India’s EV Market: Sales, Growth, and Future Outlook

Strategic Expansion: AtliQ Motors’ Comprehensive Market Analysis for India’s Electric Vehicle Sector

CODEBASICS RESUME PROJECT CHALLENGE #12

Agenda

- Problem Statement
- Project Overview
- Primary Questions
- Secondary Questions
- Dashboard Summary
- Additional Analysis

Problem Statement

AtliQ Motors, an American automotive giant known for its electric vehicles (EVs), has seen its market share rise to 25% in North America over the past five years. As part of their expansion into India, where their current market share is less than 2%, Bruce Haryali, the chief of AtliQ Motors India, has asked us to conduct a detailed market study of the EV/Hybrid sector in India.

In my role as Peter Pandey, the data analyst, I analyzed the data to answer the questions outlined in the provided document. I designed a clear and intuitive dashboard to present my findings and used additional research to support my recommendations. The goal was to create a compelling and concise presentation, focusing on good storytelling, for Bruce Haryali.

Project Overview

❖**Objective:** To analyze the EV market in India from 2022 to 2024, providing insights into sales performance, state penetration rates, and growth trends to support AtliQ Motors' expansion into the Indian market.

❖**Focus:** The analysis focuses on identifying top and bottom EV makers, evaluating state performance, analyzing quarterly sales trends, and projecting future growth rates to support AtliQ Motors' expansion strategy.

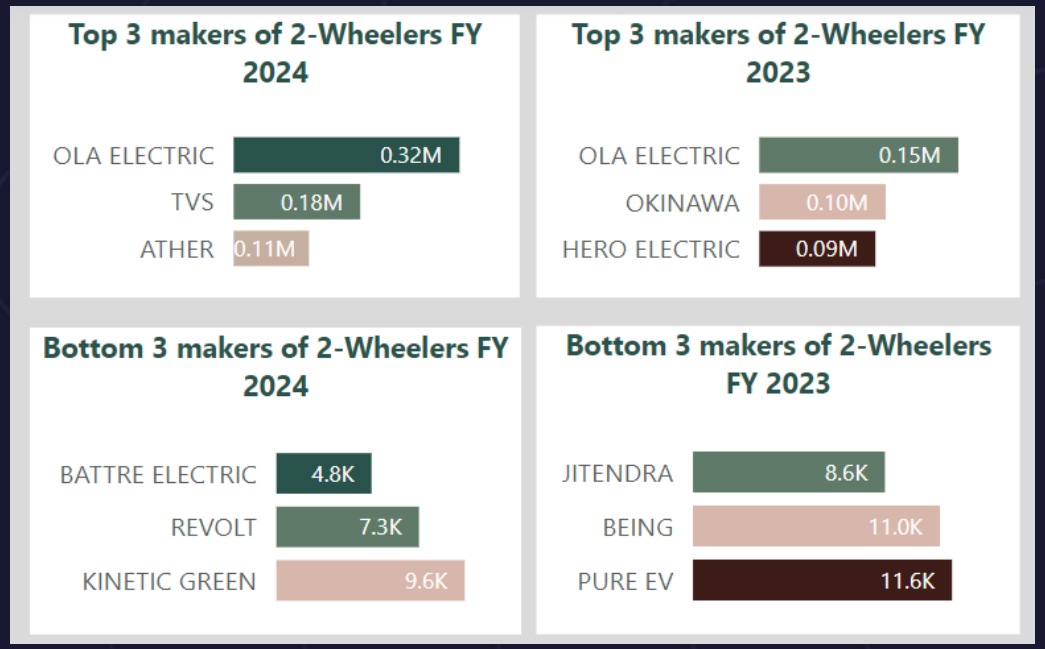
❖**Datasets:** The analysis uses `dim_date` for date-related information, `electric_vehicle_sales_by_makers` for sales data by maker, and `electric_vehicle_sales_by_state` for sales and total vehicle data by state.

❖**Data Handling Techniques:**

- **Missing Values:** Checked for and handled missing values to ensure data completeness.
- **Data Types:** Verified and adjusted data types, including converting date columns to datetime format for accurate analysis.
- **Duplicate Values:** Addressed duplicate entries by standardizing naming conventions, such as merging 'Andaman & Nicobar' with 'Andaman & Nicobar Island' to ensure consistency.

