

Electric Vehicles

RAC Response to the Select Committee Inquiry

August 2018



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RAC represents over one million Western Australians and is the leading advocate on mobility issues and challenges facing our state. A key role for RAC is to act as a voice for our members and as a strong public advocate on mobility issues. RAC works collaboratively with all levels of Government to ensure Western Australians can move around safely, easily, and in a more sustainable way.

RAC's sustainable mobility target is primarily focused on reducing carbon dioxide (CO₂) emissions from our cars. As part of our commitment to the reduction of CO₂ emissions, RAC launched the Less Emissions Mission in 2012 to encourage members to reduce their carbon footprint by rewarding owners of qualifying lower CO₂ emissions vehicles with access to discounted finance, lower insurance premiums, free membership upgrades and discounted vehicle servicing; and in 2015, RAC delivered the RAC Electric Highway®, the first of its kind in Australia. The electric highway is a network of 11 publicly accessible electric vehicle (EV) fast-charging DC stations located between Perth and Augusta, a distance of 520 kilometres. Recently, RAC responded to the Department of Environment and Energy's *Better Fuel for Cleaner Air Draft Regulatory Impact Statement* in which we highlighted the urgent requirement for cleaner fuel to play a role in reducing vehicle emissions, with the greatest proportion of reductions occurring in existing and more specifically older vehicles.

RAC believes EVs – both pure battery electric vehicles (BEV) and plug-in hybrid electric vehicles (PHEV) have potential to play a role in reducing emissions from vehicles in Australia and globally, and we welcome the opportunity to provide a submission to the *Senate Select Committee Inquiry on Electric Vehicles* (Inquiry).

Background

The Terms of Reference for the Inquiry comprise:

1. the potential economic, environmental and social benefits of widespread electric vehicle uptake in Australia;
2. opportunities for electric vehicle manufacturing and electric vehicle supply and value chain services in Australia, and related economic benefits;
3. measures to support the acceleration of electric vehicle uptake;
4. measures to attract electric vehicle manufacturing and electric vehicle supply and value chain manufacturing to Australia;

5. how federal, state and territory Governments could work together to support electric vehicle uptake and manufacturing, supply, and value chain activities; and
6. any other related matters.

RAC's response to the Inquiry aligns with our mobility agenda and focuses on EV uptake and the environmental and health (societal) benefits of reducing vehicle emissions through increased EV uptake, specifically points **1, 3 and 5 above**.

Emissions in Australia

Petrol and diesel fuelled vehicles emit CO₂, oxides of nitrogen (NOx), hydrocarbon emissions (including methane, benzene, toluene, xylene, and benzo[a]pyrene), carbon monoxide (CO), oxides of sulfur (SOx), particulate matter (PM) and ozone (O₃) which collectively impact negatively on human health and the environment.

NOx affects the respiratory system and can form smog and acid rain. Hydrocarbons include known carcinogens and hydrocarbons such as methane have 20 times the global warming impact of the same amount of CO₂. CO deprives the blood of oxygen and contributes to greenhouse gases. SOx impacts on the respiratory system and creates sulfuric acid in the atmosphere creating acid rain. When PM is inhaled, the small particles can cause serious health problems.

On the other hand, O₃ can be both good and bad. Naturally occurring O₃ is present in the upper atmosphere and absorbs some ultraviolet radiation, while tropospheric or ground level O₃ is caused by chemical reactions from pollutants and is toxic to humans. O₃ can impact negatively on the respiratory system and is one of the main contributors to smog.

In 2011, approximately 2,549 Australians fatalities were attributed to air pollution exposure, more than twice the 2017 national road toll¹ and with an estimated economic cost of as much as \$11 billion². The OECD confirms that while deaths from air pollution across Europe declined, Australian deaths rose over the same period³. Overall, approximately 1.3 per cent of all

¹ BITRE (2017) Road deaths Australia, December 2017. Accessed on 16 February 2018, https://bitre.gov.au/publications/ongoing/rda/files/RDA_Dec_2017.pdf

² Department of Environment and Energy, citing Marsden Jacob Associates Pty Ltd (2017). Analysis of AIHW burden of disease data, in Revised fuel quality standards: economic analysis, report prepared for the Department of the Environment and Energy, Accessed on 8 February 2018.

