EV PERFORMANCE AND CONSUMER EXPERIENCES

PROJECT 1
JANUARY 10, 2024

Blood Battery Team – a.k.a.
Ryan Busman, Elaine Kwan,
Deb Peters, Nick Watkins

DATA COLLECTION, CLEANUP AND EXPLORATION PROCESS

- Specific topic areas were discussed and researched
- Data sources were defined and explored
- Exporting tools were reviewed
- Data was graphed and analyzed utilizing a variety of methods

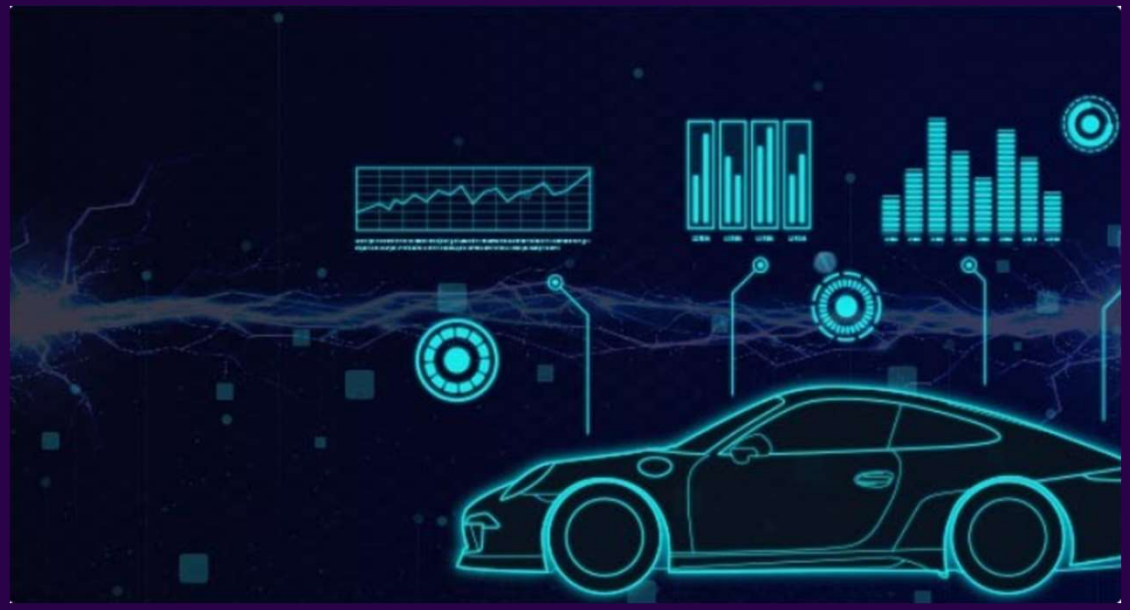
PROJECT PURPOSE

EV Attributes

EV Performance

Charging Performance

Consumer Experience and Behavior



ELECTRIC VEHICLE TYPES

Battery Electric Vehicles (BEVs), which run entirely on electricity stored in batteries.

Hybrid Electric Vehicles (HEVs), which use a combination of gasoline and electricity to run.

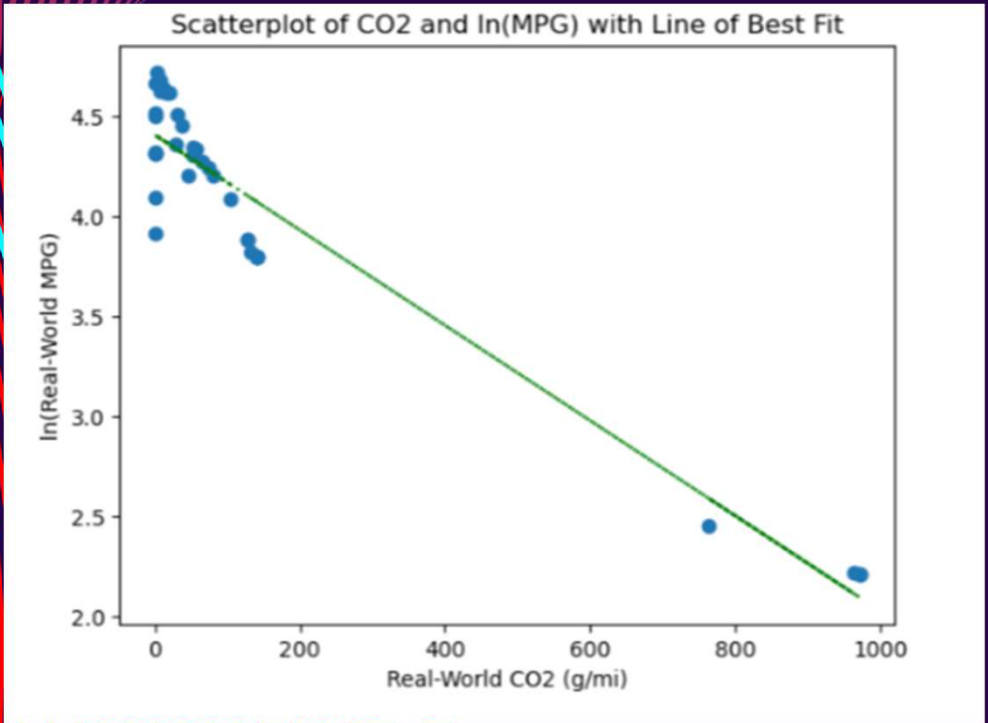
Plug-In Hybrid Electric Vehicles (PHEVs), which can be plugged in to charge the batteries and use electricity or gasoline to run.

