

Data Analytics Project 1

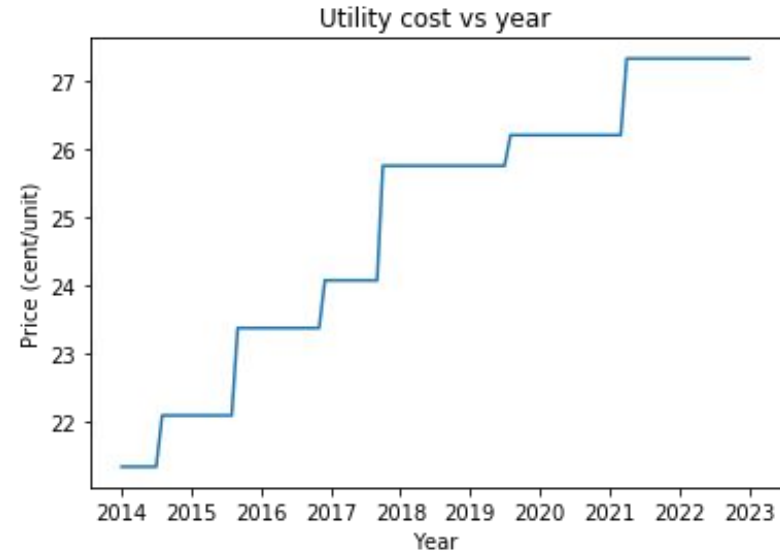
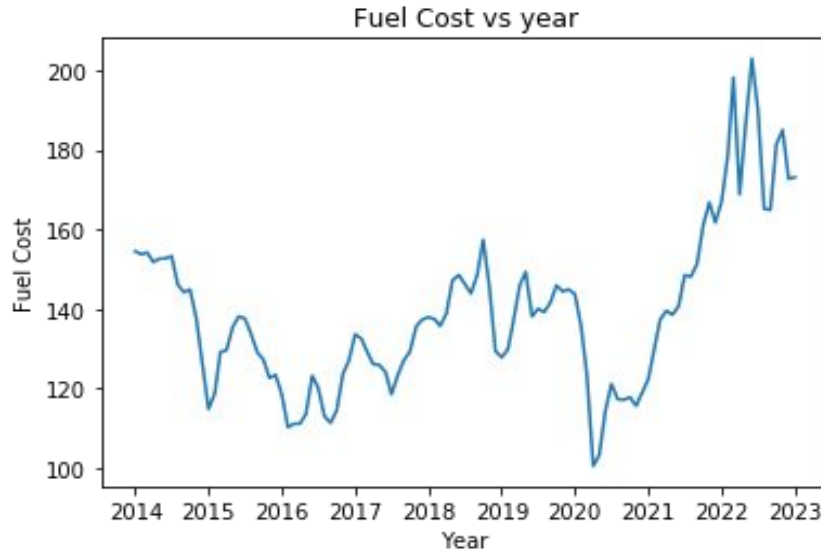
Electric Vehicles

Group Members

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Electricity and fuel cost in Australia in the past 10 years

- An uniform raise in the price of power cost while the price of fuel get fluctuated
- However, in last eleven years, fuel price has overtaken the power cost.
- Percentage raised in power cost is 33% and that of fuel is 56%.



Will electric vehicles (EV) be more worth buying in the coming years?

