



# The Future of Electric Cars

**Shaurya Juneja**

RUKMANI BIRLA MODERN HIGH SCHOOL

## Introduction

Electric cars have been around for a while, but only recently have they become a viable option for consumers looking for an environmentally friendly mode of transportation. The growth of electrical cars is predictable to continue in the future, with more and more people choosing to purchase electric cars. This paper explores the future of electric cars, including the latest advancements in technology, the environmental impact of electric cars, and the potential challenges.

### A. Background information on electric cars

Electric cars have been around since the 19th century, but they did not become a popular mode of transportation until the last few decades. One of the biggest reasons for this is the advancement of battery technology, which has made it possible to create electric cars with longer ranges and shorter charging times. In recent years, the growth of electric cars has been significant, with more and more automakers producing electric cars and consumers buying them.

### B. Importance of the topic

The topic of electric cars is crucial because of the ecological effect of traditional gasoline-powered automobiles. Electric cars are seen as a way to decrease greenhouse gas releases and mitigate climate variation. The growth of electrical cars is also essential for the automotive industry, as it presents new opportunities for innovation and growth.

### **C. Purpose of the paper**

This paper aims to explore the future of electric cars, including the latest advancements in technology, the environmental impact of electric cars, and the potential challenges that lie ahead. By understanding the future of electric cars, we can better prepare for the coming changes and make informed decisions about the type of transportation we use.

### **D. Thesis statement**

The growth of electrical cars is expected to continue in the forthcoming, with advancements in expertise and structure making electric cars more viable and desirable. While challenges must be overcome, such as the cost of production and the disposal of batteries, the future of electric cars is promising and presents new opportunities for innovation and growth. This paper will explore the latest advancements in technology, the environmental impact of electric cars, and the potential challenges that lie ahead to understand the future of electric cars better.

## **II. History of electric cars**

### **A. Early development**

The development of electronic cars can be outlined back to the 19th era when creators like Thomas Davenport and Robert Anderson created small electric vehicles. However, the first electric car to be produced in significant quantities was Baker Electric, which was introduced in 1899. It was followed by other electric cars like the Columbia Electric, produced from 1899 to 1913.

### **B. Advancements over the years**

In the 20th century, gasoline-powered vehicles largely overshadowed electric cars, but research and development continued. One of the breakthroughs in electric car technology came in the 1990s when General Motors introduced the EV1, a modern electric car with a range of up to 140 miles (Energy, 2023). In the early 2000s, the Toyota Prius hybrid car was introduced, using gasoline and electric power (Energy, 2023). This paved the way for the development of fully electric cars like the Tesla Roadster, which was introduced in 2008. Since then, there have been significant advancements in electric car technology, including improvements in battery technology, which has allowed for longer ranges and shorter charging times. Automakers have also introduced new electric models, such as the Nissan Leaf, the Chevrolet Bolt, and the Tesla Model S.

## C. Challenges faced by electric cars in the past

Electronic cars have faced several challenges, counting limited range, high cost, and lack of incriminating infrastructure. In the early days of electric cars, batteries were heavy and had a limited range, making them impractical for long-distance foldaway. Another challenge has been the high cost of electronic cars, making them less available to customers. Furthermore, the lack of charging structure has made it hard for folks to charge their electric cars on the go. Finally, there have been concerns about the ecological effect of the batteries cast-off in electronic cars. Lithium-ion batteries are commonly used in electric cars, and their production requires the extraction of raw supplies, such as cobalt and lithium, which can have undesirable ecological impacts. Disposing of batteries at the finish of their lifespan can also be challenging. Despite these challenges, advancements in technology and infrastructure are making electric cars more viable and desirable. The following section will explore the current state of electric cars.

## III. Current state of electric cars

### A. Market share

The market share of electrical cars has been steadily increasing in current years, with more and more customers indicating to purchase electric cars. In 2021, electric car sales accounted for about 4% of all new car sales worldwide, rendering to the “International Energy Agency” (IEA, 2021). Electric cars make up a significant portion of new car sales in some countries, like Norway and the Netherlands.

### B. Types of electric cars

There are 3 main types of electrical cars: “battery electric vehicles” (BEVs), “plug-in hybrid electric vehicles” (PHEVs), and “hybrid electric vehicles” (HEVs) (EVgo, 2023). BEVs are fully electric cars that are powered solely by batteries. They have no internal combustion engine and produce zero emissions. BEVs have the most extended ranges of any electric car type and are ideal for city driving. PHEVs are cars with electric motors and an internal combustion engine. They can be plugged in and charged like a BEV, but they also have a gasoline engine that kicks in when the battery is depleted. PHEVs have a shorter electric range than BEVs but can still offer significant fuel savings. HEVs are similar to PHEVs but do not have a plug-in option. They are powered by an electrical motor and an interior ignition engine and rely on regenerative braking to recharge the battery.

### C. Advantages and disadvantages of electric cars

Advantages of electric cars include:

- Zero emissions: Electrical cars yield no releases, which means they are healthier for the atmosphere than old-style gasoline-powered wagons.
- Lower operating prices: Electrical cars have inferior functioning costs than gasoline-powered cars because energy is inexpensive than gas.
- Quieter operation: Electrical cars are quieter than gasoline-powered cars, which makes them ideal for city driving.
- Prompt torque: Electrical motors provide instant twisting, which means electric cars can fast-track smoothly and quickly.