Fuel Cell Electric Vehicles (FCEVs), which use hydrogen to generate electricity and run.

EV ATTRIBUTES

- Executive Order (EO) 14057, Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability
- According to the Environmental Protection Agency (EPA), “greenhouse gas (GHG) emissions from transportation account for about 29 percent of total U.S. greenhouse gas emissions, making it the largest contributor of U.S. GHG emissions.”
- The EPA has maintained the Automotive Trends Data (ATD) since 1975

EV ATTRIBUTES

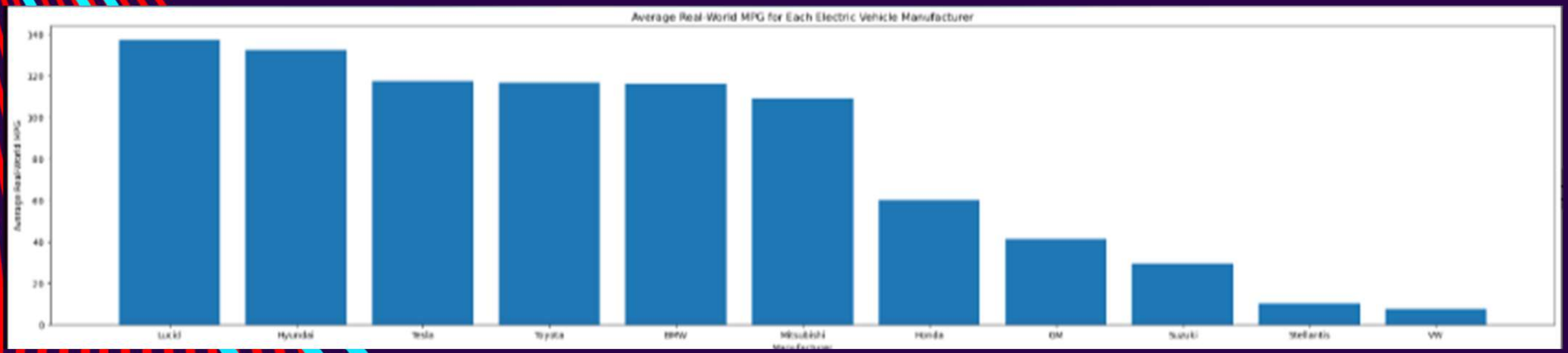


It is known that electric vehicles emit less CO2 emissions than gasoline or diesel-powered vehicles traveling the same distance.

However, some electric car models are much less efficient than their competitors.