Overview



Compare the performance of engine in both electric and traditional vehicles

Understanding the EV growth in the world

The difference between EV car sales in Australia compared to other country

A possible reason of lower EV growth in Australia

Fuel Efficiency Analysis

EV Efficiency

Unit - 1 kWh/100 miles

V.S

Gasoline Vehicle Efficiency

Unit - miles per gallon

1 kWh/100 miles = 0.3 kilowatt-hours per 100 miles

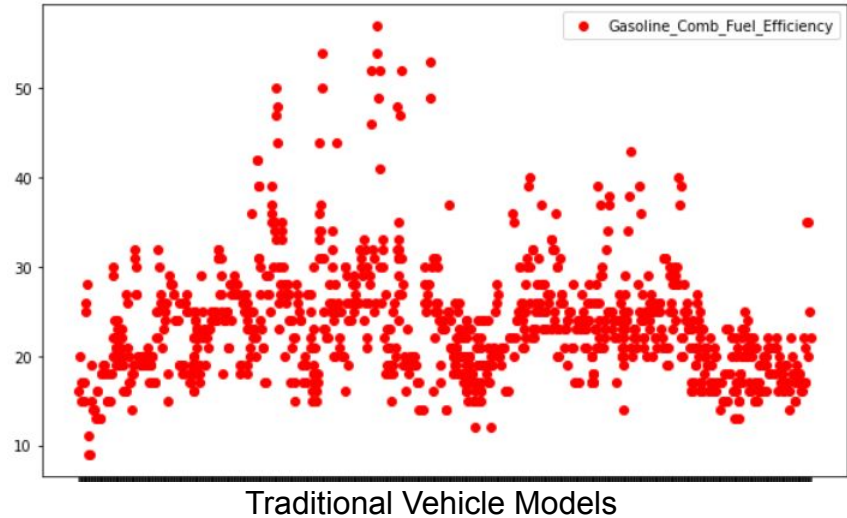
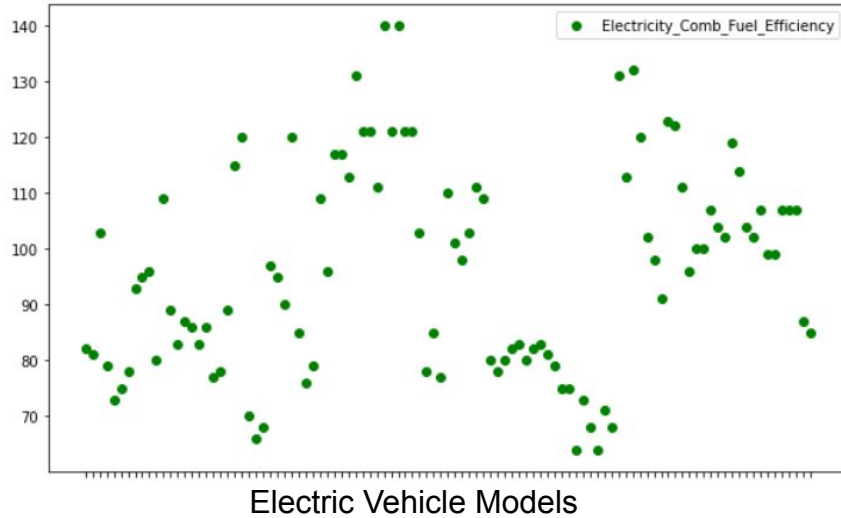
Then, MPG = 235.21 / (kWh/100 miles)

Fuel Efficiency Unit: MPG(miles/gallon)

Fuel Efficiency Analysis

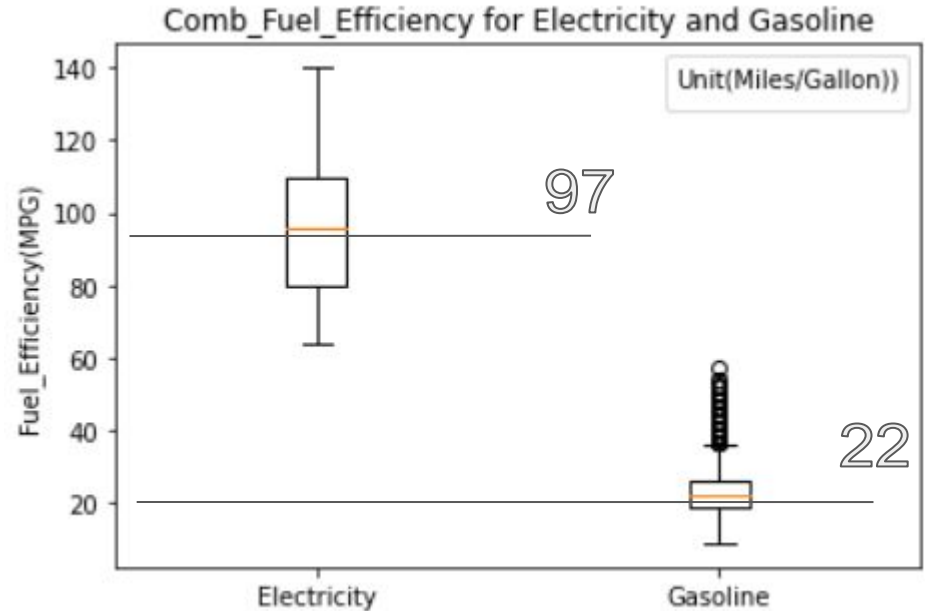
Fuel Efficiency Unit: MPG(miles/gallon)

