



The Economic Benefits of New Mobility for Australia

Driverless cars, vehicles powered by electricity rather than the internal combustion engine, and personalised transport accessed via a smartphone app are just some of the innovations that are part of the trend known as 'new mobility'.

New mobility promises a range of social and environmental advantages, making travel easier and cheaper, reducing pollution, and cutting road accidents.

Yet there are also signs that new mobility offers real and quantifiable benefits to the Australian economy. Our economic modelling shows that new mobility is likely to have a strong, positive impact on the Australian economy, raising real GDP by AUD\$62 billion to AUD\$92 billion, or 2%-3%, by 2050.

This report:

1. Outlines the types of changes that new mobility will bring
2. Provides an overview of the way in which the Australian economy is likely to be affected
3. Offers an economic analysis of the changes

1. New mobility and the future of transport

In the future, the mobility landscape will look dramatically different from today. New technologies and mobility options such as car sharing (e.g. GoGet, Flexicar) and ride sharing / pooling (e.g. Uber, Lyft, Ola) are already changing the way we travel and use traditional transport modes, such as taxis and private cars. Shared electric scooters and e-bikes are gaining traction. Innovations such as autonomous vehicles (AVs) and on-demand transport are likely to bring even more dramatic shifts.

Personalised transport

An important trend in new mobility is the personalised / customised transport experience, which provides competitive alternatives to traditional car ownership.

Personalised transport includes:

- On-demand services offered on public transport routes that better match capacity and demand to deliver superior service (e.g. BRIDJ services in inner Western Sydney)
- Mobility-as-a-service (MaaS), in which an integrated platform such as a smartphone app provides customers with a real-time, point-to-point journey management and payment platform (e.g. Whim Helsinki's MaaS app)

The sharing economy

The emergence of the sharing economy over the past decade has disrupted a broad range of industries, from software to travel accommodation.

The three key trends affecting transport are:

- Platforms that match vehicles with passengers on demand, with no advance booking. These platforms also enable passengers to share rides with other passengers (e.g. UberPool).
- Platforms for users to book the use of shared vehicles for short periods of time (e.g. GoGet).
- Platforms for electric scooters or e-bikes (e.g. Lime).

Electric vehicles

The range of electric vehicles (EVs) is increasing, and EVs are being offered at lower price points. These include hybrid, plug-in

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hybrid, and all-electric. EVs offer lower operational cost and / or more environmental benefits compared with vehicles that use petrol or diesel.

Original equipment manufacturers (OEMs) and local governments are increasingly supporting technology development in battery and vehicle options. For example, OEMs have committed to invest over US\$90 billion in EV technology and expand their model range¹. Volvo was the first car manufacturer to announce that from 2019 it would no longer produce vehicles powered by internal combustion engines.

Published forecasts of EV penetration in Australia vary significantly, though there appears to be a broad consensus that EVs could account for a material share of the total vehicle fleet over the next 20 to 30 years.

Autonomous vehicles

AVs also offer many potential benefits. Freeing car users from driving would mean they could do something else during the journey such as work, sleep or watch entertainment. Removing driver fatigue and using superior machine reaction time could improve road safety, while reducing headways and increasing effective speeds could help alleviate traffic congestion.

Various levels of autonomy are emerging, ranging from functional automation, which has been achieved by many OEMs, to full automation, which is still in its trial stages.

While there appears to be broad consensus that AVs have the potential to dominate the future vehicle fleet, the timing of their introduction and mainstream adoption is highly uncertain and hinges on customer acceptance, government policy and continued advances in technology. Major OEMs such as Ford and GM are aiming to release AVs over the next five years².

Other developments

In the longer term, other transport innovations are likely to include personal air transport (e.g. passenger drones like Uber Elevate) and the Hyperloop (high-speed mass transit exceeding 1,000km/h), though their impact is outside the scope of this report.

