

NJ Electric Vehicle Usage Analysis

Electric Vehicles (EVs) are becoming increasingly popular due to their environmental benefits and lower operating costs. As a result, many people in New Jersey are switching to electric cars. However, the lack of adequate charging infrastructure is hindering the growth of EV adoption in the state. To address this issue, our group aims to create a program that evaluates the EV friendliness of a county in NJ. The program will provide insights into the availability of charging infrastructure, population density, and traffic congestion, which will help EV owners make informed decisions about where to live and charge their vehicles based on a location provided by the user. This paper outlines our group's plan to build the EV friendliness evaluation program, highlighting the datasets we intend to explore and the methodology we will use to determine the EV friendliness of a county. By providing this tool to EV owners in New Jersey, we hope to accelerate the adoption of EVs, reduce greenhouse gas emissions, and improve the overall sustainability of the state.

Identifying Sustainability Problems

The data that we will gather from the The Electric Vehicle (EV) charging Locator dataset, New Jersey public transit dataset, and the NJ Census dataset will help us identify sustainability problems. Besides a lower fuel cost, electric vehicles offer a greener option in comparison to gas or diesel vehicles and greenhouse gas emissions are reduced. The data helps promote positive change in seeing the lower fueling costs and different types of counties where choosing electric vehicles won't only be beneficial

for the county, but for those individuals looking for ways to save money and make a positive impact on the environment.

Background on Sustainability Problem

We plan on diving into the problem of global warming with support from decreasing carbon emissions. Vehicle emissions cause air pollutants, which result in smog and health problems and greenhouse gasses. Through the investment of electric or hybrid vehicles, the amount of emission that will be produced will be a fraction compared to a gasoline vehicle. All electric vehicles produce zero tailpipe emissions. Enticing citizens to go sustainable with transportation, a significant amount of charging points will have to be put in place, with significant research done to allocate charge manufacturers that make stations that can last for their promised lifespan to make the emissions being used to produce them worth it. The purpose of persisting in this issue goes back to the care for our community and planet, as carbon dioxide contributes to global warming and is linked to respiratory illnesses and premature deaths. Caring to minimize our carbon footprint is an action that will impact beyond just our county. It is important to look for a solution that will help us long term.

Proposed Datasets

The Electric Vehicle (EV) charging Locator dataset will be a core component of our tool. This database includes information about the address of the charging station, the type of charging port available (e.g. Level 1, Level 2, or DC fast charging), the charging capacity, the hours of operation, and the payment methods accepted. This information can help us answer many questions about EV friendliness, such as: How many

chargers are there within a county? What types of chargers are they? Are they cheaper than gas options? All this information can help EV prospective owners find and use charging stations more efficiently and effectively. We can also contrast EV ownership data to determine if other people also felt that a county was better suited to handle EVs. This can help us answer questions such as: Are there higher concentrations of EVs in areas with more charging infrastructure? What counties have the highest concentration of EVs? This information can help us explore reasons why counties have higher/lower EV ownership.

The next dataset of interest will be the New Jersey public transit dataset. This includes information about total public transportation miles traveled and annual daily traffic counts within a county. Total public transportation miles traveled within a county will tell us how much the population depends on transportation by car. A higher number indicates a heavier reliance on public transportation, while a lower number may indicate more reliance on commuting by car. It is important to contrast this data with traffic counts to determine whether an EV can reduce the GHG emissions during commutes. These datasets will help us answer questions, such as: Which counties rely the most on public transportation? Which counties have the most traffic congestion? The answers to these questions can help a user make an informed decision on whether owning an EV makes practical sense within their county.

Lastly, our group plans to examine NJ Census data to determine the population demographics of areas with higher and lower EVs. Income, property taxes, and density are important factors when considering owning an EV. Are there tax deductions set in place at locations where taxes are higher? What is the median income of those counties

that have higher EV populations? Are there patterns in housing characteristics that are better suited for at home charging? These questions can help a user determine whether an EV makes sense in their county.

Use Cases

Our first use case is that our actors will include a user interested in finding the amount of chargers in their counties. The actor will provide their location and the database will provide an evaluation of the electrical vehicle friendliness of the region. This will be in the form of either an interactive graph or some sort of heat map locating regions with friendlier EV ownership. The program also will provide more detailed information about what type of chargers are in the region in the form of text output. The user can provide as much information as they want such as income population, gas prices and zip to further narrow their search. These evaluation functions will consider these values and provide scores to regions within the selection. These scores are going to determine the EV friendliness of the region. Some more additional features are if the user wants to enter in their commute time. This could generate some sort of sphere or distance around a location to show feasible areas they can travel too.