



Submission to the Climate Change Authority's Consultation Paper: 'Updating the Authority's Previous Advice on Meeting the Paris Agreement'

22 August 2019

The Electric Vehicle Council (EVC) is the national body representing the electric vehicle industry in Australia. We represent members involved in providing, powering, and supporting electric vehicles, and strive to accelerate the electrification of road transport for a more sustainable and prosperous Australia. We welcome the opportunity to make this submission in response to the Climate Change Authority's consultation paper.

In 2017, Australia's transport sector was the second largest source of carbon emissions, contributing 18% with cars accounting for around half of that.<sup>1</sup> The Department of the Environment and Energy identified transport abatement opportunities as some of the most cost-effective ways to reduce emissions by 2030.<sup>2</sup> In order for Australia to meet its Paris commitments, electric vehicle (EV) uptake must be increased. EVs reduce driving emissions, lifecycle emissions, and the developing vehicle to grid technology will provide further opportunities to lower emissions in the electricity sector. The Department of the Environment and Energy estimates that, at the current rate of electrification, road transport emissions will increase by around 10% between now and 2030.<sup>3</sup> Stronger policy action to encourage the uptake of EVs in Australia is needed.

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<sup>1</sup> Climate Council (2018) *Australia's Rising Greenhouse Gas Emissions*.

<sup>2</sup> Department of the Environment and Energy (2018) *Australia's emissions projections*.

<sup>3</sup> Department of the Environment and Energy (2018) *Australia's emissions projections*.

## How electric vehicles reduce greenhouse gas emissions

### 1) Driving emissions

Electric vehicles can drive while producing zero carbon emissions, zero nitrous oxides, and – compared to fossil fuel vehicles – half the volume of VOCs, which are known to act as greenhouse gases.

A report by PWC found that if Australia’s EV uptake were bolstered by strong policy, cumulative CO<sub>2</sub>e emissions would be reduced by 18Mt by 2030.<sup>4</sup> That would be equivalent to taking 8 million petrol vehicles off the road. Over the 2020-2030 period, this would contribute 24% of the Government’s 76 MtCO<sub>2</sub>e reduction target.

In fact, the reductions might be even higher. First, that estimate only considered passenger vehicles and did not account for the massive carbon abatement that would also result from heavier vehicles being electrified. Second, the report relied on current estimates of the electricity grid’s transition to renewables through to 2030. However, it is likely that EVs would be charged using renewable energy at a higher rate than the average grid mix. This is because there is a strong anecdotal connection between EV owners and renewable energy users and because many public chargers installed in Australia – such as those along Queensland’s Electric Super Highway and in Mirvac shopping centres – already use 100% renewable energy.

In any case, as renewable energy continues to take hold, the advantages of EVs will multiply. A US report from the Union of Concerned Scientists found that, in a grid composed of 80% renewable electricity, an EV will emit 84% fewer driving emissions compared to an equivalent fossil fuel vehicle.<sup>5</sup>

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<sup>4</sup> PWC (2018) *Recharging the Economy: Economic impacts of accelerating EV uptake in Australia*.

<sup>5</sup> Union of Concerned Scientists (2015) *Cleaner Cars from Cradle to Grave*.

Even when EVs are powered by our current energy mix, they still produce significantly less carbon per kilometre in every state except Victoria where electricity emissions are marginally higher.<sup>6</sup> That is expected to change as the Victorian Renewable Energy Target is met.

The way Australians use vehicles is also changing and provides an opportunity to harness the benefits of EVs. Shared mobility services – taxis, ride-hailing, and car-sharing – are set to take up a larger share of kilometres as their popularity continues to grow. Car sharing revenue in Australia is expected to grow 26.2% per year over the next five years.<sup>7</sup> Transitioning this vehicle segment to electric is particularly important for carbon abatement since these vehicles travel further than passenger vehicles used for other purposes. EVs are already economically attractive for shared mobility services due to their low running costs.<sup>8</sup> As such, incentives that tilt the scales even slightly in the favour of EVs will be enough to cause a noticeable increase in uptake and decrease in emissions.

## 2) Lifecycle emissions

During EV manufacturing, the majority of energy is used in the creation of the battery. On average, EVs require more energy during production than fossil fuel vehicles. However, excess emissions are offset within 6 to 16 months of driving according to a US study.<sup>9</sup> Further, as EV manufacturing increasingly uses more renewable energy, the additional energy required during production will no longer produce greenhouse emissions, widening the existing gap between EVs and fossil fuel vehicles. When manufacturing is done with 80% renewable energy, EVs can be manufactured for 25% less emissions than comparable fossil fuel vehicles.<sup>10</sup>

Even in places with carbon-intensive grids, carmakers – aware of their significant power requirements – are already manufacturing using their own renewable energy.

