



Submission to the Senate Committee on Electric Vehicles

August 2018

Tesla is grateful for the opportunity to contribute to the Senate Select Committee on Electric Vehicles, and encouraged that Senate is considering the benefits and opportunities that electric vehicles afford Australia.

Australia has more to gain than most countries from a rapid transition to sustainable transport.

Firstly, electric vehicles save lives. Their inherent safety advantages mean lower risk of injury and death in accidents. And by reducing particulates and noxious emissions, they create cleaner air for all Australians, who are currently exposed to levels of dangerous Sulphur in fuels fifteen times higher than is accepted in Europe or Japan¹.

Australia's dependence on foreign oil from the Middle East and Asia is growing rapidly. Retired Air Vice-Marshal John Blackburn AO has warned that Australia is on track to be 100% reliant on imported petroleum by 2030. By contrast, strong electric vehicle uptake would create billions of dollars of GDP and over 13,000 jobs², while improving Australia's security, energy independence, and balance of trade.

Committee members will also be aware that Australia is blessed with enviable reserves of Lithium, Nickel and Graphite, and that these sectors anticipate significant growth as electric vehicle production increases.

Most importantly, Australia is one of the nations most severely affected by climate change now and in the future. To keep climate change below two degrees of warming, and to meet Australia's commitments under the Paris Agreement, it is crucial to rapidly decarbonise transport, by transitioning to electric vehicles and renewable energy. That's why solar panels and battery storage are core to Tesla's business in addition to electric vehicles.

Despite the opportunities afforded by electric vehicles, Bloomberg New Energy Finance (BNEF) notes that Australia is currently seven years behind global pace on electric vehicle adoption.³

Australians have a strong appetite for electric vehicles. Thousands of Australians already enjoy owning a Tesla, and thousands more have placed deposits for Tesla's Model 3 sedan. A recent survey by the Royal Automobile Club of Victoria (RACV) found that 50% of Australians will consider an electric vehicle for their next purchase;⁴ the question is whether they will have sufficient opportunity to do so. Governments have an important role in answering that question

¹ Hart Energy, *International Fuel Quality Standards and Their Implications for Australian Standards*, 2014.

² A PricewaterhouseCoopers report for the Electric Vehicle Council and St Baker Energy Innovation Fund, *Recharging the economy: The economic impact of accelerating electric vehicle adoption*, found that a "50% by 2030" scenario increased real GDP by \$2.9 billion, increased net employment by 13,400, and reduced 18Mt of CO2.

³ Peter Hannam, *Australia 'seven years' behind other nations as electric car sales leap*, Sydney Morning Herald, 22 May 2018

⁴ ClimateWorks Australia, *The state of electric vehicles in Australia*, 2017.



by helping ensure Australians have access to charging infrastructure, model availability, and clear information – and by reducing financial and logistical barriers to electric vehicle uptake.

The main barrier to increasing electric vehicle uptake in Australia is not consumer appetite; rather, it is clear government leadership.

The Federal Parliament has an opportunity to send a clear message to manufacturers and consumers alike that Australia is ready for electric vehicles. That's why Tesla's primary recommendation is that the federal government set a clear and ambitious target for electric vehicle uptake.

We need only look to New Zealand and the United Kingdom for examples.

New Zealand currently has more electric vehicles on the road than Australia⁵. In May 2016 the New Zealand government announced a target to double the number of electric vehicles on the road every year to 2021. This policy is proudly supported across the political spectrum, and has been continued and expanded upon by successive administrations. It includes:

- Public education campaigns;
- Government fleet purchases;
- Temporary exemptions from road usage charges;
- Leadership and coordination on charging infrastructure;
- Support for electric mobility businesses; and
- Efforts to tackle barriers such as outdated depreciation rates and fringe benefit tax treatment of electric vehicles.

As a result, electric vehicle uptake in New Zealand has exceeded these targets each year.

The United Kingdom recently set a target of 50-70% electric vehicle sales by 2030 and 100% by 2040. Those targets are supported by a suite of measures including government fleet targets, and financial incentives of up to AUD\$14,000.

Here in Australia, the Australian Capital Territory Government this year released a strong and comprehensive plan that can serve as a blueprint for other governments.

Tesla notes the detailed recommendations put to this Committee by the Electric Vehicle Council, of which Tesla is a member. Rather than repeat those recommendations here, this submission aims to share with the Committee additional information including current barriers to electric vehicle uptake that Tesla observes in Australia.

Tesla looks forward to discussions with the Committee and would be pleased to answer any relevant questions.

