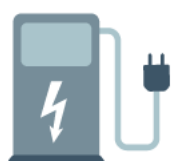


# Supporting uptake of low and zero emission vehicles

## Options and opportunities for Government

Human activity influences the planet's climate and natural ecosystems. As we move around our communities, we must look for ways to minimise our impact on air quality and the environment. Technological advances are increasing the availability of cleaner, more sustainable vehicles and fuels, but greater action to facilitate increased uptake of low and zero emission vehicles will be important to drive the transition to cleaner transport and a reduction in harmful vehicle emissions in Australia and our State.



Low emission vehicles such as Electric Vehicles (EVs) produce significantly less (or none in the case of zero emission vehicles) tail pipe emissions than vehicles with an internal combustion engine (ICE). EVs use one or more electric motors for propulsion, and are recharged by plugging in to an external power source. Some are powered by electricity alone while others, such as plug-in hybrids, use a combination of electricity and liquid fuel. Other low emission vehicles use a fuel cell to convert hydrogen to electricity to power the engine, emitting only heat and water as by-products<sup>1</sup>.

At the turn of the 20th century, EVs were seen as more viable than many ICE vehicles, being quiet, reliable and easy to drive and service but as ICE technology improved and liquid fuel distribution networks spread, demand for EVs fell away. Today, the Australian market boasts a range of EVs - with the Tesla S, Nissan Leaf, Hyundai Ioniq and BMW i3 amongst the most popular - and Australian-based companies have expressed intentions to commence assembling EVs shortly<sup>2</sup>.

Some EVs now rival the performance of similar sized ICE vehicles, and most have considerably lower running costs. Fluctuating oil prices, concerns about urban air quality and climate change and the growing number of more affordable EV models available are helping to boost the appeal.

Globally, the electric vehicle passenger car fleet in 2019 exceeded seven million, up over two million from the previous year, with 47 per cent of these being in China, 24 per cent in Europe and 20 per cent in the United States<sup>3</sup>. EV sales are forecast to hit approximately 55 million by 2040, representing 58 per cent of all new light vehicle sales and over 31 per cent of the global passenger vehicle fleet<sup>4</sup>.

Despite the growth internationally, EV sales in Australia have been slower and only totalled 6,718 in 2019, with registrations in Western Australia (WA) at March 2020 totalling just 1,108 vehicles<sup>5</sup>. While only three per cent of Western Australians currently own an electric or hybrid as their primary vehicle (and an additional one per cent as their secondary vehicle) and factors such as cost, range anxiety and access to charging infrastructure reduce the appeal for some, there is a growing appetite.



**One in two Western Australians would consider buying an electric or hybrid for their next vehicle purchase<sup>6</sup>.**

A shared attribute of those locations where EV ownership is high is the application of policy levers and a range of incentives to influence and overcome barriers to EV ownership and use. Similar measures could be applied in the Australian and WA context to make EVs a more viable and attractive option.

### Reducing harmful vehicle emissions

Vehicle tailpipe emissions create greenhouse gases (GHGs) such as carbon dioxide (CO<sub>2</sub>) and harmful airborne pollutants such as oxides of nitrogen (NOx), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), benzene and particulate matter that impact human health and natural ecosystems. Globally, the goal of reducing local air pollution and GHGs, and the associated costs and effects on health and climate are increasingly driving the push for renewables<sup>7</sup>, the uptake of low carbon transportation and the adoption of low and zero emission vehicles<sup>8</sup>.

It is well established that CO<sub>2</sub> is the primary GHG emitted through human activity and by trapping heat in the atmosphere, it has been identified a key contributor to global warming. In 2018, light passenger and commercial vehicles

<sup>1</sup> Wilberforce, T et al. (2019). Developments of Electric Cars and Fuel cell Hydrogen Electric Cars, in International Journal of Hydrogen Energy Vol 42, Issue 40, 5 October 2019.

<sup>2</sup> Australian Broadcasting Commission News (2019). Evins B, Slessor C and Boisvert, E. ACE electric vehicles to be assembled in Adelaide. Retrieved from: <https://www.abc.net.au/news/2019-05-14/ace-electric-vehicles-to-be-assembled-in-adelaide/11109132>.

