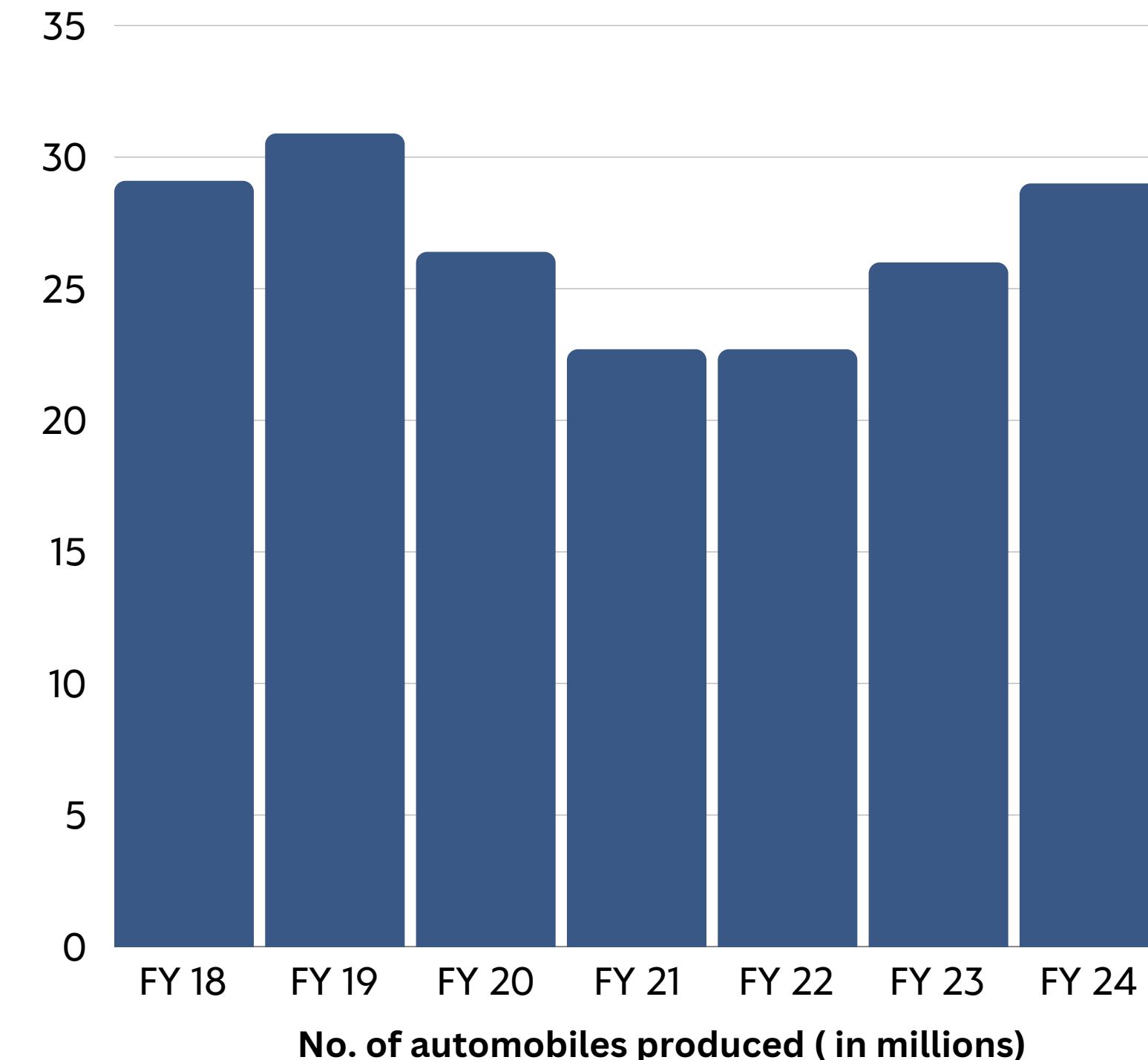
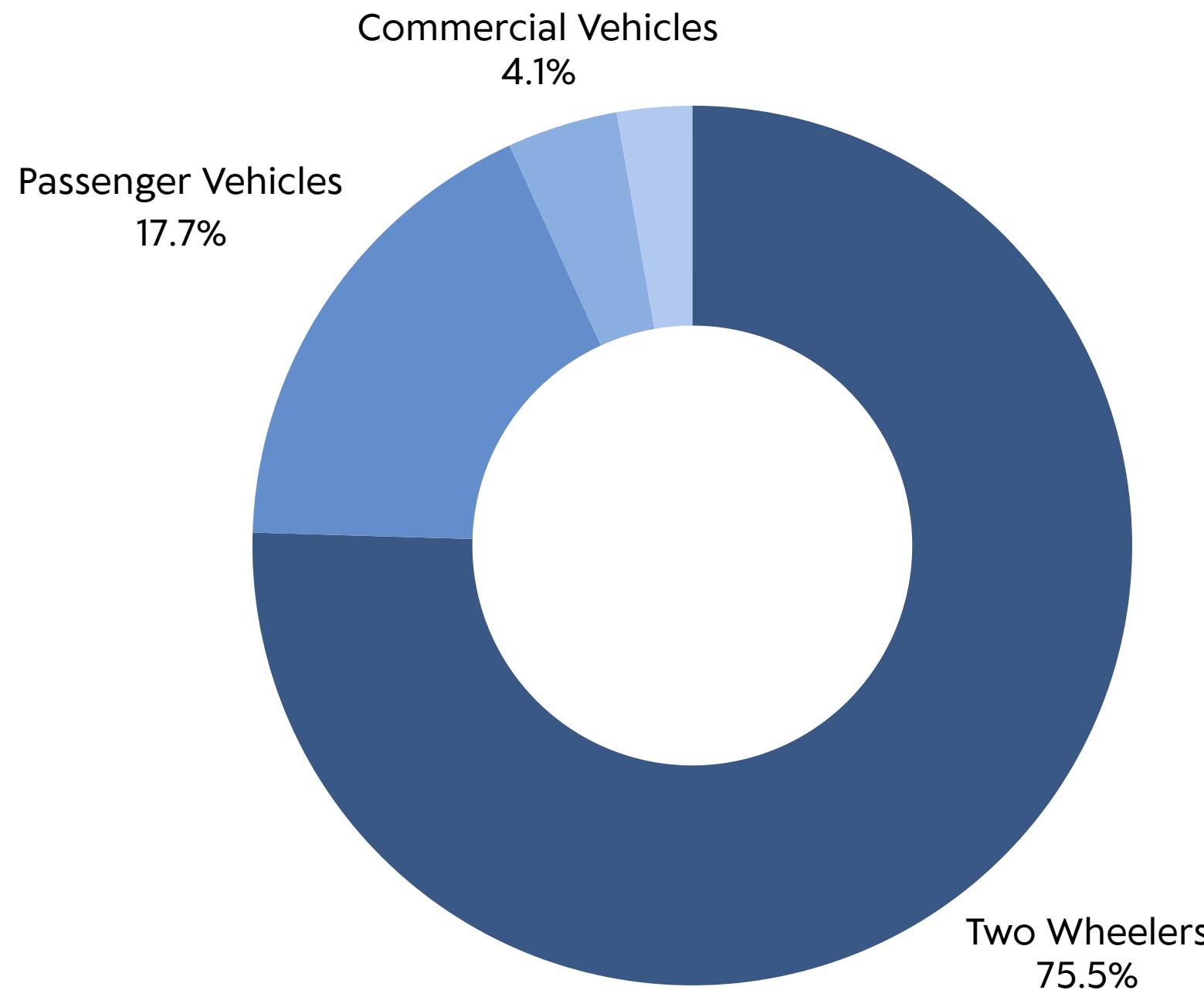
CO2 emission on Indian roads





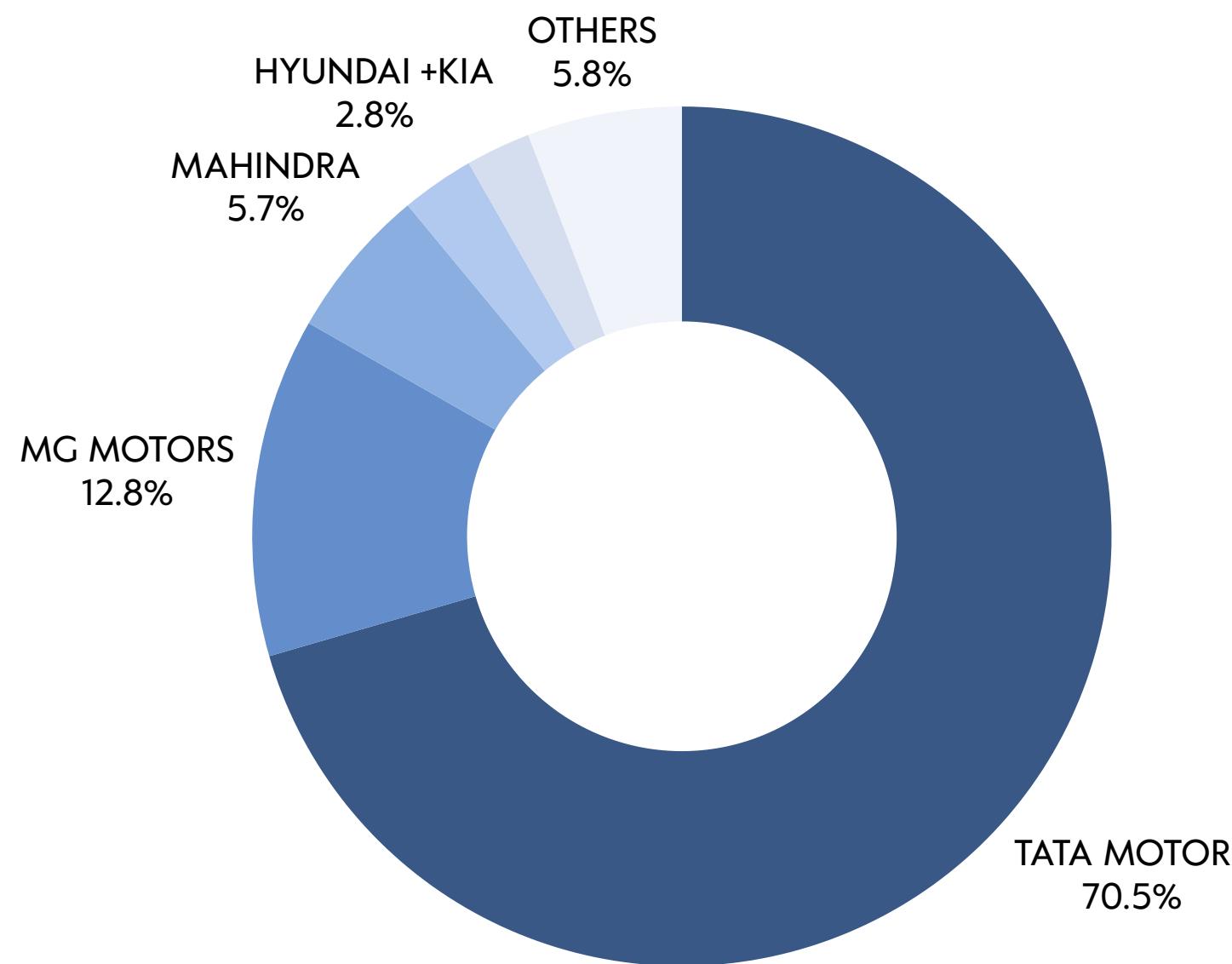
COST STRUCTURE AND EFFICIENCY

Share of each segment in Total Production Volume(FY23)



