

Electric Vehicle Data Analysis

Electric Vehicle Data Analysis on Tableau

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1. Introduction

This report looks at trends in electric vehicles (EVs) using Tableau visualizations. It shows a rise in EV adoption from 2011 to 2024, thanks to more people wanting to go green. The analysis highlights differences in how quickly EVs are being adopted in different regions of United States. Overall, the findings suggest that the electric vehicle market has great potential for growth.

2. Dataset

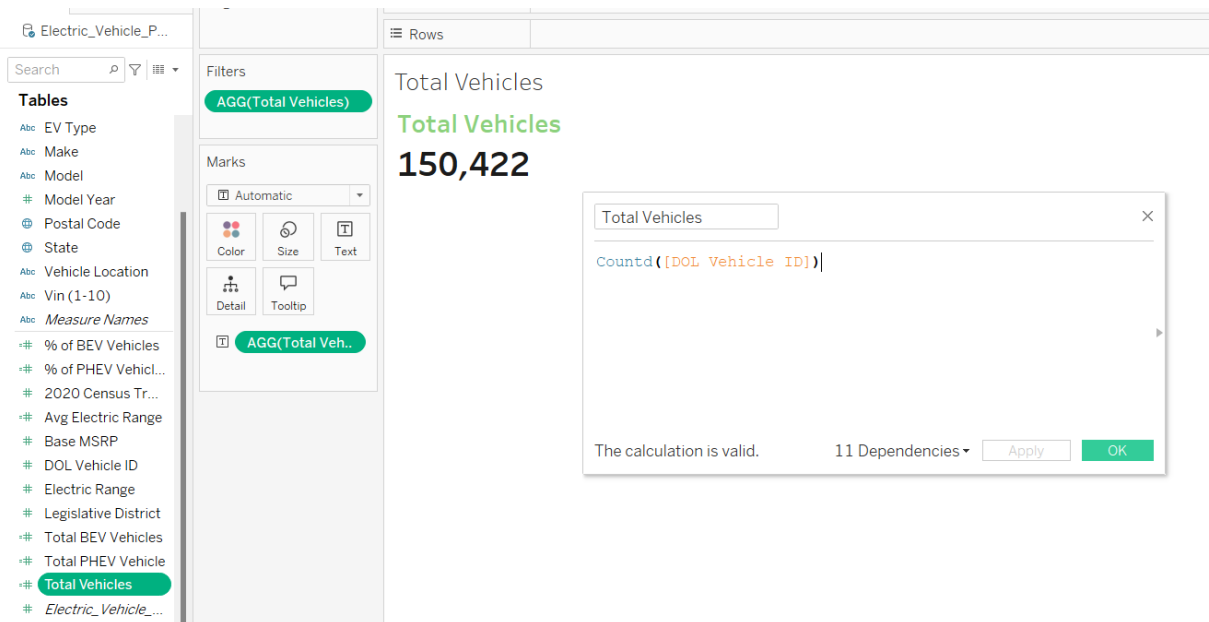
The Electric_Vehicle_Population_Data dataset contains information about Electric_Vehicle, Model, State, Make, Electric Vehicle Type, Model_Year.

3. Total Vehicles

- Gain a comprehensive view of the electric vehicle market, including battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs), to evaluate the market's size and growth potential.
- In Figure 1 we are creating a new calculated file **Total Vehicles** to *count* all the values in the columns **DOL Vehicle IDs**.
- **Insights:**
 - Total EV Vehicles are **150,422**

Figure 1:

Total Vehicles



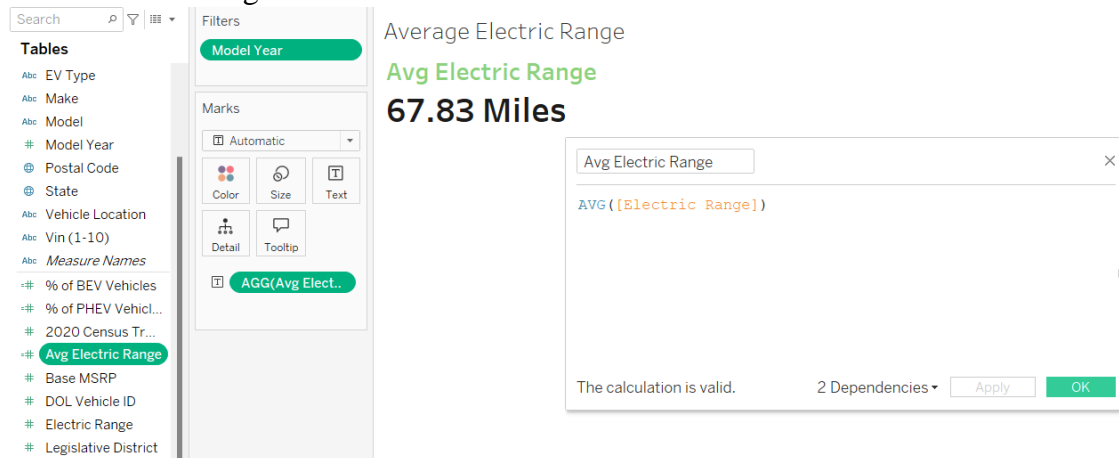
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4. Average Electric Range:

- Calculate the average electric range of the vehicles in the dataset to assess the technological improvements and efficiency of electric vehicles.
- In Figure 2 we are creating a new calculated file **Avg Electric Range** to get *AVG* of all the values in the columns **Electric Range**.
- **Insights:**
 - Avg Electric Range is **67.83 Miles**

Figure 2:

AVG Electric Range

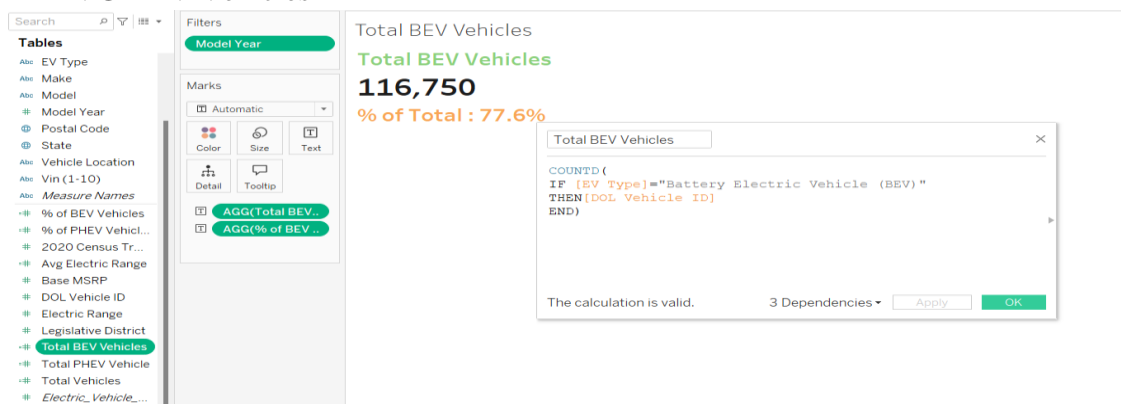


5. Total BEV Vehicles and % of Total BEV Vehicles:

- Identify and analyze the total count of Battery Electric Vehicles (BEVs) only in the dataset by using *the count* function.
- In we create a new column to calculate the *percentage of BEVs* compared to the overall number of electric vehicles to understand the prevalence of fully electric models. Please refer to Figure 3.
- **Insights:**
 - AVG BEV Vehicles are **116,750** which is **77.7%** of the total EV Vehicles

Figure 3:

AVG BEV Vehicles



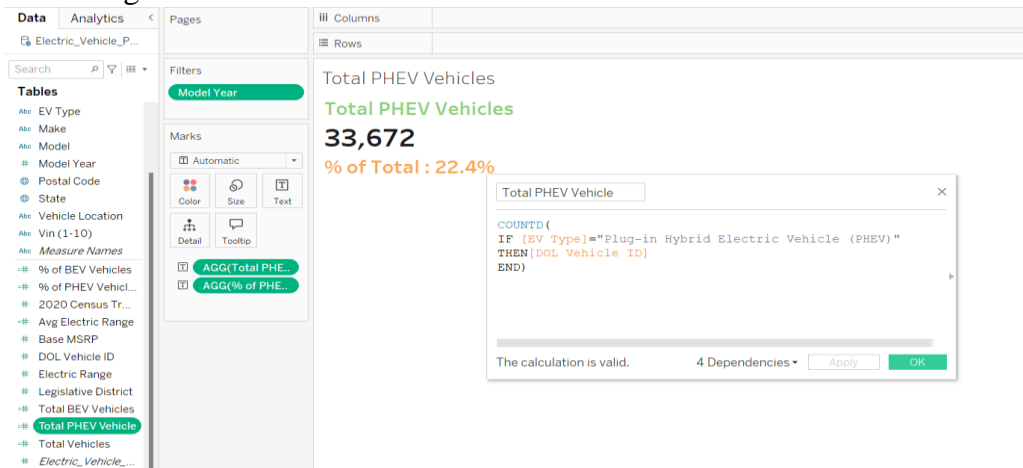
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6. Total PHEV Vehicles and % of Total PHEV Vehicles:

- Identify and analyze the total count of Plug-in Hybrid Electric Vehicle (PHEV) only in the dataset by using *the count* function.
- In we create a new column to calculate the *percentage of PHEVs* compared to the overall number of electric vehicles to understand the prevalence of plug-in hybrid models. Please refer to Figure 4.
- Insights:**
 - AVG PHEV Vehicles are **33,672** which is **22.4%** of the total EV Vehicles

Figure 4:

AVG Plug-in Vehicles

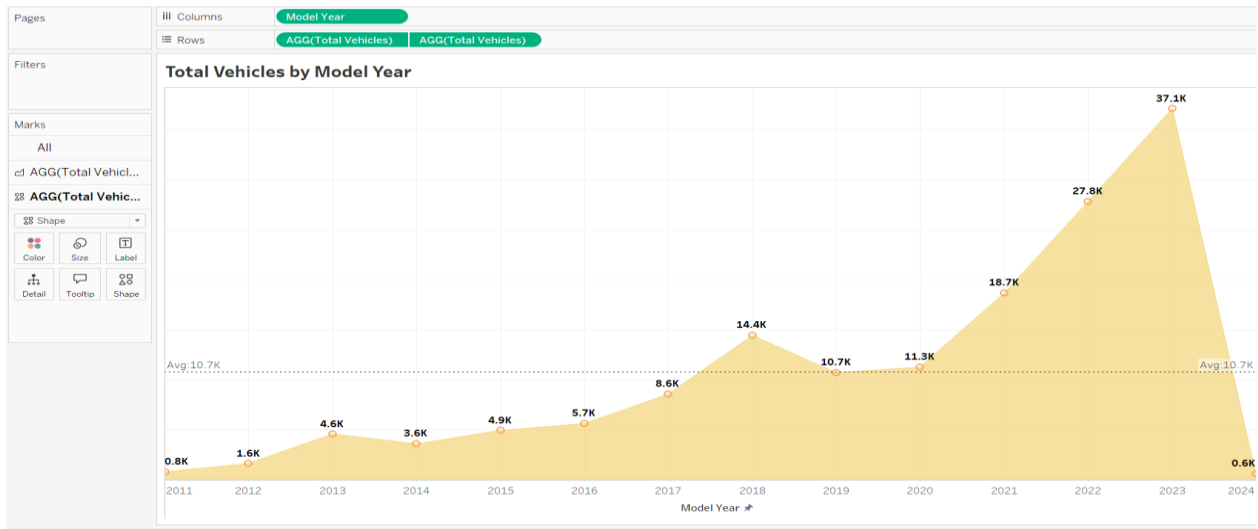


7. Total Vehicles by Model Year (From 2011 Onwards):

- Visualization:** Scatter and Area Chart
- Description:** This chart will illustrate the distribution of electric vehicles over the years, starting from 2011, providing insights into the growth pattern and adoption trends.
- In Figure 5 "Model Year" is displayed in the columns, while "AGG(Total Vehicles)" is represented in the rows. A second "AGG(Total Vehicles)" measure is added to create a dual axis to plot Scatter and Area chart together.
- Insights:**
 - From Figure 5 we can interpret that the use of EV is **gradually increasing**.
 - In 2011 Total EV cars used were 0.8k and in 2023 it has increased up to 37k.
 - Although 2024 is still ongoing, the graph indicates that totals are expected to rise by the end of the year.