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<sup>6</sup> Electric Vehicle Council (2018) *State of Electric Vehicles in Australia 2018*.

<sup>7</sup> IBIS World (2019) *Car Sharing Providers – Australia Market Research Report*.

<sup>8</sup> BNEF (2019) *Electric Vehicle Outlook 2019*.

<sup>9</sup> Union of Concerned Scientists (2015) *Cleaner Cars from Cradle to Grave*.

<sup>10</sup> Union of Concerned Scientists (2015) *Cleaner Cars from Cradle to Grave*.

This is the case for Tesla's Gigafactory which will be 100% powered by solar by the end of the year.

Finally, EV batteries reach their end-of-vehicle-life at between 70-80% battery capacity<sup>11</sup> but can continue to be used for energy storage or less demanding applications<sup>12</sup>, reducing the need for further battery manufacturing and the resultant emissions. Indeed, car manufacturers have an incentive for battery reuse as it can create additional financial returns. By 2025, it is expected that around three-quarters of used EV batteries will be reused before they are recycled.<sup>13</sup>

### 3) The recharging economy

EVs may also be a valuable mechanism to reduce emissions through the developing vehicle to grid technology. Australia has increasing solar generation, creating a significant 'duck curve' where demand drops in the middle of the day when solar output is high.

EVs can act as household batteries and provide power when rapid peaks occur, reducing the need for sudden dispatch of more power, often from fossil fuel sources. This, in effect, helps to smooth the 'duck curve', improving efficiency and reducing emissions. Once the peak is over, EVs can be recharged as normal.

Where EVs are charged using solar – either from household rooftops or from public chargers – they can further reduce household emissions by providing a source of stored clean energy overnight. Given typical daily household usage is around 10 to 40kWh and the smallest EV available in Australia has a battery capacity of 28kWh, one EV could store enough clean energy to significantly reduce household emissions.

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<sup>11</sup> Podias et al (2018) *Sustainability Assessment of Second Use Applications of Automotive Batteries: Ageing of Li-Ion Battery Cells in Automotive and Grid-Scale Applications.*

<sup>12</sup> Jiao and Evans (2018) *Business Models for Repurposing a Second-Life for Retired Electric Vehicle Batteries.*

<sup>13</sup> Australian Financial Review (2018) *What happens to used electric-car batteries? You may be surprised.*

These opportunities are even greater for fleets; utilising bidirectional charging of fleet vehicles would provide greater opportunities for the grid while also transforming the economics of fleets – from a commercial cost centre to a revenue generator. Pilot vehicle to grid schemes are underway across the world.

## **Falling prices of EVs**

As the global EV market matures and technology improves, EV prices are steadily declining. This is primarily driven by falling battery prices which have decreased by an average of 20% per year for the last 8 years.<sup>14</sup> That trend will continue with prices predicted to fall from US\$176/kWh today to \$87/kWh in 2025 and \$62/kWh in 2030.<sup>15</sup> BNEF estimates price parity between EVs and internal combustion vehicles by the mid-2020s. A report by Deloitte similarly estimated price parity would be reached by 2024.<sup>16</sup> A 2019 Australian Department of Infrastructure report suggested that EV prices would drop rapidly after 2023 as battery manufacturing matures and battery ‘megafactories’ come online.<sup>17</sup> The Department of Infrastructure report also confirmed that EVs are already cheaper in terms of total cost of ownership.

## **Global and Australian Market Update**

### Actual sales

Around the world, the EV industry is booming. In 2015, cumulative EV sales reached one million vehicles. In December last year, EV sales reached five million vehicles, with one million of those added in only six months. Overall, EV sales in 2018 grew by 64% from 2017.<sup>18</sup>

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<sup>14</sup> BNEF (2019) *Electric Vehicle Outlook 2019*.

<sup>15</sup> BNEF (2019) *Electric Vehicle Outlook 2019*.

<sup>16</sup> Deloitte (2019) *Battery Electric Vehicles: New markets. New entrants. New challenges*.

<sup>17</sup> BITRE (2019) *Electric Vehicle Uptake: Modelling a Global Phenomenon*.

<sup>18</sup> Electric Vehicle Council (2019) *State of Electric Vehicles in Australia 2019*.

