

# Write Up - Team Tesla

## Sociodemographics of EV Owners

Between 2011-2018 Electric Vehicle sales increased on average 65% YoY. With the continual decrease in pricing, along with the availability of cheaper accessories (e.g. batteries, charging ports) and more EV models being introduced we expect growth in EV sales to continue.

California by far has the most drivers of EV's (based on US sales data) and the worst pollution according to the American Lung Association makes it the best market for our research on EVs and their effects on air pollution and respiratory health.

Based on demographic data for the top five California Counties based on percent of EV registrations the typical consumers currently purchasing EVs are affluent (median Income \$92.6k+) and likely to be either Asian or White.

## Effects EVs have on Air Quality

Linear regression models showed a decrease in both ozone and PM10.

$R^2$  values were -.3116 for PM10 and -.114 for ozone, respectively. We had negative  $R^2$  values indicating that the linear regression model does not fit. Graph shows a decrease in median AQI with an increase in EVs per county. Again we ran into a terrible  $R^2$  value of -.1642 showing that the model does not fit. Based on this given data and models used there is no correlation between percentage of EVs in each county of CA and air quality factors. No linear relationship.

## Effects EVs have on Respiratory Health

There is a negative relationship between the percentage of EVs in a county and the percentage of asthma emergency department visits by county. The  $r$  square is -.4 which indicates there is a lot of error in the model and our line of best-fit does worse than the null hypothesis of a horizontal line. The p-value of the regression is .002, indicating we are confident that there is no linear relationship between the percentage of EVs and asthma respiratory incidents by county.

## CA Sources of Power

By separating the top ten counties that have the greatest EV adoption rate and comparing it against the bottom 40 counties that have the lowest EV adoption, we can see that their usage of renewable energies is statistically different. We performed an Independent T-Test and found a p-value of close to zero. This allowed us to reject the null hypothesis that these groups are from the same population.