

**LA TROBE UNIVERSITY'S SUBMISSION TO
THE SELECT COMMITTEE ON ELECTRIC
VEHICLES**

July 2018

**Inquiry into the use and
manufacture of electric vehicles
in Australia**

ENQUIRIES
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INTRODUCTION

La Trobe University welcomes the opportunity to respond to this inquiry into the use and manufacture of electric vehicles in Australia.

Through a project of national significance commenced in late 2017, La Trobe University hosted Victoria's first-ever automated (and fully electric) vehicle trial – a project aimed at addressing gaps in the knowledge and experience required to make autonomous vehicles a reality on public roads in Victoria and Australia.

Concluded in June 2018, this trial has succeeded in bringing autonomous vehicles closer to becoming a public reality, while contributing to a blueprint for their safe operation all over Australia. La Trobe University looks forward to sharing the results of these trials (including user experience/end-user feedback) after the final report is finalised in August 2018.

The Select Committee may also wish to note the outcomes of the Victorian Parliament's '[Inquiry into Electric Vehicles](#)¹' in which La Trobe was an active participant. Although the Victorian Inquiry did not consider automated vehicles in depth, it acknowledged the significance of the impact that automation of transport will have on Victoria. It recommended that that this impact be considered in planning for the State's future including in relation to transport infrastructure.

KEY RECOMMENDATIONS

- ✓ **In considering the use and manufacture of electric vehicles in Australia, take into account the four pillars that will underpin the future of transport namely electric, connected, automated and shared – and not consider electric vehicles in isolation**
- ✓ **Consider the impact that the automation of transport and shared mobility will have on the required planning for Australia's future transport infrastructure (including for electric charging, connectivity and the electric grid)**

THE FOUR PILLARS OF FUTURE TRANSPORT – ELECTRIC, CONNECTED, AUTOMATED AND SHARED

There is industry consensus that the future of transport will revolve around the four pillars of being connected, electric, automated and shared. Figure 1 shows the relationship and interconnectedness between these four pillars and the extent to which they reinforce each other for adoption, promotion and sustainability.

According to a 2016 McKinsey report², key mobility trends such as electrification, shared mobility and autonomy are set to take off. Combined with increasing urbanisation and the opportunity for connectivity to shared mobility options, these trends will reinforce each other. According to the report, shared mobility could boost electric-vehicle (EV) sales because shared vehicles are used more intensively, improving the economics of ownership. In turn, higher EV production could accelerate innovation and reduce the cost of batteries. That opens up applications in adjacent systems, such as distributed storage. The plummeting cost of distributed power generation could improve the greenhouse-gas abatement potential of EVs, because they would get more of their energy from low-carbon sources.

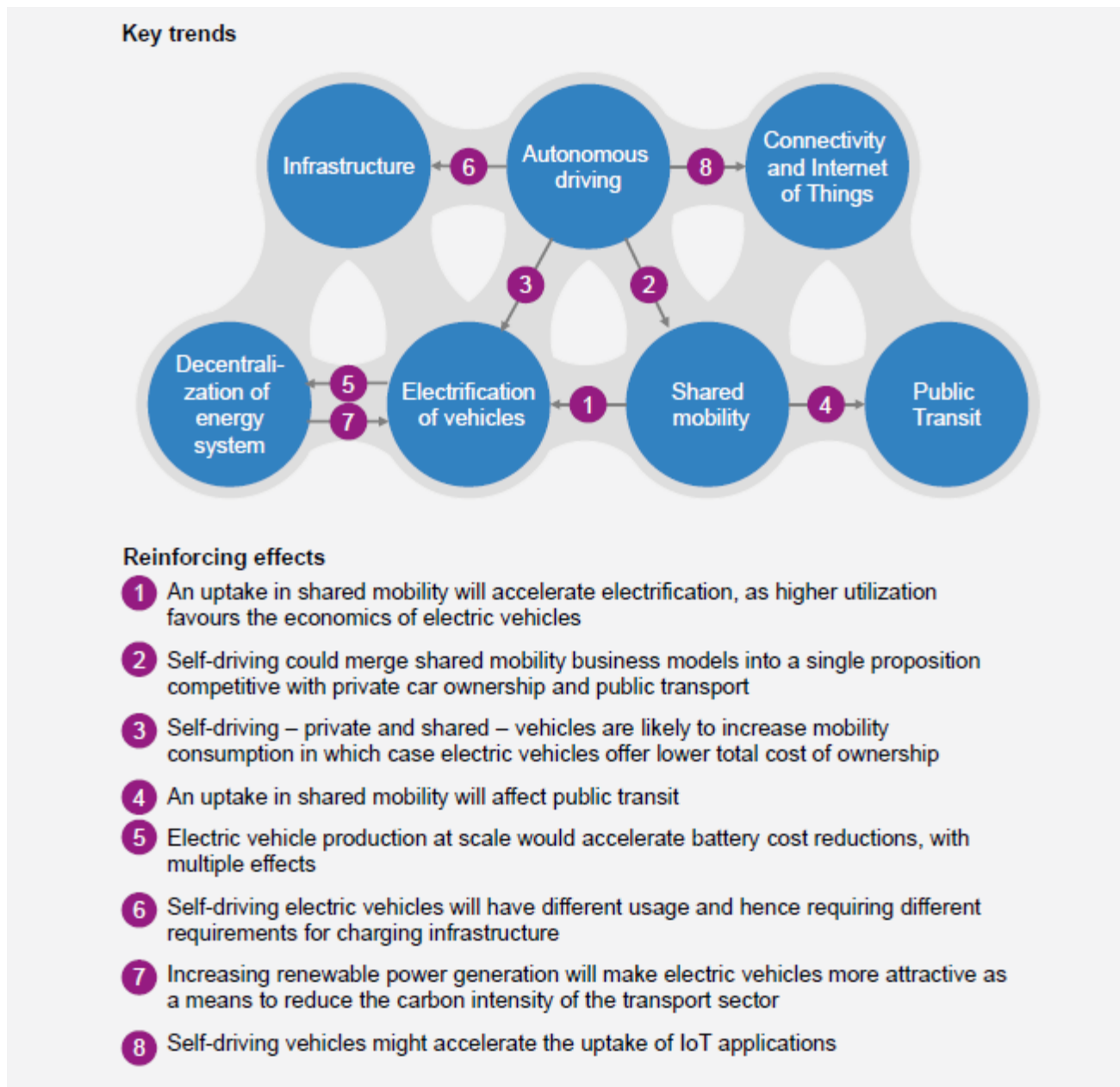
The report argues that cities will, depending on their individual characteristics, increasingly combine shared mobility, autonomy, and electrification with integrated energy systems, public transport, and infrastructure.

