

Chapter 18

Introduction to Electric Vehicles: Past, Present, and Future

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ABSTRACT

This chapter traces the evolution of electric vehicles (EVs) from their conceptual beginnings to modern production. It explores the history of electric drive, key milestones, and early challenges such as battery technology, infrastructure, and consumer acceptance. Highlighting significant advancements, the chapter examines how technological innovations, environmental demands, and shifting consumer preferences have propelled EVs into the mainstream. It also provides a forward-looking analysis of the future of EVs, discussing trends like renewable energy integration, autonomous driving, and vehicle connectivity. The chapter emphasizes the need for continued research, supportive regulations, and the role of EVs in sustainable mobility and climate change mitigation.

INTRODUCTION TO ELECTRIC VEHICLES: PAST, PRESENT, AND FUTURE

Electric vehicles (EVs) represent a major shift in automotive technology, marking a transition from a centuries-old reliance on internal combustion engines to more sustainable, efficient, and innovative modes of transportation (Ding et al., 2017). At the intersection of environmental sustainability and technological development, electric vehicles are not only means of transportation but also symbols of progress

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in our fight against climate change and our efforts towards cleaner and smarter cities (Sperling & Gordon, 2010).

This chapter explores the evolution of electric vehicles rooted from 1800s origin to their status as leaders in automotive innovation. We examine the technological breakthroughs, market trends, and policy frameworks that have shaped the EV landscape and set the stage for a future where electric mobility transforms our relationship with transportation.

Exploring the past, present, and imagined future of electric vehicles, this chapter aims to provide readers with a comprehensive understanding of the role of electric vehicles in the ongoing transition to a more sustainable and technologically advanced transportation ecosystem.

This introduction sets the tone for the chapter and provides a concise overview of what readers can expect while emphasizing the importance of electric vehicles in a broader social and environmental context.

The Past of Electric Vehicles

Electric Vehicles (EV) are vehicles that are powered either partially or entirely by a battery, which is typically charged by plugging directly into a power source (Un-Noor et al., 2017). The history of electric vehicles is a tale of innovation and persistence, reflecting the evolving success of technological advancements amidst economic, social, and environmental challenges (Sperling & Gordon, 2010). This section delves into the historical evolution of electric vehicles, tracing their origins from early inventions to their fluctuating popularity, culminating in a modern resurgence driven by environmental concerns and technological innovations.

Early Inventions and Concepts (19th Century Origins)

The evolution of electric vehicles dates to the 19th century, an era characterized by ingenuity, when the world began to use electricity (Chan, 1999). The first practical electric vehicles emerged in the 1830s and 1840s, with inventors from various countries experimenting with electric motors and batteries to power carts. Notably, Scottish inventor Robert Anderson developed an early electric wagon prototype around 1832 (Karlis et al., 2022), while American inventor Thomas Davenport built the first practical electric vehicle in 1835, a small locomotive (Guarnieri, 2018). However, these early designs were constrained by the battery technology of the time, which significantly limited their range and practicality.

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