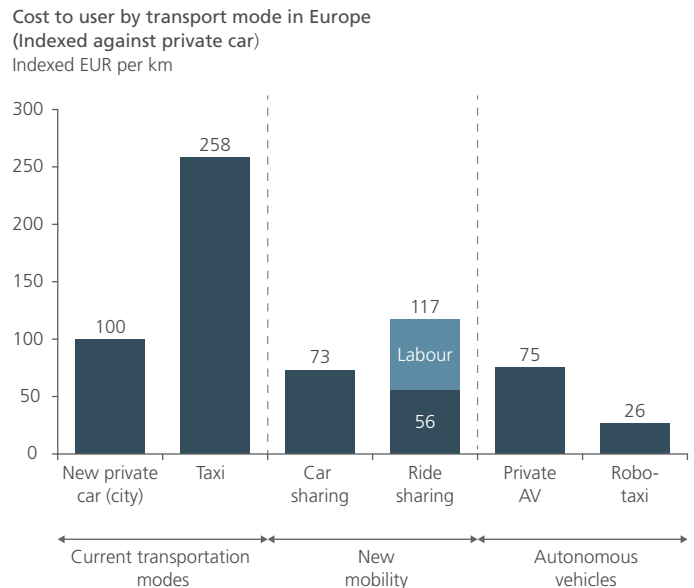
2. New mobility and the Australian economy

New mobility is likely to fundamentally alter the way households travel, which will have important implications for the Australian economy.

Cost of transport

New mobility trends will significantly reduce the costs of passenger transport. For example, transport benchmarking in Europe indicates that AVs could cut users' travel costs by 25%-75% compared with owning a private car today (see Figure 1).

Figure 1
Cost to user by transport mode



Source: L.E.K. research and analysis

Labour force participation

By improving passenger transport, new mobility could reduce or even eliminate barriers to labour force participation, increasing the size of the Australian labour force. ABS survey data of underemployed and unemployed people suggest AVs might enhance job access for up to 7.5% of people³.

Road accidents and fatalities

Estimates suggest that by eliminating human error, AVs could reduce road accidents up to 70%⁴. Lower levels of road-related injuries and fatalities would have economic benefits such as:

- Lower healthcare costs — e.g. for treatment, paramedics, hospitals, ambulances, disability care
- Higher labour productivity — reduced loss of income from inability to work, as well as non-wage contributions from household and voluntary work
- Lower insurance costs through reduced claims

Fuel consumption

EVs are expected to dramatically change the mix of the vehicle fleet in the future, shifting demand away from traditional fuel sources.

Other areas of impact

While this report focuses on the economic impact of changing household travel behaviours, new mobility will have other important effects on the Australian economy through government infrastructure spending and use by commercial

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businesses. Indeed, the earliest applications of autonomous technology are expected to be in the freight sector.

For example, Volvo is to provide autonomous trucks to transport limestone from Norwegian mine Brønnøy Kalk. In Australia, Scania and Rio Tinto have been trialling autonomous tippers and haul trucks at mine sites in Western Australia. The size of these economic benefits is outside the scope of this report but is likely to be significant; the freight sector alone is worth AUD\$49 billion⁵.

3. Economic analysis

We have estimated the impact that EVs and AVs will have on the Australian economy to 2050. Our figures are based on a scenario analysis conducted by Cadence Economics using a computable general equilibrium (CGE) model. The analysis is based on scenarios of low and high rates of adoption of new transport modes.

The analysis is indicative only and is subject to a number of caveats and limitations:

- It relies on a number of assumptions and data points obtained from a range of secondary resources (including BITRE, ABS, AAA and ICA) and L.E.K. experience

- The future development and adoption rates for new mobility are highly uncertain
- The CGE modelling is based on a range of assumptions, parameters and underlying data that constitute an approximation of the working structure of the economy

The analysis focuses on the economic benefits driven by the four key channels (i.e. increased labour force participation, insurance cost savings, improved labour force productivity and savings to health care costs) associated with the growth of personalised transport, the sharing economy, EVs and AVs. New mobility applications may have a range of other potential economic impacts that are not considered here.

AV and EV penetration

Figure 2 and Figure 3 show how Australians' use of AVs and EVs is likely to increase until 2050. Robo-taxis are assumed to account for 25%-45% of AVs, the largest section of the market. Our projections suggest that high penetration of EV sales could cause the internal combustion engine to fall to as little as 17% of the car market by 2050, compared with 99% in 2017.

