Electric Vehicle Population Data in Washington State

Source: Data.gov

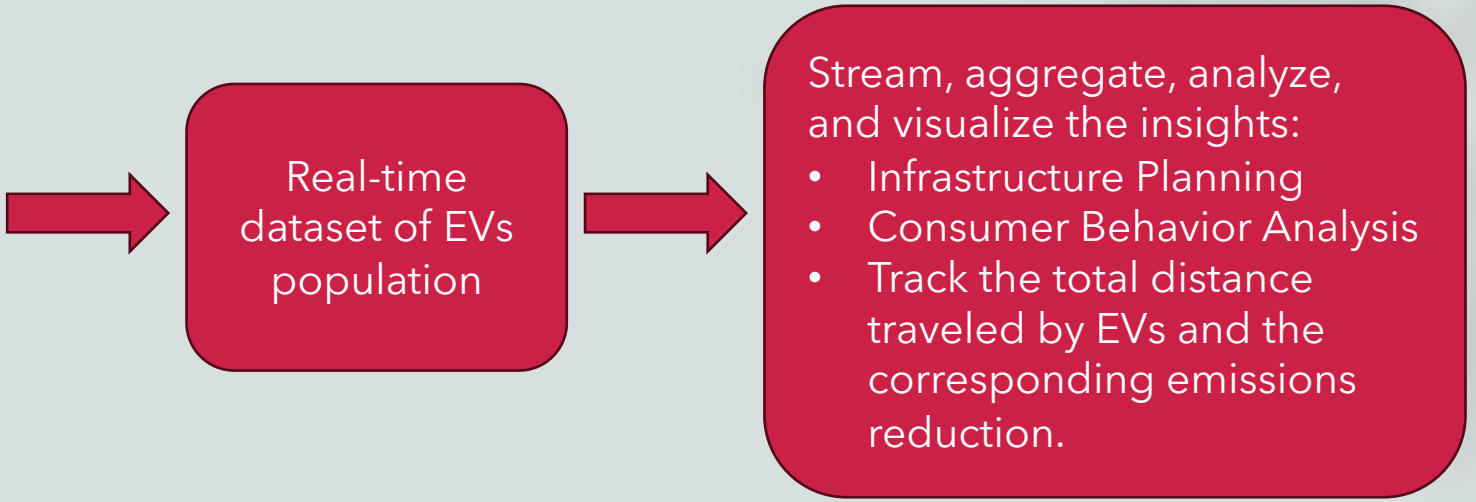
ALY6110 – Final Project

Professor: Andrew Kinley

Student: Trang Tran

Introduction: real-world problem that can be solved with big-data

- The adoption of electric vehicles (EVs)
- Not a new trend, now in fierce competition
- The widespread adoption of EVs presents several challenges, including infrastructure planning, consumer behavior analysis, and energy management.
- Various stakeholders, including governments, urban planners, automakers, and energy providers, require insights into key aspects.



Data Summary

```
# Source: spark<?> [?? x 17]
  VIN_110 County City  State Posta…¹ Model…² Make  Model Elect…³ Clean…⁴ Elect…⁵
  <chr>   <chr>  <chr> <chr>   <int>   <int> <chr> <chr> <chr>   <chr>      <int>
1 1N4AZ0… Kitsap Brem… WA      98310    2013 NISS… LEAF  Batter… Clean …       75
2 1N4AZ1… Kitsap Port… WA      98366    2019 NISS… LEAF  Batter… Clean …      150
3 5YJXCA… King   Seat… WA      98199    2020 TESLA MODE… Batter… Clean …      293
4 SADHC2… Thurs… Olym… WA      98503    2019 JAGU… I-PA… Batter… Clean …      234
5 JN1AZ0… Snoho… Ever… WA      98204    2011 NISS… LEAF  Batter… Clean …       73
6 1G1RB6… Yakima Selah WA      98942    2018 CHEV… VOLT  Plug-i… Clean …       53
# … with 6 more variables: Base_MSRP <int>, Legislative_District <int>,
#   DOL_Vehicle_ID <int>, Vehicle_Location <chr>, Electric_Utility <chr>,
#   `2020_Census_Tract` <dbl>, and abbreviated variable names ¹Postal_Code,
#   ²Model_Year, ³Electric_Vehicle_Type,
#   ⁴Clean_Alternative_Fuel_Vehicle_CAFV_Eligibility, ⁵Electric_Range
```

