Project Report

Int 217

Project

LOVELY PROFESSIONAL UNIVERSITY

PHAGWARA, PUNJAB

Electric Vehicle Market Analysis & Insights

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DECLARATION

I, Prakhar Purwar, hereby declare that the work done by me on "Excel Project" is a record of original work for the partial fulfilment of the requirements for the award of the degree of Bachelor of Technology in Computer Science - Data Science, Lovely Professional University, Phagwara.

Signature   Signature

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ACKNOWLEDGMENT

First and foremost, I would like to express my deepest gratitude to my college for providing me with the opportunity and resources to undertake this project.

I extend my sincere thanks to my Teacher, **Mam Baljinder Kaur,** for his invaluable guidance, constructive feedback, and constant encouragement throughout the project. His expertise and support were instrumental in achieving the objectives of this work.

Thank you all

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1. Introduction: -

Electric vehicles (EVs) are becoming a key part of global efforts to reduce emissions and transition toward cleaner, more sustainable transportation. As the market continues to grow, understanding the patterns in EV adoption, performance, and distribution becomes essential for policymakers, utility providers, and the automotive industry.

This project, titled **"Electric Vehicle Market Analysis & Insights"**, aims to explore and visualize important trends using real-world data from Washington State. The analysis is presented through an interactive Excel dashboard, which uses tools like Pivot Tables, Charts, and Slicers to make the insights clear and accessible.

The report focuses on six specific objectives, including EV distribution by utility provider, brand-wise electric range, model year trends, regional spread across legislative districts, CAFV eligibility, and the comparison between BEV and PHEV types. Each objective is designed to highlight a unique aspect of the EV landscape.

The dashboard not only showcases technical skills in data analysis and Excel visualization but also supports better understanding of the EV ecosystem for stakeholders working toward a greener future.

2. Source of Dataset:-

The dataset used for this project is sourced from the official U.S. government open data platform, which provides public access to data collected by various agencies. The specific dataset used is focused on electric vehicle registrations in the state of Washington.
Source link: https://catalog.data.gov/dataset/electric-vehicle-population-data

3. Dataset Preprocessing :-

Before starting the analysis, the dataset needed to be cleaned and prepared to ensure accuracy and relevance. The preprocessing steps were performed using Microsoft Excel and involved the following key actions:

- Removing Duplicates: Duplicate entries were removed to avoid skewed results in counts and averages.
- Handling Missing Data: Rows with essential missing values (such as electric range or model year) were either filled or removed based on context.
- Data Filtering: Only relevant columns required for the six analysis objectives were retained to keep the dataset streamlined.
- Standardization: Some values (e.g., EV type, model names) were standardized for consistency across rows.
- Data Transformation: New calculated columns, such as average electric range by make or year, were created using Excel formulas and pivot tables.
- Grouping and Categorization: Vehicles were grouped by brand, year, type, utility provider, and district to support various analysis objectives.