³ OECD (2014), The Cost of Air pollution: Health Impacts of road Transport, OECD Publishing, http://www.keepeek.com/Digital-Asset-Management/oecd/environment/the-cost-of-air-pollution_9789264210448-en#page54

Australian deaths and a further 0.6 per cent of all disease and injury, can be attributed to air pollution⁴.

In Australia, transport accounts for 25 per cent of all CO₂ emissions, with cars alone producing approximately 11 per cent of total CO₂ emissions⁵. Transport emissions in Australia have increased by almost 60 per cent since 1991⁶ and are projected to continue to substantially increase⁷. Eliminating the greenhouse gas emissions produced by all of Australia's cars in just a single year has been calculated as equivalent to removing all the greenhouse gas emissions produced by South Australia, Northern Territory and Australian Capital Territory combined, for that same year⁸.

What is an electric vehicle?

In the context of motor vehicles, an EV is one which predominantly uses electric motors to drive the road wheels. For the purposes of this submission, this includes battery electric vehicles (BEVs) which are powered by electricity exclusively, and plug-in hybrid electric vehicles, which can be driven on electricity only but also carry an on-board liquid-fuelled engine as back up. Hybrid vehicles or 'mild hybrids' are predominantly powered by a petrol or diesel engine and supplemented by battery power.

A plug-in battery EV produces no emissions while driving. PHEVs and hybrids produce emissions at the tailpipe anytime the internal combustion engine (ICE) is running. The only emissions attributable to driving an EV is from the generation source of the electricity used to charge. EVs that are charged

through renewable energy sources can be almost entirely emissions free.

Electricity generation

The overall comparison of vehicle emissions has been readily assessed globally. A full comparison of 100 per cent oil (petrol / diesel) to 100 per cent coal powered electricity, sees only a slight reduction in emissions by one per cent when using 100 per cent coal as the source⁹. It should be noted, no state in Australia is 100 per cent reliant on coal (see Table 1 below). The reduction in emissions increases by approximately 50 per cent when the electricity generation source is natural gas. Renewable sources such as solar, wind and hydro increase the reduction in total emissions by 92 to over 99 per cent, with the single remaining per cent being attributed to the construction of the electricity generation sources¹⁰.

The majority of Australia is covered by the National Energy Market (NEM), with south Western Australia being powered predominantly by the South West Interconnected System (SWIS). Combined, the NEM and the SWIS, account for approximately 94 per cent of Australia's electricity demand¹¹. The NEM is an interconnected electricity generation and distribution network that includes South Australia, Tasmania, Victoria, New South Wales and Queensland. Electricity generated in each state is utilised in that state and can also be 'exported' into other states via the network. At any one point in time the majority of participant states can be both 'importing' and / or 'exporting' electricity to and from other states.

Table 1 » 2016-17 Electricity generation sources

	NSW	VIC	QLD	WA	SA	TAS	NT	AUSTRALIA
Black coal	79.16%	0%	72.06%	27.62%	0%	0%	0%	45.46%
Brown coal	0%	82.54%	0%	0%	0%	0%	0%	16.77%
Natural gas	4.64%	4.90%	19.46%	55.08%	52.16%	8.43%	79.32%	19.70%
Oil products	0.45%	0.27%	1.58%	9.97%	1.01%	0.20%	18.00%	2.42%
Total non-renewable	84.25%	87.70%	93.10%	92.67%	53.16%	8.63%	97.33%	84.35%
Biomass	1.16%	1.35%	2.52%	0.47%	0.76%	0.25%	0%	1.39%
Wind	2.63%	6.78%	0.04%	3.91%	37.39%	10.21%	0%	4.80%
Hydro	8.75%	1.81%	0.98%	0.54%	0.03%	79.75%	0%	6.35%
Large-scale solar PV	0.80%	0.03%	0.05%	0.08%	0.03%	0%	0.62%	0.26%
Total renewable	15.75%	12.30%	6.90%	7.33%	46.84%	91.37%	2.67%	15.65%

Source: Department of the Environment and Energy, Australian Energy Statistics, Table O, April 2018