Shortcomings of electrical cars include:

- Inadequate range: Electrical cars still have a limited range compared to gas-powered cars, making long-distance travel hard.
- High initial cost: Electrical cars can be more luxurious to buying than gasoline-powered cars, although this cost is coming down as technology improves.
- Charging substructure: Whereas the charging substructure for electrical cars is growing, it is still not as extensive as gas posts, making it challenging to find a apartment to charge your car when you are on the go.
- Battery disposal: The discarding of batteries at the culmination of their lifespan can be challenging, as they can be difficult to recycle and may contain hazardous materials.

### D. Government policies and incentives

Many régimes around the globe have introduced policies and incentives to promote the espousal of electrical cars. These policies and inducements comprise tax credits, discounts, grants for purchasing electric cars, and investments in charging infrastructure. In the “United States”, for instance, there is a state tax credit of up to \$7,500 for purchasing a new electric car. Some states also offer additional incentives, such as rebates and free parking for electric cars. In Europe, many countries have introduced policies to phase out diesel and gasoline cars in the pending years. Norway, for example, plans to ban the sale of new diesel and gasoline carriages by 2025. Other

countries, like the United Kingdom, have set targets for phasing out these cars by 2030. These policies and incentives are helping to drive the growth of electric cars and make them more accessible to consumers.

The current state of electric cars is promising, with increasing market share, technological advancements, and government policies and incentives driving their adoption. While challenges still need to be spoken, like restricted range and high initial cost, electrical cars are becoming a more feasible option for customers who want to reduce their carbon footprint and save money on operating costs. As technology continues to improve and charging infrastructure expands, the limitations of electric cars will continue to be addressed, making them an increasingly attractive option for consumers. As more consumers switch to electric cars, the environmental impact will be significant, with reduced emissions and improved air quality. The transition to electric cars also has the potential to create new jobs in manufacturing, infrastructure, and maintenance.

#### **IV. Future of electric cars**

##### **A. Technological advancements**

One of the most exciting aspects of the future of electric cars is the potential for continued technological advancements. Electric cars will become more efficient as technology improves, with longer ranges and faster charging times. For example, researchers are exploring new battery technologies that could significantly increase the energy density of batteries, allowing for longer ranges and faster charging times. Solid-state batteries, which use a solid electrolyte instead of a liquid one, are being developed, which could increase energy density and improve safety. In addition, improvements in electric motors, power electronics, and materials science could lead to more efficient electric cars with higher performance.

##### **B. Infrastructure development**

Another critical factor in the future of electric cars is the development of charging infrastructure. As more consumers switch to electric cars, the demand for charging stations will increase. Private companies and Governments are capitalizing in the growth of charging infrastructure to make charging as convenient as refueling at a gas station. This includes the deployment of fast-charging postings along freeways and in urban zones and the development of wireless charging technology. In addition, innovative charging technology is being developed to manage the demand for electricity from electric cars and help balance the grid.

### **C. Cost reduction**

The price of electrical cars has reduced in currently, and this trend is expected to continue. As production volumes increase and economies of scale are realized, the cost of batteries, electric motors, and other components will decrease, making electric cars more affordable. In addition, advancements in manufacturing processes and materials science could lead to further cost reductions. For example, using lightweight materials like carbon fiber could reduce the weight of electric cars, improving their efficiency and reducing the cost of materials.

### **D. Competition from other renewable energy sources**

While electric cars are essential to the change to a low-carbon budget, they are not the only option. Other renewable energy sources, such as hydrogen fuel cells and biofuels, are also being developed. Hydrogen fuel cells use hydrogen to produce electricity, with water as the only byproduct. While the tech is still in the initial stages of growth, it has the probable to offer longer ranges and faster refueling times than electric cars. Biofuels are another renewable energy source that could be used in transportation. Biofuels are produced from renewable sources such as plants and algae and can be used in existing internal combustion engines. While biofuels are not as clean as electric cars or hydrogen fuel cells, they can significantly reduce greenhouse gas emissions compared to traditional gasoline. While electric cars currently have an advantage in market share, technological advancements, and government support, competition from other renewable energy sources could challenge their dominance in the future.

The future of electric cars looks promising, with continued technological advancements, infrastructure development, cost reductions, and government support. While challenges are to be addressed, such as limited range and high initial costs, electric cars offer a clean and efficient alternative to traditional gasoline-powered cars. As more consumers switch to electric cars, the environmental impact will be significant, with reduced emissions and improved air quality. The transition to electric cars also has the potential to create new jobs and opportunities for innovation in the electric car industry. While electric cars face competition from other renewable energy sources, they are well-positioned to be a significant player in transitioning to a low-carbon economy. As a high school student interested in joining college, there are many opportunities to get involved in the electric car industry, from engineering and manufacturing to policy and advocacy. The future of electric cars is bright, and it is an exciting time to be part of this vital transition.