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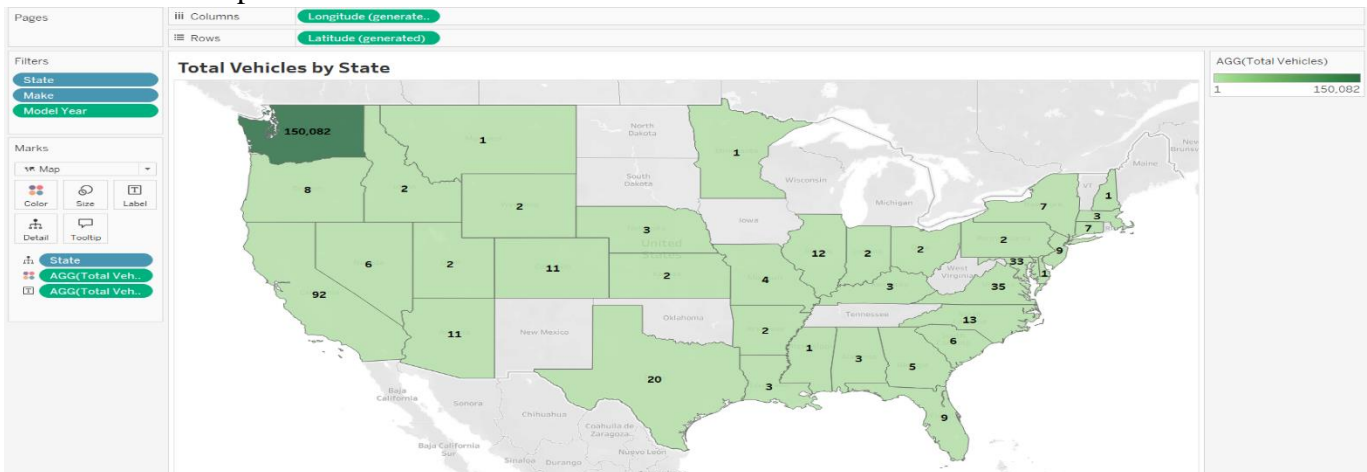
Figure 5:
Scatter Chart



8. Total Vehicles by State:

- **Visualization:** Map Chart
- **Description:** This chart will showcase the geographical distribution of electric vehicles across different states of the US, allowing for the identification of regions with higher adoption rates.
- To create a map, pull the latitude into the rows and the longitude into the columns. Then, shade the states based on the total number of vehicles in each state, allowing for a visual representation of vehicle distribution across the map.
- **Insights:**
 - In Figure 6 we understand that **Washington state(WA)** uses the highest number of EV as compared to other states.

Figure 6:
Map chart



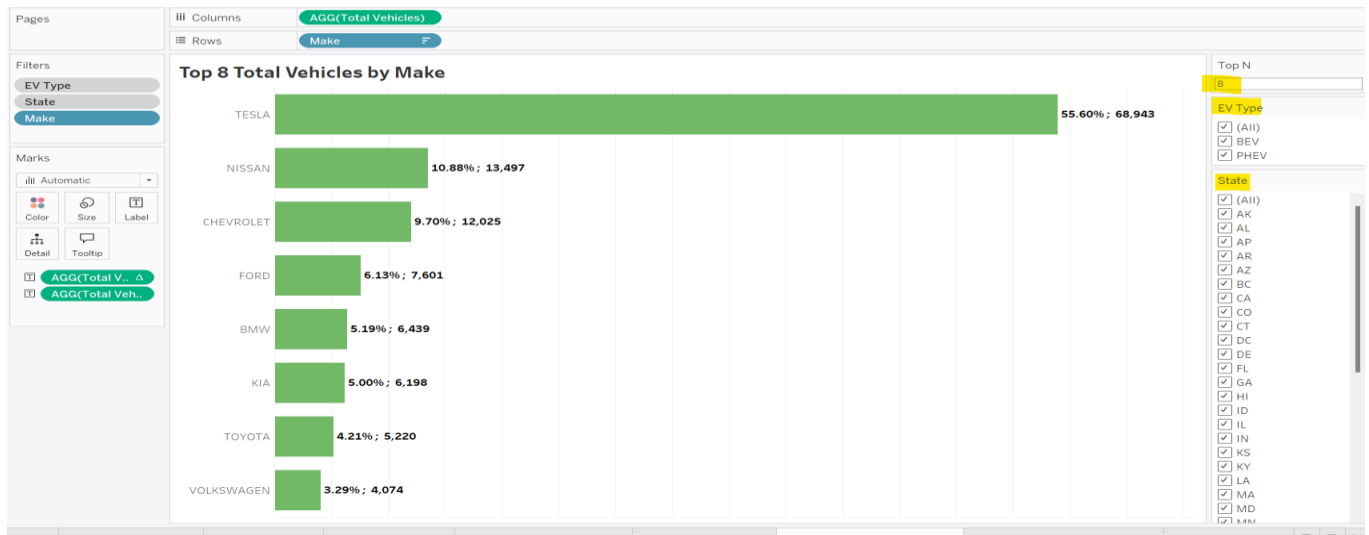
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9. Top N Total Vehicles by Make:

- **Visualization:** Bar Chart
- **Description:** Highlight the top N electric vehicle manufacturers based on the total number of vehicles, providing insights into the market dominance of specific brands. You can specify how many of the top vehicles you would like to view. Also, we can apply filter on EV Types and State as highlighted
- To create the bar chart, we pull "AGG(Total Vehicles)" into the columns and place it in the rows. We also include filters for "Make" and "State," as well as an input parameter to retrieve the TOP N records. This setup allows us to customize the bar chart to display the specific data we need.
- **Insights:**
 - In Figure 7. **TESLA** is the most used EV Vehicle followed by **NISSAN**

Figure 7:

Bar Chart

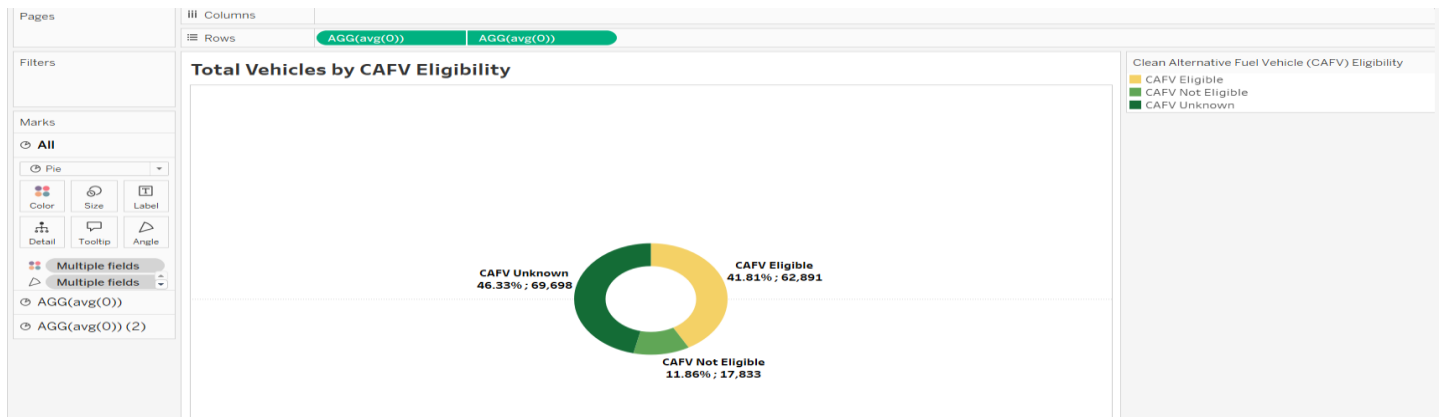


10. Total Vehicles by CAFV Eligibility:

- **Visualization:** Pie Chart or Donut Chart
- **Description:** Illustrate the percentage of electric vehicles that qualify for Clean Alternative Fuel Vehicle (CAFV) incentives. This will help us understand how these incentives influence the adoption of electric vehicles.
- To create a donut chart using "AGG(CAFV)" and "AVG(O)," first, plot the "AGG(CAFV)" values as the outer ring. Next, add "AVG(O)" values as the inner ring to show the average alongside the total. Finally, adjust the formatting and colors to enhance the visual appeal and clarity of the donut chart.
- **Insights:**
 - CAFV refer Figure 8
 - Unknown is 46%
 - Eligible is 41%
 - Not Eligible 11%

