Project Proposal: Understanding the Impact of Solar Electric Programs on Electric Vehicle Adoption in New York

Problem Identification

Problem Statement

With the ongoing climate crisis, the focus on renewable energy sources and electric vehicles (EVs) is ever-increasing. However, the exact correlation between renewable energy programs and EV adoption rates remains unclear. This project aims to analyze and understand the impact of Solar Electric Programs on EV adoption, using New York State as a case study.

Context

As governments worldwide are implementing programs to encourage the use of solar power and electric vehicles, it is crucial to understand the relationship between these two factors. Our client is the New York State Energy Research and Development Authority (NYSERDA), which is interested in evaluating the effectiveness of their current programs and identifying potential improvements to boost EV adoption rates. The insights derived from this project will inform their policy decisions, development of new programs, and resource allocation.

Criteria for Success

The project will be considered successful if we can establish a clear correlation between solar electric programs and EV adoption rates in New York State, predict future trends, and provide actionable insights for NYSERDA. The success will also be measured by the accuracy and reliability of our predictive models.

Scope of Solution Space

The project will focus on New York State only due to the availability of specific datasets. The analysis will examine the impact of solar electric programs on EV adoption rates over the past decade. We will develop statistical and machine learning models to analyze the correlation and predict future trends.

Constraints

The main constraints include the quality and completeness of the datasets, potential inaccuracies in the data, and the time limit for the project. The analysis is also limited to the state of New York and may not generalize to other regions.

Stakeholders

The primary stakeholders are NYSERDA, policymakers, solar energy and EV industry leaders, and the general public of New York State interested in adopting solar and EV technologies.

Data Sources

Two datasets from Kaggle will be used for this project:

1. Solar Electric Programs Reported: This dataset contains details about solar electric programs implemented in New York State.

2. New York State's Charge NY EV Rebate Program: This dataset provides information about EV rebate programs and adoption rates in New York State.

The data will be acquired by downloading the datasets from Kaggle and then merging them based on common attributes.

Approach

We will start by performing exploratory data analysis (EDA) to understand the characteristics and quality of the data. Data cleaning and preprocessing will be performed to handle missing values, outliers, and inconsistencies.

Next, we will analyze the trends in solar program implementation and EV adoption rates over time. We will also study the geographic distribution of these programs and adoption rates across different regions in New York State.

Statistical tests will be conducted to understand the correlation between solar electric programs and EV adoption rates. We will then build predictive models using machine learning techniques to forecast future trends in EV adoption based on solar program data.

The project will conclude with an evaluation of the models' performance, interpretation of the results, and the formulation of recommendations for NYSERDA.

Deliverables

1. A comprehensive report detailing the findings, methodology, and recommendations.

2. A presentation deck for stakeholders summarizing the key findings and insights.

3. Python notebooks with all the analysis, data processing steps, and modeling code.

4. A predictive model for forecasting EV adoption rates.

5. Data visualization dashboards to illustrate the findings.

By understanding the correlation between solar electric programs and EV adoption rates, we hope to provide NYSERDA with actionable insights that can contribute to shaping a sustainable energy future for New York State.