Electric Vehicle(EV) Market Analysis

Insights from SQL Data Wrangling & Tableau Visualizations

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Situation :

- AtliQ Motors Background :
  - AtliQ Motors is a U.S.-based company with a **25% market share in Electric vehicle and Hybrid vehicle** segment in **North America**.
  - The company aims to **expand in India**, where their market share is **lower than 2%**.
- Why this study :
  - **Bruce Haryali,** the head of AtliQ Motors India needs a **detailed analysis of Indian EV market** to plan company's expansion.

Complication :

- Challenges in Indian Market :
  - The Indian EV market is fragmented with **varying penetration rates** in different **states**.
  - **Competition** is fierce, and existing players have established strong footholds.
  - **Limited market share (<2%)**, means understanding market dynamic is crucial.

- Key Questions :
  - How should AtliQ Motors enter the Indian EV market successfully given complexities ?

Data Collection Process :

DATA SOURCES :

- Collected data from various sources like:

"Codebasics resume challenge 12 dataset"

, government websites like "vahan sewa", "e-AMRIT", "pib.gov.in"

KEY DATA POINTS :

- Fiscal Year (2022-2024)
- Electric vehicles sold by manufacturer.
- Electric vehicles sales per state.
- Total vehicles sales per state.
- Charging stations per state
- 2-wheelers and 4-wheelers data

Key Questions :

1. Who are the competitors in the EV market?

2. In which state and month should we launch our EV/Hybrid vehicle?

3. In which state should we not launch?

4. Which state is better to launch: Delhi or Karnataka?

5. What is the revenue and sales growth rate over time for the 2-wheelers and 4-wheelers market?

6. What is the charging stations to EV ratio?

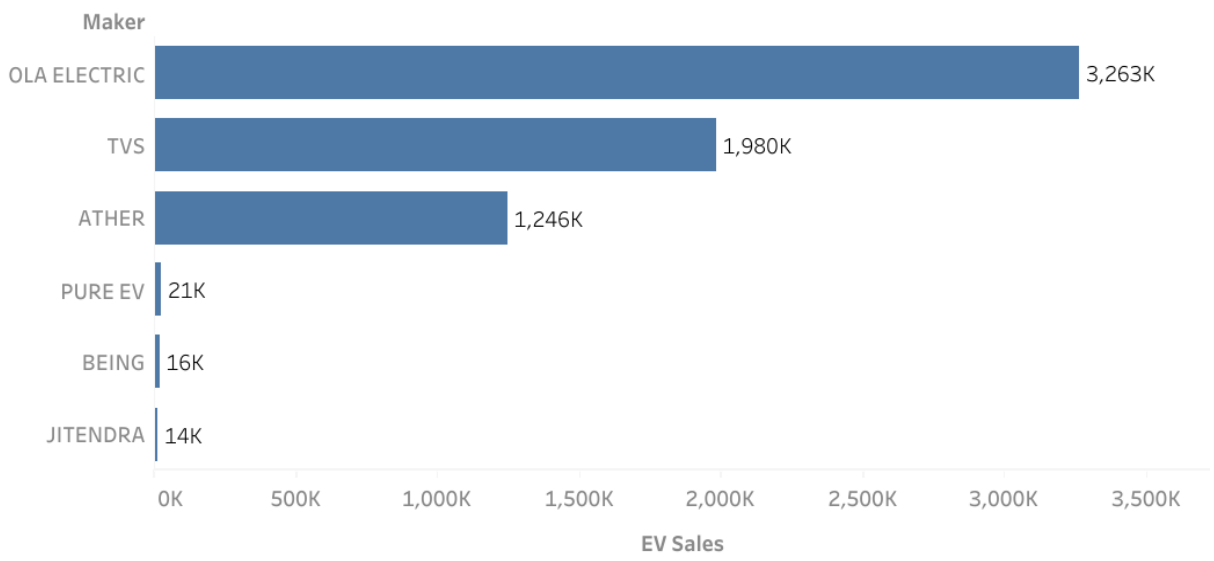
7. What will be the projected sales volume & penetration rate by 2030 in the EV market?

Who are the competitors in the EV market?

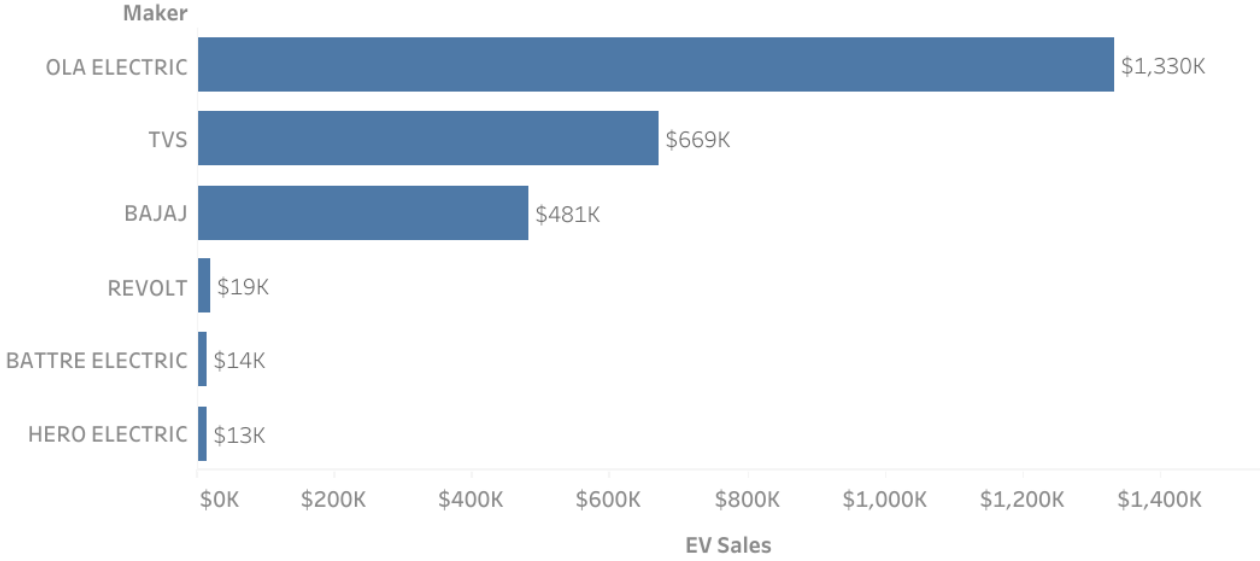
Top 3 and Bottom 3 2-Wheeler Manufacturer in FY 2023 & 2024

