

# Electric Vehicle Technology and Charging Infrastructure

Palak Rai<sup>1</sup>, Kabir Sansare<sup>2</sup>, Atharva Nikam<sup>3</sup>, Yash Bhattad<sup>4</sup>, Aditya Shirsath<sup>5</sup>  
Guru Gobind Singh Polytechnic, Nashik, Maharashtra, India

**Abstract:** *The transition to electric vehicles (EVs) represents a significant step towards sustainable transportation, addressing concerns over greenhouse gas emissions and fossil fuel dependency. This paper explores the advancements in electric vehicle technology, including battery efficiency, energy management systems, and vehicle performance. Additionally, it examines the current state of charging infrastructure, highlighting the challenges and opportunities for expansion, standardization, and integration with renewable energy sources. A comprehensive analysis of EV adoption trends, government policies, and industry innovations is presented to identify gaps and propose solutions for creating a robust and accessible charging network. The paper concludes with a discussion on future directions for EV technology and infrastructure, emphasizing the need for global collaboration and investment to enable a cleaner and more efficient transportation ecosystem.*

**Keywords:** Electric vehicles, charging infrastructure, battery technology, renewable energy, vehicle-to-grid (V2G), sustainability, smart grids