EV sales now account for 5% of new car sales in China, 7% in California, and 50% in Norway.<sup>19</sup> This overseas success has been driven by forward-thinking government policy that is helping to kickstart this revolutionary industry.

In Australia, however, a lack of EV policy leadership has meant that our nation is lagging behind. Australians purchased only 2,216 EVs in 2018, a slight drop of 3% from the 2,284 models sold in the previous year.<sup>20</sup> The first half of 2019 has seen much stronger sales (1,277) compared to the same period last year (670) but EVs still only account for around 0.2% of new car sales. This is well behind the global average of 1.5%.<sup>21</sup>

### Forecast sales

With falling costs and growing awareness of the environmental and social benefits of EVs, sales are predicted to rise steadily across the globe. Bloomberg predicts that 20% of vehicle sales will be electric by 2028<sup>22</sup> while BHP estimates EVs will comprise at least 7% of the world's fleet in 2035.<sup>23</sup> Indeed, many countries such as China, the United Kingdom, and France, have set dates from which sales of fossil fuel vehicles will be banned.

A lack of policy direction in Australia, however, means that uptake will be much slower without national EV policies in place. A recent report by the Australian Department of Infrastructure analysed 22 countries and found that Australia will reach 2% EV sales in 2021, ahead of only India.<sup>24</sup> Energeia predicts EV sales in Australia will reach 10% in 2028 and 50% in 2036.<sup>25</sup>

### **The role of EV policy**

The lack of national EV policies has created market uncertainty which precludes automakers from bringing more and cheaper EVs to Australian shores, preventing many consumers from taking part in this technological shift. This means that

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<sup>19</sup> Electric Vehicle Council (2019) *Cleaner and Safer Roads for NSW*.

<sup>20</sup> Electric Vehicle Council (2019) *State of Electric Vehicles in Australia 2019*.

<sup>21</sup> EV Volumes (2019) *Global EV Sales for 2018*.

<sup>22</sup> BNEF (2019) *Electric Vehicle Outlook 2019*.

<sup>23</sup> BHP (2019) *The Electrification of Transport*.

<sup>24</sup> BITRE (2019) *Electric Vehicle Uptake: Modelling a Global Phenomenon*.

<sup>25</sup> ARENA (2018) *Australian Electric Vehicle Market Study*.

Australia is missing out on the substantial benefits that EVs offer, particularly in regard to carbon abatement. That jeopardises Australia’s ability to meet its commitments under the 2015 Paris Agreement.

Successful EV markets overseas all initially suffered from the same ‘barstool’ problem that currently faces Australia. The market requires sufficient charging infrastructure, model availability, and consumer demand. If any of those three legs are missing, the other two also fall over. Foreign governments have shown that strong policy action is able to get over this initial problem and jumpstart nations’ EV markets. Those overseas markets are now rapidly taking off and providing all the societal and environmental benefits that come with EVs.

Market	Major EV Policies	EV new car sales market share
California <sup>26</sup>	<ul style="list-style-type: none"> <li>• USD\$2,500 rebate for BEVs in addition to federal tax credits of between \$2,500 to \$7,500.</li> <li>• Funding and tax credits for commercial customers and residents who install charging stations.</li> </ul>	7
China <sup>27</sup>	<ul style="list-style-type: none"> <li>• Exemption from purchases taxes.</li> <li>• A subsidy program that peaked in 2016 with a value of nearly \$9,000 USD. Local governments in Beijing and Shenzhen additionally offer subsidies around half of those offered by the central government.</li> <li>• Compulsory targets for vehicle manufacturers to produce a minimum number of EVs or face fines or be required to purchase credits from other businesses.</li> <li>• Requirement that central government and some cities and public organisations have EVs as 50% of their fleet.</li> <li>• Funding for local governments to build charging stations.</li> </ul>	5
Norway <sup>28</sup>	<ul style="list-style-type: none"> <li>• A wide range of policies that made total cost of ownership less expensive for BEVs than comparative fossil fuel vehicles.</li> </ul>	50

<sup>26</sup> Environmental and Energy Study Institute (2018) *Comparing U.S. and Chinese Electric Vehicle Policies*.

<sup>27</sup> Environmental and Energy Study Institute (2018) *Comparing U.S. and Chinese Electric Vehicle Policies*.

<sup>28</sup> Norwegian Electric Vehicle Association (2019) *Norwegian EV Policy*.