<sup>3</sup> International Energy Agency (2020). Global EV Outlook 2020, Entering the decade of electric drive? Retrieved from: <https://www.iea.org/reports/global-ev-outlook-2020>.

<sup>4</sup> Bloomberg NEF (2020). Electric Vehicle Outlook. Retrieved from: <https://about.bnef.com/electric-vehicle-outlook/>.

<sup>5</sup> Data provided by the WA Government, Department of Transport, April 2020.

<sup>6</sup> RAC Environmental Sustainability Survey undertaken in 2019 (results yet to be published).

<sup>7</sup> International Renewable Energy Agency (2018). International Energy Agency and the REN21, Renewable Energy Policies in a Time of Transition. Retrieved from: [http://energyaccess.org/wp-content/uploads/2018/04/IRENA\\_IEA\\_REN21\\_Policies\\_2018.pdf](http://energyaccess.org/wp-content/uploads/2018/04/IRENA_IEA_REN21_Policies_2018.pdf).

<sup>8</sup> Weeberb, J et al.(2018). How Clean are Electric Vehicles? Evidence-based review of the effects of electric mobility on air pollutants, greenhouse gas emissions and human health. Atmospheric Environment Volume 185, July 2018. Retrieved from: <https://www.sciencedirect.com/science/article/abs/pii/S1352231018302711>.

produced over 63.6 Mt CO<sub>2</sub>-e, which accounted for over 63 per cent of emissions from the transport sector and 12 per cent of all greenhouse gas emissions produced in Australia<sup>9</sup>.

Australia's average CO<sub>2</sub> emissions intensity for new passenger cars in 2019 was 169.3g/km, compared to 169.8g/km in 2018<sup>10</sup> and the rate of reduction has been steadily decreasing since 2012. European emissions intensity in 2017 ranged from 133g/km in Estonia to 105g/km in Portugal, meaning Australia's average is between 29 per cent and 64 per cent higher<sup>11</sup>.

Australia signed the COP21 Paris Agreement in December 2015, which aims to limit global warming to less than 2 degrees Celsius by 2050. As part of the global response to climate change, Australia has committed to reducing the nation's GHG emissions by 26 to 28 per cent below 2005 levels by 2030 and forecasting by the International Energy Agency (IEA) suggests a significant proportion of all new vehicle sales would need to be some kind of plug-in EV to achieve this<sup>12</sup>.

The higher average CO<sub>2</sub> emissions intensity has been linked to Australian consumer preference for heavier vehicles with larger and more powerful engines, a lower proportion of diesel-powered engines, fewer government incentives to encourage uptake of lower emissions vehicles and lower fuel prices.

When it comes to reducing CO<sub>2</sub> emissions from within the transport sector, Australia is falling behind the rest of the world and is the only developed nation without a CO<sub>2</sub> emissions standard for new light vehicles<sup>13</sup>. Europe has mandated a target of just 95g CO<sub>2</sub>/km for all new cars by 2021 (phased in from 1 January 2020), with a reduction of 15 per cent by 2025 and a further cumulative reduction of 37.5 per cent on the 2021 target by 2030<sup>14</sup>. Further, several countries have banned the sales of new ICE vehicles such as Norway (from 2022), India (from 2030), Germany (from 2030), Scotland (from 2032), England (from 2035) and France (from 2040); with France and England indicating a full ban on ICEs by 2050.

Since 2015, RAC has been calling for an impactful national mandatory CO<sub>2</sub> emissions intensity standard for all new light passenger vehicles sold in the Australian market to align with the rest of the developed world and provide Australians with better access to a greater range of low and zero emission vehicles.

## Boosting uptake

Now, more than ever, is an opportune time to support moves to increase uptake of low and zero emission vehicles, particularly when consumer awareness and interest in environmental issues is growing and choice within the new vehicle sales market is increasing. It has been forecast that EVs could account for 70 per cent of new vehicle sales and 30 per cent of the vehicle fleet in Australia by 2040<sup>15</sup> but action will be required to realise this and reduce the impact of vehicle emissions on our health and the environment.

