
A study of charging station infrastructure of electric vehicles with respect to the Pune market

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ABSTRACT

This paper is for the revolution and the need for electric vehicles (EV) and its challenges for the charging infrastructure for Pune electric automobile industry. The current growth of EVs is slow due to the issues such as slow charging time, accessibility, lack of charging infrastructure. Identifying the characteristics and demand of fast charging EV load of Pune. Within a radius of 3 km charging station is required in the Pune. Government policies and the Pune municipal corporation initiative towards the charging infrastructure for the smart Pune city. Interaction of electric vehicle and charging station for the availability of charging slots in the charging station to reduce waiting time.

KEYWORDS: Electric vehicle, Pune charging stations, charging infrastructure, charging, smart charging.

1. INTRODUCTION

The fastest growing and the most advanced Education and IT centre in recent time. Pune is the fifth largest metropolitan city in India. The major capital establishment in India is from the education sector, manufacturing section and the Information sector (IT). The megacity needs to be mega planned and cost-effective manner. The megacity plans are published. The municipal corporation of Pune is planning to develop a smart connect structure for public transport and private transport. Pune is a well planned and well-structured city. Need to develop the EV segment infrastructure for Pune. The mobile app and the charging station tracking system are in Pune.

2. OBJECTIVES OF THE STUDY

- To evaluate available and required infrastructure necessary for the adoption of EVs.
- To present a comprehensive overview of the market size and market growth rate of EVs.

- To study existing scenarios in the implementation of charging infrastructure in Pune city.
- To evaluate available and required infrastructure necessary for the adoption of EVs.

3. REVIEW OF LITERATURE

In an electric vehicle, there are different multiple players involved that can bring the change in the assiduity. Presently, government programs have a major part in the Indian electric vehicle industry.

Non-availability of the charging stations in the Pune corporation area. It will improve the distance range and help people to charge their vehicles in very less time. On average, 4 wheelers electric vehicles need 4-5 hr. to charge full and with the help of the advanced charging stations and the chargers, it will require 30-45 min with the help of the charging slot booking application consumer reduces the waiting time. The construction of the cost of the charging station.

Algorithm for charging station slot booking

The charging station selection traces the live location of the vehicle and taps the range available with it. It covers the limits of the charging stations. And also, it communicates with the other devices that update the traffic and finds the shortest and traffic-less path. With the help of it, drivers can book the charging slot in the advance to avoid the traffic and waiting time.



Charging Infrastructure

At present Pune needs to provide additional charging infrastructure to boost the adoption of Electric vehicle by Pune customers. The lack of charging stations in the Pune will put customers under anxiety, as the vehicle driving range is not sufficient as per the requirement and the vehicle may not run long distance without charging stations at frequently intervals on the road ways.

Charging Infrastructure is classified as follows:

Home Charging:

Home charging is the most common and the basic type of charging. The user needs to have a 230v/15A single phase supply is required to charge Electric vehicles. With the help of home charging facility customer not need to invest their quality time for waiting for charging at home customer can charge at night. And the connection is connected in the home electric meter hence no additional billing for it.

Public Charging:

The public charging is mainly maintained by the government and the service providers. Public spaces as parking lots, Mall parking, office parking area may be target to provide public charging with the separate meter and time consuming and cost effective manner.

AC charging:

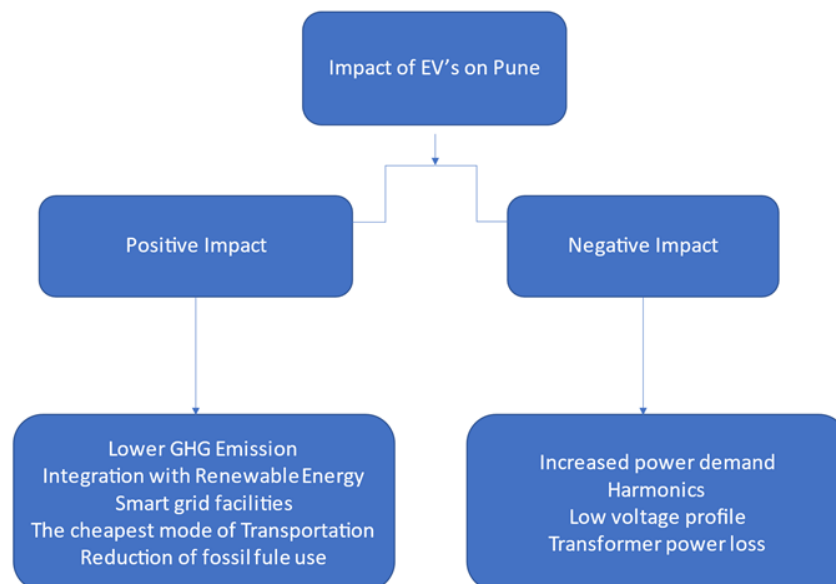
AC charging is the slow/fast charging. It depends on the converters and the slow charging will cost less and the fast charging will cost high.