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Figure 8:
Pie Chart



11. Total Top 10 Total Vehicles by Model:

- **Visualization:** Table Map
- **Description:** Highlight the top electric vehicle models based on the total number of vehicles, offering insights into consumer preferences and popular models in the market. Please refer to Figure 9.
- We created tables using the columns "Model," "Make," and "EV_Type," along with calculated fields for "% of Total Vehicles" and "Total Vehicles." This allows us to analyze the distribution and share of different vehicle types effectively. The tables provide a clear overview of vehicle counts and their contributions to the total.
- **Insights:**
 - Model Y, Model 3, Model S, Model X of TESLA are in the Top 6.
 - LEAF of NISSAN in the TOP 3.

Figure 9:
Table Map

Total Vehicles by Model

Model	Make	EV Type	% of Total	Total Vehicles
MODEL Y	TESLA	BEV	18.95%	28,502
MODEL 3	TESLA	BEV	18.42%	27,709
LEAF	NISSAN	BEV	8.77%	13,187
MODEL S	TESLA	BEV	5.06%	7,611
BOLT EV	CHEVROL	BEV	3.81%	5,733
MODEL X	TESLA	BEV	3.40%	5,114
VOLT	CHEVROL	PHEV	3.25%	4,990
ID.4	VOLKSW	BEV	1.99%	2,999
NIRO	KIA	BEV	1.23%	1,854
		PHEV	0.68%	1,022
PACIFICA	CHRYSLER	PHEV	1.76%	2,642
WRANGLER	JEEP	PHEV	1.75%	2,629
MUSTANG M.	FORD	BEV	1.74%	2,619
PRIUS PRIME	TOYOTA	PHEV	1.68%	2,527
X5	BMW	PHEV	1.37%	2,068
I3	BMW	BEV	0.39%	592
		PHEV	0.88%	1,325
FUSION	FORD	PHEV	1.22%	1,829
EV6	KIA	BEV	1.09%	1,644
IONIQ 5	HYUNDAI	BEV	1.09%	1,638
C-MAX	FORD	PHEV	1.03%	1,546
RAV4 PRIME	TOYOTA	PHEV	1.01%	1,525
R1T	RIVIAN	BEV	0.90%	1,357
XC90	VOLVO	PHEV	0.82%	1,233
BOLT EUV	CHEVROL	BEV	0.77%	1,153
E-GOLF	VOLKSW	BEV	0.71%	1,075
E-TRON	AUDI	BEV	0.65%	979
XC60	VOLVO	PHEV	0.63%	949
PRIUS PLUG--	TOYOTA	PHEV	0.63%	942
XC40	VOLVO	BEV	0.56%	840
R1S	RIVIAN	BEV	0.54%	812
500	FIAT	BEV	0.54%	806
CLARITY	HONDA	BEV	0.43%	651

Please use the links provided in the References section to access the Tableau dashboard and the dataset for further exploration. This will allow you to interact with the Dashboard and the data

