



Future distribution of electric vehicles

Snapshot

- **Australia is transitioning towards a more fuel-efficient vehicle fleet. Based on the current EV growth trend, private buyers are expected to add 80,000 new electric vehicles (EVs) to Australian roads over the next 10 years.**
- **There are strong social and spatial factors driving the uptake of EVs in urban areas, including household income, travel patterns, and market supply. Improved infrastructure will also increase the market share of EVs.**
- **Research from the Clean Air and Urban Landscapes Hub has produced a new forecast of EVs and their distribution in urban areas. It has also assessed the implications of increased EV uptake for transport policy and infrastructure in Australia.**

Background

The increased use of low-emission vehicles would make a significant contribution to reducing greenhouse gas emissions. In addition to strategies to improve the fuel efficiency of existing vehicles, boosting the uptake of EVs can accelerate this change. The Australian Government has recognised the need for stronger national policies to increase EV uptake, but the current policy framework has led to limited support and incentives and, in turn, a low EV uptake compared to other countries. We explored current patterns of EV adaptation and infrastructure in Australian cities, and investigated possible policy interventions that can increase future EV use.

What we did

This project conducted the first ever spatial analysis of motor-vehicle registration data and the latest vehicle-use survey for Melbourne. It also analysed the social and spatial characteristics of areas with high or low uptake of EVs. Drawing on the outputs of this analysis and current EV-uptake research, we developed a new model to predict future EV use in urban areas. This model can also be used as a tool to assess the potential energy and emissions savings from a range of EV growth scenarios.



Key findings

This research showed that EV use is increasing and there will be up to 85,000 battery-powered vehicles in Australia by 2030. But the rate of EV uptake is not uniform in urban areas. This growth can be impacted by local social characteristics (such as residents' education level and employment type), financial capacity, vehicle stock, travel demand, and access to charging stations. For example, a spatial forecast has shown that the middle and outer suburbs of Melbourne will see high EV growth (Figure 1). This is mainly driven by higher car ownership, travel demand, and increasing wealth of new residents in those areas.

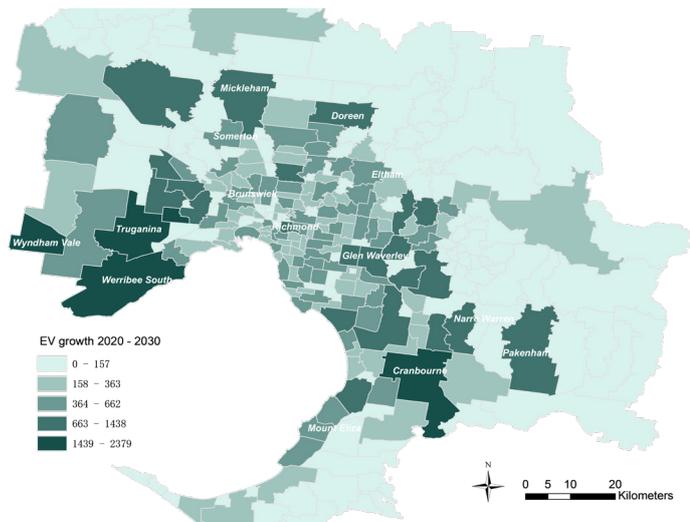


Figure 1: Forecasted electric vehicle growth in Melbourne

The environmental benefits of increased EV use are significant. It is estimated that in Melbourne alone, we could save more than 500,000 litres of fuel per day if 10% of the current private vehicle fleet were replaced by EVs. The model also showed there are further opportunities to stimulate EV uptake, rather than relying solely on the market. Finally, the research found that we need better charging infrastructure in future high-growth areas and in popular destinations such as employment and activity centres.



Electric vehicle charging station in Adelaide's CBD

Transport emissions and air quality

Traffic emissions are a well-known source of air pollutants, including particulate matter smaller than 2.5 micrometers (PM_{2.5}). Emissions from on-road petrol and diesel vehicles contribute to almost a fifth of the man-made PM_{2.5} concentrations in the NSW Greater Metropolitan Region. When inhaled, these tiny particles can get deep into the lungs and bloodstream and can be harmful to human health. To better understand the concentrations of air pollutants generated by traffic, the CAUL Hub's air quality researchers conducted a roadside study in Sydney's east. The study found levels of PM_{2.5} at the roadside were about twice what was measured at nearby air quality monitoring stations. PM_{2.5} concentrations were also found to be about 50% higher in the morning rush hour compared to the evening traffic peak. [A Clean Air Plan for Sydney](#), led by the CAUL Hub, outlines a number of policy recommendations to improve Australia's air quality, including measures to incentivise the uptake of EVs.

Way forward

The high up-front cost and limited government support are the main factors impeding the uptake of EVs in Australia. This research has identified the expected effect of a range of government initiatives and has shown that stronger EV policy will generate greater benefits (e.g. fuel and emissions savings) for households and cities, and create opportunities to accelerate the transition from petrol to electric cars. These policies opportunities include legislated vehicle fuel-efficiency standards, industry support, financial incentives, and transport regulations such as dedicated EV parking. Providing more charging stations would also encourage the use of EVs in the future.

Sources

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About the CAUL Hub

The Clean Air and Urban Landscapes (CAUL) Hub is funded by Australian Government's National Environmental Science Program. The remit of the CAUL Hub is to undertake "Research to support environmental quality in our urban areas". This includes research on air quality, urban greening, liveability and biodiversity, with a focus on practical implementation of research findings, public engagement and participation by Indigenous Australians. The CAUL Hub is a consortium of four universities: The University of Melbourne, RMIT University, the University of Western Australia and the University of Wollongong.