4. Analysis on Dataset :-

Objective 1: Electric Vehicles by Utility Provider

i) General Description

This analysis identifies how EVs are distributed among different utility service providers, helping understand the role of infrastructure in EV adoption.
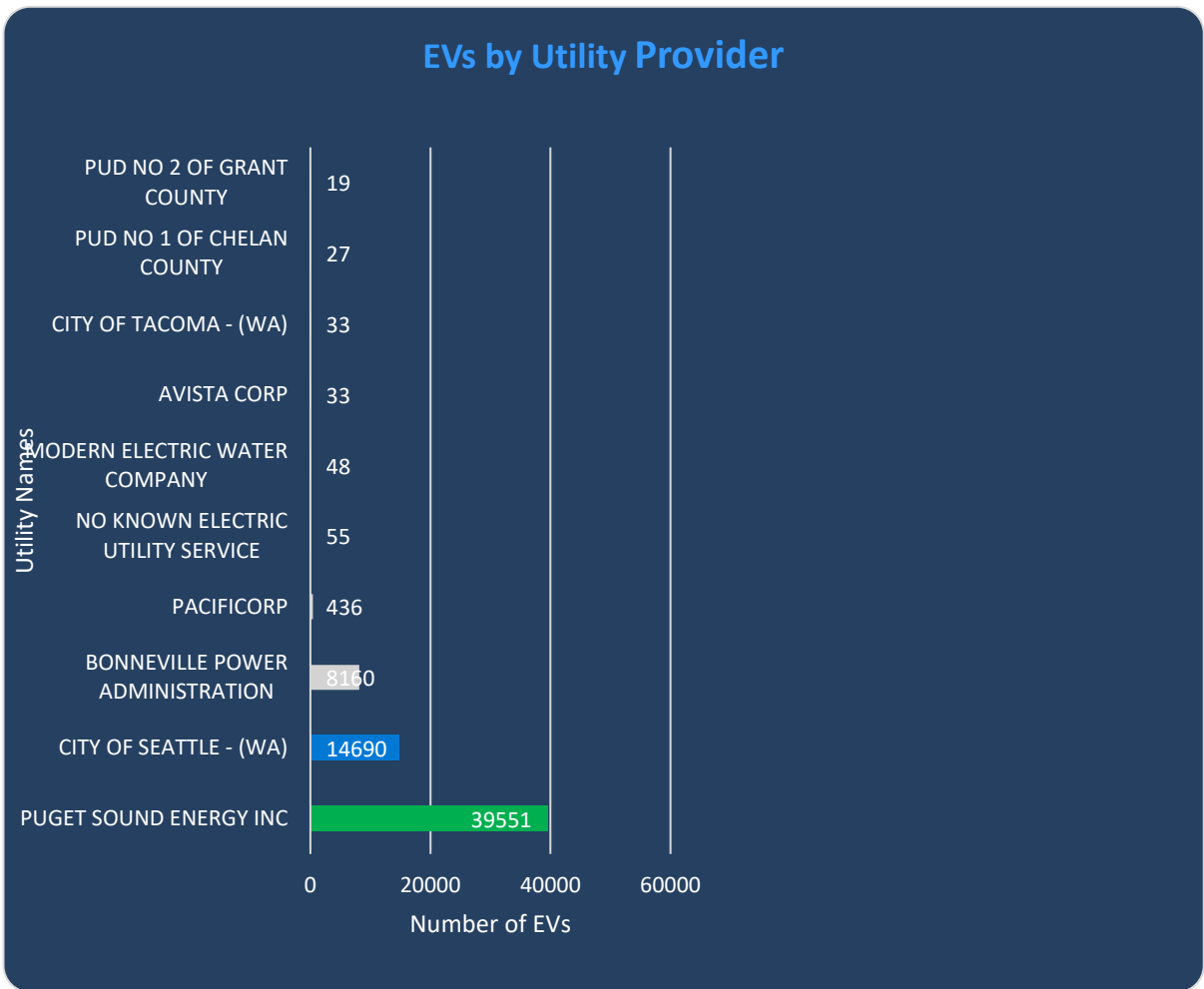
ii) Specific Requirements

- Count number of EVs served by each utility provider.
- Highlight top providers by EV count.

iii) Analysis Results

- Puget Sound Energy and Seattle City Light serve the majority of EVs.
- A small number of providers support a disproportionately high number of vehicles.

iv) Visualization

Bar chart showing EV count by utility provider.

EVs by Utility Provider

Utility Names	Number of EVs
PUD NO 2 OF GRANT COUNTY	19
PUD NO 1 OF CHELAN COUNTY	27
CITY OF TACOMA - (WA)	33
AVISTA CORP	33
MODERN ELECTRIC WATER COMPANY	48
NO KNOWN ELECTRIC UTILITY SERVICE	55
PACIFICORP	436
BONNEVILLE POWER ADMINISTRATION	8160
CITY OF SEATTLE - (WA)	14690
PUGET SOUND ENERGY INC	39551

Objective 2: Average Electric Range by Make (Brand)

i) General Description

This analysis compares the average electric driving range of EVs by brand.