In 2024, **Bajaj** took 3rd place from **Ather**. **OLA Electric** and **TVS** remains Top 2.

2023

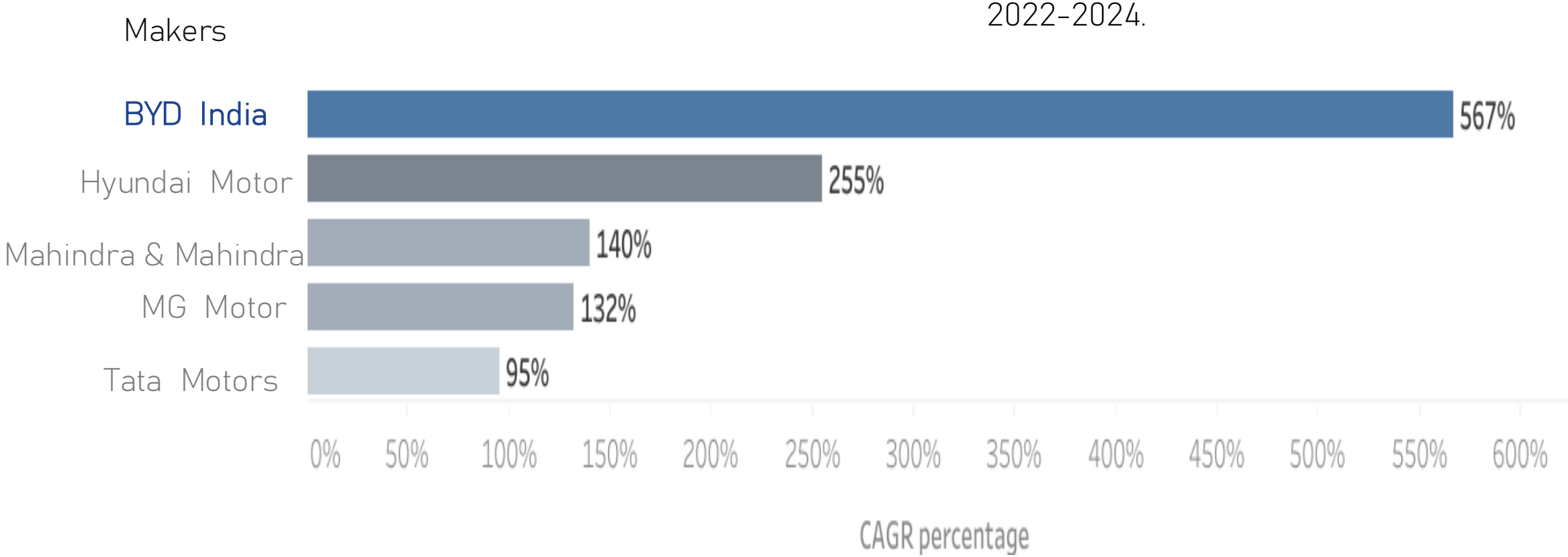


2024

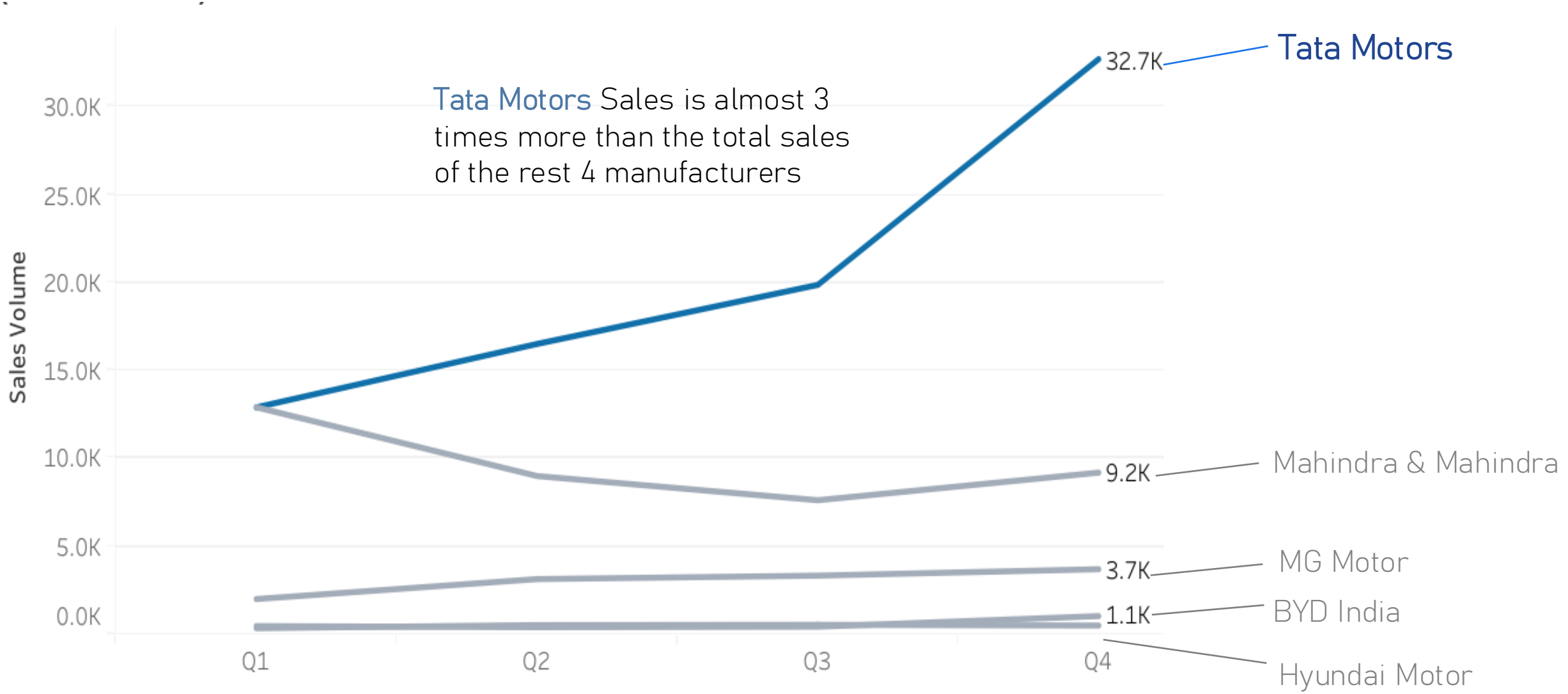


Top 5 Manufacturer's CAGR in 4-Wheeler units (2022-2024)

BYD India has seen the highest compound annual growth rate from 2022-2024.