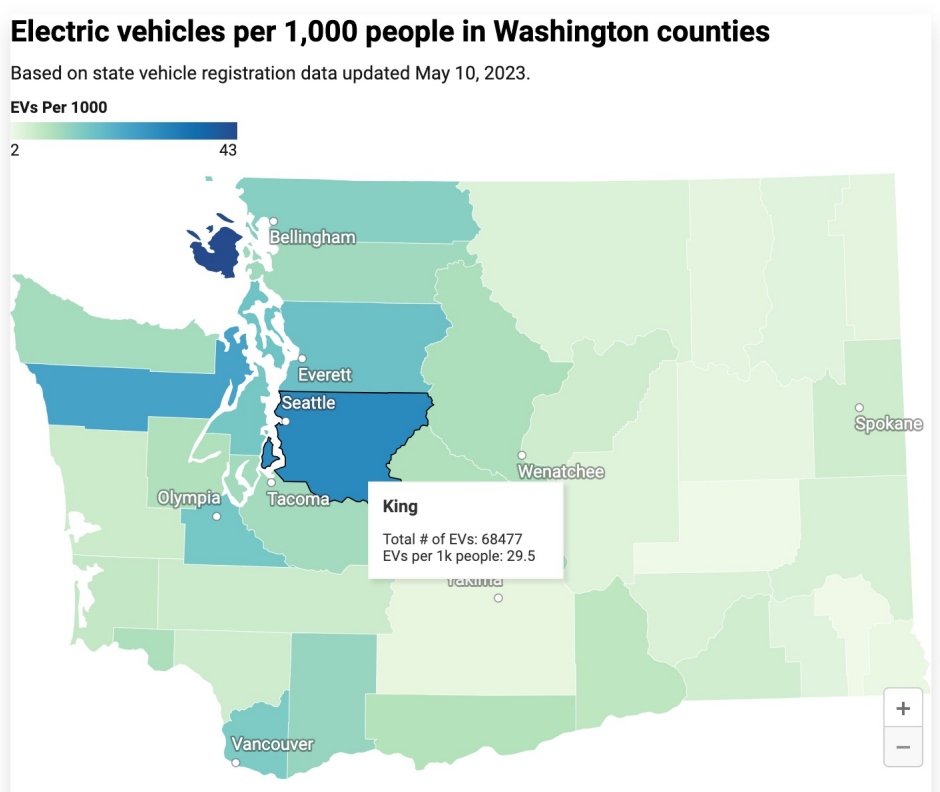
- This dataset shows the Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (PHEVs) that are currently registered through Washington State Department of Licensing (DOL).
- 139k rows, 17 variables