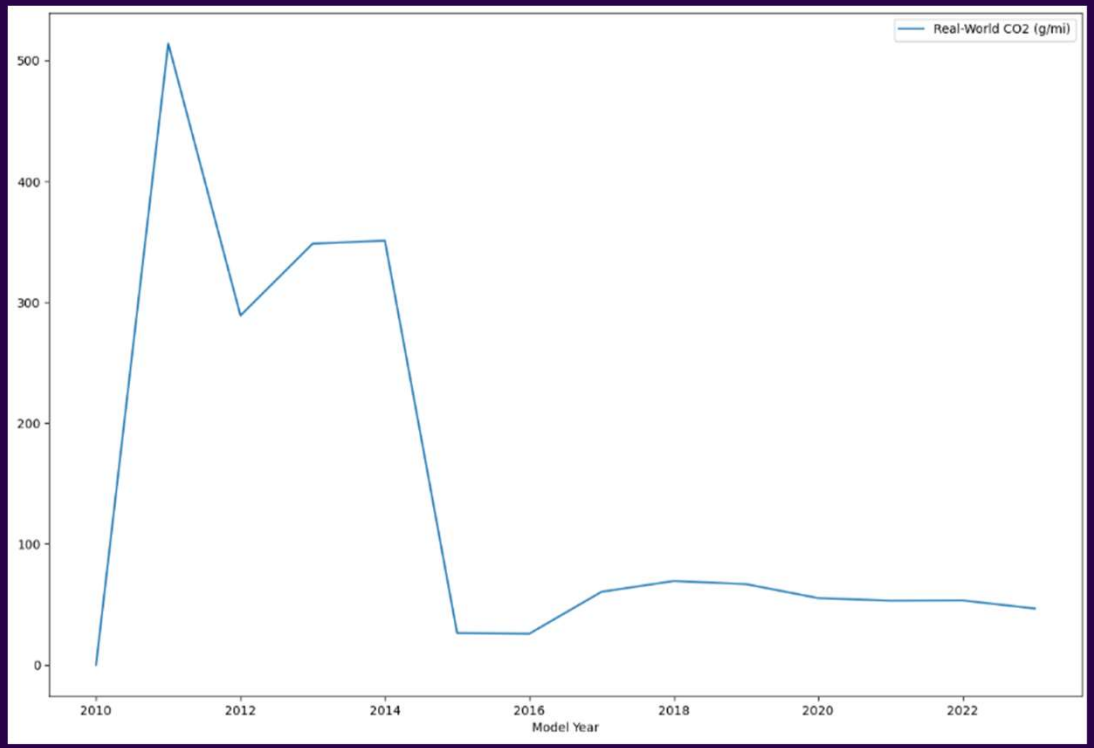
EV ATTRIBUTES

Average electric vehicle real-world fuel economy/mpg has been considerably lower for Honda, GM, Suzuki, Stellantis, and VW models when compared to Lucid or Hyundai.

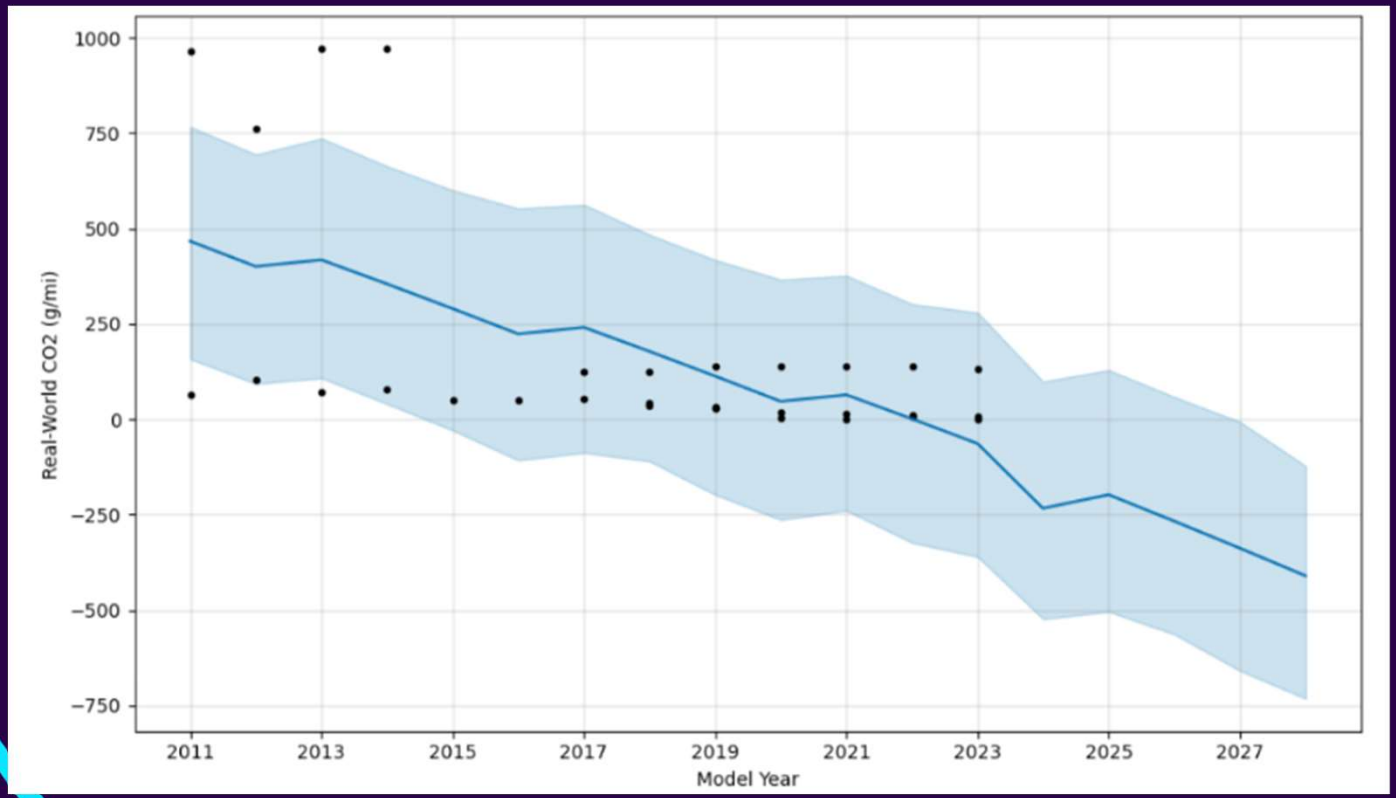


EV ATTRIBUTES

CO2 emissions by electric vehicle model year are trending downward toward carbon negativity.