⁵ There are over 9,241 EVs on the road in New Zealand as of July 2018.
<https://www.transport.govt.nz/resources/vehicle-fleet-statistics/monthly-electric-and-hybrid-light-vehicle-registrations/>.
The 2018 *State of Electric Vehicles in Australia* report by ClimateWorks and the Electric Vehicle Council estimate ~7,351 EVs on the road in Australia



1 - About Tesla

Tesla's mission is to accelerate the transition to sustainable energy.

Strategy.

To achieve this mission, Tesla has pursued a two-stage strategy. Stage one, outlined in 2006⁶ can be summarised as:

1. Create a low volume car, which would necessarily be expensive (Tesla Roadster);
2. Use that money to develop a medium volume car at a lower price (Models S and X);
3. Use that money to create an affordable, high volume car (Model 3, which is due for release in Australia mid next year); and
4. Provide solar power so that drivers can be energy positive.

Part two of Tesla's strategy, outlined in 2016⁷, is to:

1. Create stunning solar roofs with seamlessly integrated battery storage;
2. Expand the electric vehicle product line to address all major segments;
3. Develop a self-driving capability that is 10x safer than manual driving, via massive fleet learning; and
4. Enable your car to make money for you when you aren't using it.

In addition to consumer vehicles, Tesla are working on heavy-duty trucks and high passenger-density urban transport. The Tesla Semi is already demonstrating substantial reductions in the cost of cargo transport while increasing safety.

Carbon savings.

So far, Tesla drivers have reduced total CO2 tailpipe emissions by 3,276,946 tonnes. Here in Australia, Tesla drivers in Brisbane have reduced 474,187 kg of CO2, and in Adelaide 234,099 kg, for example.⁸

Electric transport is necessary to limit climate change, but it is not sufficient. We must also power transport (and everything else) with renewable energy that is affordable and dispatchable. That's why solar panels and stationary batteries are core parts of Tesla's business.

Tesla solar panels have generated more energy than all Tesla vehicles have used, making Tesla energy positive in net terms.

⁶https://www.tesla.com/en_AU/blog/secret-tesla-motors-master-plan-just-between-you-and-me

⁷https://www.tesla.com/en_AU/blog/master-plan-part-deuxhttps://www.tesla.com/en_AU/blog/master-plan-part-deux

⁸Tailpipe emissions reductions from historical cumulative kilometers driven by the global Tesla vehicle fleet. Counted live at: https://www.tesla.com/en_AU/carbonimpact



Self-driving and vehicle-sharing.

Tesla believes that self-driving technology can deliver incredible improvements in safety and price for consumers. All Tesla vehicles currently produced have the hardware needed for full self-driving capability at a safety level substantially greater than that of a human driver.

As regulatory approvals allow full self-driving features to be rolled out, vehicle owners will be able to add their car to a Tesla shared fleet at the tap of a button, significantly offsetting and at times potentially exceeding monthly loan or lease costs. This dramatically lowers the true cost of ownership of vehicles. Since most cars are only in use by their owner for 5% to 10% of the day, the fundamental economic utility of a true self-driving car is likely to be several times that of a car which is not.



2 - Tesla in Australia.

Tesla is proud to employ over 300 staff in Australia directly, and also to have hundreds of talented Australians in its ranks working on design, engineering, and manufacturing overseas.

Australia is a supplier both of manufactured components and battery minerals to Tesla products. A significant portion of Tesla's Nickel and Lithium purchases have feedstock originating in Australia.

Charging network.

Tesla operates the largest electric vehicle charging network in Australia, consisting of 118 high-voltage Supercharger posts and over 500 convenient destination chargers.

Superchargers deliver energy rapidly, at up to 120 kw (~300km of range per hour) and gradually slow down as the battery fills. It takes approximately 20 minutes to charge to 50%, 40 minutes to charge to 80%, and 75 minutes to charge to 100%. All superchargers in Australia are carbon offset. Tesla drivers may also use adaptors to charge from other public chargers.

Tesla Destination Chargers are installed in cooperation with local businesses throughout the country, and charge at a rate that adds 16-42km/hr of range, depending on power supply.

Most Tesla owners do the vast majority of their charging (over 90%) at home, where they typically install home charging units. Those who have solar power often opt to add a Tesla Powerwall battery to store their solar energy for charging.



Supercharger Network
Current: 118 posts / 21 sites
By end of 2019: 172 posts / 31 sites



3 - The potential economic, environmental and social benefits of widespread electric vehicle uptake in Australia.