Quarterly Sales Volume Trends (2022-2024) for Top 5 EV Manufacturers (4-Wheelers)



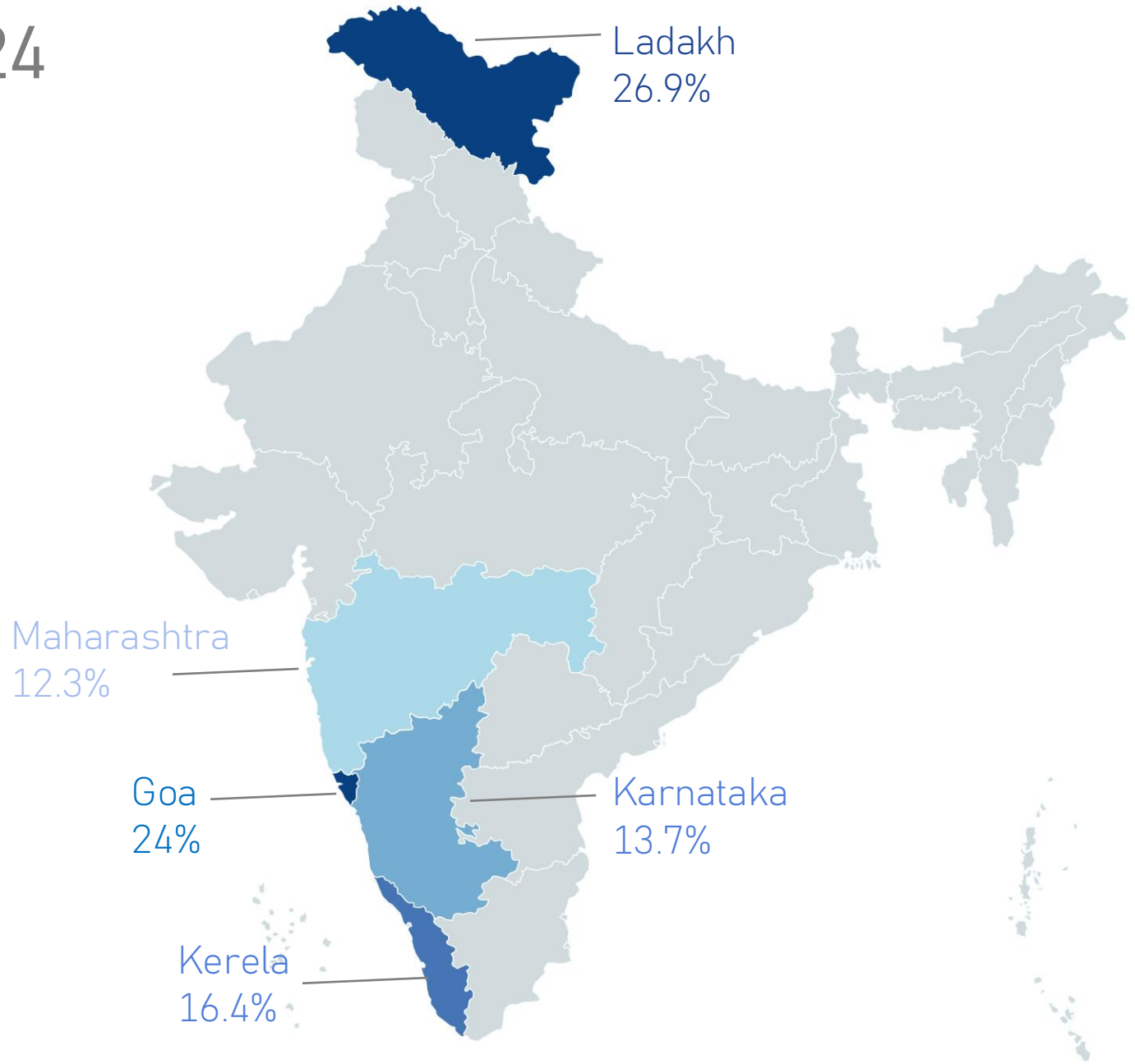
Key Players in the EV Industry :

- The Top 3 competitors in 2-Wheeler category are : OLA Electric, TVS and Bajaj.
- Top 5 competitors in 4-Wheeler category are : Tata Motors (dominance), Mahindra & Mahindra, MG Motors, BYD India (highest growth) and Hyundai Motor.

