CO2 emission and Fuel Economy

TITLE	Analysts	Purpose and Objectives	Fuel Economy Score	Overall best combination of fuel a..	Engine Impact	Trend in Fuel Economy over the years	Comparison of different fuel types	Recommendations

Analyzing CO2 emission and Fuel Efficiency on vehicles

How has fuel and CO2 emission impacted the environment

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Purpose:

The purpose of this dataset is to explore patterns in fuel economy over time, compare the environmental performance of various fuel types, and assess how different drive types influence vehicle efficiency and emissions. This dataset was chosen because it offers valuable insight into how vehicle features impact sustainability and the environment.

OBJECTIVES:

1) Impact of drive type and how it effects fuel efficiency and emissions

2) Comparing different fuel types such as gasoline or electric to assess environmental performance of each

3) Exploring trends in fuel economy over the years to identify patterns or changes in the approach to fuel efficiency

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Car drive type	
2-Wheel Drive	-1.000
4-Wheel Drive	3.195
All-Wheel Drive	3.608
Front-Wheel Drive	0.727
Part-time 4-Wheel Drive	3.804
Rear-Wheel Drive	0.778

AVG Fuel Economy Score

-1.000 3.804

A fuel economy score reflects how environmentally efficient a vehicle is, with lower or negative values indicating better fuel efficiency and reduced emissions. This score, provided by the Environmental Protection Agency (EPA), evaluates a vehicle's environmental impact. It is calculated using multiple factors, including fuel consumption, CO2 emissions, and overall vehicle performance.

Lower score=less environment impact
High score=more environment impact

-2 wheel drive, and front/rear wheel drive score the best in fuel economy yet these are less commonly discussed or marketed in mainstream fuel-efficiency conversations.
-While All-Wheel Drive and Part-time 4 wheel drive vehicles score poorly overall in fuel economy (likely due to weight, size and complexity of car performance) some newer AWD models are reducing emissions due to hybrid technology and adding start/stop features in the cars to help the environment

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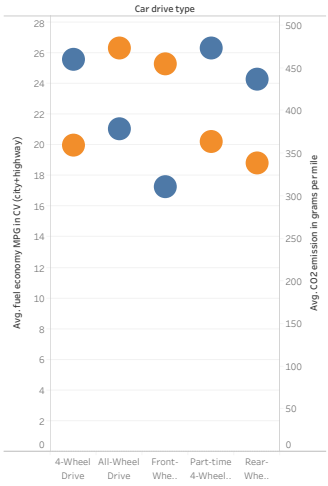

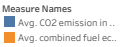

If we look at helping the environment and best average fuel economy in MPG, this dual-axis bubble chart compares both by car drive type, with each drive type represented by two bubbles:
-Orange = Avg. MPG (higher is better)
-Blue = Avg. CO2 emissions (lower is better)

Front wheel drive offers the best combination for fuel economy and CO2 emission, considering this to be the best overall choice for a drive type, additionally all wheel drive is the second best choice as the Avg fuel economy and CO2 emission is still well balanced

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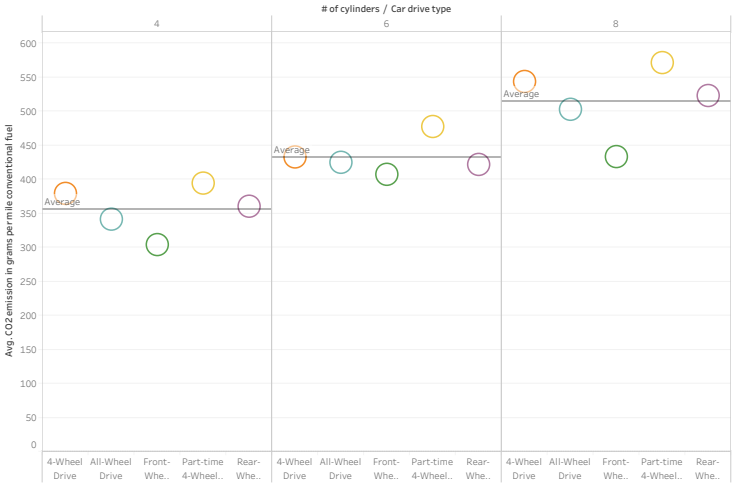

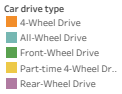

When comparing car drive types by cylinder the best overall choice is a 4 cylinder. This will have the least impact on the environment. As expected the bigger the engine, the bigger the impact on environment, as average CO2 emission increases as engine size increases

