


Chapter 13


Study on Environmental and Social Impacts Through Electric Vehicles

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ABSTRACT

Transitioning to electric vehicles (EVs) can significantly reduce environmental and social impacts, improve air quality, and enhance social equity, with higher energy efficiency when integrated with renewable sources. Electric vehicles significantly

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improve urban air quality by reducing pollutants, reducing respiratory and cardiovascular diseases, and enhancing the quality of life in urban areas through quieter operation. Electric vehicles (EVs) are gaining popularity due to their social benefits, such as improved public health, economic opportunities, and potential to address social equity issues. The chapter explores the necessity of charging infrastructure, sustainable battery materials, and consumer adoption barriers for transitioning to a sustainable transportation system, suggesting potential solutions through policies and innovative technologies. The chapter highlights the transformative impact of electric vehicles on environmental sustainability and social equity, suggesting that leveraging their advantages can lead to a cleaner, healthier, and more equitable future.

INTRODUCTION

The transportation sector significantly contributes to global greenhouse gas emissions, causing climate change and environmental degradation. Traditional ICE vehicles release CO₂, NO_x, and PM, causing global warming and air quality degradation. These contaminants are hazardous to health, particularly in crowded metropolitan environments. As electric vehicles (EVs) gain greater traction, they provide a viable way to lessen these negative effects on the environment, meeting the pressing need to solve these environmental issues (Hawkins et al., 2012).

When compared to fossil fuels, electric vehicles (EVs) are a greener option that improve public health by lowering urban air pollution. Compared to conventional cars, they are more energy-efficient and transfer a greater amount of energy from the power source to propulsion. Electric vehicles (EVs) can propel civilization toward a more sustainable future when paired with renewable energy sources like solar and wind. The transportation industry is made more sustainable overall when renewable energy is integrated into EV charging infrastructure, hence lowering the carbon footprint associated with vehicle operating (Vidhi et al., 2021).

The switch to electric vehicles (EVs) has positive effects on the environment and the economy. By encouraging innovation and generating jobs in the manufacturing, infrastructure development, and technology sectors, the EV industry may stimulate economic growth. By lowering reliance on fossil fuels, EVs improve energy stability and security. They are in line with international agreements to cut carbon emissions, such the Paris Agreement, which aims to keep global warming to less than 2 degrees Celsius over pre-industrial levels. For nations all throughout the world, this change represents a strategic economic opportunity (Omahne et al., 2021).

Challenges to the broad adoption of electric vehicles (EVs) include the need for large investments in the infrastructure necessary for charging them, worries about the sustainability of resources and the environmental impact of battery manufacture,

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