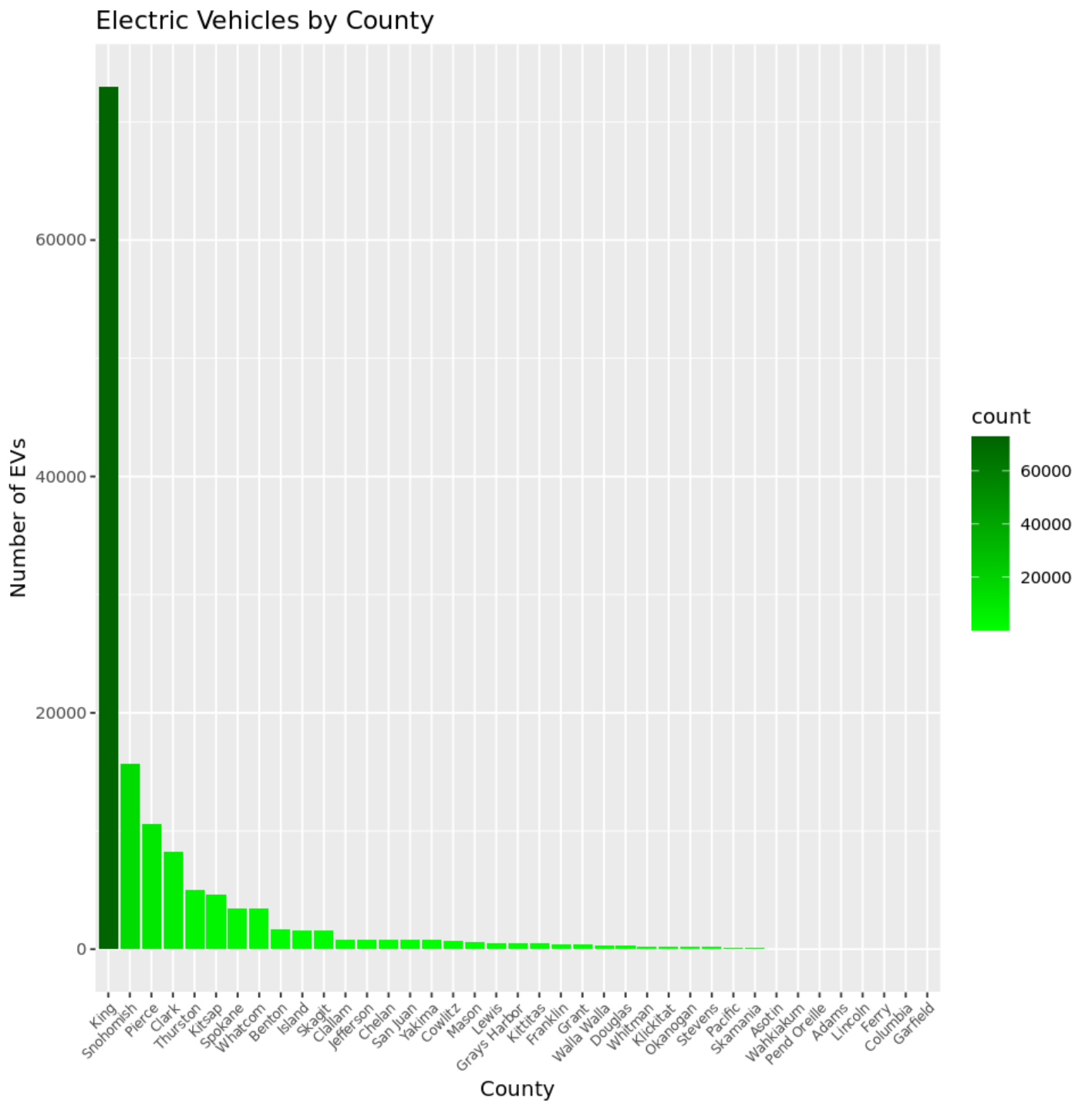
```
 [1] "CAFV_Eligibility"      "County"                 "City"
 [4] "State"                 "Model_Year"             "Make"
 [7] "Model"                 "Electric_Vehicle_Type" "Electric_Range"
[10] "Base_MSRP"             "Electric_Utility"
```

Key variables

Where are EVs more popular?

*King County stands out with the largest number of electric vehicles (over half of the records), significantly exceeding the counts in other counties.

