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**BIS582 Data Visualization: Theory and Practice**

**Electric Vehicle Population Analysis**

kjouo p9


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## Introduction

The popularity of electric vehicles (EVs) is rising as consumers seek greener, sustainable transportation methods. Governments and businesses worldwide encourage EV use to combat climate change and reduce pollution. This study analyzes EV population data, focusing on adoption trends, regional distribution, and consumer preferences. Visualizations were created using Tableau to identify patterns and trends. The aim is to provide decision-makers, manufacturers, and policymakers with actionable insights to improve EV adoption and address challenges (U.S. Department of Energy, n.d.).

## Objectives and Goals

The study's objectives include:

* Examining EV distribution and adoption trends.
* Identifying factors influencing adoption and regional disparities.
* Evaluating customer preferences for EV types and classifications.
* Analyzing the impact of charging infrastructure on adoption.
* Quantifying the environmental benefits of EVs.

## Dataset Characteristics

|  |  |
| --- | --- |
| **Columns** | **Definitions** |
| Total Vehicles | The total count of electric vehicles analyzed in the dataset |
| Average Electric Range | The mean electric range of vehicles in miles |
| Vehicle Types | * **BEV (Battery Electric Vehicles)**: Fully electric vehicles. * **PHEV (Plug-in Hybrid Electric Vehicles)**: Vehicles with both electric and combustion engines. |
| Model Year | The production year of the vehicle model. |
| Make | The manufacturer of the vehicle. |
| Model | Specific model designation of the vehicle. |
| State | Geographical state in which the vehicle is registered. |
| CAFV Eligibility | Indicates whether the vehicle is eligible for Clean Air Vehicle programs. |

**Dataset Dictionary**:

**Key Variables**

1. **CAFV Eligibility**: Categorized into:

* Eligible
* Not Eligible
* Unknown

1. **Model Year Distribution**:

* Range: 2011–2025.
* Includes a notable peak in production in 2022.

1. **State wise Distribution**: Highlights total vehicles registered across U.S. states.
2. **Make Analysis**:

* Top brands include Tesla, Chevrolet, Nissan, and Ford.

1. **Model Analysis**:

* Most popular models: Tesla Model Y, Tesla Model 3, and Nissan Leaf.

**Metrics and Key Visualizations**

**Metrics**

1. **Total Vehicles by Year**: Trends in EV adoption over time
2. **Top Makes**: Identification of leading manufacturers based on total vehicles.
3. **CAFV Eligibility**: Breakdown of eligibility percentages.
4. **Geographical Trends**: Analysis of vehicle registrations by state.

**Filter**: Filters applied globally for dynamic exploration:

* CAFV Eligibility
* EV Model
* Model
* State
* TOP N

**Key Performance Indicators (KPIs)**:

1. Total Vehicles
2. Average Electric Range
3. Total BEV Vehicles
4. Total PHEV Vehicles

## Findings

1. **How has EV adoption grown year-over-year?**

Over time, the number of people using electric vehicles (EVs) has increased consistently, with a notable uptick from 2018 to 2023. The largest adoption was in 2023, when over 60,000 automobiles were registered. This shows that EV growth is being driven by government incentives, better technology, and increasing awareness.

A graph with numbers and lines

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1. **Which state has the highest electric vehicle registrations?**

States have different rates of EV adoption, although Washington leads by a wide margin. Some states have very little EV use, which may be due to differences in incentives, infrastructure, or customer preferences. Regional efforts are important because adoption rates are higher in areas with stronger charging networks and supporting policies.

**A map of the united states

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1. **What are the top 10 vehicles made by total registrations?**

Tesla leads the EV industry, making up more than half of all vehicles, with Ford, Nissan, and Chevrolet following closely behind. Tesla's dominant market position is a result of its powerful brand and cutting-edge technology. There are chances for competition in the EV market, as evidenced by the smaller shares held by other manufacturers like BMW and Kia.

**A screenshot of a computer

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1. **What is the distribution of CAFV eligibility among registered vehicles?**

About one-third of EVs are categorized as "CAFV Eligible," meaning they fulfill certain requirements. Most, however, fall into the "CAFV Unknown" category, indicating the need for improved classification and documentation to monitor eligibility and its effect on adoption rates.

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1. **What are the most popular EV models?**

EV preferences are dominated by Tesla models, with the Model Y and Model 3 accounting for over 36% of all EVs and leading the market. Although they are similarly well-liked, other vehicles like the Nissan Leaf and Chevrolet Bolt EV have far lower market shares, which reflects the desire of consumers for brands.

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## Discussion

EV adoption is driven by government incentives, technological advancements, and environmental awareness. Adoption rates vary regionally due to disparities in infrastructure and incentives. Charging infrastructure availability significantly impacts adoption, with areas lacking networks showing slower growth. Additionally, EVs reduce air pollution and carbon emissions, though impacts vary based on energy sources. Consumer preferences indicate a trend towards BEVs in urban areas and PHEVs in regions with limited infrastructure.

## Conclusion

This analysis underscores the transformative potential of EVs in creating a sustainable transportation system. Strategic investments in infrastructure, public awareness campaigns, and supportive policies are vital to overcoming adoption barriers and fostering growth.

## References

* Dataset downloaded from – Data.Gov – An official website of the United States Government. (<https://catalog.data.gov/dataset/electric-vehicle-population-data>)
* This dataset contains the updated data from 2011 to 2025.