

EV POPULATION ANALYSIS REPORT

This report provides a comprehensive analysis of the electric vehicle (EV) population in Washington State, based on the provided dataset, Jupyter Notebook, and presentation.

Dataset Overview

The analysis is based on the **Electric Vehicle Population Data** from the Washington State Department of Licensing (DOL).

- **Source:** <https://catalog.data.gov/dataset/electric-vehicle-population-data>
- **Records:** 261,698
- **Columns:** 17

The dataset contains detailed information about Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (PHEVs) registered in Washington. The key columns used in the analysis include:

- **County:** The county where the vehicle is registered.
- **Model Year:** The manufacturing year of the vehicle.
- **Make:** The manufacturer of the vehicle (e.g., TESLA, FORD).
- **Electric Vehicle Type:** Whether the vehicle is a BEV or PHEV.
- **Electric Range:** The vehicle's electric range in miles on a single charge.
- **Base MSRP:** The Manufacturer's Suggested Retail Price.

Key Findings and Analysis

The analysis reveals several key trends in the EV population of Washington State:

1. EV Population Trend by Model Year

There has been a significant and accelerating adoption of EVs in Washington.

- **Insight:** A noticeable increase in EV registrations began around **2018**.
- **Trend:** The growth has been particularly rapid between **2020 and 2024**, indicating an accelerating market adoption.

This trend suggests a growing consumer interest in electric vehicles, likely driven by a combination of factors including increased model availability, improved technology, and greater environmental awareness.

2. BEV vs. PHEV Distribution

The EV market in Washington is dominated by Battery Electric Vehicles (BEVs).

- **Insight: BEVs** make up nearly **80%** of the EV population in the state.
- **PHEVs** constitute a smaller but still significant portion of the market, at around **20%**.

This indicates a strong preference for fully electric vehicles over plug-in hybrids among consumers in Washington.

3. Top 10 EV Manufacturers

The market is led by a few key players, with both established and newer automotive companies having a strong presence.

- **Market Leader: TESLA** is the clear market leader by a large margin.
- **Strong Presence:** Traditional automakers such as **NISSAN, CHEVROLET, and FORD** also have a significant number of registered EVs.
- **Other Key Players: KIA, BMW,** and other manufacturers follow, indicating a competitive market.

4. Top 15 Counties by EV Count

EV ownership is geographically concentrated, with the highest adoption rates in and around major metropolitan areas.

- **Highest Concentration: King County** has the highest number of registered EVs, followed by **Snohomish** and **Pierce** counties.
- **Insight:** This pattern suggests that urban and suburban areas are the primary hotspots for EV adoption in Washington.

5. Electric Range by EV Type

There is a clear difference in the electric range capabilities of BEVs and PHEVs.

- **Insight:** BEVs have a much higher median electric range than PHEVs.
- **Distribution:** The electric range for BEVs is widely distributed, with many models offering a high range. In contrast, the range for PHEVs is more concentrated at the lower end, as expected due to their hybrid nature.

Technologies Used for Analysis

The analysis was performed using a standard set of data science tools:

- **Python:** The core programming language used for the analysis.
- **Pandas:** For data manipulation and exploration.
- **Matplotlib & Seaborn:** For creating data visualizations.
- **Apache Spark (PySpark):** For large-scale data processing and aggregation.

Conclusion

The analysis of the Electric Vehicle Population Data for Washington State provides several key takeaways:

- The dataset, with over **260,000 registered EVs**, provides a robust sample for a detailed analysis of EV adoption trends.
- The EV market in Washington is dominated by **BEVs**, with **Tesla** being the leading manufacturer.
- EV adoption has grown significantly since **2018**, with a rapid acceleration in recent years (**2020–2024**).
- **BEVs** offer a substantially higher electric range compared to **PHEVs**.
- The highest concentration of EVs is in urban and suburban counties like **King and Snohomish**.

This dataset is a valuable resource for studying EV adoption trends, planning for charging infrastructure, and supporting clean energy initiatives. The insights from this analysis can help policymakers and businesses make informed decisions related to the future of transportation in Washington State.