Other submissions, including by the Electric Vehicle Council, have detailed the significant benefits that electric vehicles offer to the Australian economy. Those points needn't be repeated here; rather, we include below additional information where Tesla has particular insight.

1.1 Life-saving safety advantages of electric vehicles.

The Tesla Model S achieved the best safety rating of any car ever tested by the National Highway Traffic Safety Administration (NHTSA)⁹. It set a new record for the lowest likelihood of injury to occupants from front, side, rear and rollover accidents. In the same test, the Model X was rated safest SUV ever tested, and the second safest vehicle overall, second only to the Model S.

When designed from the ground up, electric vehicles (EVs) have significant safety advantages.

Larger crumple zones. Not having a large gasoline engine block allows for a much longer crumple zone to absorb a high-speed impact. This is fundamentally a force over distance problem – the longer the crumple zone, the more time there is to slow down occupants at force loads that do not cause injuries.

More stability, less rollover risk. The battery pack in Tesla vehicles is mounted below the floor pan, providing a very low centre of gravity. This ensures exceptional handling and safety advantages. For example, the Model S refused to rollover via normal methods in independent testing. The NHTSA found it significantly less likely to roll than other vehicles, with even the top vehicles tested being approximately 50 percent worse.

1.2 Reducing fatalities and illness due to noxious transport pollution.

Vehicle emissions cause 40% more deaths than the road toll in Australia, according to research by Melbourne Energy Institute (MEI).¹⁰

Committee members will be aware that Australia has dangerous levels of Sulphur in its fuels, with permissible Sulphur levels fifteen times higher than Europe and Japan.¹¹ Stricter regulation

⁹ https://www.tesla.com/en_AU/blog/tesla-model-s-achieves-best-safety-rating-any-car-ever-tested

¹⁰ Schofield, R, Walter, C., Silver, J., Brear, M., Rayner, P., and Bush, M. (2017), *Submission on the "Better fuel for cleaner air" discussion paper*. Melbourne: Clean Air and Urban Landscapes Hub/Melbourne Energy Institute



of vehicle emissions may help reduce particulates, but as the MEI have stated, “there is simply no safe level when it comes to air pollution. Our policy makers must aim for best practice, not just meeting standards – because even the smallest decrease will improve our health.”¹²

While electric vehicles don't eliminate all particulate matter, they emit no tailpipe nitrogen dioxide and considerably lower particulates overall. They therefore offer a significant opportunity to improve air quality and therefore to save lives.

1.3 Reducing pollution

Electric vehicles emit zero tailpipe emissions.

Electric vehicles can be, and often are, powered by 100% renewable energy.

It's impossible for a petrol or diesel vehicle to be zero emissions. Ensuring an electric vehicle is zero emissions is simple, and many owners do that as a matter of course.

Most electric vehicle charging is done at home, where owners often use their home solar and storage systems to charge with 100% renewable energy. Most public chargers, such as Tesla's Supercharger network, are carbon-offset or powered by accredited GreenPower.

Electric vehicles are a necessary but insufficient step in decarbonising transport. That's why Tesla also build solar panels and stationary batteries to create renewable energy and make it more dispatchable. The energy generated by Tesla's solar panels exceeds all the energy that Tesla vehicles have consumed.

Electric vehicles get cleaner as they age.

The average age of vehicles on the road in Australia is over 10 years¹³. Every electric vehicle purchased today will be even more carbon-efficient in a decade than it is today, as renewable energy targets are met, and coal generators are retired.

¹¹ International Fuel Quality Standards and Their Implications for Australian Standards FINAL REPORT | OCT. 27, 2014

¹² ¹² Schofield, R, Walter, C., Silver, J., Brear, M., Rayner, P., and Bush, M. (2017), *Submission on the "Better fuel for cleaner air" discussion paper*. Melbourne: Clean Air and Urban Landscapes Hub/Melbourne Energy Institute

¹³ <https://www.caradvice.com.au/574207/australia-average-vehicle-age-is-10-1-years/>



If governments are interested in ensuring that electric vehicle uptake delivers maximum carbon pollution reduction, options include:

- Providing federal infrastructure funding for electric vehicle charger rollout contingent upon renewable energy supply for those chargers;
- Providing purchase incentives for home and workplace charging contingent upon renewable energy supply either through purchasing Greenpower or demonstrating home solar and battery usage; and
- Working with state governments to explore time of use tariffs to incentivise charging that minimises peak demand or is concurrent with off-peak wind and solar supply.