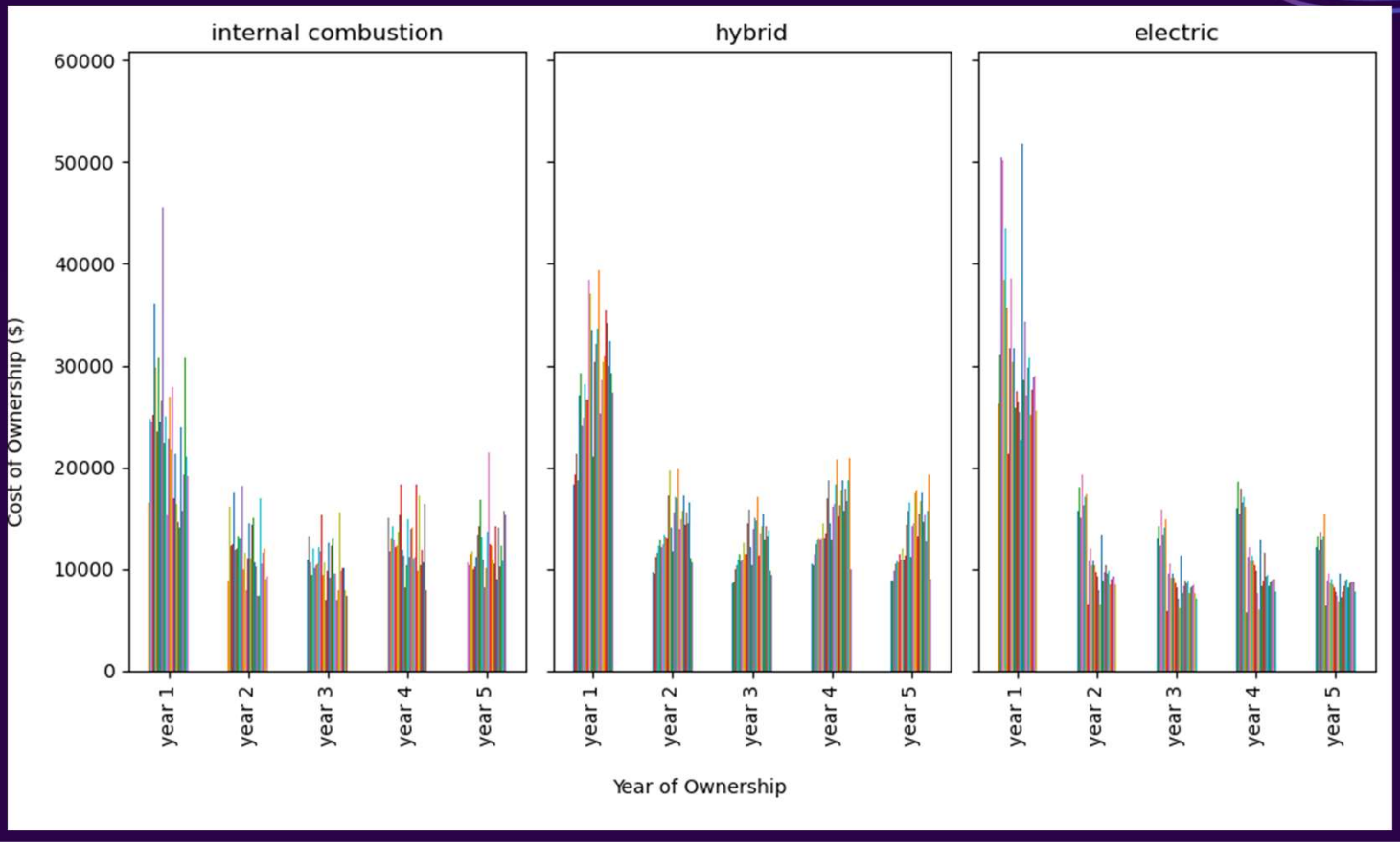
EV ATTRIBUTES



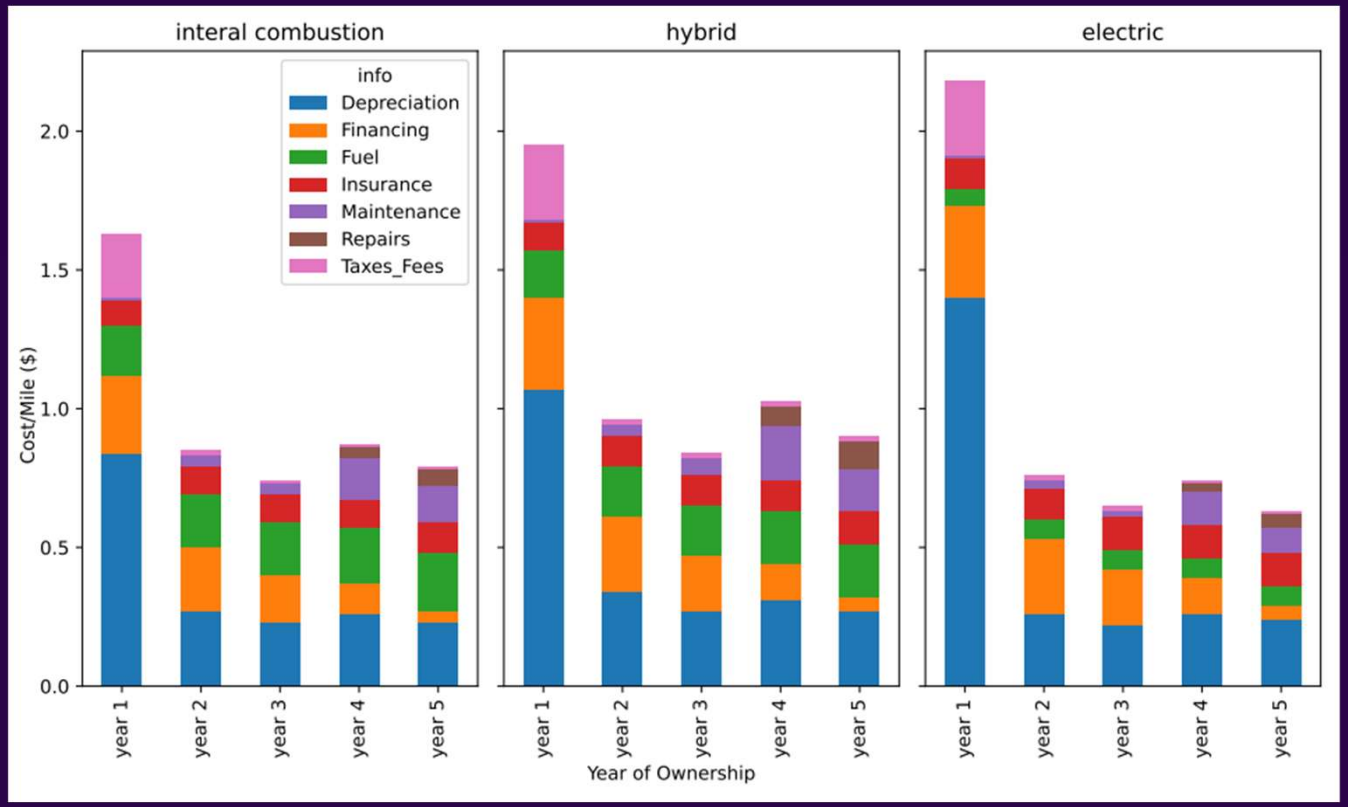
EV PERFORMANCE

- EV cost assumes an average person in the US drives 15,000 miles per year.
- A new 2023 vehicle is in the price range of 26-113k.
- The largest cost in the 1st year is the depreciation cost.
- There is a definite correlation between the cost to buy the car and the depreciation.