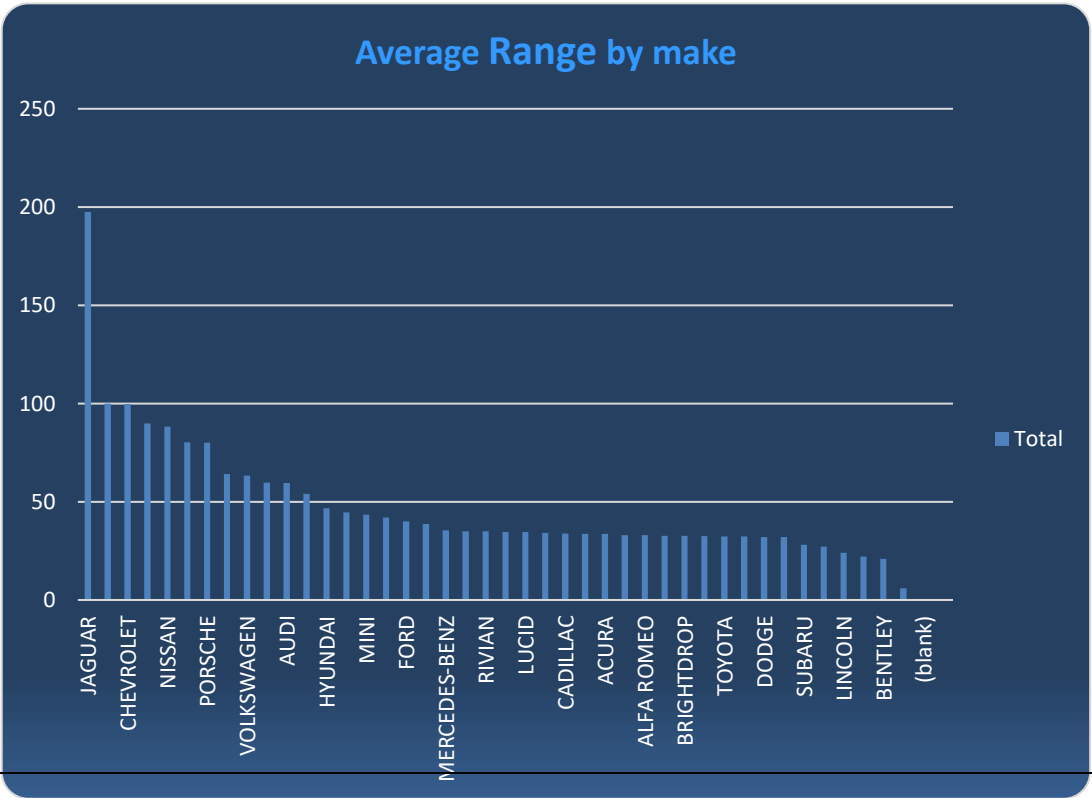### ii) Specific Requirements

- Group EVs by brand.
- Calculate average electric range for each.

iii) Analysis Results

- Tesla consistently shows the highest average electric range.
- Other brands like Chevrolet and Nissan show competitive ranges in specific models.

iv) Visualization

- Horizontal bar chart with average range per make.
- Option to filter by EV type or year.