DC charging:

In the DC charging the high current is provided to the battery to charge fast and the charging rates are very high. The voltage rating of the DC is 48V/72V.

For the Pune and any other metro city smart charging and fast charging infrastructure is required for the commercial and non-commercial vehicles which are running long distance.

Impacts of Electric Vehicles in Pune:



4. RESEARCH METHODOLOGY

The research defines its scope as the consumer behavior of existing electric vehicle owners, industry experts, and potential electric vehicle customers. Data Collection: Data shall be collected using secondary data sources and primary data sources such as surveys and interview methods. Sample Size: Data would be collected from a sufficient number of samples. Sampling Method: Appropriate sampling method will be used for data collection. Proposed data analysis: The data collected will be analyzed using various multi-variant statistical tests like chi-square, T-test, etc.

5. FINDINGS OF THE STUDY AND DATA ANALYSIS

With successfully installing new charging infrastructure in Pune territory the electric vehicle selling ratio will increase and the customer satisfaction ratio also increased. The mobile app provides the current situation of charging point availability in specific territories and also users can know the waiting time. Customer satisfaction is most important in the sales and brand value or reputation purpose so with the help of the app it will full fill customers' requirements.

6. DISCUSSION

The Pune municipal corporation decision of 500 new charging points in the Pune megacity. The Government of India initiative "National Electric Mobility Mission Plan 2020" will have no impact on the market size and growth rate of electric vehicles. The Government of India initiative "National Electric Mobility Mission Plan 2020" will impact on market size and growth of electric vehicles. The present infrastructure will influence consumer behaviour in electric vehicles. Promote NEMMP 2020 Energy security (successful implementation of NEMMP 2020 will save 9.5 B litres of crude oil & roughly 620 B USD Achieving carbon footprint (30-35% reduction) Industry. Factors influencing the current & future buying

decision EVs show the potential benefit for human health and Offer driving ranges will not be limited by battery capacity and with the help of charging stations. Insights into consumer buying behaviour and awareness about the sales potential of electric vehicles.

7. CONCLUSION

Maintainable development of charging structure is a must. This work answered the charging station placement problem in the environment of Pune megacity, a problems forthcoming smart megacity. The charging station point allocation is structured in the multipurpose model just like cost effective manner, power stability, and the distribution of network. With the help of the charging station selection algorithm the proposed charging station is allocated and nearby charging stations are suggested. Also, the Author suggested to apply the planning model to the Pune municipal corporation and in future all the mega city's in future. It is very important to plan in initial level for the charging infrastructure strategy. Our futuristic view is to solve the critical problem for the Pune corporation area.

8. REFERENCES

- Energie, D. GmbH et al. (2020)., IEEE 3-5 Nov. 2020.
- <https://inc42.com/features/what-are-the-challenges-for-the-ev-market-in-india/>
- <https://www.dhi.nic.in/UserView?mid=1378>
- <https://www.electronicb2b.com/electric-vehicle/will-nemmp-2020-and-fame-be-game-changers-in-the-indian-ev->
- <https://www.kazam.in/category/news/electric-vehicle-charging-stations-in-Pune>
- <https://www.sciencedirect.com/science/article/abs/pii/S0967070X16303584>
- Kumar and Dash, K. (2013). Advance in Electronic and Electric Engineering. ISSN 2231-1297, Volume 3, Number 4 (2013), pp. 471-476.
- Sanchari, D., Kari, T. et al. (2019)., IEEE Access, Volume 7