



TRENDS _{in} ELECTRIC VEHICLE MARKET IN INDIA



The India Backdrop

India is expected to be one of **THE TOP THREE AUTOMOBILE MARKETS** of the world

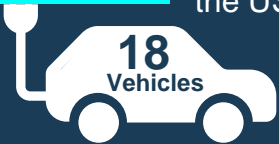


The industry accounts for 7.1% of India's Gross Domestic Product (GDP) and the [Automotive Mission Plan 2016-2026](#) of the Government of India aims to raise this to

12%

**1000
CITIZENS**

The [automobile ownership in the country remains low](#), with only 18 cars per 1,000 citizens, compared to nearly 69 in China and 786 in the US. This indicates the opportunity available in the market.

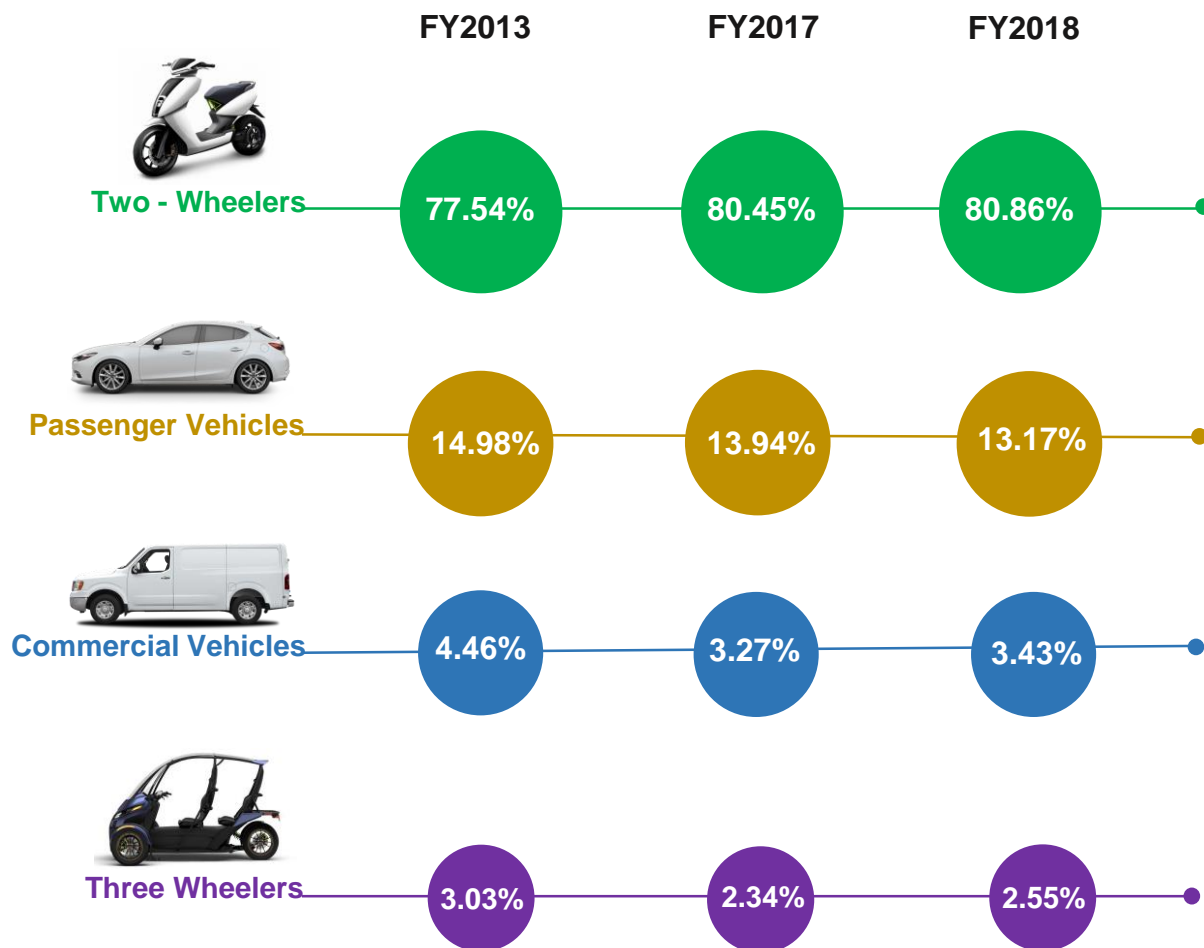
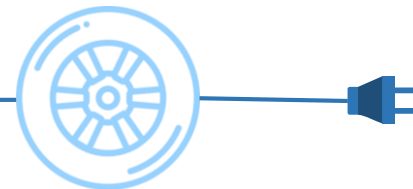


1.95 crore vehicles

The automobile market in India witnessed a production of a total of 1.95 crore vehicles, comprising passenger, commercial, three-wheeler and two-wheelers vehicles and quadricycle vehicles in April-October 2018 compared to 1.71 crore in April-October 2017, registering a growth of 14.39%.



Share of Vehicle Type Sales in India



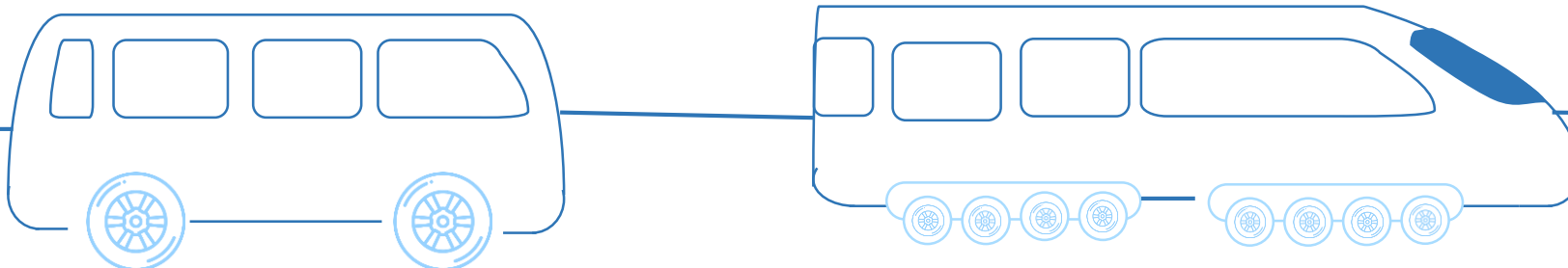
With respect to sale of vehicles in the industry, **the passenger car segment grew by 5.87%, the commercial vehicle segment by 35.68%, the three-wheeler segment by 31.97% and the two-wheeler segment by 11.14%** in April-October 2018 over the same period the previous year.

Dominance of Road & Rail

Public buses and trains have been the primary mode of transport in the country.

The maximum spend of around 66% of households in rural areas and 62% of households in urban areas is on buses.

The other modes of transportation include autorickshaws, cabs and trains.



Declining share of public transport buses, which has necessitated a revamp of public transport system in the country, has resulted in the **growing demand for app-based cab aggregators.**

