

# **Inquiry into the transition to electric vehicles**

**RAC response to the Standing Committee  
on Climate Change, Energy, Environment  
and Water**

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## **RAC response to the Standing Committee on Climate Change, Energy, Environment and Water's Inquiry into the transition to electric vehicles**

We thank the Standing Committee on Climate Change, Energy, Environment and Water for the opportunity to provide feedback into the *Inquiry into the transition to electric vehicles*.

RAC is a purpose-led member organisation. Since our foundation in 1905, RAC has existed to be a driving force for a Better WA – this is our purpose. We act as a voice for more than 1.3 million members in more than 60 per cent of Western Australian households. We work collaboratively with government, industry, our members and all Western Australians to champion change that will deliver safer, sustainable and connected communities – this is our 2030 Vision.

Transport decarbonisation is a critical part of our transition towards a net zero-emissions future. Electrification of our road transport system is widely accepted as important to reduce the impact of mobility emissions on health and the environment. Also of importance, is managing the interrelated impacts such as on fuel excise revenue, the electricity system, automotive industry, and the environment. Modelling by Aurecon<sup>1</sup> for a WA context shows only battery EVs (BEVs) and fuel cell EVs (FCEVs) have the potential to come close to the magnitude of life cycle<sup>2</sup> carbon dioxide equivalent reductions needed to meet Paris Agreement<sup>3</sup> commitments. Operating on WA's existing mixed grid<sup>4</sup>, the life cycle emissions of BEVs are already lower than a comparable petrol vehicle by 55 per cent, and as the electricity mix continues to decarbonise, this gap will increase - on a fully renewable grid, the life cycle emissions of a BEV would be 86 per cent lower. The life cycle emissions of a FCEV powered by green or grey hydrogen would be 83 per cent or 50 per cent lower on a petrol equivalent, respectively.

RAC's response to the terms of reference aligns with our social and community impact priorities and focuses on the following interrelated issues: infrastructure to support the transition to electric vehicles (EVs), including charging infrastructure and the electricity grid; the impact of the EV transition on electricity consumption and demand; opportunities for fuel saving consumer energy technologies; the environmental impacts of vehicle manufacturing and end-of-life opportunities for recycling; and the impact of EVs on transport revenue.

### **Electric vehicle charging infrastructure and the electricity grid**

EVs and plug-in hybrid EVs (PHEVs) may have only represented around 8.5 per cent of new vehicle sales<sup>5</sup> in 2023, but it's a sizeable increase of around 120 per cent from the year prior<sup>6</sup>. While more than eight out

<sup>1</sup> Modifying the International Council on Clean Transport research/modelling for the Western Australia context in 2023. Using average vehicle characteristics and fuel and electricity consumption in real-world driving conditions. Scenarios considered the South-West Interconnected System emission factors for 2021 grid mix (which is 0.68kg CO<sub>2</sub>-e/kWh) sourced from Clean Energy Regulator EERS release, and a potential future where only renewable energy is used for electricity supply and hydrogen production.

<sup>2</sup> Accounting for the tailpipe emissions, fuel and electricity production, and vehicle manufacturing Assumptions include average vehicle lifetime of 240,000km; fuel economy; and emissions. Inputs include: fuel/electricity production; fuel/electricity consumption; maintenance; and vehicle, hydrogen tank and battery manufacturing.

<sup>3</sup> Limiting global warming to below 2°C, preferably below 1.5°C, pre-industrial levels. United Nations Climate Change (n.d.) The Paris Agreement. Retrieved from: <https://unfccc.int/process-and-meetings/the-paris-agreement>.

<sup>4</sup> Assumptions based on 2021 grid mix (which is 0.68kg CO<sub>2</sub>-e/kWh). Clean Energy Regulator (2023). EERS release 2021-22. Retrieved from: <https://www.cleanenergyregulator.gov.au/OSR/EERS/Archived-EERS-releases/EERS-release-2021-22>

<sup>5</sup> Includes passenger, SUV and light commercial vehicles.

<sup>6</sup> Federal Chamber of Automotive Industries (2023). VFACTs National Report – New Vehicle Sales December 2023 (subscription).

of every 10 vehicles sold in Australia still relies purely on petrol or diesel<sup>7</sup>, as EVs become more popular, a greater portion of the overall energy mix will be electricity as opposed to fossil fuels, increasing demand on the grid.

