



ANALYSIS OF LOW-SPEED ELECTRONIC VEHICLES IN INDIA.

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ABSTRACT

This research aims to analyze the workings of low-speed electric vehicles in India. Low-speed EVs operated with a battery have a very influential market, as it is most useful for short distances. Covering substantial economic as well as environmental importance. With the world emphasizing reducing global warming and fostering sustainable development, EVs play a crucial role. EVs are eco-friendly with numerous advantages, like reaching the last mile of connectivity and encouraging sustainable development. Although being such a versatile EV India faces problems concerning its rules and regulations, specifically the low-speed EVs, which are the future. Its regulatory challenges include licensing, registration, insurance, and safety standards. The legal regulatory framework is inconsistent with the needs of the hour. A thorough understanding of various frameworks in India, like the FAME Scheme, and the Motor Vehicle Act, will provide a deeper understanding of the flaws in the recent system of frameworks. Also, analyzing the framework of different countries will provide useful insight into the betterment of the regulations. A new and robust framework can pave the way for a well-structured law, policies, safety standards, and infrastructural advancement.

Keywords: Low-Speed Electronic Vehicle, Economic and Environmental Benefits, Sustainable Development, Regulatory Challenges, Safety Standards.

INTRODUCTION

Firstly, before stating the benefits and barriers associated with the Low-speed Electric Vehicle, let's dive into understanding what it is. Low-speed electric vehicles are vehicles that have a speed limit between 25 to 70km/h, depending on the type of vehicle. They are operated with the help of a battery¹. They are lightweight and compact with a restricted speed limit. LSEV

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¹ Shriram General Insurance, 'RTO Regulations: Electric Bikes and Scooters' (11 April 2024) <https://www.shriramgi.com/article/rto-regulations-electric-bikes-scooters> accessed 24 Mar. 25

being environmentally friendly is a great vehicle as it eliminates the use of greenhouse gases as compared to traditional vehicles, which use these gases for internal combustion. With the rising pollution and its deteriorating effect on individuals as well as the planet, electric vehicles play a significant role in overcoming this issue, as it being cost-effective plus environmentally friendly. LSEVs being in the criteria of electric vehicles poses a major economic opportunity, also to the manufacturers with low cost of production and government incentives, and commuters by providing them with an economical vehicle which is incentivized as well as sustainable. In a country like India, which is cost cost-conscious market, EVs generally have a greater market base. India's e-mobility ecosystem can be enhanced with the proliferation of the LSEVs.

Taking into consideration the low-speed electric vehicle is a short-distance travel vehicle that generally operates within the speed of 20-25km/h² and has numerous contributions toward environmental sustainability. Firstly, it reduces the emission of greenhouse gases in the atmosphere, improving air quality. They don't emit gases such as nitrogen oxides (NOx) and other particulate matter into the atmosphere, as compared to conventional vehicles, which operate on different types of fuels such as diesel and petrol. The use of EVs can mitigate the greenhouse gas effects. LSEVs being operated with a battery, and constructed with light materials for low speed use less energy as compared to conventional vehicles. LSEVs and EVs in general use renewable energy, which makes them sustainable for the planet. LSEVs reduce the reliance on natural and non-renewable energy sources, making it friendly from energy energy-intensive and contributing towards sustainability. LSEVs are suited for short-distance commutes within urban neighbourhoods, business centres, or industrial parks. They can contribute to less traffic congestion and parking in urban planning.

Although LSEVs have significant environmental advantages concerning on-road usage, it is imperative to evaluate their entire lifecycle, including production and disposal. Electric vehicles, in general, generate fewer greenhouse gases and pollutants throughout their lifetime compared to conventional fuel-powered cars. Although emissions from manufacturing may be higher, the long-term reduction in operational emissions more than compensates for this impact. LSEVs are an environmentally friendly mode of transport for short distances with the added benefits of fewer emissions, decreased energy consumption, and smaller environmental

² The Central Motor Vehicles Act 1989 (IND).

impact. To ensure their maximum sustainability value, though, there should be clean sources of energy for charging and practices for responsible end-of-life vehicle management.