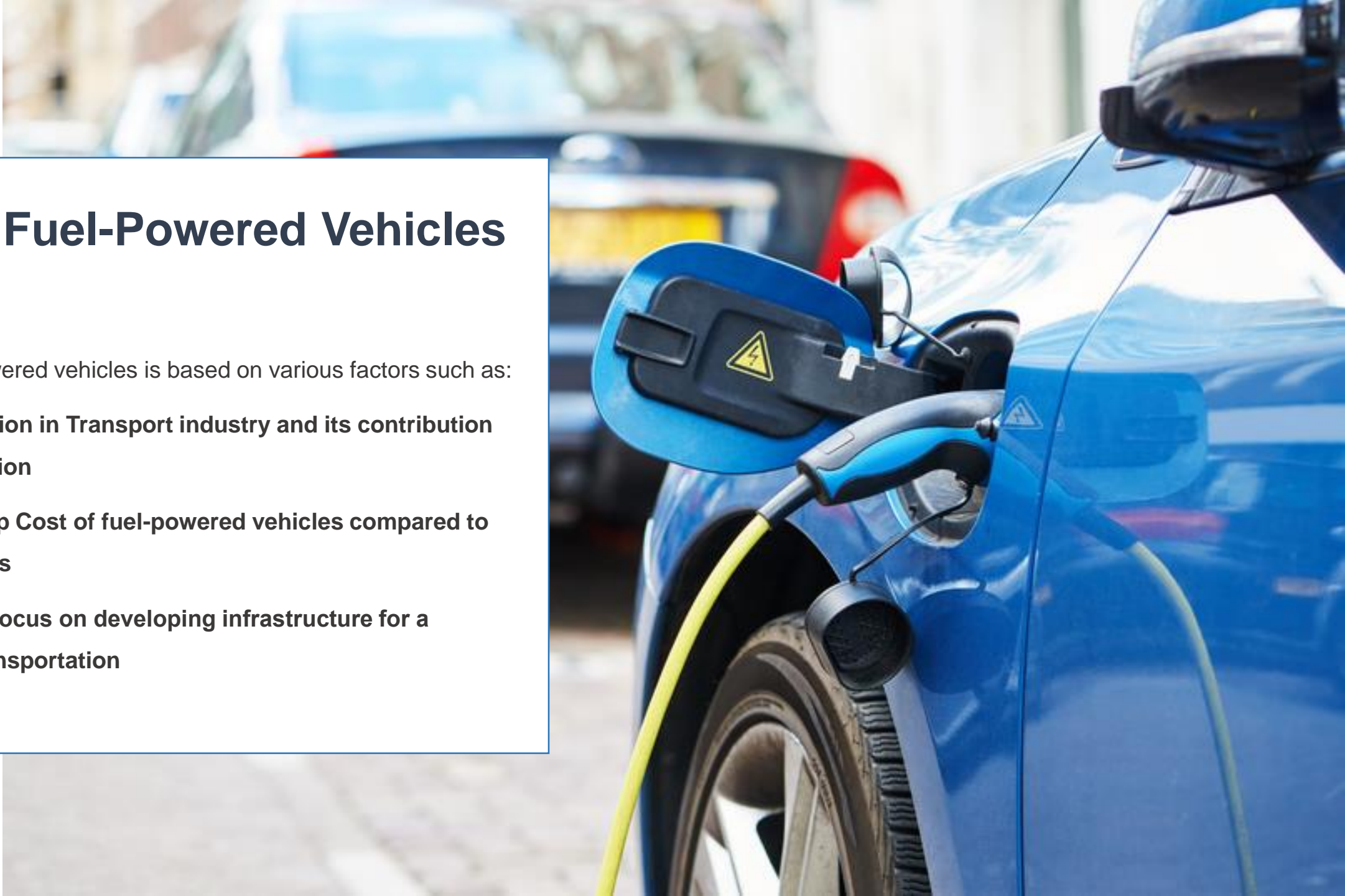
Two of the largest app-based cab aggregators caters to approx. **3.5 million rides** on daily basis.

What is imperative for the country, in a long term perspective, is to improve public transport infrastructure with **vehicles running on electricity and alternate fuel technology which make this mode of transportation convenient, safe, environment friendly** and encourage people to opt for public transport.

Road for Fuel-Powered Vehicles

Future of Fuel-powered vehicles is based on various factors such as:

- **Fuel Consumption in Transport industry and its contribution to the air pollution**
- **Total Ownership Cost of fuel-powered vehicles compared to Electric vehicles**
- **Government's focus on developing infrastructure for a sustainable transportation**



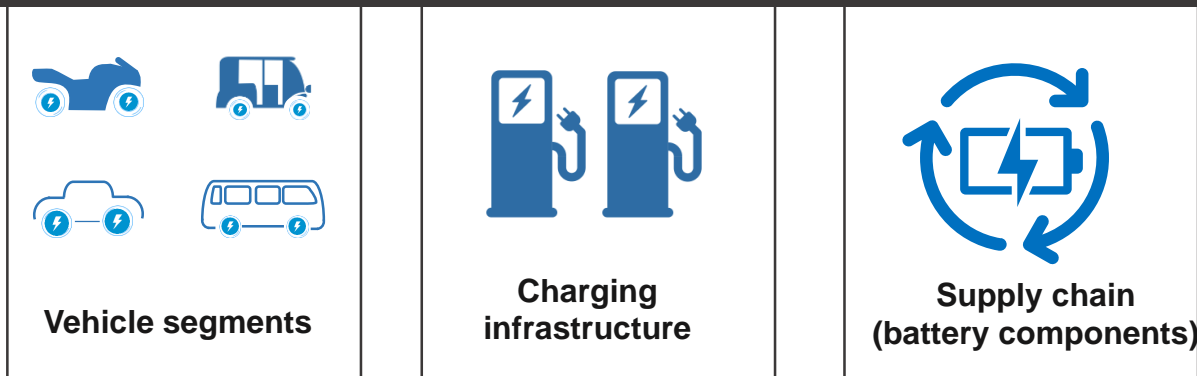
Electric Vehicles on the Horizon



Electric Vehicle Deployment Roadmap and likeliness of adoption of EV to take place across vehicle segments



EV Deployment Roadmap



Key Findings

- Shift towards EV for automotive industry in India is necessary to retain its position and gain additional ground with the shifting global focus towards Electric Vehicles.
- Two-wheelers; three-wheelers; and Intracity buses are expected to be the first segments to adapt the paradigm shift whereas, passenger cars and commercial vehicles are likely to take some time.
- Regulatory support to play key role in EV adoption in the country.
- With BS-IV in place, the Total Cost of Ownership (TCO) for passenger cars would remain competitive which is anticipated to shift, considerably, in favor of EV after BS-VI implementation. However, in case of 2W, TCO for Electric 2W is quite less when compared with its fuel-powered counterparts.

Electric Vehicles: Global Market Scenario



Market Scenario: Electric Vehicle

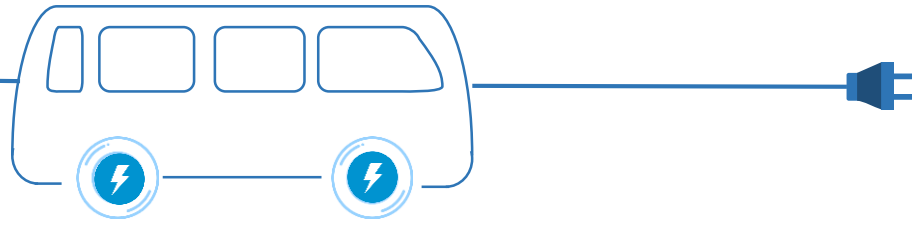
Electric Vehicle Market Growth Rate, in terms of Vehicle Units sold, for Select Countries with Historical Growth and Forecast Growth, across the globe

Market Insights

- **China** and **United States** stood as the largest markets in terms of **Electric Passenger car** sales in 2018, whereas, **India**; **Spain**; **United Kingdom**; and **Germany** are anticipated to grow at highest CAGR during the next five years.
- In Electric Motorcycles market, China contributed around 99% of the global unit sales in 2018 followed by United States. However, attributed to favorable government policies, better infrastructure, and growing awareness of CO2 emission, India; Vietnam & Taiwan are anticipated to witness growth during the next five years.