At a national level, Commonwealth Scientific and Industrial Research Organisation (CSIRO) modelling suggests that EVs<sup>8</sup> could account for around 52 per cent of new passenger vehicle sales and almost 15 per cent of the total vehicle fleet in Australia in 2030<sup>9</sup>. Grid assessments undertaken by the Australian Energy Market Operator have warned that without planning for, and responding to, the challenges associated with transport electrification, the grid will be at risk of widespread outages within the next five years<sup>10</sup>. Similar conclusions were drawn from the WA Government's *Whole of System Plan*, which is a detailed study of how WA's principal electricity system, the South-West Interconnected System (SWIS), may evolve over 20 years<sup>11</sup>. **To support EV growth while ensuring the ongoing security, reliability, and efficiency of our power system, the Australian and WA Governments should continue to assess the existing capabilities of the network and take early action to accommodate future demand.** Preparing the grid for increased electricity demand through investment in grid infrastructure and firming capacity<sup>12</sup> is necessary to integrate grid-scale renewables and distributed energy resources<sup>13</sup>, and enable the increasing supply of low emissions electricity to consumers. **To facilitate the transition to a decarbonised road transport system, the Australian and WA Governments must work with industry to accelerate the integration of clean energies into the grid.**

RAC has welcomed the Australian and WA Governments commitments to scale up funding for EV charging infrastructure. For example, the WA Government's allocation of almost \$60 million in the 2022-23 State Budget to accelerate the use of zero emission vehicles<sup>14</sup>, which included \$23 million to expand WA's EV charging network; and the Australian Government's almost \$250 million to the Driving The Nation fund, which included \$39.9 million to help expand the national EV charging network<sup>15</sup>. However, according to CSIRO EV projections for WA's Wholesale Electricity Market<sup>16</sup>, the likely scenario<sup>17</sup> is that in 2030 there will be approximately 287,000 passenger BEVs within the SWIS area<sup>18</sup>. International Council on Clean Transport research<sup>19</sup> indicates that to service this many vehicles, at minimum, 14,500 workplace, 1,900 DC fast chargers and 9,800 public AC chargers would be required – and this would need to be scaled up to service the whole of WA. **Given the uptake anticipated in the near-term, urgent action and additional investment is needed to fill network gaps and install charging infrastructure in the areas where it is, and will be needed, most.**

### EVs and other cost saving consumer energy technologies

Due to its size, solar is possibly the only viable renewable energy resource for residential use. Consumers are increasingly installing rooftop solar panels to take control of their electricity bills and charge their EVs<sup>20</sup>, and there are renewable power incentives to increase the affordability of these technologies<sup>21</sup>. While solar

<sup>7</sup> Hybrid vehicles made up 8.45 per cent of new vehicle sales in 2023.

<sup>8</sup> Includes battery electric vehicles; plug-in hybrid vehicles; and fuel-cell electric vehicles.

<sup>9</sup> Commonwealth Scientific and Industrial Research Organisation (2023). Electric vehicle projections 2022. Retrieved from: [https://aemo.com.au/-/media/files/stakeholder\\_consultation/consultations/nem-consultations/2022/2023-inputs-assumptions-and-scenarios-consultation/supporting-materials-for-2023/csiro-2022-electric-vehicles-projections-report.pdf?la=en](https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2022/2023-inputs-assumptions-and-scenarios-consultation/supporting-materials-for-2023/csiro-2022-electric-vehicles-projections-report.pdf?la=en)

<sup>10</sup> Australian Energy Market Operator (2022). 2022 Integrated System Plan for the National Electricity Market. Retrieved from: <https://aemo.com.au/-/media/files/major-publications/isp/2022/2022-documents/2022-integrated-system-plan-isp.pdf?la=en>

<sup>11</sup> Energy Policy WA (2022). Whole of System Plan. Retrieved from: <https://www.wa.gov.au/government/document-collections/whole-of-system-plan>

<sup>12</sup> Grid firming is used as a flexible energy supply to keep the grid stable in the event of power intermittency (e.g. solar or wind resources are not sufficient/available).

<sup>13</sup> Distributed energy resources are small-scale energy resources usually situated near sites of electricity use, such as rooftop solar panels and battery storage.