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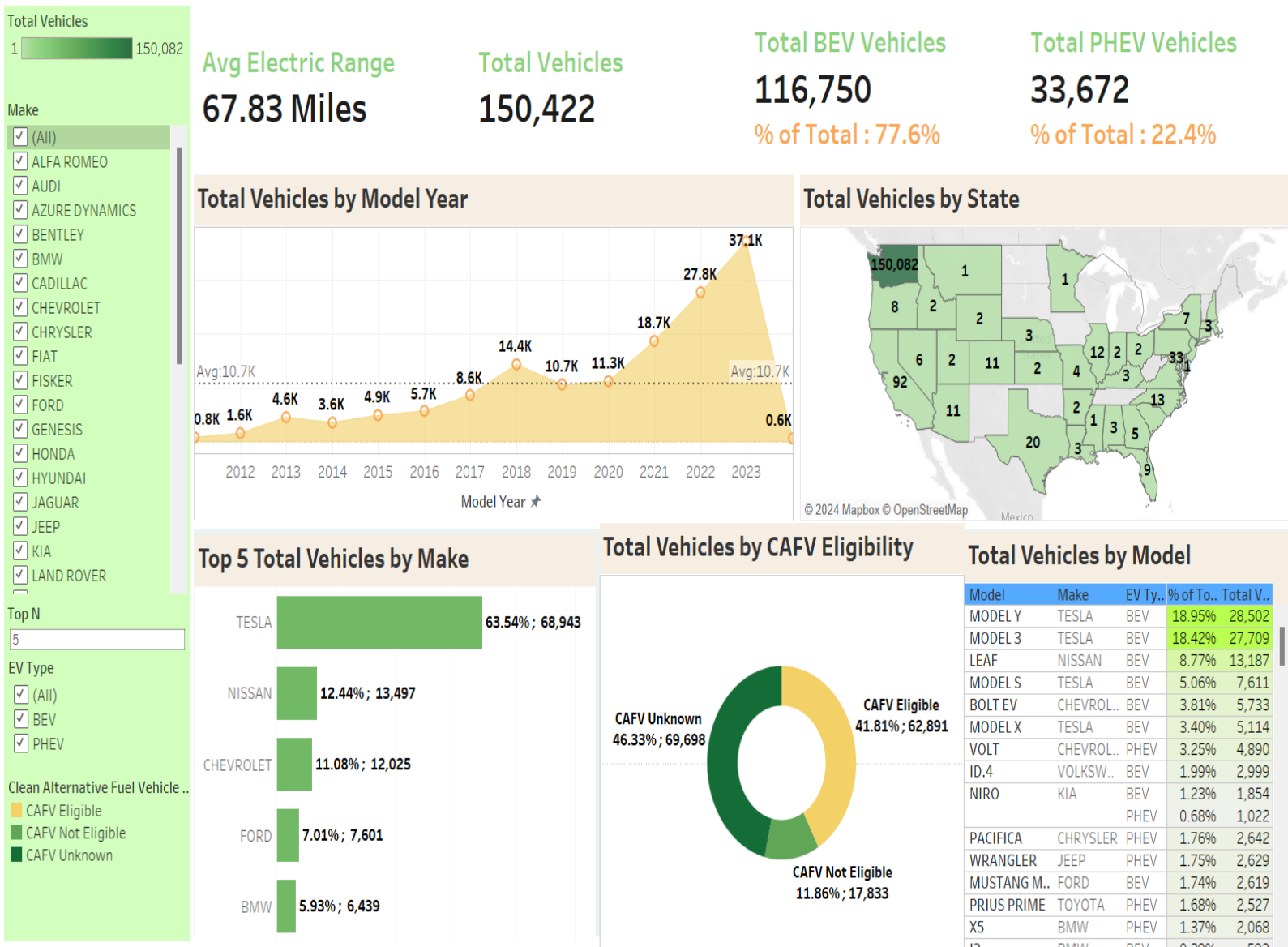
12. EV Dashboard (Conclusion)

The dashboard(Figure 10) provides a comprehensive overview of the electric vehicle market, highlighting key metrics such as the average electric range of vehicles, the total number of Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicle(PHEV), and their percentage relative to all electric vehicles. It also illustrates the proportion of electric vehicles eligible for Clean Alternative Fuel Vehicle (CAFV) incentives, offering insights into how these incentives affect vehicle adoption. Together, these elements help users understand technological advancements, market trends, and the influence of incentives on the growing popularity of electric vehicles.

Overall, these features help users grasp market trends and the impact of incentives on the popularity of electric vehicles. For further exploration, please check the links in the References section to access the Tableau dashboard and dataset.

Figure 10:

EV Dashboard



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References

Shinde, S. (2024). *EV analysis* [Tableau workbook]. GitHub.
<https://github.com/ShindeShwetaK/My-Tableau-Project/blob/main/EV%20Analysis.twbx>

IoT Tech. (2024). *Electric vehicle data (1997-2024 update version)* [Data set]. Kaggle.
<https://www.kaggle.com/datasets/iottech/electric-vehicle-data-1997-2024-update-version>