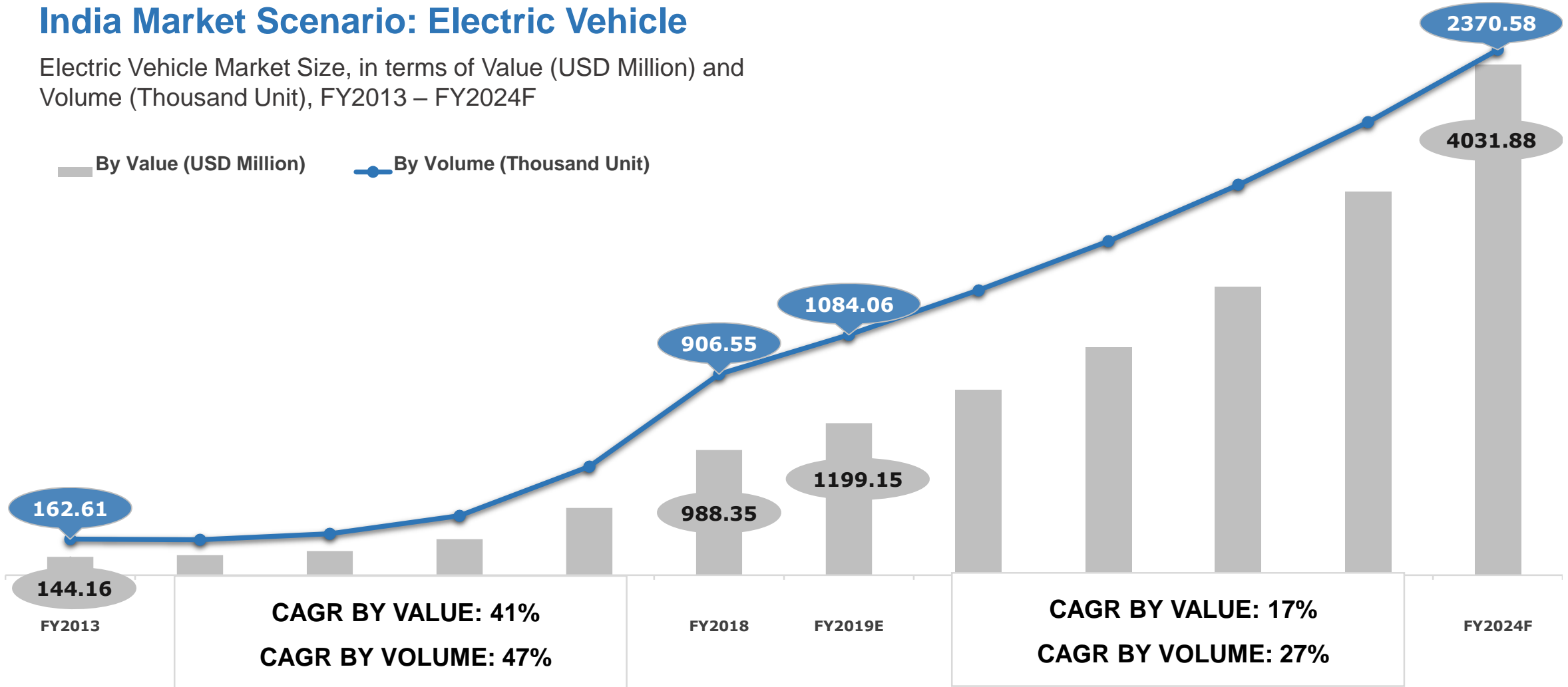
Countries	Electric Passenger Cars		Countries	Electric Motorcycles	
	Sales Growth (%) Historic: 2014 – 2018	Sales Growth (%) Forecast: 2019 – 2024		Sales Growth (%) Historic: 2014 – 2018	Sales Growth (%) Forecast: 2019 – 2024
India	177%	45%	India	-	73%
Spain	58%	39%	Vietnam	-	37%
United Kingdom	93%	35%	Taiwan	-	17%
Germany	66%	31%	United Kingdom	35%	16%
Portugal	104%	29%	Austria	43%	16%
China	148%	28%	Netherlands	5%	11%
Italy	44%	27%	Canada	11%	9%
Mexico	51%	27%	France	123%	8%
Australia	58%	27%	Spain	39%	8%
South Korea	102%	27%	Japan	7%	8%
Global	50%	25%	United States	7%	8%
France	44%	24%	Germany	41%	7%
Belgium	110%	23%	Global	1%	3%
Switzerland	51%	23%	China	1%	3%
Sweden	88%	22%	Italy	16%	2%
New Zealand	181%	22%			
Netherlands	-19%	20%			
Iceland	131%	19%			
Canada	54%	18%			
Norway	64%	17%			
Japan	14%	16%			
United States	20%	15%			

Electric Vehicles: India



India Market Scenario: Electric Vehicle

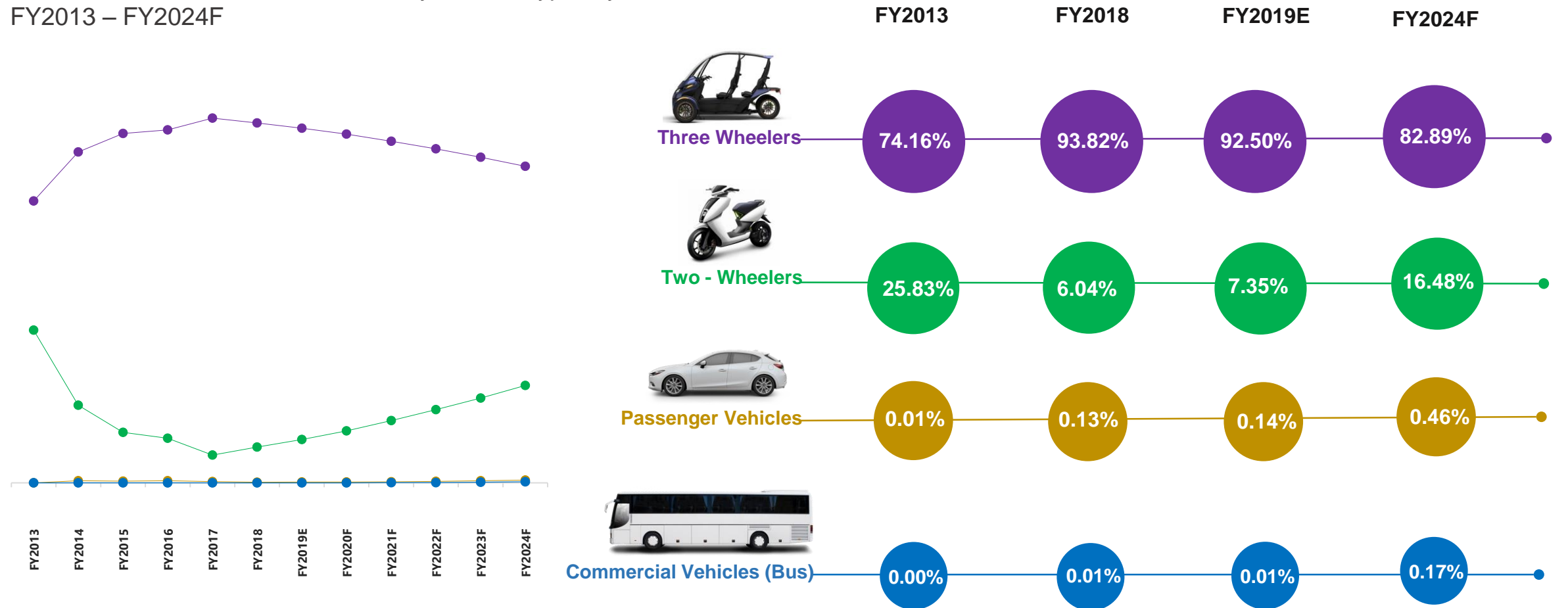
Electric Vehicle Market Size, in terms of Value (USD Million) and Volume (Thousand Unit), FY2013 – FY2024F



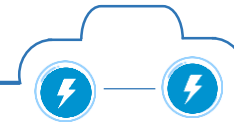
Electric Vehicles: India

India Market Scenario: Electric Vehicle

India Electric Vehicle Market Share, By Vehicle Type, By Volume, FY2013 – FY2024F



