

# Analysis of Electric Vehicle Market in Washington State

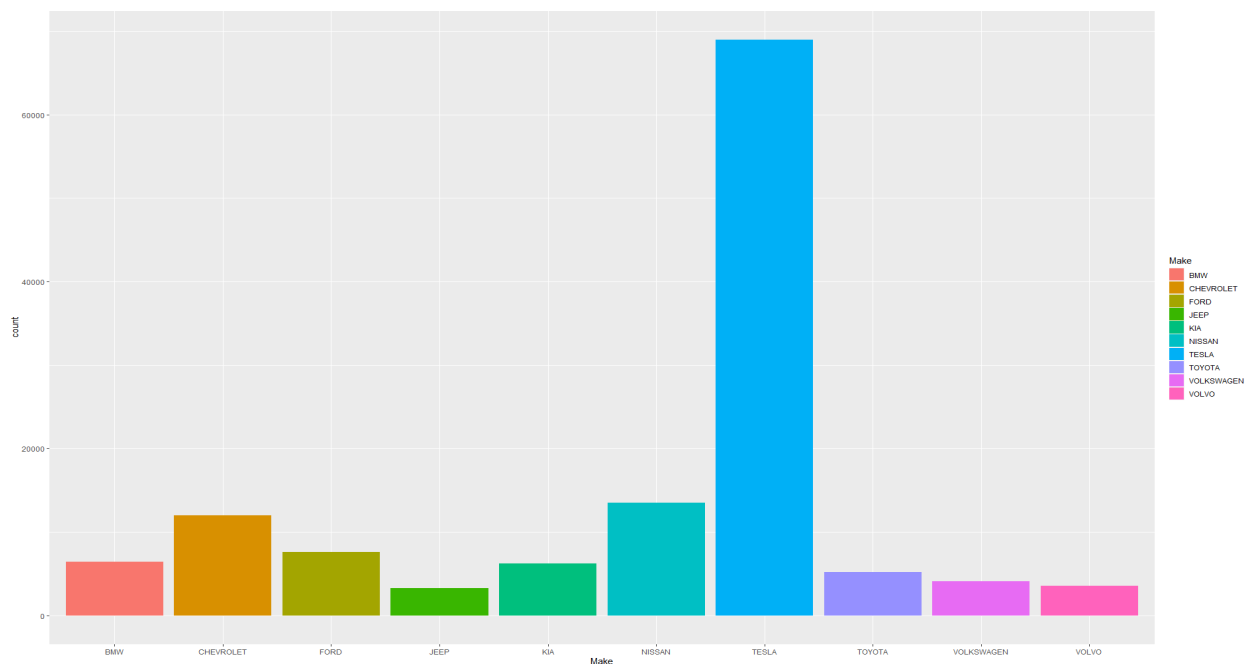
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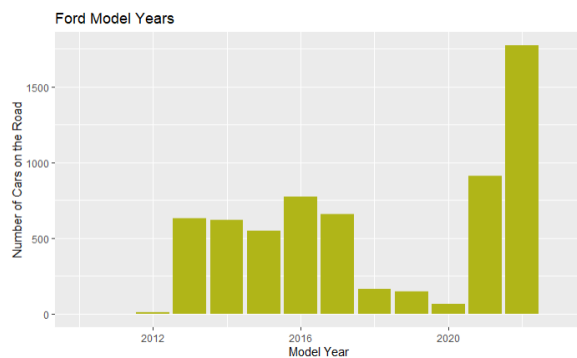
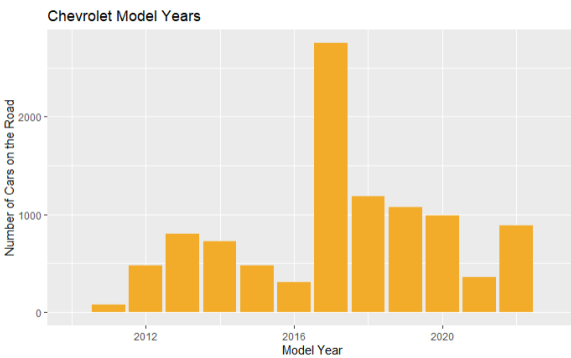
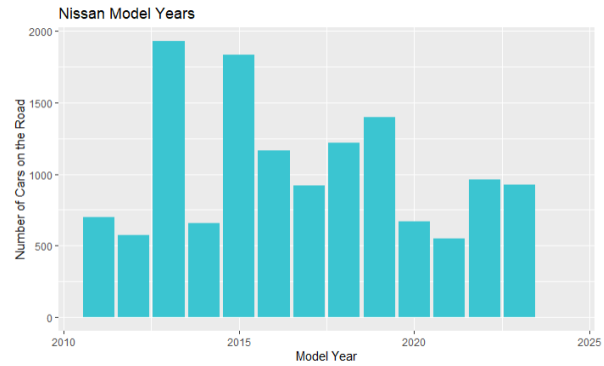
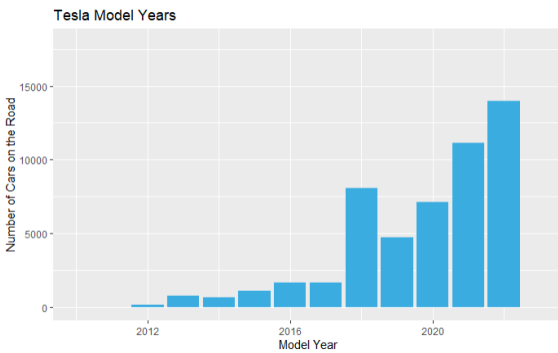
Carson Edwards

