

# A Study on Emergence of Electric Vehicles (EVs) in Different Major States of India

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## Abstract:

Owing to population pressure, there has been increasing the transportation vehicles in the world scenario. The conventional transportation is existing by using fuels and it has called upon the environmental pollution and environmental disaster. There has been initiated research among the scientists how this pollution could be minimized by eco-friendly transportation. Amidst a global push for sustainable transportation, India has taken steps by initiating Electric Vehicles (EVs) in different states of India. This study will delve into the trends of Electric Vehicles adoption in different states of India. This comprehensive study not only highlights the positive and diverse scenery of Electric Vehicles adaptation but also serves as a vital resource for the policymakers and researchers and stakeholders.

**Keywords:** Pollution, Eco-Friendly Transportation and Electric Vehicles.

## Introduction:

India is the most populous country in the world with one- sixth of world's population. It covers 1,425,775,850 population at the end of April 2023. The simultaneous surge in population and infrastructure development has led to a significant increase in transportation demand (Bansal & Goyal,2020). Surging demand raises pollution, congestion and energy security worries. Automotive expansion is crucial for Indian economy, yet conventional vehicles drive Pollution and oil dependence (Patidar,2019). Globally, transportation accounts for 19 per cent of energy consumption, projected to reach 21 per cent by 2040, including cars, planes and ships (Sharma & Chandel, 2020). To address these challenges, India acknowledges the necessity of Electric Vehicles transportation. Electric Vehicles are less polluting than their conventional counterparts (Sharma & Chandel,2020). Limited research has been carried out in the field of Electric Vehicles development in India. The Indian government and state administrations are exploring various incentives programs to ensure the success of this environment friendly transportation initiatives. It is reported by Ahmed and Dewan (2007) that adopting Electric Vehicle in Delhi could curtail air pollution by about 24%, curbing emissions and potentially lowering fuel consumption as well as fuel costs. Srilatha, S et.al (2021) stated that in Tamil Nadu customers adopting Electric Vehicles for government subsidies, while others resist due to lower mileage. Likewise, Madhya Pradesh customers prioritize electric Vehicles for affordability, charging infrastructure (Mahajan et.al 2021). Saw & Kadia (2023) noted that the states of Delhi, Uttar Pradesh, Gujarat and Karnataka have low annual Electric Vehicle registrations; under 2 percent, 1 percent and 0.5 percent respectively. Among the ample research on Indian Electric Vehicle's preference, only few have examined state-

specific registration and very few delve into Electric Vehicle’s registration data and trends. Thus, we try to explore in this research study the growth and progress of Electric Vehicles across major states of India.

**Objectives of the Study:**

1. To evaluate the trend of Electric Vehicles in different major states of India.
2. To bring into focus the trend of Electric Vehicles segments in the major states of India.

**Research Methodology:**

This research paper has been designed on the basis of secondary data. The raw materials of data have been collected from different online sources like Vahan Dashboard <https://Vahan.parivahan.gov.in/vahan4> Dashboard, an initiative by the Ministry of Road Transport and Highways, Government of India and organized by the authors using Microsoft Excel. The data set covers the financial years from March 2014 to March 2023 including a span of 9 years. For achieving the objectives of the study table and graph analysis and descriptive analysis have been taken into execution.

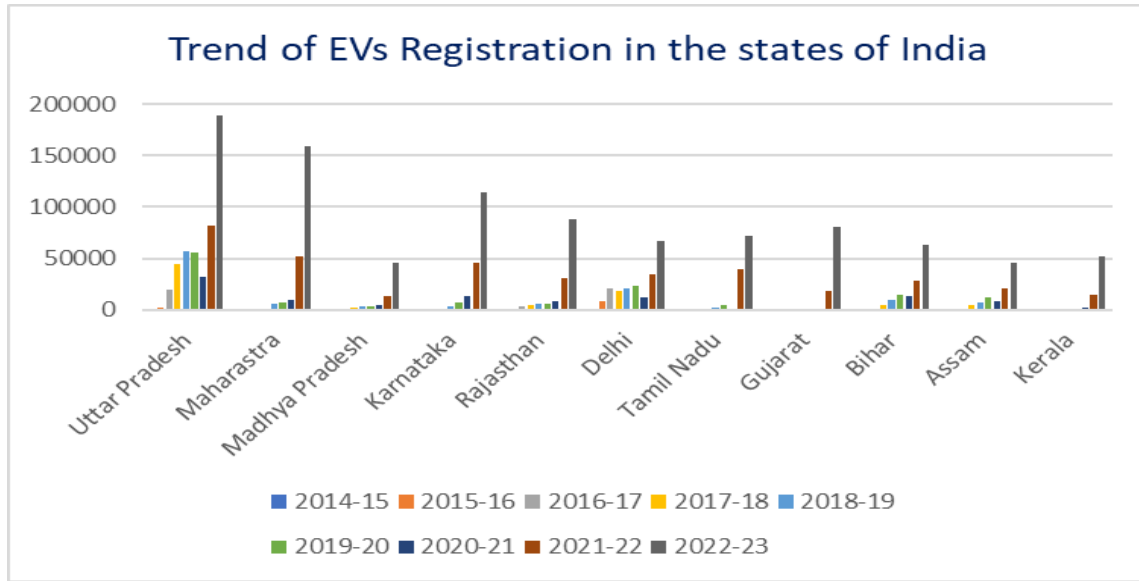
**Electric Vehicles Registration Details in Different Major States in India from 2014 March to 2023 March**