Electric Vehicles: India



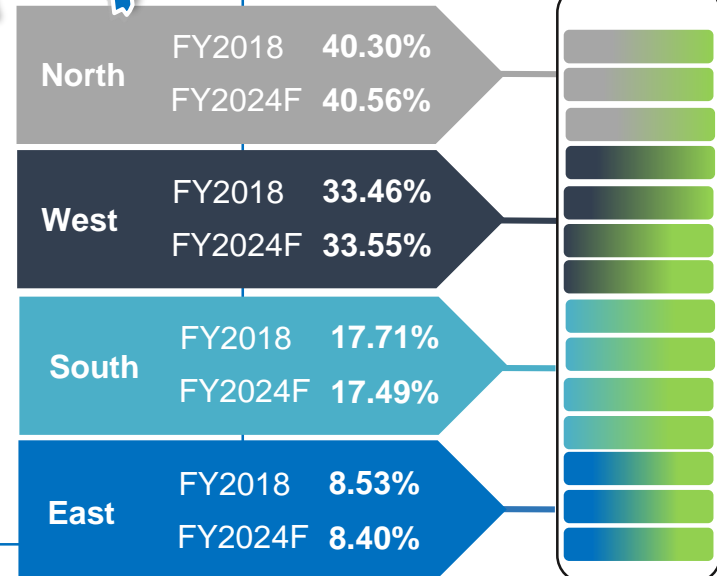
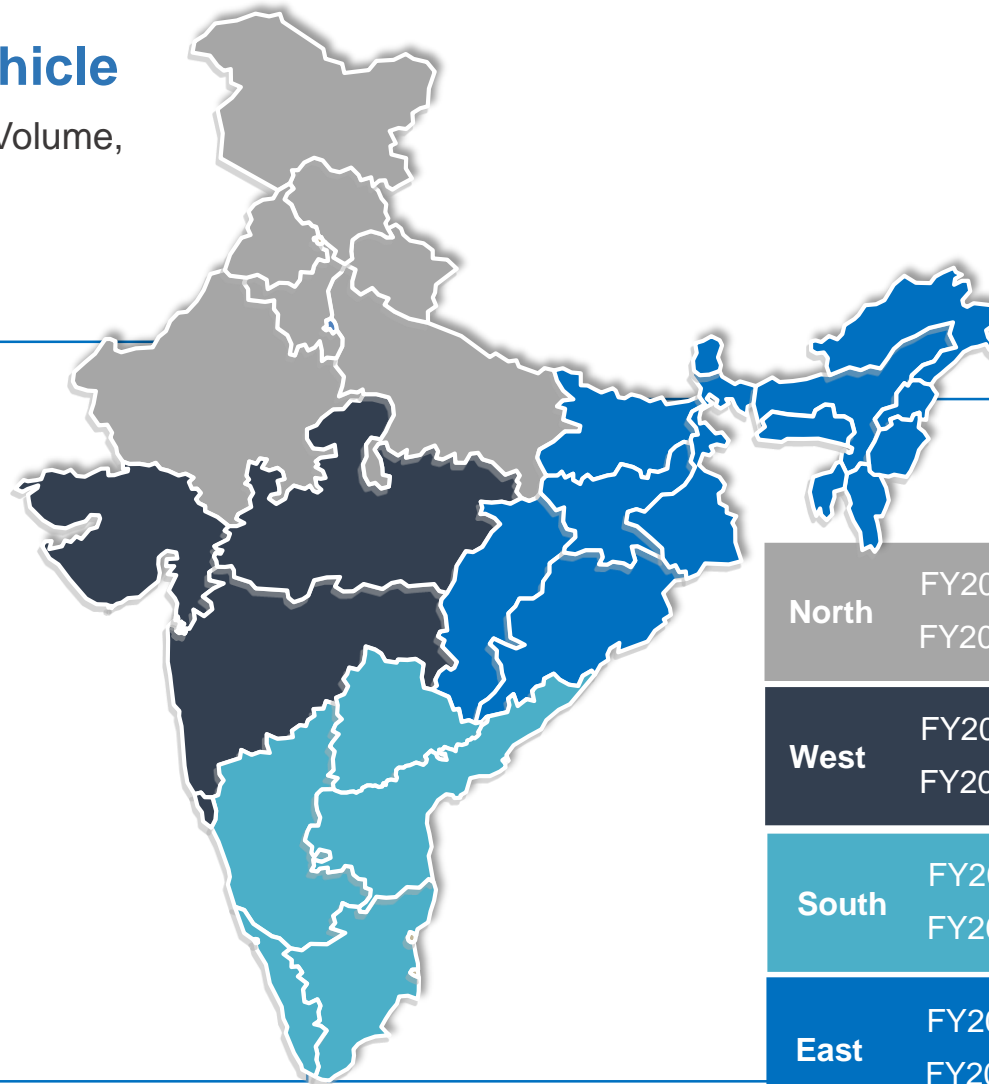
India Market Scenario: Electric Vehicle

India Electric Vehicle Market Share, By Region, By Volume, FY2013 – FY2024F

NORTH INDIA DOMINATED THE ELECTRIC VEHICLE MARKET IN INDIA

North region accounted for over 40% volume share in Electric Vehicle market in India in FY2018 and is expected to remain dominant during the next 5 years on the back of factors like:

- Growing road congestions due to high vehicle ownership rate in areas like Delhi/NCR
- Rising Developments in public transport infrastructure
- High urbanization rate
- High Vehicular air pollution



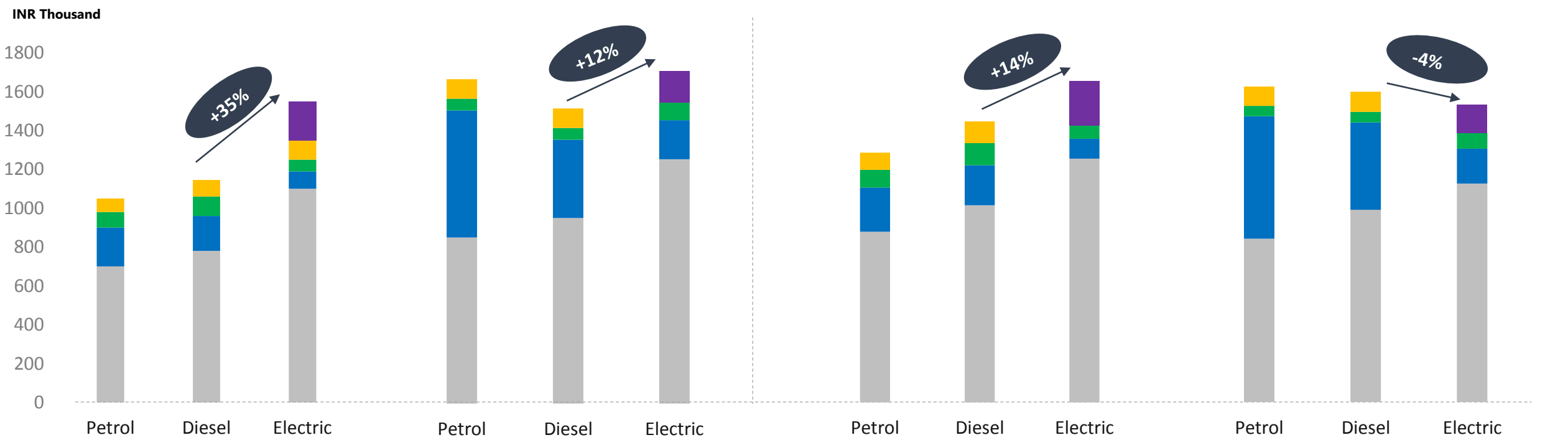


Cost of Ownership Analysis - Passenger Vehicle



BS-IV (Current Scenario)

Post BS-VI (2020 Onwards)



By 2020, operating cost for most EVs are expected to compensate for the high acquisition cost

Cost of Ownership Analysis – Two-Wheeler



BS-IV (Current Scenario)

Post BS-VI (2020 Onwards)

INR Thousand

180
160
140
120
100
80
60
40
20
0

Internal Combustion Engine (ICE)

Electric

Internal Combustion Engine (ICE)

Electric

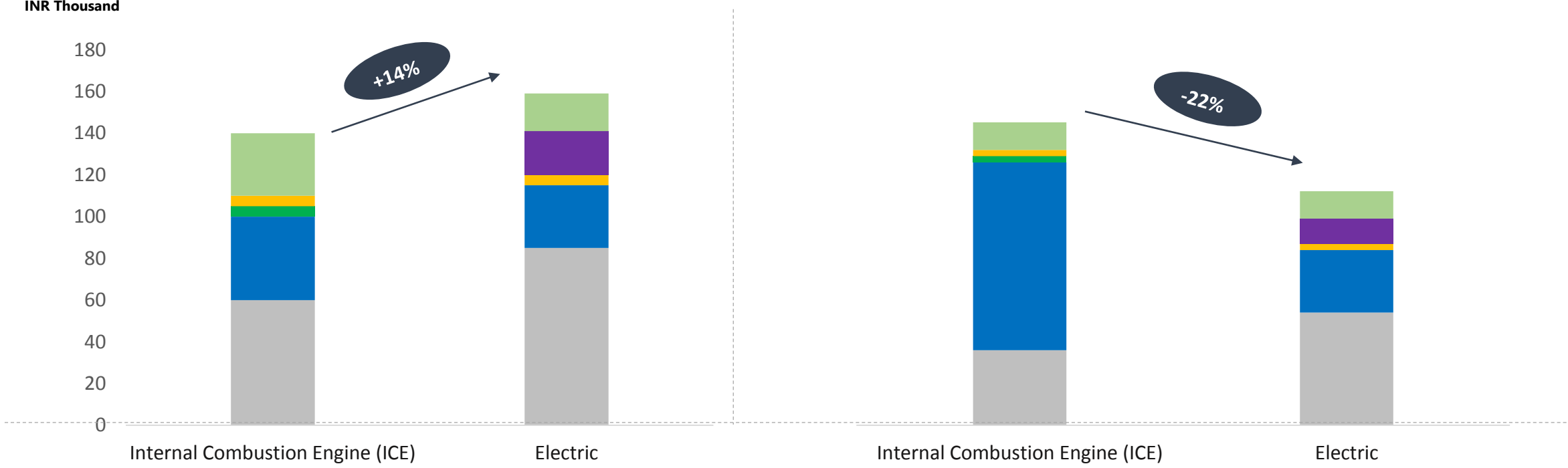
Private

Commercial



+14%

-22%



Electric Vehicle Adoption across Segments



Factors Driving Electric Mobility

		Route predictability	Vehicle utilization	Price differential	Ease of charging	Investment by OEMs	Policy intervention potential	
2W	Private	Favorable	Favorable	Neutral	Favorable	Favorable	Unfavorable	Favorable
	Commercial	Favorable	Favorable	Favorable	Favorable	Favorable	Favorable	
3W	Commercial	Favorable	Favorable	Favorable	Favorable	Favorable	Favorable	Favorable
	Private	Unfavorable	Unfavorable	Favorable	Favorable	Favorable	Unfavorable	
PV	Cab aggregators	Unfavorable	Favorable	Favorable	Favorable	Favorable	Favorable	Neutral
	Car rental	Unfavorable	Favorable	Favorable	Unfavorable	Favorable	Favorable	
	Corporate cabs	Favorable	Favorable	Favorable	Favorable	Favorable	Favorable	
	Government fleet	Favorable	Favorable	Favorable	Favorable	Favorable	Favorable	
	Bus (intra city)	Favorable	Favorable	Unfavorable	Favorable	Favorable	Favorable	
CV	SCV	Favorable	Favorable	Unfavorable	Favorable	Favorable	Favorable	Unfavorable
	LCV	Unfavorable	Favorable	Unfavorable	Unfavorable	Unfavorable	Unfavorable	
	M&HCV	Unfavorable	Favorable	Unfavorable	Unfavorable	Unfavorable	Unfavorable	

