Powering the Future

Visualizing Electric Vehicle Trends in WA

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Challenge Overview

This dashboard project explores the Electric Vehicle (EV) Population Data from Washington State, a publicly available dataset curated by the Washington State Department of Licensing. It contains detailed records of electric vehicles actively registered in the state. The dataset includes fields such as make, model, model year, electric range, vehicle type (battery electric or plug-in hybrid), and ZIP code-level geographic information.

The central challenge this dashboard seeks to address is: How can data-driven visualizations help us understand the spread and growth of electric vehicle adoption across Washington State?

As the state pursues ambitious environmental goals, such as reducing greenhouse gas emissions and transitioning to clean energy transportation, understanding where and how electric vehicles are adopted is essential. This dashboard aims to transform raw registration data into accessible, interactive insights that support strategic decisions in policy, business, infrastructure, and research.

Purpose and Intent

The purpose of this dashboard is twofold: to inform and to explore. For stakeholders such as policymakers, transportation planners, and advocacy groups, it provides clear visuals that summarize EV distribution trends and give insights on growth trajectories. For researchers, businesses, and community members, it offers tools for exploring the data through simpler visualizations.

The resulting data visualization dashboard's goal is to inform and empower multiple stakeholder groups. Transportation departments can use insights to prioritize infrastructure deployment, such as new charging stations in underserved areas. Researchers can apply the findings to measure the effectiveness of policy interventions, while clean energy advocates can use the visual narratives to communicate progress and identify equity concerns in green technology adoption.

Our intent is to enable users to:

- Analyze geographic trends in EV adoption at the ZIP code level.
- Identify the most popular EV makes and models and how they vary by region.
- Compare vehicle types, such as battery electric vs. plug-in hybrids, and their electric ranges.
- Support the strategic placement of EV infrastructure, such as public charging stations.

This challenge matters because transitioning to electric vehicles is a critical component of climate action plans. Yet, adoption may not be uniform across communities. By visualizing this data, we hope to reveal where progress is occurring and where it's lacking, enabling more targeted and inclusive policy decisions.

Some of the guiding questions we hope to address through the dashboard include:

- Are there regions in Washington that are lagging in EV adoption?
- Where is EV adoption accelerating most rapidly, and why?
- Which EV models are most common, and how does their distribution vary geographically?
- Are newer models with longer ranges driving growth in certain areas?
- Can we identify correlations between electric range and location or vehicle type?

The challenge, which looks primarily into growth trends, offers an opportunity to examine electric vehicle adoption across Washington State. It encourages participants to explore the data and uncover patterns and trends that may vary by region or vehicle type. Through visualizations of growth over time and geography, the challenge supports informed analysis while allowing stakeholders to interpret the insights according to their own perspectives and objectives.

Proposed Project Plan

Week 7: Planning and Data Acquisition

- Define project scope and objectives.
- Acquire and preprocess the Electric Vehicle Population Data.

Week 8: Data Analysis and Design

- Perform exploratory data analysis.
- Identify key metrics and trends.

