MINISTERIAL FORUM ON VEHICLE EMISSIONS
IMPROVING THE EFFICIENCY OF NEW LIGHT VEHICLES:
DRAFT REGULATION IMPACT STATEMENT, DECEMBER 2016

Comments by 350.org Australia

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CONTENTS

1. WHO WE ARE 1
2. KEY POINTS AND SUMMARY OF RECOMMENDATIONS 2
3. THE CLIMATE IMPERATIVE 3
4. FUEL EFFICIENCY STANDARDS AND CARBON EMISSIONS 4
5. ELECTRIC VEHICLES 7
6. VEHICLE SHARING AND AUTONOMOUS VEHICLES 9
7. CONTACT DETAILS 12

1. WHO WE ARE

350 Australia is one part of a global movement taking action to halt the climate crisis. We work with a network of campaigners and local groups across the country to help coordinate online campaigns, grassroots organising, and mass public actions to keep fossil fuels in the ground and support a transition to a cleaner and fairer economy.

The number 350 means climate safety: to preserve a liveable planet, and to protect our own and future generations from dangerous climate change, scientists tell us we must reduce the amount of CO_2 in the atmosphere from its current level of 402 parts per million to below 350 [1].

[1] James Hansen et al. Assessing dangerous climate change.
http://journals.plos.org/plosone/article?id=10.1371/journal.pone.008164

2. KEY POINTS AND SUMMARY OF RECOMMENDATIONS

350.org Australia is pleased to have the opportunity to comment on the Ministerial Forum's Draft Regulation Impact Statement (hereafter called the *Draft RIS*).

We support the core aim of the Ministerial Forum – to achieve a reduction in greenhouse emissions from Australia's road transport sector. Our comments are driven by the urgency of this imperative in the light of the worsening climate crisis. It is our view that, as Australia's electricity sector is progressively transformed, the decarbonisation of the transport sector will, during the next decade, emerge as a major priority for meeting our commitments under the Paris Agreement and for taking the further actions required if Australia is to contribute its fair share to limit global warming to 2°C and preferably less.

We recognise that some of the issues canvassed in these comments could have been made last year in a response to the Ministerial Forum's discussion paper. Nevertheless, during the past 12 months there have been significant advances in vehicle technologies which we urge the Ministerial Forum to consider.

We note COAG's target of a 40% improvement in energy productivity between 2015 and 2030, and its strategy of "reducing barriers to entry in the market for new technologies and service options" as one means of achieving this target. Our comments will refer specifically to some of these "new technologies and service options".

The *Draft RIS* identifies three options for fuel efficiency standards, and claims that the most ambitious of these options (105 grams of carbon dioxide emitted per km travelled) would align Australia with EU and US targets. However, we draw attention to the fact that the EU has a target of 95g/km by the year 2021, and is already assessing a target in the range 68-78g/km for the year 2025. We also note that the US has a target of 89g/km for the year 2025, and South Korea has a target of 97g/km for 2020. Given this background, in our view even the strongest target option in the *Draft RIS* looks quite weak.

We appreciate that Australia is starting from a higher-emissions baseline than these other jurisdictions, but we think it reasonable for Australia to lag their targets by no more than 5 years. On this basis we recommend a timeframe of no later than 2022 target of 105g/km, and we recommend that the Ministerial Forum undertake a review in 2020 with a view to aligning with the new EU standard (95g/km) by 2026.

In our view, the benefit-cost analysis for each of the three options in the *Draft RIS* was based on an inadequate estimate of the Social Cost of Carbon (SCC). We cite research supporting the use of a higher SCC which, had it been used, would estimate significantly higher benefits of CO_2 abatement and would support our arguments for earlier and more stringent fuel efficiency standards.

We urge the Ministerial Forum to look beyond traditional vehicles and transport models, and to take account of two significant developments which will transform the light vehicle transport sector in the next two decades: the uptake of plug-in electric vehicles (EVs) and the trend towards new models of vehicle sharing. We will cite studies that underscore these developments and their implications for carbon emissions, and we will make some recommendations for action by the Ministerial

Forum in this space.