2W : Two - wheeler ; 3W Three – wheeler ; SCV : Small commercial vehicle ; LCV : Large commercial vehicle ; PV : Passenger vehicle



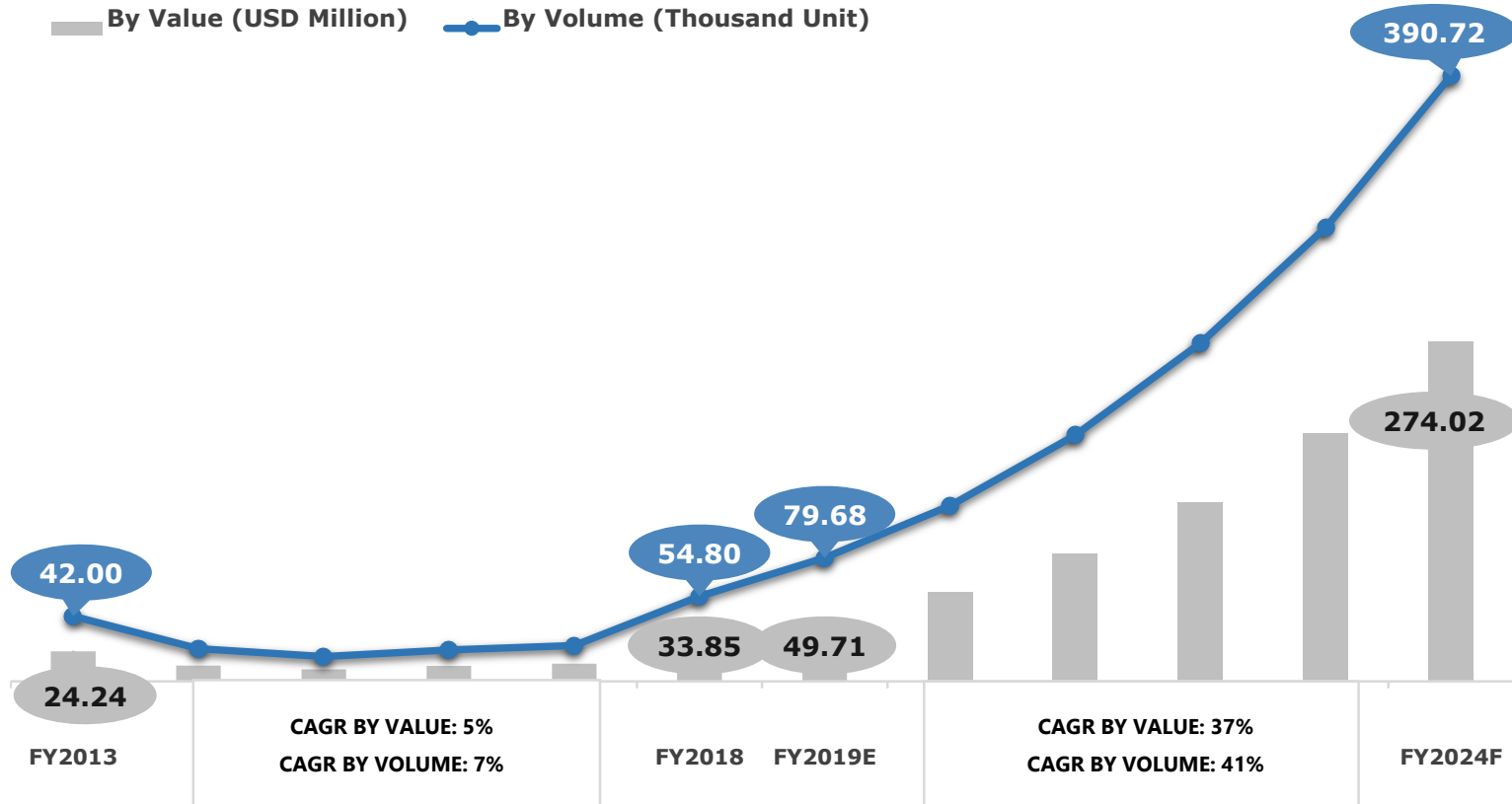
Electric Two Wheelers in India



India Market Scenario: Electric Two Wheelers

Electric Two Wheelers Market Size, in terms of Value (USD Million) and Volume (Thousand Unit), FY2013 – FY2024F

■ By Value (USD Million) ● By Volume (Thousand Unit)

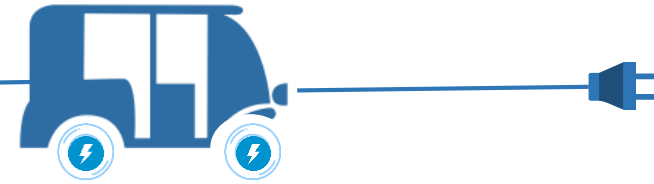


Market Insights



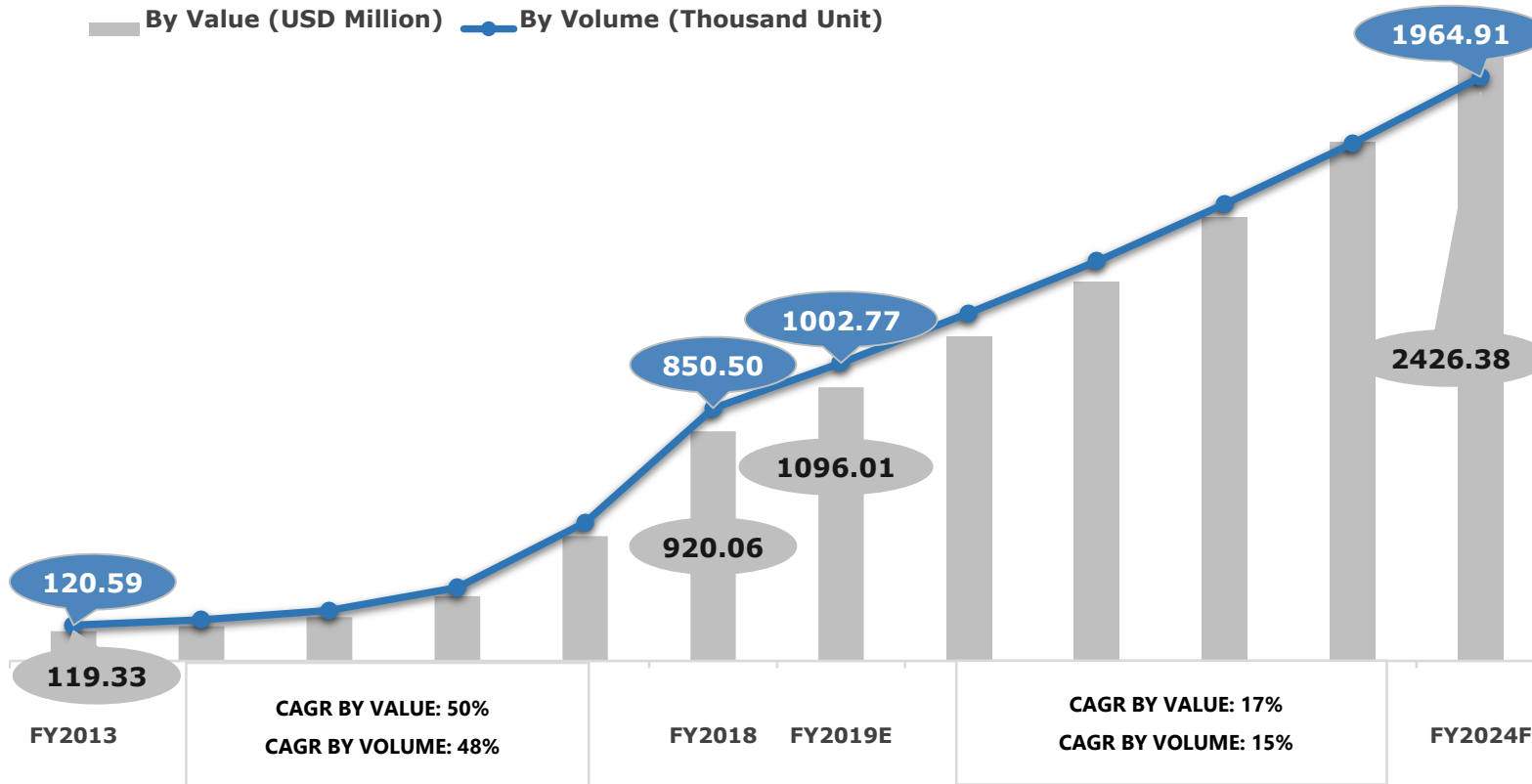
- Given the ease of charging, this segment represents the highest potential for penetration, even for areas with minimal charging network.
- An end-to-end ecosystem (right from in-house manufacturing to setting up charging infrastructure) being created by start-ups is likely to accelerate the adoption of electric two wheelers.
- The electric 2W segment has already demonstrated its potential in 2011-12, when electric 2Ws clocked sales of 90,000 units. However, the sales saw a dip in the following years with a withdrawal of subsidies by the Ministry of New & Renewable Energy (MNRE), with sales of only 23,000 units in FY2017.