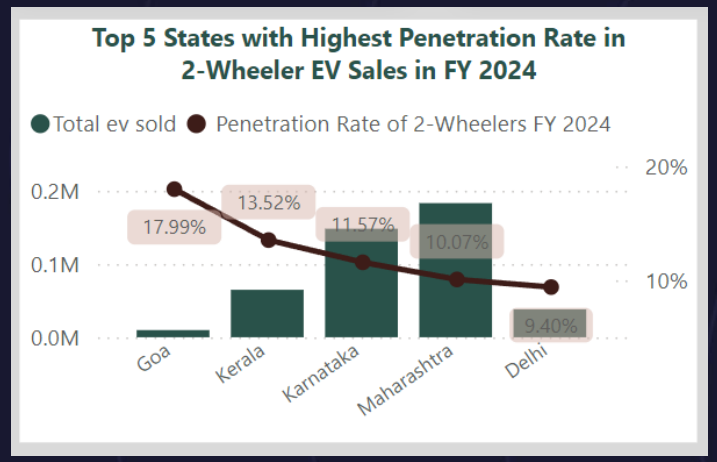
Primary Questions

DATA-DRIVEN ANALYSIS OF SALES, PENETRATION RATES, AND GROWTH TRENDS

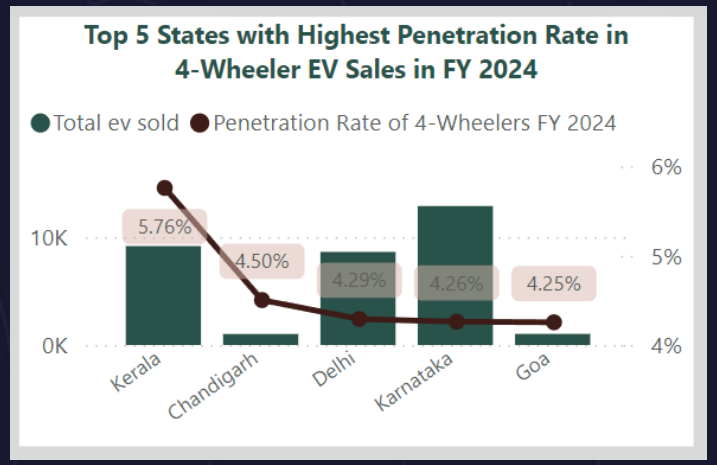


fiscal_year	category	maker	electric_vehicles_sold
2023	Top 3	OLA ELECTRIC	152583
2023	Top 3	OKINAWA	96945
2023	Top 3	HERO ELECTRIC	88993
2023	Bottom 3	PURE EV	11556
2023	Bottom 3	BEING	11018
2023	Bottom 3	JITENDRA	8563
2024	Top 3	OLA ELECTRIC	322489
2024	Top 3	TVS	180743
2024	Top 3	ATHER	107552
2024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

Q1. List the top 3 and bottom 3 makers for the fiscal years 2023 and 2024 in terms of the number of 2-wheelers sold.