1.4 Household savings.

Like most new technologies, electric vehicles currently have an upfront cost premium. However, as electric vehicles are produced at greater scale, this premium reduces, and electric vehicles become cheaper overall to run. Electric vehicles have significantly lower maintenance costs due to fewer moving parts in the vehicle drivetrain, and lower fuel costs due to their greater efficiency.

Over the longer term, self-driving features offer the greatest opportunity to reduce transport costs for households. Over the past 10 years, car ownership in Australia has continued to rise while car passenger kilometres per capita has fallen. This decreasing utilisation rate of cars is the greatest opportunity for household savings. The average Australian household spends 15% of their income on transport.¹⁴ Self-driving vehicles will be able to achieve exponentially higher vehicle utilisation due to pooling, providing households the opportunity to save thousands of dollars each year. The same features promise to increase transport utility, particularly for those less able to drive, such as the elderly and people with restrictive disabilities.

1.5 Fun.

Instant torque. Silence. Low centre of gravity for incredible handling. Electric vehicles are simply better to drive. It may not be as important as limiting dangerous climate change. But it's not nothing. Tesla would be more than happy to arrange test drives for committee members, and anyone else who is interested!

¹⁴Australian Automobile Association, *Transport Affordability Index*, March 2018



4. Opportunities for electric vehicle manufacturing and electric vehicle supply and value chain services in Australia, and related economic benefits.

Australia has several advantages for manufacturers of electric vehicles. It is a key supplier of minerals for batteries. If these minerals are processed to battery-grade in Australia, domestic manufacturers could realise savings on transport and tariffs. Australia also has an experienced and well-educated automotive workforce, and beneficial regional trade arrangements.

However, mass electric vehicle manufacture requires considerable scale and is only likely to be economic in countries where growing markets for electric vehicles and battery storage can satisfy a large portion of domestic production. Countries that articulate a clear and ambitious long-term vision for electric vehicles and battery storage, and that have stable policies to encourage uptake, are at a clear advantage for attracting manufacturing.



5. Measures to support the acceleration of electric vehicle uptake.

Tesla notes the comprehensive recommendations outlined by the Electric Vehicle Council. Further to those recommendations, below are some practical barriers to electric vehicle uptake that Tesla currently observes in Australia, and options for solutions that the Committee might consider.

5.1 Residential charging.

Barrier: Customers who are keen to purchase electric vehicles in Australia are often unable to do so if they live in apartments or are renting their home. Some are able to install charging quickly. However, others can be delayed because strata meetings for their building are very infrequent or have no clear process to follow for charging installations. Customers can also be faced with unreasonable demands or objections from landlords or strata committees.

Options: This barrier to uptake has been effectively managed in other jurisdictions. For example, in Spain, Portugal, and California, property laws for existing apartment buildings require EV-owners simply to notify landlords or co-owners that they are installing their own charging point. The EV-owner bears all costs for installation and operation of the charger, including insurance, and installation by a certified electrician. The property manager or strata committee may not turn down the request for an installation, but may, within one month of application, agree on modifications to the application, or within two months, propose an alternative.

Leadership by the Federal Government in coordinating state, territory, and local government to streamline and harmonise processes for charging installation would aid electric vehicle uptake.

5.2 Fast charging.

Barrier: Although most EV-owners do the majority of their charging at home, Australians want to be confident that they can access fast charging when its required near their home, or on longer journeys.

Options: Electric vehicle charging is a key piece of public infrastructure for the coming decades. Public funding for charging infrastructure helps ensure equitable access to this important infrastructure and assuages consumers' "range anxiety" about electric vehicles.



To ensure maximum utility, public chargers should:

- Be simple to activate and use;
- Have power higher than 7kW for slower urban charging (Level 2 Electric Vehicle Supply Equipment (EVSEs)) and higher than 100kW for DC Fast Chargers (DCFCs);
- Use a plug standard that is compatible with most EVs sold in Australia (IEC Type 2 for Level 2 EVSEs and IEC CCS Type 2 for DCFCs);
- Be capable of energy demand management (reducing power usage in response to signals from grid operators at times of peak demand);
- Be capable of adopting time of use tariffs to incentivise charging off-peak;
- Offset energy use with accredited Greenpower or carbon offsets; and
- Include warranty for maintenance to ensure maximum uptime.

5.3 Urban low-power charging.

Challenge: Most EV owners do the vast majority of their charging at home. However, those without access to off-street parking, or those who rent, are often unable to install home charging. As lower-priced electric vehicles become available in the Australian market, this will increasingly be a barrier to EV uptake, particularly in urban areas.

