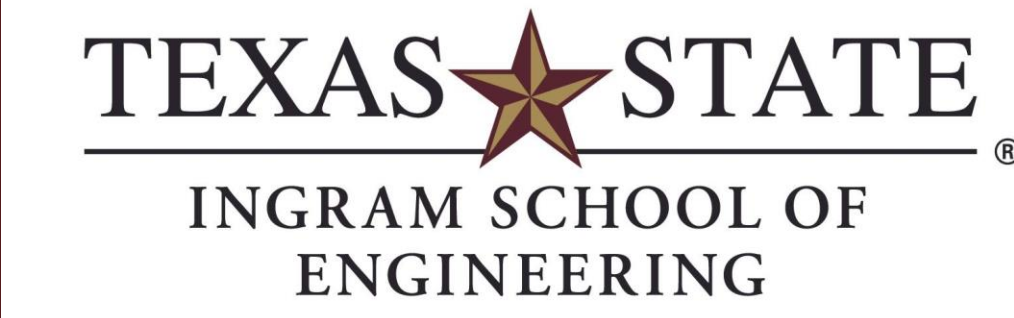


1.01 Net –Zero Microgrid For EV Charging in Texas Through 2040

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Background Information



- This project addresses the need for sustainable electric vehicle (EV) charging infrastructure in Texas in response to growing health and environmental concerns as well as to boost domestic energy security.
- An expected 45 million electric vehicles will need access to large and dependable charging networks by 2040.
- To forecast the number of EVs and Plug-in Hybrid Electric Vehicles (PHEVs) until 2040, this project focuses on seven Texas regions.

Problem Statement

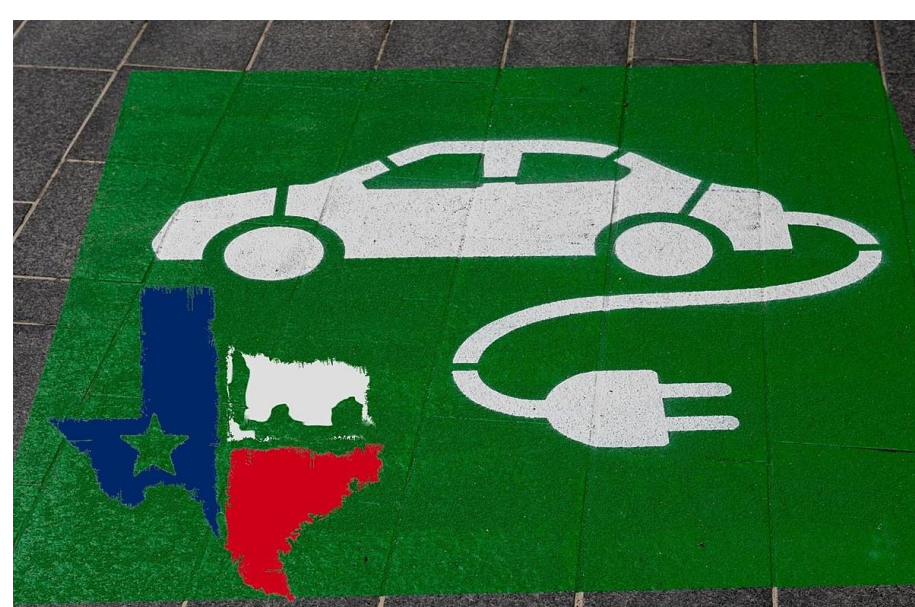
The development of a comprehensive strategy that ensures efficient and sustainable electrification of transportation, reduces fossil fuel dependence, and enhances grid resilience in the face of climate-related disruptions is urgently needed.

Project Objectives

- Predict the number of EV charging stations required per region from 2020 – 2040.
- Determine solar and wind farm capacity needed to supply renewable energy to the EV charging stations from 2020 – 2040.
- Develop a cost analysis to determine the feasibility of net – zero emissions EV transportation systems.

Project Purpose

- Demonstrate potential 55% EV ownership in Texas by 2040.
- EVs are zero-emission only when charged with renewable energy.