¹ Inquiry into electric vehicles. Economy and Infrastructure Committee, Parliament of Victoria, May 2018.

² An Integrated Perspective on the Future of Mobility, Bloomberg, McKenzie & Co., October 2016

Figure 1: Key trends in the future of mobility

(Source: An Integrated Perspective on the Future of Mobility, Bloomberg, McKenzie & Co., October 2016)



Considering all four pillars will open up opportunities for the future of transport in our cities

La Trobe University takes the view that if electric vehicles are to be considered and supported in isolation, their impact on shared mobility and public transport is likely to be limited. A switchover to electric platform vehicles is unlikely to bring about substantive changes in single car ownership and occupancy through replacing current internal combustion engine cars. While electrification alone may have a positive impact on air quality and emissions (depending on the composition of the electric grid), this will not have a significant impact on congestion.

However, a comprehensive approach that takes into account automation, connectivity and shared mobility is likely to have more far-reaching implications for the future of transport and for reducing congestion.

According to Infrastructure Australia, the cost of avoidable congestion in Australia will be in excess of \$50 billion by 2031³. Further to this, ten year modelling by VicRoads for population growth and transport infrastructure, shows that unless there is a nine per cent mode-shift in transport, Melbourne will need to have about 25 per cent increase in capacity on ten per cent of its road links. Similar issues are likely to occur in Australia's other major cities such as Sydney and Brisbane as population growth increases.

Electric and automated vehicles which support shared mobility could be part of the solution to these and other issues such as optimal urban land utilisation and investment in private vehicles. For example, current levels of car ownership have led to considerable amount of land being dedicated to car parks which is not the ideal outcome for prime urban land. Similarly, for the average Australian, a vehicle is probably the second most expensive investment after their house but the car tends to be idle 90 per cent of the time. In addition, it is the fastest depreciating asset that a consumer is likely to own.

Automated and electric vehicles, particularly when providing connectivity to public transport for what is referred to as 'first and last mile connectivity solutions', have the potential to substantially shift attitudes to mass transit. If an automated vehicle can bridge the gap between the source (e.g. one's home), the destination (e.g. La Trobe University) and the closest mass transit transportation hubs already (e.g. train stations or bus interchanges), then people would be more likely to use the public transport already on offer. This is one of the key research questions that La Trobe's 'Autonobus' trial sought to address.

La Trobe's Autonobus Trial

With the aim to bring Autonomous Shuttles a step closer to a public reality, in late 2017, partners including VicRoads, Keolis Downer, La Trobe University, HMI Technologies, the Australian Road Research Board and the RACV launched a major project called 'Autonobus' – a first of its kind project in Victoria. The value of the project exceeded \$1 million dollars, with major cash contribution from State Government of Victoria through its road agency VicRoads, along with significant cash and in-kind contributions from all partners. The project aimed to address gaps in knowledge from a variety of perspectives, including regulators, industry and end-users. The aims of the project were to:

- Explore the use of autonomous vehicle shuttles to address last mile access and integration with existing transport modes
- Promote the potential for autonomous vehicles to provide new mobility solutions

The project successfully culminated in putting a Level 4 Autonomous shuttle bus into service with the public trials concluding in June 2018. The initiative pushed well beyond a controlled situation demonstrations and successfully trialled the technology in a near real-world environment. La Trobe's busy Bundoora campus, which is approximately 1.5 times the size of Melbourne's CBD and close to the second most congested area in Melbourne, was an ideal site to trial this project. Commercial user-experience testing methods were employed where user attitudes were not only tested after the trial ride experience, but also prior to it, enabling evaluation of user-experience as well as the trial's overall impact.

The initiative has brought autonomous vehicles closer to being a public reality and has contributed to delivering a detailed blueprint for their safe operation all over Australia including a deeper understanding of:

- Legislation, regulation, safety and assurance (of interest to VicRoads and Government)
- A viable commercial framework (of interest to industry)
- The technological platform (of interest to tech providers)

³ Australian Infrastructure Audit - Our Infrastructure Challenges Report – Volume 1, Infrastructure Australia, April 2015.

- User and Social benefits (all users)

The University looks forward to sharing the results of these trials (including user experience/end-user feedback), with the committee after the final report is finalised by August 2018.