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E-VEHICLE TRENDS IN INDIAN STATES

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ABSTRACT:

The present study helps to understand the current scenario of Electric vehicles in Indian states and the reasons for their rising popularity among people. The study is based on secondary data taken from government reports that depict popularity as highly diverse among Indian states. States like Bihar, Rajasthan, Tamil Nadu, and Assam are at the top in adopting EVs that are away from traditional combustion engine vehicles. although the government of India is running various schemes and programs for the growth of the electric vehicles industry, state policy is highly important in implementing the programs and schemes initiated by the central government. Bihar is keenly prioritizing the industrial policy in favor of EVs using the PPP model and is on the list of leading states in production and sales. These vehicles' lower maintenance and running costs make them popular among consumers. The need of the day is to work on the infrastructural front to give a further kick to the industry.

KEYWORDS: Electric Vehicles (EVs), PPP- public-private partnership, PLI- Production Linked Incentives

INTRODUCTION:

In India, Electric Vehicles make up only 2 percent of total automobile sales. Also, the government has a target to increase the adoption of EVs in the coming decades. Sales are expected to increase by 40-45 percent by 2030. Motorbikes and scooters dominate the Indian electric vehicle market, while China and the U.S. are adopting EV cars. In addition, Tata Power is the largest power generation company, claiming that it has built around 2500 charging stations in 300 cities on 350 of 600 highways in India. The company targets to have 25,000 charging stations by 2018.

According to FADA (Federation of Automobile Dealers Association of India) The overall retail sales of these vehicles, including passenger vehicles, was 1,11,971 units in October 2022. The sale of commercial electric vehicles was up by 125.64 percent to 274 units in the month of October 2022. The sale of two-wheeler

e-vehicles in the same month was 73,169 units compared to 19,826 in the same month of year 2021. This showed a year-on-year growth of 269.09 percent. In the case of three-wheelers, the sale of these vehicles surged 92.87 percent to 34,793 units during October 2022 as compared to the previous year's same month with 18,040 units. According to the Hindustan Times on December 21, 2022, the sales of EVs in India are already at a high record, and they may hit 6 lakhs by March 2023. In terms of the sales of EVs, 2022 was a landmark year, crossing the sales of the last year, 2021. In the financial year 2021-22, nearly 2.38 lakh E-vehicles were sold in the country. Tata Motors is the leading industry in the EV four-wheeler segment with a huge 90 percent market share, and Ola Electric has the largest share in the two-wheeler segment.

- The Indian government has taken various steps to promote electric vehicle usage.
- FAME India scheme: The faster adoption and manufacturing of the Hybrid & Electric Vehicles scheme was launched in 2015 to reduce the dependency on fossil fuels and address the issue of vehicular emissions. Currently, phase II of the FAME India scheme is under implementation w.e.f. April 1, 2019.
- PLI Scheme: The production incentive scheme was launched in May 2021 to bring down the price of batteries in India, which may reduce the cost of electric vehicles.
- GST reduced from 12 % to 5%: The government of India has reduced the GST on electric vehicles to 5 percent. GST on charging stations was reduced from 18 percent to 5 percent.
- Exempt from permit requirements: Battery-operated electric vehicles are exempted from permit requirements and are given green license plates as per the announcement of the Ministry of Road Transport and Highways.
- Road Tax: The Ministry of Road Transport Highways has announced waiving road tax on Electric Vehicles, which will reduce their initial cost.

To increase the sale of two-wheeler electric vehicles, e-vehicles must be cost-effective, and more importantly, charging infrastructure needs to be in place. The cost of EVs has to fall by 20 to 30 percent to compete with internal combustion engine vehicles. However, the lifestyle cost of Electric Vehicles is lower. That means the money the electric vehicle owner saves in fuel and maintenance costs consumed by the higher initial purchase price. If the government made cost-effective policies for EVs, there would be no return to combustion engine vehicles.