Electric vehicles are gaining market share on American roads. The number of electric vehicles increased from around 22,000 in 2011 to over 2 million in 2021 (U.S. Bureau of Labor Statistics). This number is expected to grow over the next ten years as auto manufacturers are scrambling to compete with each other to stay afloat in these changing markets. This analysis focuses on the state of Washington and the different electric vehicles that are pouring onto the state's streets. Unsurprisingly, the most popular auto manufacturer for electric vehicles is Tesla. Through this analysis we will try to understand Washington's electric vehicle market, make sense of Tesla's dominance, and try to predict whether or not it will continue.

We will begin this analysis by looking at the top 10 most common makes of cars in our dataset. The most common electric vehicles are Teslas, and the next highest ones are household names like Nissan and Chevrolet.



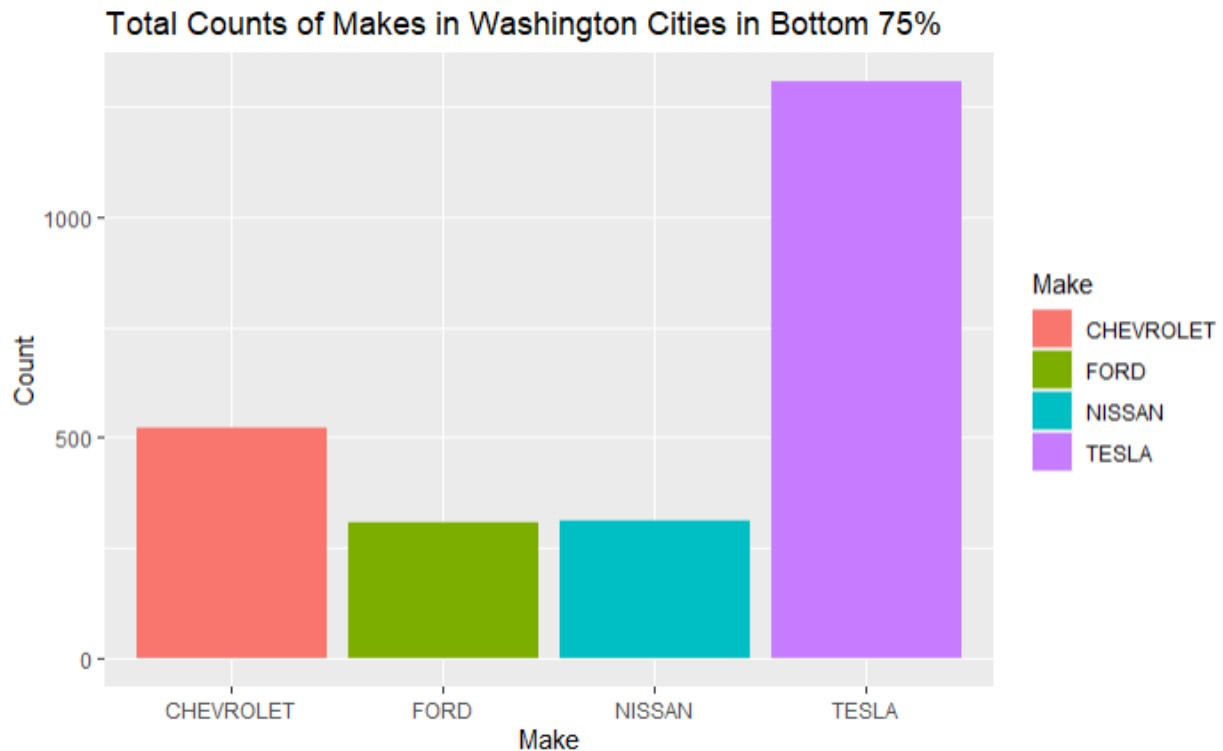
Our dataset also contains the model year for our cars, so let's break down our most common ones by year and make.