In which state and month should we launch our EV/Hybrid vehicle?

Top 5 States with highest 2-Wheeler EV Penetration rates in FY 2024

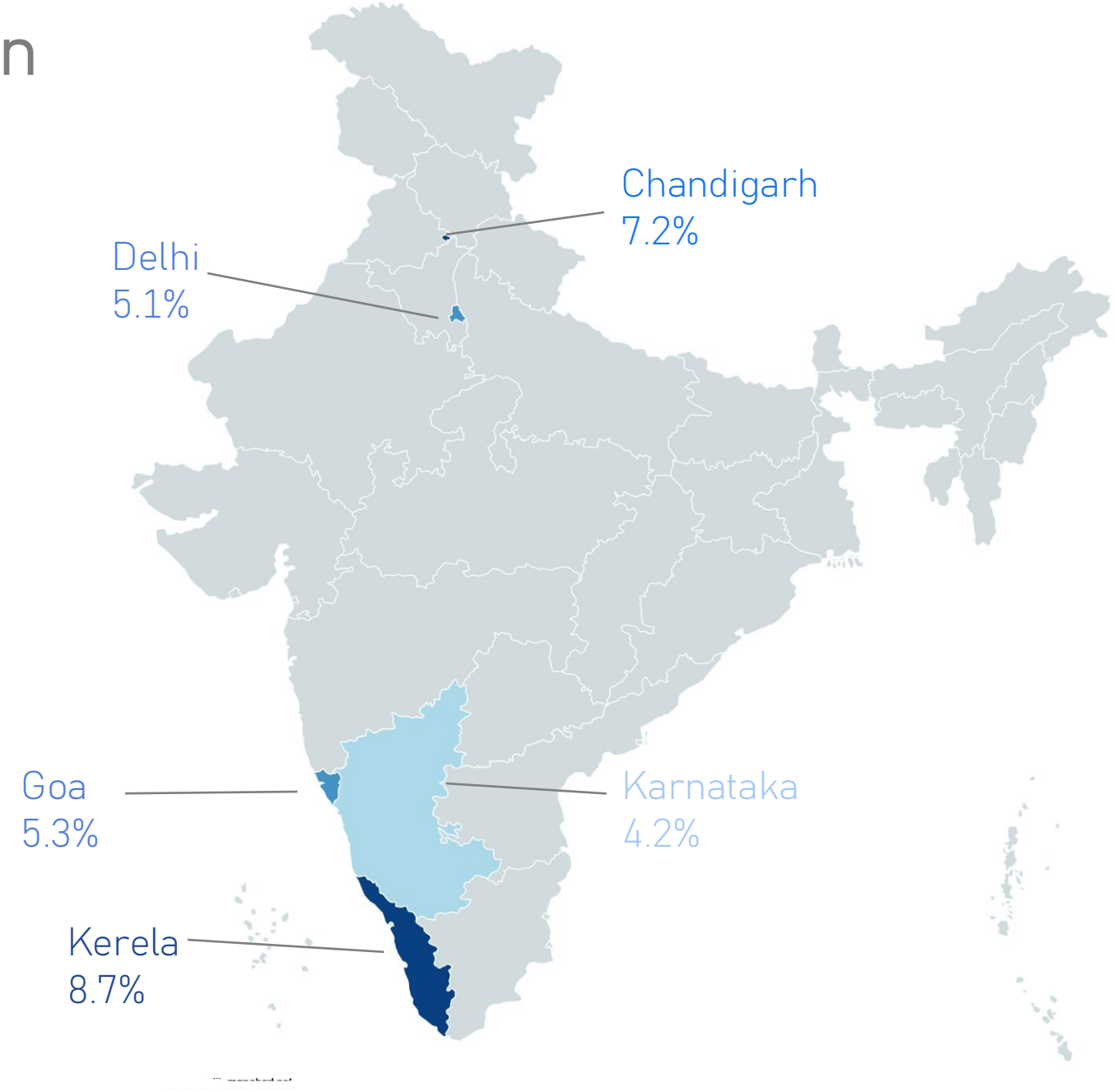
- **Goa** stands out as the best option due to its high penetration rate of **24%**, good infrastructure, and potential for both local and tourist demand.
- **Kerala** and **Karnataka** are also promising markets to consider due to their growing interest in EVs and suitable infrastructure.