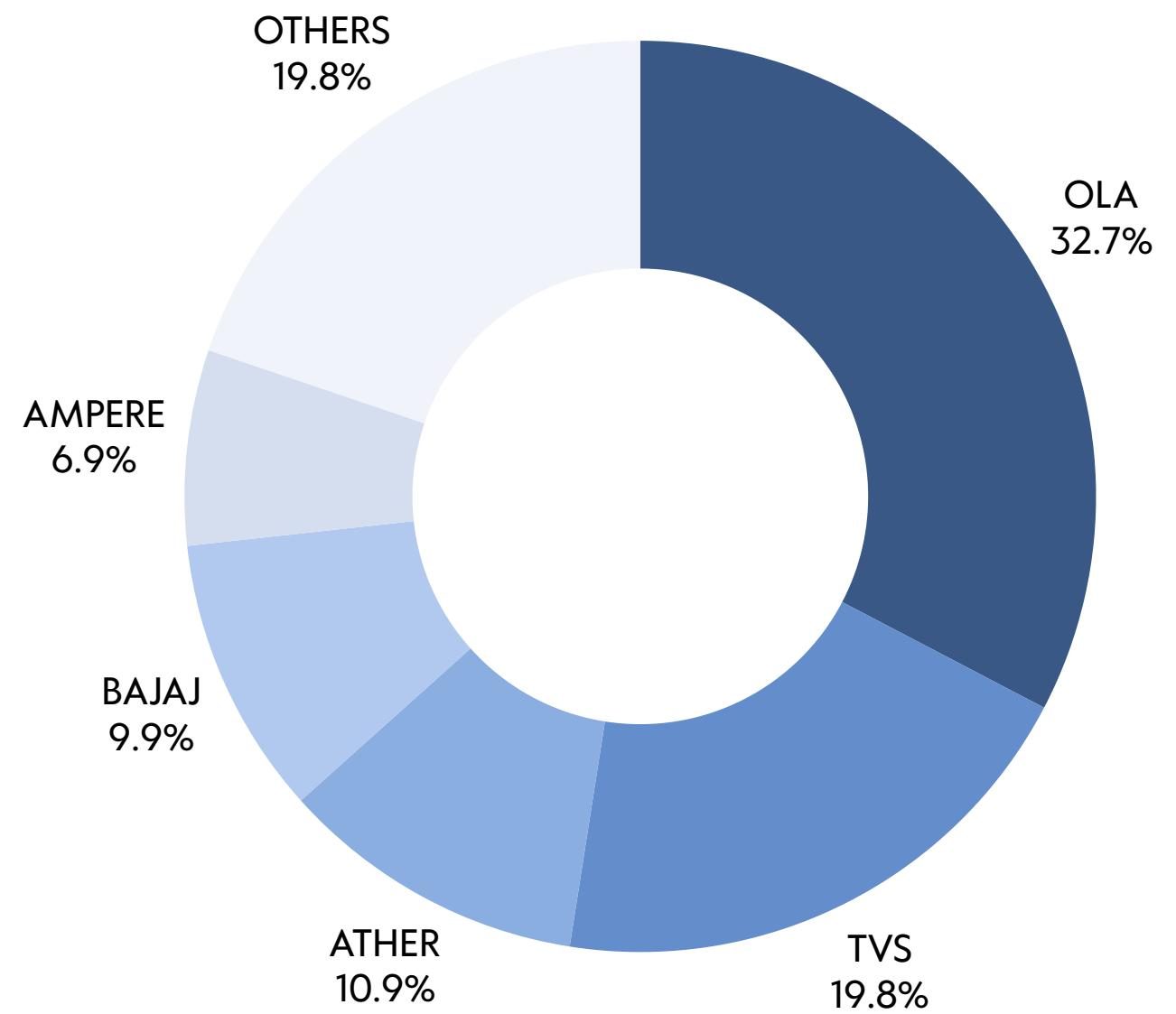
India is the world's third-largest Automobile market

E Cars market share in India



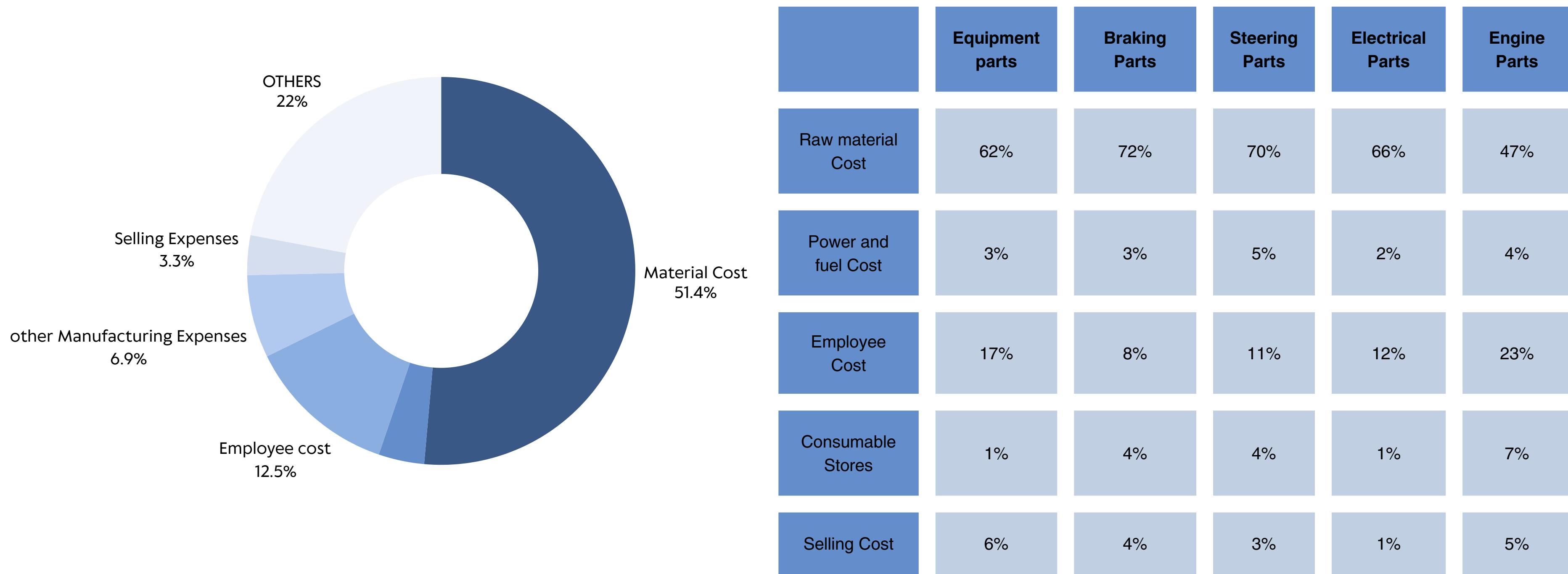
- TATA Motors has the largest market share in the electric car market
- MG Motors and BYD both have Chinese promoters
- BYD has a JV with the Indian company Megha Engineering

Two Wheeler EVs market share

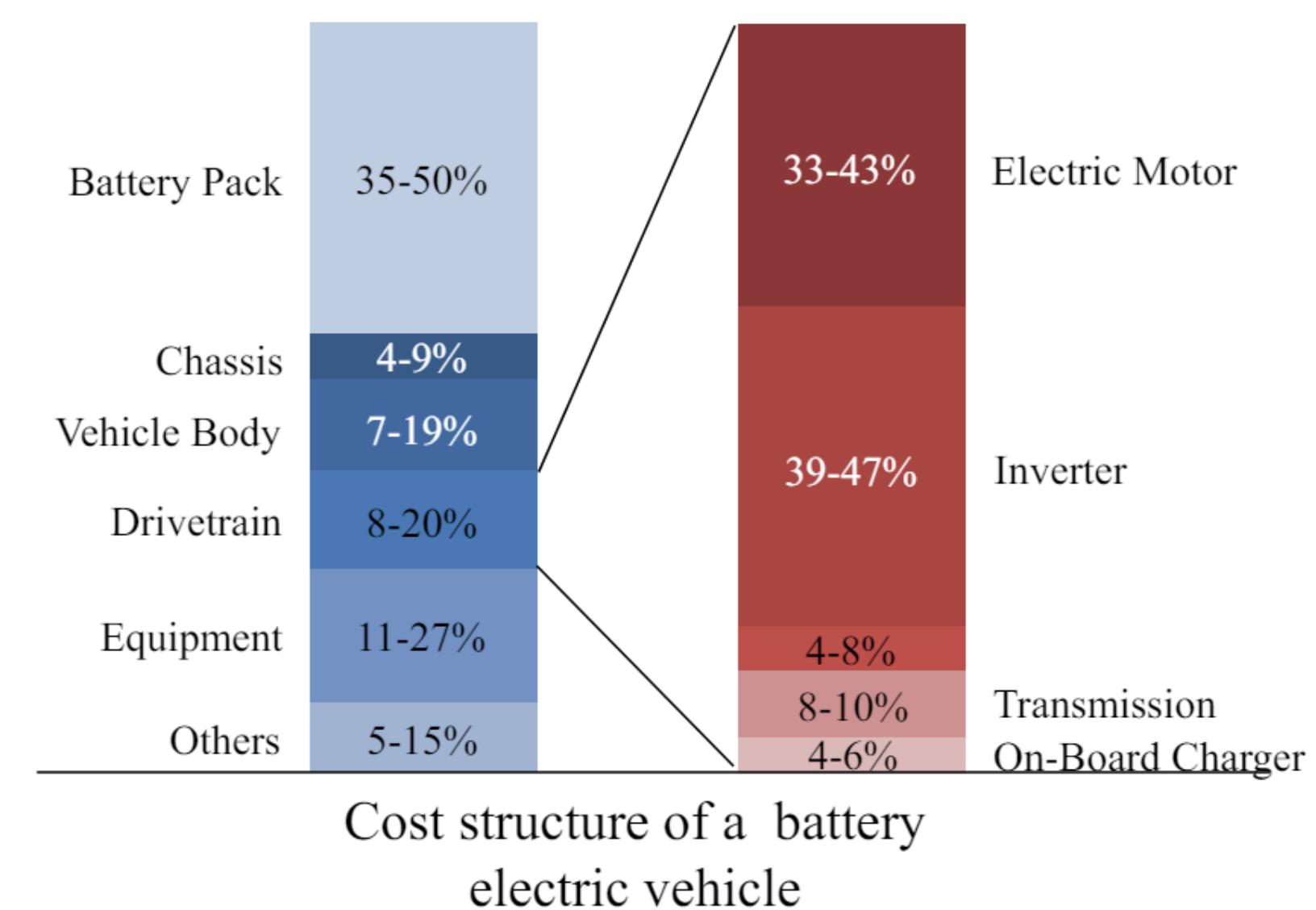
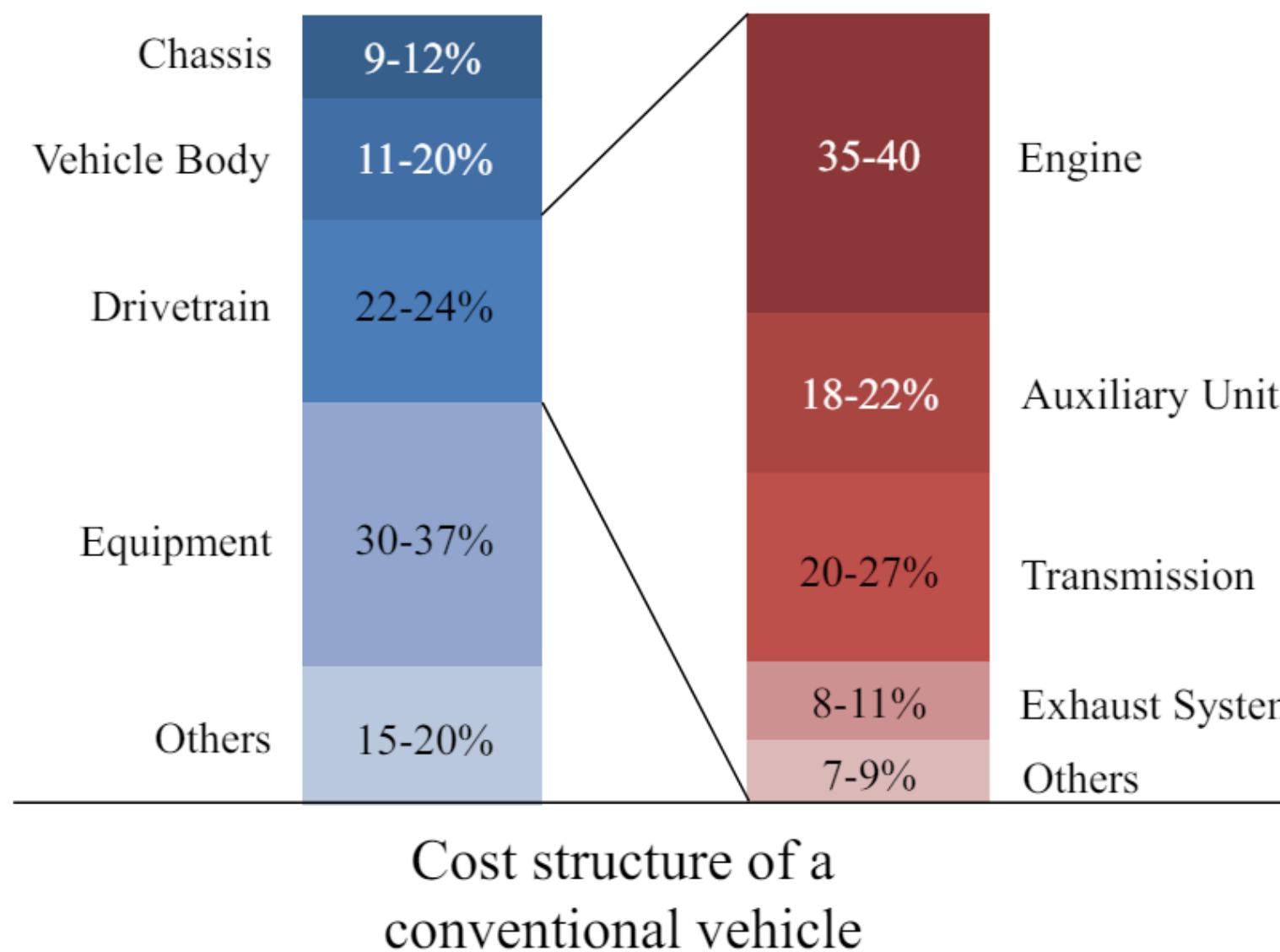


