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Impact and Challenges to Adopting Electric Vehicles in developing countries – a case study in India

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Abstract

Climate change is one of the current threats the world is facing. Pollution is the primary factor causing climate change in which air pollution plays a major part. Almost all developed and developing countries emit a lot of greenhouse gases (GHG). The transportation sector is responsible for the majority of GHG emissions. Nowadays, almost all nations make an effort to lower CO2 emissions from transportation. India also has a strategy to achieve zero emissions through several programmes. When considering ways to lower GHG emissions from the transportation sector, electric vehicles (EVs) are the first choice that comes to mind. The main goal of this case study is to identify why and how India is having trouble launching EVs. India faces significant obstacles in the areas of infrastructure, electricity, battery technology, and consumer behaviour. India already has the infrastructure necessary for the general usage of fuel-powered automobiles. Suddenly changing to another technology and expecting to complete the requirement is a little problematic in emerging nations like India. The majority of electric vehicles (EVs) use lithium-ion batteries, and India is in a position to buy these batteries from other nations. As a result, the battery is a little expensive in India. Nothing is difficult to overcome the barriers compared to the benefits of EVs. In conclusion, this study makes several recommendations for eliminating the barriers to India's EV adoption.

Keywords: Electric Vehicles (EVs), Benefits of Electric Vehicles, Challenges to adopting Electric vehicles, Future of EVs in India, EV Case study, Transport

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1. Introduction

India is the world's second most populated country and the world's leading consumer of goods and real estate. India can provide vast amounts of resources for the world because it is a developing country with huge workforce. Transport is critical in the manufacturing and production of goods to meet the needs of people all over the world. In the last four financial years (2019-2022), 149,875,389 new vehicles were registered [1] among 1,406,199,041 (1.4) billion persons, resulting in a 10:1 vehicle registration ratio. Details of registered automobiles in the past four financial years are provided in Fig. 1. All of these vehicles run on fossil fuels, which results in CO2 emissions of 2.63 billion tons in 2019 and 2.44 billion tons in 2020 [2]. Because of the pandemic's full lockdown, CO2 emissions in 2021 and 2022 cannot be addressed in this study. In 2017, 12 lakh people perished in India as a result of high levels of air pollution [3]. The government has taken several initiatives to reduce pollution. One notable example is the Karnataka state government's "Less Traffic Day" programme [4], which encourages people to take public transportation on the second Sunday of the month to minimise CO2 emissions. Another example is the Delhi government's "odd-even scheme," which regulates the use of motor vehicles. The driver who disobeys the scheme is subjected to a heavy fine of Rs.20,000 [5].

A hundred initiatives announced by the Indian government have also failed to reduce pollution. However, technology is bringing positive changes to the automobile industry. The introduction of electric vehicles (EVs) gradually reduces air pollution and increases the benefits for society. In general, adopting new technology is difficult for developing countries compared to developed countries. The purpose of this paper is to examine how India, a developing nation, struggles to adopt modern technology, namely electric vehicles. Electric vehicle advantages outweigh their adoption struggles on a par. In order to address the difficulties, certain

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