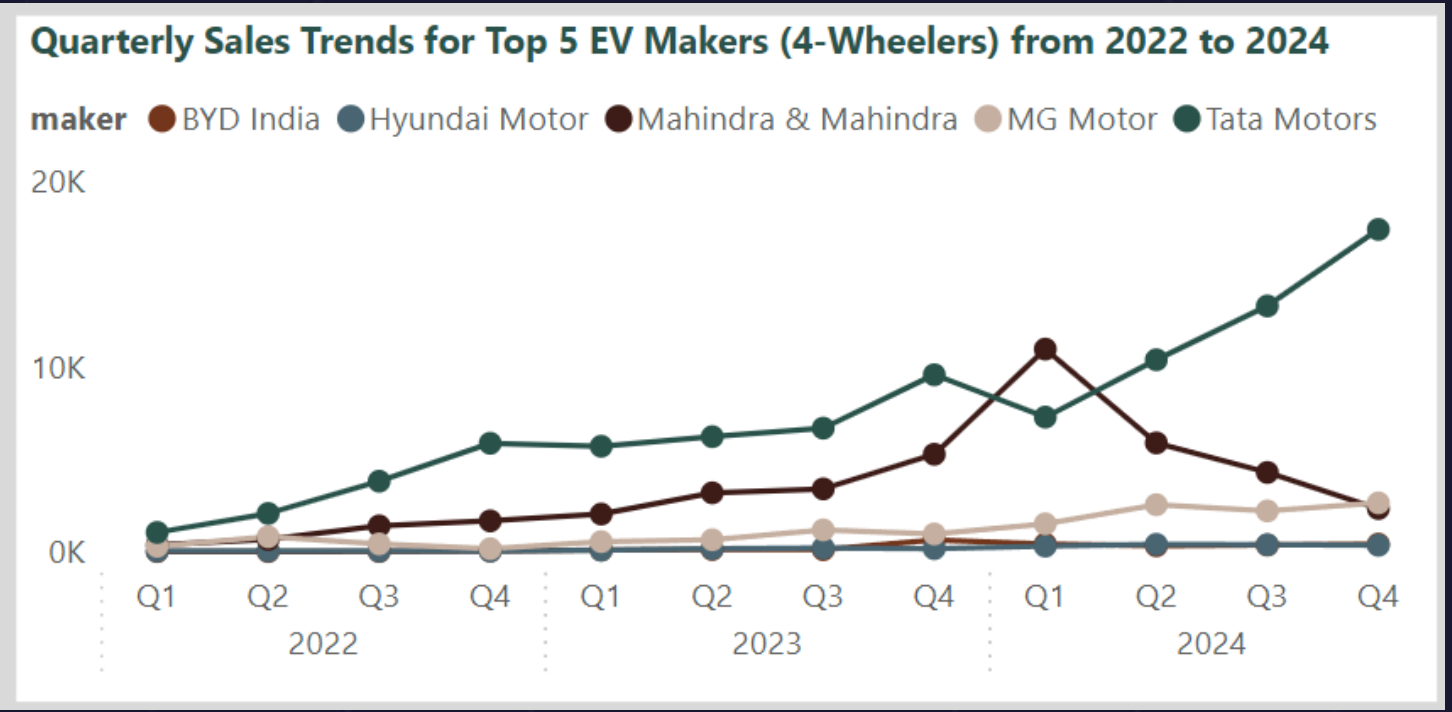


vehicle_category	state	electric_vehicles_sold	penetration_rate
2-Wheelers	Goa	9768	0.1799
2-Wheelers	Kerala	64769	0.1352
2-Wheelers	Karnataka	148111	0.1157
2-Wheelers	Maharashtra	183052	0.1007
2-Wheelers	Delhi	38094	0.0940
4-Wheelers	Kerala	9169	0.0576
4-Wheelers	Chandigarh	1020	0.0450
4-Wheelers	Delhi	8630	0.0429
4-Wheelers	Karnataka	12878	0.0426
4-Wheelers	Goa	1031	0.0425

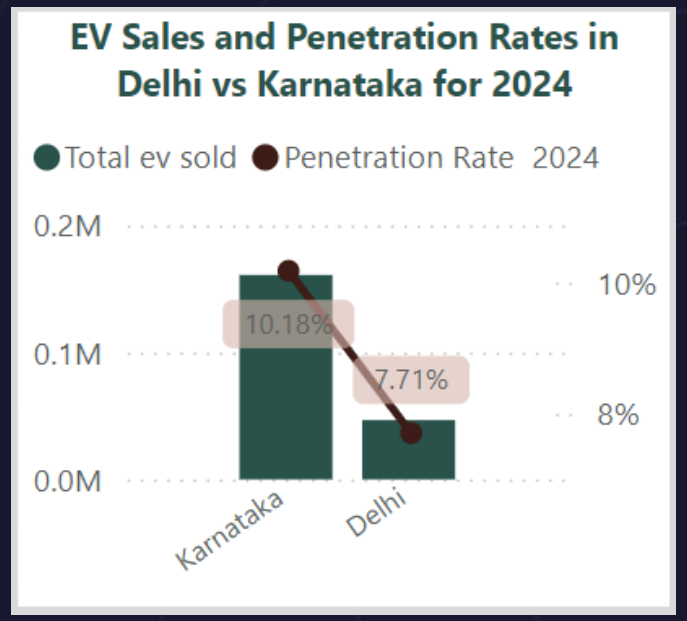


Q2. Identify the top 5 states with the highest penetration rate in 2-wheeler and 4-wheeler EV sales in FY 2024

Q3. List the states with negative penetration (decline) in EV sales from 2022 to 2024?