- OLA's market share has shot up from 6% in FY22 to being the market leader in FY24
- TVS launched its iQube in January 2020, and seen rapid growth in sales.
- Top 3 players hold more than 60% market share

Cost structure in the auto-component Sector



Cost structure in Vehicle

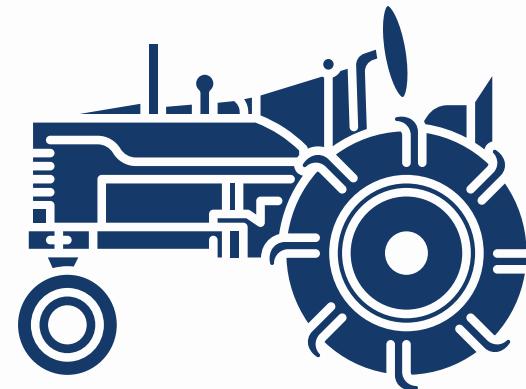


Facts



Bike

India is the world's largest manufacturer of two-wheelers, with over 21 Mn produced annually.



Tractor

India is the world largest manufacturer of tractors.



Truck

World's third largest heavy truck manufacturer and fourth largest car manufacturer

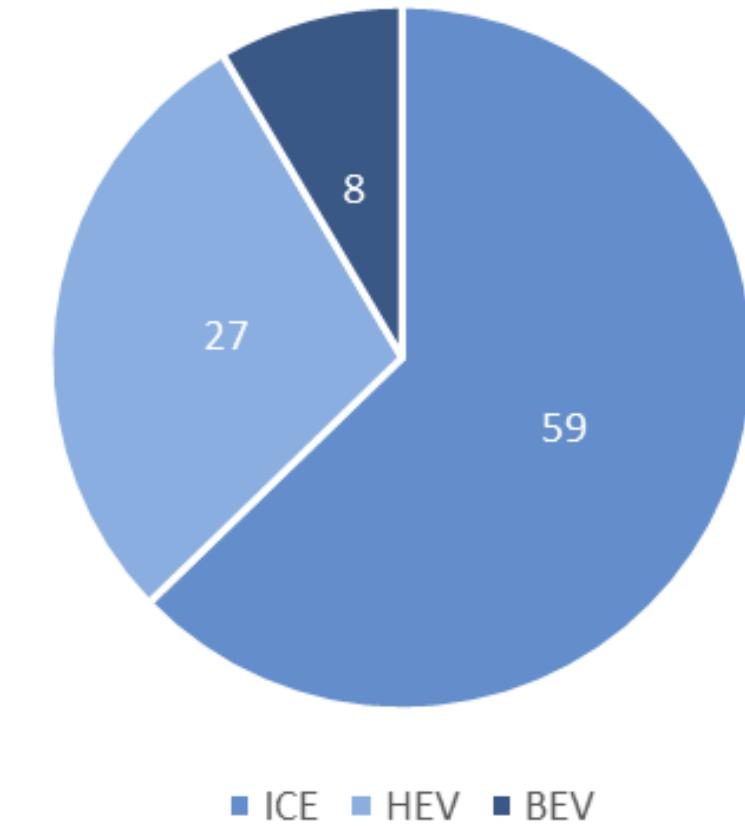
CONSUMER PREFERENCES

Comparison of whether consumers choose ICE (internal combustion engines), HEV (hybrid EV), BEV(Battery EV)

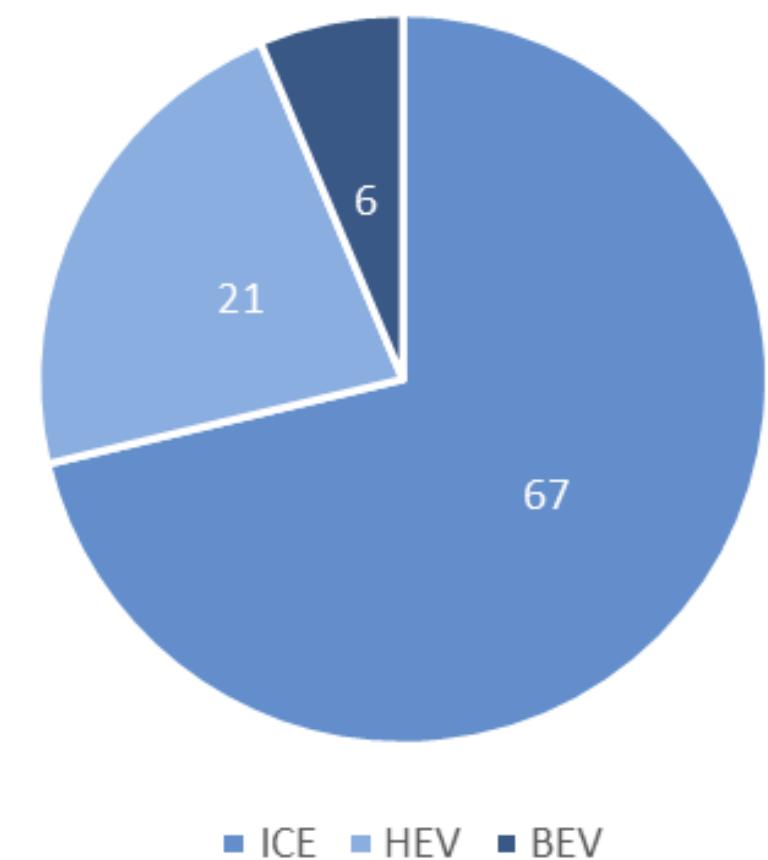
US consumers' interest in ICE has risen by 8.5% and has decreased in EV by 8.5%

Reason: Shortage of affordable EVs, inadequate charging infrastructure and ignorance about EV benefits, EVs have 80% more problems than ICE

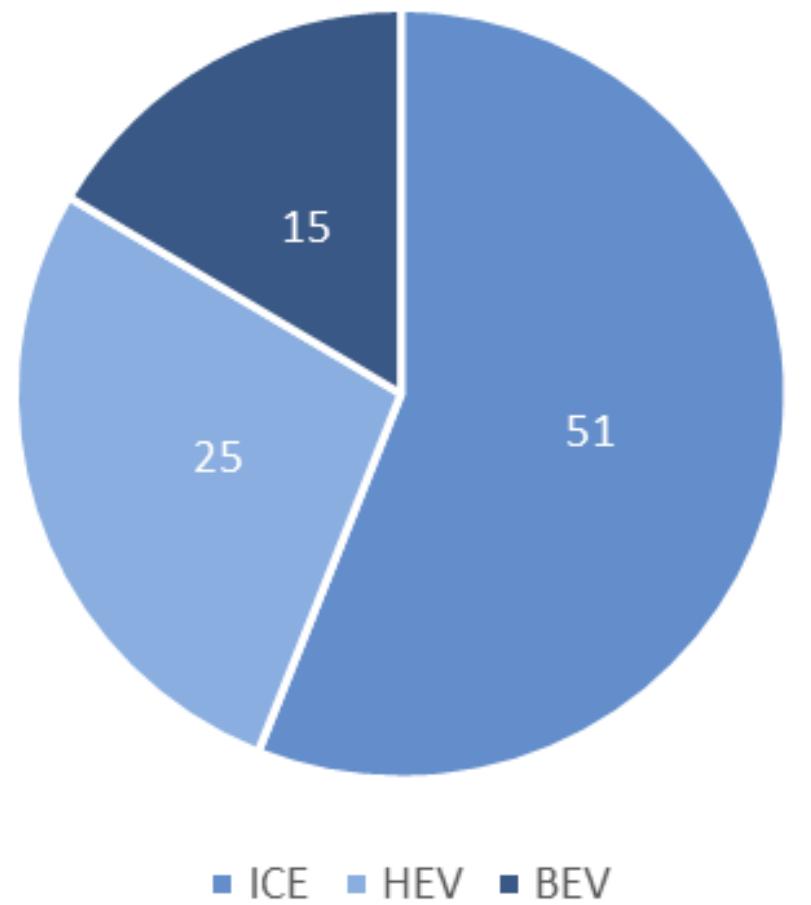
US 2020



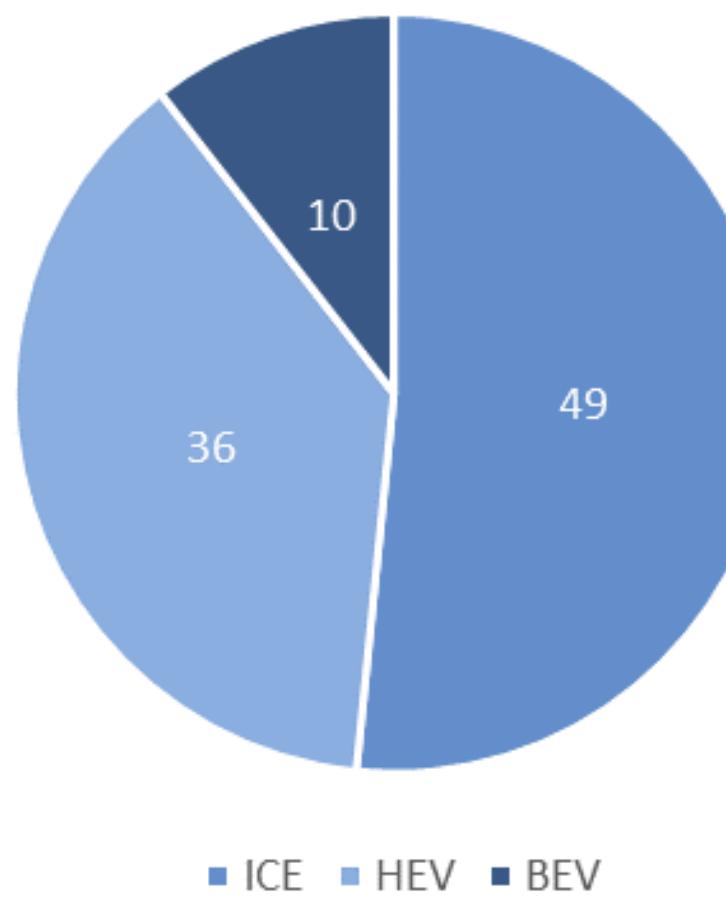
US 2024



India 2020



India 2024



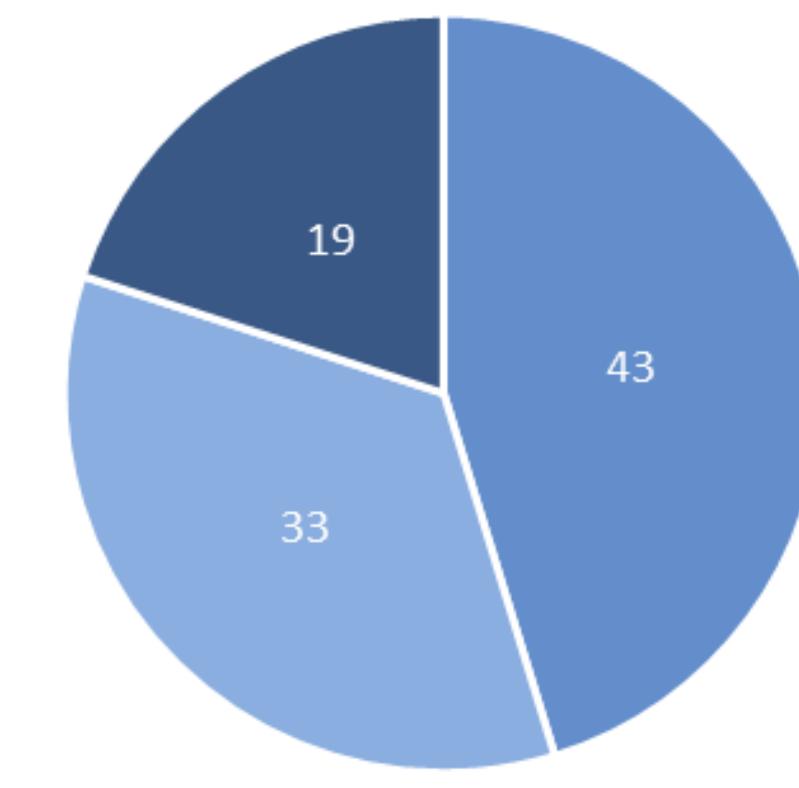
Interest in EVs has grown by 11% in the Chinese market.

