

## ELECTRIC VEHICLE MISCONCEPTIONS AND CHALLENGES IN INDIA – A TECHNICAL REVIEW

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### ABSTRACT

Transportation is vital for developing nations, driving trade, industry, and economic growth. With rising global demand for green mobility, EVs are gaining traction in India due to government support, tech progress, and environmental awareness. However, misconceptions persist about their full environmental impact. This article examines EV-related emissions and adoption barriers, analysing lifecycle emissions—battery production, power generation, and disposal. Despite rising EV use, only 23% of India’s electricity is renewable, and up to 90% of batteries face improper recycling, potentially worsening pollution. The study aims to inform stakeholders, correct myths, and guide India toward sustainable transportation.

**Keywords:** Electric Vehicles, Green Energy, Environmental pollution, EV battery, Emission.

### 1. INTRODUCTION

Since most vehicles are powered by internal combustion engines, transportation is essential for economic growth in developing nations. But in order to guarantee sustainable transportation development, growing worries about emissions, fuel prices, pollution, and energy security are propelling a global movement toward cleaner, more effective substitutes like biofuels and cutting-edge technologies. Transportation is responsible for 23% of greenhouse gas emissions [1]. Rapid development and transportation are major contributors to the global problem of environmental pollution. Internal combustion engines power more than 99.9% of the 1.2 billion cars currently on the road, and by 2040, that number is predicted to increase to 2 billion. These engines emit harmful pollutants such NO<sub>x</sub>, CO, CO<sub>2</sub>, HC, and PM [2]. Transportation accounts for 7 billion tons of CO<sub>2</sub> emissions annually, or 20% of the world's energy consumption [3], [4]. It is responsible for 28% emissions of the greenhouse gas in the United States [3]. Many countries have adopted stringent emission standards, such as US, EU, and Bharat norms, in response to the serious environmental and health problems caused by these emissions [5]. One of the such emission standard is shown in table 1.1 and is followed by various countries. Researchers advocate pollution control technologies like diesel particulate filters and selective catalyst reduction to curb vehicular emissions [7]. Alternative fuels such as ethanol and LPG offer promise but face production and availability limitations, contributing just 5% of transport energy [3]. EVs emerge as a key sustainable solution globally, with India at the forefront of adoption [8], [3].

Table 1.1: European Union (Euro standards) for heavy-duty vehicles [1, 6].

	CO (g/kWh)	HC (g/kWh)	NO <sub>x</sub> (g/kWh)	PM (g/kWh)
<b>Euro - I</b>	4.5	1.10	8.0	0.61
<b>Euro - II</b>	4.0	1.10	7.0	0.15
<b>Euro - III</b>	2.1	0.66	5.0	0.13
<b>Euro - IV</b>	1.5	0.46	3.5	0.02
<b>Euro - V</b>	1.5	0.46	2.0	0.02