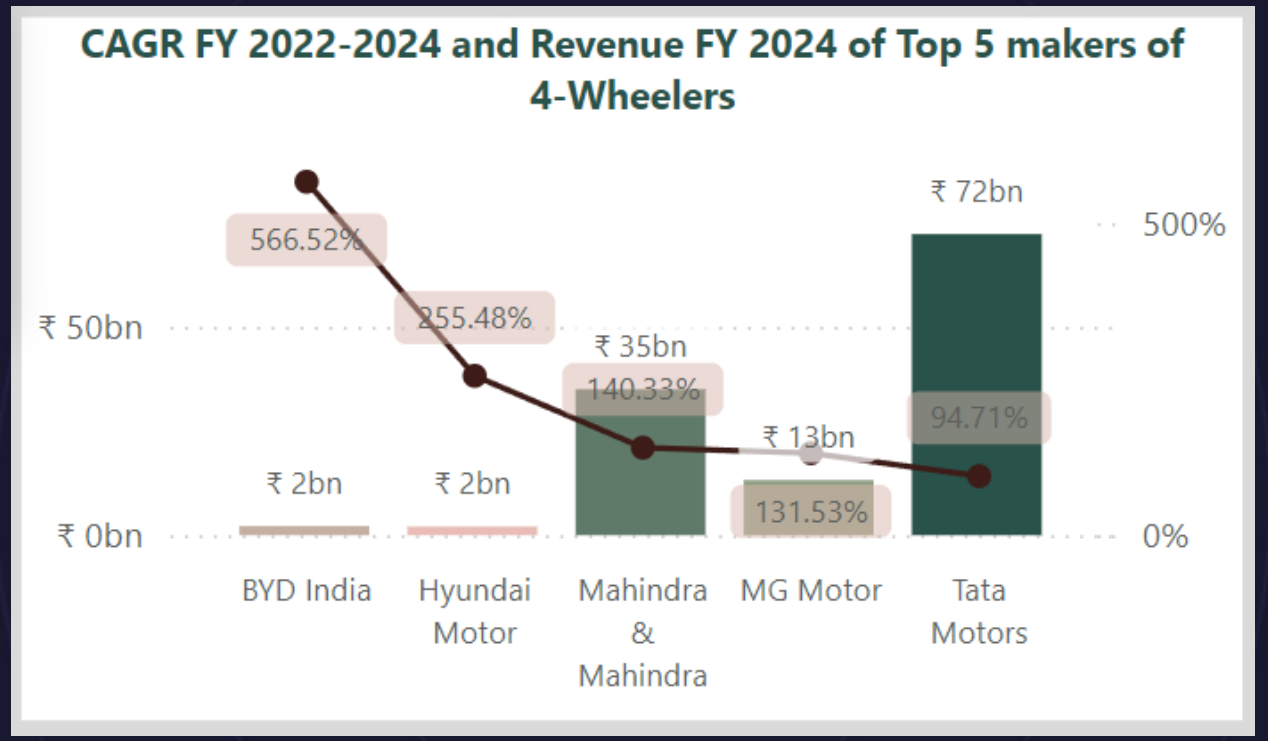


Q4. What are the quarterly trends based on sales volume for the top 5 EV makers (4-wheelers) from 2022 to 2024?

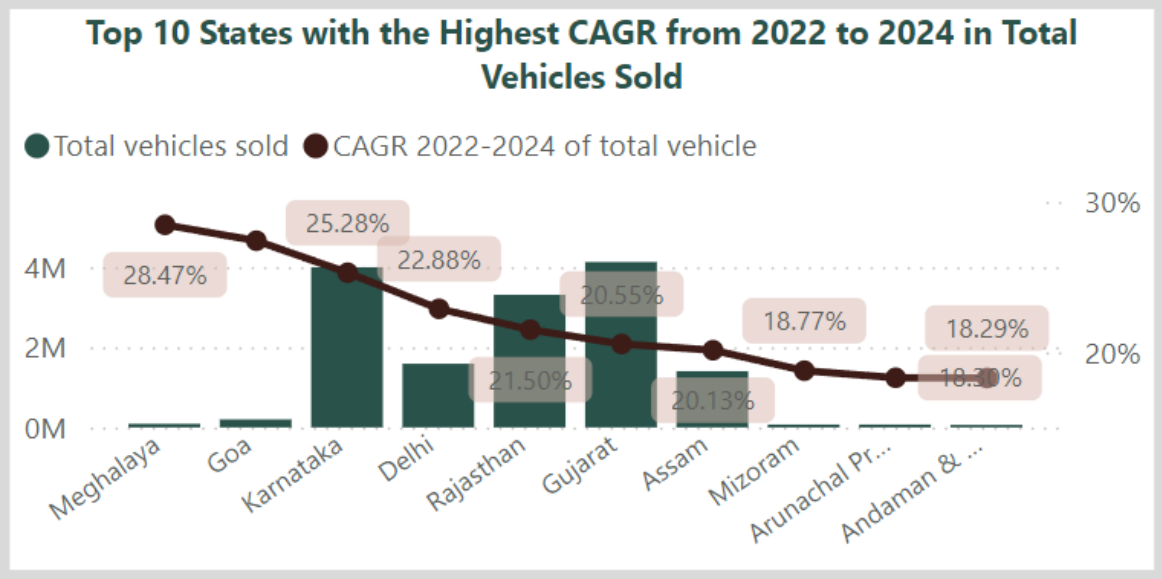


	state	electric_vehicles_sold	penetration_rate
▶	Delhi	46724	0.0771
	Karnataka	160989	0.1018

Q5. How do the EV sales and penetration rates in Delhi compare to Karnataka for 2024?

