Electric Vehicles: Past, Present, & Future

Andres Guerra, Alex Geretz,
Stephen Aquilina, Alan Elliott

Introduction

Electric Vehicles (EVs) are vehicles, such as cars, that are powered by electricity.

In this presentation, we will explore the history of electric vehicles, their advantages and disadvantages as a solution to climate change, and some potential future technologies that could enhance electric cars as an alternative to internal combustion vehicles.

Electric Vehicles

The Past

History (Up to Late 1800s)

Before the invention of electric vehicles, steam-powered and gas-powered cars were created. While these vehicles gained popularity, they had several drawbacks, such as the need for frequent water refills, long startup times, excessive noise, unpleasant odors, and difficulty in driving.

Information: Matulka, R.

History (Up to Late 1800s)

Before the invention of electric vehicles, steam-powered and gas-powered cars were created. While these vehicles gained popularity, they had several drawbacks, such as the need for frequent water refills, long startup times, excessive noise, unpleasant odors, and difficulty in driving.

The first electric vehicle to debut in the United States was in 1890, and it was capable of reaching a top speed of 14 mph. Unlike steam and gas-powered cars, electric vehicles did not suffer from many of the same issues, leading to their increasing adoption by the public.

An early electric car invented shortly after 1900

Information: Matulka, R.

History (1900s – 1970s)

Thanks to Henry Ford's introduction of the Model T in 1908, gasoline-powered cars became widely available and affordable, which left electric vehicles unable to compete.

Henry Ford's Model T car

Information: Matulka, R.

History (1900s – 1970s)

Thanks to Henry Ford's introduction of the Model T in 1908, gasoline-powered cars became widely available and affordable, which left electric vehicles unable to compete.

Henry Ford's Model T car

Additionally, the discovery of crude oil in Texas contributed to the decline of electric vehicles, leading to their near extinction by 1935.

Information: Matulka, R.

History (1900s – 1970s)

Thanks to Henry Ford's introduction of the Model T in 1908, gasoline-powered cars became widely available and affordable, which left electric vehicles unable to compete.

Henry Ford's Model T car

Additionally, the discovery of crude oil in Texas contributed to the decline of electric vehicles, leading to their near extinction by 1935.

However, during the 1960s and 1970s, rising oil prices due to gas shortages, particularly following the 1973 Arab Oil Embargo, rekindled interest in electric vehicles.

An electric vehicle charging station in 1973

Information: Matulka, R.

History (1980s – Present Day)

In the 1990s, although interest began to wane again, federal and state regulations continued to prevent it from going extinct. Interest has continued to rise today due to a widespread understanding of our current climate crisis.

Information: Matulka, R.

A view of the back of the White House, representing federal regulations

Earth, as viewed from space

Electric Vehicles

The Present

Strengths

- Relatively low up-front cost, low initial infrastructure requirements

Information:
Hawkensen, P.

Strengths

- Relatively low up-front cost, low initial infrastructure requirements
- Prices are likely to decrease further due to battery price trends.

Information:
Hawkensen, P.

Strengths

- Relatively low up-front cost, low initial infrastructure requirements
- Prices are likely to decrease further due to battery price trends.
- Flexibility: effective in most short- to medium-distance land journeys.

Information:
Hawkensen, P.

Challenges

- Infrastructure challenges
  - Availability of EV charging stations
  - EVs are heavier, which can strain existing transportation infrastructure
  - High use of EVs can strain the energy grid

Information:
Hawkensen, P.

Challenges

- Batteries
  - Current methods of battery production emit GHGs
  - Minerals used to create batteries are rare, expensive, and often sourced unethically
  - Use of battery materials in EVs would take those materials away from other climate solutions.

Information:
Hawkensen, P.