Reason: Govt policies, Environmental Concerns
(Air pollution being major concern)

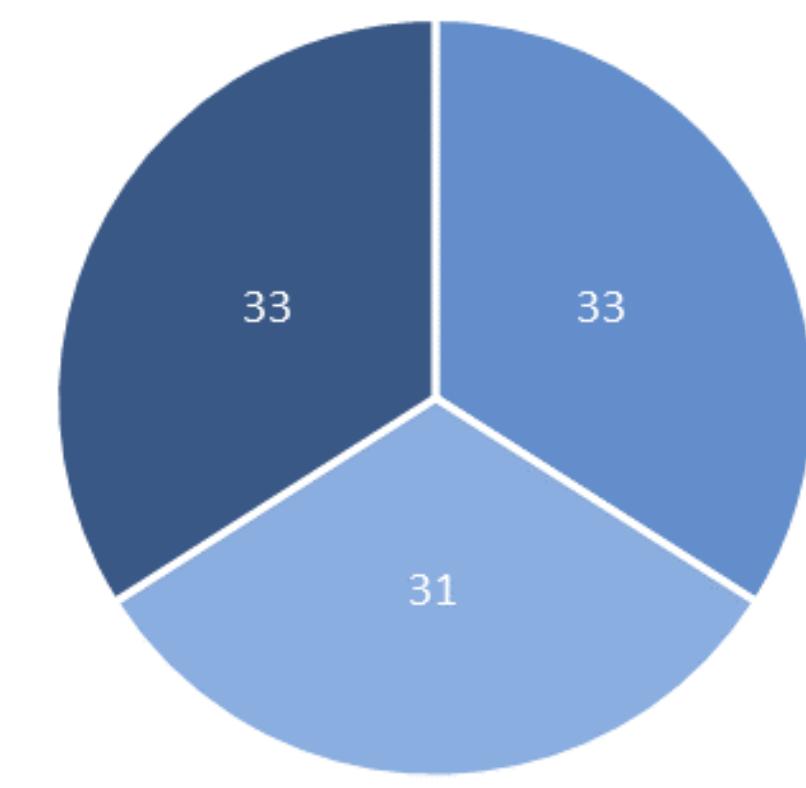
Indian consumers are showing an increased interest in EVs by approx 4.5%