REGULATORY INCONSISTENCIES AND CHALLENGES IN LSEV ADOPTION

There are many advantages of LSEVs, yet regulatory inconsistencies and ambiguities in the law. One such main challenge lies in their indeterminate classification under current motor vehicle laws. Most states, as well as India, have LSEVs trapped in a middle ground between electric bicycles, three-wheelers, and full-scale electric vehicles, creating inconsistencies across registration, insurance, and licenses. One of the main concerns about LSEVs is that they are not well defined in statutes. Other concerning issues follow from the first issue only because they are not well defined, leading to lower safety standards while manufacturing as well as while using it. There are no stringent standards to regulate their work, making it a limited scope for mass use.

In India, the regulation of low-speed electric vehicles (EVs) is primarily governed by the Central Motor Vehicles Rules (CMVR), 1989³, which is established under the Motor Vehicles Act, 1988⁴. These regulations define specific criteria for certain electric vehicles to be exempt from standard requirements such as registration and the necessity for a driving license. Low-speed electric two-wheelers (e-2Ws) in India, classified as Non-Motorised Vehicles (NMVs), are currently exempt from various important criteria such as registration, licensing, helmet usage, and insurance requirements. This category, initially reserved for bicycles and rickshaws, now encompasses electric two-wheelers with motors of up to 250 watts and a top speed of 25 km/h, as clearly stated in the acts. Although these exemptions were made to encourage electric mobility, they have given rise to numerous safety and compliance issues. One of the key issues is the absence of helmet use by riders. As there is no legal requirement, most users do not wear helmets, even though manufacturers such as PureEV⁵, which includes free helmets with every purchase. Moreover, these low-speed electric vehicles are now used for commercial purposes by various delivery agents to deliver a product within the local limit of deliveries, but outside the ambit of existing transport legislation. Another increasingly growing issue is their use by

³ The Central Motor Vehicles Act 1989 (IND).

⁴ Government of India, *Motor Vehicles Act, 1988* (updated 2019)

⁵ EV Reporter, 'Low-Speed EVs: Safety Concern?' <https://evreporter.com/low-speed-evs-safety-concern/> accessed 24 Mar. 25.

minors, especially for micro-mobility products, which has led to safety hazards.⁶ Two-wheeler riders caused 36.5% of total road accident deaths in India in 2018, with 55,336 reported deaths.⁷ The lack of helmet regulations for low-speed EV occupants makes them more susceptible to serious injuries and death. A further key concern is the lack of insurance coverage for these vehicles. Because NMVs are not eligible for the FAME II subsidy, which is needed with more advanced battery technology and greater performance, owners have few financial incentives to take out insurance. Some manufacturers have teamed up with insurance companies to provide coverage, but buying insurance is still voluntary for consumers. This optional insurance creates concerns over liability and financial protection during accidents. As electric two-wheelers become more popular, these safety and regulatory concerns become more critical. The government may be forced to implement stronger regulations, including compulsory helmet-wearing and insurance coverage, to ensure the safety of both riders and other road users. Encouraging responsible usage through public awareness campaigns and appropriate legal measures could help mitigate the risks associated with low-speed electric vehicles.

Taking into consideration the working of other countries:

China's Ministry of Industry and Information Technology (MIIT)⁸ Has released a draft of revised national standards for pure electric passenger vehicles for seeking public feedback. A significant aspect of this draft is the classification of mini low-speed electric vehicles (LSEVs) as a special category of passenger battery electric vehicles (BEVs). The newly proposed standards describe certain constraints on dimensions, curb weight, and other aspects of mini LSEVs. Importantly, MIIT is stressing that mini LSEVs should satisfy identical safety guidelines for regular passenger BEVs. As soon as the revisions become definitive, MIIT and relevant authorities intend to cover mini LSEVs with existing passenger car rules. Mini LSEVs are four-wheeled electric cars with a maximum of four seats and a speed limit below 70 km/h. They have become popular in China's lower-tier cities and rural areas, with sales exceeding one million units per year in recent years. They have, however, long been in regulatory limbo, deviating from existing passenger vehicle norms. As a result, owners are neither frequently unable to secure vehicle licenses, nor are they permitted to possess driving licenses to drive

⁶ EV Reporter, 'Low-Speed EVs: Safety Concern?' <https://evreporter.com/low-speed-evs-safety-concern/> accessed 24 Mar. 25.