Summary of recommendations

We recommend that the Ministerial Forum:

[1a] Endorse the introduction of legislated fuel efficiency standards for new light vehicles in Australia (see Section 4 below)

[1b] Set an initial standard of 105g/km in carbon emissions by 2022

[1c] Undertake a review in 2020 with a view to aligning with the new EU standard (95g/km) by 2026.

[1d] Continue to review the standards regularly to ensure that they are in line with technological developments

[1e] Revisit the Social Cost of Carbon (SCC) basis for its benefit-cost estimates

[1f] Re-estimate the costs and benefits of the 105g/km target on the assumption of a 2022 timeframe.

[1g] Set a target date to achieve zero emissions from the Australian transport sector.

[2a] Encourage state and territory governments to implement a uniform, time-limited incentive for the purchase of plug-in electric vehicles in their jurisdictions (see Section 5 below)

[2b] Encourage the Federal Government to exempt EVs from the Luxury Car Tax

[2c] Encourage the Federal Government to develop a National EV Roadmap

[2d] Encourage the introduction of a target, within this Roadmap, for 50% of all new car sales in Australia to be EVs by 2026.

[3a] Encourage state and territory governments to monitor developments in autonomous vehicles (see Section 6 below)

[3b] Encourage state and territory governments to ensure that their traffic regulations do not inhibit trials of autonomous vehicles on Australian roads.

3. THE CLIMATE IMPERATIVE

As climate change impacts intensify, the window in which to reduce carbon emissions and prevent further devastating climate impacts narrows. Transforming Australia's transport sector to a low or zero emissions economy will be a significant step in this process.

The need for urgent climate action has never been so clear. The Bureau of Meteorology has documented the extreme heat experienced in southeast Australia during summer 2016-17, with the highest monthly mean temperatures on record for Sydney and Brisbane, and the highest daytime temperatures on record for Canberra[2].

[2] Bureau of Meteorology. Special climate statement 61 - exceptional heat in Southeast Australia in early 2017. 24 February 2017.

The surge in global temperatures[3] experienced in 2015 and 2016 had already generated serious consequences such as the massive bleaching event that damaged the northern half of the Great Barrier Reef so severely that Reef experts fear it may never recover[4].

It is clear that to protect our climate, fossil fuel emissions must be urgently constrained. This conclusion flows from the landmark paper by leading climate scientist James Hansen and his colleagues[5]. This paper states: "continuation of high fossil fuel emissions, given current knowledge of the consequences, would be an act of extraordinary witting intergenerational injustice."

In a number of places, this submission (and the *Draft RIS*) refer to Australia's commitments under the Paris Agreement. Our view is that these commitments are currently inadequate to deliver Australia's fair share of effort to prevent global warming exceeding 2°C, let alone deliver the objective - which we support - of limiting warming to 1.5°C. We note that Australia's fair share of the remaining carbon budget to limit warming to 1.5 degrees is 2.5 Gt of CO_2 from 2015. At the current rate of emissions (0.4 Gt from fossil fuel combustion alone), this budget would be exhausted by 2021 [6].

4. FUEL EFFICIENCY STANDARDS AND CARBON EMISSIONS

We welcome the fact that the *Draft RIS* is explicitly framed in the context of climate change and the imperative to reduce carbon emissions. As Australia's electricity sector is transformed and decarbonised, attention will focus more on emissions from the transport sector.

We note the pledge by the CEOs of thirteen major automakers to accelerate the development of cleaner vehicles, in order to reduce greenhouse gas emissions[7]. One of their commitments was to "continue improving the internal combustion engine while also developing new energy-efficient drivetrains". In the light of this commitment, we are encouraged that a significant improvement in fuel efficiency standards is eminently achievable.

The *Draft RIS* notes that Australia's light vehicle fleet is less efficient, in terms of carbon emissions, than that of many other countries, and it identifies the mandatory fuel efficiency standards of those countries as a key reason.

