Stephanie Contino, Ayesha Chaudhry, Srujana Endreddy, Geethika Manojkumar, Andrew Varlese

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Prof. DeGood, Dr. Michels

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Phase II Proposal

With the growing concern of climate change, many people are wondering which steps can be taken to reduce the issue. Greenhouse gasses are one of the biggest contributors to climate change. Commonly, greenhouse gasses are emitted from gas powered vehicles. The issue of greenhouse gas emissions from vehicles has been persistent for many years. According to the EPA, 4.6 metric tons of carbon dioxide are emitted annually from a typical passenger vehicle (Environmental Protection Agency, 2022). This number can be eliminated by switching to alternatively fueled cars. Our project is focusing on electric vehicles as an alternative to gas powered cars. Electric vehicles emit no tailpipe emissions (Environmental Protection Agency, 2022). We believe making the switch to electric vehicles from gas powered vehicles will greatly reduce the amount of greenhouse gas emissions released into the atmosphere and increase sustainability.

Stakeholders will be constantly affected by the transition from gas to electric vehicles, for example, the utilities will be affected by the increase in demand for electricity to power EVs, which could put pressure on the electric grid. However, integrating smart charging systems and renewable energy sources can help mitigate this issue. Additionally, utilities may have an opportunity to provide charging infrastructure for EVs, creating a new source of revenue. Another stakeholder that will be heavily affected by EVs is the automakers themself. The production of EVs requires a significant investment in research, development, and changes to the manufacturing process. As EVs become more popular, automakers may shift their focus to producing more sustainable vehicles to remain competitive. Additionally, the sale of EVs can be affected by government policies and regulations, such as emissions standards and tax incentives.

There are ethical concerns regarding electric vehicles. Though they are much better for the environment in terms of emissions, there are concerns over how the battery supplies are gathered. Cobalt mining is especially one of the main concerns. According to Forbes, “The U.S. Department of Labor estimates that at least 25,000 children are working in cobalt mines in the DRC, a number that is sure to grow as the production of climate-friendly electric cars expands” (Posner, 2023). With this in mind, it is important to solve the ethical concerns of electric vehicles before making a full transition from gas powered vehicles. Overall, gas powered vehicles are hurting the environment and present a large issue of sustainability, but we must also be careful to not create a new problem.

To further understand the role of vehicles emitting greenhouse gas emissions, data collected from Sustainable Jersey elucidates that on-road vehicles in every municipality of New Jersey produce the highest amount of greenhouse gas emissions as compared to other pollutants (Sustainable Jersey, 2022). Since many individuals depend on their automobiles as their primary mode of transportation, on-road vehicles thus account for the majority of gas emissions. In 2020 alone 82% of residents in New Jersey used cars, trucks, or vans as their means of transportation to work (Sustainable Jersey, 2022). As a result, the data displays that among all the New Jersey townships, automobiles contribute the most carbon dioxide to the atmosphere (Sustainable Jersey, 2022). Furthermore, data gathered from different road textures will also be implemented into the database to demonstrate how it affects the municipalities’ greenhouse gas emissions in various localities. Most importantly, the database will also include the data of an increase in electric vehicle ownership in all municipalities of New Jersey.

Several questions arose within the data we collected regarding greenhouse gas emissions between gas cars vs electric cars in New Jersey. First and foremost being comparing both vehicles (gas and electric), which released the most and least amount of emissions. Which municipalities had the least amount of greenhouse gas emissions, and what mode of transportation was common for that area. The data following those research questions would help further prove the relation between vehicles and those specific municipalities gas emissions. Another research question being how does gas car emissions compare to electric vehicle charging. And finally, how does certain road textures for municipalities play a role in lessening the amount of greenhouse gas emissions within that area.

This data can help identify sustainability problems by showing numbers of greenhouse gas emissions by county, municipality, and statewide. It would help bring into perspective the total amount of emissions. By then examining the data from just gas powered vehicles, it would help further show that there is a large issue of sustainability with gas powered vehicles. The data of vehicle miles traveled is also supportive in showing this sustainability problem. With this data, the opportunity to propose change is evident. Seeing how many emissions are produced leads into the question of what can be done to reduce them. By showing how emissions and total output compares by making the switch to electric vehicles, this data will show that it is possible to make vehicles more sustainable by switching from gasoline to electric.

Use case I: Add a map to the website

Primary Actor: User

Goal in Context: Add a map of New Jersey’s municipalities to display data for which municipality emits high amounts of greenhouse gas emissions.

Trigger: User decides to view the map data on the website

Scenario:

1. User clicks on “map data” and hovers over the map
2. User clicks on a specific municipality on the map to view data
3. Based on mouse hover, data of that municipality will be displayed.

Use case II: Interactive Pie chart

Primary actor: User

Goal in Context: Add a pie chart that shows each municipality and their respective community GHG emissions by sector and energy type. An interactive button will be provided that’ll allow users to be able to change municipalities and view whatever data for any municipality they choose.

Trigger: User decides to view data based on different municipalities

Scenario:

1. User clicks on “show chart”.
2. User clicks on button to switch between municipalities
3. Pie chart will continuously alter to the next municipality data based on interactive button being switched.

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