EV AND THEIR FUTURE IN INDIA

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INTRODUCTION

The concerning impact of climate change associated with global warming, heating up of the atmosphere, intense deforestation, and massive carbon emissions is nothing new to mankind. With every passing year global carbon emissions are rising tremendously which is having a cascading effect on our planet. The specific issue of carbon emissions is significant, compared to the other factors involved in the above-mentioned scenario, predominantly because of its direct link with the global greenhouse effect. When we discuss the harmful effect that excess carbon emissions have on our planet, we need to critically understand how it affects the planet. Carbon dioxide is a major greenhouse gas in our atmosphere which helps to keep the planet warm to prevent the freezing of the global surface. However, by adding more carbon dioxide to the atmosphere, there are unprecedented repercussions that follow such as the rising temperature of the earth's temperature, beyond controllable levels. Furthermore, the according to the observations by the NOAA Global Monitoring lab in 2021, carbon dioxide was the dominant cause behind two-thirds of the total heating influence of human-induced greenhouse gasses. Even the ramifications of the excess rise in carbon emissions are also felt in the oceans, due to the acidification of the ocean, when the carbon dioxide gets dissolved in the ocean, thereby increasing the pH from 8.21 to 8.10, thus rendering the oceans inhabitable for certain marine species.

HOW TRANSPORTATION AIDS CARBON EMISSIONS

One of the biggest contributors to carbon emissions today is the transportation sector. Based on the data from the U.S. Greenhouse Gas Emissions and Sinks 1990–2021 (the national inventory that the U.S. prepares annually under the United Nations Framework Convention on Climate Change), transportation accounted for the largest portion (29%) of total U.S. GHG emissions in 2021.[1] Cars, trucks, commercial aircraft, and railroads, among other sources, all contribute to transportation end-use sector emissions. Although this data

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[1] 'Carbon Pollution From Transportation' (EPA, MAY 11,2023) <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions> accessed 25 May,2023

represents the scenario in the US, this is a global phenomenon wherein almost all developed as well as developing countries contribute to global carbon emissions.

The major component that causes this emission is the combustion of fossil fuels comprising gasoline and diesel, which release carbon dioxide into the atmosphere. This excess Carbon dioxide, along with other greenhouse gases such as methane (CH4), nitrous oxide (N2O), and hydrofluorocarbons (HFCs) causes the Earth's atmosphere to warm, resulting in changes to the climate drastically, causing changes in the climate. Thus, to protect the environment, a massive change needs to be brought in the transportation sector, essentially by embracing the new generation of Electric Vehicles, which are a better alternative compared to transport based on fossil fuels.

HOW ELECTRIC VEHICLES CAN POTENTIALLY HELP THE ENVIRONMENT

The benefit of having electric cars over other motor vehicles needs to be understood from the difference between the two methods of transportation. ELECTRIC VEHICLES are meant to be a utilitarian means of transportation that would reduce emissions, due to the absence of fossil fuels for running the cars, and would also improve the air quality, and carbon dioxide emissions, and even reduce noise pollution inadvertently. Furthermore, it is estimated that just one electric vehicle on the road can save an average of 1.5 million grams of CO2, which is the considerable equivalent of4 return flights from London to Barcelona.[2] However, the predominant concern that arises is related to the high amount of energy required to produce an electric vehicle. Compared to cars that run on fossil fuels, more energy is required in the production of an electric vehicle, due to the production of lithium-ion batteries. However, with persistent research and development involved in creating more sustainable means of generating electric vehicles, and adopting techniques such as battery swapping, re-usage of old batteries, and recycling of components of the vehicle, in the near future, even the potential emissions could reduce. This is also evident from the fact that major national and international Car manufacturers such as AUDI, BMW, HYUNDAI, etc. are prioritizing the production of Electric vehicles for the consumption of customers. Even major global powers

[2] 'Benefits of electric cars on the environment' (edfenergy.com)https://www.edfenergy.com/energywise/electric-cars and environment#:~:text=With%20no%20tailpipe%2C%20pure%20electric,be%20for%20pedestrians%20and%20cyclists accessed 26 May,2023

are providing benefits and tax concessions to both companies and customers for adopting the usage of Electric Vehicles.

EV MARKET IN INDIA (CURRENT POSITION AND GOVERNMENT SCHEMES)

The current electric vehicle market in India was expected to be to, be around 7,025.56 million in 2021, and is anticipated to have grown to be around 30,414 million by 2027, registering a 28.93% CAGR in terms of revenue. However, another major factor that needs to be considered is that apart from the vehicle market, other components are also equally growing, thus making it a potentially lucrative segment that would be resourceful both for the economy as well as the environment alike. The Indian government has a favorable stance when it comes to electric vehicles, such that the recent laws are prioritizing the usage and production of electric vehicles. Not only the central government but also the state governments are also taking measures to implement the mass usage of electric vehicles at least in the government sectors.

