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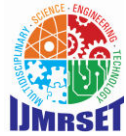
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Faster Adoption of Electric Vehicles in India: A Review

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ABSTRACT: India endeavours to be on a path of energy transition in the road transport sector. The National Electric Mobility Mission Plan (NEMMP) 2020 was launched in 2013. The genesis of the endeavour is the vision to reduce urban pollution, meet the GHG emission targets as promised in UN climate change pact and to become an energy independent nation. The objective of this paper is therefore to do a comprehensive analysis on significance of electric vehicles (EV) as a solution, steps taken by government to promote the same, challenges to its adoption and evaluate solutions to promote faster adoption of EVs.

KEYWORDS: Electric Vehicles, Government Policies, Urban Pollution.

I. INTRODUCTION

India endeavours to be on a path of energy transition in the road transport sector. The National Electric Mobility Mission Plan (NEMMP) 2020, launched in 2013, aimed at paving the way for a shift from fossil fuel-based mobility to an electric powered one. The mission set an ambitious target of 6–7 million electric vehicles in the country by 2020. The impact of subsequent schemes and initiatives by the Government of India, mostly channelled through the FAME schemes, has been limited in achieving the targets of NEMMP. As of June, 2019, just about 2.7 lakh electric vehicles have been sold under the FAME scheme since its implementation in April, 2015 including about 1.7 lakh electric two-wheelers. The government has announced that the country would shift to an entirely electric public transport along with 30% electric private vehicles by 2030, lending a further push towards the goal of electrification [1]. Recent data collated by SMEV1 indicates that 54,800 electric two-wheelers and 1200 electric four-wheelers were sold in 2017–18. In terms of the total cars and two-wheeler sales, these figures translate into a miniscule proportion. Electric two-wheelers constituted an insignificant, 0.002%, in the entire two-wheeler sales in 2017–18. Similarly, electric cars formed a mere 0.0003% of the total car sales in India for the same financial year (FY). Considering the total market sales in FY 2016–17 were only 39,000 (electric two-wheelers and fourwheelers), India has certainly shown a progress towards electric vehicle adoption, but a slow one [2]. The sluggish growth as compared to the vision 1 Society of Manufacturers of Electric Vehicles, India numbers clearly indicates the presence of unforeseen challenges impeding the targeted electrification. There is a need to acknowledge that a quick transition, howsoever well-desired, might be challenging to achieve in the absence of a clear policy, limited understanding about technological challenges, infrastructural deficiencies, and lack of consumer acceptance and awareness in the Indian market. Quick technological transitions may also have negative externalities on the job markets. To enable faster adoption of electric vehicles, it is imperative to develop an understanding of these challenges. Against this background, TERI in association with the Society for Development Studies (SDS) proposes to undertake a research study and aims to bridge the vital gap between the expectations of the consumers and the industry actors vis-à-vis government policies, initiatives, and actions.

II. OBJECTIVE OF THE STUDY

1. To understand the mobility scenario in India.
2. To understand the role of electric vehicles in India's mobility scenario.
3. To estimate emission and energy impact of electrification of two-wheelers in India.
4. To understand perspective of consumers in electrification of two-wheelers.
5. To assess business feasibility and overall expected charging infrastructure requirement.
6. To understand industry's perspective in electrification of two-wheelers.
7. To identify suitable business and financing models for different electric vehicle segments.



III. RESEARCH METHODOLOGY

This study will mostly rely on literature review and various policies of India. Also, the current study will utilize earlier research on the subject and build upon the existing knowledge.

LIMITATION OF THE RESEARCH

Due to the practical and time constraints the research provides a review of EV based on the secondary data only.

POLICY FRAMEWORK SUPPORTING ELECTRIFICATION IN INDIA

❖ National Level Policies and Interventions

- 1. National Electric Mobility Mission Plan (NEMMP) 2020**
The National Electric Mobility Mission Plan (NEMMP) 2020, was launched in 2013 by the Ministry of Heavy Industries and Public Enterprises in order to promote the demand of environment-friendly electric vehicle technologies. The primary aim of the Plan was to provide financial and infrastructural support to electric vehicle technologies in India.
- 2. Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME - India), 2015 Phase 1**
The Ministry of Heavy Industries and Public Enterprises launched the FAME-India Scheme in April, 2015. The salient features of FAME India scheme are as under:
 - The scheme was launched for the initial two years of the 12th Plan period– Phase I (2015-17), which was further extended till March 2019.
 - The scheme had an outlay of Rs. 795 Crore under various plan heads for Phase I of the scheme, which was increased to Rs. 895 Crore due to the extension of Phase I.
 - The scheme covered all vehicle segments i.e. two, three, and four-wheelers, cars, LCVs, buses etc. and all forms of hybrid (Mild / Strong / Plug-in) and pure electric vehicles; the incentive on hybrids was withdrawn when the Scheme was extended after March 2017.
- 3. Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME - India), 2019 Phase 2**
The Government of India launched Phase-II of FAME or FAME-II in March 2019 with ten times the financial resources of FAME-I. FAME-II has an overall budget of Rs. 10,000 crore allotted for demand incentives, charging infrastructure and IEC activities. FAME-II deviates from its predecessor in the logic of demand incentive allocation. FAME-II is not based on the specific vehicle model but on the battery size. The scheme is mainly applicable to vehicles used as public transport.
- 4. National Energy Storage Mission, 2018**
In February 2018, an expert committee under the chairmanship of Secretary, Ministry of New and Renewable Energy, with representatives from relevant ministries, industry associations, research institutions and experts were constituted by the Ministry of New and Renewable Energy to propose draft for setting up National Energy Storage Mission (NESM) for India. The primary objective of the NESM is to strive for leadership in energy storage sector by creating an enabling policy and regulatory framework that encourages manufacturing, deployment, innovation, and further cost reduction. Furthermore, India's NESM has proposed three-stage solution approach, which is:
 - creating an environment for battery manufacturing growth
 - scaling supply-chain strategies
 - scaling of battery cell manufacturing
- 5. National Policy on Electronics, 2019**
The policy envisions positioning India as a global hub for Electronics System Design and Manufacturing – (ESDM) by encouraging and driving capabilities in the country for developing core components, including chip-sets, and creating an enabling environment for the industry to compete globally. The policy would indirectly affect technological advancements and innovation in the field of electric vehicles.