⁴AIHW (2016). Australian burden of disease study: impact and causes of illness and death in Australia 2011, AIHW, Canberra. <https://www.aihw.gov.au/getmedia/d4df9251-c4b6-452f-a877-8370b6124219/19663.pdf.aspx?inline=true>
⁵Australian Government, (2018). Department of Environment and Energy, National Greenhouse Gas Inventory 2016 <http://ageis.climatechange.gov.au/#>
⁶ibid.
⁷Department of Environment and Energy (2017). Australia's emissions projections 2017, <http://www.environment.gov.au/system/files/resources/eb62f30f-3e0f-4bfa-bb7a-c87818160fc/files/australia-emissions-projections-2017.pdf>
⁸Op. cit. National Greenhouse Gas Inventory 2016
⁹Union of Concerned Scientists (2015). Cleaner cars from cradle to grave, <https://www.ucsusa.org/sites/default/files/attach/2015/11/Cleaner-Cars-from-Cradle-to-Grave-full-report.pdf>
¹⁰ibid.
¹¹AIIPH, Electricity markets and the role of coal fired power stations https://www.aiph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/Coal_fired_power_stations/-/media/Committees/ec_ctte/Coal_fired_power_stations/Final%20Report/c02.pdf

For example, Victoria can be both importing electricity from Tasmania and South Australia (both of which are predominantly powered by renewables (see Table 1 above)), while also 'exporting' electricity to New South Wales. Therefore, electricity generated within the NEM should be considered with a measure of variability, due to the lack of finite 'boundaries' for each generation state.

Since 1990 electricity generation has increased by over 68 per cent, with an increasing proportion of renewable energy sources particularly over the period from the early 2000s. We are currently at the highest level of renewable energy generation in Australia, in both nominal and proportional terms, and as further coal fired power plants close, this will further increase. Notable imminent or recent closures include Hazelwood (Victoria) which closed in 2017 [and is therefore contributing to the quoted figures] and Liddell (New South Wales) with planned decommissioning for 2022. At its closure Hazelwood was Australia's most emissions intensive electricity generation plant.

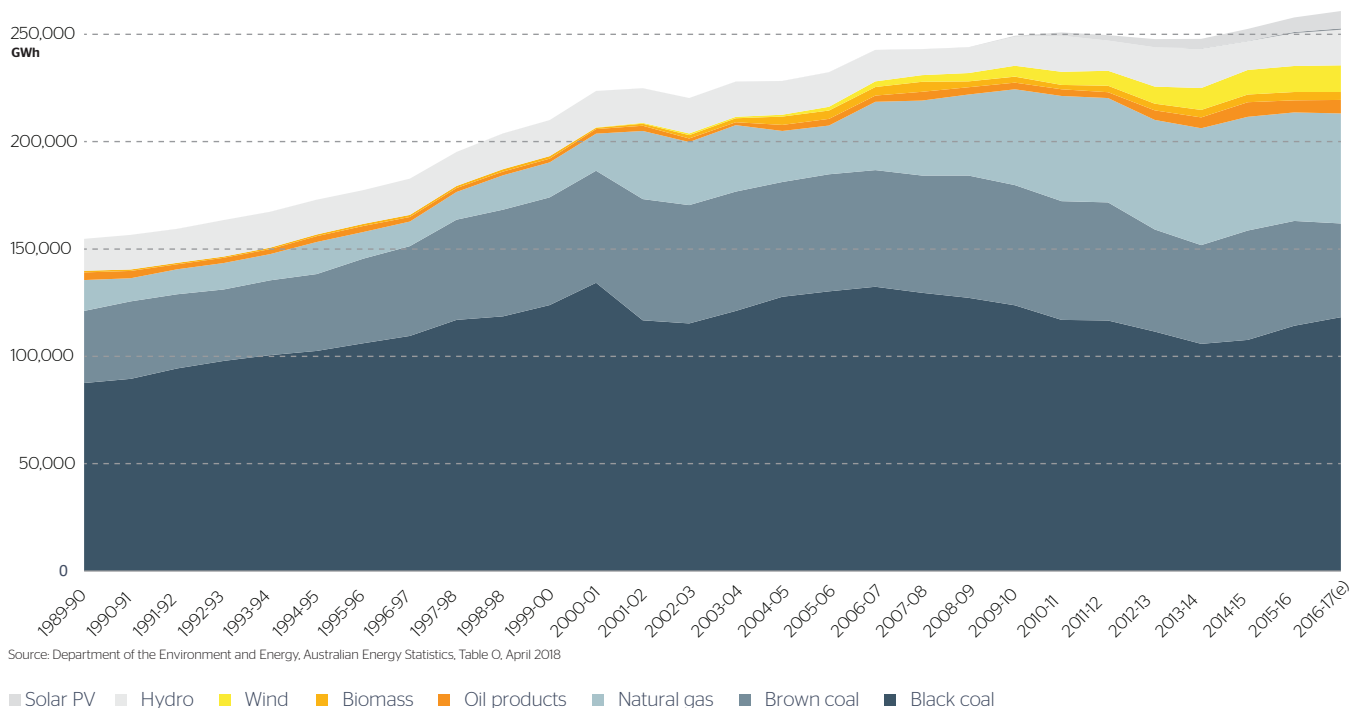
Light vehicles, being cars, SUVs and light commercial vehicles, make up the greatest proportion of transport emissions, accounting for over 58 million tonnes of CO₂ per year, or over 61 per cent of all transport emissions and 15 per cent of all CO₂ emissions¹². With this in mind, making meaningful emissions reductions will need to closely align with transitioning electricity generation to renewable sources.