A previous life cycle assessment of emissions from EVs in WA found they perform marginally better than petrol and diesel cars. However, recent European research indicates that EVs outperform diesel and petrol passenger vehicles, across all electricity generation makeups; and even on heavily carbon intensive grids such as Poland, where EVs produce 30 per cent less CO<sub>2</sub> emissions than traditional passenger vehicles<sup>16</sup>. EVs charged by the average European electricity profile 'repay their "carbon debt"' after a year, and can save over 30 tonnes of CO<sub>2</sub> across their lifetime when compared to an equivalent non-electric vehicle. Taxis, on-demand ride share and shared vehicles - vehicles that travel significantly greater distances - can save up to 85 tonnes over their lifetime<sup>17</sup>. While this is positive, lessening Australia's reliance on non-renewables electricity generation remains an imperative to further reduce life-cycle emissions. In Denmark, the adoption of strong policies for clean energy transition has enabled the achievement of 50 per cent renewable electricity generation in 2020 (target of 100 per cent by 2050)<sup>18</sup> and in Norway, electricity production is also more than 98 per cent hydro-electric<sup>19</sup>.

<sup>9</sup> Australian Government. Australian Greenhouse Emissions Information System, National Greenhouse Gas Inventory. Retrieved from: <https://ageis.climatechange.gov.au/>

<sup>10</sup> National Transport Commission (2020). Carbon Dioxide Emissions Intensity for New Australian Light Vehicles 2019. Retrieved from: <https://www.ntc.gov.au/sites/default/files/assets/files/Carbon-dioxide-emissions-intensity-for-new-Australian-light-vehicles-2019.pdf>

<sup>11</sup> Ibid.

<sup>12</sup> International Energy Agency. World Energy Outlook 2019. As predicted under the Sustainable Development Policy Scenario.

<sup>13</sup> While the Australian Government proposed a standard, no commitment has been made yet.

<sup>14</sup> European Commission, CO<sub>2</sub> emission performance standards for cars and vans (2020 onwards). Retrieved from: [https://ec.europa.eu/clima/policies/transport/vehicles/regulation\\_en](https://ec.europa.eu/clima/policies/transport/vehicles/regulation_en)

<sup>15</sup> Anna Chau (2019). Infrastructure Australia Address to CEDA, Government News. Skasston J, Electric Vehicle Charging Network A National Priority. Retrieved from: <https://www.governmentnews.com.au/electric-vehicle-charging-network-a-high-national-priority/>

<sup>16</sup> Transport and the Environment (2020). Analysis of Electric Car Lifecycle CO<sub>2</sub> Emissions. Retrieved From: <https://www.transportenvironment.org/sites/te/files/downloads/T%26E%E2%80%99s%20EV%20life%20cycle%20analysis%20LCA.pdf>

<sup>17</sup> Ibid.

<sup>18</sup> Berggreen, J. (2020). Denmark Passes Magic 50% in Renewable Electricity Generation Milestone. Clean Technica. Retrieved from: <https://cleantechnica.com/2020/01/05/denmark-passes-magic-50-in-renewable-electricity-generation-milestone/>

<sup>19</sup> Government of Norway (2016). Renewable Energy Production in Norway. Retrieved from: <https://www.regjeringen.no/en/topics/energy/renewable-energy/renewable-energy-production-in-norway/id2343462/>

Internationally, the countries that provide monetary incentives are realising the greatest levels of EV uptake. Currently, EVs still have a price differential with comparable ICE vehicles, predominately due to the cost of batteries. There are several different subsidy/ incentive applications globally, which intend to create price parity and in some countries a price advantage for EVs; while they vary by jurisdiction, they are mainly characterised by tax and/or fee exemptions; rebates and/or subsidies; and tax breaks.

Currently, there are few, if any, Australian EV 'fleet penetration' targets and little in the way of direct financial support, particularly in WA. Discounted parking is available to EV drivers in New South Wales (NSW), Queensland, and South Australia, and stamp duty and registration discounts apply in the Australian Capital Territory (ACT), Victoria, NSW and Queensland<sup>20</sup>. There has been a marked lack of charging infrastructure for plug-in EVs in Australia but this is now growing<sup>21</sup> and inclusion of the establishment of a national EV fast-charging network in Infrastructure Australia's 2019 Infrastructure Priority List, for delivery in the next five years, demonstrates the national significance and importance of providing such enabling infrastructure but funding for its roll-out is still required.