Average **Range** by make

Objective 3: Model Year vs. Electric Range Analysis

i) General Description

Explore how electric range has changed over time with vehicle model year.
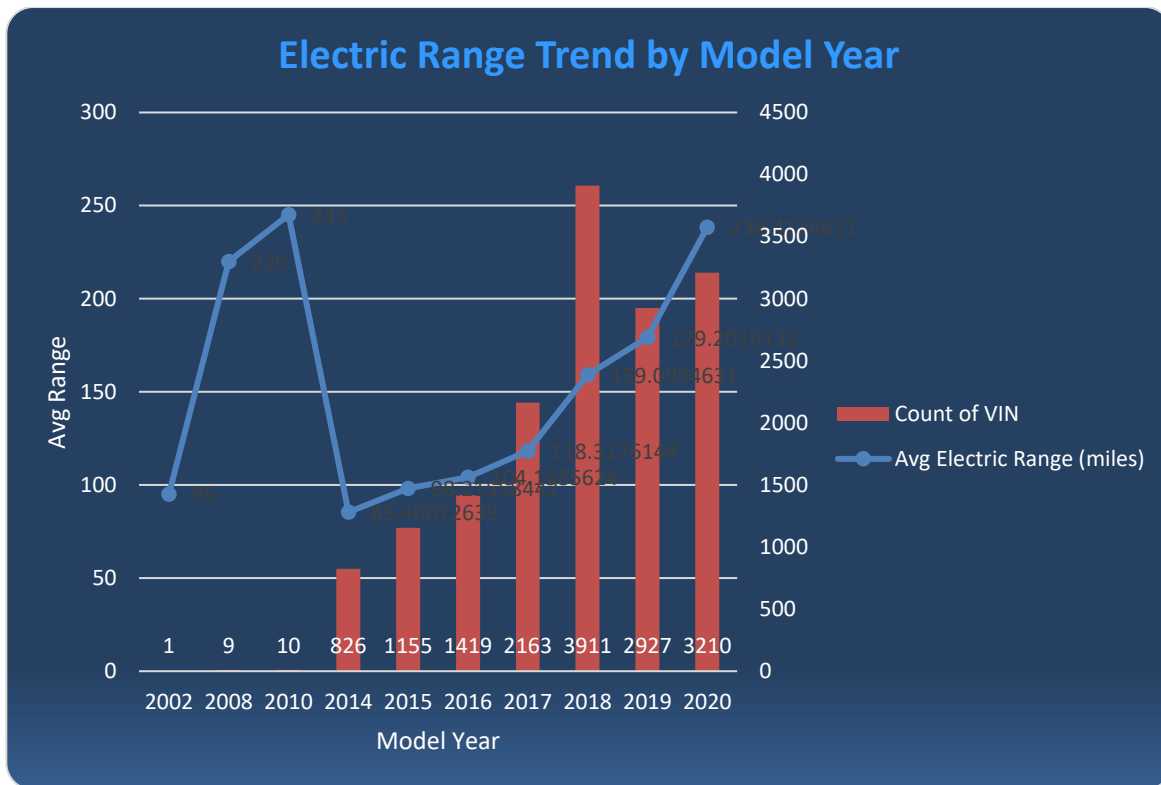
ii) Specific Requirements

- Plot electric range against model year.
- Observe any trends or improvements.

iii) Analysis Results

- Strong positive trend in electric range with newer model years.
- Notable increase post-2017, reflecting tech improvements.

iv) Visualization

- Combo chart: Year on X-axis, Range on Y-axis.

- Option to filter by brand or EV type.