Figure 2
Household transport costs

Low AV / robo-taxi penetration

	2017	2030F	2050F
Private car	69%	50%	15%
Taxi / ride share	4%	10%	10%
Robo-taxi	–	5%	25%
Private AV	–	–	5%
Public transport	10%	15%	25%
Other active	17%	20%	20%
Tolls	NA	NA	NA

High AV / robo-taxi penetration

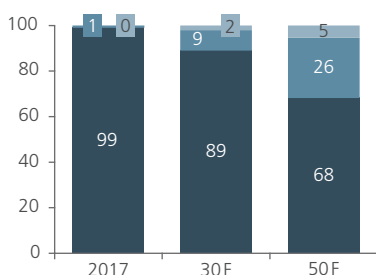
	2017	2030F	2050F
Private car	69%	40%	5%
Taxi / ride share	4%	10%	5%
Robo-taxi	–	10%	45%
Private AV	–	5%	5%
Public transport	10%	15%	25%
Other active	17%	20%	20%
Tolls	NA	NA	NA

Sources: L.E.K. analysis; Cadence Economics

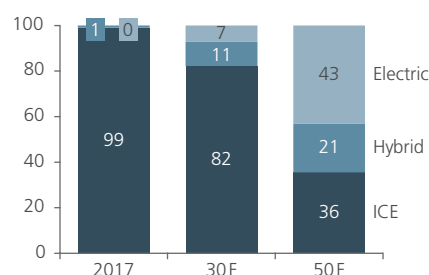
Figure 3
Total vehicle mix, based on EV penetration scenario

Total vehicle mix, based on EV penetration scenario

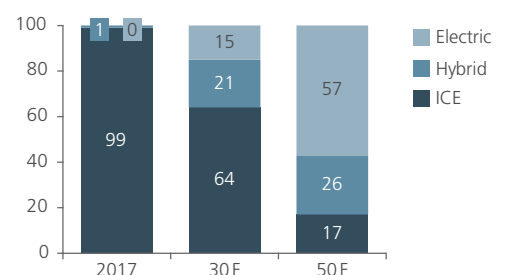
Low EV penetration of sales
(2017, 30F, 50F)
Percent