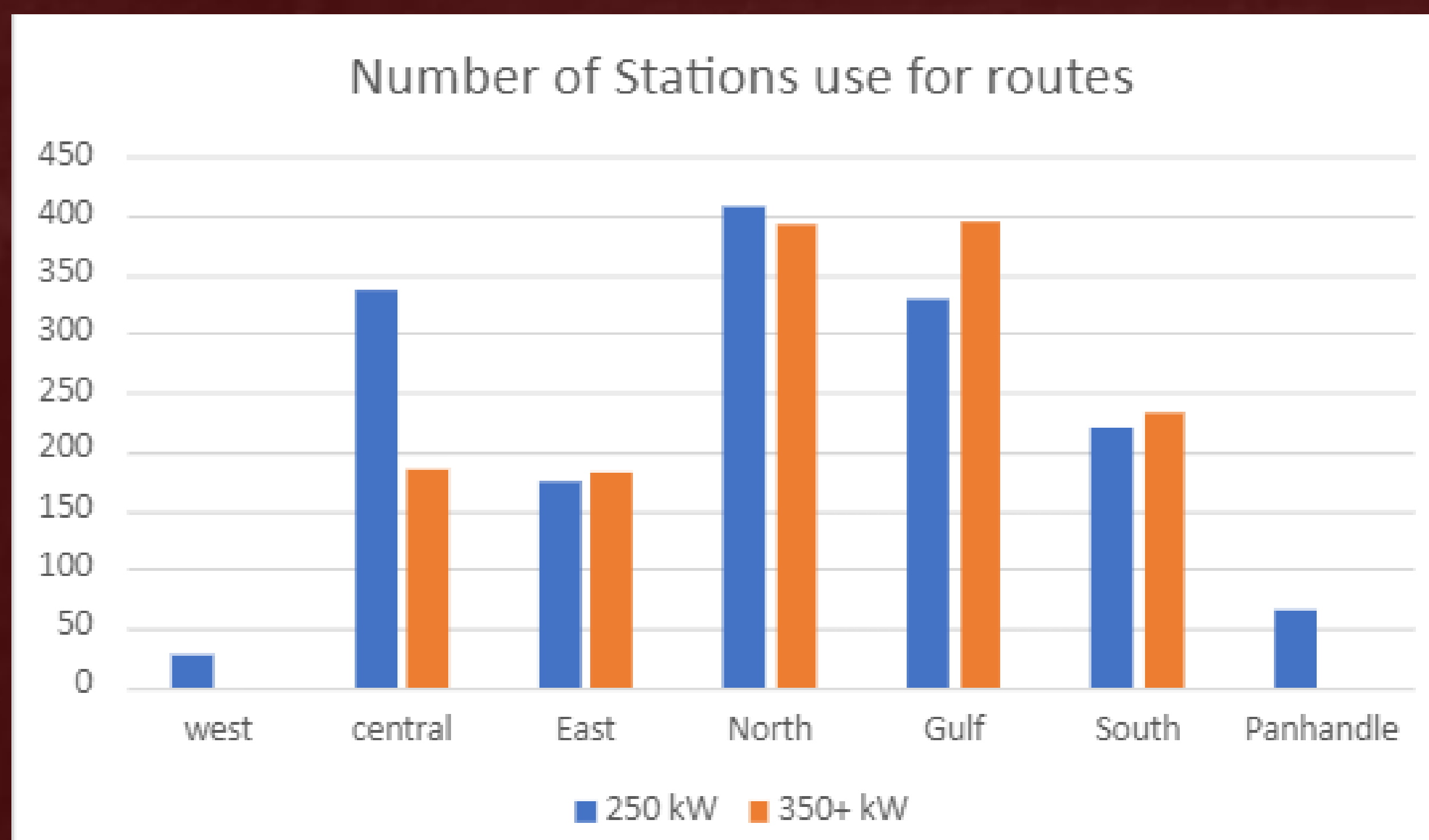
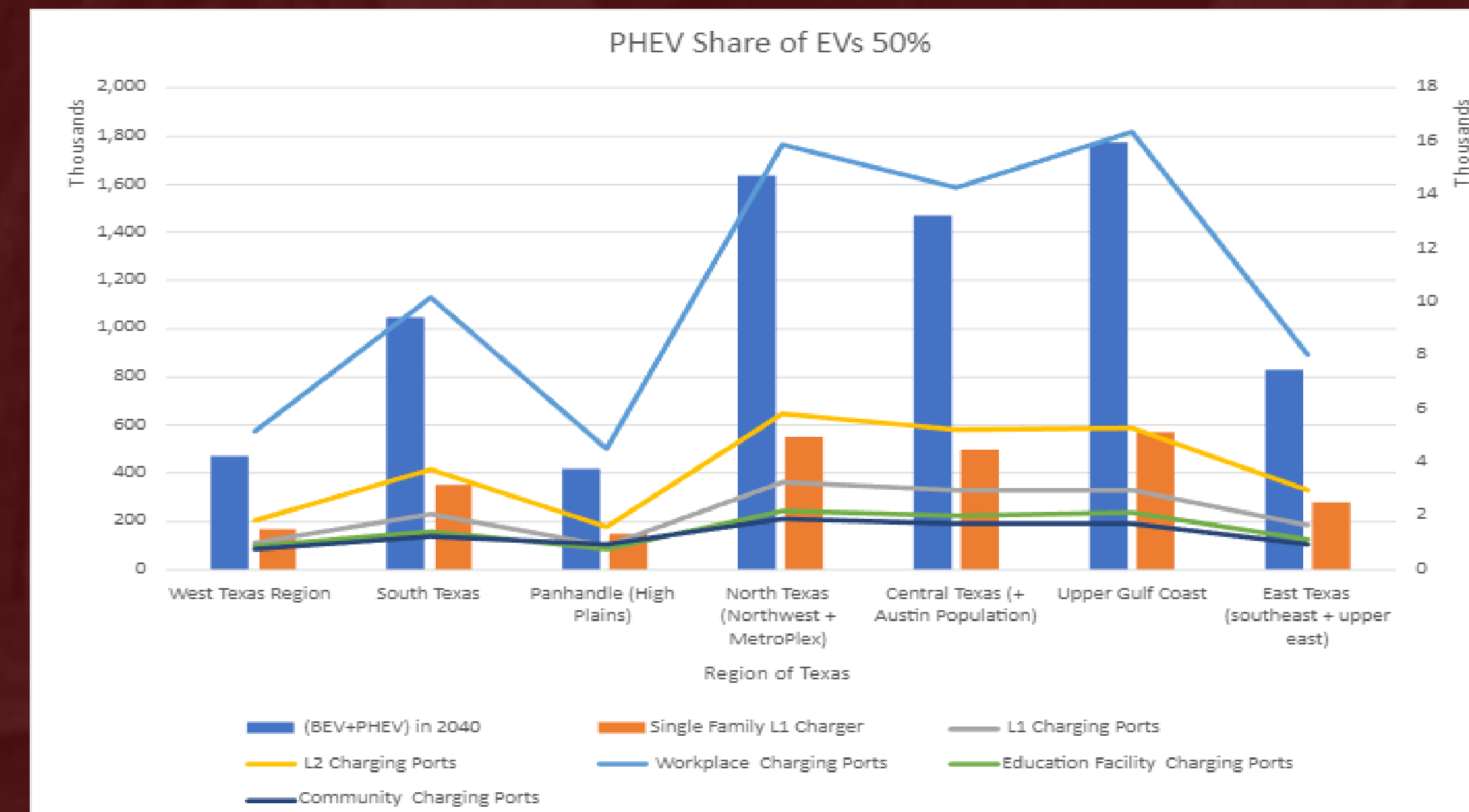
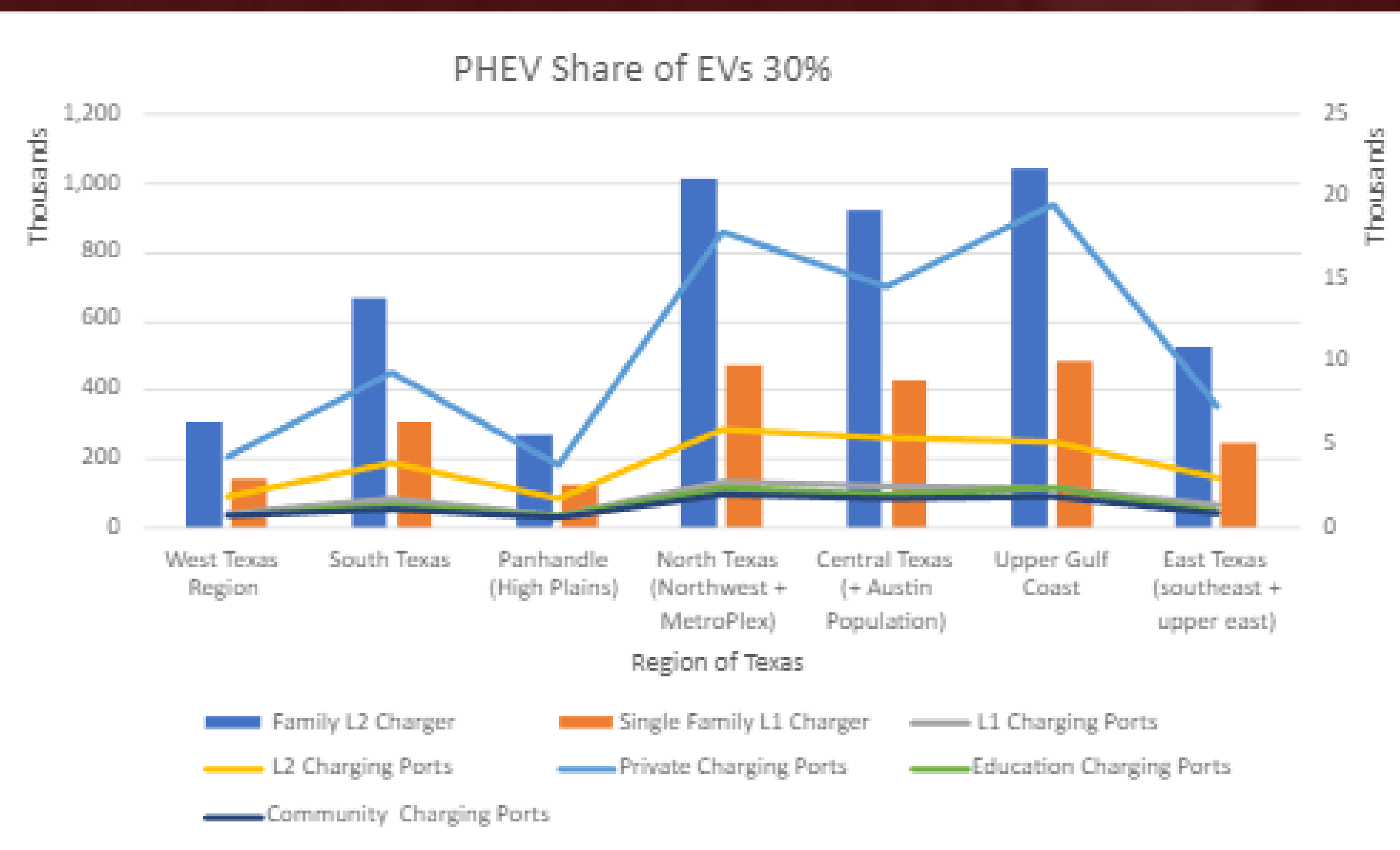
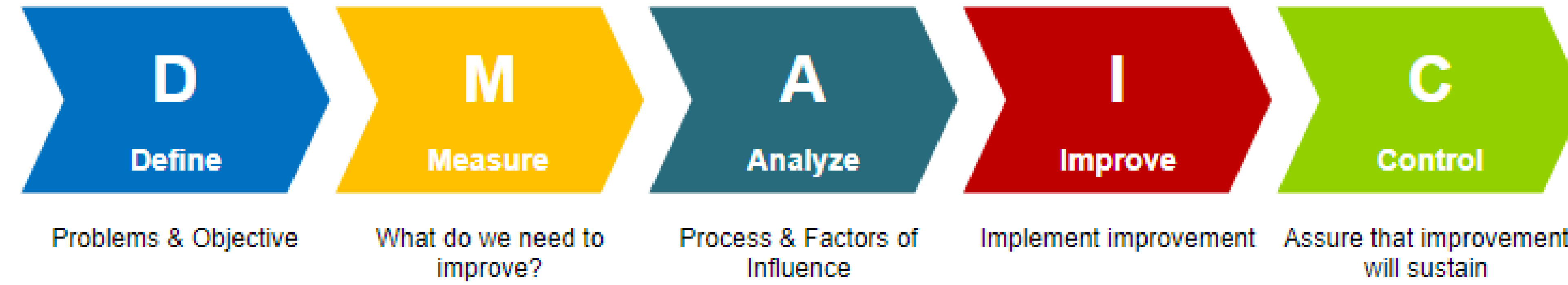
- Charging with the current grid would result in 25.7 million tons of carbon emissions annually.

- Aim to plan Texas' first net-zero EV charging network.

Analyse

- A data collected will be analyze using available software from Texas State University and EPRI.
- Microsoft Excel for performing optimization.
- EPI Pro Light to forecast EV Charger type and quantities require.

Problem Approach



Future Plans

- Evaluate the upfront costs of establishing the net-zero microgrid, including charging stations, renewable energy source and grid integration.
- Estimate ongoing costs associated with maintaining and operating the microgrid, considering factors like equipment upkeep, software updates and regular inspections.

Human Factors

Key Factors for Success:



- Minimize charging times and congestion
- Improve user experience and satisfaction
- Reduce emissions through strategic charging station placement
- Minimize unnecessary trips in search of charging points
- Encourage EV adoption and lower emissions
- Contribute to a cleaner, greener planet
- Address design-induced human performance difficulties
- Prevent accidents and dependability issues
- Ensure a positive impact on the project's financial aspects

Team Members: Arslan, Valentina, Joy