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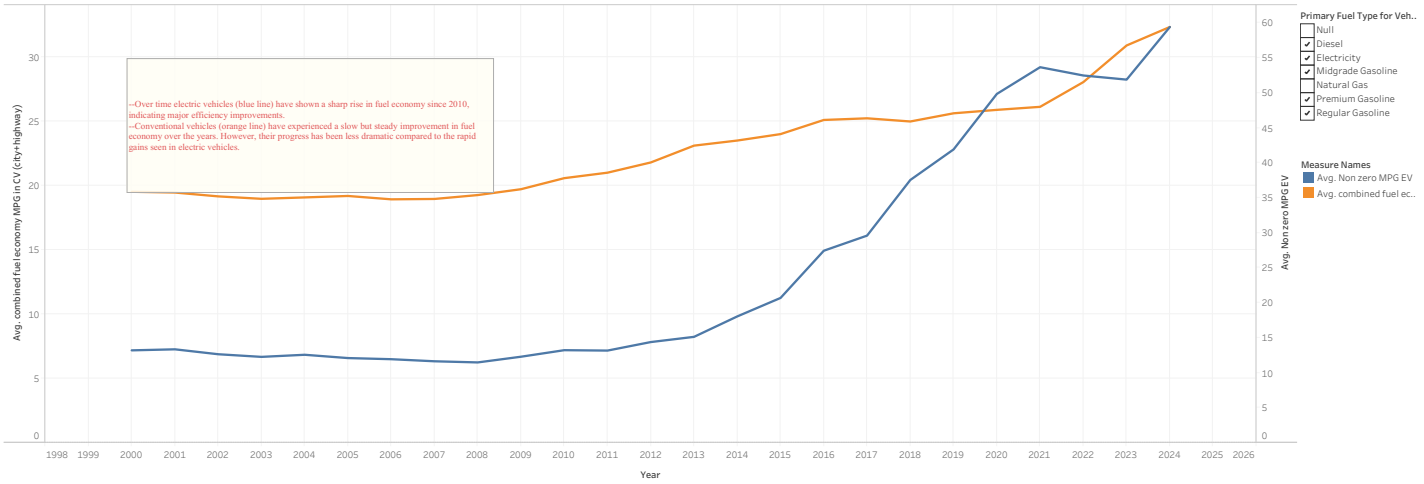

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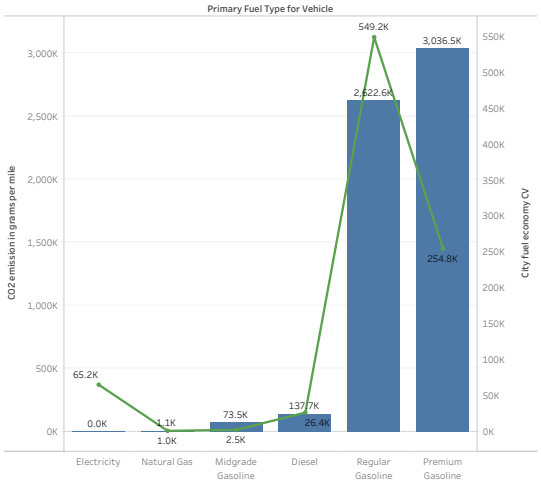

Measure Names
CO2 emission in gram..
City fuel economy CV

-Electric is the Cleanest and Most Efficient Fuel Type. Electric has zero CO2 emissions and the highest city fuel economy (65.2K MPG), confirming it as the most environmentally friendly option among all fuel types.
-Regular and Premium Gasoline Have the Highest Environmental Impact
These two fuel types show extremely high CO2 emissions (2.62M and 3.03M grams per mile respectively), while also having lower fuel economy compared to electricity—highlighting their inefficiency and environmental burden.

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Recommendations for drive type:
1) Promote and encourage use and development of Front-Wheel Drive and 2-Wheel Drive platforms for companies and consumers focused on fuel efficiency and emissions reduction.
2) Prioritize lightweight vehicle design and smaller engines across all drive types especially in 4WD and AWD models. Lighter vehicles consume less fuel and emit less CO2 and more cost efficient to manufacture
3) If you need the traction and power of AWD or 4WD, look for models that offer hybrid options, this will help the environment much more rather than getting a fully gas powered vehicle

Recommendations for Trend in Fuel Economy over the years:
-Investigate the growing adoption of electric vehicles by analyzing how many users are making the shift to EVs year over year, and identify which manufacturers are leading this transition
-Explore the key factors behind the rapid improvement in EV fuel economy such as advancements in electric motors, battery efficiency, or weight reduction to understand what's driving innovation

Recommendations for fuel:
-Encourage electric vehicle adoption due to better efficiency and zero CO2 emissions
-Disincentivize high-emission fuel types: Gas cars could be more subject to taxes, and higher prices are also more harmful to the environment
-Invest in infrastructure: expand charging stations to support more electric vehicles