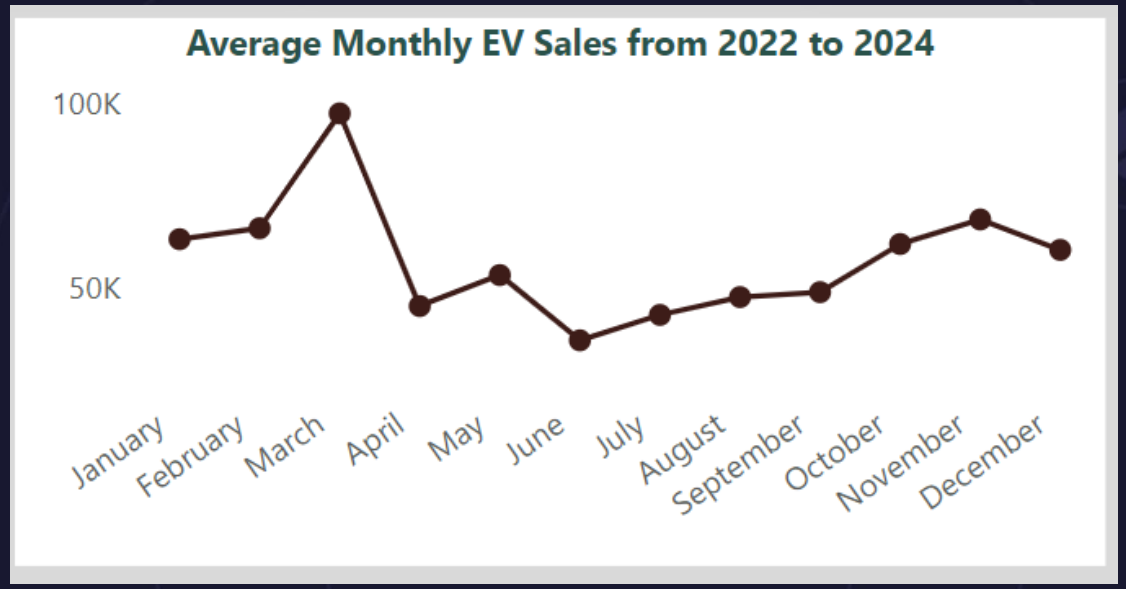


Q6. List down the compounded annual growth rate (CAGR) in 4-wheeler units for the top 5 makers from 2022 to 2024.



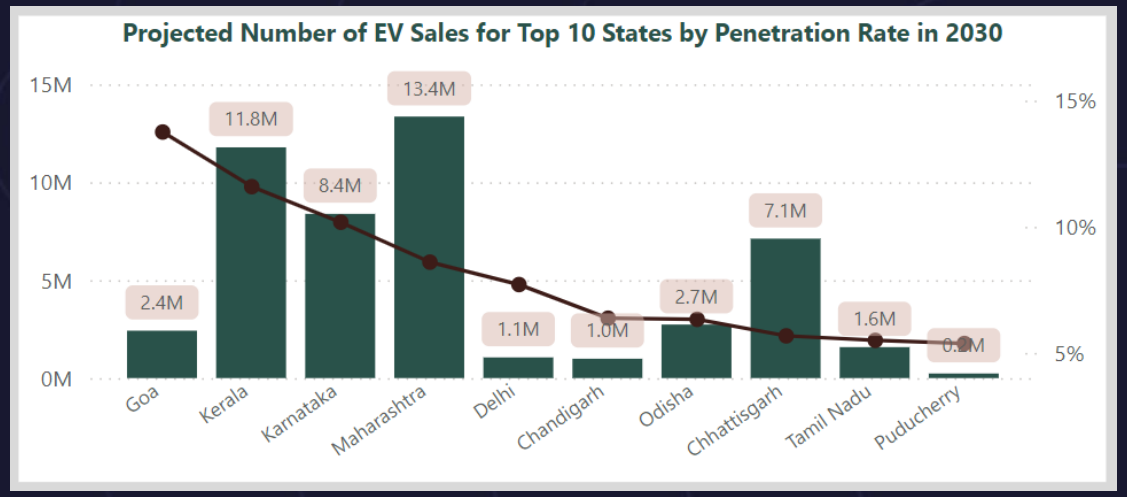
	state	Total_vehicle_sold	state_CAGR
▶	Meghalaya	90183	0.2846907468336495
	Goa	199970	0.27410196373759654
	Karnataka	3994329	0.2528358216462363
	Delhi	1588436	0.22884347375896485
	Rajasthan	3307591	0.21497380300976032
	Gujarat	4125551	0.20545677110380023
	Assam	1403271	0.20133671757754912
	Mizoram	71307	0.18771599004139028
	Arunachal Pradesh	71547	0.18303358701264272
	Andaman & Nicobar Island	18885	0.18287114640606572

Q7. Top 10 States with the Highest CAGR from 2022 to 2024 in Total Vehicles Sold



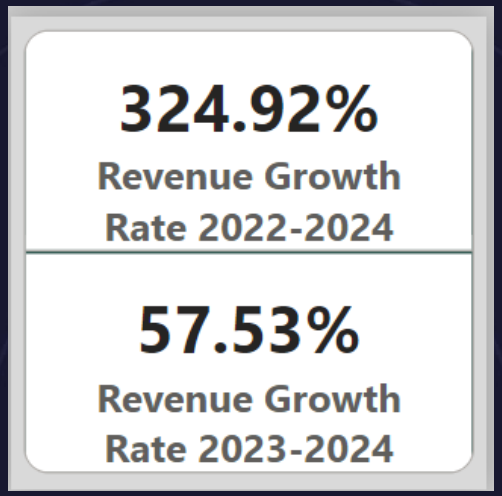
	month	avg_sales
▶	6	35569.6667
	3	97195.6667