The *Draft RIS* also identifies three options for fuel efficiency standards, and claims

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http://www.bom.gov.au/climate/current/statements/scs61.pdf

[3] Andrea Thompson. Streak of record hot temps adds another month. Climate Central, 20 September 2016. http://www.climatecentral.org/news/record-hot-temps-another-month-20715

[4] Peter Hannam. Sad truth: Great Barrier Reef may never rebound to previous health: scientists. Sydney Morning Herald, 30 May 2016. http://www.smh.com.au/environment/climate-change/sad-truth-great-barrier-reef-may-never-rebound-to-previous-health-scientists-20160530-gp76wl.html

[5] James Hansen et al. Assessing dangerous climate change. http://journals.plos.org/plosone/article?id=10.1371/journal.pone.008164

[6] Sivan Kartha, Implications for Australia of a 1.5C Future, Stockholm Environment Institute Working Paper No. 2016-09, https://dbqvwi2zcv14h.cloudfront.net/images/SEI_Report_Final.pdf.

[7] Auto industry CEOs unite in rare vow to tackle climate change. Forbes, 14 December 2015. https://www.forbes.com/sites/joannmuller/2015/12/14/auto-industry-ceos-unite-in-rare-vow-to-tackle-climate-change/#4592cab333d1

that the most ambitious of these options (105 grams of carbon dioxide emitted per km travelled) would align Australia with EU and US targets.

According to the EU web page on CO_2 emissions from passenger cars[8], the current situation in the EU is as follows:

- the current (2015) target is 130g/km
- the average emissions achieved by new cars in 2015 was 119.5g/km (this compares with 176g/km in Australia)
- the 2021 target, to be phased in from 2020, is 95g/km
- the Commission has committed itself to assessing the range of 68g/km to 78g/km for the year 2025 [9]
- these targets and outcomes refer to fleet averages (heavier cars are allowed higher emissions than lighter cars).

In this light even the strongest target option in the *Draft RIS* (105g/km by 2025) looks quite weak. By 2025, the EU would have put in place - four years earlier - a standard of 95g/km. So the *Draft RIS* proposal cannot really be described as a measure which "aligns with EU standards".

We also note that in the US the light-duty vehicle fleet target for 2025 is 143 grams per mile, which equates to 89g/km [10].

We also draw attention to the new fuel efficiency standards[11] announced by South Korea in December 2014. These standards set a target for passenger car fleet average emissions of 97g/km by 2020, a reduction of more than 30% compared to their 2015 target.

We appreciate that Australia is starting from a higher-emissions baseline than the EU and could not expect to achieve parity with the EU in the short term. However, it is not unreasonable to expect Australia to achieve the EU's 2021 target by (say) 5 years later, in 2026. On this basis it would be reasonable for Australia to set an intermediate timeframe of no later than 2022 for the weaker target of 105g/km.

The Australian Conservation Council made a submission (hereafter called the *ACF submission*) to the Ministerial Forum's discussion paper[12]. That submission recommended that Australia aim to reach the EU's 2021 standard by 2023. It also recommended that the standards be reviewed regularly to ensure that they are in line with technological developments.

In terms of the three targets set out on pages 27-28 of the Draft RIS, we clearly

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[8] European Commission: climate action. Reducing CO2 emissions from passenger cars. https://ec.europa.eu/clima/policies/transport/vehicles/cars_en

[9] EU urged to set 'challenging' 2025 car emissions goal. Automotive news Europe, 19 June 2015. http://europe.autonews.com/article/20150619/ANE/150619836/eu-urged-to-set-challenging-2025-car-emissions-goal

[10] International Council on Clean Transportation. United States Light Duty Vehicle Efficiency Standards. Factsheet, November 2014. http://www.theicct.org/sites/default/files/info-tools/pvstds/US_PVstds-facts_dec2014.pdf

[11] South Korea fuel economy and greenhouse gas standards for new light-duty vehicles (2016-2020). PDF downloaded from within http://theicct.org/south-korea-FE-and-GHG-standards-new-ldvs-2016-2020

[12] Australian Conservation Foundation. ACF Submission to the Australian Government's Ministerial Forum on Vehicle Emissions. April 2016. https://infrastructure.gov.au/roads/environment/forum/files/Australian_Conservation_Foundation.pdf

support the strongest option (105g/km) but with a shorter timeframe, on three grounds:

- this option would broadly align with overseas targets (though lagging behind the EU targets as noted above) ;
- this option would deliver the largest cumulative reduction in greenhouse gas emissions (231 megatons to 2040, compared with 164 megatons for the next greenest option, according to Table 8 on Page 35 of the *Draft RIS*); and
- this option would still deliver a positive benefit/cost ratio of 1.86.