<sup>14</sup> WA Government (2022, May 10). WA's climate action efforts accelerate with \$60 million EV package [Press release]. Retrieved from: [https://www.wa.gov.au/government/media-statements/McGowan-Labor-Government/WA's-climate-action-efforts-accelerate-with-\\$60-million-EV-package-20220510](https://www.wa.gov.au/government/media-statements/McGowan-Labor-Government/WA's-climate-action-efforts-accelerate-with-$60-million-EV-package-20220510)

<sup>15</sup> Department of Climate Change, Energy, the Environment and Water (2023). Driving The Nation. Retrieved from: <https://www.dcceew.gov.au/energy/transport/driving-the-nation>

<sup>16</sup> Australian Energy Market Operator (2022). WEM Electricity Statement of Opportunities. Retrieved from: <https://aemo.com.au/en/energy-systems/electricity/wholesale-electricity-market-wem/wem-forecasting-and-planning/wem-electricity-statement-of-opportunities-wem-esoo>

<sup>17</sup> CSIRO has modelled four scenarios: Exploring Alternatives; Progressive Change; Step Change; and Hydrogen export. It has been noted that the tentative mappings for the 2023 WEM Electricity Statement of Opportunities indicate that Step Change is the expected scenario.

<sup>18</sup> Modelling covers the South-West Interconnected System project area, and does not include the North-West Interconnected System or regional power.

<sup>19</sup> The International Council on Clean Transportation (2021). Charging Up America: Assessing the Growing Need for U.S. Charging Infrastructure Through 2050. Retrieved from: <https://theicct.org/publication/charging-up-america-assessing-the-growing-need-for-u-s-charging-infrastructure-through-2030/>

<sup>20</sup> Energy Policy WA (2021). Energy Transformation Strategy. Retrieved from: <https://www.wa.gov.au/organisation/energy-policy-wa/energy-transformation-strategy>

<sup>21</sup> Department of Climate Change, Energy, the Environment and Water (2024). Renewable power incentives. Retrieved from: <https://www.energy.gov.au/rebates/renewable-power-incentives>

panels present the opportunity to lower electricity costs (and therefore EV charging costs) in stand-alone housing, there are limitations for solar installation in apartments and for renters which creates a potential inequality in access. **RAC supports policies and initiatives that improve community access to the benefits of solar and other distributed energy resources, however acknowledges that these must be accompanied by preparing the grid for their integration.**

With the popularity of solar panels growing, there has been a steady decline in minimum operational demand<sup>22</sup> and an increase of energy ‘prosumers’ (consumers and suppliers) - this has exacerbated the challenge of how to adjust the grid and generation mix. Preparing for forecast demand, understanding EV charging patterns among different members of the community, and influencing their behaviours to manage peak load demand, will be necessary to help balance soaring levels of solar power already generated in WA each day. A survey commissioned by the WA Government found that EV owners were more likely to have solar than the general population, and in fact, that 73 per cent of EV owners already have it<sup>23</sup>. The research found that EV owners are broadly following positive behaviours and are already charging in line with the grid’s needs (e.g. charging during the day and avoiding peak demand times), however it will be important to ensure that consumers are educated and continue to demonstrate these behaviours as EVs become mainstream. **EV charging policy and education is necessary to support and incentivise positive charging practices e.g. managing charging times, refining and promoting the use of time-of-use tariffs, and encouraging smart charger adoption.**

#### The environmental impacts of EV manufacturing and end-of-life opportunities

The vehicle industry has a major impact on the mining industry, as the mining industry provides many of the components used to build a vehicle. EV batteries require lithium, nickel, cobalt, manganese, and graphite<sup>24</sup>, and increased EV sales will necessitate a scale up of all elements of the battery supply chain. The process of extracting the metals and minerals used in vehicles and batteries has multiple and significant environmental impacts. These include the use of large quantities of water; generation of pollution and waste; contamination of waterways; deforestation; and biodiversity destruction<sup>25,26</sup>. A circular economy<sup>27</sup> is well suited to dealing with issues of materials supply risks, which are particularly pertinent to the rapid adoption of renewable energy technologies<sup>28</sup>. In 2023 the Australian Government established the Circular Economy Ministerial Advisory Group to advise the Australian Government on the opportunities and challenges in making the transition to a circular economy by 2030<sup>29</sup>. **To strengthen the resilience and sustainability of automotive supply chains and reduce primary resource requirements, government and industry will need to work towards a circular economy.**