There are a few things we can make a note of from this. Not only is Tesla showing dominance over the market in total number of cars on the road, but they are also growing their numbers more than any of the other top companies. Other things to note are that Nissan cars have a rather even distribution of model years on the road and Ford seems to be getting more electric vehicles on the road recently. It is important to keep in mind that these are not sales per year, these are the numbers of the current cars on the road. This means that there are more 2017 Chevrolet cars than 2017 Tesla cars on the road. However, having almost 15,000 2022 Teslas on the road compared to the <1000 Chevrolets on the road can tell us the current sales are higher for Tesla. A lower number of 2017 Teslas on the road could also mean that the cars themselves are not lasting as long as other brands. We will have to take a look at price data later to further understand that trend.

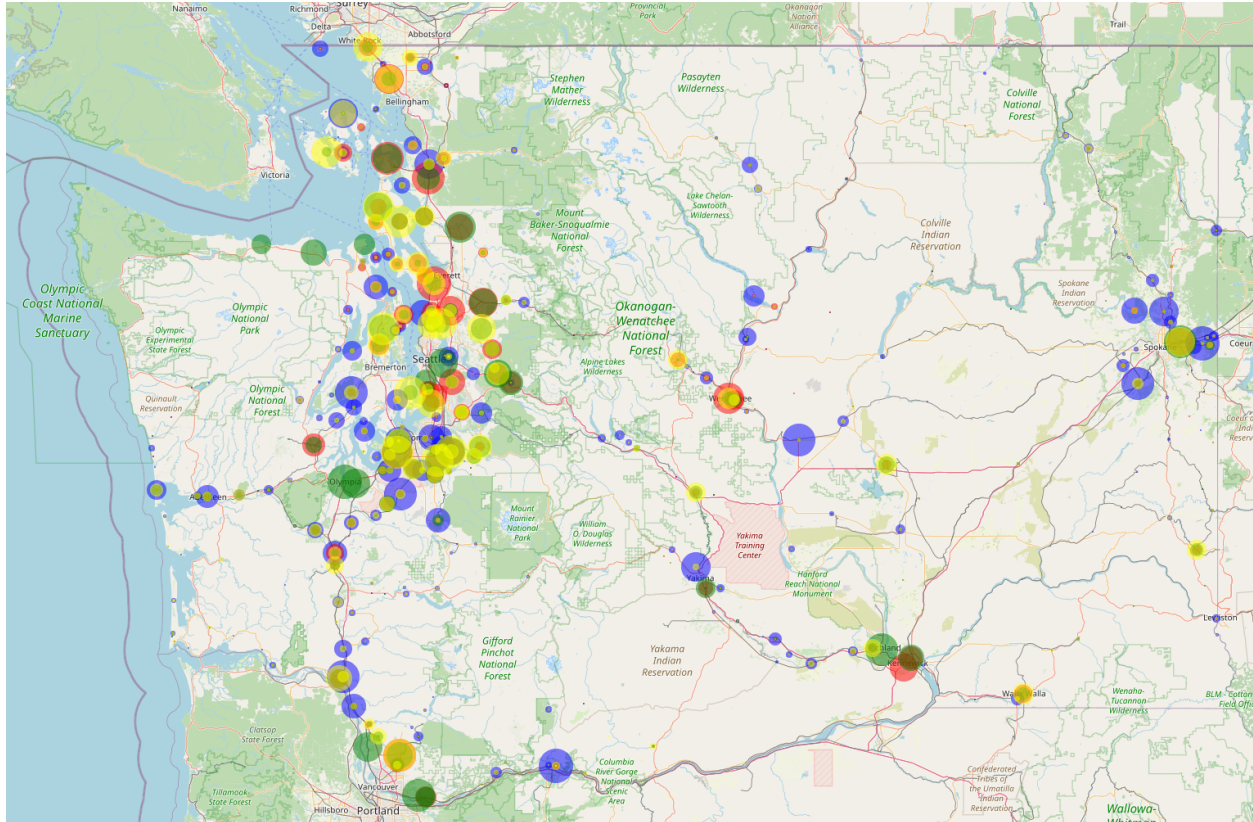
The next information that we can use to understand this market is location data. The dataset is largely represented by the Seattle metro area and the cities that surround it. To get an idea on if this trend of Tesla dominance is a Seattle specific trend, we will look at less populous areas. When grouping the

data by city, we see that to be in the top 25% a city only needs to have 54 electric vehicles in it. We will also continue to isolate our 4 most popular auto manufacturers. The chart below shows the total counts of the 4 brands from all the cities that