Electric Range Trend by Model Year

Objective 4: Distribution of EVs by Legislative District

i) General Description

Understanding how EVs are spread across legislative districts.
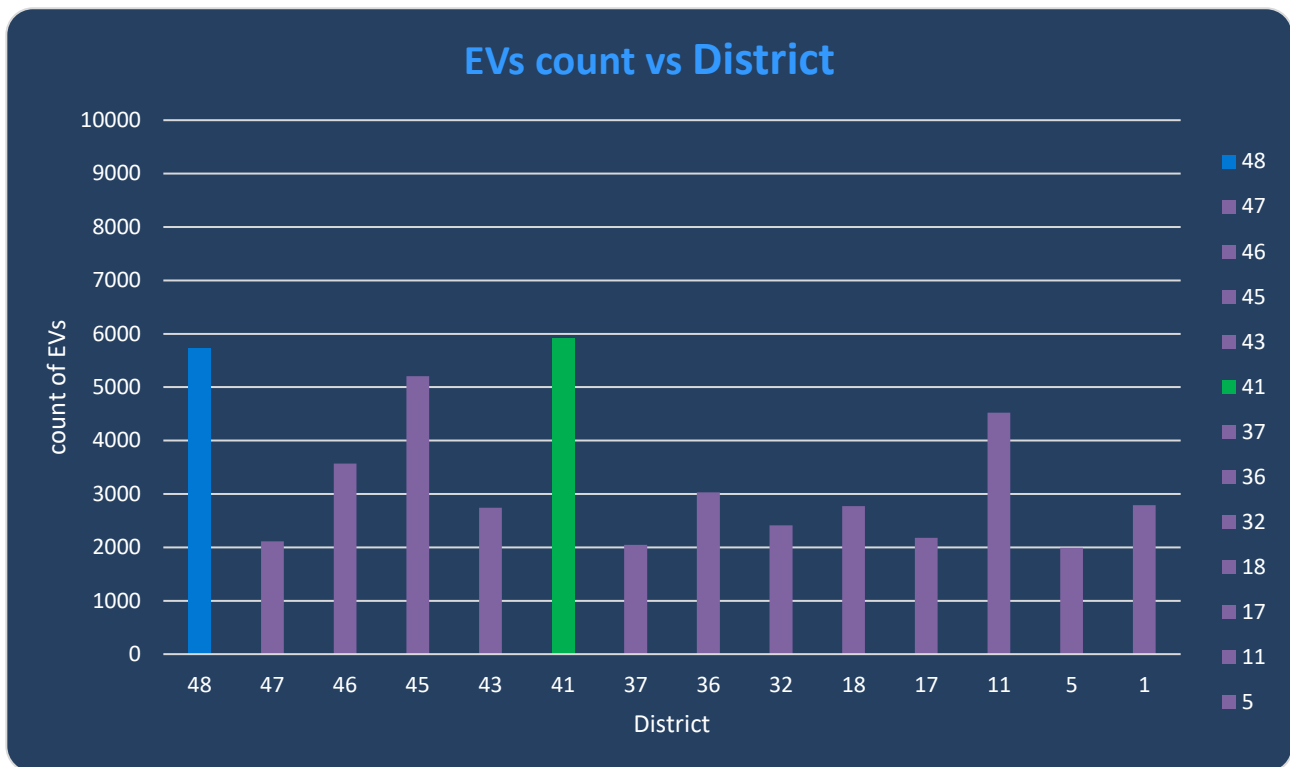
ii) Specific Requirements

- Count EVs by district.
- Highlight areas with high/low adoption.

iii) Analysis Results

- Urban districts (like Seattle area) have higher EV concentrations.
- Some rural areas show limited EV presence.

iv) Visualization

- Urban districts (like Seattle area) have higher EV concentrations.
- Some rural areas show limited EV presence.

EVs count vs District

Objective 5: CAFV Eligibility vs. Electric Range

i) General Description

Assess if CAFV-eligible vehicles tend to have higher electric ranges.
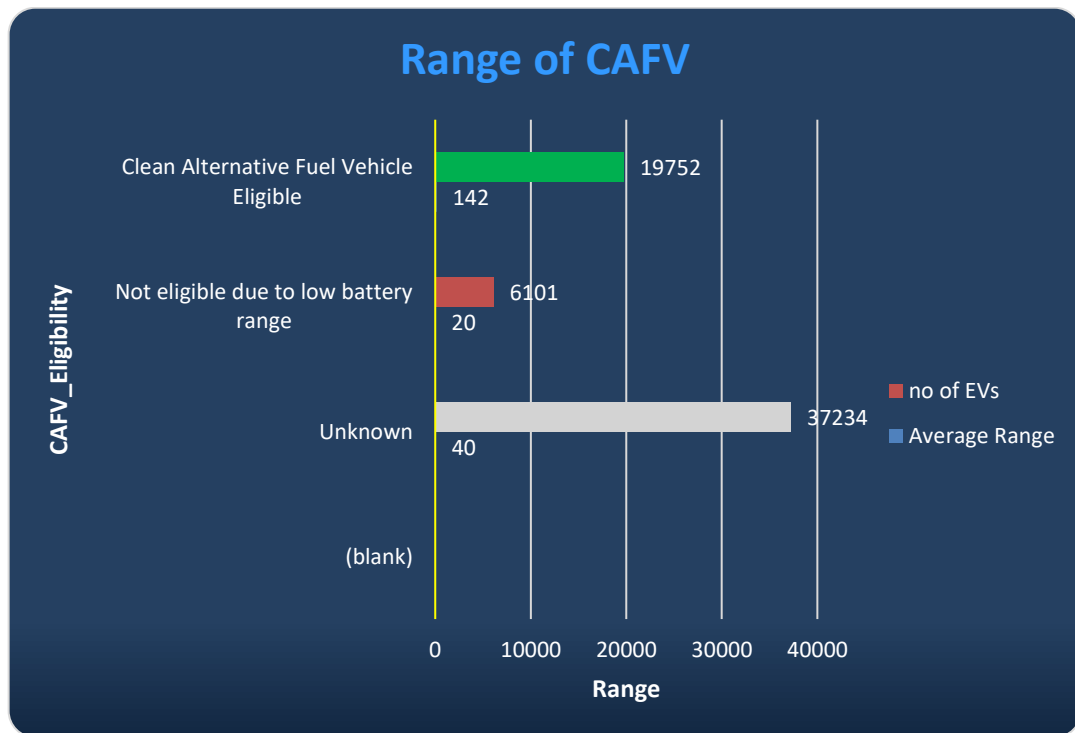
ii) Specific Requirements