Top 5 States with highest 4-Wheeler EV Penetration rates in FY 2024

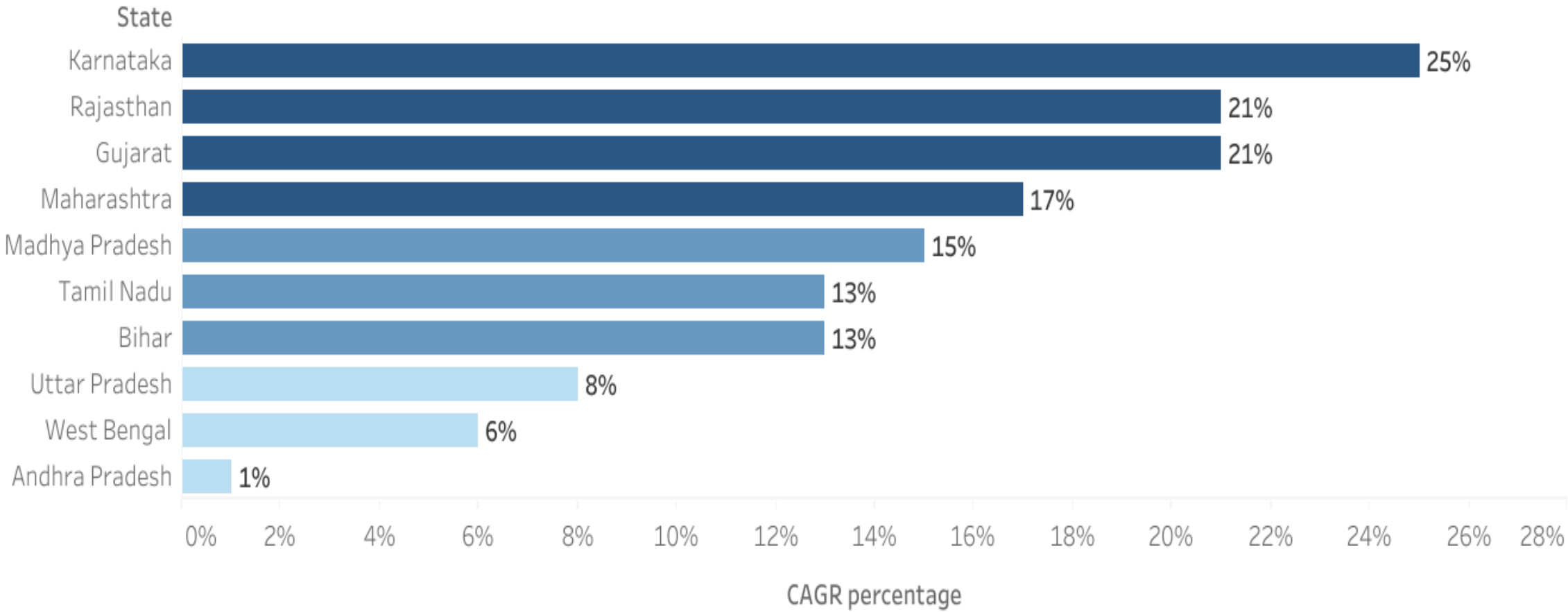
- **Delhi (5.13%)**: Large market with EV-friendly policies and high growth potential, especially as the city aims to be a leader in clean transportation.

- **Karnataka (4.23%)**: The lowest penetration among these states, which may imply an emerging market with less competition. Karnataka's tech-savvy population and its EV policies could provide a solid foundation for future growth. There's room to capture market share early here.

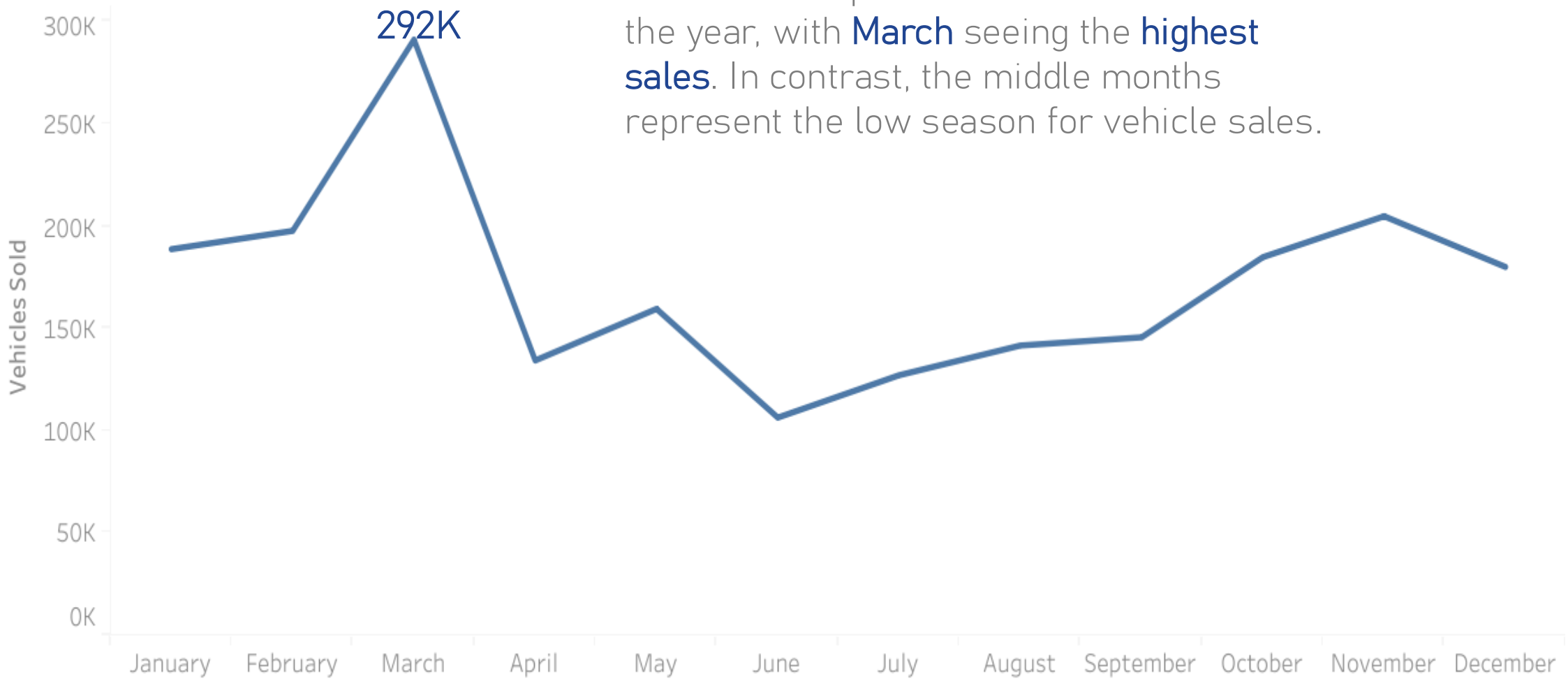


Top 10 States by CAGR : (2022-2024)

Vehicle sales in Karnataka, Maharashtra, Gujarat, and Rajasthan are increasing at a compound annual rate above 15%.