- City_FE
- Hwy_FE
- Comb_FE



Fuel Efficiency Analysis

- Higher MPG → → → Higher Fuel Efficiency
- Lower Energy Cost for the Owner
- Small Carbon Footprint

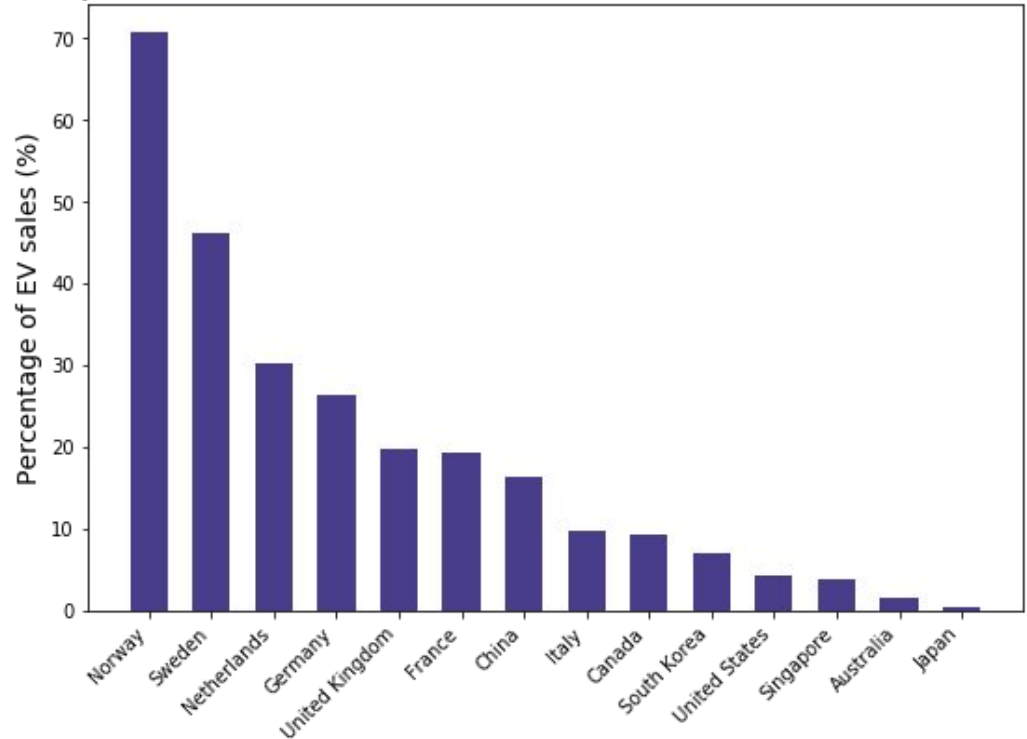


Fast Acceleration, higher top speed, and lower emissions

EV cars sales in different countries (2021)