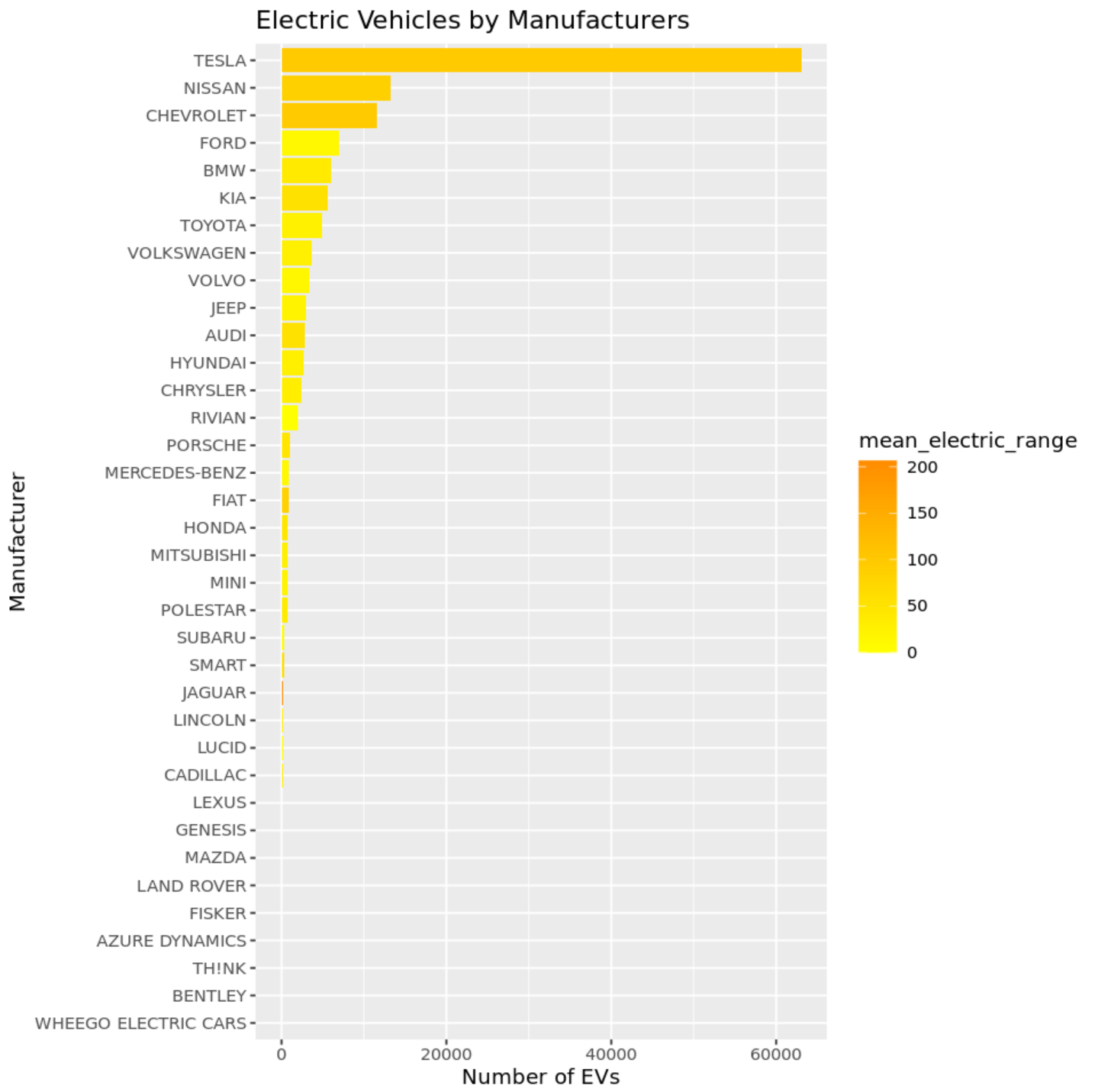




Which manufacturers are preferred?

