STP Worksheet

S- Situation **T**- Target **P**- Plan

Attempts at delegation and action planning often fail because there is a lack of alignment on the definition of the situation. Furthermore, rarely do people clearly agree on the target state prior to formulating an Action Plan. Attaining agreement on ***what*** the situation and the ideal target state are, ***before*** attempting to discuss ***how*** to get to the target state will ensure solid Action Plans. When Action Plans are also developed by the people responsible for the results, the commitment to the plans will be higher and the opportunity for success significantly increased. If the endeavor is delegated, it's important to check that there is agreement on the situation and the target with key interested parties, before implementing the Action Plan. This ensures that the Action Plan will be supported and deliver the results desired.

Hurdle or Barrier we are addressing:

We want to assess the impact building infrastructure and age have on properties' energy efficiency (via Energy Star Rating) and greenhouse gas (GHG) emissions specifically in the metro Seattle area with non-residential and multifamily buildings over 20,000 square ft. With global warming continuing its threat on the Earth, predicting energy usage and GHG emissions provides environmental scientists useful tools for mitigating this global crisis.
Data source:
https://data.seattle.gov/Permitting/2022-Building-Energy-Benchmarking/5sxi-iyiy/about_data

S - Defining the Situation:

Ask questions beginning with what, when, where, why, who and how. For example: How is it affecting our customers, employees, financial results, competitive position, teamwork, communications and the quality of our products/services? Include facts, opinions, beliefs, feelings, hunches, and assumptions. Feelings and beliefs are valid, just because someone feels them. Only facts can be debated and tested. If there is disagreement on facts or significant facts are unknown, the action plan can include an information-gathering step.

What: While the City of Seattle energy mostly comes from hydropower (80%), the emissions its buildings produce can still have a large impact on the climate crisis. Are there any features of a building that allow us to gauge a building's emissions footprint? Or how does its energy use over time work as a predictor?
When: We will be looking at building energy benchmarks from 2022, for non-residential and multifamily buildings greater than 20,000 square feet.
Where: The metropolitan Seattle area.
Why: Global warming is an ever increasing concern, and the large buildings of a metropolitan area like Seattle can be major users of energy and producers of greenhouse gasses. Being able to accurately predict if a building will be energy efficient before it is built is a huge deal, and can

play a massive part in reducing the overall energy usage and greenhouse gas emissions of these buildings that are typically super-emitters.
How: We will use 2022 energy benchmarking data from Seattle which covers various aspects of non-residential and multifamily buildings such as total square footage, year built, and annual energy usage adjusted to a would-be 30 year period of average weather. With this set, we will use these variables to predict a property's Energy Star score as well as its total GHG emissions.

T- Identifying the Target:

What is the ideal state? It's the end of the assignment and we've done a great job, what does that look like? What outcomes or results are we looking for? **Check that for every point under the situation, there is a point under the target that addresses the issue.**

Our team's primary goal is to find evidence that older and larger buildings create more energy waste through heating and appliance electricity use. Since the materials used in the construction of older buildings are significantly less advanced than materials used in modern times, as well as the higher energy draw of older appliances, we anticipate that there will be a distinct excess energy use in older buildings. We aim to use this knowledge to inform apartment owners about the energy expenses of their apartment before purchasing to incentivize people to purchase homes that are more efficient to decrease the impacts of the climate crisis.

Since the city of Seattle is such a densely populated area, new buildings are often being created and older ones are being renovated, so it would also be incredibly useful if our data could predict the efficiency of a building before construction is completed. This would also help to reduce the effects of the climate crisis by providing realistic energy consumption estimations for the lifespan of the building to reduce greenhouse gasses.

P- Plan

Action Planning Worksheet

Date: 09/11/2024 **Champion**: Group 5 **Team:** 5

Given the Situation and Target, our goal is:

To create a model that can generate accurate and meaningful predictions about a building's environmental impact based on described features of the building.

Why this goal is important *OR* (CSF(s) it addresses:

Understanding how a building's architecture impacts its energy consumption and GHG emissions will aid architects and city planners to regulate their energy usage and contributions to global warming. It will encourage a future of buildings that are constructed in a more sustainable fashion thus, slowing down the rate of climate change.

Measurable Result (How we'll know it's successfully completed)

We have an understanding of which building features have an impact on its energy use. Our model is capable of making accurate predictions about a building's estimated energy use.

Action Steps:

What	By When	Who
Get Data - .csv file downloaded from the City of Seattle Data Portal Website and added to team github repo.	9/6/24	Libby
Clean Data - handle missing and null values, drop features that are not relevant to our analysis.	9/20/24	John
Explore data - create some basic plots, find features that relate to each other, uncover correlations. Find patterns and trends.	9/27/24	Natalie
Generate/train initial model - After deciding model type and strategy	10/4/24	Connor
Evaluate model performance - with decided criteria i.e. (accuracy, predicted vs actual)	10/18/24	Libby
Modify model based on performance (if needed) - adjust parameters, criteria, and possibly data.	10/25/24	Connor
Study & Interpret total energy usage results - Determine optimal building dimensions and qualities, and find the points of diminishing returns.	11/8/24	Natalie

Greenhouse gas analysis - Compare energy usage from other energy sources with GHG usage, and look for trends in what leads to excessive use of GHGs.	11/15/24	Natalie
Draft final report - create a rough outline of the final report detailing our entire process	11/29/24	All
Finalize Report - proofread, decide format and publish final report.	12/6/24	John
Rehearse presentation - time our speeches and pacing while practicing our slide deck timing	12/10/24	All
Deliver Final Presentation	12/13/24	All

Questions:

Are the Actions ordered to provide the most significant impact as early as possible? Is there a significant benefit to the company if a partial solution is implemented first, and refinements added later?

% Chance of Success 75%

Possible Major Barriers to Success:

Features included in the dataset may not be good predictors for a building's energy output. Meaningful predictions require good data and features to be fed into the model. There could be a possible garbage-in garbage-out issue.

Help Required:

Instructor Consultation
Online references (Stack Overflow, W3 Schools, package documentation, etc.)
Instructor Publish Rubric?