Electric Three Wheelers in India



India Market Scenario: Electric Three Wheelers

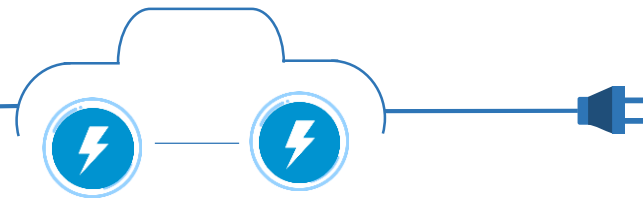
Electric Three Wheelers Market Size, in terms of Value (USD Million) and Volume (Thousand Unit), FY2013 – FY2024F



Market Insights

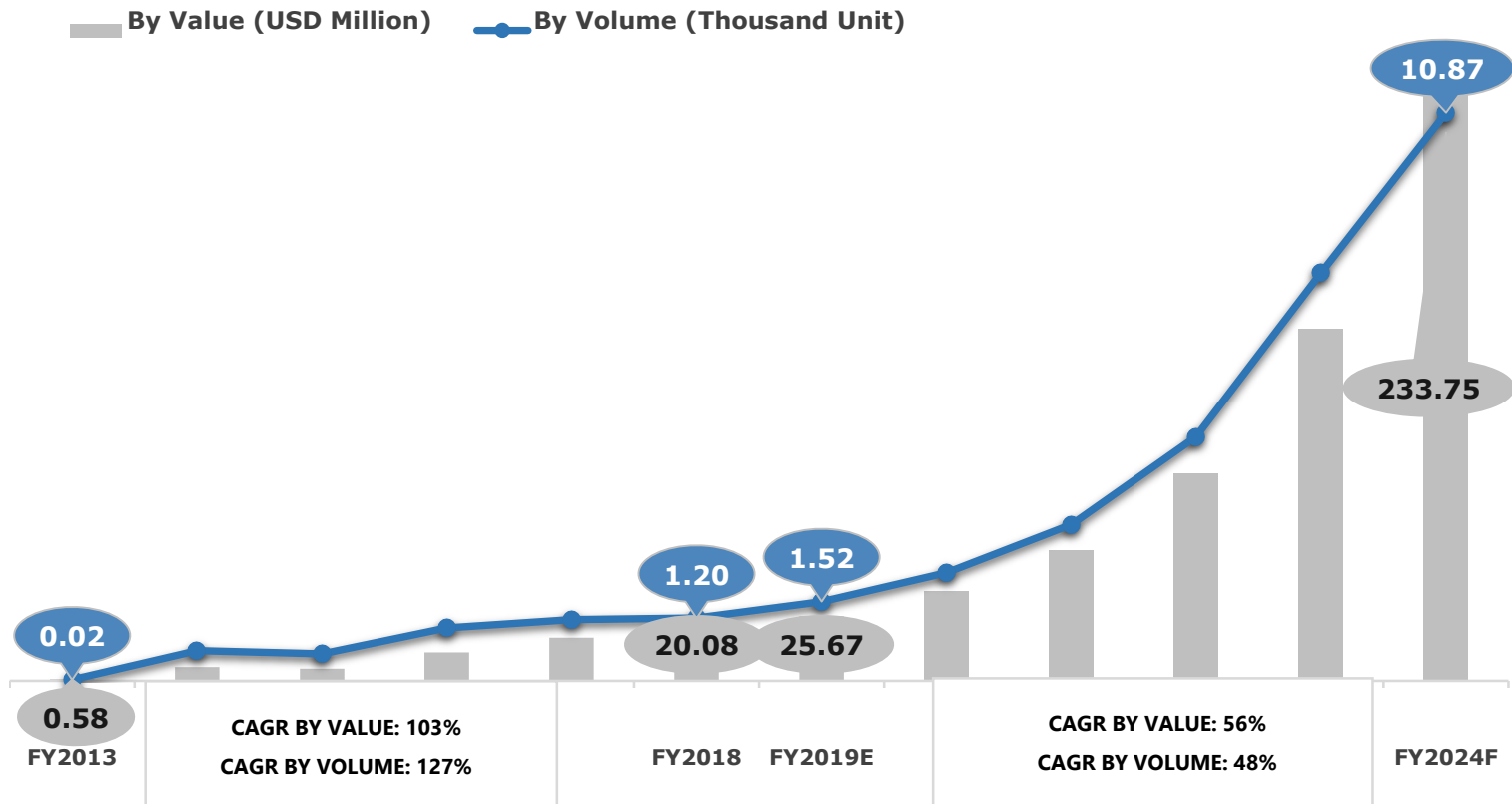
- Given the head start of the e-rickshaw segment, a mild push by the Government could drive a nationwide adoption.
- Considering the lack of essential public transport for last-mile connectivity, e-rickshaws could play a critical role while giving the necessary boost to vehicle electrification in the country.
- India has emerged as one of the biggest 3W markets, with a total sales of over 0.85 million units in FY18. 3Ws are widely used in India as an affordable means of public and goods transportation over short-to-medium distances.

Electric Passenger Car in India



India Market Scenario: Electric Passenger Car

Electric Passenger Car Market Size, in terms of Value (USD Million) and Volume (Thousand Unit), FY2013 – FY2024F

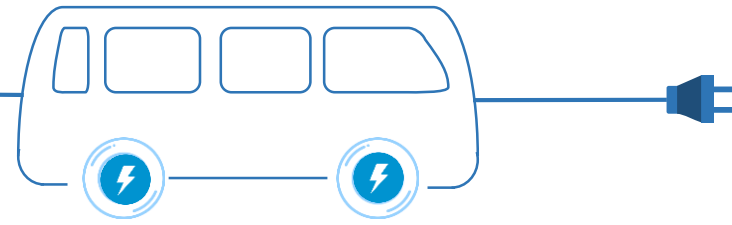


Market Insights



- India is the fifth largest car market in the world with over 3.3 million cars sold in FY18. Electric car sales, however, have continued to be very low and constituted merely 0.6% of the PV sales in FY18.
- Corporate fleets, which have a defined route and operations in a limited geography, tops the list while private cars score the lowest on ease of electrification. PV fleets are likely to be more willing to adopt EVs as the vehicle running costs (which are lesser for an EV) are one of the major influencers in purchase decisions.