Peak and Low Season Months for Vehicle Sales (2022-2024)



Vehicle sales peak at the start and end of the year, with **March** seeing the **highest sales**. In contrast, the middle months represent the low season for vehicle sales.

Recommended Launch Strategy :

- **2-Wheelers**: Launch in **Goa** for high penetration and dual demand from locals and tourists. Consider **Kerala** and **Karnataka** as emerging markets with strong infrastructure and growing interest.
- **4-Wheelers**: Focus on **Delhi** for its large market and supportive EV policies, and **Karnataka** for its potential as an emerging market with less competition but high growth opportunities.
- **Timing**: Plan the launch for **March**, which sees peak sales, to maximize market entry impact.

In which state should we not launch?

State with Declining Penetration rate (2022-2024)

There were no state with negative market penetration, however **Sikkim showed no growth in EV Market penetration rate** from 2022 - 2024.

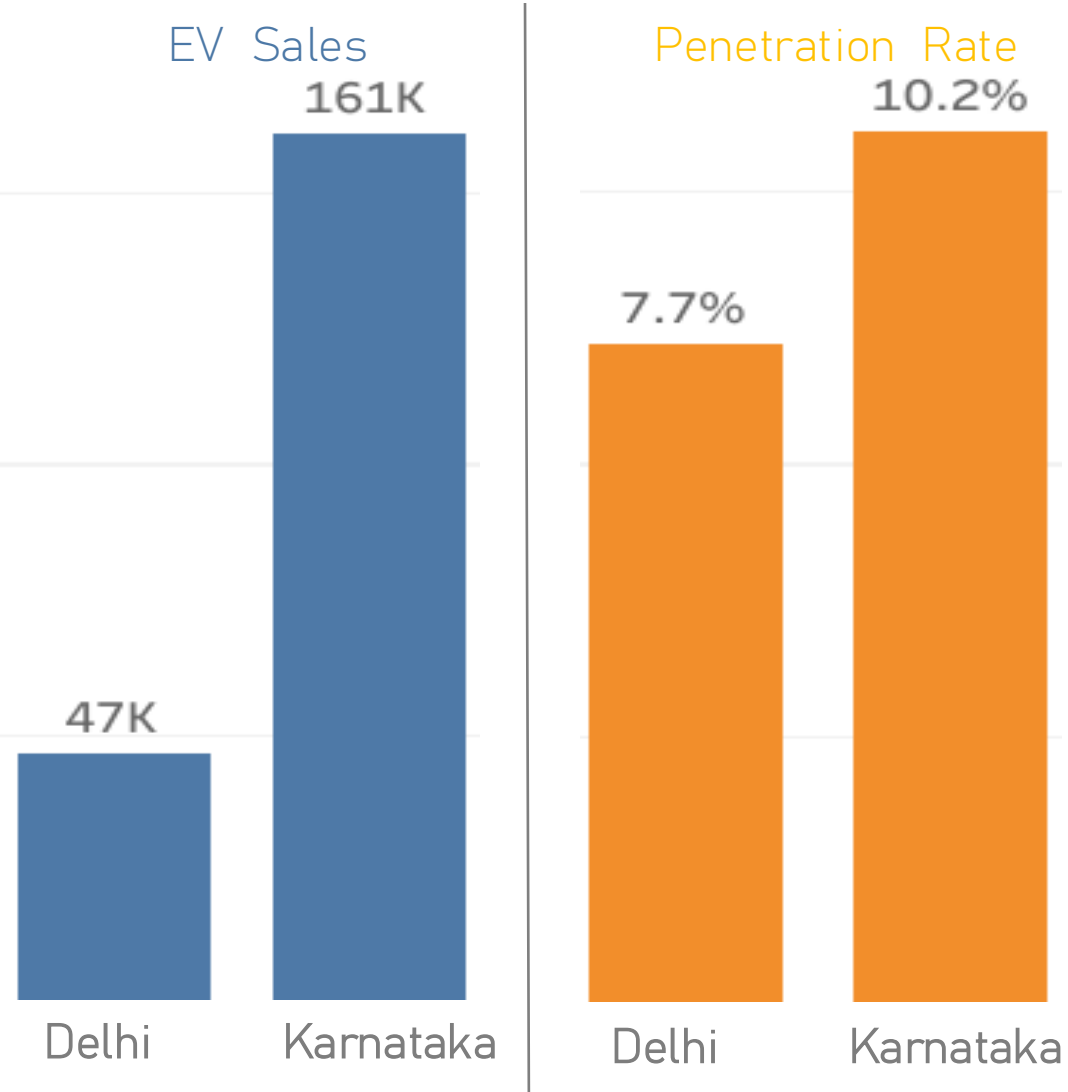
State	Penetration Rate 2022	Penetration Rate 2024
Sikkim	0	0

Key Finding :

- Avoid launching in **Sikkim** due to its stagnant EV Market.
- Sikkim's combination of a small market size, challenging infrastructure, and geographical hurdles make it a less favorable location for launching EVs.

Which state is better to launch: Delhi or Karnataka?