Supporting the acceleration of EV uptake in Australia

Australia has not undergone the same uptake in EVs that are occurring in other regions such as China, Europe and the USA. Internationally, there are a number of influences that are not currently present in Australia.

Globally over 1.1 million new EVs were sold in 2017, increasing 58 per cent from the previous year¹³. China made up just over 70 per cent of that total¹⁴ and for the first time, EV sales in Norway made up over 50 per cent of all new vehicle sales¹⁵. In Australia, our 2017 sales were the highest on record increasing by 77 per cent from the previous year up to 2,424 EV sales¹⁶, however this number still lags well behind global uptake.

Figure 1 » Electricity generation sources



Source: Department of the Environment and Energy, Australian Energy Statistics, Table O, April 2018

¹²Op. cit. National Greenhouse Gas Inventory 2016

¹³Bloomberg NEF, (2018), Electric Vehicle Outlook 2018, <https://about.bnef.com/electric-vehicle-outlook/>

¹⁴Ibid.

¹⁵Ibid.

¹⁶National Transport Commission (2018), Carbon Dioxide Emissions Intensity for New Australian Light Vehicles 2017, pg 24. Accessed at [https://www.ntc.gov.au/Media/Reports/\(F4FA79EA-9A15-11F3-67D8-582BF9D39780\).pdf](https://www.ntc.gov.au/Media/Reports/(F4FA79EA-9A15-11F3-67D8-582BF9D39780).pdf)

Vehicle emissions standards

Vehicle emissions standards set a 'limit' for vehicle emissions. The limit for each vehicle is determined by the weight of the vehicle, known as the 'limit curve'. Vehicles that produce emissions greater than the designated limit have penalties imposed on the manufacturer. Credits and debits are accrued and offset against each other for vehicles that are 'under' or 'over' their designated emissions limit.

Alarming, Australia is the only developed nation without a vehicle emissions standard. Due to this, Australia has not realised the same level of emissions reductions as seen overseas, with only 'incidental' and in recent years stagnating, reductions in emissions (Figure 2 below).

According to the National Transport Commission, the CO₂ emissions intensity for passenger cars in Australia during 2017 was 171.5g/km, 45 per cent higher than the European average of 118.5 g/km¹⁷. The European Union currently has a CO₂ emissions standard of 130g/km which was introduced in 2015. This will be reduced to 95g/km for all new cars by 2021 (phased in from 2020) with plans to reduce that by a further 30 per cent by 2030, with the first 15 per cent reduction required by 2025¹⁸.