Medium EV penetration of sales
(2017, 30F, 50F)
Percent

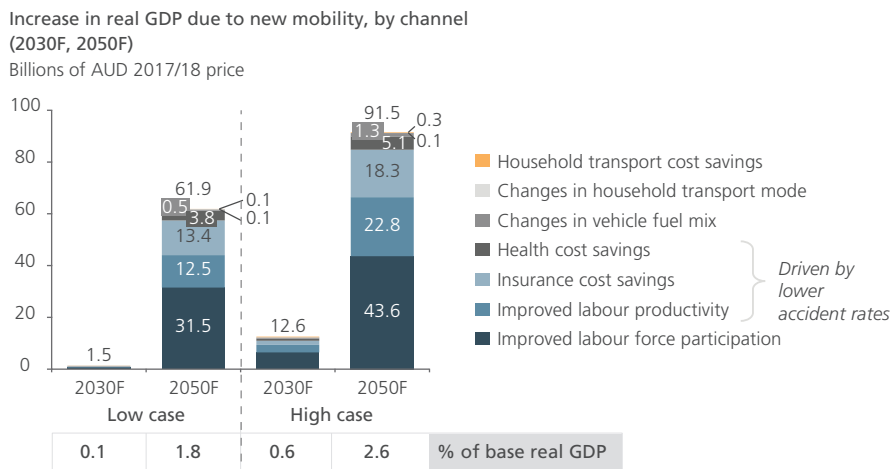


High EV penetration of sales
(2017, 30F, 50F)
Percent



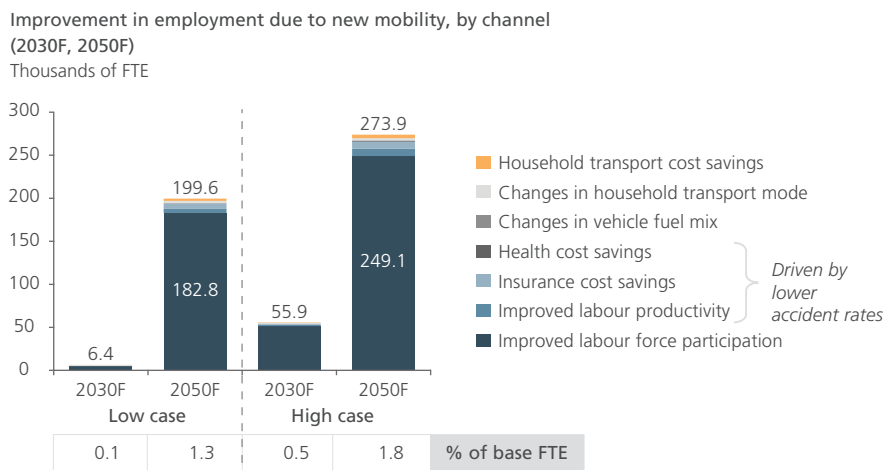
Sources: L.E.K. analysis; Cadence Economics

Figure 4
Economic impact of new mobility: Real GDP



Sources: L.E.K. analysis; Cadence Economics

Figure 5
Economic impact of new mobility: Employment



Sources: L.E.K. analysis; Cadence Economics

Impact on GDP

The introduction and adoption of new mobility options could increase Australia's real GDP by AUD\$62 billion to AUD\$92 billion by 2050, a rise of 2%-3% over projected GDP without new mobility (see Figure 4). In addition, our analysis suggests that new mobility will boost employment by 200,000-274,000 full-time equivalents (FTE), or about 1%-2% (see Figure 5).

About half of the increase in GDP is likely to come from improved labour force participation through reduced transport barriers, contributing AUD\$32 billion to AUD\$44 billion.

Lower accident rates are also a key economic benefit, improving real GDP by AUD\$30 billion to AUD\$46 billion by 2050. Improved labour productivity and lower insurance costs will account for 87%-89% of this GDP increase.

Conclusion

New mobility is likely to have a highly disruptive influence on Australia's transport landscape over the next few decades, with few aspects of travel unaffected. However, our analysis suggests the country's economy will receive a significant boost.

There remain many unknowns and variables. The impact of disruptive technologies is notoriously difficult to forecast, and new mobility innovations such as AVs and EVs have still to overcome significant hurdles to widespread adoption, such as regulatory approval and infrastructure development.

Nevertheless, businesses and governments should waste no time in beginning to plan for the future under new mobility.

Endnotes

- ¹ Reuters, "Global carmakers to invest at least \$90 billion in electric vehicles" (January 2018).
- ² Ford and General Motors media centre.
- ³ Among respondents, 3.7% said the main difficulty in finding work was "too far to travel / transport problems", while another 3.7% cited "difficulties with finding childcare and other family responsibilities".
- ⁴ L.E.K. research and analysis.
- ⁵ IBISWorld, "Road Freight Transport — Australia Market Research Report".

About the authors



Mark Streeting, Partner, L.E.K Consulting

Mark Streeting is a leader in L.E.K.'s Global New Mobility Practice and is an experienced economist with over 30 years' experience and postgraduate qualifications in economics, statistics and econometrics. He routinely deals with conventional and innovative approaches to and quantification of direct and wider economic benefits. He has extensive experience in the following areas: multi-modal modelling (SP and RP techniques), demand model calibration and validation (including elasticity estimation), cost-benefit analysis, conventional and innovative approaches to benefit valuation, benefits realisation, pricing policy and development, applied econometrics, and regulatory policy. He has supported government and private sector clients across Australia, New Zealand, Asia, the Middle East, Europe, and North and South America.



Steve Brown, Managing Director, Cadence Economics

Steve Brown has extensive experience in applied quantitative economic analysis and public policy advice. He is an expert in the field of CGE modelling, in which he has been working since 1990. His work experience spans the public and private sectors. He began his career at the Industry Assistance Commission (now Productivity Commission) before going on to become the Head of Global Modelling at the Australian Bureau of Agricultural and Resource Economics (ABARE). At ABARE, Steve was responsible for Australia's largest public sector CGE modelling team. Following his move into the consulting sector, Steve has developed CGE models in Australia and overseas.

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