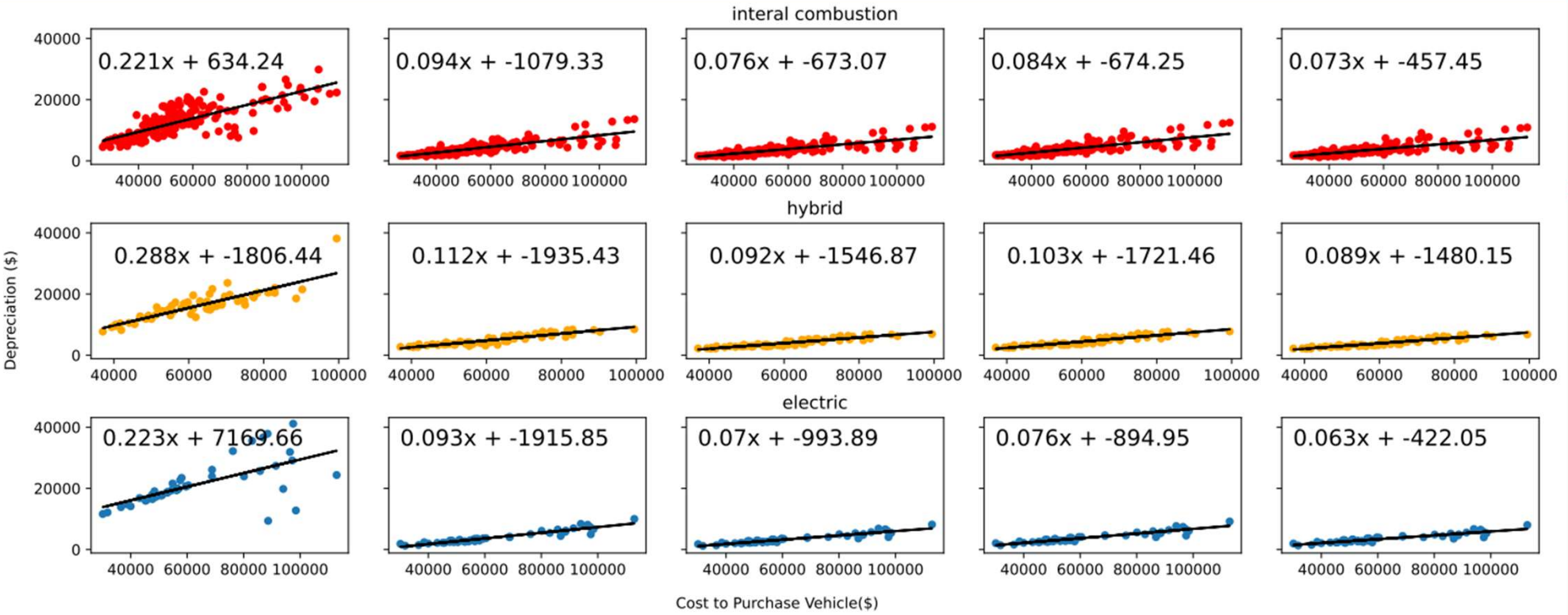
EV PERFORMANCE



EV PERFORMANCE



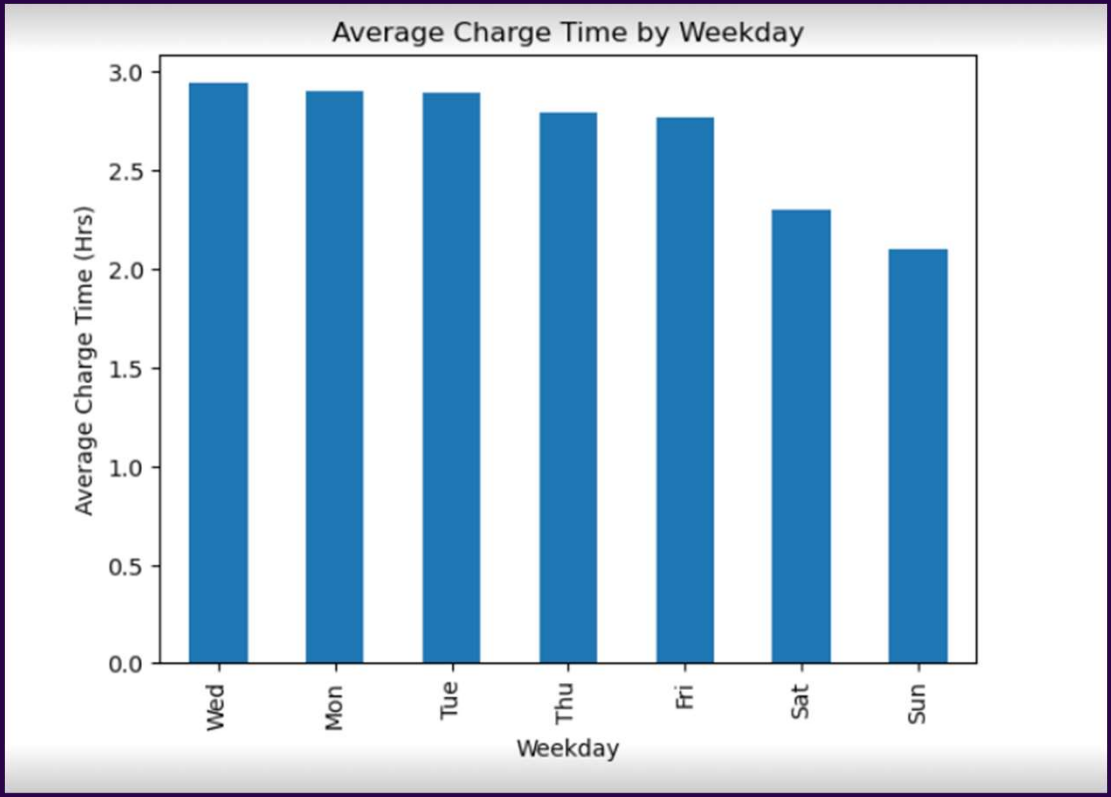
EV PERFORMANCE



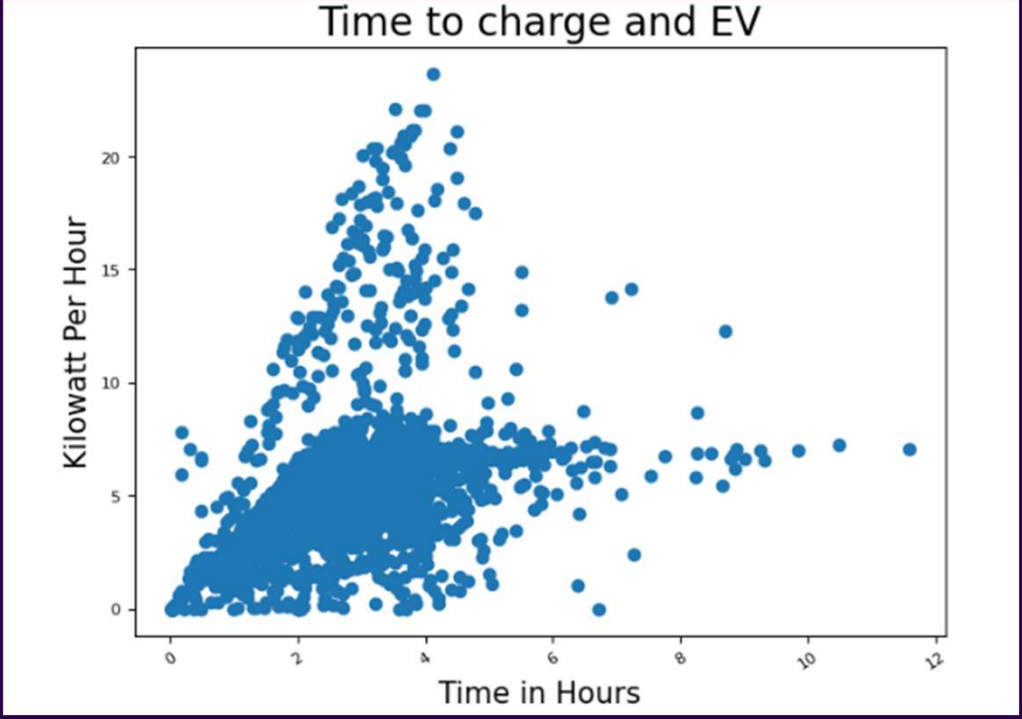
CHARGING PERFORMANCE

- Average overall charge is 2.82 hours, using 5.81kW.
- Charge times are greatest on Wednesdays with an average of 2.94 hours needed to charge and electric vehicle.
- Typical EV takes about 8 hours to charge. Most drivers do a top-off charge, rather than a full charge.
- Sunday is the lowest at 2.1 hours. It is not until the weekend days that we see a substantial drop in the hours needed to charge an electric vehicle. There is only a gradual decline over the days of the work week.