Comparison of EV Sales and Penetration rates : Delhi vs Karnataka, 2024



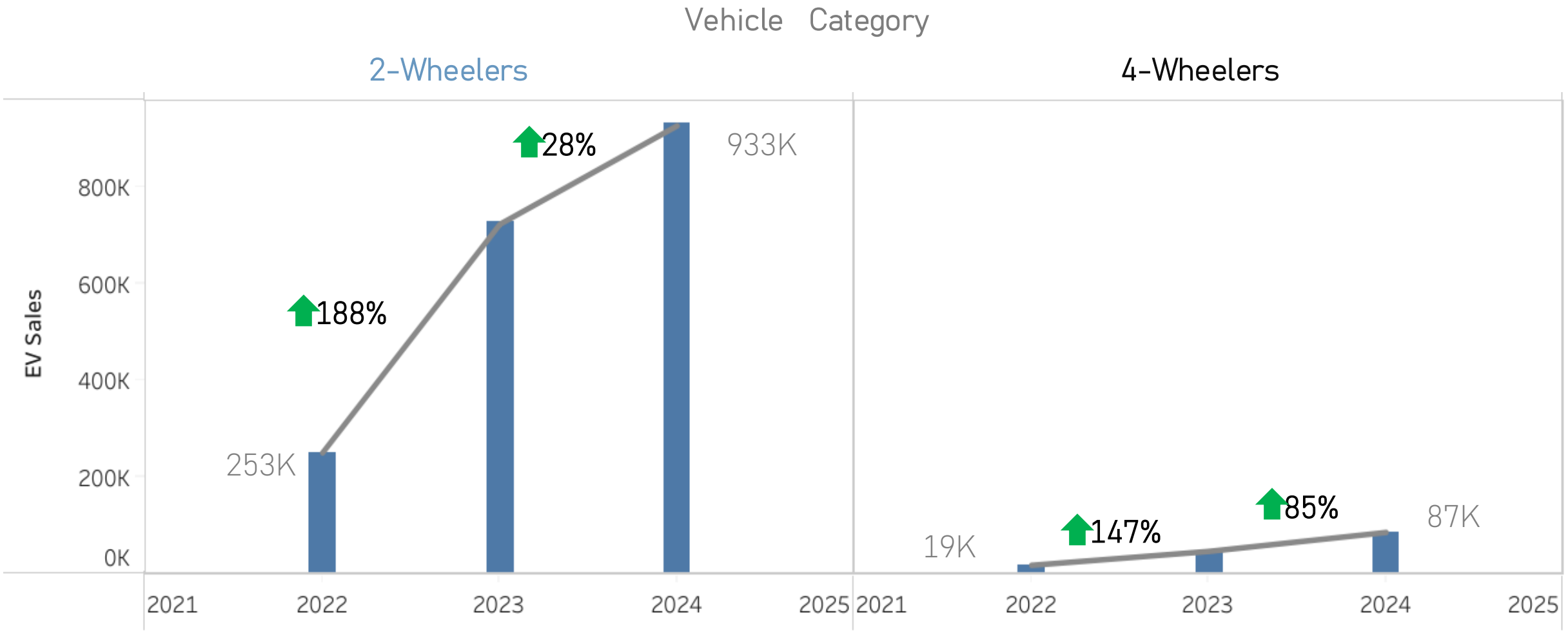
Karnataka would be a good choice, given following incentives for manufacturer :

·**Production Incentives**: The state offers up to 15% capital subsidy for EV manufacturers.
·**Tax Rebates**: Refund of state tax components such as SGST on the sale of EVs.
·**Land Concessions**: Allotment of land at concessional rates for establishing EV manufacturing facilities.
·**Interest-Free Loans**: Interest-free loans for EV charging infrastructure development.
·**Electricity Tariff**: Reduced electricity tariffs for EV production and charging station operations.

What is the revenue and sales growth rate over time for 2-wheelers and 4-wheelers market?

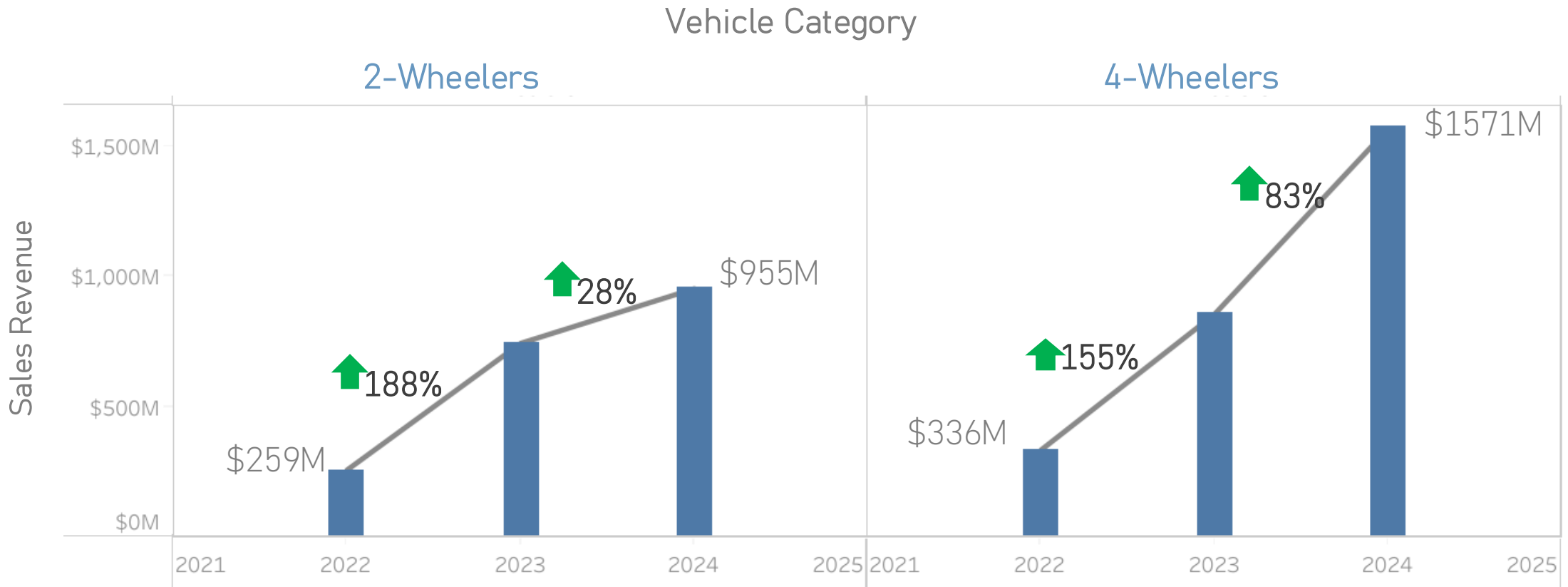
Electric Vehicle Sales Volume Growth : 2-Wheelers vs 4-Wheelers (2022-2024)