The United States' CO₂ standard will be approximately 99g/km by 2025¹⁹. A growing chorus of nations have also announced bans on the sales of new ICEs, including Norway (2022), India

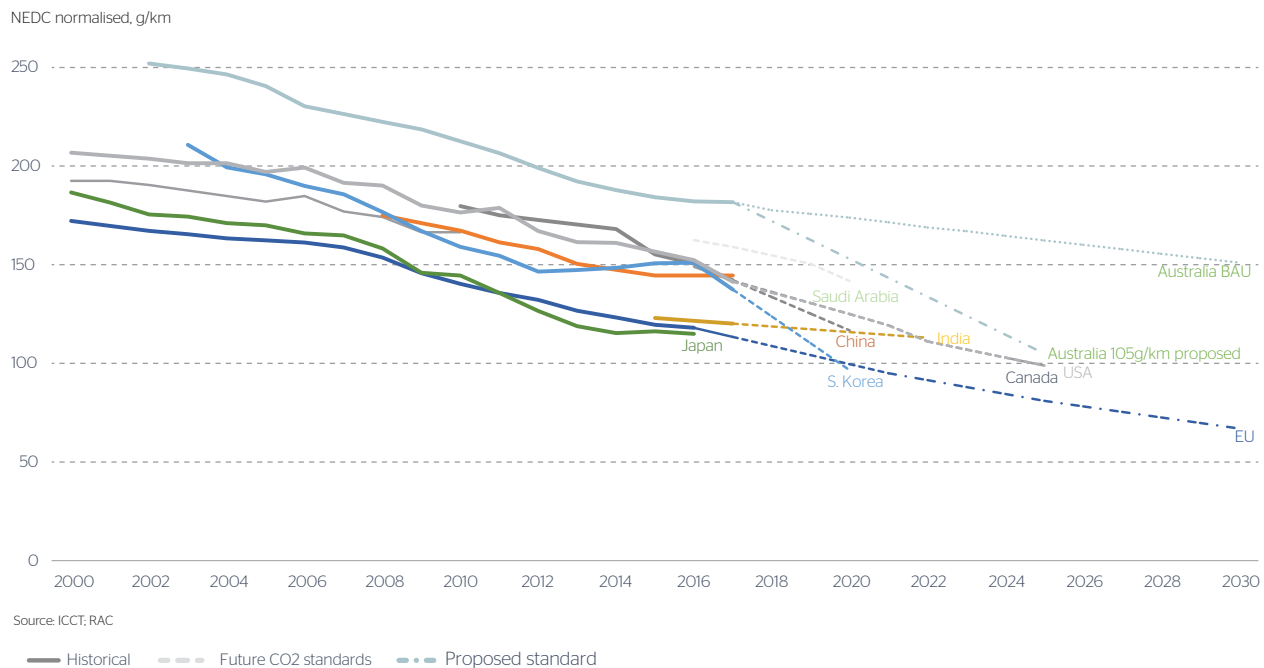
(2030), Germany (2030), Scotland (2032), France (2040) and England (2040); with France and England indicating a full ban on ICEs by 2050²⁰.

Currently there are limited EVs for sale in Australia, with little to compel or encourage vehicle manufacturers to sell them here. Due to a combination of the high price of EVs relative to conventional vehicles, a view that EVs will negatively impact on after-sales servicing revenue and a lack of consumer demand, manufacturers have not provided the same vehicles for sale in Australia as they do overseas.

Vehicle emissions standards create significant motivation for manufacturers to provide EVs to the Australian market, and ensure Australia is being afforded the same access to emissions reductions technologies and reducing overall new vehicle emissions averages. The Federal Government's proposed vehicle emissions standards provide significant incentive for pure EVs to be sold in Australia, due to 'bonus' or 'super' credits afforded to EVs.

Currently, there are a handful of EV models available for sale in Australia, with approximately 155 different models available globally²¹. Specifically comparing this to models available in right-hand drive markets other than Australia, there are approximately 50 EV models available in Japan, 33 in the UK and 27 in New Zealand²². New Zealand has almost three times the EV model availability than Australia.

Figure 2 » International passenger CO₂ emissions



Source: ICCT, RAC

¹⁷ Ibid
¹⁸ European Commission (2018). "Reducing CO₂ emissions from passenger cars". https://ec.europa.eu/clima/policies/transport/vehicles/cars_en
¹⁹ ICCT (2018). International CO₂ data tables. https://www.theicct.org/sites/default/files/Global_PV_figure_data_20180406.xlsx
²⁰ Energeia (2018). Australian Electric Vehicle Market Study Prepared by Energeia for ARENA and CEFC, May 2018. Accessed at <https://www.cefc.com.au/media/401923/australian-ev-market-study-full-report-jun2018.pdf>
²¹ Op. cit. Bloomberg NEF
²² Op. cit. Energeia

Incentives / subsidies

Internationally, the countries that provide fiscal incentives for EVs are realising the greatest levels of EV uptake. Currently, EVs still have a price differential with a comparable ICE, predominantly due to the cost of batteries. Monetary incentives such as subsidies, seek to, at a minimum, at least partially offset this difference.