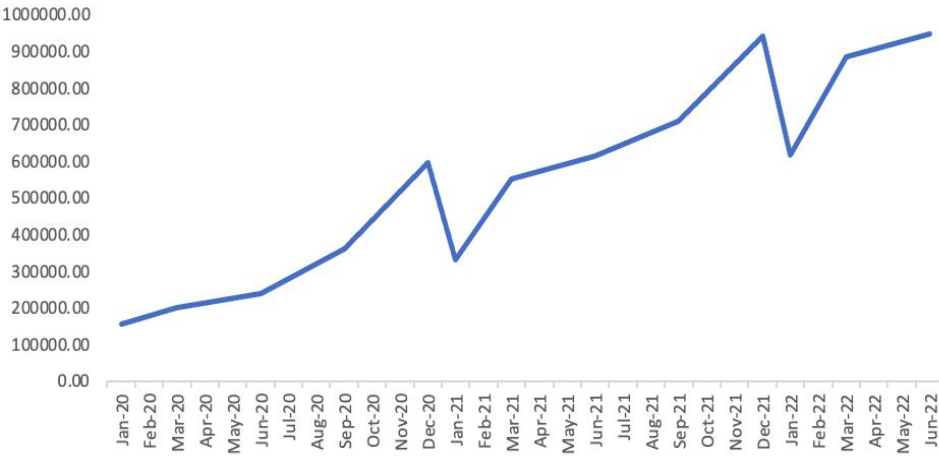
- More EV car buyers in European countries decided to purchase EV in 2021
- Only 1.6% of general Australian car buyers decided to purchase a new electric vehicles in 2021
- A very low percentage compared to other countries

Proportion of Electric Vehicles sales in different countries

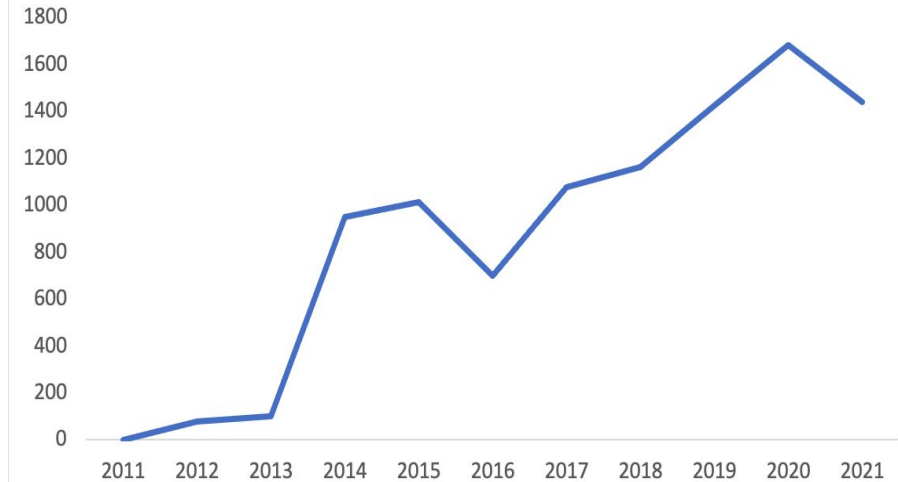


Global and Australia EV sales

Global_EV_sales(2020-2022)