**Table -1**

| States        | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 |
|---------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Uttar Pradesh | 119     | 2424    | 19502   | 44364   | 57229   | 56224   | 31592   | 82028   | 188946  |
| Maharastra    | 936     | 999     | 820     | 1452    | 6288    | 7395    | 9409    | 51442   | 158683  |
| MadhyaPradesh | 37      | 182     | 957     | 1741    | 3238    | 3564    | 4382    | 14099   | 45284   |
| Karnataka     | 639     | 694     | 626     | 755     | 3892    | 7176    | 13006   | 46186   | 114075  |
| Rajasthan     | 76      | 1459    | 3775    | 4662    | 5655    | 5926    | 8196    | 31391   | 88328   |
| Delhi         | 52      | 8647    | 21556   | 17956   | 21429   | 23682   | 11809   | 34522   | 67124   |
| Tamil Nadu    | 157     | 81      | 90      | 130     | 2195    | 4199    | 1137    | 39624   | 71844   |
| Gujarat       | 67      | 99      | 147     | 218     | 732     | 893     | 1684    | 19042   | 81114   |
| Bihar         | 11      | 179     | 1406    | 4267    | 9995    | 14262   | 13289   | 28274   | 62606   |
| Assam         | 7       | 27      | 353     | 4675    | 7899    | 12019   | 8959    | 20435   | 45290   |
| Kerala        | 20      | 27      | 30      | 75      | 401     | 622     | 2189    | 14861   | 52281   |

Source: Collected from online sources.

Figure-1



Source: Author's compilation

The above table and figure depicted the Electric Vehicle registration figures of major Indian states during the period from March 2014 to March 2023. Several significant trends can be deduced from the data. The table shows that Uttar Pradesh, the state with the highest population, demonstrated a remarkable increase in Electric Vehicle registrations, commencing at 119 units in 2014-15 and drastically increase to an impressive 188,946 units in 2022-23. On the other hand, Maharashtra exhibited a consistent growth pattern with registration progressing from 936 units in 2014-15 to a substantial 158,683 units in 2022-23.

Karnataka depicted a continuous upward trend 639 units in 2014-15 and reaching a peak of 114,075 units in 2022-23. Similarly, Delhi's Electric Vehicles registration started at 52 units in 2014-15 and exhibited a steady growth at 67,124 units by 2022-23. In Rajasthan, this registration initiated at 76 units and experienced gradual growth, culminating in 88,328 units by 2022-23. Bihar underwent a significant surge, elevating from 11 units in 2014-15 to an impressive 62,606 units by 2022-23. Tamil Nadu shows fluctuations, beginning at 157 units and reaching 71,844 units registrations by 2022-23. On the other hand, Gujarat displayed this registration a consistent growth, starting at 67 units and progressively escalating to 81,114 units by 2022-23. Similarly, Assam's Electric Vehicles registrations followed a steady growth trajectory, progressing from 7 units to 45,290 units by 2022-23. Madhya Pradesh started from 37 units and progressed to 45,284 units by 2022-23. Kerala's growth trend was 20 units in 2014-15 and culminating in 52,281 units by 2022-23.

It is noteworthy that during COVID-19 period the registrations of Electric Vehicles declined in several states in India. Post COVID period the trend of registrations of Electric Vehicles again promisingly increasing in these states. The data shows an upward trend in the registrations of Electric Vehicles in the Indian states.

**Different Types of Electric Vehicles Registration in India March 2014 to March 2023.**

The Table-2 and figure-2 shows the different types of Electric Vehicles registrations in some major states of India from 2014 to 2023 up to March. The table-2, reveals the highest registration of Electric Vehicles at 482,428 units, attributed to its substantial population and proactive efforts in promoting Electric Vehicles. Two wheelers, three wheelers and four wheelers are registered as 45590, 435012 and 1826 respectively in Uttar Pradesh. Maharastra secured the second rank with 237424 Electric Vehicles registration driven by urban centres like Mumbai and Pune. These cities contribute significantly to the large numbers of EV-2 wheelers due to their convenience for short distance and traffic congestion.

