

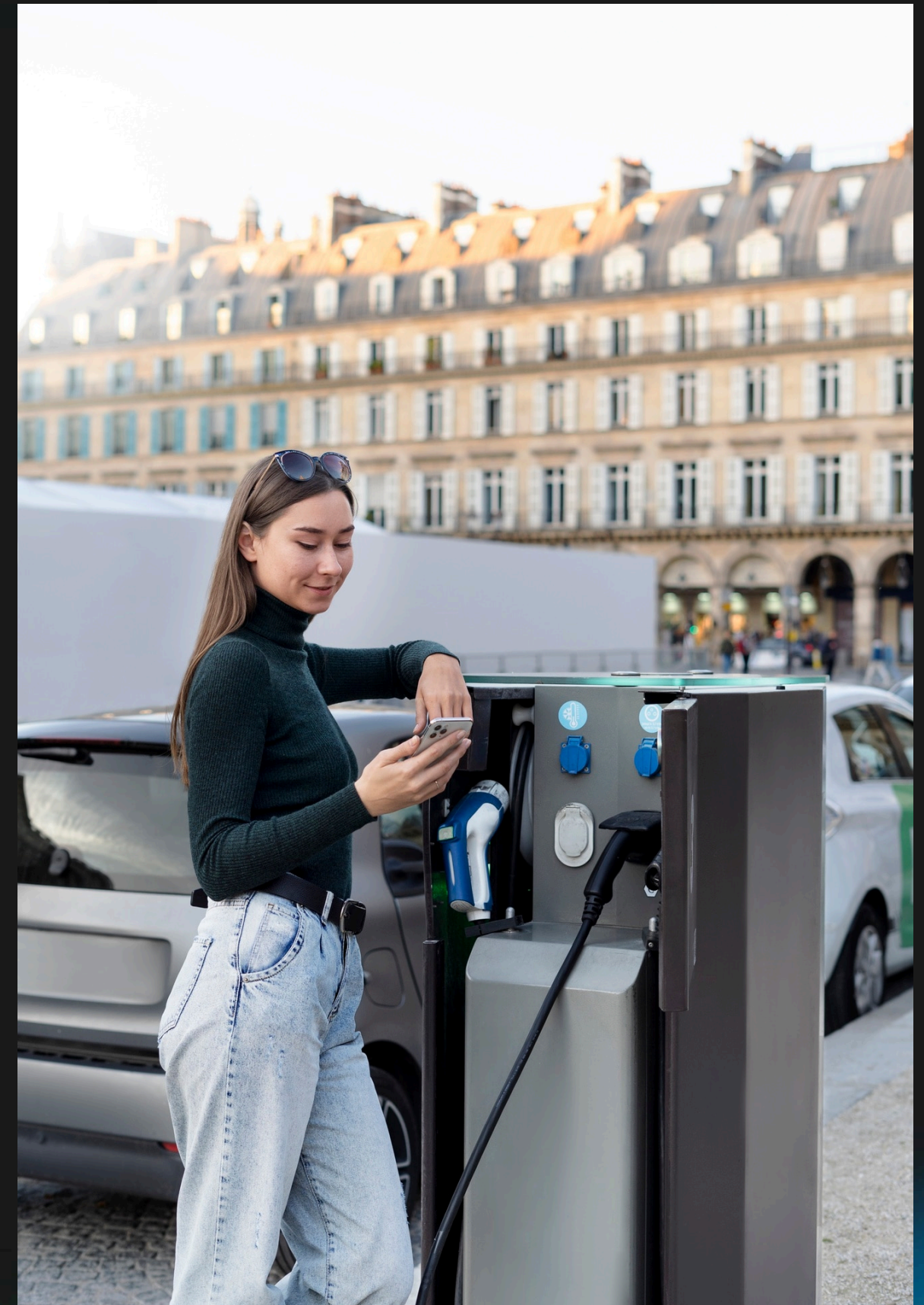


Market Analysis of Electric Vehicle Sales

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Introduction to EV Sales Trends

Electric Vehicles (EVs) are revolutionizing the automotive industry. This presentation provides a **comprehensive analysis** of sales trends, market insights, and factors influencing consumer preferences. Understanding these dynamics is essential for stakeholders aiming to navigate the evolving landscape of **sustainable transportation**.



Data Source

This analysis utilizes three key datasets:

- 1) `dim_date`: A date dimension table containing fiscal years, quarters, and months to enable time-based analysis.
- 2) `electric_vehicle_sales_by_makers`: A dataset detailing EV sales categorized by maker, vehicle type (2-wheelers and 4-wheelers), and sales volume.
- 3) `electric_vehicle_sales_by_state`: A dataset providing state-wise EV sales, total vehicle sales, and penetration rates, allowing for geographical comparisons and growth projections.