Electric Vehicle Sales in Australia



Global EV sales: 428 % increased in between Jan 2020 - June 2022

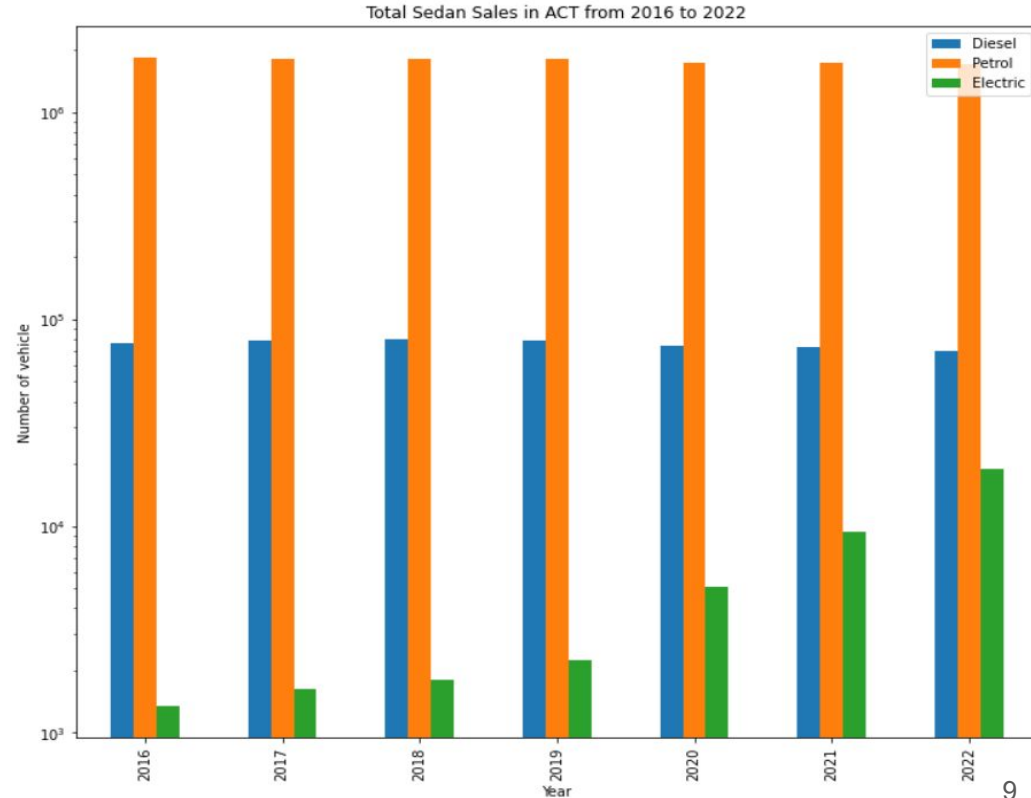
EV sales increasing, but during COVID-19 has impacted the sales between Dec 20 and Jan 2021 as well as the same timeframe in 2021/2022

Australia: 14.54% decreased in between 2020 - 2021

Zoom into Australian Capital Territory (ACT)

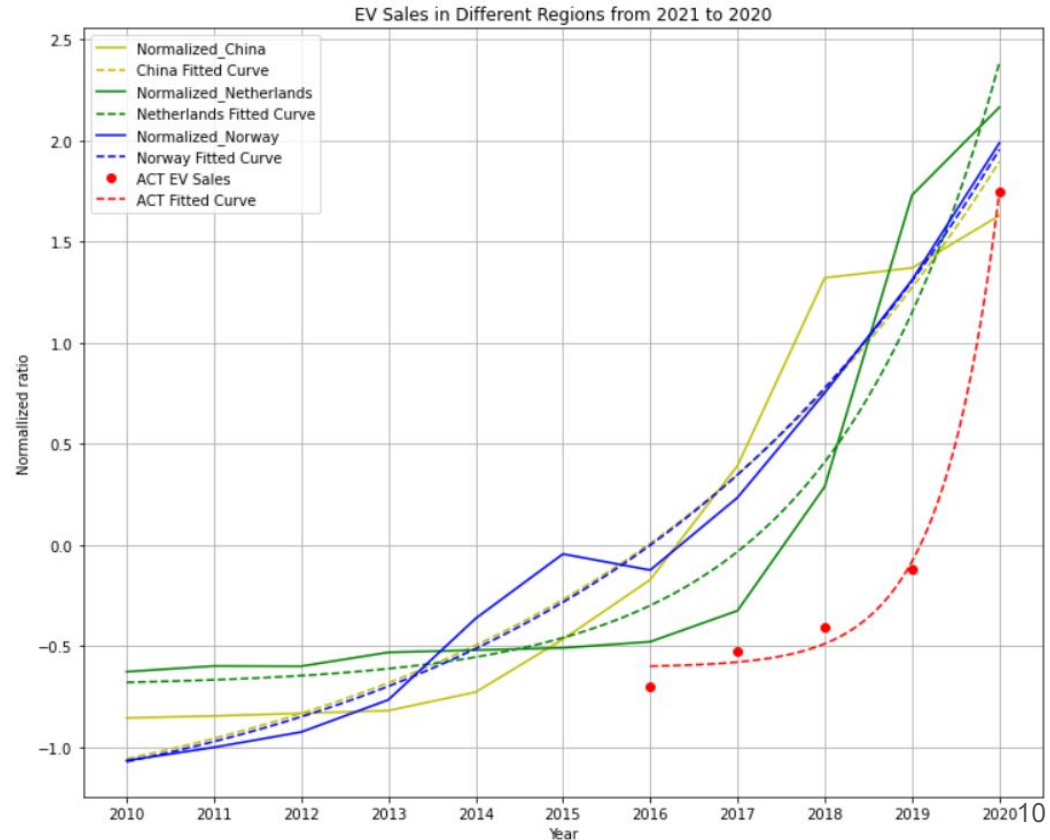
- ACT is one of the earliest states in AU to put forward the “zero emissions vehicles strategy”
- Assume sedan is the type of vehicle for normal family usage
- Logarithmic scaled y-axis is applied to get a better view