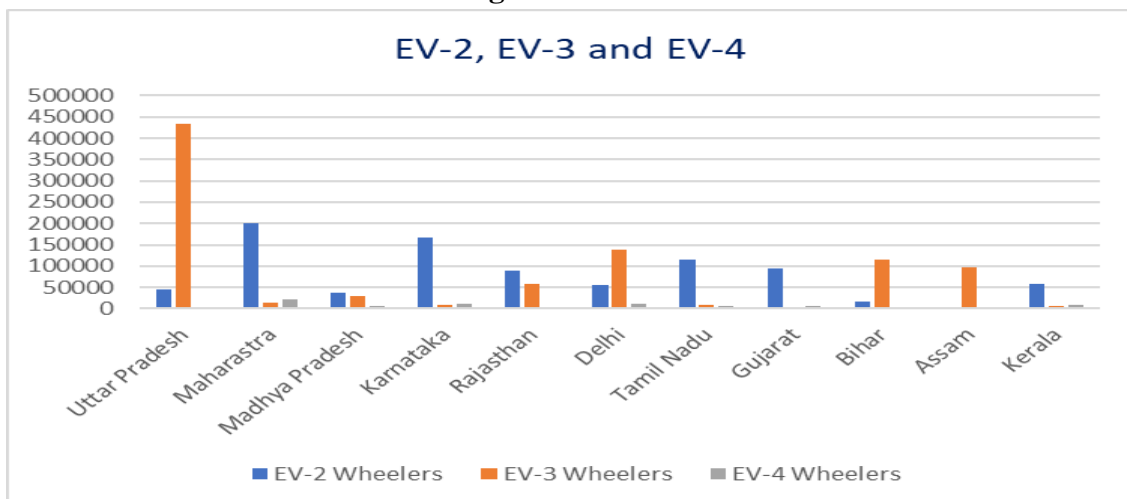
**Table- 2**

| States         | EV-2 Wheelers | EV-3 Wheelers | EV-4 Wheelers | Total   |
|----------------|---------------|---------------|---------------|---------|
| Uttar Pradesh  | 45590         | 435012        | 1826          | 482428  |
| Maharastra     | 200804        | 14803         | 21817         | 237424  |
| Madhya Pradesh | 38516         | 28665         | 6303          | 73484   |
| Karnataka      | 165907        | 8920          | 12222         | 187049  |
| Rajasthan      | 89478         | 56890         | 3100          | 149468  |
| Delhi          | 54626         | 139581        | 12570         | 206777  |
| Tamil Nadu     | 116311        | 7606          | 6340          | 1430257 |
| Gujarat        | 94360         | 3719          | 5917          | 103996  |
| Bihar          | 17634         | 116255        | 400           | 134289  |
| Assam          | 3053          | 95926         | 685           | 99664   |
| Kerala         | 57162         | 5119          | 8225          | 70506   |

Source: Author’s compilation

Delhi the national capital is highly urbanized, is secured the 3<sup>rd</sup> rank with 206777 of Electric Vehicles registration. This Electric Vehicles existing has combated pollution emission in the city. Karnataka is another state of south India occupied the 4<sup>th</sup> rank in registration of Electric Vehicles with 187,049 units and benefiting from Bengaluru’s tech- hub status.

**Figure-2**



Rajasthan secured the fifth position in registration of Electric Vehicles with 149,468 units. Bihar is in sixth rank with 134,289 EV registration, focusing on EV-2 wheelers and EV-3 wheelers to address cleaner urban transport solutions. Tamil Nadu, another state secured the next position with 130,257 EV registrations revealing a strong presence in EV-2 wheelers and EV-3 wheelers, coupled with balanced EV-4 wheelers reflecting diverse trends. Likewise, Gujarat, Assam, Madhya Pradesh and Kerala are registered Electric Vehicles in recent time.

It is notable that Maharashtra leads in EV-2 wheelers registration, followed by Karnataka. In case of 3-wheelers registration Uttar Pradesh is in the leading position followed by Bihar. While 4-wheeler registrations are found in the leading position by Maharashtra followed by Delhi. This comprehensive analysis displays the positive and diverse landscape of Electric Vehicles adoption across the major states of India.

### Conclusion

In the way of attaining safe and sustainable environment of the nation, initiating of Electric Vehicles in the field of transportation across the Indian Major states is a bright future of the nation. Above analysis reveals that as populous states like Uttar Pradesh and Maharashtra underscores the potential for change even in the most populous and bustling regions. The consistent growth patterns in almost all the major states of India show the enduring appeal of Electric Vehicles, backed by a combination of technological advancements, Government incentives and growing awareness of environmental concerns. The commitment of these states to combat pollution and emissions is palpable, as seen in the continent upward trajectory of EV registrations. The post-pandemic recovery phase has breathed fresh life into the EV movement, showcasing the resilience of the transition towards greener alternatives. The prevalence of EV-2 wheelers in urban centres like Mumbai and Bangalore and the dominance of EV-3 wheelers in densely populated states like Uttar Pradesh and Bihar and EV-4 wheelers in Maharashtra and Delhi, underline the adaptability of EV to cater to various transportation needs infrastructural settings.

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