Group 1-5 Pitch
Fleet Management

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Problem Statement

- In the push for improving the current state of the environment, many businesses have made it a goal to reduce their impact on the environment as a whole.

- In the case of TCNJ, the goal is to become carbon neutral by 2040, and one of the steps in this process is to reduce the carbon impact of the vehicle fleet.

- However, there needs to be a plan of action when considering the costs of performing this transition and what the best course of action could be.

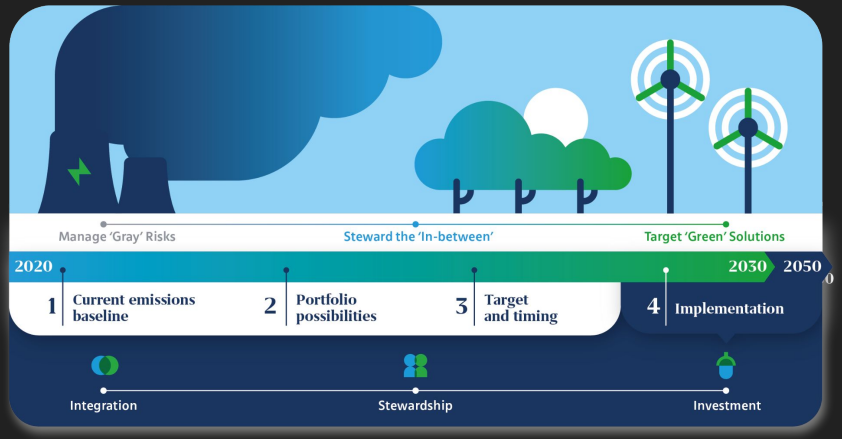
TCNJ
THE COLLEGE OF NEW JERSEY

Objective

- What is the most cost effective solution in which the College can reach its goal of net 0 emissions by 2040?
- This process can be done by analyzing the costs of owning different types of vehicles and the amount of emissions they create at different points in time.
- Should the College move to transition its fleet to zero emission alternates immediately or later in the cycle?

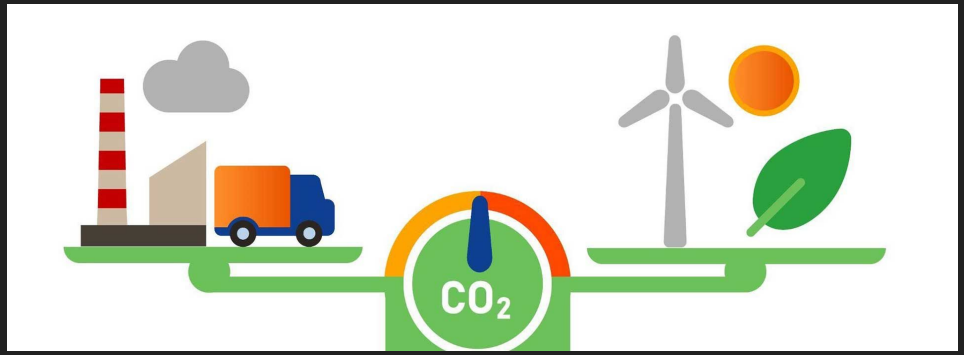
Desired End Product

- We wish to create a model of the current TCNJ fleet where vehicles and vehicle factors can be changed and costs/carbon effects can be calculated and displayed.
- Users can therefore test different replacement/transition strategies to find the best possible outcome for the emissions transition.



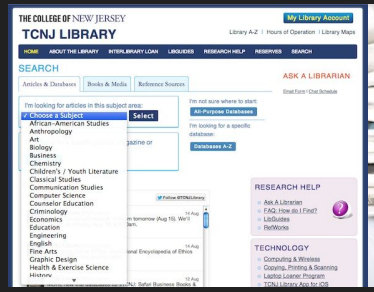
Importance and Need

- We cannot jump to a solution for the carbon neutral problem without a system for testing the possibilities towards reaching this goal.
- Our produced system will allow ease of method testing with quick result and predictions for the outcomes of switching vehicles in the vehicle fleet towards a 0 emissions solution.



Plan For Research

- We will first start with the data from the excel files in Canvas.
- We will then search other reports/studies about carbon emissions (Maybe from the TCNJ's virtual library).
- Next, we will find newspaper/magazine/journal articles about carbon neutral efforts and difficulties (Virtual/physical library).
- Look for statements from car manufacturers about their efforts to reduce carbon emissions from their vehicles.
- We would also try to gain ideas from other existing measurement systems to improve our module.



Other Systems

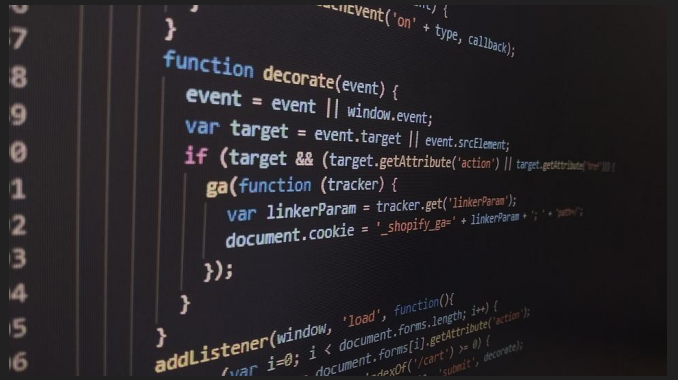
- https://afdc.energy.gov/files/u/publication/greet_fs_june_2013.pdf
- https://www.energystar.gov/buildings/benchmark?testEnv=false
- The Energy Star program's system is linked to your electric bills and is applied strictly to buildings while determining solutions based on more successful buildings, our system can do both cars and buildings (with slight modification) and offers ideas based on options that TCNJ has already determined viable.
- https://stars.aashe.org/reports-data/
- AASHE's tool is designed for comparison between other schools and generating data for reporting purposes. Our system provides data for analytical purposes.