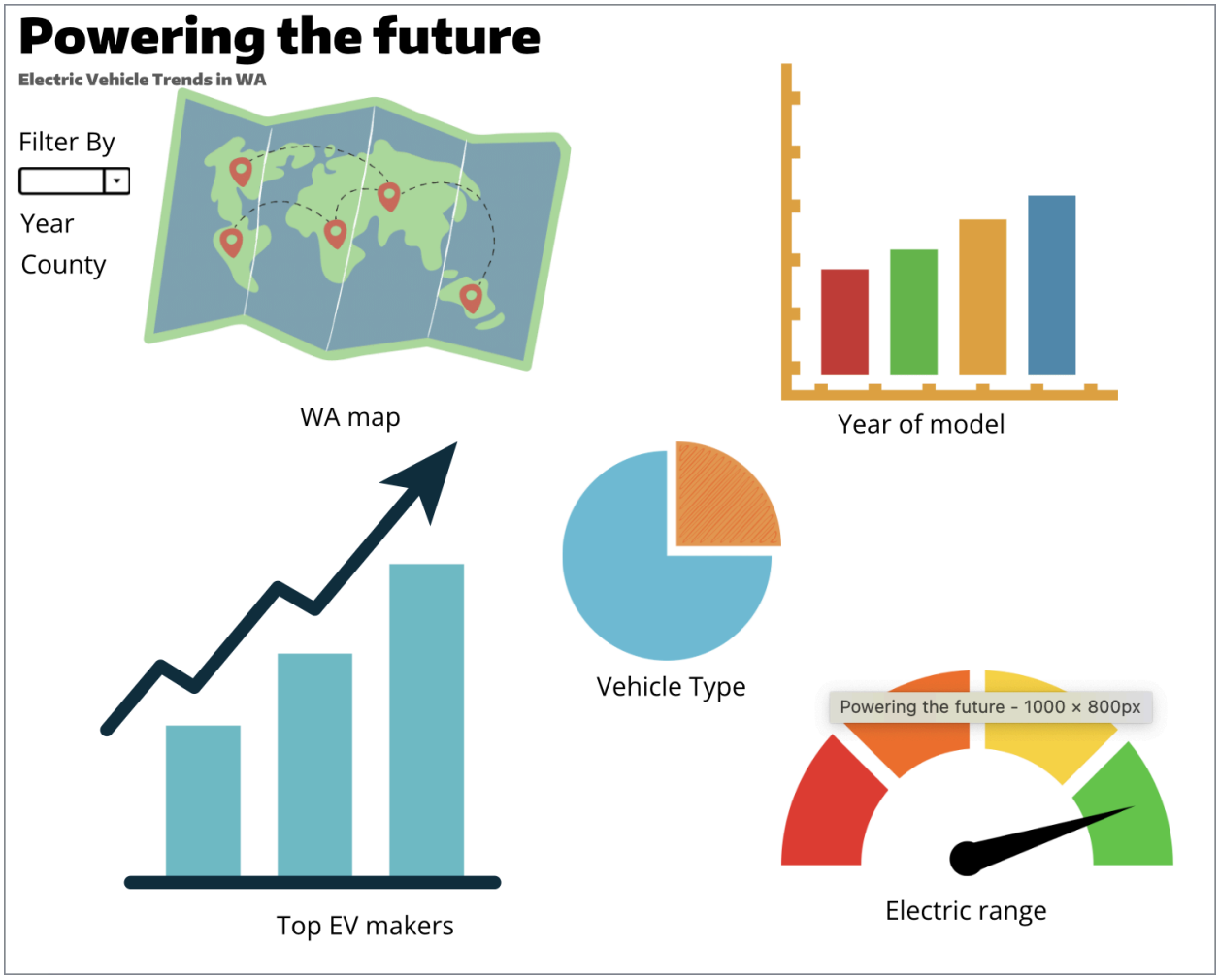
Week 9: Development
- Develop the interactive dashboard using appropriate tools like Tableau.
- Integrate data visualizations and interactive elements.

Week 10: Testing and Deployment
- Conduct usability testing and gather feedback.
- Refine visualizations and interface based on feedback.

Description of possible team roles

- **Project Manager:** To oversee project timeline, coordinates team activities, and ensures objectives are met.
- **Data Analyst:** To handle data cleaning, analysis, and interpretation.
- **UX/UI Designer:** To design the dashboard interface for optimal user experience.

Sketch of the Potential Data Interface



Background

For this project we selected “State of Washington - Electric Vehicle Population Data” created by the department of licensing in November of 2020 which contains information relating to Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (PHEVs) that were registered in 2020 through Washington State Department of Licensing (DOL). The DOL is responsible for vehicle registration throughout the state and because registration is mandatory for all vehicles operating in Washington, the dataset includes a near-complete inventory of registered

EVs within the state. We accessed this data through data.gov, which is a US government run website created in 2009 that provides free open data collected by the US government.

This dataset was collected to support state efforts to track the growth of electric vehicle (EV) adoption across Washington state. With the increasing emphasis on environmental sustainability and reduction of greenhouse gas emissions, the data serves as a crucial tool for policymakers, researchers, advocacy organizations, and business leaders. The dataset contains info on over 150k individual vehicles, including data on the car itself: its make, model, VIN number, electric range, as well as data on the location of its registration: city, county and tract data. For privacy reasons personally identifiable information such as owner names or exact addresses is excluded from the dataset.

There are several limitations of the dataset which should be noted. The first is that it does not include any possibly relevant information around the EV owner's demographics, income level, or any qualitative data on their reason behind purchasing their EV. Another limitation is that while the ZIP code-level data provides regional granularity, it does not allow for precise spatial analysis at the neighborhood level. Aside from this there are few other relevant limitations, however some entries contain null or blank fields in less critical columns such as electric range or vehicle type. These gaps slightly hinder detailed analysis, particularly when trying to model trends over time or across geography. Thankfully a data dictionary is accessible on the data.gov catalog page and the Washington Open Data Portal, where the dataset is hosted. This dictionary describes each column, and the values found within it, making the dataset more accessible for a wide range of users.

It should be noted that several publications and policy briefs have drawn on this dataset to support environmental research and transportation planning. An example is the Washington State Energy Strategy, which incorporates insights from the electric vehicle population data to track progress toward clean energy and carbon reduction goals. Additionally, academic articles on EV adoption often cite the dataset as a key source of empirical information about regional adoption rates and infrastructure needs

Works Cited

- "State of Washington - Electric Vehicle Population Data." *Catalog*, Publisher data.wa.gov, 10 Nov. 2020, catalog.data.gov/dataset/electric-vehicle-population-data.

- Carpenter, V. P. (2021). *Electric Vehicle Adoption in Washington State Municipalities: Does Local Government Capacity Explain Compliance with State Government Mandates*. ProQuest Dissertations & Theses.