This is also a challenge for equitable access to electric vehicles. Bloomberg New Energy Finance predicts that electric vehicles will achieve price parity with internal combustion engine vehicles (ICEVs) in 2025 and become steadily cheaper.¹⁵ EVs already offer significant safety benefits, and savings in fuel and maintenance. Without access to on-street charging, these benefits will accrue more to those who own their own homes or have access to off-street parking.

Options: The City of Amsterdam provides an example of addressing this challenge through demand-based urban low power charging. Charging points are installed for on-street parking spaces within 300m of an EV-owner's residence. This approach has several advantages.

- **No parking space is lost and parking revenues are maintained.** Dedicated EV parking is created where EVs actually are. EVs pay regular parking permits.
- **Cost-effective deployment through high utilisation rate from day one.** Most chargers see 30% utilisation from day one of installation.
- **Smart charging offers further revenue opportunities.** Longer parking vs. charging time and provide an opportunity for adapting charging schedule and create flexibility for the grid.

¹⁵ Bloomberg New Energy Finance, *Electric Vehicle Outlook 2018*, <https://about.bnef.com/electric-vehicle-outlook/#toc-download>



5.4 Leasing.

Barrier: A large portion of new vehicles purchased in Australia are novated leases or business purchases. The nature of Fringe Benefits Tax (FBT) means that EVs often attract a far higher effective rate fringe benefits tax than ICEVs.

Tesla has observed that enthusiastic prospective EV customers sometimes choose nonetheless to purchase an ICEV once they are informed of this difference in tax treatment.

For ICEVs, drivers are able to claim deductions against Fringe Benefits Tax for fuel. Electricity is not currently defined as a fuel for the purposes of FBT, and nor are EV-owners able to claim equipment used to charge for their EVs, such as solar panels, home batteries, and charging equipment.

Options: As it stands, the Fringe Benefits Tax disadvantages EVs compared to ICEVs. This might be remedied by:

- Applying a lower rate of FBT for electric vehicles;
- Treating a portion of the cost of acquiring home batteries (such as Tesla Powerwalls) and home solar cells as 'car expenses' in the year the expense is incurred; or
- Allowing owners to amortise the cost of acquiring home batteries and solar cells over the term of a novated lease.

As part of its electric vehicle strategy, the New Zealand government committed to review tax depreciation rates and the method for calculating fringe benefit tax to ensure electric vehicles are not being unfairly disadvantaged compared to ICEVs.

5.5 Fleets.

Barrier: Many fleet purchasers and lease financiers make assumptions about maintenance and fuel costs based on a percentage of the purchase price of a vehicle. Because some electric vehicles currently have higher equivalent upfront costs, but significantly lower maintenance and fuel costs, these assumptions are highly disadvantageous to EVs.

Options: Tesla notes the recent commitment by the Australian Capital Territory to make 100% of new fleet vehicles electric from 2021 where a suitable electric model is available. Fleet targets of this kind are powerful ways to give manufacturers confidence about the transition to electric vehicles. Importantly, they also help drive change throughout private fleets by driving changes to pricing and procurement practices among fleet operators.



5.6 Treatment under fuel and vehicle efficiency standards.

Challenge: Fuel and vehicle efficiency standards such as those currently under consideration by the Ministerial Forum on Vehicle Emissions are important policy options. However, without appropriate compliance flexibility measures, these standards can be disadvantageous to manufacturers who exclusively sell zero emissions vehicles (ZEVs).

Consider a scheme that includes penalties for non-compliance but has no mechanisms for manufacturers to trade credits (such as under the Californian ZEV credit scheme) or to pool compliance with other manufacturers (such as under the EU scheme). In such a scheme, manufacturers that sell a range of less efficient vehicles gain the financial benefit of avoided penalties from each ZEV sale. However, manufacturers that exclusively sell ZEVs gain no benefit at all.

Options: Governments should strive to ensure fuel and vehicle standards do not disadvantage ZEV-only manufacturers. Linking Australian compliance schemes to mature international approaches operating in North America or the European Union will reduce compliance cost and complexity.

5.7 Public education.

Challenge: The majority of Tesla's work on the showroom floor is customer education. Most Australians have never driven an electric vehicle before and they have a lot of questions. Tesla is more than happy to answer them, and to give Australians the opportunity to drive an electric vehicle. However, accelerating electric vehicle uptake involves public behavioural change, and Australians deserve clear and independent information about the electric vehicle transition.

Options: The New Zealand Government has run a strong public education campaign outlining the advantages of electric vehicles, and helping consumers understand how to make the transition. They also offer comprehensive and accurate information on a dedicated government website. Consumers and manufacturers have found this to be a helpful, trusted resource for potential consumers.