REVIEW OF LITERATURE

Khurana Anil et al. (2020), in their paper entitled “A Study on the Adoption of Electric Vehicles in India: The Mediating Role of Attitude,” examined the factors that affect the adoption of E-Vehicles by consumers. The data was collected by filling out a questionnaire from the respondents who own a four-vehicle, i.e., a car only. The study used Structured Equation Modeling (SEM) to analyze the data. It was found in the study that various factors are responsible for the demand for these E-Vehicles, such as environmental concerns, perception of economic benefit, social influence, behavioral intention, and attitude. The study concluded that

attitude emerged as a strong mediator influencing electric car adoption. The study also found that the sales penetration of electric vehicles is expected to rise sharply after 2030.

Ali Saqlain (2021), in the paper entitled “An Overview of Why Electric Cars are the Future of Transportation,” analyzed why people are moving towards using electric vehicles. For the study's analysis, secondary data was collected from various sources, such as Google Scholar, Research Gate, e-books, etc. It was found in the study that there was a reduction in charging time for its effectiveness in use, which is one of the reasons for the rise in these vehicles' demand and sales. The paper also concluded that it helps reduce traffic accidents, minimize environmental impact, and increase productivity.

Goel Sonali et al. (2021), in their paper entitled “A review on barrier and challenges of electric vehicles in India and vehicle to grid optimization,” provided an outline of the different types of Vehicle incursion rate in the market and discussed their different techniques of optimization and modeling approach. It was found in the study that major barriers to electric vehicles are vehicle servicing, high capital cost, raw material for batteries, efficiency of batteries, driving range, charging time, charging stations, and battery recycling. The paper also discussed the schemes for purchasing electric vehicles in India, like the National Electric Mobility Mission 2020. It was concluded that these vehicles have the capacity to increase the fuel economy of vehicles but with a rise in the purchasing cost compared to traditional vehicles.

OBJECTIVES

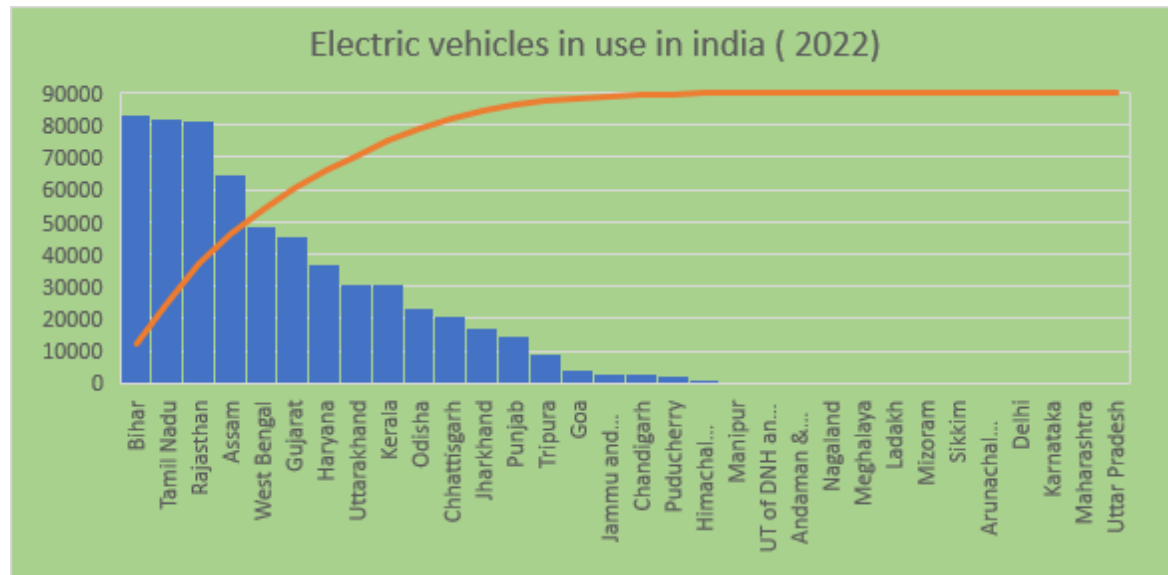
- To analyze the state-wise data of registered e-vehicles and sales trends of e-vehicles
- To study the reasons for the high demand for vehicles.