There are a number of different subsidy applications globally, which intend to create price parity and in some countries a price advantage between EVs and ICE and diesel engines. These subsidies or incentives vary by jurisdiction however are mainly characterised by:

- › tax and / or fee exemptions;
- › rebates and / or subsidies; and
- › tax breaks.

Most simply in Australia, tax and fee exemptions levied on EVs would bring about substantial savings for purchasers. On a Federal level, all vehicles are levied with Goods and Services Tax (10 per cent); vehicles with a purchase price above \$66,331 threshold (\$75,526 for 'fuel efficient' vehicles) pay an additional 33 per cent Luxury Car Tax for every dollar above the threshold²³; and Fringe Benefits Tax can also be payable depending on business / private usage and eligibility. Exempting EVs from each of these taxes and levies would begin to create significant financial incentives for EV buyers.

At a State level, vehicles are subject to varying levels of stamp duties, vehicle licensing fees, other state-specific fees and administration fees. Individual states are able to provide up-front exemptions in the form of stamp duty exemptions and tax and fee exemptions of up-front and ongoing vehicle licensing fees.

Any tax exemption considerations should ensure they reflect the relative emissions reduction impact of the vehicle; PHEVs for example should also be encouraged and have some form of incentive, but not to the same extent as a pure battery EV, with pure EVs being afforded full fee exemptions. A sliding scale or 'banding' reflective of emissions would ensure the highest incentives are provided at the highest reflective of emissions reduction / elimination.

Additional to monetary incentives there are numerous non-monetary incentives that provide further incentives for EV uptake. Internationally, some of these incentives include access to high-occupancy vehicle lanes, access to free or convenient parking, manufacturer incentives, EV sales targets, access to charging infrastructure, and /or access to a variety of EVs for sale.

Fleet procurement policies

Ensuring access to a wide range of EVs for sale is a significant start, dispersing them into the general vehicle fleet is also important. Federal, State and Local governments, as well as business, make up a significant proportion (more than half) of new vehicle sales²⁴. Fleet vehicles also have a much higher turnover rate than privately purchased vehicles. Both government and

business fleets have a higher average emissions intensity than private new vehicle sales²⁵.

Given the high sales volumes and turnover, government and business fleet procurement can have a significant impact on EV uptake. Ensuring there is a significant proportion of electric new vehicle purchases or a whole-of-department shift to EV procurement is vital. For example, in Western Australia the *WA Government Fleet Policy and Guidelines* does include a provision for a CO₂ benchmark²⁶. However, any benchmark or standard should ensure it is impactful, in line with international best practice (in the absence of an Australian standard) and include express provision for EVs. The fleet procurement policy should also apply to both state and federal Government Business Enterprises, in particular those with high public visibility and large operational vehicle fleets. Not only will this increase new EV sales and the EV fleet overall, it will also create a significant second tier of sales through the second-hand vehicle market, enabling EV access to a greater range of consumers with varying price sensitivities.

Charging infrastructure

There are currently, five 'levels' of charging infrastructure:^{27,28}

1. General power outlet (GPO)

- › Approximately 3kw
- › Basic household electricity plug / GPO
- › Approximately 17 hours for 100kms of charge

2. Basic AC charger

- › Between 7kw – 11kw
- › A basic AC (alternative current) 'slow' or 'trickle' charger
- › Overnight charging

3. DC fast charger

- › Approximately 22kw
- › A 'fast' AC charger, used for mostly 'destination' or 'top-up' charging in public places such as car parks and shopping centres
- › Four to eight hour full charge

4. DC fast charger

- › Approximately 50kw
- › Fast charging, located along major traffic routes
- › Almost 100 kms of charge in 30 minutes

5. DC ultra-fast charger

- › Up to approximately 350kw
- › Currently not in Australia
- › Full charge in comparison with filling a tank of fuel

A consideration by government in investing in widespread charging infrastructure will assist in alleviating 'range anxiety', and the flow on economic impacts of an increase in charging infrastructure could be assessed as part of this. The term 'range anxiety' is worry on the part of a person driving an EV that the battery will run out of power before the destination or a suitable charging point is reached.