⁷ EV Reporter, 'Low-Speed EVs: Safety Concern?' <https://evreporter.com/low-speed-evs-safety-concern/> accessed 24 Mar. 25.

⁸ Seneca ESG, 'China's Ministry of Industry and Information Technology (MIIT) Seeks Public Opinion on Revised LSEV Standards' <https://search.app/eHbNAYtCzv4u19fBA> accessed 24 Mar. 25.

these vehicles. This regulatory confusion has enabled numerous mini LSEVs to evade strict technical requirements, resulting in drastic differences in quality. From 2013 to 2018, an estimated 830,000 traffic accidents involving mini LSEVs took place across the country, causing 18,000 deaths and 186,000 injuries. The new standards are designed to raise the quality of mini LSEVs and lower associated accidents by placing them on an equal regulatory footing with passenger BEVs. At present, there are not many domestic mini LSEV makers that satisfy passenger vehicle safety standards. To adapt to the new amendments, businesses must undergo safety checks and acquire new energy vehicle (NEV) manufacturing qualifications, which is a stringent threshold that may weed out many substandard producers from the market. With the huge potential of the mini LSEV market being recognized, mainstream BEV producers are entering the arena, boosting competition and forcing incumbents to enhance their offerings. For example, in late 2020, SAIC-GM Wuling rolled out its mini EV model, which reached monthly sales of 29,000 units by May 2021, leading domestic BEV sales lists.⁹

INDIA'S EFFORTS TO PROMOTE ELECTRIC MOBILITY (FAME SCHEME)

The Government of India initiated the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME)¹⁰ scheme under the National Electric Mobility Mission Plan (NEMMP) to promote the adoption of electric mobility. The initial phase, FAME-I¹¹ (2015–2019), had a budgetary outlay of ₹895 crores and primarily dealt with demand incentives for electric two-wheelers, three-wheelers (e-rickshaws), four-wheelers, and electric buses. The phase also had the goal to facilitate technology development, pilot projects, and the creation of charging infrastructure. Subsidies were offered based on battery capacity at ₹10,000 per kWh, which encouraged early adoption. Nevertheless, the effect of FAME-I was still restricted because of poor charging networks, sluggish policy implementation, and no incentives for commercial fleets. Acknowledging these limitations, the government launched FAME-II in 2019 with a much larger budget of ₹10,000 crores, running until 2024. In contrast to the initial phase, FAME-II concentrated on the large-scale adoption of EVs in public and shared transport sectors, to enable 7,000 electric and hybrid buses, 500,000 electric three-wheelers, 55,000 electric four-wheeler passenger vehicles, and 1 million electric two-wheelers. Incentives in this phase were directly tied to localized production, to ensure that only EVs with Made-in-India

⁹ Seneca ESG, 'China's Ministry of Industry and Information Technology (MIIT) Seeks Public Opinion on Revised LSEV Standards' <https://search.app/eHbNAYtCzv4u19fBA> accessed 24 Mar. 25

¹⁰ Government of India, Ministry of Heavy Industries, *FAME-II Scheme Guidelines* (2023).

¹¹ Government of India, Ministry of Heavy Industries, *FAME-I Scheme Guidelines* (2015).