To help combat range anxiety and to make a real contribution and commitment towards the growth of EVs in WA, RAC delivered the RAC Electric Highway<sup>®</sup>. The highway is the first of its kind in Australia, with the network of 11 publicly accessible EV fast-charging DC stations located in the South West. RAC's Less Emissions Mission also encourages members to reduce their carbon footprint by rewarding owners of qualifying lower CO<sub>2</sub> emissions vehicles with discounts on finance rates and car insurance and savings on Auto Services.

In WA, subsidies or discounts could be applied to a range of fees and taxes motorists are required to pay to both the State and Federal Governments. Private vehicle use charges are collected using both fixed and variable fees. Fees paid to the Federal Government include fuel tax, luxury car tax (LCT), GST on fuel and customs tax from imported cars. LCT<sup>22</sup> of 33 per cent applies to any vehicle above the Australian Taxation Office (ATO) set thresholds<sup>23</sup> and with low and zero emission vehicles priced higher than non-fuel efficient cars, many are subject to this tax.

State Government fees and taxes include vehicle registration fees, licence fees, and stamp duty. Currently stamp duty for light vehicles in WA varies with vehicle price<sup>24</sup>, increasing relative to

the cost of a vehicle - this combined with the differential tax scale for LCT disincentivises low and zero emission vehicle uptake.

In addition to tax incentives, providing concessions or privileges that give owners of low and zero emission vehicles more priority or convenience can also be exercised, including permitting the use of 'bus only' lanes during congested periods or providing access to more convenient dedicated parking bays.

### Facilitating the uptake of electric vehicles - Norway

Norway has invested in EV uptake since the 1990s and has remained the global leader for the EV market share, with 52 per cent of new cars sold being EVs<sup>25</sup>.

Norwegian Government incentives and support for EVs include:

- » establishing a high carbon price (1991),
- » no purchase/ import taxes (1990),
- » annual registration fees for EVs reduced (1990),
- » no annual road tax (1996),
- » no charges on toll roads or ferries (1997-2017),
- » free municipal parking (1999-2017),
- » access to bus lanes (2005),
- » fifty per cent reduced company car tax (2000-2018),
- » compensation for scrapping of vans when converting to zero emission vans (2018) and twenty-five per cent VAT exemptions on leasing (2015) and purchase (until 2021 when they will be revised)<sup>26</sup>,
- » 63 fully electric car ferries will be introduced in 2021-2022<sup>27</sup>; and
- » 11,000 charging points, with fast-charging stations every 50km on main roads.

The Norwegian Government delegated decisions about what incentives would be applied to local municipalities. Along with sales tax exemption, access to bus lanes was found to be the most important incentive for encouraging EV ownership.

Having a climate policy is the key driver for Norway's increased uptake of EVs. The 2020/21 mandatory CO<sub>2</sub> emissions targets for new passenger vehicles is set at 95g/km but a bi-partisan agreement has been enacted to ban petroleum fuelled cars by 2025, despite oil and reserves being part of the country's economy.

<sup>20</sup> Vic Roads Hybrid or Electric Vehicle Registration Discounts <https://www.vicroads.vic.gov.au/registration/registration-fees/concessions-and-discounts/hybrid-vehicle-registration-discount>. Queensland Government, Vehicle Registration Duty Rates, <https://www.qld.gov.au/transport/registration/fees/duty/rates>. Transport for New South Wales, Registration Costs, <https://www.rms.nsw.gov.au/roads/registration/get-nsw-registration/electric-vehicles/index.html>. ACT consumer policies, Electric Vehicle Council, State of Electric Vehicles 2019 <https://electricvehiclecouncil.com.au/wp-content/uploads/2019/09/State-of-EVs-in-Australia-2019.pdf>

<sup>21</sup> In 2018, there were 783 charging locations in Australia (less than 10 per cent of which are fast-charging) and the average distance between stations nationwide is approximately 200km.