RESEARCH METHODOLOGY

In this paper, we used secondary data from registered Electric vehicles and charging stations sanctioned by the government of India in different states. The data was collected from government sites such as PIB (Public Information Bureau) and Vahan Dashboard. Some data was also taken from online articles. Bar diagrams, Tables, and pie charts were used to analyze the data.

DATA ANALYSIS:

FIGURE 1.1



Source: <https://pib.gov.in/PressReleasePage.aspx?PRID=1842704>

The figure shows state-wise data on electric vehicles used in India. Bihar, Tamil Nādu, Rajasthan, and Assam are some states where the highest numbers of electric vehicles are used. Bihar uses 15 percent of total vehicles, followed by Tamil Nādu (14 percent) and Rajasthan (14.6 Percent). Maharashtra and Uttar Pradesh are among the lowest-value states in Electric Vehicle use.

TABLE 1 (ANNUAL SALES OF E-VEHICLES)

YEAR	DATA	PERCENT
2016	17973	
2017	56551	214.6
2018	96756	41.6
2019	146590	34
2020	170812	14.2
2021	140828	-21.3
2022	455773	69.1

Source: JMK Research Estimates, Vahan Dashboard

FIGURE 1.2

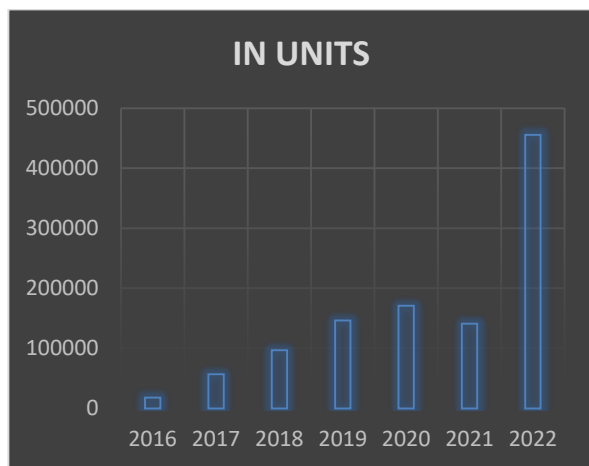
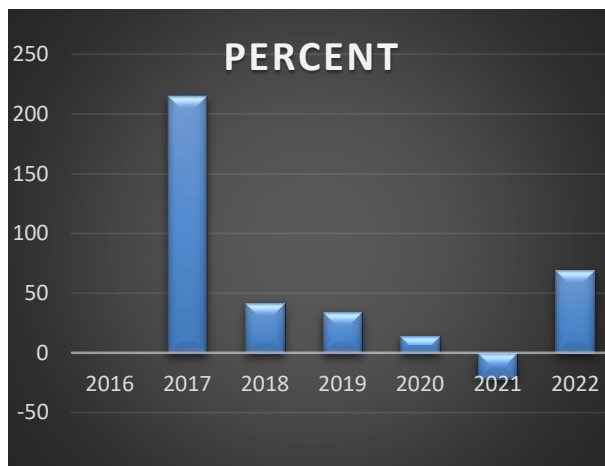


