

Analysis of Electric Vehicle Adoption Trends in India (2018-2023)

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Executive Summary

Electric vehicle (EV) adoption in India has grown significantly, reaching a 6.3% market share in 2023, up from less than 1% in 2018. The growth has been driven by two- and three-wheelers, which dominate the EV market, supported by government initiatives like the FAME-II subsidy program. However, four-wheeled electric vehicles still account for a minor share. Comparisons with global leaders like China and Europe reveal India's potential for further growth if infrastructure and policy initiatives continue. This report recommends sustained investment in EV manufacturing, charging infrastructure, and consumer incentives to achieve the government's target of 30% EV market share by 2030.

Introduction

- **Background:** Electric vehicles are becoming an essential part of the global shift towards sustainable mobility. India, as one of the world's largest vehicle markets, has embraced this transition, focusing on affordable EV options such as two-wheelers and three-wheelers. Government policies and subsidies have played a key role in boosting adoption rates.
- **Objective:** This report aims to analyze EV sales trends in India from 2018 to 2023, identify factors contributing to growth, and compare India's progress with global markets. The findings will provide actionable insights to guide stakeholders in accelerating EV adoption.
- **Data Sources:** The primary data source is the Vahan Dashboard, aggregated by Clean Mobility Shift. Additional context is derived from government reports, Statista visuals, and global benchmarks from CleanTechnica and TechCrunch.

Methodology

The analysis was conducted using the following steps:

- **Data Analysis Tools:** Python and Tableau were used for cleaning, processing, and visualizing the data.
- **Data Preprocessing:** Missing values were handled, and percentages were calculated for market share analysis.
- **Visualization Techniques:** Bar charts, line graphs, and pie charts were created to illustrate trends and market composition.
- **Comparative Analysis:** India's data was compared to global EV adoption trends, focusing on market shares and policy impacts.

Data Overview

Dataset Summary:

- ❖ **Years Covered:** 2018 to 2023.
- ❖ **Key Variables:** Annual EV sales (by type), EV market share, government subsidies, and global benchmarks.
- ❖ **Breakdown for 2023:** Two-wheelers (56% of EV sales), three-wheelers (38%), and four-wheelers (5.3%).

Preprocessing Steps:

- ❖ Ensured consistency in yearly data.
- ❖ Aggregated EV sales into categories for analysis.
- ❖ Calculated growth rates and market share percentages.

Analysis and Insights

1. Growth Trends in EV Sales:

- EV sales grew from 129,098 units in 2018 to 1,379,311 in 2023, marking a CAGR of approximately 62%.
- The market share increased from 0.5% to 6.3% over the same period.

2. Dominance of Two- and Three-Wheelers:

- Two-wheelers accounted for 56% of total EV sales in 2023, driven by affordability and urban mobility needs.
- Three-wheelers made up 38%, with significant adoption for commercial use like e-rickshaws.

3. Four-Wheeler Adoption:

- Despite doubling sales from 2022, four-wheelers only reached 72,930 units in 2023, reflecting infrastructure and cost challenges.

4. Policy Impact:

- The FAME-II subsidy program disbursed over \$600 million, catalyzing adoption.
- Government targets aim for a 30% EV market share by 2030, which requires sustained effort.

5. Global Comparisons:

- China's EV market share (22% fully electric, 30% including hybrids) and Europe's (23%) far outpace India, highlighting areas for improvement.