We also point out that the benefit-cost analysis for each of the three options in the *Draft RIS* used a conservative and (in our view) inadequate estimate of the Social Cost of Carbon (SCC). If a more appropriate SCC had been used, the benefits of CO_2 abatement from the proposed fuel standards would be significantly higher which would support our arguments for earlier and more stringent fuel efficiency standards.

The estimate used by the *Draft RIS* ($35/per tonne of CO_2 abated) was based on a figure used by the US Environmental Protection Agency (EPA) in 2010, which in turn relied on a policy developed by US Office of Management and Budget. The *Draft RIS* (page 74) notes that "the chosen valuation ($A35/per tonne over the full projection period) is conservative both due to being held constant (whereas the SCC values in OMB 2010 increase significantly over time) and to being lower than many literature values".

In August 2016 the US Interagency Working Group on Social Cost of Greenhouse Gases issued a Technical Update[13] of the SCC which implied a cost for the year 2040 of US$60. They also considered higher values for different levels of uncertainties, in line with advice from the National Academies of Science, Engineering and Medicine[14]. Furthermore, a 2014 article[15] published in *Nature Climate Change* reported a meta analysis of current SCC research and found an appropriate lower bound of US$125 to the SCC. Additionally, they found that "On the basis of the precautionary, minimax regret approach, one can arrive at considerably higher estimates of the SCC than US$125."

We recommend that the Ministerial Forum revisit the Social Cost of Carbon (SCC) basis for its benefit-cost estimates.

We also recommend that the Ministerial Forum re-estimate the costs and benefits of the 105g/km target on the assumption of a 2022 timeframe.

Finally, we recommend that the Ministerial Forum set a target date to achieve zero emissions from the Australian transport sector.

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[13] Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis. https://www.epa.gov/sites/production/files/2016-12/documents/sc_co2_tsd_august_2016.pdf

[14] National Academies of Sciences, Engineering, and Medicine; Division of Behavioral and Social Sciences and Education; Board on Environmental Change and Society; Committee on Assessing Approaches to Updating the Social Cost of Carbon reports. Assessment of Approaches to Updating the Social Cost of Carbon: Phase 1 Report on a Near-Term Update (2016); Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide (2017)

[15] J C J M van den Bergh and W J W Botzen. A lower bound to the social cost of CO2 emissions. Nature Climate Change, Vol 4, April 2014, p. 253-258. http://go.nature.com/2m5yxvY

5. ELECTRIC VEHICLES

350.org Australia urges the Ministerial Forum to consider two broader issues which are likely to have a significant impact on light vehicle carbon emissions over the medium term (10-15 years).

These issues relate to the potential to reduce transport emissions by reducing the number of Internal Combustion Engine (ICE) vehicles in Australia's light vehicle fleet or, at the very least, reducing the rate of growth of the ICE light vehicle fleet. When combined with strong fuel efficiency standards for ICE vehicles, such measures have the potential to reduce carbon emissions from the transport sector by a greater extent than that contemplated in this draft statement.

The first of these issues relates to plug-in electric vehicles (EVs). When charged using electricity from renewable sources, EVs have zero greenhouse gas emissions which means, given the urgency of the climate challenge as outlined in Section 3, that they should form a key component of any strategy to reduce emissions in the transport sector.

We note also that the substitution of EVs for petrol vehicles will have the additional benefit of eliminating those noxious emissions which have negative health impacts, quite apart from the climate change issues, as outlined in the Ministerial Forum's Discussion Paper *Better fuel for cleaner air* [16](hereafter referred to as the *Discussion Paper*).

In April 2016 a broad coalition of representatives from Australia's EV market lodged a submission in response to the Ministerial Forum's discussion paper[17]. This submission is hereafter referred to as the *Path Forward Report*. That report made the following observation:

The implementation of standards aimed to improve the fuel efficiency of conventional … engines will only go so far in achieving the Australian Government's greenhouse gas emissions reduction targets…. It is, however, the development of policies to support the broad scale adoption of new and emerging technologies, in particular EV technology, that could bring significant changes in … lessening the environmental footprint of transportation (p.4)

The *Electric vehicles* report from Beyond Zero Emissions, hereafter called the *BZE report* [18] found that a shift to 100% electric vehicles would eliminate at least 6% of Australia's greenhouse emissions, based on urban passenger vehicles only. The report presented financial modeling of the transition under a variety of assumptions.