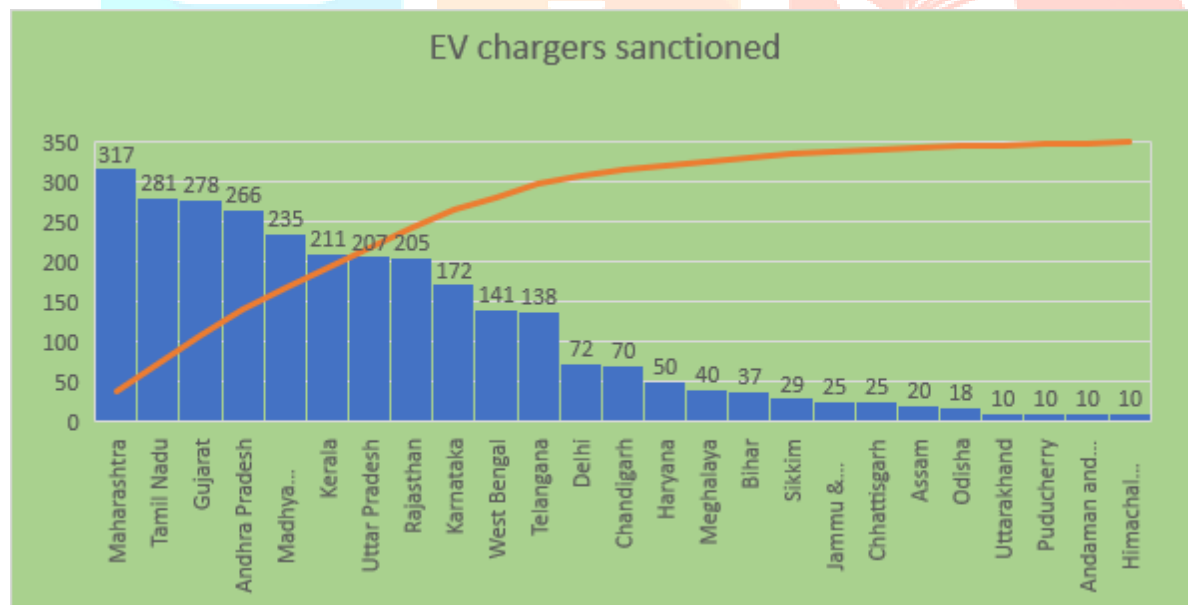
FIGURE 1.3



Source: JMK Research Estimates, Vahan Dashboard

Table 1 and figures 1.2 and 1.3 show units and percentage change of electric vehicles sold in India from 2016 to 2022 after launching FAME Phase 1. Here, the change was biggest in 2017 with 56561 Vehicles, and sales almost doubled this year. In the year 2021, sales were -21 percent.

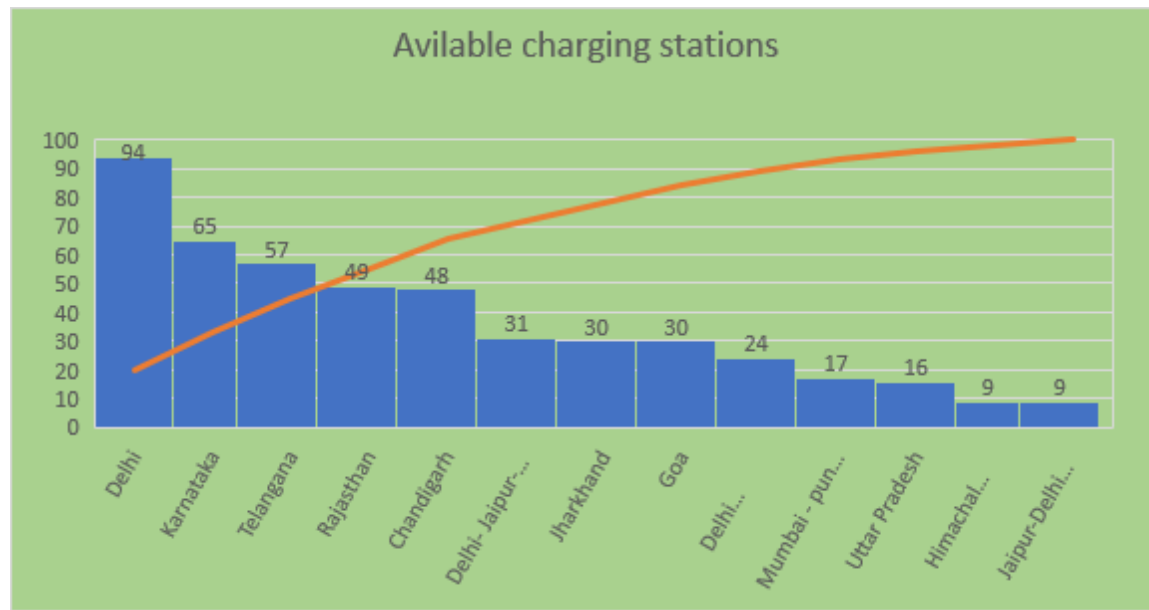
FIGURE 1.4 (Sanctioned charging stations)