Key terminology

1) Penetration Rate Definition: The percentage of EVs sold compared to total vehicles sold in a given region or category. Formula: $(\text{Total EV Sales} / \text{Total Vehicle Sales}) * 100$

2) Compounded Annual Growth Rate (CAGR) The rate of return required for a value to grow from its beginning balance to its ending balance, assuming profits are reinvested annually. Formula: $\text{CAGR} = (\text{Ending Value} / \text{Beginning Value})^{(1/n)} - 1$

3) Projected number of EV sales EV sales projections for the year 2030 we used following formula Formula : $\text{Projected Sales (2030)} = \text{Total Sales (2024)} * (1 + \text{CAGR})^{2030 - 2024}$



Key Insights

- Top and Bottom Makers (FY 2023-2024)
- Penetration Rates by State (FY 2024)
- Decline in EV Sales (2022-2024)
- Quarterly Sales Trends (2022-2024)
- Delhi vs. Karnataka Sales Comparison (FY 2024)
- CAGR of 4-Wheeler Makers (2022-2024)
- CAGR of Top 10 States (2022-2024)
- Peak and Low Seasons for EV Sales
- Projected EV Sales in Top 10 States (2030)

Electric Vehicle Market Analysis

Fiscal Year

2023

2024

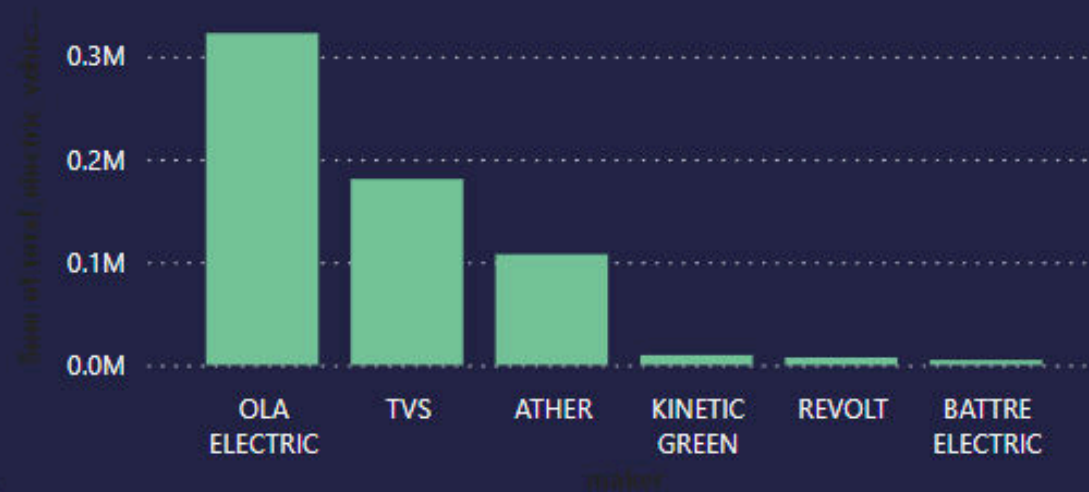
Vehicle Category

2-Wheelers

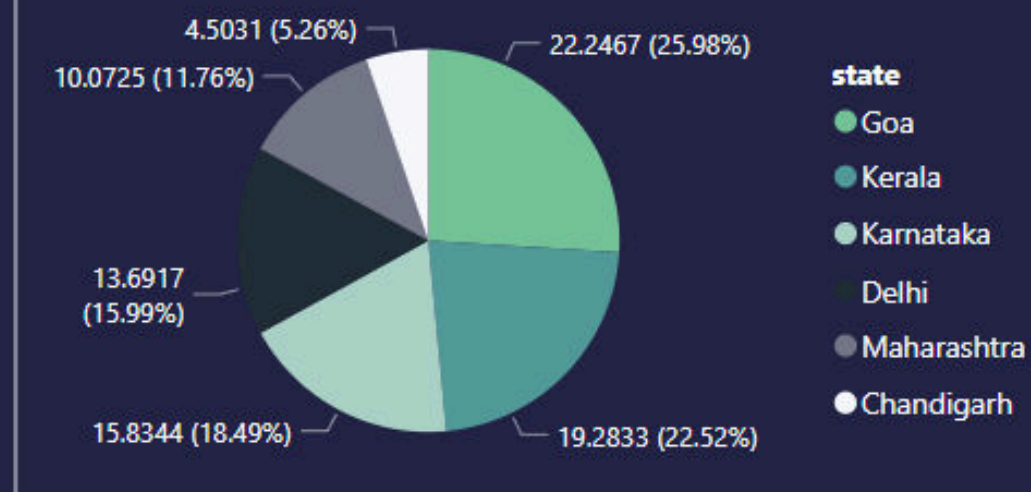
4-Wheelers



Top 3 and Bottom 3 makers for the fiscal years 2023 and 2024 in terms of the number of 2-wheelers sold.