NOTABLE INSTANCES OF ADOPTION OF EVs BY THE STATES

1) UP GOVERNMENT EV SCHEME

To boost the usage of electric vehicles, Yogi Adityanath's Uttar Pradesh government has introduced a newer policy aimed at converting the government vehicles in all the government sectors into Electric Vehicles in a phased manner by 2030. Through this target, the Uttar Pradesh government can potentially be the first major state to have 100 percent EV in government departments in the country. Notably, to encourage EV vehicles in the state the government notified the Uttar Pradesh EV Manufacturing and Mobility Policy of 2022, under which the government has provided an exemption from road tax and registration fees for 3 years on the purchase of an EV. Even provisions have been made to allow the purchase of EVs from government agencies like Rajasthan Electronics Instrument Ltd based on the nomination without tender. Such major policies would surely impact the adoption of Electric Vehicles among the general public and also raise awareness about their efficacy and sustainability.

MAJOR POLICY INITIATIVES

The major policy initiatives have always been aimed at improvising the current position of the EV industry. The major policies are-

FAME-I SCHEME[1st April 2015 to 31st March 2019] - Faster Adoption and Manufacturing of Hybrid& Electronic Vehicles in India(FAME INDIA)was developed in 2015 to promote the production of electric vehicles and to ensure technological advancements in sustainable technology.

FAME-II SCHEME[1st April 2019 to 31st March 2024] - The Fame II scheme aims to create demand for the adoption of electric vehicles within the country. Furthermore, it also attempts to include sustainable public transport and charging infrastructure.

PRODUCTION LINKED INITIATIVE (PLI) SCHEME - THE PLI scheme is another major initiative that Aims to generate change in the Indian automobile sector, and its predominant objective is to improve the manufacturing capabilities for Advanced Automotive products (AAP). Thus, the aim of this scheme is concentrated on generating sustainable employment, removing economic constraints, and establishing a resilient supply chain for the country. Another part of this scheme involves a program, with a sales value link, the Champion OEM Incentive is available for all battery electric vehicle (BEV) and hydrogen fuel cell vehicle sectors. This component offers a financial incentive that ranges from 13 to 18%. Any other innovative automotive technology vehicle listed by the Ministry of Heavy Industries is also covered.

VIABLE MEASURES HAVE BEEN INCORPORATED, TO BOOST THE ELECTRIC VEHICLES INDUSTRY IN THE COUNTRY

To generate interest within the general public regarding the adoption of electric vehicles, apart from schemes and incentives, certain critical policy measures have also been incorporated to persuade the usage of electric vehicles in large numbers. The primary objective of these measures, comprises the benefits of cost reduction in the purchase and registration of electric vehicles, providing exclusive incentives only to those customers who

are willing to purchase an electric vehicle, to prioritize the massive usage of Electric vehicles. These measures are-[3]

1)The GST on electric vehicles including both 2-wheelers and 4-wheelers been decreased from 12% to 5% and from 18% to 5%, for chargers and charging stations, respectively.

2) A notification regarding charging infrastructure standards for private charging at homes and workplaces, by the Ministry of Power.

3) The Ministry of Road Transport &Highways(MoRTH) declared that the battery-operate vehicles will receive green license plates and will be exempted from permit requirements, to ease the process of acquiring an electric vehicle over a normal fuel-based vehicle

4)The Ministry of Road Transport and Highways [MoRTH] has issued a letter advising states to exempt EVs from road taxes, lowering the initial cost of EVs. This is a very ingenious move since people prefer cars and vehicles having lower initial costs. One of the most effective strategies that can be employed to streamline the process of acquiring an electric vehicle is to lower the constraints of high expenditure in acquiring one, through tax benefits, easy documentation procedures, and concessions in terms of other economic costs associated with the vehicle.

5) India has two strategies aimed at buyers and manufacturers, under which the government offers $1.4 billion in subsidies to buyers and imposes a hike on import tariffs to promote domestic manufacturing. Also, Energy Efficiency Services Limited (EESL) is procuring 10,000 EVs from manufacturers for distribution to government departments on a rental model and upfront sales. EESL's tender of 10,000 EVs aims to reduce the upfront cost of EVs substantially.

6) Technology Platform for Electric Mobility (TPEM), which will be principally financed by the Department of Heavy Industry (DHI), will create technologies and products, give some of the electric mobility technologies a competitive edge globally, and sufficiently boosts industrial technological capabilities.