We recognise of course that EV's will provide zero effective emissions only if they are re-charged using 100% renewable electricity. In a parallel submission to the Independent Review of Energy Security in the National Electricity Market, we have argued that a 100% renewable electricity system by 2030 is an achievable, secure

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[16] Ministerial Forum on Vehicle Emissions. Better fuel for cleaner air: discussion paper. December 2016. http://www.environment.gov.au/system/files/consultations/f3f4acc3-f9e6-4cc3-8a1e-a59a6490cffd/files/better-fuel-cleaner-air.pdf

[17] The path forward for electric vehicles in Australia. April 2016. http://climateworks.com.au/publication/document/path-forward-electric-vehicles-australia-joint-submission-federal-government

[18] Beyond Zero Emissions. Electric vehicles report. August 2016. http://bze.org.au/electric-vehicles-report/

and affordable objective[19].

The table in the *Draft RIS* (p. 21) canvasses a range of emission-reducing technologies such as turbo diesel engines, dual clutch transmissions, hybrid and electric vehicles, lighter vehicles, and efficiency accessories. EVs are listed as reducing CO_2 emissions by 100%, but at an estimated differential cost of $19,000 in 2020 and $10,000 in 2025. Based on sources cited below, we assert that the cost differential used for the year 2025 is likely to be a significant over estimate.

In particular, we wish to draw attention to the February 2016 forecasts of Bloomberg New Energy Finance, hereafter called the *BNEF forecasts*[20]. Their analysis is that continuing reductions in battery prices will bring the total cost of ownership of EVs (on an unsubsidised basis) below that of conventional-fuel vehicles by 2025, even if the latter continue to improve their fuel efficiency by 3.5% per year. They also forecast that annual sales of EVs will reach 35% of new light duty vehicle sales by 2040.

This forecast was made prior to the release of the 2017 Chevy Bolt which (given its range of 380 km and its price tag of US37,495) has been acclaimed as a "game changer" for the EV market. In our view, the *BNEF forecasts* can already be regarded as too cautious.

A recent article in *The Economist* has drawn attention to further upbeat forecasts of EV sales by a growing number of financial and industry observers[21].

We suggest that Australia's state and territory governments, instead of simply waiting for this trend to emerge in the mid 2020s, could act earlier to encourage the uptake of EVs and building of charging infrastructure. Such action would assist in the aim of "reducing barriers to entry in the market for new technologies and service options".

We recognise that Australians frequently make relatively long trips in private vehicles, and will therefore see the limited driving range of EVs as an obstacle to purchase. The announced ranges of new and impending offerings (such as the Chevy Bolt and Tesla Model 3) should allay these concerns. But even if "range anxiety" persists, there is an opportunity for Australian urban and suburban households with more than one car to reorganize their vehicle usage, to replace one of the petrol vehicles with an EV, and to make all local and short range trips, as far as possible, using the EV. Government incentive programs could play a useful role in stimulating this transition. Further, the development of EV charging infrastructure is already occurring through Tesla Motors' 'Supercharger' network (as identified in the *Discussion Paper*[22]) and will also serve to mitigate range issues.

In the United States, purchase of EVs attracts a federal income tax credit of up to US$7500, depending on the battery capacity, and additional state or local incentives are available. In Portugal, a government subsidy of €5000 applies to the first 5000

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[19] 350 Australia. Submission to the Finkel Review, 3 March 2017.

[20] Bloomberg New Energy Finance. Here's how electric cars will cause the next oil crisis. 25 February 2016. https://www.bloomberg.com/features/2016-ev-oil-crisis/

[21] Electric cars are set to arrive far more speedily than anticipated. The Economist, 18 February 2017. http://www.economist.com/news/business/21717070-carmakers-face-short-term-pain-and-long-term-gain-electric-cars-are-set-arrive-far-more?cid1=cust/ednew/n/bl/n/20170216n/owned/n/n/nwl/n/n/NA/8885810/n