Reason: Price point, lower operating cost, Tax benefits

China 2020

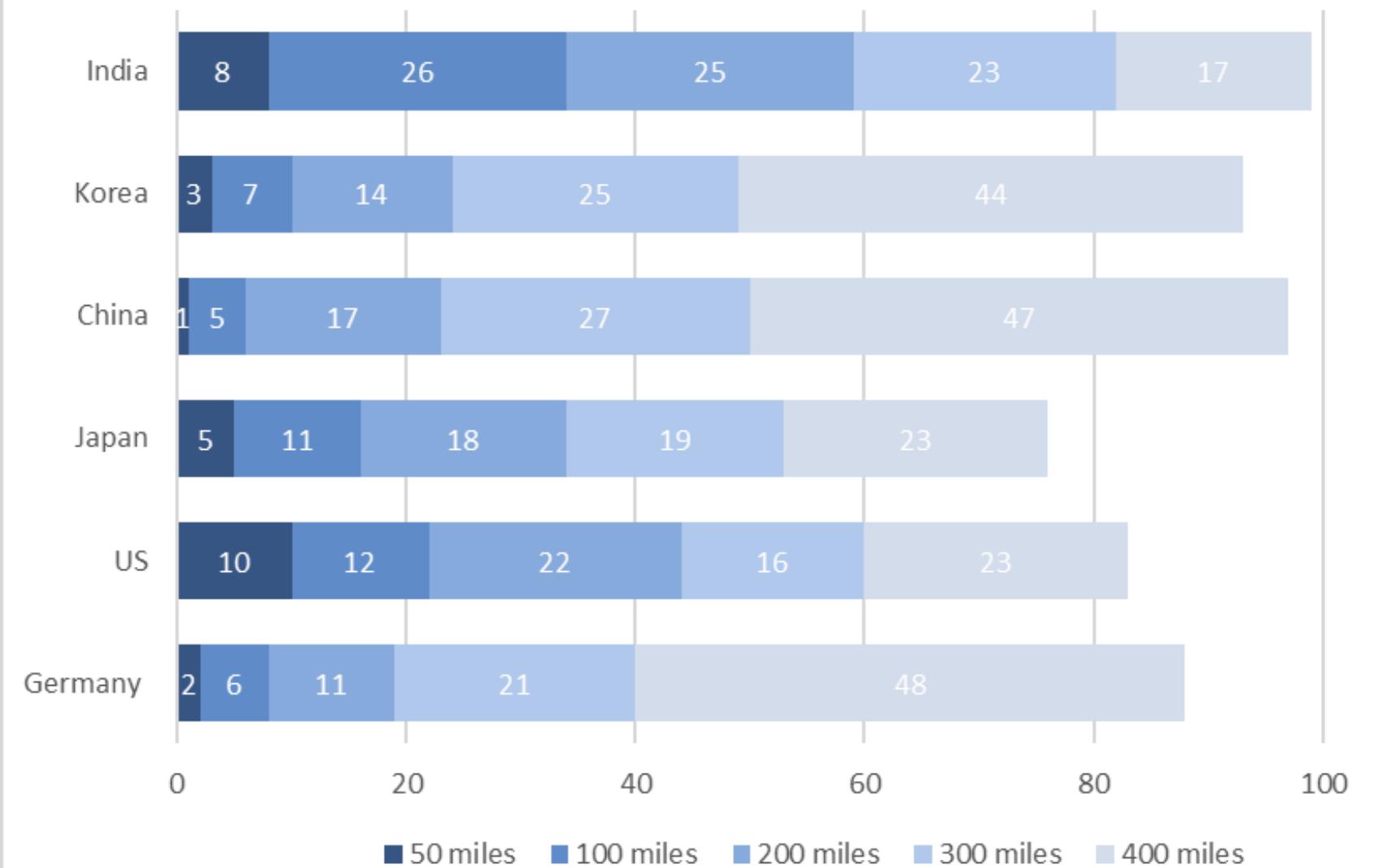


China 2024

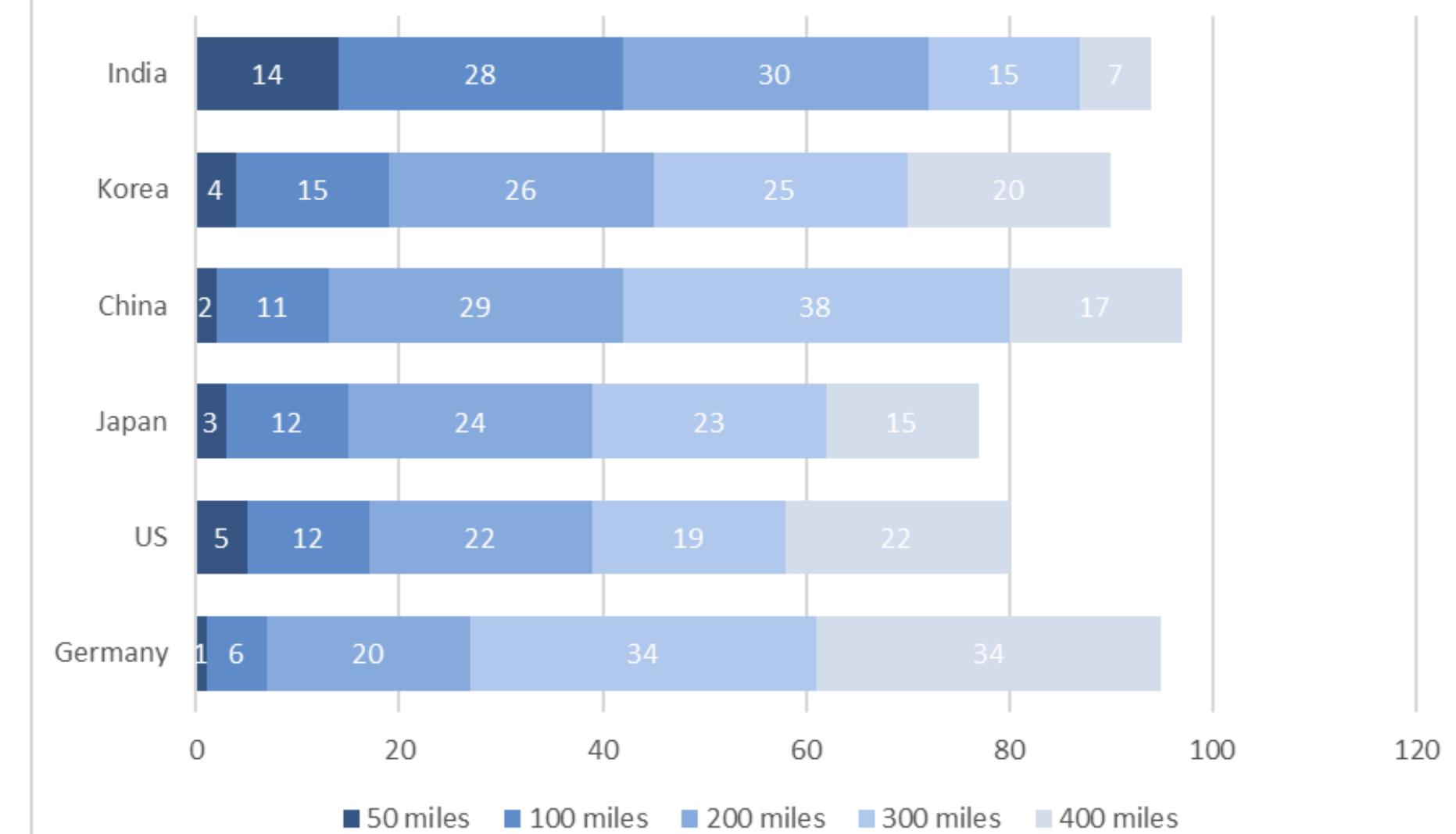


Expected Drive Range

EXPECTED DRIVE RANGE OF EV- 2024

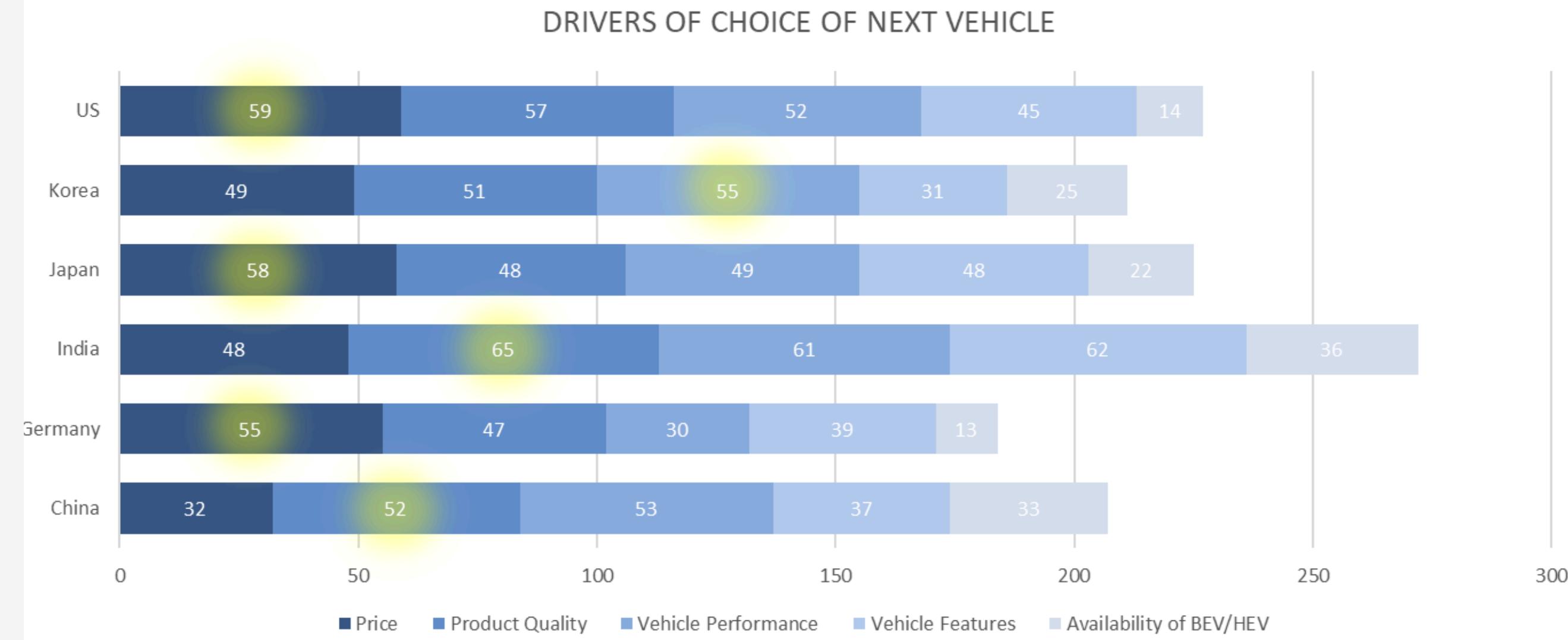


EXPECTED DRIVE RANGE OF EV- 2020



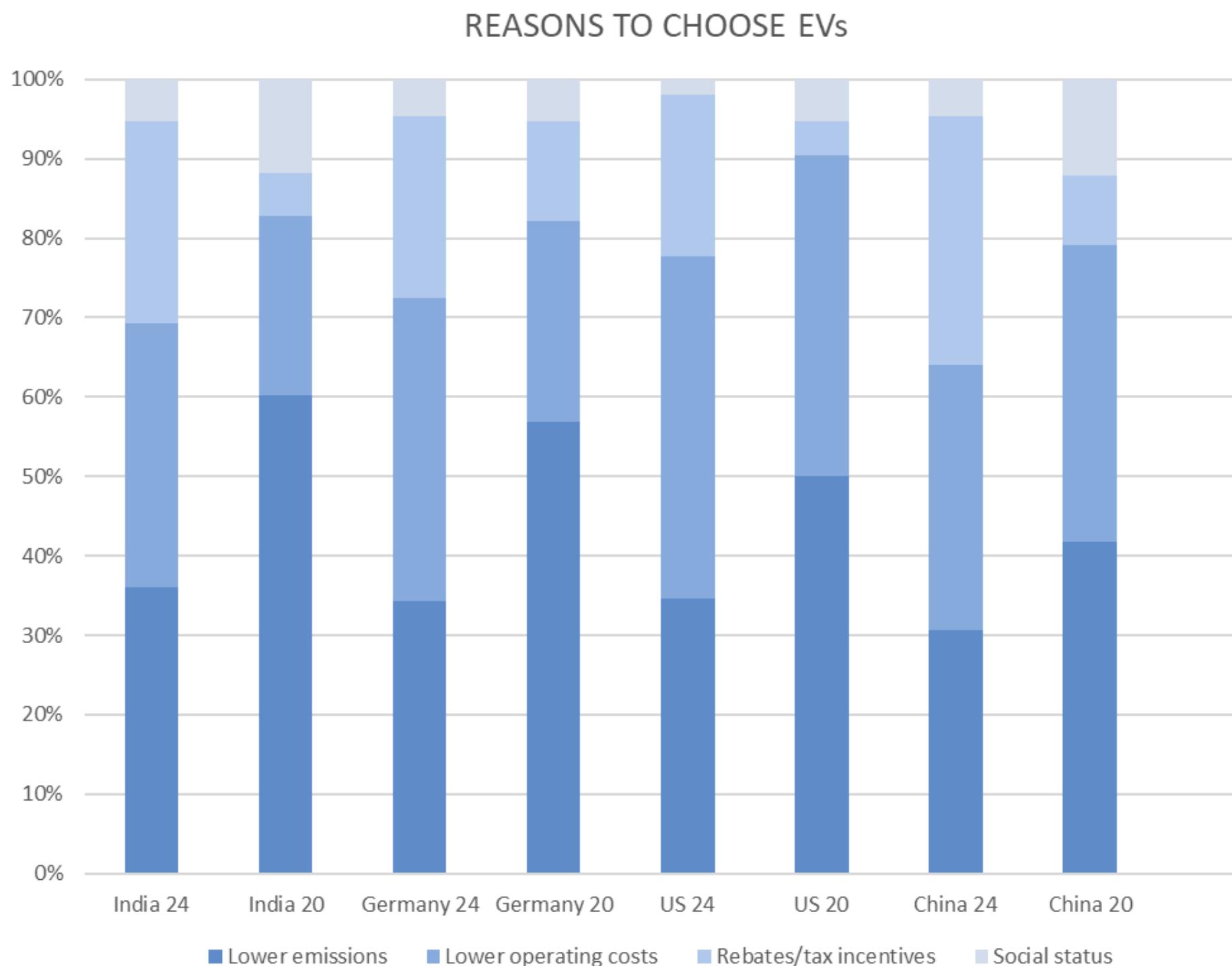
- Expected drive range has increased in most countries but for US there is no considerable increase.
- Tesla lowers its driving range estimates amidst strict US regulations
- Earlier the range estimates would overstate the real world performance.

Drivers of choice of Next Vehicle



Availability of electrically powered engine does not play a significant role in selecting the next vehicle for most consumers. **Price, product quality, and vehicle performance** are the key factors that affect vehicle choice.

Reasons to Choose EVs



- People are choosing EVs less for the environmental benefit and more for lower operating costs and extra tax benefits.
- This means price plays an important role in choosing EVs over traditional vehicles. Increase in future fuel prices also contributes to the shift to EV.



STRATEGIES AND INNOVATIONS OF LEADING MANUFACTURERS

The Indian automobile industry is reasonably concentrated, with the top five players having most of the market share in all the segments:

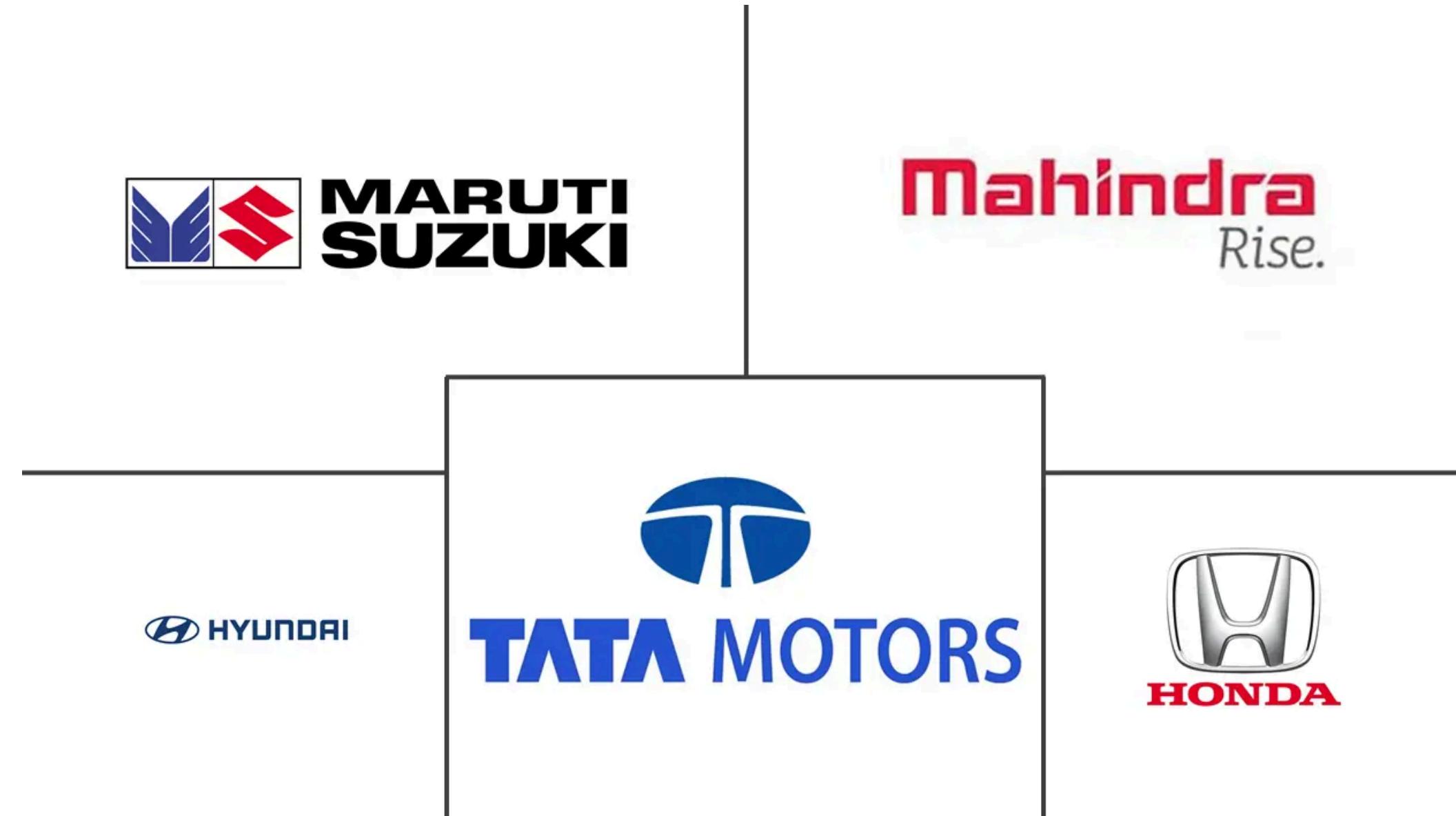
1.Tata Motors Limited

2.Maruti Suzuki India Limited (Suzuki Motor Corporation)

3.Mahinda and Mahindra Limited

4.Hyundai Motor Company

5.Honda Motor Company



TATA MOTORS

- From the streets of Mumbai to the prestigious avenues of London, the growls of Tata Motors engines echo across the globe.
- With consolidated revenues of Rs. 120.0K Cr in the FY24, it is the leader in commercial vehicles and among the top three in passenger vehicles.

Strategic Overview (*Redefining the EV Space for Indian Customer*)

Sales and Marketing

Leverage the network to expand the customer base.

Continue to focus on states where there is high demand, driven by aggressive EV policies and benefits.

Continue brand building for creating awareness, driving aspirations and enhancing customer experience.

Accelerating Ecosystem Development

Expand Tata uniEVerse to offer holistic ecosystem solutions to customers.

Expand our footprint of public charging.

Driving deeper localisation for components solutions to drive mass adoption.

Offering Product and Segment-Versatility

Continue to expand our portfolio, providing India specific offerings with different body styles, driving ranges-and price points.

Leveraging our Gen 3 strategy in line with market readiness to strengthen the EV demand.