Over the years, the 2-Wheeler EV market has grown substantially, approaching **1 million units sold.**



Electric Vehicles Revenue Growth : 2-Wheelers vs 4-Wheelers (2022-2024)

Assuming an average price of $655 for 2-Wheelers and $1786 for 4-Wheelers, the **EV industry** in India has **evolved into a billion-dollar market** between FY 2022-2024.



What is the charging stations to EV ratio?

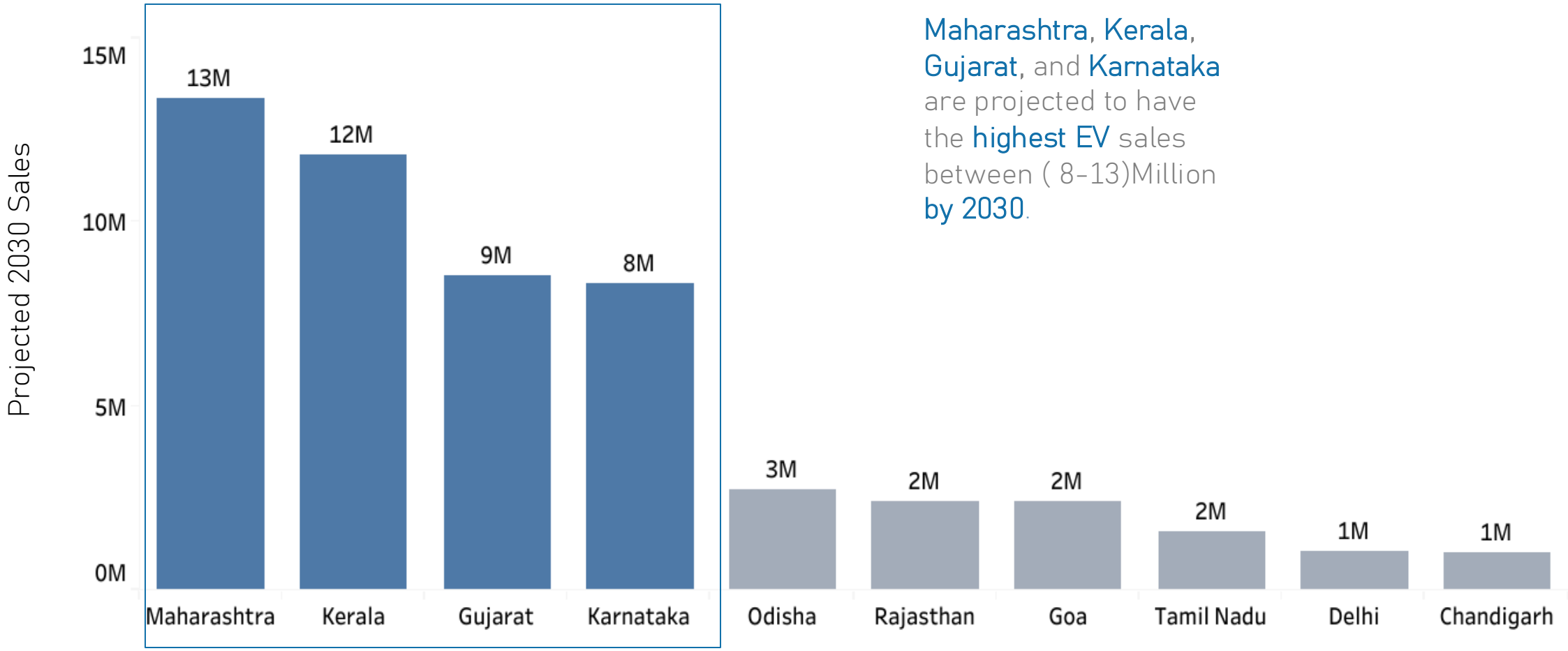
Number of Charging Stations per 1000 EV's : Top 5 States

State	EV Sales	Number of Charging Stations	Charging Stations per 1000 EV
Maharashtra	396K	3,079	8
Karnataka	313K	1,041	3
Tamil Nadu	200K	643	3
Gujarat	181K	476	3
Rajasthan	150K	500	3

The number of charging stations per 1,000 EVs is critically low, even in the top five states. A robust charging infrastructure is essential.

What will be the projected sales volume & penetration rate by 2030 in the EV market?

Projected EV Sales for Top 10 States by 2030



Maharashtra, Kerala, Gujarat, and Karnataka are projected to have the highest EV sales between (8-13)Million by 2030.

Top 3 Recommendations for AtliQ Motors:

- **Launch in Goa**: High penetration rate (24%) and strong infrastructure for immediate market presence.
- **Focus on Karnataka**: Utilize growth incentives and potential in this emerging market with 4.23% penetration.
- **Enhance Charging Infrastructure**: Invest in charging stations to support long-term growth and customer adoption.

Conclusion :

- AtliQ Motors can succeed in India by focusing on **regions with high growth rates**, launching during **peak seasons**, and positioning against the **top 3 competitors**.
- **Further Analysis**: Use continuous data updates to refine the strategy as the Indian EV market evolves.