Source: <https://pib.gov.in/PressReleasePage.aspx?PRID=1842704>

The figure represents data from charging stations sanctioned by the government for charging e-vehicles. Maharashtra, Tamil Nadu, Gujrat, and Andhra Pradesh are the top priority states in charging stations because of the high use of Electric vehicles. Almost 11 percent of charging stations are distributed in Maharashtra, the highest and the lowest number of charging stations sanctioned in Himachal Pradesh, which is 0.3 percent.

FIGURE 1.4 (Available Charging Stations)



Source: <https://pib.gov.in/PressReleasePage.aspx?PRID=1842704>

Figure 1.4 shows the data of available charging stations in which Delhi and Karnataka are among the top states providing the facility with values 94 and 65. the total covers almost one-third of the total available charging stations. Himachal – Pradesh and Jaipur- Delhi highways are with lowest facility.

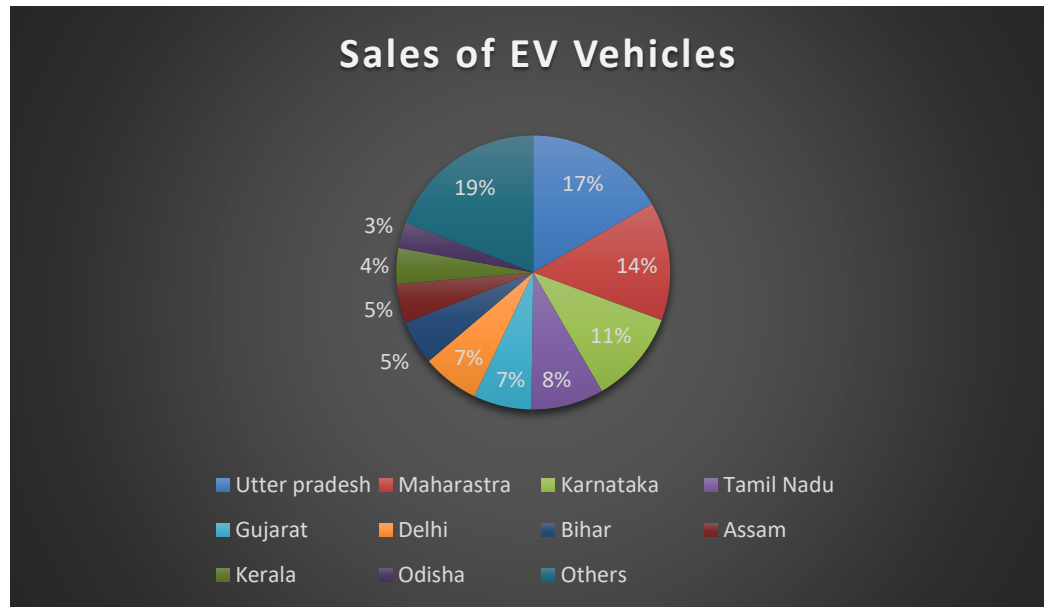
TABLE 2 (State Wise Sales Of E-Vehicles in Units)

State	Sales
Utter Pradesh	52930
Maharastra	44511
Karnataka	34900
Tamil Nadu	27272
Gujarat	21742
Delhi	21430
Bihar	16648
Assam	14696
Kerala	13395
Odisha	9810
Others	60496

Source: Vahan Dashboard

FIGURE 1.5

EV Sales from Jan'22 to May'22



Source: Vahan Dashboard

The Table 2 and the figure 1.5 represent the sales values and share of Electric vehicles. Uttar Pradesh, Maharashtra, Karnataka, and Tamil Nadu have the highest sales of electric vehicles. The total sales in these four states are more than fifty percent of total sales. The least-performing states in terms of electric vehicle sales are Kerala, Odisha, and other remaining states.