To reduce the life cycle impact of all vehicles, end-of-life recycling and disposal represents both a significant challenge and opportunity. In WA and Australia there is a lack of regulation for vehicle recycling. In Australia, most of the materials recovered from a vehicle are steel, plastics, glass, and rubber. However the proportion of a vehicle that is recycled could be increased through the introduction of minimum recovery requirements. For example, Belgium has mandatory requirements for the recycling of end-of-life vehicles, including the amount of mass that needs to be captured from the recycling process. A recent report has found that in Belgium, on average more than 97 per cent of a vehicle can be recovered and recycled<sup>30</sup>.

<sup>22</sup> Minimum demand is the lowest level of energy demanded from the grid at a point in time. Under certain scenarios it can place the grid under strain and make the energy system vulnerable.

<sup>23</sup> Energy Policy WA (2023). EV Action Plan – Publication of WA EV Charging Behaviour Research Report. Retrieved from: <https://www.wa.gov.au/government/announcements/ev-action-plan-publication-of-wa-ev-charging-behaviour-research-report>

<sup>24</sup> Natural Resources Defense Council (2022). Electric Vehicle Battery Supply Chains: The Basics. Retrieved from: <https://www.nrdc.org/bio/jordan-brinn/electric-vehicle-battery-supply-chains-basics>

<sup>25</sup> Columbia Climate School – Climate, Earth, and Society (2023). The Paradox of Lithium (18 January 2023). Retrieved from: <https://news.climate.columbia.edu/2023/01/18/the-paradox-of-lithium/>

<sup>26</sup> MINING.COM (2021). Nickel: the mined commodity most exposed to biodiversity risks — report (7 October 2021). Retrieved from: <https://www.mining.com/nickel-the-mined-commodity-most-exposed-to-biodiversity-risks-report/>

<sup>27</sup> A circular economy is an economic system designed with the intention that maximum use is extracted from resources and minimum waste is generated for disposal. A circular economy is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible.

<sup>28</sup> Bleicher, A. & Pehlken, A. (2020). The Material Basis of Energy Transitions. Retrieved from: <https://www.sciencedirect.com/book/9780128195345/the-material-basis-of-energy-transitions>

<sup>29</sup> Australian Trade and Investment Commission (2023). Circular economy. Retrieved from: <https://www.globalaustralia.gov.au/industries/net-zero/circular-economy>

<sup>30</sup> Febelauto (2023) Key figures. Retrieved from: <https://www.febelauto.be/jaarverslag2022/kerncijfers-afgedankte-voertuigen.html>

When it comes to batteries specifically, potentially 95 per cent of battery components can be recovered for alternative use, or may even be turned into new batteries<sup>31</sup>. The European Union (EU) has recently introduced a new law to ensure that batteries are collected, reused, and recycled. The new regulations will ensure that, in the future, batteries have a lower carbon footprint, use minimal harmful substances, need less raw materials from non-EU countries, and are collected, reused and recycled to a high degree<sup>32</sup>. While EV battery recycling is not yet commonplace in Australia, the importance of a pro-recycling policy has been recognised in the WA Government's *Future Battery Industry Strategy*<sup>33</sup> as well as in the Australian Government's *National Electric Vehicle Strategy*<sup>34</sup>.

Product stewardship schemes support the environmentally sound management of products and materials over their life - they can help hold manufacturers accountable for the materials they use, and ensure there are re-use and re-cycling opportunities available<sup>35</sup>. It was pleasing to see the Australian Government commit funding towards developing Australia's first collective vehicle stewardship scheme and investigation of the automotive supply chain<sup>36</sup> and experience from this should inform the extent to which participation from manufacturers or original equipment manufacturers needs to be mandatory. **Greater action is needed in Australia to better address end-of-life and battery waste across all vehicle types.**

### The impact on fuel excise

Along with other sources of revenue from motorists, in 2022-23, the Australian Government collected an estimated \$18.71 billion in petrol and diesel excise<sup>37</sup> alone. Fuel excise (particularly on diesel) makes up the largest share of motorist taxation raised by the Australian Government. While fuel excise in terms of total revenue is expected to continue increasing in the near term, with the introduction of hybrid and electric vehicles, as well as ongoing vehicle efficiencies, we need a plan for ensuring a sustainable revenue stream to support our transport system into the future.