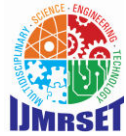
❖ **State-Level Policies:**

Table 1 : State-level EV policies and their targets

State	Targets
Karnataka Electric vehicle and Energy Storage policy 2017	<ul style="list-style-type: none"> • 1000 e-buses by 2030 • 100% three-wheelers / four-wheelers moving goods will be encourage to transit to electric mobility by 2030 • Incentives for first 100 fast charging stations
Telangana Electric Vehicle Policy Draft 2017	<ul style="list-style-type: none"> • Telangana State Transport Corporation to set a target of 100% electric buses by 2030 for intracity, intercity, and interstate transport • Government will set up first 100 fast charging stations in GHMC
Maharashtra's Electric vehicle and related infrastructure Policy	<ul style="list-style-type: none"> • Increase number of EVs registered in Maharashtra to 5 lakh • To generate an investment of Rs. 25,000 crore in EV
Uttar Pradesh Electric Vehicles Manufacturing Policy 2018	<ul style="list-style-type: none"> • Public Transportation – 1000 EV buses by 2030 • Private Transportation – State government will encourage electric 2-wheeler taxis for short distance mobility, and existing auto rickshaws will be encouraged to resort to EV technology • Goods Transportation – Further, to promote adaptability of EV in Goods transportation, EV-3 wheelers, 4-wheelers mini goods vehicles will be encouraged in GB Nagar, Ghaziabad, Agra, Lucknow, Kanpur, Varanasi
Kerala EV Policy	<ul style="list-style-type: none"> • 1 Million EVs by 2022 • Pilot Fleet of 200,000 two- wheelers, 50,000 three wheelers, 1000 goods carriers, 3000 buses and 100 ferry boats by 2020 • Part of Public Transport fleet of 6000 buses to be made electric by 2025
Tamil Nadu EV Policy	<ul style="list-style-type: none"> • Attract ₹50,000 crore in investments and create 1.5 lakh new jobs • 100 per cent road tax exemption for all types of EVs, capital subsidies, reimbursement of State GST, subsidy on land cost and special incentives for job-creating EV projects
Draft Delhi Electric Vehicle Policy 2018	<ul style="list-style-type: none"> • Battery Electric Vehicles (BEVs) 25% of all new vehicle registrations by 2023 • 50% of the public transport bus fleet zero emission by 2023

ISSUES FROM CURRENT POLICY AT NATIONAL AND STATE LEVELS

The shift to electric vehicles is a topic concerning areas of energy, technology, and transport. There are multiple ministries at the centre and departments at the State involved in improving the adoption of electric vehicles in India. The Ministry of Heavy Industries launched the scheme providing purchase subsidy to electric vehicles, The Ministry of Power published the mandatory guidelines for public charging infrastructure and the Ministry of Housing and Urban affairs released the model building bylaws which facilitated provisions for private charging infrastructure. The Ministry of Power mandated 5 different types of chargers in all Public charging stations installed after December 2018, when the publication was released. The mandatory charger requirement adversely affects the business feasibility of a public



charging station and put a halt into private players independently setting public charging stations. A coordinated effort from the central ministries and state departments with adequate feedback mechanisms for improving the policies will certainly aid in improving the adoption of electric vehicles in India.

POLICY SUPPORT REQUIRED FOR FASTER ADOPTION OF ELECTRIC VEHICLES

While governments can improve the demand from the consumers by purchase subsidies, they can help the manufacturers with tax exemptions and other policy support.

- The state governments can provide road tax for electric vehicles.
- The state departments may have a partial or full waiver of toll taxes.
- The state also has a significant role in establishing the charging infrastructure to nourish the effective adoption and usage of electric vehicles.
- At the city level, the government can discount the registration fee for EVs, facilitate faster registration and develop reserved/free parking spots for electric vehicles.

For the manufacturers, the Governments at the city, state, and national level can significantly aid in improving the adoption of electric vehicle.

- At the national level, the government can make long-term roadmaps to mitigate investment risks for OEMs and release more grants for R&D for improved domestic production of EVs and EV components.
- At the State level, the governments can aid in provision of land electric vehicle charging facilities and also subsidize the supply of electricity of such stations.
- At the City level, the land costs for charging stations could be brought down by concessions in municipality related taxes like property tax.

IV. CONCLUSION

The EV technology is costly and is still evolving. Therefore there is a general concern that a forced adoption might not be sustainable. Moreover the majority of EV value chain lies outside India. The forced adoption might therefore result in import of low quality products leading to erosion of industry's current global competitive advantage. This will pose huge risk to millions of jobs supported by this industry and GDP of the country.

Phase wise local EV manufacturing plan linked to financial incentives as laid out in FAME II is thus appreciated as the right path to mitigate this risk. Battery amounts to almost 40~50% of the EV cost. Localization of cell manufacturing will therefore help in reducing EV costs, and achieving self-sufficiency to ensure a sustainable EV growth. A national level strategy to secure critical raw material sources for cell manufacturing, and to incentivize local cell manufacturing through capital subsidy, favourable trade & FDI policies, and investment models such as PPP is need of the hour.

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