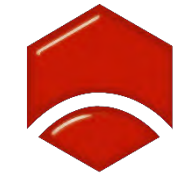
ENGINEERS
AUSTRALIA

Transport Technology

Submission to the QLD Parliament Transport and Public Works Committee

October 2018



Engineers Australia
11 National Circuit, Barton ACT 2600
Tel: 02 6270 6555
Email: publicaffairs@engineersaustralia.org.au

www.engineersaustralia.org.au

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1. Introduction and key points

1.1 About us

Engineers Australia is the peak body for the engineering profession in Australia. With about 100,000 individual members across Australia, we represent individuals from a wide range of disciplines and branches of engineering. Engineers Australia is constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community. Engineers Australia's response is guided by our Charter and Code of Ethics which states that engineers act in the interest of the community, ahead of sectional or personal interests towards a sustainable future. Engineers are members of the community and share the community's aspirations for Australia's future prosperity.

Transport Australia Society (TAs) is an Engineers Australia technical society and home for transport professionals in Australia. TAs focusses on key transport decisions affecting the well-being, productivity and sustainability of our cities and regions. TAs seeks to improve public debate on strategic transport issues, ensuring transport professionals are at the table when Governments make decisions regarding transport policy, reform and infrastructure investment.

1.2 Introduction

Engineers Australia welcomes the opportunity to provide this submission to the Queensland Parliament Transport and Public Works Committee *Inquiry into transport technology – the challenges and opportunities which technology will bring to the transport sector in coming years.*

Transport systems around the world are undergoing a transformation. This change has been caused by a convergence of growing and changing inner city populations, consumer behaviours, new technologies and the emergence of innovative services. The future of transport is electric, connected, automated and shared.

Rising fuel prices, the availability of new and innovative technologies and greater social and environmental consciousness are some factors that have contributed to the transformation of global transport systems. Emerging trends towards convenience and walkability in modern urban planning represents an opportunity to rethink the way we deliver transport.

1.3 Key messages

- The future is automated, electric, connected, shared and requires a focus on sustainability, productivity and affordability.
- Engineers Australia encourages government to prioritise policy drivers to incentivise greater uptake of electric vehicles in line with global trends away from fossil fuel reliance.
- Engineers Australia recommends continued investment and deployment of charging infrastructure for electric vehicles.
- Engineers Australia also advises the government to recognise the value of fostering development of other technologies, such as hydrogen energy power.
- Engineers Australia advocates for a regulatory environment which supports the emergence of mobility as a service.

1.4 Contact

To discuss the contents of this submission further please contact Sybilla Grady, Policy Advisor, [redacted].

2. Terms of reference A and B

Identifying trends and changes in fuel type usage in the sectors of personal transport, freight transport and public transport such as the increasing uptake of hybrid and electric vehicles.

Examination of the readiness of the transport network for increasing electrification of vehicles in coming years.

Cars are responsible for approximately 8% of Australia's greenhouse emissions. About 6% of Australia's total emissions are attributed to urban car travel and approximately 75% of passenger car kilometres are travelled in urban areas.[1]

Data collected by the Australian Bureau of Statistics (ABS), for the 2018 Motor Vehicle Census shows that of 19.2 million motor vehicles registered in Australia, diesel powered vehicles constitute 23.4%. This represents growth of 1.3% since 2017, with a decline in the registered use of petrol powered vehicles. Diesel currently remains the fastest growing fuel type in Australia but the increase is only modest.[2]

As the cost of more modern transport technologies decreases, so too will the reliance on fossil fuels. The trend for many national governments around the world is to ban the sale of passenger vehicles powered by fossil fuels progressively over the next 20 years.[3] The future of transport appears to be electric.

Engineers Australia encourages governments to prioritise transport policies with a focus on sustainability, productivity and affordability and which support the global trend away from fossil fuel reliance.

In June 2017, there were 476 dedicated electric vehicle public charging stations in Australia.[4] As the volume of electric cars increases in Australia, this number will be insufficient.

The Queensland Government in collaboration with local councils created the world's longest electric super highway in a single state and indeed, the rest of Australia is well supported. The Australian Electric Vehicle Association recently published *Around Australia Electric Highway – now complete!* which provides a digital snapshot of electric charger and service stations around Australia.[5]

The majority of the time cars are parked, so providing greater access to charging infrastructure in carparks and existing service stations will assist in alleviating range anxieties.

Engineers Australia recommends further investment in deployment of infrastructure to support the electrification of the transport network.