Reforming transport pricing will be a complex policy and political issue and in October 2023, the High Court of Australia ruled to overturn Victoria's low emissions vehicles road user charge, citing that the power to introduce such an excise was limited to the Australian Government. This will likely have impacts on existing and planned state and territory fees and charges and put further pressure on the Australian Government to urgently develop a nationally consistent framework.

To respond to issues associated with the decarbonisation of the transport system and the need for a fair, effective and sustainable funding model, **it is essential that the Australian Government develops and consults on a new road user charging model encompassing all vehicles and considering the holistic impacts (e.g. social, economic and environmental) of road use, to replace the array of existing fees and charges used to generate revenue.** Outside of broader tax reform, RAC does not support the introduction of a new and additional tax targeting EV users in WA; the preferred approach is to incentivise uptake, particularly in the early stages while fleet penetration remains low.

### Other key considerations

Even if all vehicles in our fleet were EVs today, private car use would still be a source of emissions as complete decarbonisation of the energy grid remains years away. In addition, beyond greenhouse gases (e.g. carbon dioxide), EVs still contribute other pollutants, such as particulate matter (e.g. PM<sub>2.5</sub> and

<sup>31</sup> Commonwealth Scientific and Industrial Research Organisation (2023). Lithium-ion battery recycling. Retrieved from: <https://www.csiro.au/en/research/technology-space/energy/energy-in-the-circular-economy/battery-recycling>

<sup>32</sup> European Commission (2023). Circular economy: new law on more sustainable, circular and safe batteries enters into force. Retrieved from: [https://environment.ec.europa.eu/news/new-law-more-sustainable-circular-and-safe-batteries-enters-force-2023-08-17\\_en](https://environment.ec.europa.eu/news/new-law-more-sustainable-circular-and-safe-batteries-enters-force-2023-08-17_en)

<sup>33</sup> Department of Jobs, Tourism, Science and Innovation (2020). Western Australia's Future Battery Industry Strategy. Retrieved from: <https://www.wa.gov.au/system/files/2020-10/Future-Battery-Industry-Strategy-Western-Australia-January-2019.pdf>

<sup>34</sup> Department of Climate Change, Energy, the Environment and Water (2023). National Electric Vehicle Strategy. Retrieved from: <https://www.dccceew.gov.au/sites/default/files/documents/national-electric-vehicle-strategy.pdf>

<sup>35</sup> Department of Climate Change, Energy the Environment and Water (2021). Product stewardship in Australia. Retrieved from: <https://www.dccceew.gov.au/environment/protection/waste/product-stewardship>

<sup>36</sup> Department of Climate Change, Energy, the Environment and Water (2023). National Product Stewardship Investment Fund. Retrieved from: <https://www.dccceew.gov.au/environment/protection/waste/product-stewardship/national-product-stewardship-investment-fund>

<sup>37</sup> Commonwealth of Australia (2023), 'Budget Paper No. 1: Budget Strategy and Outlook'. Retrieved from: <https://budget.gov.au/content/bp1/index.htm>

PM<sub>10</sub>)<sup>38</sup>, which arises from wear and tear on brakes and wheels. While it is important to increase the uptake of EVs, Australia's transport system must shift from being car and fossil fuel dependent to one that prioritises active and public transport. **The Australian and WA Governments need to lead the way by investing more in initiatives that reduce our reliance on private vehicles and increase active and public transport use.**

### Conclusion

There is a need for urgent action and strong leadership to drive larger-scale change and ensure Australians can continue to enjoy our beautiful environment and breathe cleaner, healthier air.

We trust RAC's submission, which is based on enabling a smooth and sustainable transition to EVs, is useful in preparing for the progression away from fossil fuel powered vehicles towards a transport system which reduces the negative impact of vehicles on our health and the environment. In support of our submission please refer to our [Federal Budget submission](#), [Public Policy](#) and RAC's previous submissions and publications at <https://rac.com.au/about-rac/advocating-change/reports>.

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<sup>38</sup> Timmers, V. & Achten, P (2016). Non-exhaust PM emissions from electric vehicles. Atmospheric Environment. Retrieved from: <https://www.sciencedirect.com/science/article/abs/pii/S135223101630187X>