<sup>22</sup> For the purposes of the ATO, a fuel-efficient car is one that has fuel consumption that does not exceed seven litres per 100 kms as a combined rating under the vehicle standards in force under section 7 of the *Motor Vehicle Standards Act 1989*. Australian Taxation Office. Retrieved from <https://www.ato.gov.au/Business/Luxury-car-tax/In-detail/Definitions-Luxury-car-tax/>

<sup>23</sup> In 2020-21, for fuel-efficient vehicles, the threshold is set at \$77,565, with the non-fuel-efficient vehicles being set at \$68,740 (tax is paid on the value of the car above the threshold).

<sup>24</sup> Department of Transport, Vehicle Licence Duty Calculator. Retrieved from: <https://www.transport.wa.gov.au/licensing/vehicle-licence-duty-calculator.asp>

<sup>25</sup> International Energy Agency (2019). Electric Vehicle Outlook 2019. Retrieved from <https://www.iea.org/reports/global-ev-outlook-2019>.

<sup>26</sup> Norsk elbilforening. Norwegian Electric Vehicle Policy. Retrieved from: <https://elbil.no/english/norwegian-ev-policy/>.

<sup>27</sup> Government of Norway. Hon Ola Elvestuen, Minister for Climate and Environment. Norway's Low Emission Policy 2018. Retrieved from: <https://www.regjeringen.no/en/aktuelt/norways-low-emissions-strategy/id2607245/>.

## A way forward

The emissions reduction strategies and policies for passenger vehicles in Australia still lag behind other countries and a common factor in countries where EV uptake has been greatest is political drive to actively reduce CO<sub>2</sub> emissions, linked to tangible commitment to combatting climate change.

RAC believes a clear strategic direction for Australian and WA Climate Policy and transport energy strategy, backed by appropriate investments, to drive a transition to cleaner transport and accelerate the uptake of low emissions vehicles is essential to reduce harmful vehicle emissions.

In tandem with the introduction of an Australian CO<sub>2</sub> emission standard for new light vehicles and target to facilitate the importation of low and zero emissions vehicles, a range of policy levers and incentives could be considered by the State and Federal governments to influence and overcome barriers to ownership and use in WA:

- » Ensure a collaborative, whole of government approach to developing a roadmap for action for the electrification of transport, combined with decarbonisation of the electricity grid / transition to appropriate renewable electricity generation;
- » Set ambitious targets for WA's low and zero emission vehicle fleet (including the government fleet), uptake and charging infrastructure delivery as part of the development of an EV strategy;
- » Investigate and trial a range of incentives which seek to reduce the price differential in favour of low and zero emissions vehicles;
- » As a priority, investigate for implementation tax exemptions such as stamp duty and vehicle registration concessions and/or exemptions for low and zero emissions vehicles, with the discount reflective of level of emissions - plug-in hybrids should be encouraged and have some form of incentive, but with battery EVs being afforded greater exemptions;
- » Plan for, and support, the provision of infrastructure to service electric and hybrid vehicles including the expansion of public EV charging facilities;

- » Ensure only low and zero emissions vehicles (aligned to international good practice) are purchased for government fleets;
- » Operate a public transport fleet that uses cleaner energy sources (including alternatively powered - hybrid, all-electric and hydrogen fuel cell - buses) and continue to retire high emissions buses, vastly accelerating the uptake of Euro VI or above standard buses; and
- » Deliver an effective national rating system to ensure consumers have access to user-friendly emissions and fuel consumption information when purchasing a new car.

Currently, there is an opportunity for WA to lead the country on low and zero emissions vehicle policy with the development of a State Climate Policy and Electric Vehicle Strategy underway. Further, it is understood the WA State Government operates a fleet of 8,807 passenger and light commercial vehicles, with an estimated average emissions intensity of 193g/km, well over the national average of 180.9g/km (the CO<sub>2</sub> benchmarks set by Government for its passenger and SUV fleet are substantially higher than the national average), taking further steps to decarbonise the government fleet could put the wheels in motion.

## About RAC

RAC is a voice for more than 1.1 million members from more than 60 per cent of households. Since our foundation 115 years ago, RAC has existed to be a driving force for a Better WA by championing change that will deliver transport options that are safe, more sustainable and better connect Western Australians and their communities now and into the future.

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