

Electric Cars



Not only do traditional gasoline vehicles emit high levels of CO2, they are also increasingly becoming more relatively expensive, as the clean energy transition unfolds. Electric battery-powered cars are poised to take over and replace gasoline cars as the automobile of choice.

Overview

- **Electric cars** are vehicles which use an electric motor connected to a battery or fuel cell for power. **Hybrids** offer part-electric, part-gasoline power.
- Most electric car batteries function by having charged ions—typically lithium—travel at a fast speed, releasing charged electrons which in turn create a current that powers the vehicle.



Current Standing in the U.S.

- Charging an electric car typically takes a minimum of 30 minutes, and it's estimated that nearly **200,000 additional charging stations** (there are now 25,000) will be needed to serve the electric car economy by 2025.
- There are **1.45 million** electric cars in the U.S., 20% of the global stock, and 1.9% of U.S. cars.

The Economics

- The average cost of a new electric car was \$55,600 in 2019, which is a 13.4 percent decrease compared to the year before, but still high compared to the average new car cost of \$36,600.
- On average, running an electric car costs \$485 a year, which is **less than half of the \$1,117 for gasoline cars**.

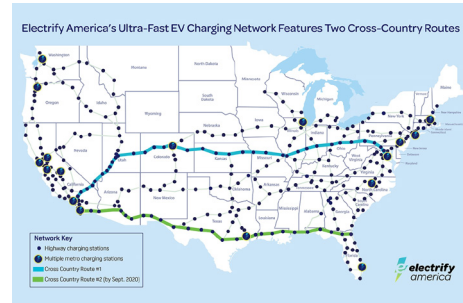
- The **most expensive part** of an electric car is the battery - specifically, cobalt inside the battery costs around \$34,000 per ton. Its relatively brittle nature makes batteries fragile, expensive, and susceptible to damage.

Challenges

- **Though rare**, lithium ion batteries are notorious for having high heat release that can cause **fires or explosions**.
- Battery energy storage is only about 1% of the capacity of gasoline, meaning electric cars travel less distance and need more charging time.
- **The global demand for cobalt** will increase by 235,000 to 430,000 tons by 2030, which is 1.6 times the Earth's current mining capacity.
- About 60% of this is harvested in the **Democratic Republic of the Congo**, where \$2 a day wages and child labor have drawn questions of human rights violations.

What's Next?

- The next big step for electric cars is the development of **cheaper, more efficient batteries** with higher energy storage. For instance, by 2023, carbon nanotube batteries without cobalt could enter the market, significantly reducing battery costs.



- The government can assist in the development of electric cars by **funding R&D of new battery technology and promoting infrastructure construction** of DC Fast Charging stations, which can achieve between 60 to 80 miles of travel for only 20 minutes of charging.
- Finally, we should **encourage mining at home** for the rare earth minerals required to power electric cars, rather than relying on foreign countries with dubious human rights records.