- Petrol vehicle sales
- Diesel vehicle sales
- Electric vehicle sales

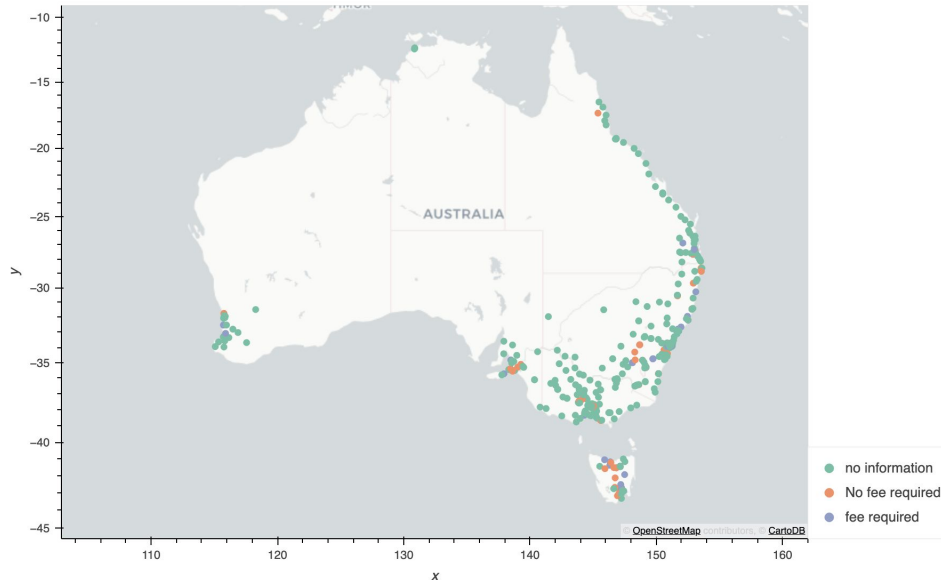
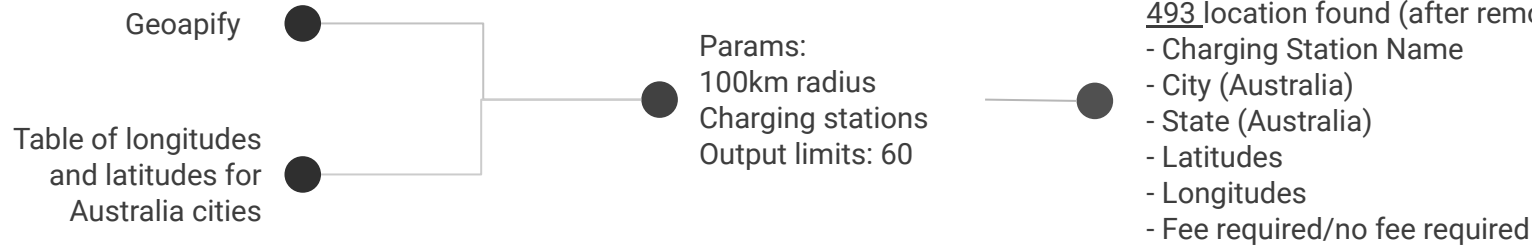


