CSC315 & BUS/MGT385 Collaborative Project

Phase II: Proposal

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I.   Data being used in Database

The datasets being used in our collaborative project are all from the Sustainable New Jersey website. They include: Aggregated Community-Scale Utility Energy Data, Electric Vehicle Ownership Data, Solar Installation Data, Energy Efficiency Program Participation Data, and Municipalities of New Jersey.

The first dataset, Aggregated Community-Scale Utility Energy Data, shows the total amount of electricity and natural gas purchased in a municipality by sector from 2015 through 2021. The electricity purchased is displayed in kWh and the natural gas purchased is divided up in terms of residential, commercial, industrial, and street lighting sectors. Sustainable New Jersey uses this data to calculate GHG emissions from electricity and natural gas.

The second dataset, Electric Vehicle Ownership Data, shows the estimated total number of personal vehicles and electric vehicles in every New Jersey municipality for 2015 and 2020. It was prepared using the US Census ACS data and the New Jersey Department of Environmental Protection's (NJDEP's) Alternative Fueled Vehicles (AFV) Report data. This can be used to track community Electric Vehicle adoption.

The third dataset being used in our database is the Solar Installation Data, which shows all solar installations in New Jersey from 2000 to 2020. The data includes: information about every installation, the total number of installations by year, total number of installations by customer type, and the total MW installed in each municipality for 2015 and 2020. The data was derived from New Jersey's Clean Energy Program Solar Activity Report "Installation Data".

The final dataset used in our project was the Municipalities of New Jersey dataset. This dataset contained standard information on New Jersey's municipalities, such as which county they belong to, as well as their municipality code.

II.   Questions the data will explore

Utilizing the existing attributes in available datasets will allow users to combine information from various sources to conduct accurate research on this topic. One example for using all the available data would be to ensure the power companies can sustain the increasing number of electric vehicles as they become more and more mainstream. Some relevant data points from the data sets are: residential electricity and natural gas consumption, total number of vehicles vs. number of EVs owned, number of residential solar installations.

III.   How the data could help identify sustainability problems, and opportunities to propose positive change

The datasets mentioned above will be combined to make our database. This will allow us to run queries in order to see if there is a correlation between the municipalities with the most eclectic vehicle ownership and the municipalities with the most amount of solar installations. Another correlation we can make is comparing the amount of electricity and natural gas that is purchased by those municipalities that have the most EV or the most solar installations.

By running these tests and queries, our goal is to identify areas/municipalities who have increased their solar energy production and EV use and if the energy needed to charge EVs is being supplemented by increased solar usage.

IV. Overview of the sustainability issue

    A. Background of the problem

Are areas that use more electric vehicles drawing more power, and if they are whether or not these areas are trying to offset this increased electrical demand with more solar.

    B. Various stakeholders affected by the problem

Stakeholders include private citizens, energy producers, fossil fuel companies, auto manufacturers. Private citizens are stakeholders as they bear the weight of harm caused by pollutants. Energy producers and fossil fuel companies are heavily invested in fossil fuels, as well as auto manufacturers.

    C. Ethical Issues

Some of the ethical issues include resource acquisition for things like batteries, job loss or gain, and environmental impact. Are areas that demand more energy also produce more solar energy.

V. Detailed Textual Use Cases

    A. Use Case 1

        1) System prompts user to select first data set to retrieve

2) User selects data set

3) System prompts user to select second data set

4) User selects second data set

5) System prompts user on how to view data correlations

6) User selects data view type

7) System generates graphical correlation data

B. Use Case 2

1) System prompts user to select data set

2) User selects data set

3) System displays data

4) System analyzes data for outlier data

5) System displays areas that could use improvement

6) System prompts user to highlight areas that could use improvement

7) User highlights displayed areas that could use improvement

8) System displays detailed information regarding the highlighted data set

Appendix :

The Data being used has changed the datasets we have used for our project: Aggregated Community-Scale Utility Energy Data, Electric Vehicle Ownership Data, and Solar Installation Data.
Detailed Textual Use Cases

Use Case 1

System prompts user to select county

User selects county

System prompts user to select municipality

User selects municipality

System shows the solar installations, energy, and electric vehicles data for that specify county &

municipality.

Use Case 2

System prompts user to select a interesting query to view

User selects query

System displays data