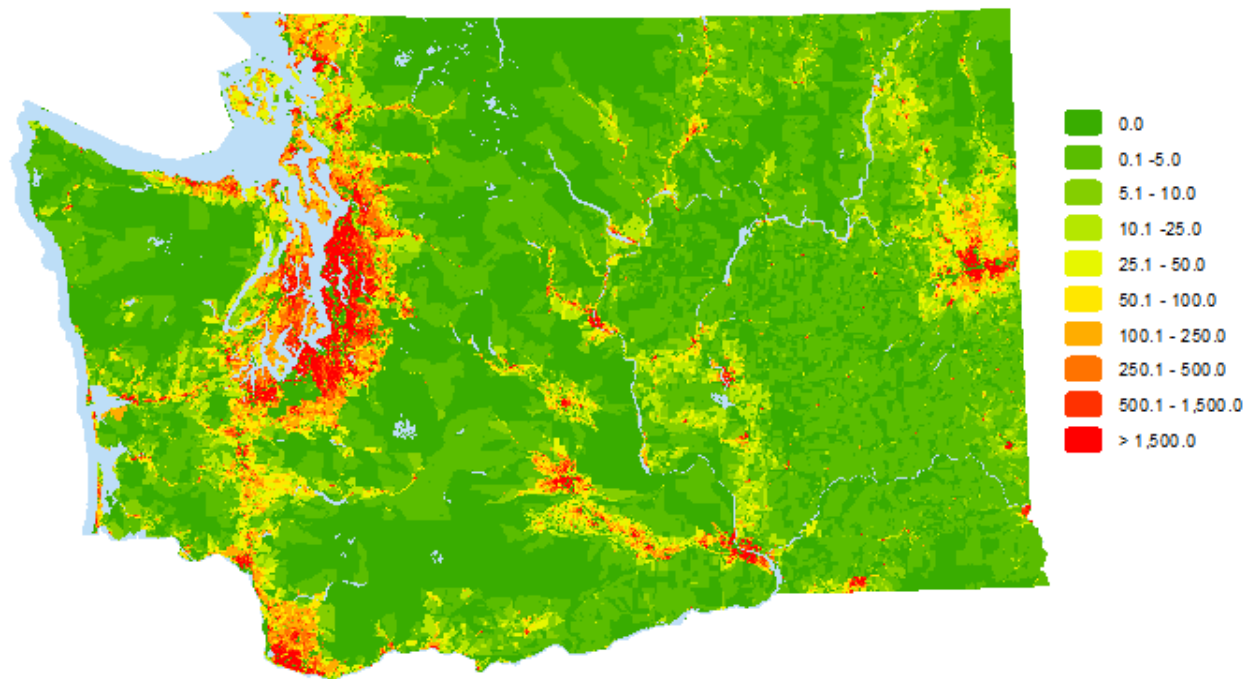


When reviewing the charts, the first immediate observation is that Tesla is still the most common car on the road. However, the gap is not as large when compared to the entire dataset where Tesla showed a dominance over Nissan by over a factor of 5. Here we can see that ratio has been reduced to Tesla having around 2.5 the number of cars on the road as Nissan.

This is a good opportunity to take a look at the price data for the cars involved. Those who work in the Seattle metro area are more likely to have higher salaries than those who live in more rural parts of Washington. From a quick search, Tesla cars start at \$38,990 for the Model 3 whereas the Chevrolet Bolt starts at \$27,495(*Compare & Bolt EV*). To confirm the price difference is a possible cause of our rural and urban divide, we will take a look at some map data.



Pictured above is a map showing the cities where there are less than 54 cars of each brand on the road. This was the threshold chosen that puts all these cities in the bottom 75% in terms of representation in the dataset. This threshold helps isolate lower population areas that may not have access to the high salaries that those in urban areas may have. In blue is Tesla, where we can see that they have the largest circles consistently, reflecting what we already know about their market dominance. In red is Nissan, which seems to have less representation across the board as expected. We see similar patterns for Chevrolet (in yellow) and Ford (in green). Chevrolet, however, seems to have some of the largest circles in remote areas such as in the southeast. Ford stands out as well in areas near Vancouver (southwest) and Richland (southeast near the river).



We get the most context when pairing these charts with a population density map provided by the U.S. Census Bureau (*Population density by census block*). We can identify circles on our previous chart that represent brands other than Tesla that are fairly large for not being in a red area.

Given all the evidence as shown above, it is hard to suggest that our underdogs will be able to outpace Tesla in the near future. While there are examples of cheaper brands thriving in rural areas, it seems like Tesla shines in its own way with large circles close to the threshold well away from urban areas. Ford has shown a spike in representation with vehicles coming out in the past 2 years, but they are still behind Tesla by almost a factor of 10 in areas above the 75th percentile. It is also worth noting that Nissan has steady representation even with older cars, suggesting they may have an advantage over some companies in the long term. One possible solution to help gain market share is if the secondary companies work on marketing a premium product. People in rural areas may only be buying cars that are not Teslas because they cannot afford Teslas. Nissan, Ford, and Chevrolet need to work on expanding their market into the Seattle metro area, possibly by changing marketing strategies or products to mimic Tesla.

## References

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