Financial Targets

Positive Ebitda Margins

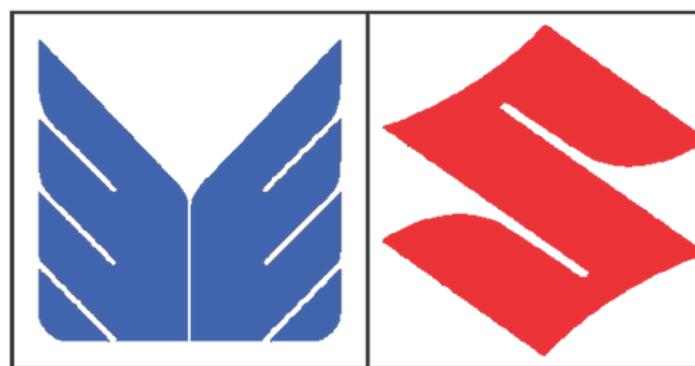
Capex of \$2 Bn till FY27

Breakeven FCF

Strategic Overview

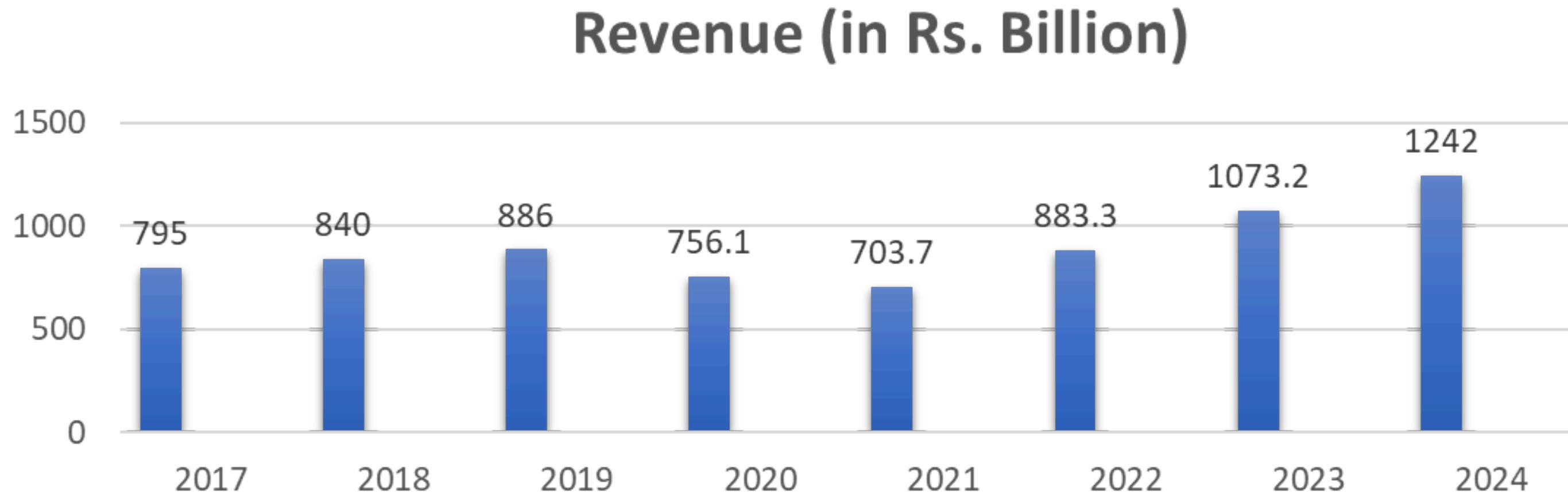
TATA Motors intend to further strengthen its position by investing in new sustainable technologies, products and mobility solutions that offer superior value proposition.

Key Strategic Focus Areas	Market Development and Customer Experience	Expand Into New Growth Opportunities	Financial Targets
Strengthening the core business Driving efficiency for financial fitness Expanding into new growth opportunities	Delivering enhanced value to our customers Bringing innovative solutions and enhancing customer satisfaction. Continue to leverage on GTME process Sampoorna Seva 2.0 Value added service offerings Strengthening network	Digitalisation: Continue to aggressively pursue digitalisation across the value chain Non-Vehicle and International businesses continues to be clear priority Green mass-mobility solution strengthen presence in EV buses and fleet contracts	• • • • • •
Products	Driving Efficiencies		Strong double digit EBITDA margins
Delivering best-in-class operating economics, superior comfort and convenience and enhanced connectivity Strengthening our current portfolio Customised EV product and ecosystem solutions to drive EV adoption across prioritised segments and use cases	Building competitive cost structure to lower the breakeven, maturing towards cost leadership	₹2,500 crore Annual capex spend	Strong FCF generation



MARUTI SUZUKI

- Maruti Suzuki India Limited, once called Maruti Udyog Limited, is the Indian part (subsidiary) of a Japanese car company called Suzuki Motor Corporation.
- Maruti Suzuki's success as the largest automobile manufacturer in India is the result of a well-rounded strategy that includes localization, a strong dealership network, a diverse product portfolio, technological innovation, strategic partnerships, and effective marketing.



Local Manufacturing

- Maruti Suzuki has significantly localized manufacturing by sourcing most components locally, reducing costs and mitigating foreign exchange risks.
- **Wide Range of Models:** Maruti Suzuki offers a diverse range of models, from entry-level hatchbacks to premium sedans and SUVs, attracting a broad customer base.
- **Rural Outreach:** The company has strategically expanded its presence in rural areas, tapping into the growing rural market by tailoring its offerings to meet the specific needs of rural customers .
- **Strong Brand Equity:** Maruti Suzuki has built strong brand equity over the years through consistent quality, reliability, and value-for-money offerings. This has helped the company maintain customer trust and loyalty .
- Maruti Suzuki's extensive dealership network in India ensures wide customer reach and accessibility, supported by robust service infrastructure that boosts customer satisfaction and loyalty.



mahindra

**55,248 CRORE
INR**

Revenue for FY24

24% INCREASE

Percentage increase

- Pricing Strategy- With its competitive pricing strategy, the company tries to convey its brand message that users can get similar or better features for their vehicle at low prices.
- Market Penetration :For price-sensitive rural markets, Mahindra and Mahindra offers flexible pricing and financing, easily penetrating these areas and building credibility with field workers and farmers.
- In international markets, Mahindra and Mahindra uses market penetration pricing by keeping prices low initially to capture market share, then gradually increasing them once a good customer base is established.



R&D AND TECHNOLOGICAL ADVANCEMENTS

Leading Manufacturers

OEM wise Electric Bus Sales, March 2024

SI No.	Makers	Mar-24	Feb-24	Difference	% Change	Market Share
						Mar-24
1	TATA MOTORS	225	138	87	63%	54.3%
2	JBM AUTO	73	17	56	329%	17.6%
3	PMI ELECTRO MOBILITY	50	85	-35	-41%	12.1%
4	VE COMMERCIAL	29	10	19	190%	7%
5	SWITCH MOBILITY	18	21	-3	-14%	4.3%
6	PINNACLE MOBILITY	9	4	5	125%	2.2%
7	MYTRAH MOBILITY	5	2	3	150%	1.2%
8	VEERA VAHANA UDYOG	4	4	0	0%	1%
9	OLECTRA GREENTECH	1	41	-40	-98%	0.2%
TOTAL		414	322	92	29%	100%

Source: Vahan Dashboard. Data as per 1360 out of 1447 RTOs across 34 out of 36 state/UTs.

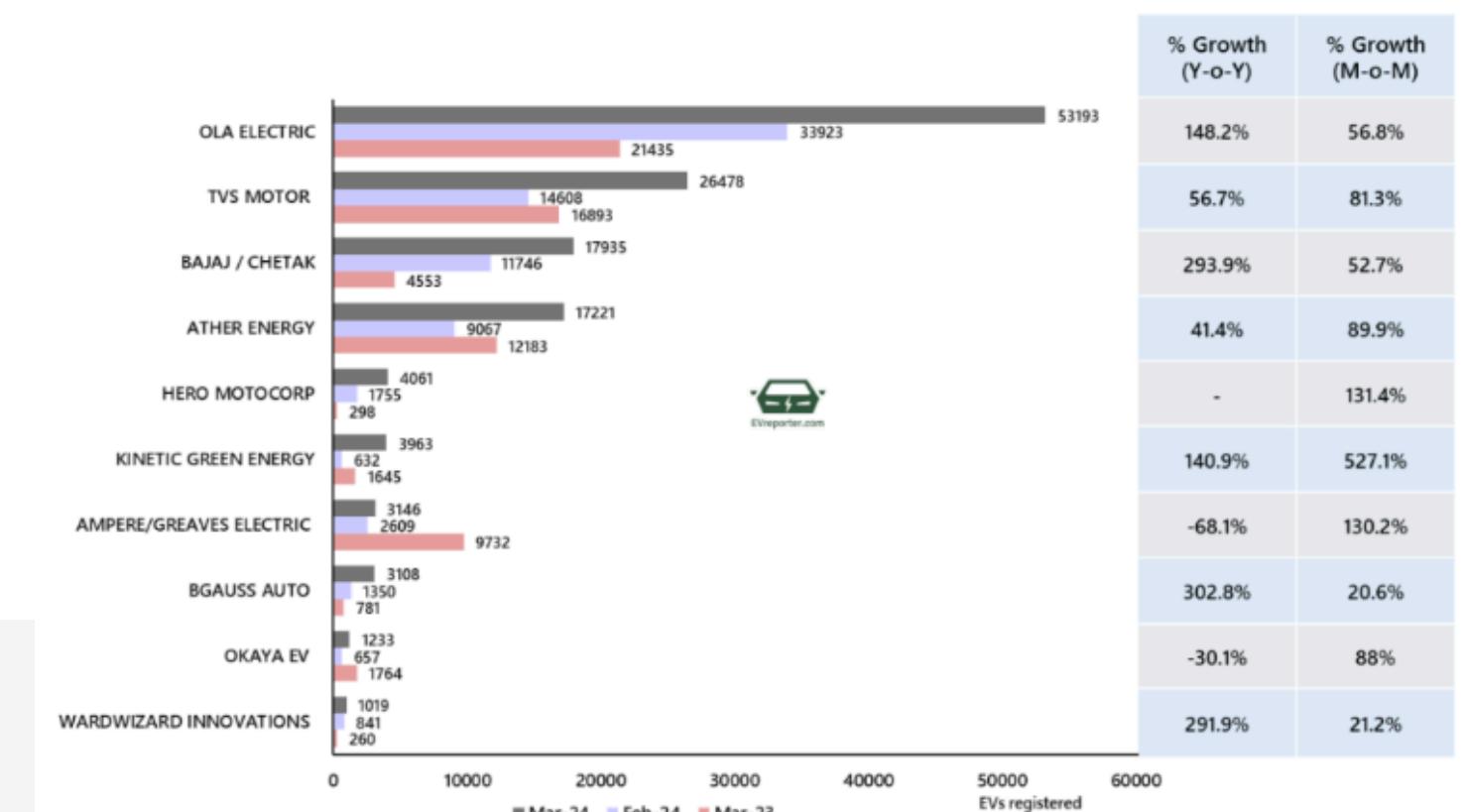
OEM wise E-4W Sales, March 2024

SI No.	Makers	Mar-24	Feb-24	Difference	% Change	Market Share
						Mar-24
1	TATA MOTORS	6,949	5,090	1,859	37%	74%
2	MG MOTOR	1,107	1,085	22	2%	12%
3	MAHINDRA & MAHINDRA	652	638	14	2%	7%
4	BYD INDIA	134	148	-14	-9%	1%
5	HYUNDAI MOTOR	146	122	24	20%	2%
6	BMW INDIA	70	128	-58	-45%	1%
7	PCA AUTOMOBILES	178	83	95	114%	2%
8	VOLVO AUTO INDIA	40	45	-5	-11%	0%
9	MERCEDES -BENZ AG	50	46	4	9%	1%
10	KIA MOTORS	33	23	10	43%	0%
11	OTHERS	24	26	-2	-8%	0%
TOTAL		9,383	7,434	1,949	26%	100%