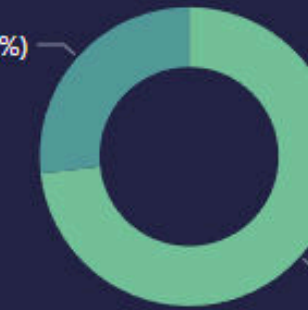


Top 5 states with the highest penetration rate in FY 2024.



Sum of total_sales by month

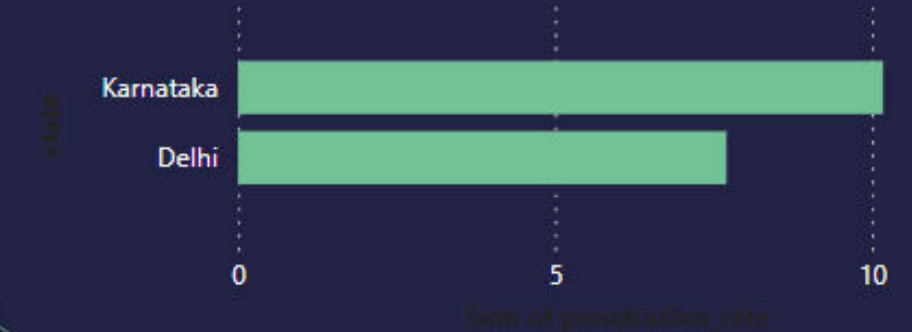
106.71K (26.79%)



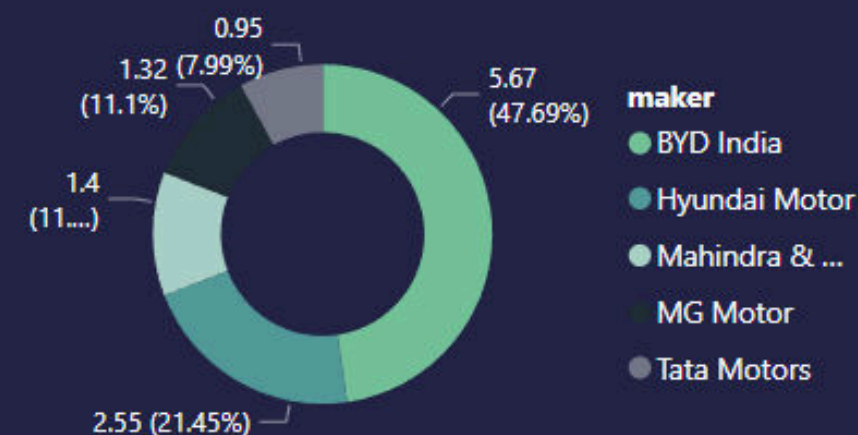
month
March
June

291.59K (73.21%)