Q8. Peak and Low Season Months for EV Sales from 2022 to 2024



	state	state_CAGR	projected_sales_2030	penetration_rate
▶	Goa	1.4644833718246102	2419573.9202134437	0.1375
	Kerala	1.3283195498041072	11779401.021597262	0.1159
	Karnataka	0.932431254145927	8383406.408540366	0.1018
	Maharashtra	1.0188930675001089	13351145.667887205	0.0860
	Delhi	0.6810007528255304	1054259.3536513462	0.0771
	Chandigarh	1.6457513110645907	986811.0000000003	0.0637
	Odisha	1.0294214133589898	2732813.9968704316	0.0633
	Chhattisgarh	1.5089166086181502	7118218.70797229	0.0567
	Tamil Nadu	0.5995313041638166	1579547.274096641	0.0549
	Puducherry	1.0544362842395478	232936.4613866966	0.0537

Q9. What is the projected number of EV sales (including 2-wheelers and 4-wheelers) for the top 10 states by penetration rate in 2030, based on the compounded annual growth rate (CAGR) from previous years?



Q10. Estimate Revenue Growth Rate of EVs in India for 2022 vs 2024 and 2023 vs 2024.

Secondary Questions

EXPLORING MARKET DYNAMICS, CUSTOMER BEHAVIOR, AND STRATEGIC RECOMMENDATIONS

Q1.What are the primary reasons for customers choosing 4-wheeler EVs in 2023 and 2024 (cost savings, environmental concerns, government incentives)?

1. Cost Savings:

- Rising fuel prices and lower operational costs make EVs financially advantageous. The total cost of ownership, including fuel, maintenance, and tax incentives, results in significant savings over traditional vehicles.

2. Environmental Concerns:

- Increased awareness of climate change and the need for reduced carbon footprints lead to a preference for EVs, which produce zero tailpipe emissions and contribute to reducing urban air pollution.

3. Government Incentives:

- Central and state governments in India have introduced various subsidies and incentives to promote EV adoption. These include reduced GST rates, exemptions from road taxes, and subsidies on the purchase price, which make EVs more affordable.

Q2. How do government incentives and subsidies impact the adoption rates of 2-wheelers and 4-wheelers? Which states in India provided most subsidies?

Government incentives and subsidies have significantly impacted the adoption of electric vehicles (EVs) in India by addressing cost barriers and supporting infrastructure development. The main effects include:

- **Reduced Purchase Costs:** Subsidies decrease the initial cost of EVs, making them more affordable, especially for middle-class consumers. For instance, the FAME II scheme offers incentives based on battery capacity, which helps EVs compete more effectively with traditional vehicles.

- **Increased Adoption Rates:** States such as Delhi, Maharashtra, and Karnataka, which offer substantial subsidies and additional benefits like tax exemptions and rebates, have experienced higher EV adoption rates. Delhi's policy, for example, provides up to ₹30,000 for two-wheelers and ₹1.5 lakh for four-wheelers, leading to a noticeable increase in EV sales.

- **Infrastructure Support:** Incentive programs often include investments in EV charging infrastructure, which alleviates range anxiety and further encourages EV adoption.

Overall, these government initiatives play a crucial role in accelerating EV adoption by making vehicles more affordable and supporting necessary infrastructure, particularly in states with aggressive subsidy programs.

Q3. How does the availability of charging stations infrastructure correlate with the EV sales and penetration rates in the top 5 states?

The availability of charging infrastructure is strongly correlated with EV sales and penetration rates:

- **Goa:** With a high penetration rate in 2-wheelers, Goa has a dense network of charging stations, particularly in urban areas. The state government has also promoted home-charging solutions.
- **Kerala:** The state's comprehensive EV policy has facilitated the development of a robust charging network, contributing to high sales figures for both 2-wheelers and 4-wheelers.
- **Karnataka:** Home to major cities like Bengaluru, Karnataka boasts an extensive charging network, which supports its high penetration rate and sales volumes.
- **Maharashtra:** The state has prioritized charging infrastructure in its EV policy, leading to significant growth in EV sales.
- **Delhi:** The capital has aggressively expanded its charging infrastructure, which has directly impacted its high EV penetration rates.
- **Conclusion:** States with well-developed charging infrastructure have seen higher EV adoption rates, as the availability of charging stations reduces range anxiety and makes EV ownership more convenient.

Q4. Who should be the brand ambassador if AtliQ Motors launches their EV/Hybrid vehicles in India and why?

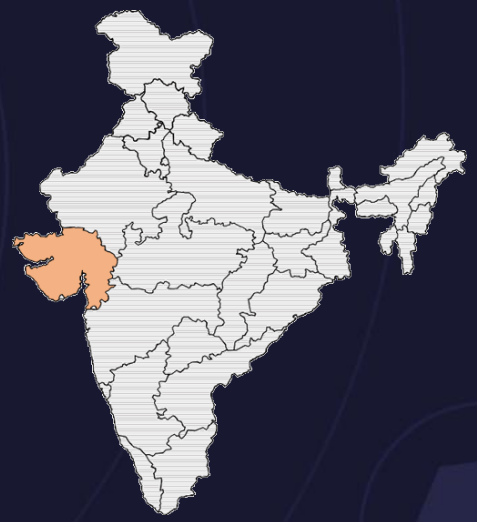
Virat Kohli: Appeals strongly to younger audiences and sports enthusiasts, representing dynamism and a modern lifestyle. His popularity can drive significant attention and engagement for AtliQ Motors, aligning well with the innovative and eco-friendly image of EVs.