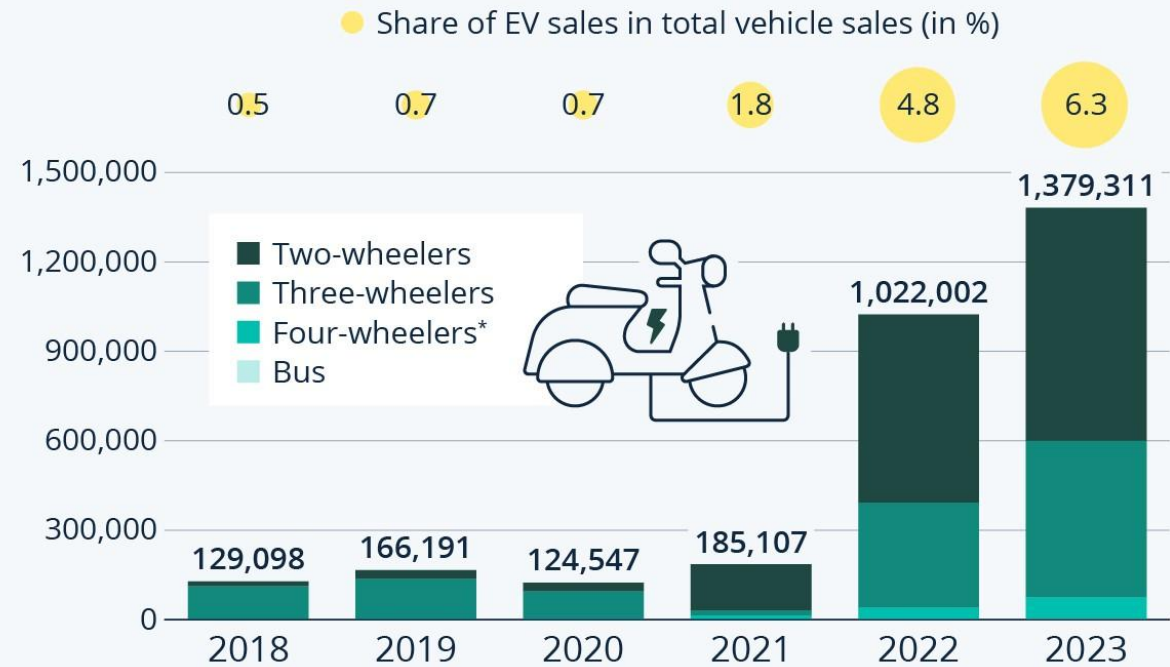
Charts and Visualizations

Annual EV Sales (2018-2023):

- A bar chart showcasing the annual growth in EV sales from 2018 to 2023.
- Data points: 129,098 (2018), 166,191 (2019), 124,547 (2020), 185,107 (2021), 1,022,002 (2022), and 1,379,311 (2023).

India's EV Adoption Shifts Gears After Covid Pandemic

Electric vehicle sales in India by year and type



Source: Vahan Dashboard via Clean Mobility Shift

Conclusions

India's EV adoption is on an upward trajectory, driven by two- and three-wheelers. While market share has grown to 6.3% in 2023, significant gaps remain in four-wheeler adoption and infrastructure development. Comparisons with global leaders show the need for accelerated investment and policy interventions to achieve the 2030 target.

Recommendations

1. Boost Infrastructure Development:

1. Expand charging networks across urban and rural areas.
2. Introduce battery-swapping stations to support two- and three-wheelers.

2. Enhance Subsidy Programs:

1. Continue and expand FAME-II subsidies, focusing on four-wheelers.
2. Offer tax incentives for EV manufacturing and R&D.

3. Encourage Private Investment:

1. Attract global EV manufacturers like Tesla to establish local plants.
2. Collaborate with foreign investors for technology transfers.

4. Promote Public Awareness:

1. Launch campaigns to highlight cost savings and environmental benefits of EVs.
2. Provide financing options for middle-income households.

Appendix

1.Raw Data:

1. Yearly EV sales by type (2018-2023).
2. Market share percentages.

2.Visualizations:

1. Detailed bar and line charts.
2. Pie charts showing 2023 market composition.

3.Code Snippets:

1. Python scripts used for data cleaning and analysis.

4.References:

1. Vahan Dashboard.
2. Clean Mobility Shift reports.
3. TechCrunch and CleanTechnica articles.