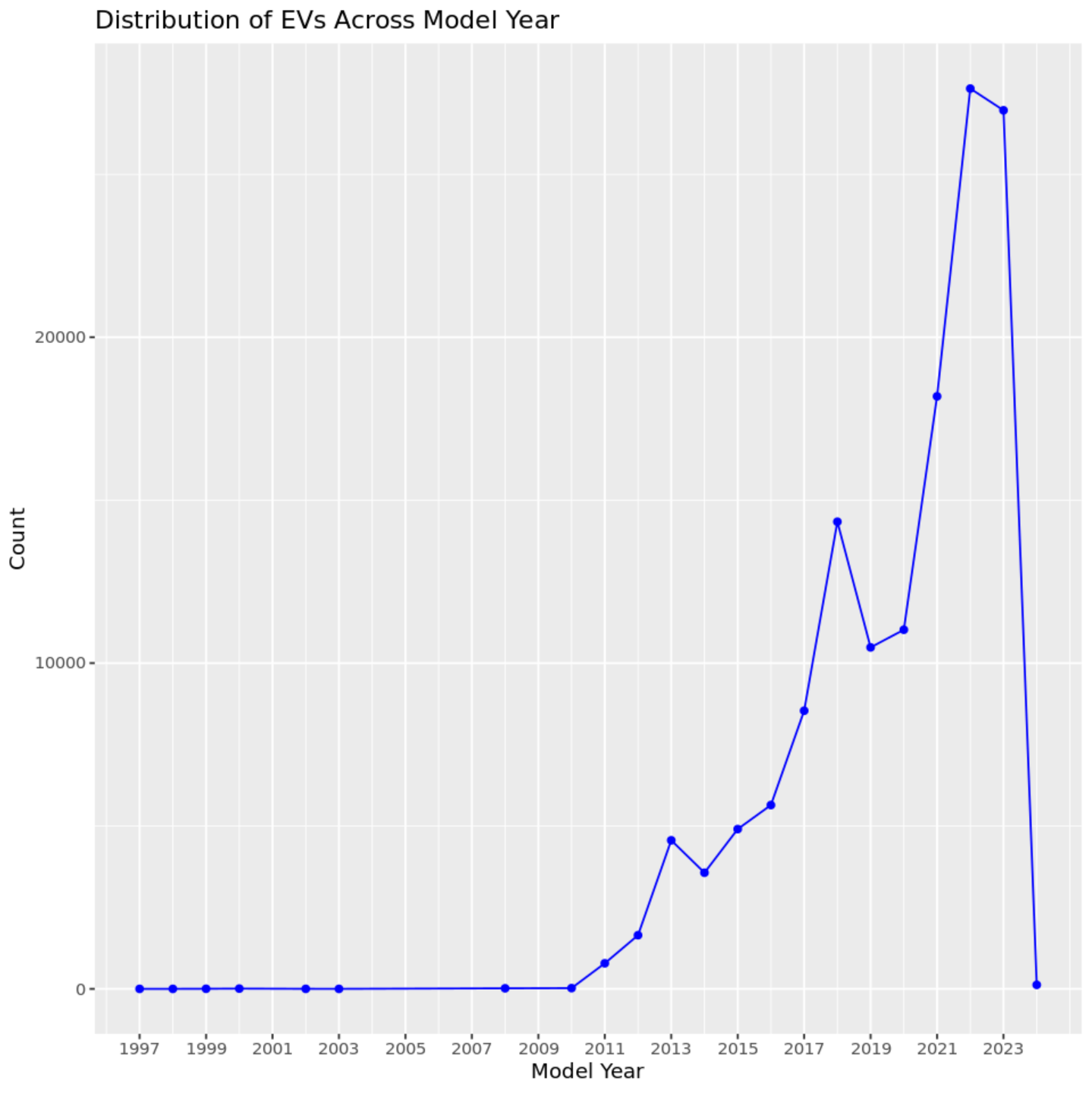
*not surprisingly, Tesla tops the list and is far ahead of other competitors.