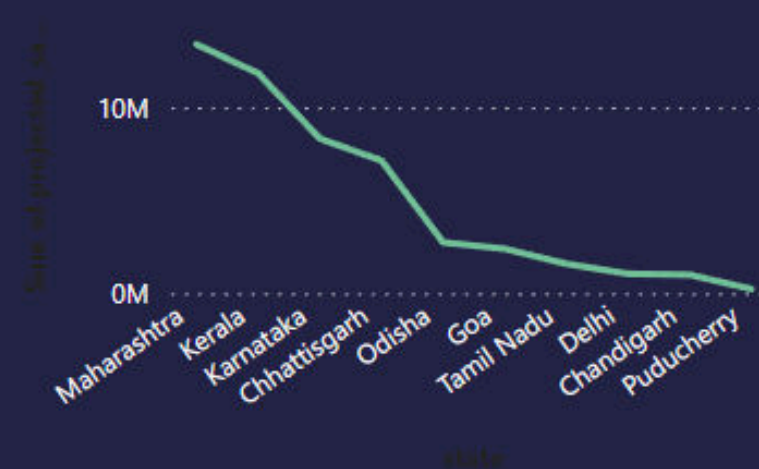
Sum of penetration_rate by state



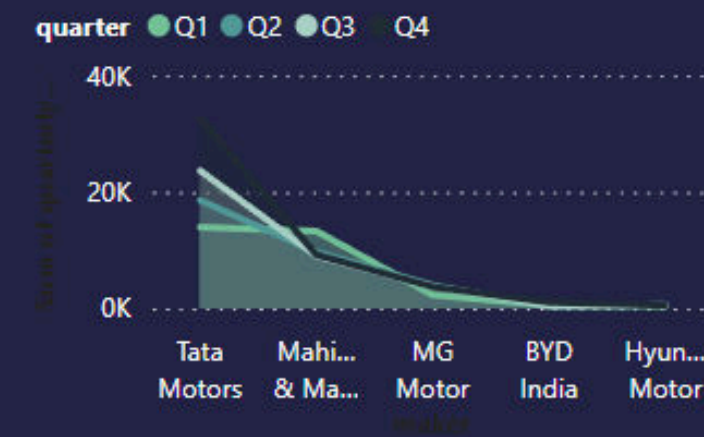
Max of CAGR by maker



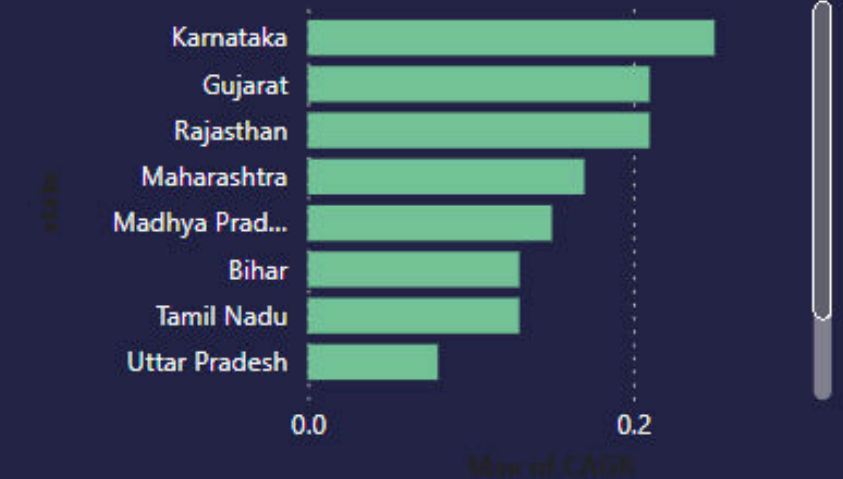
Sum of projected_sales_2030 by state



Sum of quarterly_sales by maker and quarter



Max of CAGR by state



Top-3 and Bottom-3 makers for the fiscal years 2023 and 2024 in terms of the number of 2-wheelers sold.

	fiscal_year	maker	total_electric_vehides_sold	rank_type
►	2023	PURE EV	11556	Bottom 3
	2023	BEING	11018	Bottom 3
	2023	JITENDRA	8563	Bottom 3
	2023	OLA ELECTRIC	152583	Top 3
	2023	OKINAWA	96945	Top 3
	2023	HERO ELECTRIC	88993	Top 3
	2024	KINETIC GREEN	9585	Bottom 3
	2024	REVOLT	7254	Bottom 3
	2024	BATTRE ELECTRIC	4841	Bottom 3
	2024	OLA ELECTRIC	322489	Top 3
	2024	TVS	180743	Top 3
	2024	ATHER	107552	Top 3

- OLA ELECTRIC dominated 2-wheeler sales in 2023 and 2024, achieving remarkable growth from 152,583 to 322,489 units.
- In contrast, smaller competitors like JITENDRA and BATTRE ELECTRIC faced challenges, posting the lowest sales figures in both years.

Top 5 states with the highest penetration rate in 2-wheeler and 4-wheeler EV sales in FY 2024.

	state	vehicle_category	penetration_rate
▶	Goa	2-Wheelers	17.9923
	Kerala	2-Wheelers	13.5249
	Karnataka	2-Wheelers	11.5733
	Maharashtra	2-Wheelers	10.0725
	Delhi	2-Wheelers	9.4009
	Kerala	4-Wheelers	5.7584
	Chandigarh	4-Wheelers	4.5031
	Delhi	4-Wheelers	4.2908
	Karnataka	4-Wheelers	4.2611
	Goa	4-Wheelers	4.2544

- In FY 2024, Goa (17.99%) and Kerala (13.52%) showcased high EV adoption rates for 2-wheelers.
- For 4-wheelers, Kerala (5.76%) and Chandigarh (4.50%) led in penetration, reflecting a growing trend towards electric vehicles in these regions.