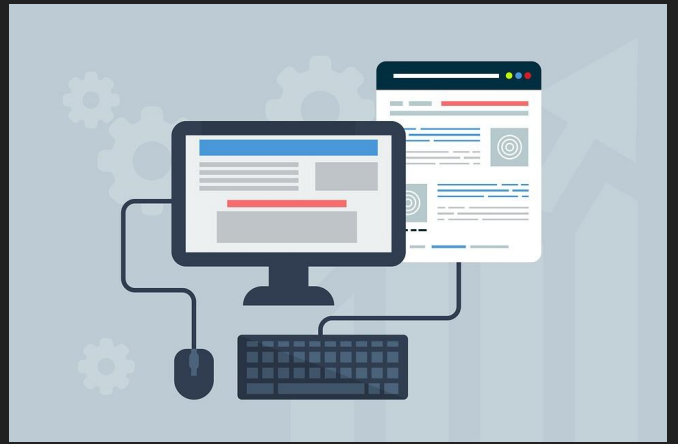
Other Applications

- We believe that our module can be used for campus buildings; the data would just need to be changed since it’s a sustainability testing system.
- The application doesn’t have to just apply to TCNJ, other schools or even car companies could benefit from a vehicle sustainability testing system.

Performance

- To ensure strong performance, efficient search algorithms need to be implemented into our system for ease of use to the user.
- Inside the code, we would reduce any nested loops which would slow down the search time.
- There needs to be a good database design to make it easy to navigate for users
- Caching





Security

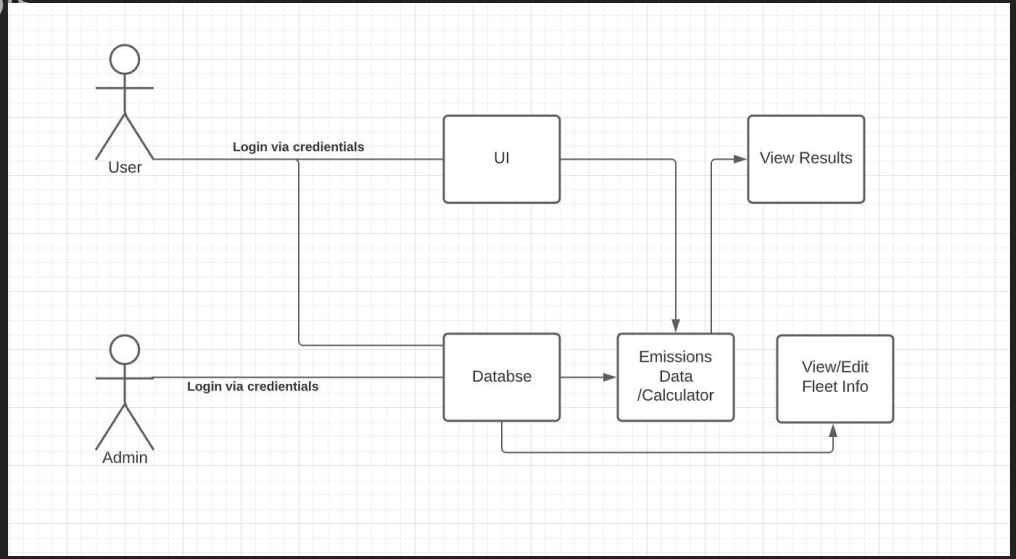
- Users would need to have a username and password in order to have access to our module.
- Using two-step authentication would add an additional layer of security against potential attacks.
- Three schema architecture → separation of user applications & physical database

Backup and Recovery

- All of the available data in our module will be uploaded to TCNJ servers for appropriate backup of our material.
- Credentials would be needed to access this information to prevent deletion.

Technology/Database Concepts + Diagram

- We will need to understand how to use and view Excel files in order to keep track of our data.
- Some technologies & database concepts we will need to learn:
  - Optimal Database Design with PostgreSQL
  - Querying our database in an efficient manner
  - Securing & Backing up our data



Fleet Vehicle Management

Group 1-5

Need

- To become carbon neutral by 2040
- Our produced system will allow ease of method testing with quick result and predictions for the outcomes of switching vehicles in the vehicle fleet towards a 0 emissions solution
- Utilize a system for testing the possibilities towards reaching this goal

Approach

- Gathering empirical data in order to provide accurate information
- Our produced system will allow ease of method testing with quick result and predictions for the outcomes of switching vehicles in the vehicle fleet towards a 0 emissions solution

Benefit

- Ewing and the surrounding communities will benefit from the reduction of emissions from the College
- The College of New Jersey will benefit from a more cost and carbon efficient fleet in the long run

Competition

- Our system is flexible and can be applied to various types of sources of energy usage (with some modification)
- Our system is not based around comparison between other schools/buildings, but catered to what options the user is already picking between.

The End