**the color gradient is filled based on their mean electric range.

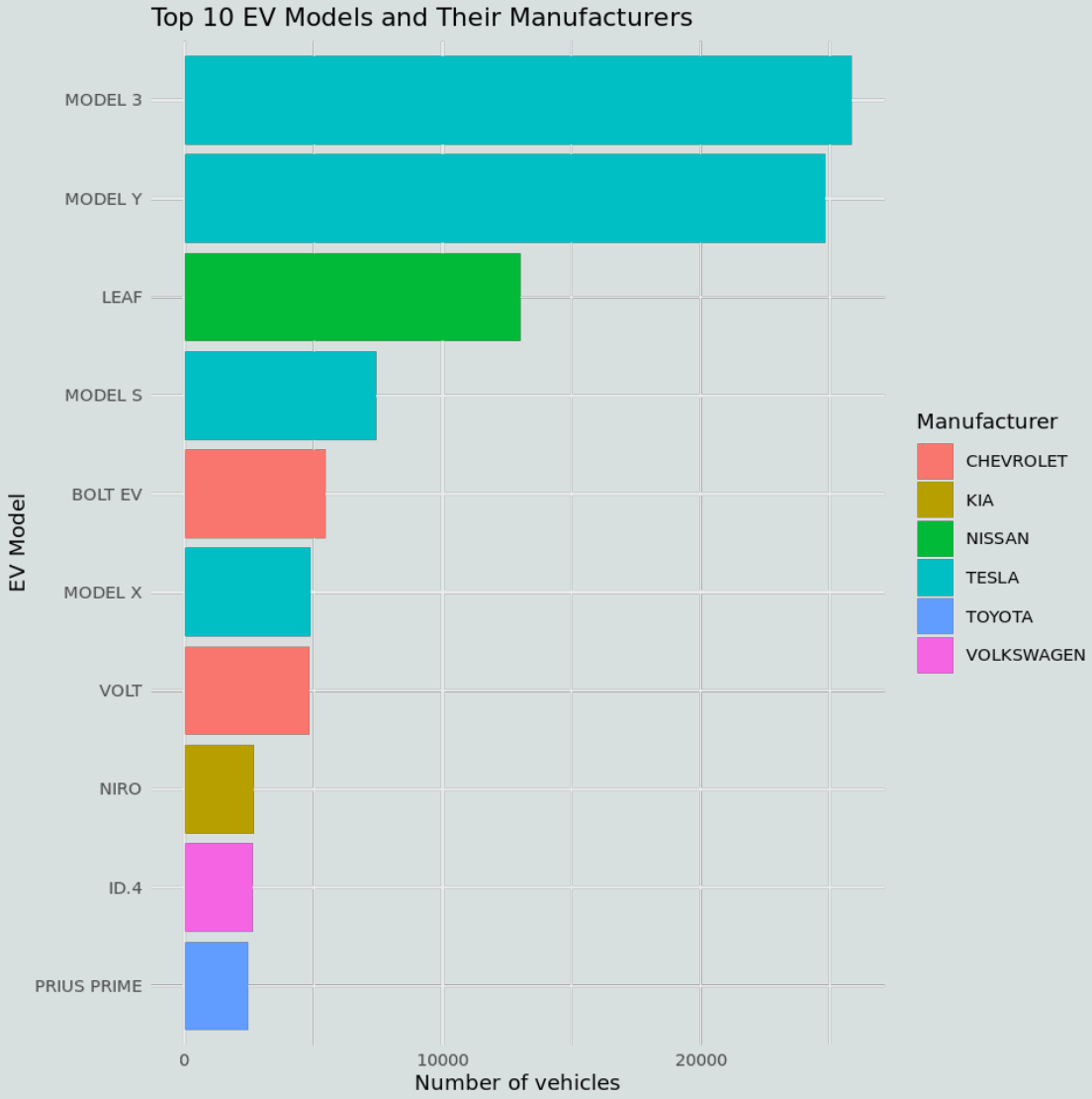


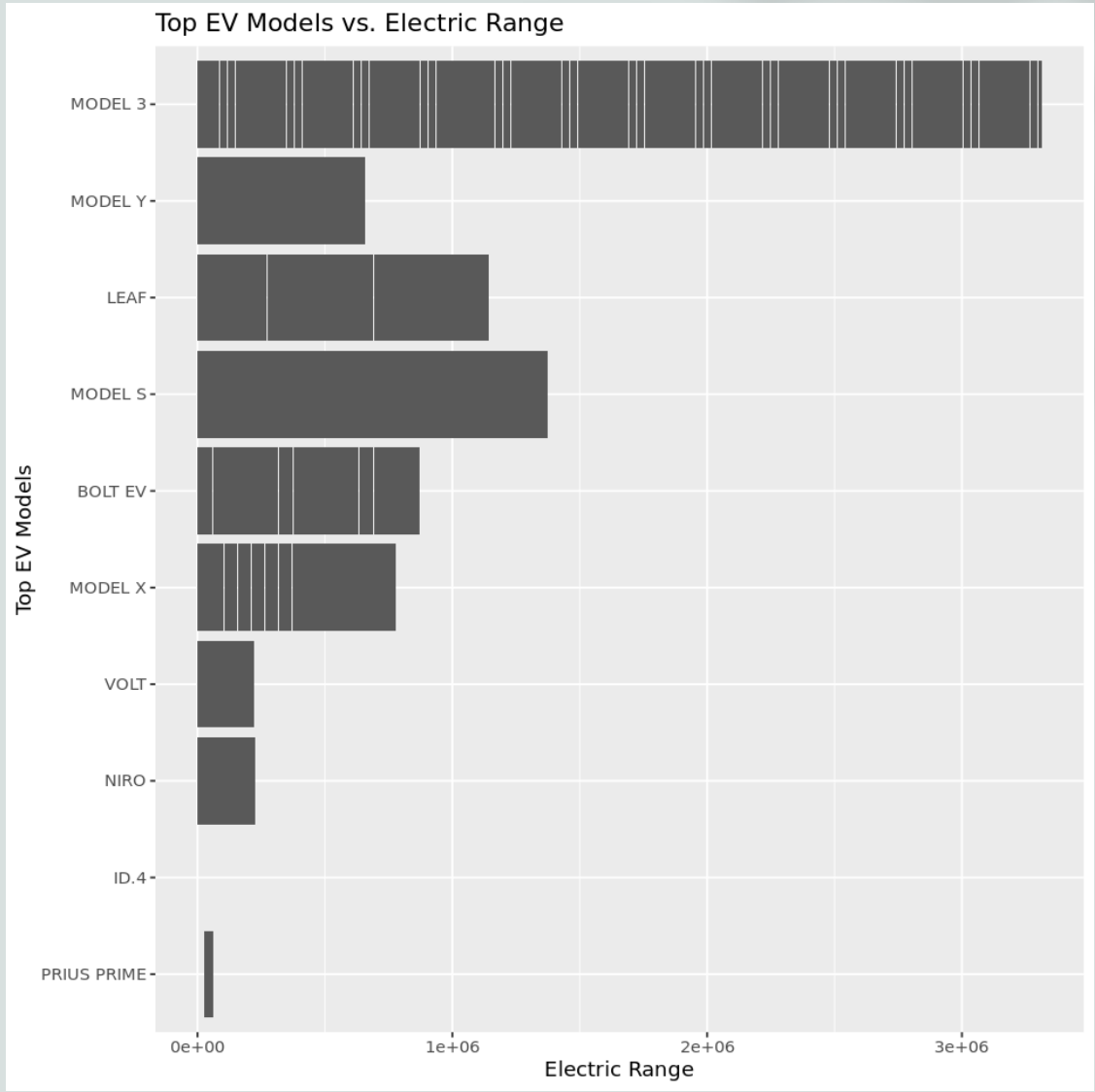
EVs across the Model Year

There was a sharp increase in the number of registered EVs from 2016 to 2018, a downtrend in 2019 and 2020, then a vertical increase in 2021 and 2022.