	<p>These included savings on purchase/import taxes, road taxes, carbon taxes, company car taxes, road tolls, and free parking and bus lane access.</p> <ul style="list-style-type: none"> <li>• Many of these policies are now being wound back as the EV market has become well-established.</li> </ul>	
United Kingdom <sup>29</sup>	<ul style="list-style-type: none"> <li>• £1.5 billion in grants for plug-in vehicles and schemes to support charging infrastructure.</li> <li>• Grants for electric cars up to £3,500 and for electric taxis up to £7,500 as well as for other vehicle types.</li> <li>• £500 for EV owners to install home chargers.</li> <li>• 50% of new cars must be ultra-low emission by 2030.</li> </ul>	2.6

## Policy recommendations

In order to harness the potential of EVs for Australia’s carbon abatement goals, the EVC recommends policies be implemented in four areas.

### 1) Implementation of strong CO<sub>2</sub> emission standards

The introduction of light vehicle CO<sub>2</sub> emissions standards in line with European standards would directly reduce emissions and encourage carmakers to bring a wider variety of EVs to Australia. Currently, 80% of the light vehicle market has CO<sub>2</sub> standards while Australia does not.<sup>30</sup> This means Australia is a dumping ground for inefficient vehicles that cannot be sold elsewhere. According to the Department of Industry, Australian cars emit 27% more carbon than their equivalent UK counterparts.<sup>31</sup> A clear policy commitment would also provide a signal to manufacturers that the government was serious about addressing emissions from passenger transport. This in turn would allow carmakers to bring lower priced EVs to Australia, increasing sales and reducing carbon emissions.

### 2) Policies to directly reduce EV costs and improve model availability

#### *Fringe benefit tax reduction*

<sup>29</sup> House of Commons (2019) *Electric vehicles and infrastructure*.

<sup>30</sup> Australian Financial Review (2019) *Fuel efficiency standards better than a Trump deal*.

<sup>31</sup> Department of Industry (2019) *Improving the efficiency of new light vehicles*.



An EV exemption or reduction in the fringe benefit tax applied to EVs would provide an incentive for companies with fleets and employees in those companies to own an EV. This is critical since fleets make up 52% of the annual new car sales.<sup>32</sup> Such policy would also have flow-on effects for the second-hand market, increasing availability and lowering prices. Based on current EV costs a 100% reduction on FBT would bring EVs close to price parity with fossil fuel vehicles for fleet purchases, rapidly accelerating initial uptake. Such a scheme could then be phased out by 2025 by which time EVs are expected to have reached price parity with fossil fuel counterparts.

#### *Government fleet policy*

A government EV fleet target would use government purchasing power to increase manufacturer confidence and improve model availability. Government fleet policy could also include the development of a bulk procurement process that could allow for a more cost-effective approach at multiple levels of government and for Australian businesses.

### 3) Policies to improve charging convenience

Australia needs a clear and coordinated plan for electrifying its roads. Range anxiety is one of the leading impediments to EV uptake and highly visible and well-placed public chargers will go a long way to alleviating this fear. Several states, councils, and private businesses are doing admirable work on this front but more is needed to ensure Australia does not remain an EV laggard. Federal funding could be used to fill gaps in the network – such as in rural areas – and to offer financial incentives for home and commercial chargers.

#### *Example: Workplace Charging Challenge*

The US Department of Energy manages the Workplace Charging Challenge, which provides technical advice and assistance to partner organisations installing charging infrastructure for employee use. There are now 757 Workplace Charging Challenge partners, and employees at these organisations are 6 times more likely to drive an electric vehicle than the general population.

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<sup>32</sup> Australian Financial Review (2018) *Car fleets are big business in Australia*.

#### 4) Policies to increase consumer knowledge and awareness

Consumer surveys have shown a strong correlation between knowledge of EVs and willingness to purchase.<sup>33</sup> Providing consumers and businesses with clear information about the benefits of EVs is a cheap and effective way to increase uptake and reduce emissions. This can be both in the form of an online resource as well as through public demonstrations of the technology.

##### *Example: Go Ultra Low*

The UK Government has worked with industry to launch the “Go Ultra Low” website. Consumers can fill out an online form to find out which electric vehicle is right for them.

##### *Example: NZ Electric Vehicle Community Outreach Program*

The NZ Government is supporting a series of events and promotional activities to provide ‘see, ride and drive’ experiences.

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<sup>33</sup> Electric Vehicle Council (2019) *State of Electric Vehicles in Australia 2019*.