2.1 Electric Vehicles in Australia

Australia is behind the global trend in electric vehicle (EV) uptake in developed nations but, whilst growth is slow, it is certain to increase. In 2017, 2,284 electric vehicles were purchased, an increase of 67% from 2016.[6]

The main barriers to greater adoption of EVs in Australia are a lack of understanding of the range required of vehicles, and price anxieties. Most EVs marketed in Australia have a range between 100km and 500km. A Victorian travel survey of over 700,000 car trips taken in one year, found that almost half of the surveyed trips were less than 5km, more than 90% were

[1] Beyond Zero Emissions, *Zero Carbon Australia: Electric Vehicles*, 2016, p13. Available at: http://media.bze.org.au/ev/bze_ev_report.pdf.
[2] Australian Bureau of Statistics, *9309.0 – Motor Vehicle Census, Australia, 31 Jan 2018. Proportion of Vehicles - By Fuel Type Graph_data 2018.* Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/9309.0
[3] For example, see: Slezak, Michael, *As the UK plans to phase out petrol cars, is Australia being left behind?* The Guardian, 30 July 2017. Available at: https://www.theguardian.com/environment/2017/jul/30/as-other-countries-give-petrol-cars-an-end-date-is-australian-being-left-behind
[4] Frydenberg, Josh, *Stand by, Australia, for the electric car revolution*, Sydney Morning Herald, 12 January 2018. Available at: https://www.smh.com.au/opinion/stand-by-australia-for-the-electric-car-revolution-20180112-h0hazy.html.
[5] The Australian Electric Vehicle Association, *Around Australia Electric Highway – now complete*, Christopher Jones 2018. Available at: http://www.aeva.asn.au/Electric%20Highway
[6] ClimateWorks Australia and the Electric Vehicle Council, *The State of Electric Vehicles in Australia. Second Report: Driving Momentum in Electric Mobility*, June 2018, p3. Available at: https://climateworks.com.au/sites/default/files/documents/publications/climateworks_australia_state_of_electric_vehicles_2_june_2018.pdf

less than 30km and less than 1% were greater than 120km.[7] The survey highlighted that most EVs have sufficient range to cover a majority of urban car trips.

The Australian Capital Territory (ACT) released the *Zero Emissions Vehicle Action Plan* earlier this year and is a market leader in the deployment of charging infrastructure and electric vehicle uptake rates. This increase in EV uptake is also due to stamp duty exemptions and discounted registration for zero emissions vehicles.[8] Purchase incentives must be a key policy driver in promoting EV uptake in Queensland and across Australia.

A number of Australian states and territories are already embracing automated electric vehicle technology and are conducting trials of electric driverless buses. Engineers Australia encourages governments to continue supporting trials through fuel efficiency targets and a regulatory environment conducive to greater EV uptake for businesses and individuals. As the domestic market grows, EV manufacturers will provide more options for Australian consumers.

Some progressive governments overseas have already taken steps to ban the manufacture and sale of internal combustion engines. Whilst unrealistic for the short term, the ultimate goal can be achieved if long term planning decisions are taken now.

Recent research conducted for the City of Melbourne demonstrated that due to the carbon intensity of electricity production in certain Australian states, operating an electric vehicle in Australia can sometimes be dirtier than many of the most popular petrol cars.[9] In order to fully realise the benefits associated with the electrification of our transport networks, focus upon emissions reductions for the entire electricity network must occur concurrently.

The government must work to reduce commercial barriers for business in order to drive the uptake of electric vehicles. Further investment needs to focus on application of renewable energy source to reduce emission levels.

Engineers Australia encourages governments to implement policies which incentivise electric vehicle market growth and support the electrification of our transport networks.

2.2 Hydrogen

The overall economic benefits of hydrogen production in Australia have been widely documented. Recently, the Hydrogen Strategy Group, chaired by Australia's Chief Scientist, produced a briefing paper for the Council of Australian Governments Energy Council extolling the broad social and economic benefits of hydrogen production for Australia.

Whilst the combustion characteristics of hydrogen differ from other fuels, feedback from Engineers Australia members is that the overall associated risks are similar.

With an increased demand for zero emissions transport options, hydrogen fuel cells can provide a reasonably priced, rapid refuel and long range alternative. Furthermore, as hydrogen has the capacity to store energy and flexible load, grid resilience is increased.

In tandem with the incentives and deployment of infrastructure policies required for the electrification of our transport networks, Engineers Australia encourages the government to recognise the value of fostering our hydrogen energy power.