Quarterly trends based on sales volume for the top 5 EV makers (4-wheelers) from 2022 to 2024.

	quarter	maker	quarterly_sales
▶	Q1	BYD India	487
	Q2	BYD India	423
	Q3	BYD India	454
	Q4	BYD India	1055
	Q1	Hyundai Motor	392
	Q2	Hyundai Motor	579
	Q3	Hyundai Motor	586
	Q4	Hyundai Motor	519
	Q1	Mahindra & Mahindra	13286
	Q2	Mahindra & Mahindra	9670
	Q3	Mahindra & Mahindra	9025
	Q4	Mahindra & Mahindra	9212
	Q1	MG Motor	2309
	Q2	MG Motor	3957
	Q3	MG Motor	3766
	Q4	MG Motor	3721
	Q1	Tata Motors	13953
	Q2	Tata Motors	18581
	Q3	Tata Motors	23678
	Q4	Tata Motors	32723

- Tata Motors maintained strong sales throughout the year, culminating in 32,723 units in Q4.
- BYD India demonstrated consistent growth, achieving a peak of 1,055 units in Q4.
- Competitors such as Mahindra are also expanding their market presence, contributing to a dynamic automotive landscape in India.

EV sales and penetration rates in Delhi compared to Karnataka for 2024.

	state	fiscal_year	total_EV_sold	total_vehide_sold	penetration_rate
▶	Delhi	2024	46724	606348	7.7058
	Karnataka	2024	160989	1581988	10.1764

- Karnataka's electric vehicle sales reached 160,989 units, far surpassing Delhi's 46,724 units.
- This resulted in a penetration rate of 10.18% in Karnataka, compared to Delhi's lower rate of 7.71%, highlighting Karnataka's stronger adoption of EVs.

Peak and low season months for EV sales based on the data from 2022 to 2024.

	season	month	total_sales
▶	Peak Month	March	291587
	Low Month	June	106709

- March emerged as the peak month with the highest sales of 291,587 units.
- June recorded the lowest sales, with only 106,709 units sold.

The compounded annual growth rate (CAGR) in 4-wheeler units for the top 5 makers from 2022 to 2024.

	maker	CAGR
►	BYD India	5.67
	Hyundai Motor	2.55
	Mahindra & Mahindra	1.4
	MG Motor	1.32
	Tata Motors	0.95

- BYD India achieved the highest CAGR of 5.67%, boosting sales from 33 to 1,466 units. Hyundai Motor followed with a 2.55% CAGR, rising from 110 to 1,390 units.
- Tata Motors had a slower growth rate of 0.95%, increasing from 12,708 to 48,181 units.

Top 10 states that had the highest compounded annual growth rate (CAGR) from 2022 to 2024 in total vehicles sold.

	state	CAGR
►	Karnataka	0.25
	Gujarat	0.21
	Rajasthan	0.21
	Maharashtra	0.17
	Madhya Pradesh	0.15
	Bihar	0.13
	Tamil Nadu	0.13
	Uttar Pradesh	0.08
	West Bengal	0.06
	Andhra Pradesh	0.01

- Karnataka achieved the highest CAGR at 0.25%, leading the growth among Indian states. Gujarat and Rajasthan followed closely with 0.21%.
- In contrast, West Bengal and Andhra Pradesh lagged with lower growth rates of 0.06% and 0.01%, respectively.

Projected number of EV sales for the top 10 states by penetration rate in 2030, based on the CAGR from previous years.

state	projected_sales_2030
Karnataka	6034805.3
Maharashtra	5884471.29
Tamil Nadu	3574586.24
Delhi	2099677.61
Odisha	1356820.13
Chhattisgarh	1104220.49
Kerala	499488.7
Goa	329476.72
Puducherry	140560.58
Chandigarh	84443.61

- Karnataka and Maharashtra are projected to dominate sales with 6.03 million and 5.88 million units, respectively.
- In contrast, smaller states like Chandigarh and Puducherry have significantly lower forecasts, at 84,443 and 140,560 units, respectively, highlighting regional disparities in market performance.

Conclusion and Future Outlook

In conclusion, the **electric vehicle market** is poised for continued growth. As technology improves and consumer awareness increases, the shift towards electric mobility will likely accelerate. Stakeholders must remain agile to capitalize on emerging **opportunities** in this dynamic sector.

Thanks!