[22] Ministerial Forum on Vehicle Emissions. Better fuel for cleaner air: discussion paper. December 2016. http://www.environment.gov.au/system/files/consultations/f3f4acc3-f9e6-4cc3-8a1e-a59a6490cffd/files/better-fuel-cleaner-air.pdf

new electric cars sold in that country. The United Kingdom has offered a Plug-in Car Grant since 2011, with a grant capped at £5000, subject to the vehicle meeting criteria for emissions and other factors[23]. Incentives offered by other national and sub-national jurisdictions are summarised in:

- The Wikipedia article *Government incentives for plug-in electric vehicles* [8]
- The *Path forward* report (p.13) and the *BZE report* (p.48), which list the incentives offered in Canada, China, Denmark, France, Germany, Japan, Netherlands, Norway, Spain, Sweden, UK, and the US.

In many cases the cost of such rebates is limited by offering them only to the first cohort of applicants in order to stimulate the initial take-up of EVs, after which purchase prices may decrease due to market economies of scale.

Currently no Australian state or territory has a direct EV purchase incentive, four have registration incentives, and two have stamp duty discounts (*BZE report*, p.14).

Taken together, the *Path forward* report and the *ACF submission* made several recommendations aimed at accelerating the uptake of EVs in Australia. These included:

- Up-front purchase incentives, in line with those seen in leading markets
- Full exemption for EVs from the Luxury Car Tax
- A National EV Roadmap, with the support of the Federal Government
- A target, within this Roadmap, for 50% of all new car sales in Australia to be EVs by 2026.

To this end, we recommend that the Ministerial Forum encourage state and territory governments to implement a uniform, time-limited incentive for the purchase of plug-in electric vehicles in their jurisdictions; we encourage the Federal Government to develop a National EV Roadmap; and we support the other recommendations list above.

6. VEHICLE SHARING AND AUTONOMOUS VEHICLES

We have already stressed the vital importance of reducing greenhouse emissions from vehicles to the maximum extent possible, given the urgency of the climate challenge as outlined in Section 3. In this section we cite research which indicates that shared used of EVs in a future autonomous vehicles scenario has the potential to reduce emissions further than through the mere substitution of an EV for a petrol vehicle in a traditional car ownership model.

It is now widely acknowledged that the 2020s will see the deployment of "autonomous" (or self-driving) cars. The Wikipedia article *Autonomous car* [24] is a useful summary of the current status of their development.

One way to appreciate just how far this development has proceeded is to watch

[23] Government incentives for plug-in electric vehicles (Wikipedia article).. http://en.wikipedia.org/wiki/Government_incentives_for_plug-in_electric_vehicles

[24] Autonomous car (Wikipedia article). http://en.wikipedia.org/wiki/Autonomous_car

videos of the 2017 Chevy Bolt operating in autonomous mode in San Francisco [25]. These videos show the autonomous vehicle system coping well with stop-start traffic, pedestrian crossings, lane positioning, vehicles partially blocking the road, and so on.

In the Australian Parliament, the House of Representatives Standing Committee on Innovation, Science and Resources is currently inquiring into the social issues relating to land-based driverless vehicles in Australia[26]. Some submissions to the Inquiry suggested that self-driving cars will be commercially available within five years[27].

If fleets of such cars were operated as ride-sharing or quasi-taxi services (of which Uber and Lyft are two examples) they would have the potential to disrupt existing transport models. From the perspective of a low emissions goal, it would be desirable to base such driverless taxis on EVs.

Technology developments such as widespread use of smart phones, online booking and route planning systems, provide the ability for consumers to book a vehicle for a specific time or to request a vehicle, have it show up within a few minutes, take the passenger to their destination (along with other passengers heading for nearby destinations, if appropriate), drop off the passenger and head off to collect another, calculate the distance travelled and deduct the relevant fee from the consumer's account.

This future model of urban and suburban urban mobility would deliver the following benefits.

- A significant reduction in greenhouse gas emissions
- Reduced transport costs
- Safety (since the vast majority of vehicle accidents are due to human error)
- Universal mobility (a 24/7 door-to-door service for all urban and suburban residents)
- Reduced congestion (by increasing the number of passengers per car during peak hours)
- Less time travelling (such as the time currently spent finding a car park)
- Better use of travel time (passengers are free to undertake other tasks)
- Land use savings (involving a proportion of the land devoted to car parks)
- More efficient use of existing infrastructure (the road networks in Australian cities and suburbs) which may reduce the need for investment to extend this infrastructure.