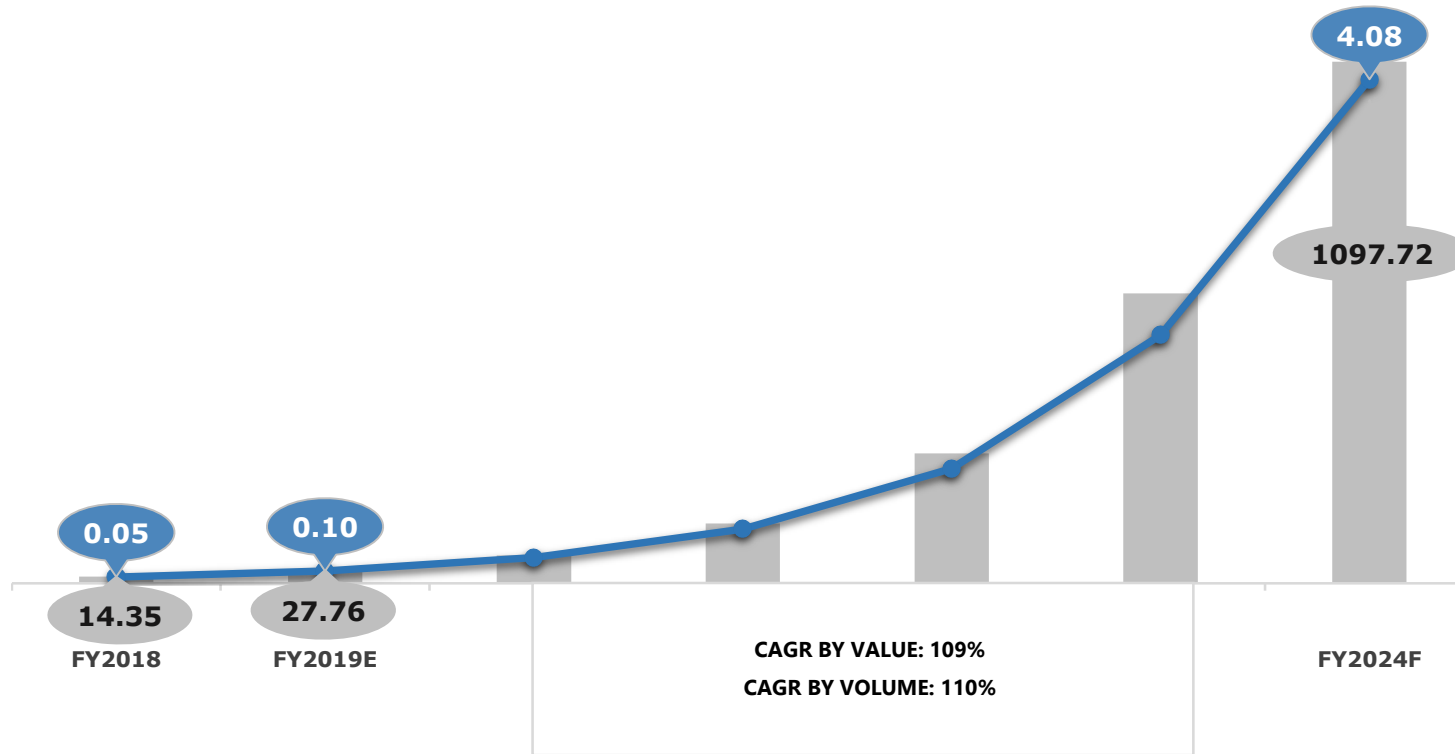
Electric Bus in India



India Market Scenario: Electric Bus

Electric Bus Market Size, in terms of Value (USD Million) and Volume (Thousand Unit), FY2013 – FY2024F

■ By Value (USD Million) — By Volume (Thousand Unit)



Market Insights



- Electrification of buses allows for an opportunity to showcase a plausible deployment of EVs in the Indian context. According to TechSci Research, intra-city bus segment is more market ready than others because of shorter trip length, route predictability and ease of charging at bus depots.
- Indian market is already witnessing a few e-bus pilots by state run transport units (SRTUs) — Navi Mumbai, Himachal Pradesh and Bengaluru — with a few more in the pipeline - Chandigarh, Telangana and Gurgaon.

KEY PLAYERS

Smart city EV pilot — Nagpur

The government of Maharashtra launched India's first multi-modal EV pilot in Nagpur in May 2017. The project is being run by the Municipal Corporation of Nagpur in collaboration with private players. Its salient features include:

- Initial investment of INR200 million (estimated) toward EVs and charging infrastructure
- Network of 10 fast chargers (initially) created across three strategic locations
- Waiver of VAT (formerly), road tax and registration of EVs by the state government
- End-to-end project deployment in less than 3 months

Key components of the Nagpur EV pilot

Vehicles deployed	Charging infrastructure
Around 200 EVs deployed across Nagpur	Public charging stations spread across the city (fixed distance gap)
OEMs involved : BYD, Kinetic, Mahindra Electric, Tata Motors and TVS	Battery swapping stations set up for 3Ws
100 cars 100 e-rickshaws 2-3 buses	Single point, multiple chargers All EVs come back to base for charging



KEY PLAYERS

Lithium Urban Technologies

India's first 100% EV-based commercial fleet operator

Commencing operations in mid-2015, Lithium has pioneered a new concept in the country's urban mobility by demonstrating EVs' commercial and operational viability in fleet operations.



100% electric
fleet of ~400EVs



Partnered with
800+ drivers



Vehicles run
250-300 Km
per day



EBITDA positive within
10 months and cash
within 25 months of
operations



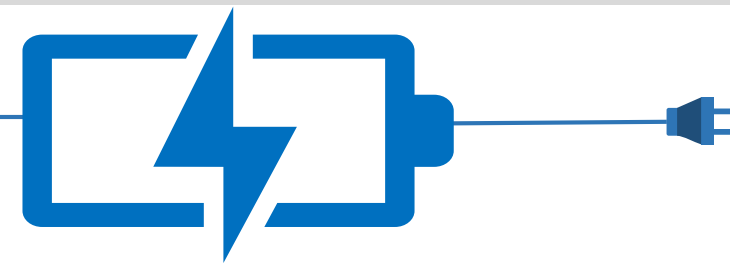
Checked in excess of
20+ million Km
















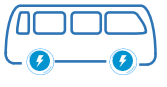





Abated 7000+
MT of CO2
emissions to date






Key Enablers

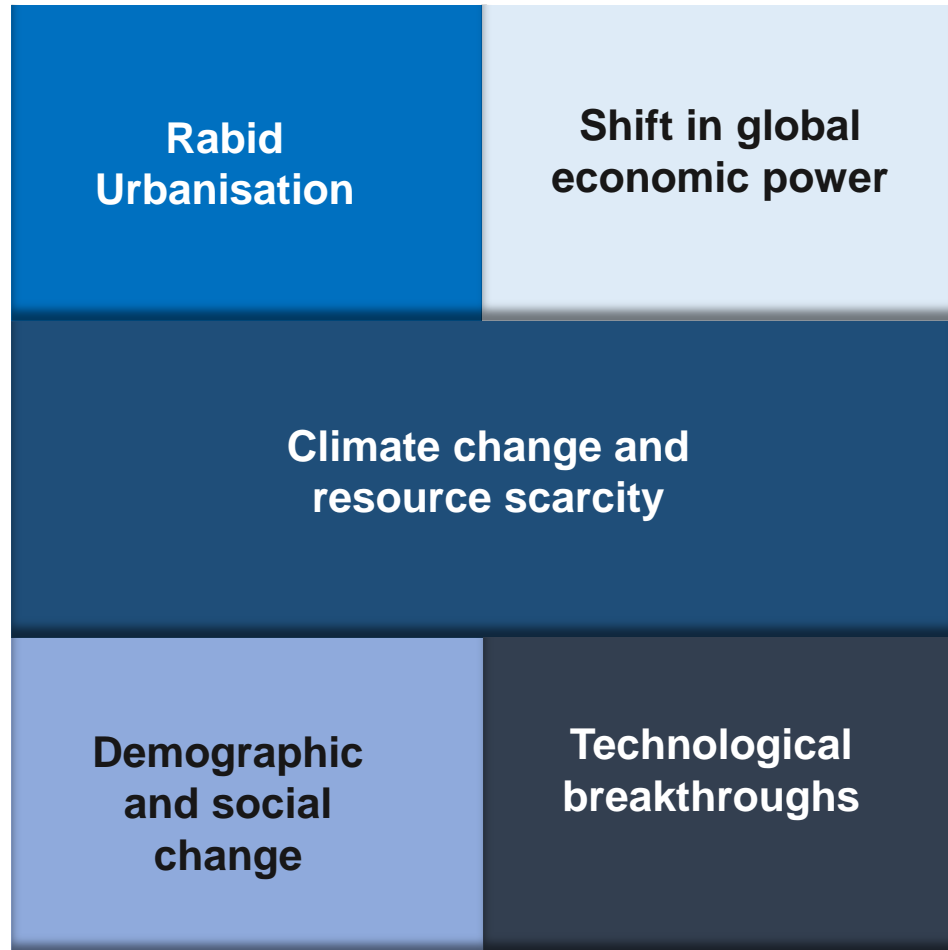


Category	Segment	Short term (2018 – 19)	Medium term (2020-22)
 Two - Wheelers	Private		 
	Commercial		
 Three Wheelers	Commercial		
 Passenger Vehicles	Private		 
	Commercial		
 Commercial Vehicles	Commercial		 