CHARGING PERFORMANCE



CHARGING PERFORMANCE

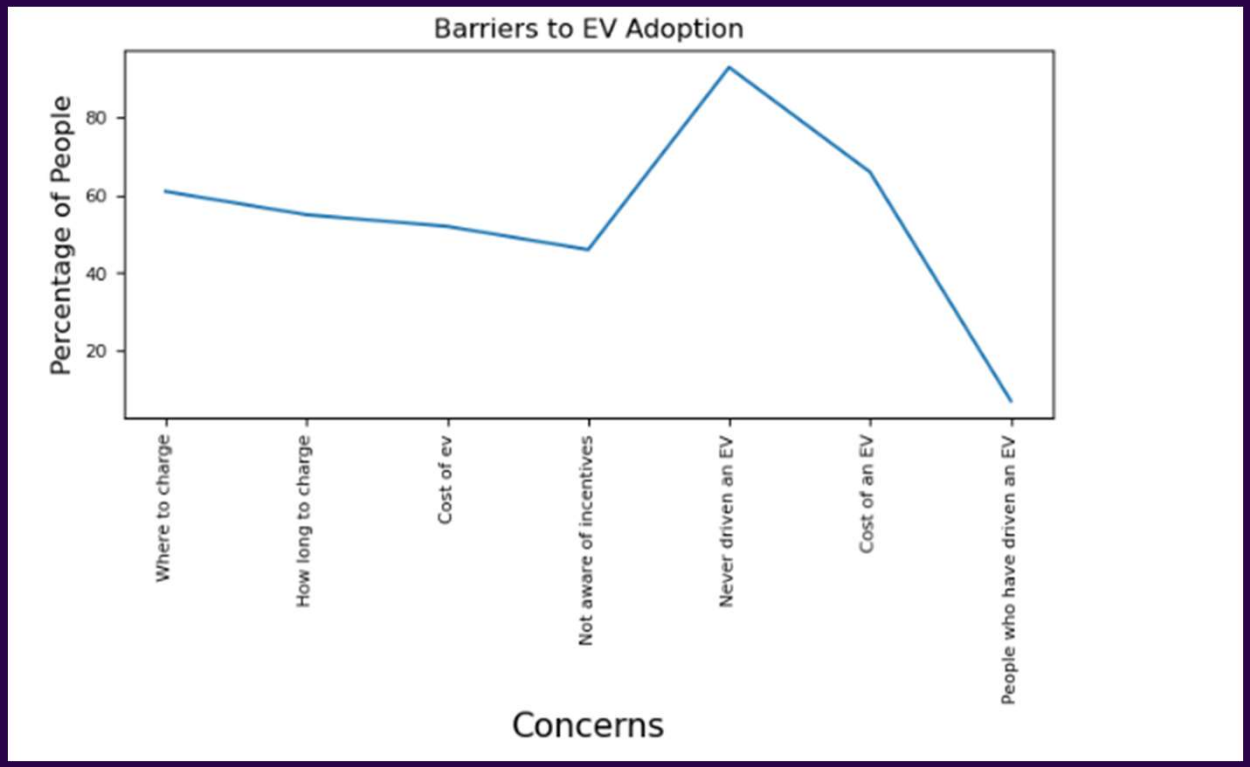


CONSUMER EXPERIENCE

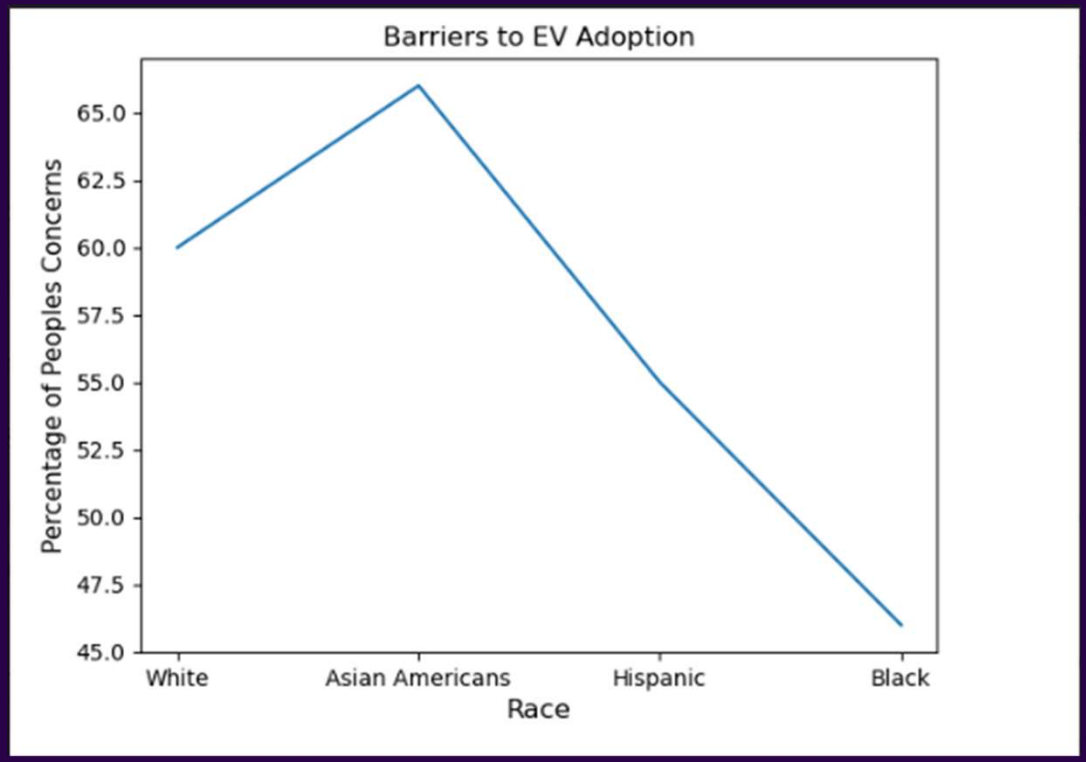
Demographic of EV Buyers:

- Males are more likely than females.
- Younger adults are more likely than older adults.
- Americans with a higher education are more likely than those with a lower education.
- Americans with a higher household income are more likely than those with a lower household income.
- Americans who live in urban areas are more likely than those living in suburban or rural settings.

CONSUMER EXPERIENCE



CONSUMER EXPERIENCE



SUMMARY OF FINDINGS FROM THE DATA

- EV CO2 Emissions are decreasing, but some manufacturers could do better
- EVs have more costs for the first five years than most consumers realize
- Charging stations are not located conveniently throughout the US
- Customers need more reassurance to reduce the fear of purchasing an EV

FUTURE CONSIDERATIONS

US vs Global Market

Alignment in the markets

Environmental Impact

Blood batteries – Lithium Mines, etc.

What is the True Cost

Economics of Use, e.g., End of Life/Battery Disposal

Infrastructure Support

Can our current grid support the number of EVs projected?

Hidden Costs

What costs are incurred after purchase?

THANK YOU

The Blood Battery Team

a.k.a. Ryan Busman, Elaine Kwan, Deb Peters, Nick Watkins