Comparing ACT EV sales with other regions in the world

- Normalized data by z-score normalization to compare among different regions
- Chose to use exponential regression because of the increasing trends
- ACT is following the same trend with the sample regions
- If the tendency remains, we would expect an exponential growth in the next few years



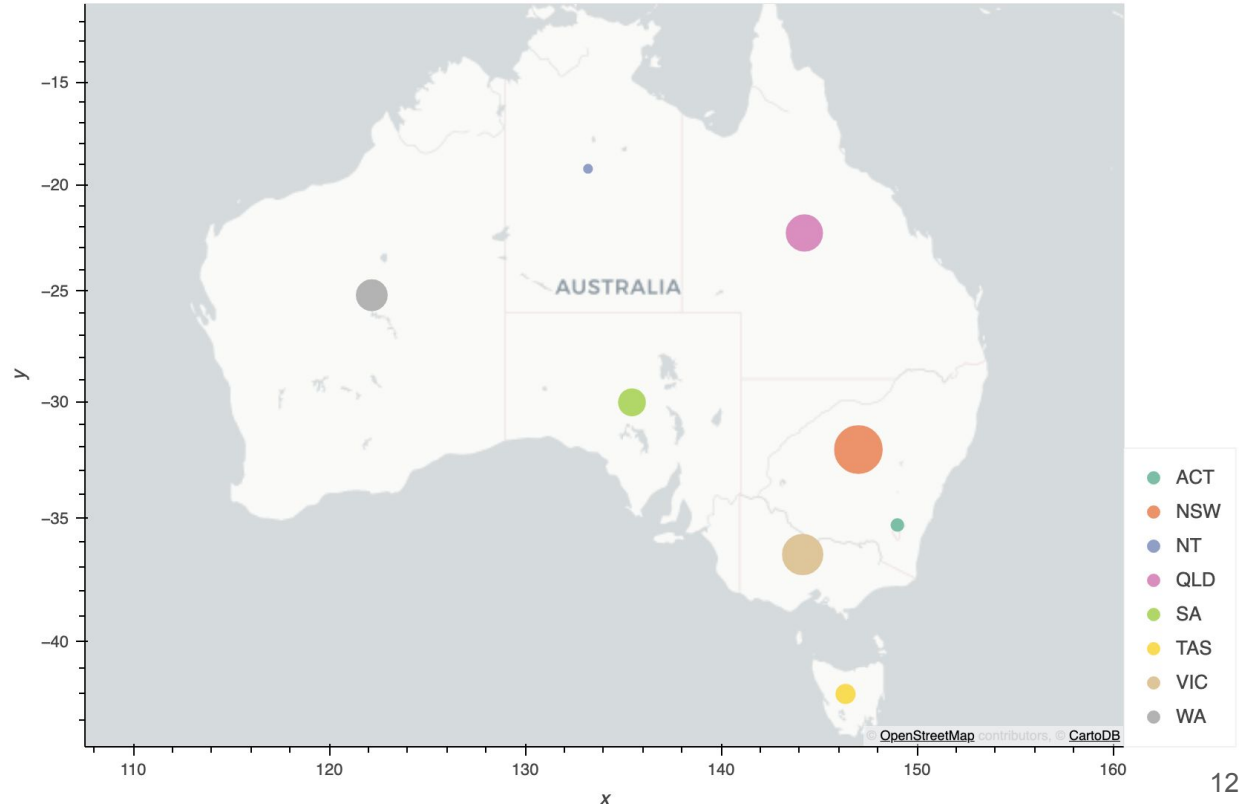
Charging Station location in Australia From Geoapify