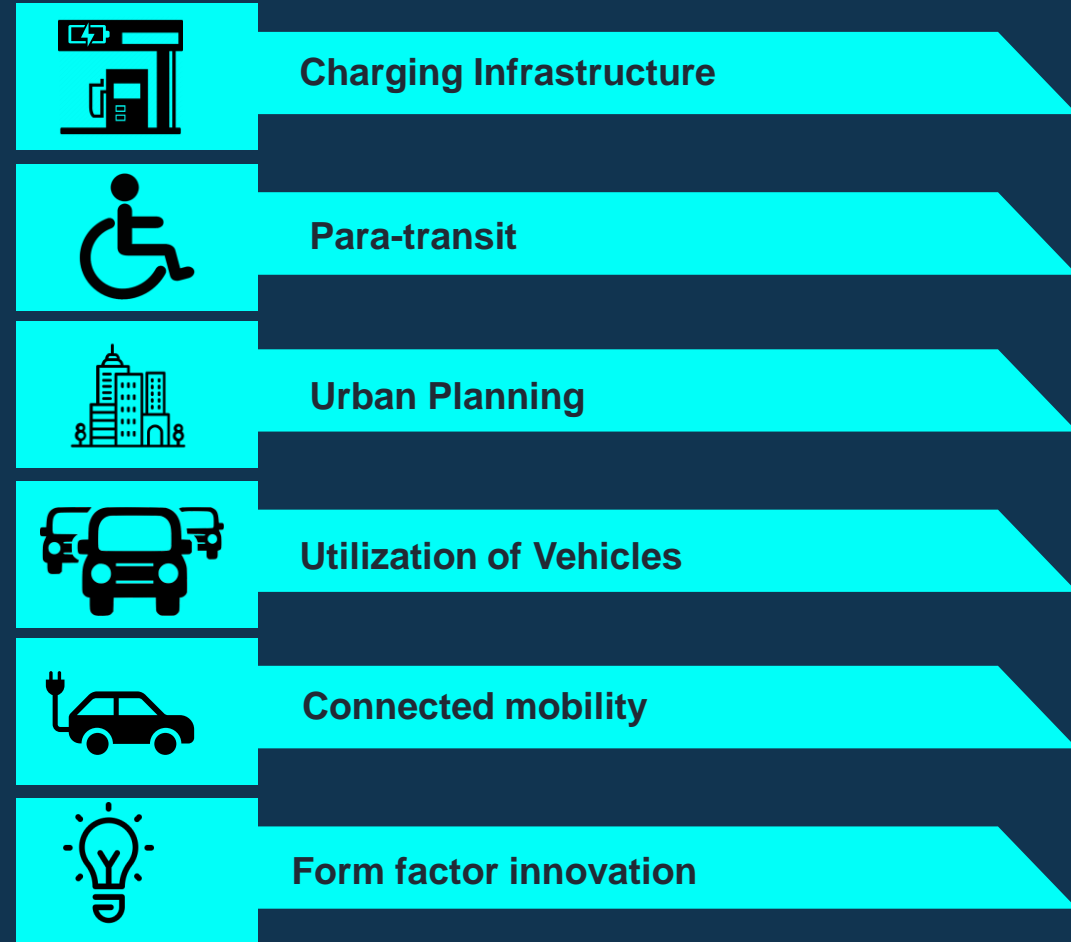
IMPACT ON MAJOR AUTO-COMPONENTS		
Negative Impact	Neutral	Positive Impact
Engine Parts	Steering Systems	Electric Motors
Clutch	Seats	Batteries
Radiators	Brake Lining	Headlights
Gears	Leaf Springs	Inverters
	Shock Absorbers	Microprocessors
		Wiring Harnesses
		Controllers

	Personalized Charging		Public Charging		Battery Swapping
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Public Transport Imperatives & Megatrends



Increased mobility of electric vehicles in public transportation in India



Possible Entry Routes



Type of Players	Short-term Entry Route (Current to Next 5 Years)	Long-term Entry Route (Beyond 5 Years)
Automotive OEMs	<ul style="list-style-type: none"> ▪ Sales Subsidiary ▪ Tie-up with Indian Players 	<ul style="list-style-type: none"> ▪ Joint Venture ▪ Enhancement of Existing Business Model
Automotive Component Suppliers (Engine Parts & Related Components)	<ul style="list-style-type: none"> ▪ 3rd Party Manufacturing Collaboration/Contract Manufacturing ▪ Distribution Network Set-up ▪ Sales Subsidiary ▪ Assembly Unit ▪ Joint Venture 	<ul style="list-style-type: none"> ▪ Brownfield ▪ Greenfield
Automotive Component Suppliers (Non-Engine Parts & Related Components)	<ul style="list-style-type: none"> ▪ 3rd Party Manufacturing Collaboration/Contract Manufacturing ▪ Sales Subsidiary ▪ Import Distribution 	<ul style="list-style-type: none"> ▪ Acquisition/Joint Venture ▪ Greenfield
Automotive Component Suppliers (Electronic Parts)	<ul style="list-style-type: none"> ▪ Import Distribution ▪ Sales Subsidiary ▪ Technology Transfer 	<ul style="list-style-type: none"> ▪ Acquisition ▪ Assembly Unit ▪ Greenfield

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We deliver our customers with high value market research and advisory services to identify new market opportunities, growth engines and innovative ways to capture the market. We support leading organizations for meeting strategic business goals and making informed business decisions.

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12+
Industries

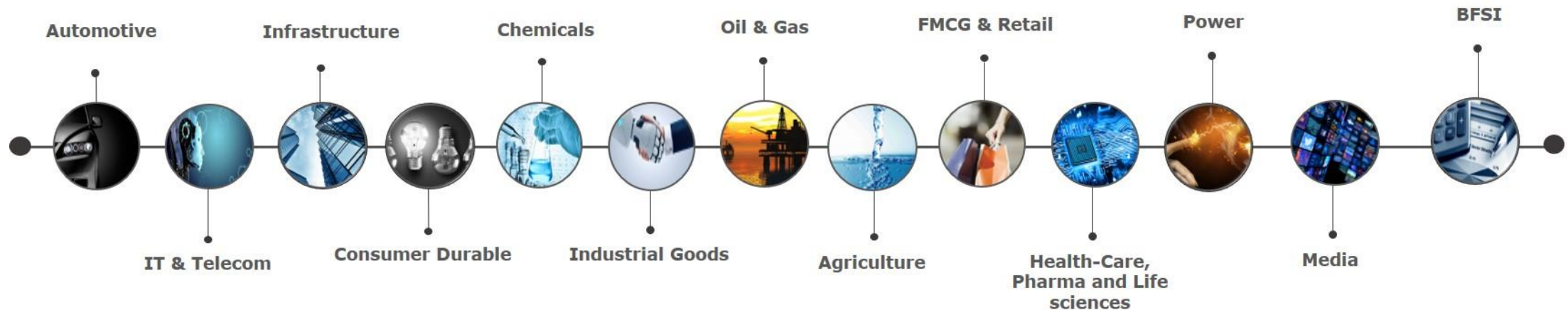
1500+
Successful Projects



80 +
Countries

150 +
Professionals

Areas Of Functional Expertise



Services We Offer

Planning



✓ Market Analysis

- Addressable Market
- Growth Drivers
- Competition Benchmarking

✓ India Validation Visit

✓ Entry Strategy Preparation

- Organization Structure
- Distribution Structure

✓ Location/Site Analysis

✓ Outline Business Plan

- Sales Projections
- Operational Expenses
- Marketing Expenses
- Profitability

Implementation



✓ Regulatory and Statutory Approvals

✓ Company Incorporation

✓ Site Selection within identified

✓ location

✓ Securing the land & assistance in purchase

✓ State level incentives

✓ Executive Search & Recruitment

✓ Project Management

✓ Assistance in Setting-Up

- Factory / Assembly, Warehouse / R&D Center, Distribution network
- Identification of Partners & Acquisition targets
- Vendor selection

✓ Support Services – Admin, Finance, Legal

Advisory



✓ Advise on Regulatory Compliances

- Appreciation of changes in policies
- Lobbying with the government

✓ Advise on Sales ramp up

- Marketing and sales activities
- Distributor selection
- Generate sales leads

✓ Advise on HR Services

- Compensation structure
- Salary Benchmarking
- Recruitment & HR policies
- Retention policies



THANK YOU