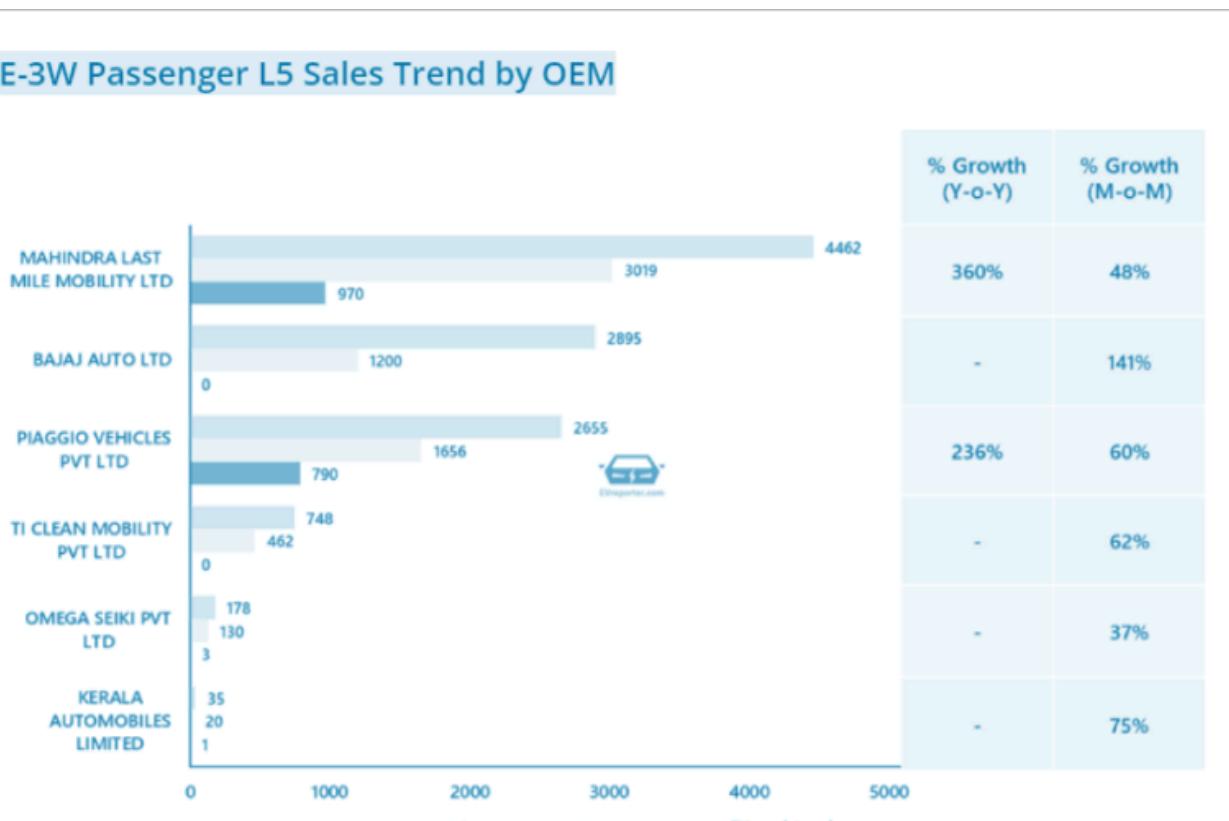
Others include Audi, Porsche, JLR etc.

Source: Vahan Dashboard. Data as per 1360 out of 1447 RTOs across 34 out of 36 state/UTs.

High Speed E-2Wheeler Sales Trend by OEM

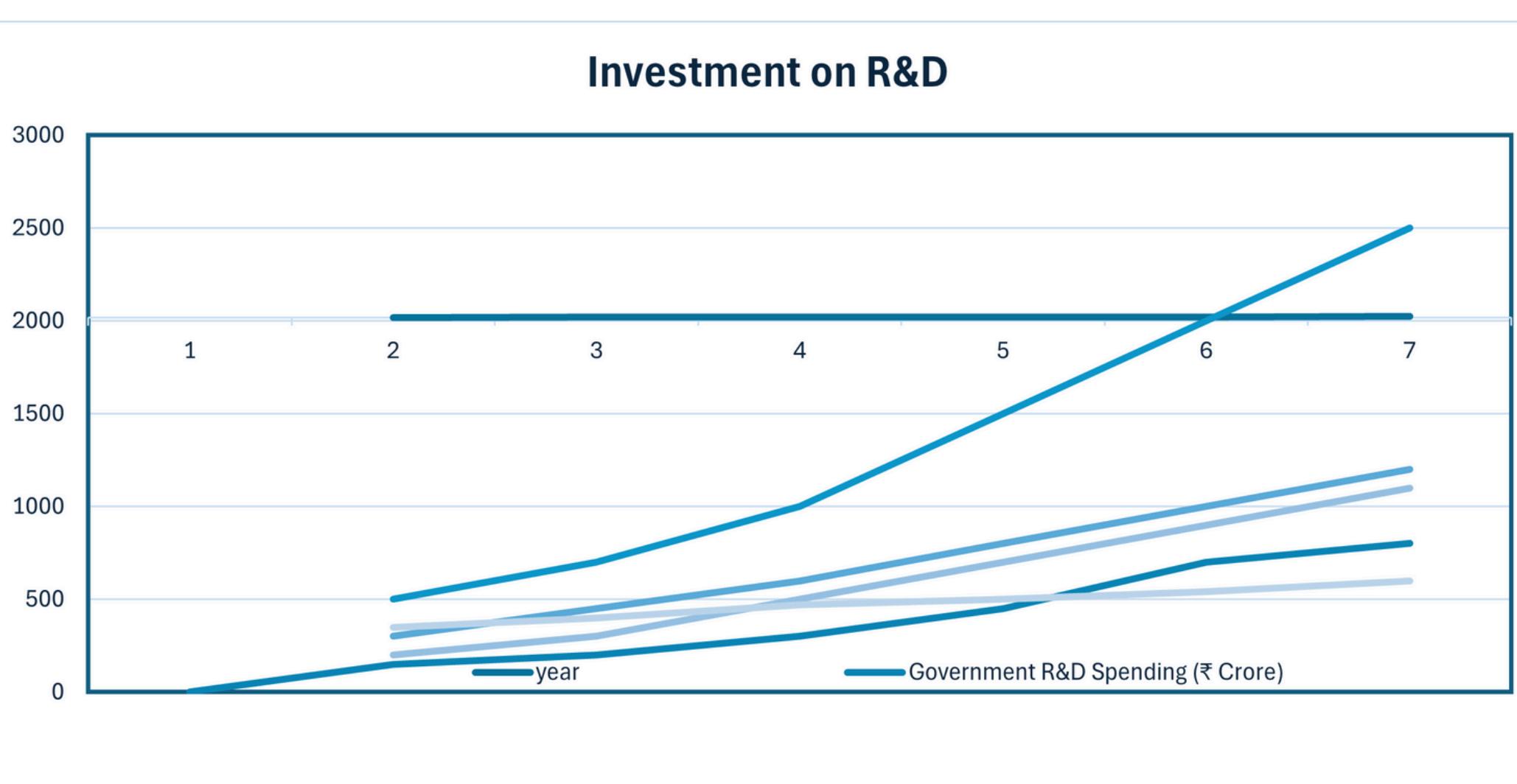


E-3W Passenger L5 Sales Trend by OEM



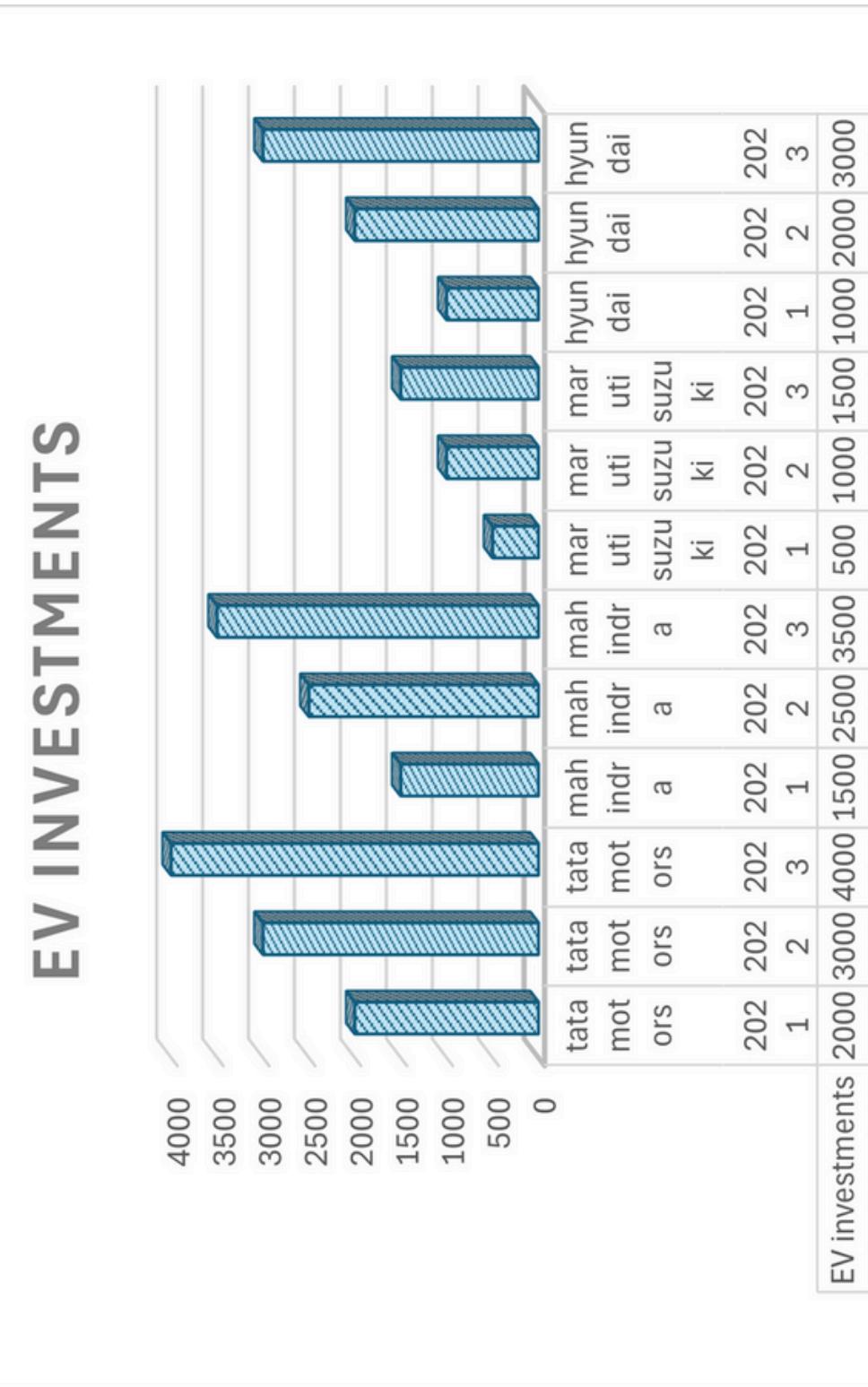
Source: Vahan Dashboard. Data as per 1360 out of 1447 RTOs across 34 out of 36 state/UTs.

RESEARCH AND DEVELOPMENT:



- Government spending on R&D for electric vehicles is shown to increase more rapidly than for green/hybrid vehicles, reflecting a growing focus on full electrification.
- Manufacturer investments are generally higher than government spending, with a clear trend towards increased investment over time.
- Companies focusing on EVs (like Tata and Mahindra) show steeper investment growth compared to those focusing on hybrids.
- The data suggests a shift in focus towards EVs in the Indian market, with hybrid technology still receiving significant but comparatively lower investment.