Ayushmann Khurrana: is known for his roles in films that tackle social issues and promote progressive values, aligning with AtliQ Motors' focus on sustainability and innovation. He has a broad appeal across different demographics, including urban and semi-urban consumers, which aligns well with AtliQ Motors' target market. Ayushmann's significant following on social media can enhance brand visibility and engagement, particularly among younger, tech-savvy audiences.

Conclusion: Ultimately, **Ayushmann Khurrana** might be the slightly better fit if AtliQ Motors aims to emphasize its commitment to social and environmental values, while **Virat Kohli** would be ideal for a more general appeal, emphasizing performance and broad market reach.

Q5. Which state of India is ideal to start the manufacturing unit? (Based on subsidies provided, ease of doing business, stability in governance etc.)

1. **Maharashtra**
   - **Subsidies and Incentives:** Capital subsidies, interest subvention, exemptions from stamp duty and electricity duty.
   - **Ease of Doing Business:** High ranking with streamlined processes.
   - **Infrastructure:** Robust industrial corridors, ports, and supply chains.
   - **Governance and Stability:** Stable governance with a focus on industrial growth.
2. **Gujarat**
   - **Subsidies and Incentives:** Capital subsidies, concessional land rates, and electricity duty exemptions.
   - **Ease of Doing Business:** Business-friendly environment with quick approvals.
   - **Infrastructure:** Strong industrial infrastructure with a thriving automotive sector.
   - **Governance and Stability:** Stable governance with proactive industrial policies.
3. **Tamil Nadu**
   - **Subsidies and Incentives:** Capital subsidies, tax exemptions, and power tariff subsidies.
   - **Ease of Doing Business:** High ranking with investor-friendly policies.
   - **Infrastructure:** Established automotive base, skilled labor, and good connectivity.
   - **Governance and Stability:** Consistent governance supporting industrial development.



Recommended State: Gujarat

Gujarat emerges as the ideal choice for AtliQ Motors due to its proactive policies, strong automotive ecosystem, and government support, making it a favorable destination for setting up an EV manufacturing unit.

Q6. Your top 3 recommendations for AtliQ Motors.

- **Expand in High-Growth States:**
  - **Karnataka, Kerala, and Goa**: These states show the highest EV penetration rates and significant sales growth. AtliQ Motors should prioritize expanding its manufacturing units and distribution networks in these regions to tap into the growing demand.
  - **Leverage Government Incentives**: States like Gujarat and Tamil Nadu offer attractive subsidies, including capital investments, tax exemptions, and reduced land rates. Establishing production facilities in these states will reduce costs and enhance profitability, making it easier for AtliQ Motors to scale operations.
- **Strengthen Partnerships:**
  - **Collaborate with Leading EV Makers**: Partnering with top performers like OLA ELECTRIC, TVS, Tata Motors, and Mahindra & Mahindra can help AtliQ Motors enhance its product offerings and access a larger customer base. These collaborations could also lead to shared resources in areas like supply chain management and marketing.
  - **Invest in R&D**: To maintain a competitive edge, AtliQ Motors should focus on innovation, particularly in battery technology, vehicle efficiency, and cost reduction. Joint R&D initiatives with established EV makers can accelerate the development of cutting-edge technologies, making AtliQ Motors a leader in the EV market.
- **Focus on Long-Term Growth:**
  - **Target High-Sales Regions by 2030**: With states like Kerala and Maharashtra projected to have the highest EV sales by 2030, AtliQ Motors should prioritize these regions for future market expansion. This includes investing in charging infrastructure, localized marketing campaigns, and establishing strong dealer networks.
  - **Capitalize on the Booming Market**: The EV market in India has seen tremendous growth, with a 324.92% increase in revenue from 2022 to 2024. However, the growth rate is expected to stabilize, so AtliQ Motors should focus on sustainable strategies, such as improving customer retention, diversifying product lines, and exploring new business models like EV financing, leasing, or subscription services to maintain momentum.

Dashboard Summary

1. Market Overview

- **Total EV Sales**: India's EV market reached 1 million units sold in 2024, reflecting a substantial market growth of 276.03% from 2022 to 2024. The CAGR for this period stands at 93.91%.
- **Revenue Performance**: In 2024, the market generated ₹209.63 billion in revenue. The revenue growth rate from 2022 to 2024 was 324.92%, with a growth rate of 57.53% between 2023 and 2024.
- **Future Projections**: By 2030, EV sales in India are projected to reach 54 million units, indicating strong long-term market potential.