Compare range averages between eligible and non-eligible vehicles.

iii) Analysis Results

- CAFV-eligible vehicles usually have longer electric ranges.
  - Indicates alignment of policy with performance.

iv) Visualization

- Stacked bar chart or side-by-side bar chart comparing ranges.

Range of CAFV

Objective 5: CAFV Eligibility vs. Electric Range

i) General Description

Determine how the EV market is split between BEVs and PHEVs.

ii) Specific Requirements

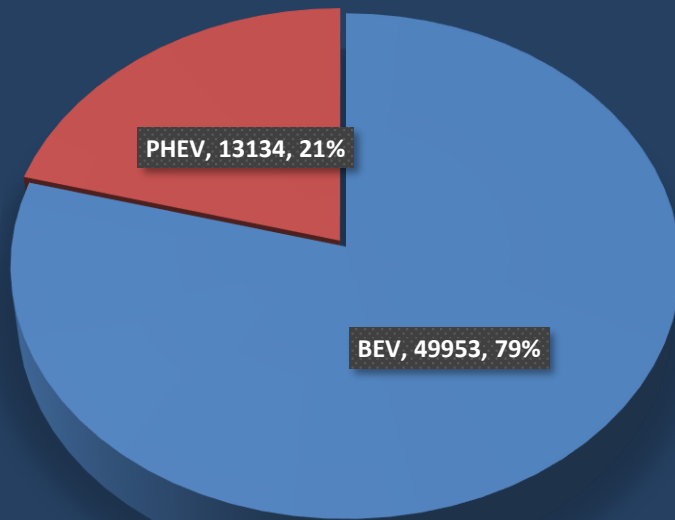Calculate proportions of each EV type.

iii) Analysis Results

- Battery Electric Vehicles (BEVs) make up the majority.
- Indica PHEVs remain relevant but in smaller numbers.

iv) Visualization

- Pie chart showing percentage distribution.

Proportion of EVs by Type

PHEV, 13134, 21%

BEV, 49953, 79%

5. Conclusion :-

This project provided a comprehensive analysis of electric vehicle (EV) trends using real-world data from Washington State. Through an interactive Excel dashboard, we explored multiple dimensions of the EV ecosystem — including utility provider distribution, brand-wise performance, year-over-year improvements, and geographic spread.

The findings highlight several key insights:

A few utility providers serve the majority of EVs, suggesting regional infrastructure leadership.

Tesla leads in electric range, while other brands show steady progress.

Newer model years demonstrate a clear improvement in electric range, showing rapid technological advancements.

Urban legislative districts have significantly higher EV adoption, underlining the role of accessibility and awareness.

CAFV-eligible vehicles tend to have better performance, reflecting well-designed environmental policy standards.

Battery Electric Vehicles (BEVs) dominate the market, but Plug-in Hybrid Electric Vehicles (PHEVs) still hold value in certain segments.

Overall, the dashboard enables users to interactively explore EV trends and supports better planning, investment, and policy decisions in the transition to sustainable transportation.

LinkedIn link:

https://www.linkedin.com/posts/prakharpurwar_exceldashboard-datavisualization-electricvehicles-activity-7317212299746807808-2iAs?utm_source=share&utm_medium=member_desktop&rcm=ACoAAD1lepQBKHPOcR7SK1cnnOjxHFAwOxohrTw