STRATEGY AND INVESTMENTS:



Tata Motors:

- Launch of multiple EV models (Nexon EV, Tigor EV, Punch EV)
- Expansion of charging infrastructure
- Introduction of new EV concepts (e.g., Tata Curvv EV)
- Partnership with Tata Power for charging solutions
- Investment in battery technology

Mahindra:

- Development of Born Electric platform
- Focus on electric SUVs
- Launch of XUV400 electric
- Collaboration with Volkswagen for EV components
- Unveiling of multiple EV concepts

Hyundai:

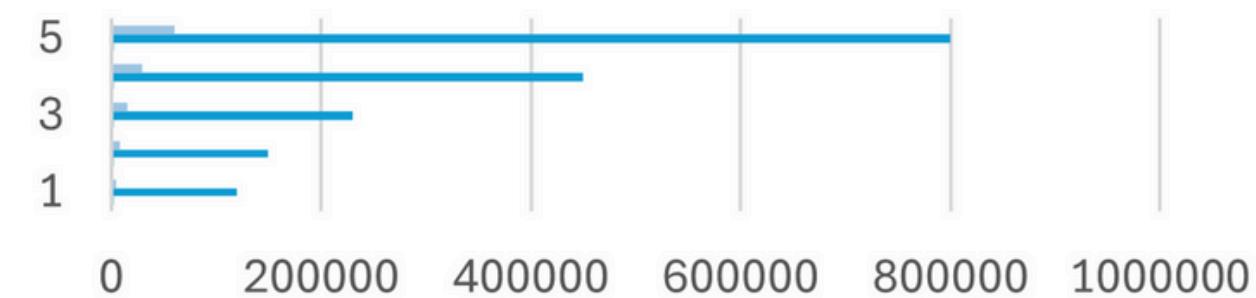
- Launch of Kona Electric
- Investment in charging infrastructure
- Introduction of Ioniq 5 EV
- Focus on battery technology

Maruti Suzuki:

- Focus on hybrid technology
- Development of flex-fuel engines
- Announcement of first EV launch by 2025
- Expansion of CNG vehicle lineup
- Partnership with Toyota for EV development

Technological Advancements:

Technological advancement in Electric scooters



Electric scooters premium

5000

8000

15000

30000

60000

Electric cars standard

120000

150000

230000

450000

800000

year

2019

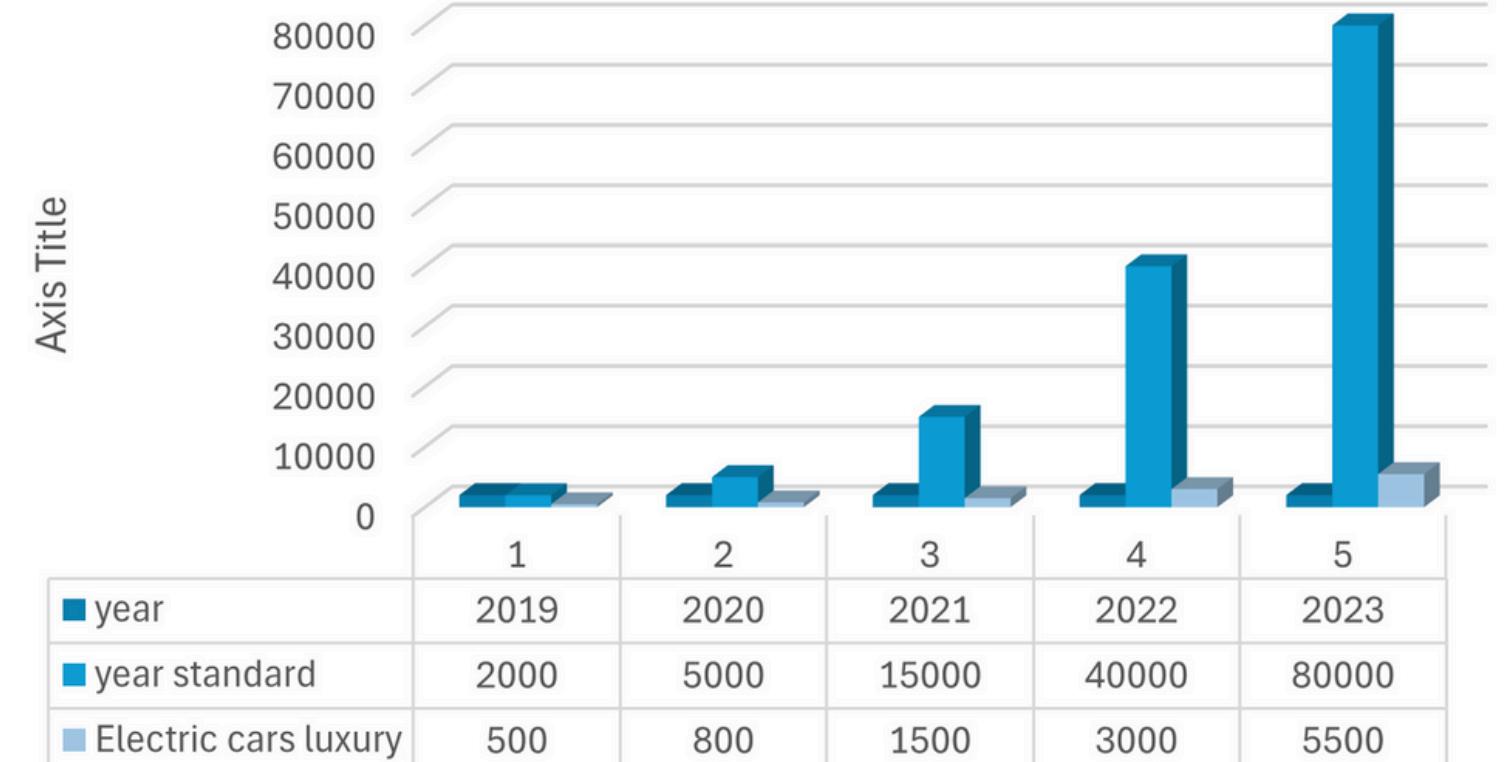
2020

2021

2022

2023

Technology advancements on cars



year

2000

5000

15000

40000

80000

year standard

500

800

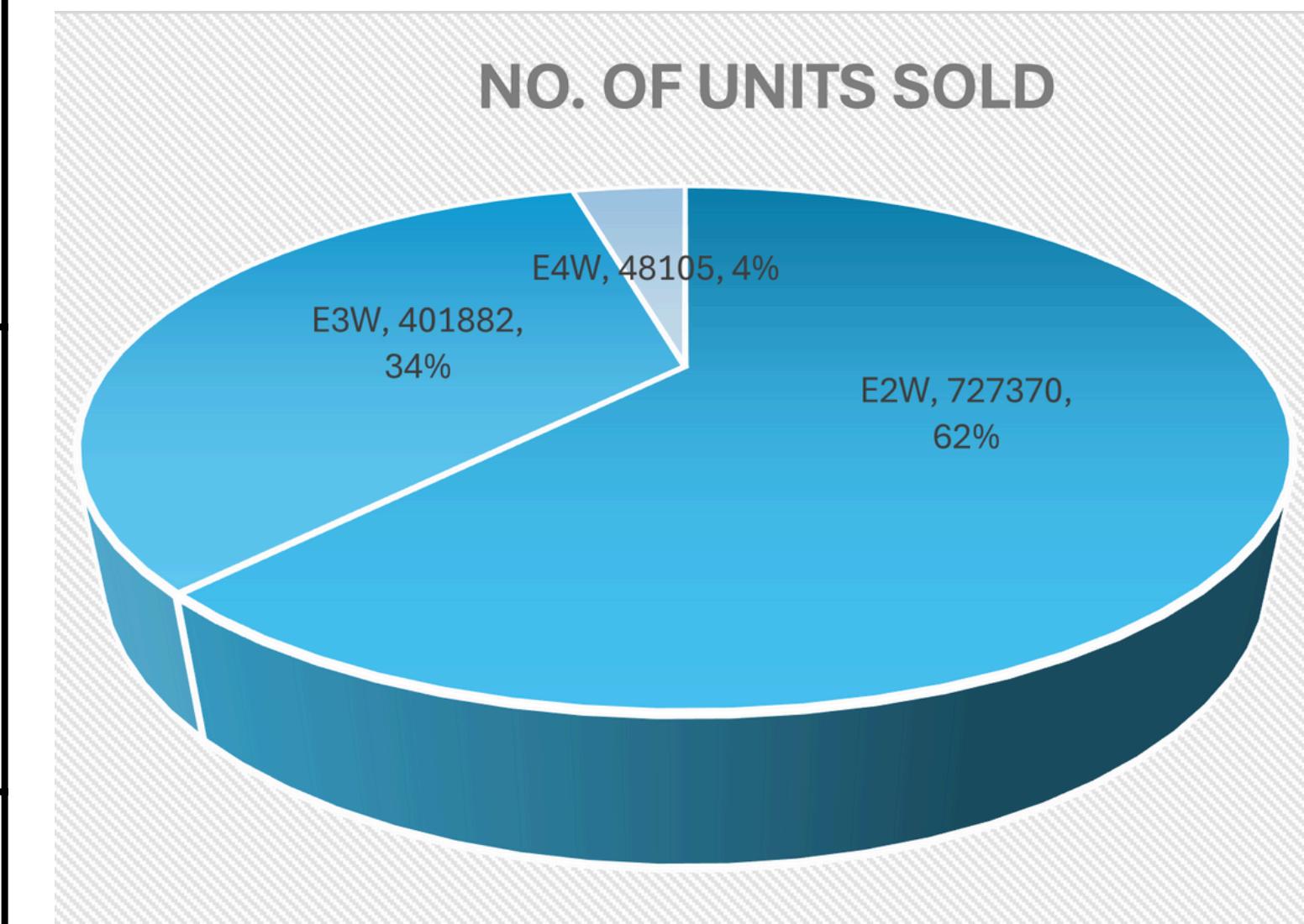
1500

3000

5500

Electric cars luxury

company	year	technological advancements
TATA MOTORS	<ul style="list-style-type: none"> ◦ 2020 ◦ 2021 ◦ 2022 	<ul style="list-style-type: none"> ◦ Ziptron EV technology platform introduced ◦ Advanced driver assistance systems (ADAS) for EVs ◦ Improved battery management system increasing range by 15%
Mahindra	<ul style="list-style-type: none"> ◦ 2020 ◦ 2021 ◦ 2022 	<ul style="list-style-type: none"> ◦ MESMA (Mahindra Electric Scalable Modular Architecture) platform launched <ul style="list-style-type: none"> - Integrated thermal management system for EVs ◦ Prototype solid-state battery with 25% higher energy density
Hyundai	<ul style="list-style-type: none"> ◦ 2020 ◦ 2021 ◦ 2022 	<ul style="list-style-type: none"> ◦ Improved Kona Electric with increased range (from 452 km to 484 km) ◦ Introduction of Vehicle-to-Load (V2L) technology in Ioniq 5 ◦ Prototype hydrogen fuel cell system for commercial vehicles



Strategic Partnerships in the Indian EV Ecosystem

- **Government Partnerships :** The Indian government is actively collaborating with industry leaders and research institutions to accelerate EV adoption. These partnerships focus on developing policies, infrastructure, and technology to support the growth of the EV ecosystem.
- **Foreign Investments:** Foreign companies are investing heavily in the Indian EV market, bringing in advanced technologies, manufacturing expertise, and financial resources. These partnerships are essential for bridging the technology gap and accelerating the adoption of EVs in India.
- **Manufacturer Collaborations :** Collaboration between manufacturers is essential for sharing knowledge, resources, and technologies to develop and deploy EVs at scale. These partnerships enable manufacturers to leverage each other's strengths and accelerate the development of cost-effective and efficient EVs for the Indian market.
- **Technology Partnerships:** Partnerships with technology companies are crucial for developing advanced features like AI, connectivity, and battery management systems for EVs. These partnerships help integrate cutting-edge technologies into EVs, enhancing their performance, safety, and user experience.

PREDICTED FUTURE TRENDS

Growing Demand

- Rising middle-class income and a huge youth population will result in strong demand.
- In January 2024, the total production of passenger vehicles*, three-wheelers, two-wheelers, and quadricycles was 23,28,329 units.
- The global EV market was estimated at approximately US\$ 250 billion in 2021 and by 2028, it is projected to grow by 5 times to US\$ 1,318 billion.
- In April 2024, the total production of passenger vehicles*, three-wheelers, two-wheelers, and quadricycles was 23,58,041 units

OPPORTUNITIES

- India could be a leader in shared mobility by 2030, providing opportunities for electric and autonomous vehicles.
- Focus is shifting to electric vehicles to reduce emissions.
- By 2030, the Indian government has committed that 30% of the new vehicle sales in India would be electric.

RISING INVESTMENT

- The automobile sector received a cumulative equity FDI inflow of about US\$ 35.40 billion between April 2000 - September 2023.
- India is on track to become the largest EV market by 2030, with a total investment opportunity of more than US\$ 200 billion over the next 8-10 years.
- The automobile sector received a cumulative equity FDI inflow of about US\$ 36.268 billion between April 2000 - March 2024

POLICY SUPPORT

- The Automotive Mission Plan 2016-26 is a mutual initiative by the Government of India and the Indian automotive industry to lay down the roadmap for the development of the industry.
- The FAME Scheme was extended for a further period of 2 years up to March 31st, 2024.

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- **Screener Maruti Suzuki India Ltd Dataset**
- **Statista Global EV Dataset**
- **Invest India Indian Automobile Industry Analysis**
- **IBEF Indian Automobile Industry Analysis**
- **Finshots India**



THANK YOU