Challenges

- Maintenance
  - EV maintenance and repair are significantly more reliant on the manufacturer/dealer compared to traditional cars

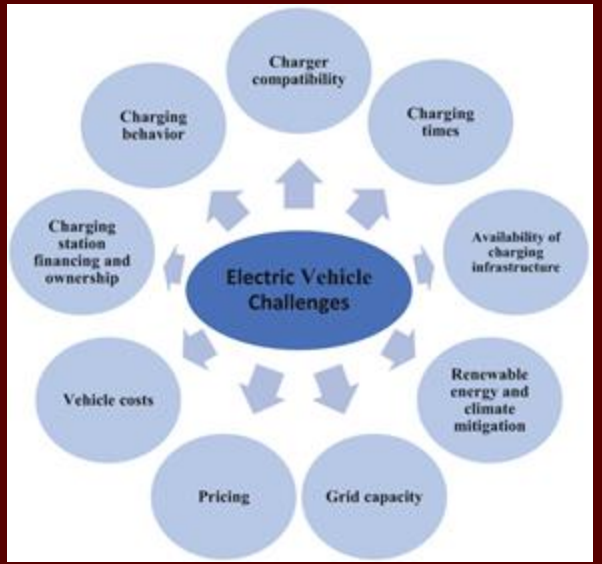

Image: Abdi, H.
Information: Hawkensen, P.

Electric Vehicles

The Future

Climate Impact of Internal Combustion Vehicles

- Current global Greenhouse Gas (GHG) emissions total an equivalent of 51.2 Gigatons of CO_2 per year.

Information:
Emissions Database for ...

Current Climate Impact of EVs

- An amount of greenhouse gases equivalent to 0.040 Gigatons of CO_2 per year is currently displaced by EVs.

Image: Getty Images
Information: Hawken, P.,

Potential Future Climate Impact of EVs

- Electric cars have the potential to displace an equivalent of 2.870 Gigatons of CO_2 per year under a scenario of complete adoption.

Information: Hawken, P.,

A potential Future: Solid State Batteries

- Solid-state batteries, currently in the prototyping phase for electric vehicles, utilize a solid material to transfer ions between electrodes instead of the liquid material used in traditional lithium-ion batteries.

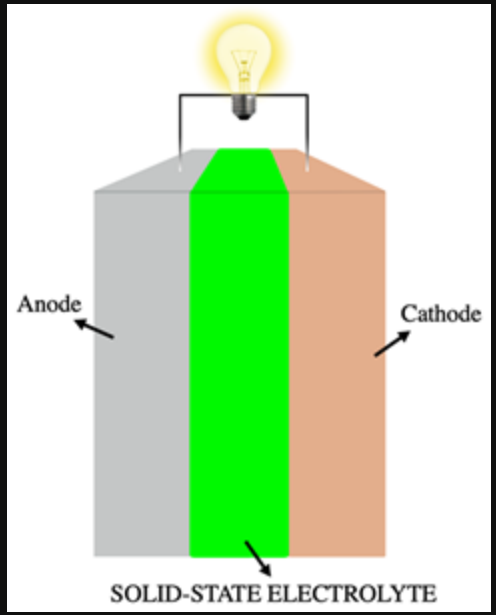

Image: Bertoli, L.
Information: Nichols, D., Bertoli, L.

A potential Future: Solid State Batteries

- Solid state batteries have potential for:
  - Higher energy density
  - Faster charging
  - Improved safety
  - Longer lifespan

Image: Mercedes-Benz
Information: Nichols, D.

Electric Vehicles

In Conclusion...

Conclusion

- Electric vehicles (EVs) have been considered for a long time, but they became mainstream in the 21st century.
- EVs are seen as a potential solution to climate change, but they come with both advantages and disadvantages.
- In today's world, EVs are likely to play a crucial role in any strategy aimed at addressing climate change.

Works Cited

Abdi, H., et. al. 2022. Operational Challenges of Electric Vehicle Smart Charging. Green Energy and Technology. Springer, Cham. https://doi.org/10.1007/978-3-031-05909-4_10.

Bertoli, L. All-solid-state battery showing the solid-state electrolyte Wikipedia commons.

Emissions Database for Global Atmospheric Research. 2025. GHG emissions of all world countries. *European Commission.*

Fitzgerald, G. 2024. EV Charging Infrastructure: Trends, Requirements & Costs. *Smart Electric Power Alliance*.

Hawken, P., K. Wilkinson, et al. 2017. Drawdown: the most comprehensive plan ever proposed to reverse global warming. *Project Drawdown*. ISBN: 9781524704650.

Matulka, R. 2014. The History of the Electric Car. *Department of Energy*. https://www.energy.gov/articles/history-electric-car.

Nichols, D. 2025. The Future of EV Batteries: What's Next?. *GreenCars*. https://www.greencars.com/greencars-101/the-future-of-ev-batteries.

Yang, Z. 2023. How did China come to dominate the world of electric cars? *MIT Technology Review*.