FINDINGS AND SUGGESTIONS

Based on the secondary data and available literature the study finds many reasons for the high demand of electric vehicles. Some of them are:

Environment Friendly: Electric vehicles are growing at an annual compound rate. The basic reason for this growth is the environment. The issue of climate change is a hot topic of debate in the world. Electric vehicles seem a good option for climate experts to tackle the issue. Electric cars do not pollute the environment, and one can drive safely with comfort. Electric cars are better than conventional cars because electricity is used to charge batteries rather than using fossil fuels like Diesel and Petrol. Electric vehicles emit lower greenhouse gases and pollutants, indicating a good potential for the EV industry.

Cost-effective: The next reason for the high demand is the cost-effectiveness of electric vehicles. These cars require a very low maintenance cost compared to conventional cars. In the ownership Cost of any vehicle, the maintenance and running costs accounts a major share. Electric vehicle buyers have to spend less on energy

fuel as vehicles have fewer moving parts compared to gasoline engines, which helps with easy maintenance. The need for maintenance and replacement of parts

Convenient Charging: EVs depend on electricity to charge their batteries instead of using fossil fuels like diesel or petrol. So, with the large number of charging stations, it will be easier and helpful for consumers to charge at a nearby charging station. Batteries can be charged at home, which is more convenient than rushing to a petrol pump.

Tax Benefits: Electric vehicles are exempted from registration tax, unlike traditional vehicles that run on fuel. To boost their purchase, the government is also supporting their usage by supporting them by giving tax benefits.

Purchase Incentives – In the extended version of FAME 2nd, Government allocated ₹10,000 crores to provide incentives. For two and three wheelers, one can avail benefits up to ₹15000 and ₹10000 with a given battery size. These incentives are somewhat higher in the case of Four Wheelers, E- Buses, and E- Trucks.

Say no to noise Pollution- Electric Vehicles don't possess complicated controls, which means they are easy to use and have silent functioning capability. Even producers must adopt false sound methods to make them safe for pedestrians.

Based on secondary data (trends of e-vehicles), the findings are -

The Data showed that the highest registered vehicles (In use) were in Bihar, Tamil Nadu, and Rajasthan. Still, the states where sales are on the top are Utter Pradesh, Maharashtra, and Tamil Nadu, which account for nearly fifty percent of the total share.

Annual sales of E-Vehicles after launching FAME -1 (2015) were analyzed. It was found that annual sales were increasing continuously after a twofold increase in the year 2017 except in the year 2021. In that year, some fire incidents and supply chain issues affected the reputations of Top-selling brands.

There are high number of sanctioned charging stations with the value 4453, the availability of charging stations is very low, only 479. Up to 10,000 electric vehicles, only 3.35 charging stations are available. It shows a huge gap between the availability of electric vehicles and charging stations.

There is growth in the case of sales of E-vehicles, but as per the data, E2W (Three-wheeler electric) accounts for the highest share, followed by Two-wheeler. It shows that the public transport system, which is used by most of the population, needs to be recognized in the case of electric vehicles if we want to take steps toward a clean and greener future.

With high annual growth rate of registered vehicles, Registered e-vehicles account for only 0.47 Percent of total vehicles (Electric and Electric), which is very low.

Despite continuous efforts of metropolitan cities such as Delhi, Bihar was at the top of registered E-vehicles. Delhi government adopted an EV policy in 2016 to reduce pollution and promote sustainable environmental policies. But in Bihar, the industrial policy where the EV sector was prioritized showed huge growth in terms of vehicles. Here, the government can analyze the investment model used by Bihar in the EV sector so the full potential of this sector can be utilized to promote the use of E-vehicles in India.

The government can reduce the barriers to using E-vehicle vehicles by investing in extra charging stations. Charging infrastructure has to expand significantly to support the number of Electric vehicles.

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