The impact of driverless taxis on greenhouse emissions has been analysed by two

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[25] Videos of the 2017 Chevy Bolt operating in autonomous mode in San Francisco:
https://techcrunch.com/2017/02/08/watch-cruises-self-driving-bolt-ev-navigate-smoothly-to-sfs-dolores-park/
http://www.theverge.com/2017/1/19/14327954/gm-self-driving-car-cruise-chevy-bolt-video

[26] House of Representatives. Inquiry into the social issues relating to land-based driverless vehicles in Australia. Terms of Reference.
http://www.aph.gov.au/Parliamentary_Business/Committees/House/Industry_Innovation_Science_and_Resources/Driverless_vehicles/Terms_of_Reference

[27] Matthew Knott. How driverless cars could leave humans behind within five years. Sydney Morning Herald, 26 February 2017.
http://www.smh.com.au/federal-politics/political-news/drunk-robots-how-driverless-cars-could-leave-humans-behind-within-five-years-20170222-guir7t.html

researchers at the Lawrence Berkeley National Laboratory at the University of California[28]. This analysis found that the deployment of driverless EV taxis could reduce greenhouse emissions by about 90% compared with a current petrol-driven private car. Almost half of these savings would result from the intelligent planning of each journey where, for instance, smaller taxis are used for ferrying one or two people travelling on their own, and larger ones are used for three or four passengers travelling with luggage.

A report published in 2013[29] modelled the scenario of a shared, driverless fleet for Ann Arbor, Michigan, a city of 285,000 people. The study concluded that it would be possible to provide all of the residents of Ann Arbor with almost instantaneous access to a vehicle with a fleet of only 15% of the current number of privately owned vehicles.

Building on the Ann Arbor study, Mr Kent Fitch of Nicholls, ACT, developed a model for a fleet of autonomous vehicles in Canberra, using a range of scenarios[30]. Under his "high use" scenario, a fleet of 29,600 cars would meet the local transport needs of Canberra residents, replacing most personal car, bus and taxi travel. The fleet business would be viable if customers pay $0.50 per km in peak periods and $0.30 per km in non-peak periods. (This compares with current taxi fares of more than $2 per km).

Industry is now positioning to move into this space. For example, General Motors appears to be re-defining itself as a "mobility services company", as opposed to a company that merely makes and sells vehicles. It has established Maven (a rental service) which is adding the Chevy Bolt to its fleet, and it has invested in Lyft (a competitor to Uber) which has described its plans to roll out self-driving cars[31].

Governments will be understandably wary about modifying traffic laws to permit widespread deployment of such vehicles. However, we note that in December 2016 the US state of Michigan adopted legislation to allow operation of autonomous vehicles on roads in that state[32].

It is likely that the first autonomous cars will begin to operate as approved vehicles on Australia's roads prior to 2025. The implications for private car ownership, public transport and urban planning are profound. Lower density public transport with its fixed timetables, routes and inherent inefficiencies will not survive this transition.

It is recommended that the Ministerial Forum (a) monitor developments in autonomous vehicles; and (b) ensure that state and territory regulations do not inhibit trials of autonomous vehicles on Australian roads.

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[28] Autonomous taxis could greatly reduce greenhouse-gas emissions of US light-duty vehicles. Jeffery B. Greenblatt and Samveg Saxena. Nature Climate Change 5, 860-863 (2015)
http://www.nature.com/nclimate/journal/v5/n9/full/nclimate2685.html

[29] Transforming personal mobility / Columbia University [and] the Earth Institute. Revised January 27, 2013.
http://sustainablemobility.ei.columbia.edu/files/2012/12/Transforming-Personal-Mobility-Jan-27-20132.pdf

[30] Canberra autonomous car simulation [developed by Kent Fitch]
http://canberraautonomouscars.info/index.html

[31] Lyft says robots will drive most of its cars in five years.
http://www.recode.net/2016/9/18/12955162/lyft-gm-self-driving-cars

[32] Gov. Rick Snyder signs landmark legislation to allow operation of autonomous vehicles on Michigan roadways.
http://www.michigan.gov/snyder/0,4668,7-277-57577_57657-399173--,00.html

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