components and batteries were eligible for subsidies. Also, the development of charging infrastructure took centre stage, with 2,636 charging stations authorized in 62 cities and a long-term goal to set up charging stations every 3 km in cities and every 25 km on highways. Even with all these efforts, FAME-II does not have the specific coverage for low-speed electric vehicles (LSEVs), and hence it leaves a regulatory void. Electric three-wheelers (e-rickshaws) are provided by the Government of India, Ministry of Heavy Industries, FAME-II Scheme Guidelines (2023). Government of India, Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India (FAME I) Scheme (Ministry of Heavy Industries, 2015). Government of India, Ministry of Heavy Industries, FAME-II Scheme Guidelines (2023)¹². Government incentives and small four-wheeled LSEVs continue to be mainly excluded from subsidy benefits, thereby deterring them as choices for consumers and producers. LSEVs, usually characterized as four-wheeled electric cars with velocities lower than 70 km/h, can be cost-effective, environmentally friendly mobility options for cities, last-mile connectivity, and shared transport use. However a lack of subsidies and regulatory certainty has caused uncertainty in the market and more sluggish adoption levels. To fill this gap, the government can modify FAME policies to cover LSEVs, encourage their inclusion in urban mobility schemes, and provide suitable charging facilities. Widening incentives to small electric four-wheelers can stimulate increased private investment and local manufacturing innovation, aiding India in having a more inclusive and extensive EV shift.

Specific legal frameworks have been set up by several countries to govern Low-Speed Electric Vehicles (LSEVs), aiming for safety and standardization.

China: The Largest LSEV market in the world, China, promulgated the national standard GB/T 28382-2012¹³, entitled "Battery Electric Passenger Cars—Specifications. GB/T 28382-2012 specifies terms, definitions, technical requirements, and test methods for battery electric passenger cars with a capacity of up to five persons. It prescribes requirements including power output and safety standards, offering explicit regulations for manufacturers and consumers.

¹² Government of India, Ministry of Heavy Industries, *FAME-II Scheme Guidelines* (2023).

¹³ Standardization Administration of China, 'GB/T 28382-2012: Technical Conditions for Low-Speed Electric Vehicles' (Chinese Standard, 2012) <https://www.chinesestandard.net/PDF.aspx/GBT28382-2012> accessed 24 Mar. 25.

United States: The National Highway Traffic Safety Administration (NHTSA)¹⁴ Categorizes LSEVs under specific regulations. NHTSA changed the definition of "low-speed vehicle" in 2006 to include those with a Gross Vehicle Weight Rating (GVWR) of below 1,361 kilograms (3,000 pounds). These vehicles come under Federal Motor Vehicle Safety Standards (FMVSS) adjusted according to their category, which makes them fit suitable safety requirements and are confined to lower-speed roads.

European Union: The regulatory system in the EU encompasses light quadricycle categories L6e and heavy quadricycle category L7e¹⁵, respectively. These categories offer organized legal recognition of LSEVs, with definite technical requirements and safety standards for ensuring their safe incorporation into the transport system.

These specialized legal regimes in China, the United States, and the European Union enable the safe and regulated use of LSEVs and encourage their uptake while maintaining public safety. By implementing best practices from these templates, India can enhance its LSEV regulations to enable more distinct classification, safety standards, and infrastructure growth, ultimately boosting LSEV adoption in an organized manner.

CONCLUSION

LSEVs provide a viable solution to urban mobility problems, with environmental sustainability, affordability, and energy efficiency. Nevertheless, their large-scale adoption in India is hampered by regulatory hurdles such as ambiguous classification, absence of safety standards, and poor infrastructure support. Although government policies like the FAME scheme have driven EV uptake, LSEVs are left in a policy void, which requires immediate regulatory reforms. A comparative review with international frameworks points to successful regulatory frameworks of China, the U.S., and the EU, which India may use to establish a well-defined, systematic policy for LSEVs. By filling these regulatory loopholes, India can unlock the maximum potential of LSEVs, leading to cleaner, more efficient urban transport and sustainable mobility objectives.

¹⁴ US Department of Transportation, 'Federal Motor Vehicle Safety Standards; Low-Speed Vehicles' (*Federal Register*, Vol 71, No 75, 19 April 2006) <https://www.federalregister.gov/documents/2006/04/19/06-3590/federal-motor-vehicle-safety-standards-low-speed-vehicles> accessed 24 Mar. 25.

¹⁵ European Commission, *Regulation (EU) No 168/2013 on the Approval and Market Surveillance of Two- or Three-Wheel Vehicles and Quadricycles*.