We will be exploring ways to reduce the carbon footprint, specifically on-road emissions, of the most energy inefficient countries in New Jersey, specifically through the use of electric vehicles (EVs). Jersey City is not only one of the most energy efficient cities in New Jersey, but, in 2015, was ranked the 10th "greenest" city in America (Panico 2015). Knowing this, our database, and overall vision, will aim to model the energy inefficient cities I mentioned after Jersey City. The way we plan on doing this is to look at Jersey City's use of EVs, due to their use of Via. Via is a rideshare service launched three years ago with a fleet of EVs (ridewithvia.com).

The data that will be analyzed focuses on the amount of greenhouse gas emissions released into the atmosphere based on municipality and its correlation with the amount of electric vehicle owners. Population will also be taken into consideration and charging station infrastructure. In order to lower GHG emissions, carbon-free transportation is one of the most effective ways to improve sustainability at a municipal level. The selected data will answer the following questions:

1. Which municipalities are the most energy efficient?
2. How does population density affect GHG Emissions?
3. Based on previous and current data are electric vehicles lowering GHG Emissions throughout densely populated areas and by how much?

By gathering data on municipalities that are the most energy efficient, we will be able to compare this data to municipalities that have a similar population density in order to establish that there is a need for carbon-free transportation. Jersey City has

become one of the most energy efficient cities in New Jersey despite a high population density as a result of multiple projects that include carbon-free transportation (Via). Population density is significant because it allows us to accurately assume if GHG emissions are fairly high or low in a specific area. By using the amount of electric vehicle usage based on municipality, we can correlate this data with both the level of GHG emissions and population density to determine which municipality would benefit from encouraging carbon-free transportation. This will lead to charging infrastructure and encourage individuals to either purchase electric vehicles, use apps that focus on EV based transportation such as Via or use electric scooters as a form of transportation. According to the United States Environmental Protection Agency (EPA) as of 2020, carbon dioxide accounts for 79% of greenhouse gas emissions (United States Environmental Protection Agency 2022) The main sustainability problem that we are identifying is air pollution and opportunities to lower GHG emissions benefit the environment on a broader scale starting at a municipal level to evoke positive change.

A major factor for our project will be the data we will gather to incorporate into our project. Our main idea that we are trying to show is how the use of electronic vehicles helps the environment. To demonstrate this we will use data from counties which will display their average greenhouse gas emissions from two separate years, such as 2015 versus 2020. We will then also use data from the same counties where there was an increase in electric vehicle ownership and from there we will show the possible correlation between the two statistics. Additionally we will add another statistic of population in those counties to account for an increase of people in the counties which

could potentially lead to higher greenhouse gas emissions than when the population was lower in earlier years. The data about greenhouse gas emissions and electric vehicle ownership will be obtained from Sustainable Jersey's Data Resources. The data for the population of these counties will be obtained from the US Census Bureau and will be from the years 2010 and 2020 which are slightly different from the years being used in the other statistics but will still be useful.

Our database will give the user the ability to add data to a table, edit or remove data from the database, sort the data in the database, or export the data to a csv spreadsheet. By having all four of these capabilities, the user should be able to not only better understand trends in the data, but to also implement it in many other ways. By being able to sort the data, the user will be able to more easily see trends in the data when trying to examine by population size or the amount of electric vehicles in

comparison to carbon emissions, and by exporting the data to a CSV file, the data can easily be used in other programs, or put into an excel sheet for better visualization.

In conclusion, the proposed project aims to explore ways to reduce carbon footprint in energy inefficient cities in New Jersey through the use of electric vehicles. The project will analyze data on greenhouse gas emissions, population density, and electric vehicle ownership in various municipalities to determine the effectiveness of carbon-free transportation in reducing emissions. By comparing energy efficient cities
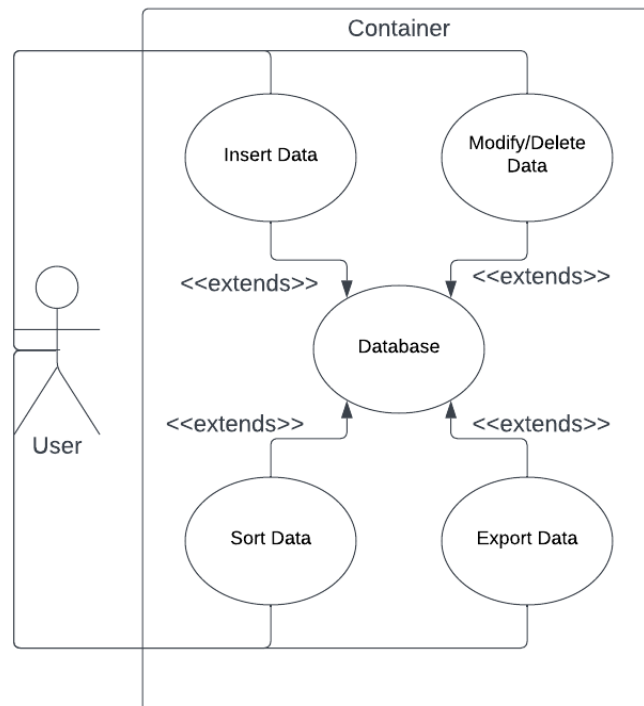
like Jersey City to similar municipalities with high population density, the project will provide insights into the need for carbon-free transportation and charging infrastructure. The data will be obtained from Sustainable Jersey's data resources and the US Census Bureau. The project will contribute to efforts to reduce air pollution and promote sustainability at a municipal level.

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