## **V. Implications of Electric Cars**

Electric cars can potentially bring about significant benefits for the environment, economy, and society. However, some challenges and drawbacks also need to be considered.

### **A. Environmental Benefits**

The most significant benefit of electric cars is their potential to reduce greenhouse gas emissions and improve air quality. Electric cars produce no tailpipe emissions, which means they do not contribute to local air pollution. Moreover, suppose the electricity used to charge electric cars comes from renewable sources, such as wind and solar power. In that case, the greenhouse gas emissions of electric cars can be significantly lower than gasoline-powered cars.

### **B. Economic Benefits**

The monetary profits of electrical cars are significant as well. One of the primary advantages of electrical cars is that they have inferior operating costs than gasoline-powered cars. Electrical cars need less upkeep than outdated cars since they have less moving portions, which reduces the frequency of repairs and the price of replacement parts (PRATLEY, 2022). Moreover, the cost of electrical energy is normally lesser than gasoline, which means that electrical cars can be cheaper to operate over their lifetime. Electric cars also have the potential to create new industries and jobs. As the demand for electric cars grows, so does the demand for the infrastructure required to support them, such as charging stations and battery recycling facilities. These infrastructure projects can create new jobs and stimulate local economies.

### **C. Social Benefits**

Electric cars can also bring about social profits. Electrical cars are silent than gasoline-powered carriages, which can reduce noise pollution in city areas. Moreover, electric cars are often seen as a symbol of innovation and progress, which can contribute to social and cultural changes that promote sustainable living.

### **D. Challenges and Drawbacks**

Notwithstanding the numerous profits of electrical cars, some contests and drawbacks need to be considered. One of the most significant encounters is the lack of charging infrastructure. While the numeral of charging posts is growing, it is still significantly lower than the number of gas stations, making it difficult to find a charging station when needed. Another significant task is the price of electronic cars. While electrical cars have

decreased over time, they are still generally more luxurious than gasoline-powered carriages (Vincent, 2023).

Moreover, the price of batteries, a critical component of electric cars, can be high, contributing to the higher cost of electric cars. Finally, there are concerns about the environmental impact of the materials used to manufacture batteries and the discarding of batteries at the culmination of their lifespan. Battery recycling technologies are still in the initial phases of growth, which means that the disposal of batteries can be a challenge.

Electric cars can potentially bring about significant benefits for the environment, economy, and society. However, some challenges and drawbacks also need to be considered. Governments, industries, and consumers must work collectively to tackle these challenges and encourage the acceptance of electrical cars as a sustainable transportation option. With continued technological advancements and infrastructure development, electric cars have the potential to become an increasingly attractive and viable option for consumers.

## **VI. Criticisms of electric cars**

Despite the numerous benefits of electric cars, they have faced criticisms from various quarters. Some of the common criticisms of electric cars include the following:

### **A. Battery technology**

Battery technology is one of the main criticisms of electric cars. Critics argue that battery technology is not yet advanced enough to make electric cars viable for long-distance travel. While electric car ranges have improved in recent years, they still fall short of gasoline-powered cars. Additionally, critics argue that batteries are expensive to replace and that their performance deteriorates over time, which can lead to a reduced range.

### **B. Limited range**

The limited range of electric cars is another major criticism. While electric cars have come a long way in range, they still fall short of gasoline-powered cars, making long-distance travel challenging. Critics argue that this limited range makes electric cars unsuitable for people who need to travel long distances regularly (Meyer, 2023).

### **C. Disposal of batteries**

The disposal of batteries is another concern with electric cars. Critics argue that disposing of batteries at the end of their lifespan can be challenging, as they can be difficult to recycle and may contain hazardous materials. Additionally, the production of batteries can be resource-intensive and may contribute to environmental issues.



## **D. Cost of production**

Finally, the cost of production is another criticism of electric cars. Critics argue that electrical cars are posher to produce than gas-powered cars, which makes them fewer available to customers. Additionally, the manufacture of batteries needs the removal of rare ground metals, which can have undesirable social environmental impacts.

While electric cars have numerous benefits, they have also faced criticism from various quarters. Critics argue that battery technology is not yet advanced enough to make electric cars viable for long-distance travel. The limited range of electric cars makes them unsuitable for people who need to travel long distances regularly. Additionally, the disposal of batteries and the cost of production are other concerns that have been raised about electric cars. As electric car technology continues to improve, these criticisms will likely be addressed, but they will require ongoing innovation and investment in research and development.

## **VII. Conclusion**

### **A. Summary of the paper**

Electrical cars are a promising tech rapidly gaining popularity. Despite some challenges and criticisms, electrical cars provide numerous recompences over old gas-powered cars, including environmental, economic, and social benefits. With continued progressions in infrastructure and technology development, the future of electric cars looks bright.

### **B. Future research directions**

Future research should focus on improving battery technology and reducing the cost of production to make electrical cars more available to a broader range of customers. Additionally, continued investment in charging infrastructure will be crucial to support the growth of electric cars.

### **C. Final thoughts**

In the end, electric cars have the potential to revolutionize the transportation industry and significantly reduce our carbon footprint. With continued innovation and support, electric cars can help us build a more sustainable future.

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