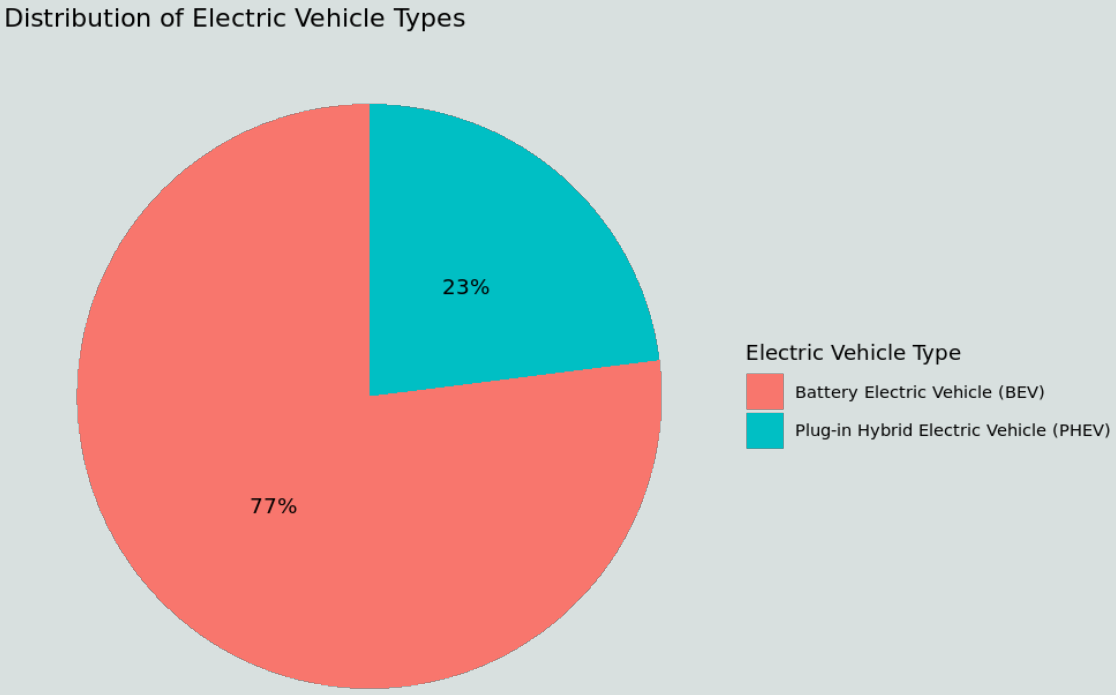


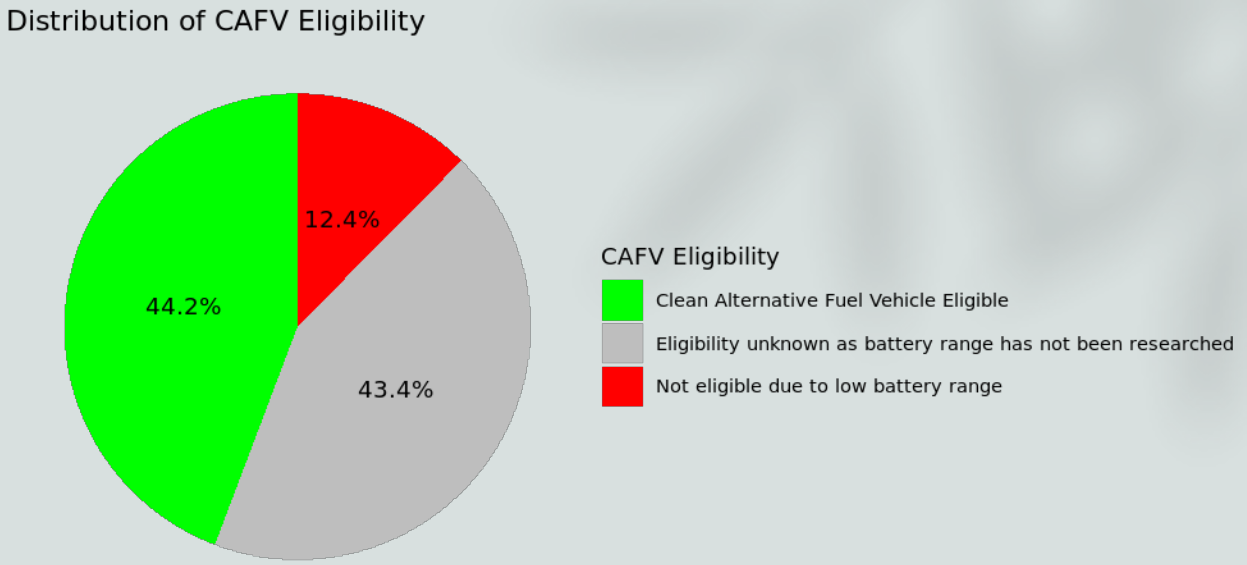
Top 10 Models and Their Manufacturers





Distribution of EV types and Clean Alternative Fuel Vehicle (CAFV) Eligibility





Conclusion and Recommendations: Electric Vehicles in Washington

- The popularity of EVs, manufacturer preferences, model year trends, and the distribution of EV types.
- Focus on strategically expanding charging infrastructure, particularly in urban areas and regions with high population density.
- Further analyze consumer behavior patterns to tailor marketing strategies and product development.
- Enhance CAFV policies and incentives.
- As electric vehicle adoption continues to evolve, ensure that the dataset is regularly updated with new vehicle registrations with complex real-time data types