[3]King Stub and Kasiva 'Electric Vehicle Industry in India: Regulations and road ahead'(ksandk, 25 October,2022)https://ksandk.com/automobile/electric-vehicle-industry-in-india-rules/ accessed 26 May,2023

7) The National Electric Mobility Mission Plan 2020 (NEMMP) was launched in 2012 to improve national fuel security via the promotion of EVs and hybrids. Furthermore, the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme provides incentives for the purchase of EVs. The Phase II of the scheme that began in 2019 offers incentives ranging from Rs 1,800 to Rs 29,000 on electric two-wheelers, and up to Rs 1.38 lakh for cars.

8) The Battery Swapping Policy was one of the budget 2022's major announcements. Simply put, a battery swapping station will enable an electric vehicle (EV) owner to quickly swap out a dead battery for a charged one. This is a very crucial step as a significant concern that is often raised in terms of the process involved in recycling old batteries with new ones.

CONSTRAINTS THAT PERSIST AND NEED TO BE ADDRESSED

In a developing country like India, adopting anything new in the first instance is a challenge for a lot of the countrymen. The entire Electric vehicle industry is a massive opportunity yet, there are prevailing constraints that are binding its potential, from getting people's acclaim.[4] These issues coupled with certain pre-conceived notions causing a sense of apathy within the masses is a major hurdle for the Indian masses. These problems are-

LACK OF CLEAN SOURCE OF ENERGY - The major source of energy used to generate electricity in India is still coal. This single non-renewable source of energy accounts for nearly one-third of all the energy-producing sources in India. 310 million tonnes of coal is required in India annually to meet the electricity requirement of the nation. Now even if the government decides to implement the mass usage of EVs in India, the vast amount of coal that will be required to produce electricity to run these vehicles would defeat the predominant motive behind the use of electric vehicles, i.e., to reduce the usage of energy sources resulting in massive amounts of carbon emissions.

UNDEVELOPED CHARGING INFRASTRUCTURE IN INDIA - Another major hurdle currently faced by Indian customers primarily is the lack of adequate charging facilities across the countries. Currently, there are 934 charging stations, most of which are located mainly in urban areas. Moreover, EVs require different charging and maintenance,

[4] 'The Future of Electric Vehicles in India: Opportunity and Challenges' (bolt.earth, 10 February,2023) https://bolts.earth/blog/future-electric-vehicles-india accessed 26 May,2023

infrastructure that the country currently lacks, and thus huge capital investments are required to provide to establish fuel stations, at least in the fuel stations already existing in the country. To work on this problem, the Ministry of Power is working to provide incentives to build EV charging stations along with several private entities that are also working to achieve the same goal.

INADEQUATE BATTERY TECHNOLOGY - The major constraint in an EV is the limited range of distance it can cover in a single fully charged battery. Compared to global competitors, the battery technology is still in a nascent stage. The cars are heavier, the batteries are small and their capacity is also less, and the only solution required to solve this problem is through capital investments in the research and development of lightweight batteries, that have increased capacity, and are sustainable, which is a tremendously difficult task in reality.

GENERAL APATHY AMONG THE BUYERS - A huge section of potential vehicle buyers has the preconceived notion that EVs are not a reliable source of transportation. Because of the huge range of already available options in terms of fuel-based cars in the Indian Automobile market, based on the financial capability of the buyer, people still give preference to fuel-based vehicles over Electric Vehicles. To add to this problem, another crucial drawback is the higher price of buying an electric vehicle. To solve the problem, huge tax benefits, a different range of attractive options, and easy financing options should be provided to the customers so that the people feel intrigued by the vast array of choices available to them.

CONCLUSION

To critically resolve these aforementioned issues a different approach needs to be incorporated. The Indian customers' need is different when it comes to buying any automobile in general. Not every Indian Family has the requisite financial ease of buying an Automobile. In such a scenario, approaching even the potential buyers with a comparatively costlier option of an Electric Vehicle would be a futile waste of time. However, this doesn't inherently mean that Electric Vehicles would be a complete waste. A systematic approach needs to be implemented to first deal with the prevailing constraints first, rather than mere marketing of electric vehicles as an alternative source of Transport.

To solve the issue of coal, other renewable sources of energy such as solar or geo-thermal-based electricity should be used. More collaboration with global automobile manufacturers can be a possible solution to the problem of limited technology and infrastructure for mass production. Another potential mechanism should be to give preference to Indian automobile manufacturers through direct concessions, in taxes so that they can invest more in the research and development of their electric vehicles.

And to solve the apathetic attitude of the Indian masses, first Electric Vehicles should be deployed and used regularly in the major as well as minor government sectors such as police cars, armed forces, or automobiles used by higher executives such as ministers and politicians, this would itself be an easy and cost-effective way of marketing in itself. Thus there is a lot of untouched potential in the Electric Vehicle Industry in our country, such that with the right policy measures and support from the government as well as the consumers, it will emerge as a thriving and significant industry in the upcoming future.