

# Intelligent Vehicle Usage for Sustainable Canberra

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**Abstract**—The goal of my hack is to extract meaningful insights from ten different datasets and make Canberra sustainable by intelligent use of vehicles. Vehicles are fundamental to everyday life; also an essential part of a growing and vibrant city. However, the greenhouse gas emitted from vehicles is one of the barriers to make a sustainable city and healthy environment for future generation. After extracting key insights from ten different datasets, it is found that the large number of vehicles here in Canberra are playing major role for carbon footprints. It is high time to take the advantage of information technology infrastructure and neighbourhood effect to develop websites, mobile applications for commuters in Canberra. These applications will help intelligent usage of vehicles and decreasing greenhouse gas to make Canberra one of the most sustainable places to live on earth.

**Index Terms**—Carbon Emission, Vehicles, Sustainability.

## 1 KEY INSIGHTS

THE ACT Government plans to make our city a better place to live, work and a more sustainable Canberra [1]. To achieve a more sustainable Canberra, it is imperative to reduce greenhouse gas emissions. The vehicles (mostly cars and buses which consume petrol, diesel) are major contributing factor (apart from electricity) to greenhouse gas emissions. For example, one litre of petrol or diesel produces approximately 2.39-2.62 kilograms of CO<sub>2</sub> [2].

To estimate the amount of CO<sub>2</sub> emitted by vehicles in ACT, the ACT Registered Vehicles dataset [3] is investigated. The current number of registered vehicle across ACT is 277554. Assuming the average fuel consumption per vehicle is only 5 litre per day (5 litres fuel consumption is fairly low in most cases), then everyday ACT registered vehicles generate  $\approx 727191$  kilograms of CO<sub>2</sub>. And every year this amount raises upto  $\approx 260$  million kilograms of CO<sub>2</sub>, which is pretty much daunting in terms of global warming.

Also, if we consider the ACT population to registered vehicles ratio, it is quite alarming to see that, it is nearly 1:1. In Figure 1, the ratio is shown (precisely, 1:0.7).

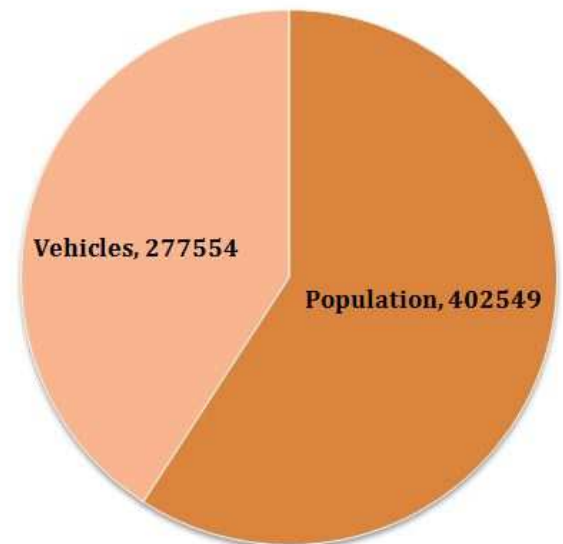


Fig. 1. ACT registered vehicles and population ratio as of 2017 [4], [5]

is one of the viable approach to reduce the carbon footprints.

## 2 MORE INSIGHTS AND PROPOSED SOLUTION

Public transport usage is one of the solutions to reduce the enormous amount of detrimental greenhouse gas. ACTION bus service have 422 routes and 2583 stops around Canberra [6], [7]. According to ACTION bus service reliability [8], 71.34% of services are on time [9] and 99.69% services are delivered successfully which is an impressive achievement. Considering the ACT school and TAFE locations [10], [11], the bus service covers 71 suburbs and  $\approx 240$  schools, TAFEs around Canberra. It is interesting to see that the ACTION buses boarding on average per day is  $\approx 63635$  [12], which means that only 15% of Canberra population use the bus service (supported by Figure 2). Usage of bus service

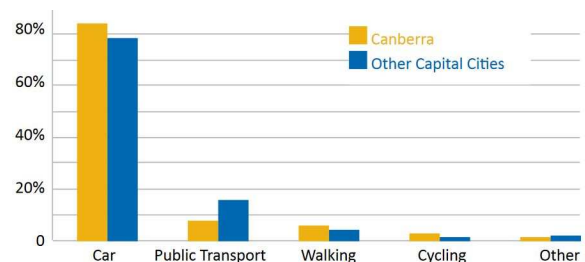


Fig. 2. Canberra commuters [1]

To ensure a stainable Canberra, it is us who have to come forward and create awareness. It is a high time to

combine both information technology and the neighbourhood effect [13]. *"The neighbourhood effect is an economic and social science concept that posits that neighbourhoods have either a direct or indirect effect on individual behaviors. Although the effect of the neighbourhood was already known and studied at the beginning of the 20th century and as early as the mid 19th century"* [14]. We can think of the following solutions which are the intersection of both information technology and neighbourhood effect:

- Mobile application and website for carpooling services: Mostly targeting commuters in a neighbourhood.
- Website and mobile application for vehicle sharing via subscription: Instead of buying a car, use car subscription for a specific time which should be cheaper than taxi/uber. Again, neighbourhood effect might be exploited here.
- Efficient applications for public transport: Combination of weather forecast, predictive analytics of service quality based on real time traffic monitoring (i.e. accidents, delays etc.), promotional offer to attract commuters to use private vehicles. And again, neighbourhood effect might be exploited here.
- Notifications: In fuel stations, there should a display to remind about the carbon footprints, i.e. if I get 50 litres of petrol, the display will show **"You are producing  $\approx 120$  kilograms of  $\text{CO}_2$ "**. Additionally, the credit/debit card transactions on these fuel stations should also send similar notifications to users, i.e., if someone spends \$50, then s/he will receive a text/e-mail from the bank saying, **"You have spent to increase  $\approx 100$  kilograms of greenhouse gas"**.

### 3 IN A NUTSHELL

Canberrans are producing a lot of greenhouse gas which is not expected for future generation. There is no better time to start combining the neighbourhood effect and information technology infrastructure to decrease the carbon footprints. The key insights gained from ten different datasets lead to develop newer strategy (e.g. efficient and informative website and mobile application) to make Canberra more sustainable.

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