²³ATO, (2018) Luxury car tax rate and thresholds. Accessed at <https://www.ato.gov.au/rates/luxury-car-tax-rate-and-thresholds/>

²⁴Op. cit. National Transport Commission

²⁵Ibid.

²⁶Department of Finance (WA) (2017). WA Government Fleet Policy and Guidelines, pg 11. Accessed at https://www.finance.wa.gov.au/cms/uploadedFiles/Government_Procurement/Policies/wa_government_fleet_policy_guidelines.pdf

²⁷Queensland Government (2018) Electric Vehicle (EV) Charging Infrastructure, March 2018. Accessed at <http://www.dsmp.qld.gov.au/resources/guideline/pda/guideline-electric-vehicles.pdf>

²⁸National Research Council of the National Academies, Overcoming Barriers to Deployment of Plug-in Electric Vehicles. Transportation Research Board and National Research Council. Washington, DC: The National Academies Press, 2015. Accessed at https://download.nap.edu/cart/download.cgi?record_id=21725

It should be highlighted that the traditional model for 'refuelling' differs significantly for an EV, the scale of publicly available fast charging infrastructure should not be as significant as current-day fuel retailers. It is anticipated the majority of charging occurs in the home or at the destination, with estimations as small as only one per cent of kilometres travelled would occur at publicly available fast chargers (if there is access to a home charger)²⁹. In this instance, charging will be for the most part long distance trips.

A coordinated approach

In the UK, the Government and car industry have created a joint program called 'Go Ultra Low', which provides a central repository for all EV ownership information and material, with all possible information being located in one place. 'Go Ultra Low' allows people to compare technologies and costs - both upfront and ongoing, emissions information and vehicle battery range, information about any applicable subsidies, information on both at-home and public fast charging, opportunities for business, connects the user to test drive any EV of interest on the website, as well as testimonials from 'real' EV drivers, and in a simple easy-to-access-and-understand format. The program brings together all major manufacturers of EVs and appropriate government departments creating a single platform for information. A similarly structured arrangement for Australian motorists has potential to provide information from a variety of sources for consumers to consider in a relatively balanced way.

Summary recommendations

1. Ensuring a focus on increasing EV uptake

The impact of vehicle emissions on our environment and health, makes it necessary to reduce our vehicle emissions. It is also important this is underpinned by an ongoing transition to a 'cleaner' grid.

2. Implement a meaningful CO₂ standard

RAC supports ensuring there is a legislative framework and guidance to reducing vehicle emissions. Without a legislated framework there is little impetus for the vehicle fleet to reduce emissions, or vehicle manufacturers to offer EVs and low emissions vehicles to Australia.

3. Implementing incentives

RAC is supportive of implementing taxation exemptions and subsidies that would create significant financial incentives to increase EV uptake. In addition to considering options for non-monetary incentives, Government, at both a state and federal level, should review and create subsidies that are reflective of levels of emissions such as:

- › Federal taxation exemptions and reductions
 - › Goods and Services Tax
 - › Luxury Car Tax
 - › Fringe Benefits Tax
- › State-based taxation exemptions and reductions
 - › Stamp duty
 - › Vehicle licensing
 - › Administration fees

4. Government and business fleet procurement policies targeting EV uptake

RAC supports ensuring government and business play a significant role in increasing the number and availability of EVs in Australia.

5. Charging infrastructure

RAC supports government planning and supporting the widespread and ongoing installation of publicly available EV charging infrastructure to support EV uptake and alleviate range anxiety.

6. A whole of government approach

RAC supports the Government ensuring a collaborative approach to implementing strategies to support the uptake of EVs. Platforms that provide easy access to information such as the UK's Go Ultra Low program should also be considered.

RAC welcomes the opportunity to participate in the Select Committee Inquiry on Electric Vehicles. We trust RAC's response, which is based on providing Western Australians with higher levels of protection from harmful vehicle emissions is helpful to the Committee.

²⁹Op. cit. Energeia, pg. 5.

For further information please
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