Charging fee required: 66 sites
No Charging fee required: 69 sites
No information: 358

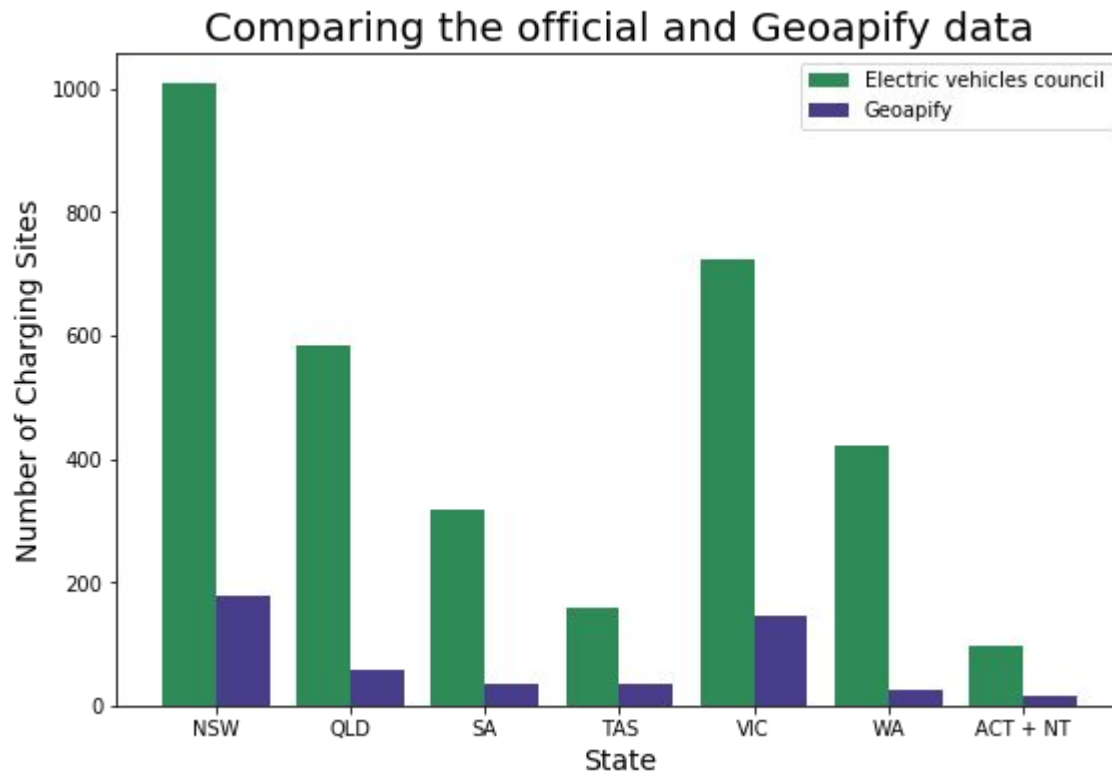
Charging Station in different state

- Data is from EV council
- A total of 1409 charging stations in Australia
- NSW has the most number of charging station



Comparison of the official and API data

- Missing a lot of data in the API
- No official site can easily obtained the location of charging station



Discussion

Electrical Vehicles	Traditional Vehicles
Higher fuel efficiency	Low fuel efficiency
Better performance	Low performance
Lower maintenance and running cost	High maintenance and running cost
Growing market	Saturated market

Despite that driving electric vehicles is beneficial in different aspect, Australian EV sales still falling behind to the other counties.

- Insufficient charging stations across the countries
- No easy or efficient way to locate the charging stations

Future Studies

Environmental:

- CO₂ emission of EV and traditional cars
- Noise pollution
- Air quality

Government:

- The effectiveness of the government policy in different countries
- How much tax incentives for EV will affect the buyers to get a EV rather than traditional cars
- Can our government can learn from other countries
- Any other infrastructures can be built before the big influx of EV