2. Segment Analysis

- **2-Wheelers vs. 4-Wheelers**:
  - **2-Wheelers**: Dominated the market in 2024 with a 91.48% share and a penetration rate of 4.40%. OLA Electric was the top performer, with a significant CAGR of 373.22%.
  - **4-Wheelers**: Despite having a smaller market share, the 4-wheeler segment showed a higher revenue growth rate of 367.79% compared to 2-wheelers (269.28%). Tata Motors led the 4-wheeler market with the highest revenue, though new players like BYD India showed the highest CAGR of 566.52%.

Dashboard Summary

3. State-Level Performance

- **Top Markets**: Maharashtra and Karnataka are the leading markets, with Maharashtra generating the highest revenue in 2024 and Karnataka demonstrating strong sales growth and penetration rates.
- **Emerging Markets**: Goa showed the highest penetration rate (13.75% projected by 2030) but with lower sales volumes, while states like Meghalaya are also showing rapid growth rates.

4. Quarterly and Seasonal Sales Trends

- **Top Makers' Quarterly Trends**: Tata Motors showed consistent growth across quarters, while Mahindra & Mahindra peaked in early 2024 but faced a subsequent decline.
- **Seasonal Insights**: The highest average monthly sales occurred in March (97,196 units), while the lowest were in June (35,570 units), suggesting seasonal demand fluctuations.

5. Competitive Landscape

- **Top Performers**: OLA Electric and Tata Motors are the top performers in the 2-wheeler and 4-wheeler segments, respectively. However, newer entrants like BYD India are rapidly gaining market share due to their high growth rates.

Conclusion: The dashboard insights underscore the rapid expansion and high revenue potential of India's EV market, particularly in the 4-wheeler segment. Focusing on high-growth states like Maharashtra and Karnataka and leveraging seasonal trends can provide AtliQ Motors with strategic advantages as it plans its market expansion in India.

Additional Analysis

Competitor Analysis

AtliQ Motors faces significant competition in the Indian EV market, with key players like **OLA Electric**, **Hero Electric**, **Ather Energy**, **TVS Motor Company**, and **Bajaj Auto** leading various segments.

- **OLA Electric** excels in two-wheelers and vertical integration but faces reliability issues.
- **Hero Electric** benefits from brand recognition and affordability, though it has a limited product range.
- **Ather Energy** offers premium, innovative products but is challenged by high pricing.
- **TVS Motor Company** leverages its legacy but struggles with the transition from ICE to EVs.
- **Bajaj Auto** capitalizes on iconic brands and a strong network but has a limited EV lineup.

Opportunities for AtliQ Motors include product innovation, targeting underserved segments, strategic partnerships, expanding into Tier 2 and Tier 3 cities, and emphasizing sustainability. However, **threats** like price wars, technological disruption, and regulatory changes must be navigated carefully.

Competitor Pricing Analysis

1. **Competitive Pricing Strategy:** Position AtliQ Motors' pricing in line with competitors like OLA and Ather, with a tiered structure to cater to different segments, from budget-conscious buyers to premium customers.

2. **Feature-Rich Value Proposition:** Emphasize advanced features such as longer range and smart connectivity at competitive prices to differentiate AtliQ Motors in a crowded market.

3. **Focus on Affordability:** Introduce entry-level models priced under ₹1,00,000 to compete with Hero Electric, leveraging government subsidies to make EVs more accessible.

4. **Promotions and Financing:** Offer attractive financing options and promotional deals to boost sales, making EV ownership more accessible to price-sensitive consumers.

Expansion Strategy

1. **Diversify Product Portfolio:** Expand into electric three-wheelers, four-wheelers, and specialized vehicles like delivery vans and buses.

2. **Expand Geographically:** Focus on Tier 2 and Tier 3 cities in India and explore international markets in Southeast Asia and Africa.

3. **Forge Strategic Partnerships:** Collaborate with charging infrastructure providers, battery manufacturers, and R&D partners to enhance product offerings and innovation.

4. **Strengthen Brand and Support:** Enhance regional marketing, build a robust digital presence, adopt sustainable practices, and expand the service network to boost customer satisfaction and loyalty.

Expansion Challenges

•**Supply Chain and Infrastructure Constraints**:
•Challenges with battery supply, component shortages, and inadequate charging infrastructure could lead to production delays and hinder EV adoption, particularly in less developed regions.

•**Regulatory and Market Competition**:
•Navigating inconsistent policies across states and international markets, along with intense competition from established players, requires strategic adaptation and significant investment.

•**Consumer Adoption and Awareness**:
•Overcoming range anxiety, low consumer awareness, and misconceptions about EVs, especially in smaller cities, will necessitate extensive educational campaigns and marketing efforts.

•**Financial and Technological Challenges**:
•High capital expenditure, the need for operational scalability, and keeping pace with rapid technological advancements are critical to maintaining competitiveness and ensuring long-term success.

Thank you!