[7] Victorian Government, Victorian Integrated Survey of Travel and Activity (VISTA). Information from various surveys is available at: https://transport.vic.gov.au/data-and-research/vista.
[8] Electric Vehicle Council, *Electric Vehicle industry welcomes ACT's policy leadership,* 16 April 2018. Available at: http://electricvehiclecouncil.com.au/electric-vehicle-industry-welcomes-acts-policy-leadership/.
[9] City of Melbourne, *Transport Strategy Refresh*, April 2018, p2. Available at: https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.com-participate.files/6615/2948/1938/Transport_Strategy_Refresh__Zero_Net_Emissions_Strategy_-_Greenhouse_Gas_Emissions_and_Air_Quality.pdf.

3. Term of reference C

Identifying other emerging technological factors which will impact on transport networks into the future, such as driver aid technology and 'driverless car' technologies.

Connected, automated and electric transport technology is here but remains unattainable to the masses. The technology is cost prohibitive on an individual basis and automated public vehicle transport remains largely under development.

Such technologies will be tested and implemented with a focus on more efficient infrastructure, reduced congestion and safety but there is still a way to go in terms of the ethical challenges associated with driverless vehicles, testing and manufacturing.

There is significant research underway to address the integration of a mixed fleet of driverless and non-driverless vehicles. Engineers Australia members have noted that research out of the UK predicts that human-operated vehicles will remain part of our transport systems up to 2050. The cost of network upgrades to support a mixed fleet is a major obstruction to automated driverless technology ubiquity.

A mixed fleet presents several risks and opportunities in future transport networks. The length of time to transition to fully autonomous cars may present disruptions from emerging adjacent markets such as autonomous aerial passenger carrying vehicles. If it is too difficult and slow to mix driverless and non-driverless cars, then it may be simpler to make driverless vehicles airborne and physically separate them. In this scenario the land based networks may become less congested but will require significant advancements in airspace management through research in Unmanned Aerial Systems (UAS) Traffic Management (UTM).

Over 30 cities including Copenhagen, Dubai, Seoul and Vancouver already operate fully autonomous trains. Migration to driverless vehicles in closed systems such as rail networks should be prioritised, particularly given the role of expanded mass transit systems in the major cities.

Mobility as a Service (MaaS) is a framework which aggregates infrastructure, services, technology and information to suit the travel and lifestyle needs of individuals. MaaS brings together transport operators and third parties, allowing a seamless provision of services, information, booking, payment and customer relationship management between transport modes.

As an emerging concept, the definition of MaaS is not yet universal. The concept is also referred to as mobility management, future mobility, new mobility or smart mobility, with some jurisdictions considering it an independent framework and others an element of the aforementioned terms.

If its full potential is realised, MaaS has the ability to coordinate multimodal options, improve transport system effectiveness, strengthen public private relationships, personalise services to align with user behaviours and promote sustainable transport.

MaaS is largely driven by commercial imperatives which may or may not align with government strategic transport and land use goals. An institutional overlay is required to ensure service delivery is consistent with societal objectives.

Engineers Australia advocates for government prioritisation of a regulatory environment to support a healthy market for MaaS services to emerge.

4. Term of reference D

Examining how technology is affecting employment arrangements in the transport industry, particularly in the food delivery area.

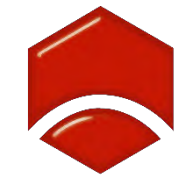
Transport is a natural market for recent shifts towards collaborative consumerism and a sharing economy. Ride and car sharing services connect people with drivers and vehicles when and where they need it. Such services provide the benefits of a personal vehicle without the costs and parking constraints of individual vehicle ownership. These services deliver mobility on demand, and in the process save time and money.

The private sector is implementing new processes to deliver food in a more competitive manner. Advances in technology have enabled fast food delivery via drive share services and even drones. This technology has resulted in changes to consumer behaviours, with many people placing greater value on saving on travel time rather than delivery cost. Home delivery services create more employment opportunities, albeit possibly on a casual basis. Small scale trials of food delivery using drones are on-going. As such the commercial viability of such processes remains debatable, not to mention the security and privacy issues associated with drone technology.

Whilst driverless vehicles may have an adverse effect on employment in some areas of the transport industry, for example truck, taxi and delivery drivers and so on, there will also be a boost to productivity through the ability for the general population to re-prioritise their time. Where people would previously have been focussed on driving, they will instead be able to work whilst in transit.

Concentrating specifically on the technological and engineering aspects of the transport sector, it is likely that the adverse employment effects will be offset by the additional jobs emerging through the introduction of driverless vehicles.

The types of jobs emerging as a consequence of a shift to a fully autonomous or mixed fleet are not yet comprehensively understood, but management of autonomous vehicle fleets, management of operating systems according to the Australian environment, assessing compliance to any Australian design codes, additional maintenance of autonomous systems to meet liability and insurance requirements, and an increase in verification and validation of operating databases that will require real time updates are just some of the jobs that will be created.



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