



Australian Electric Vehicle Association Inc.  
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To Committee Secretary  
Department of the Senate  
PO Box 6100  
Parliament House  
Canberra ACT 2600  
[electricvehicles.sen@aph.gov.au](mailto:electricvehicles.sen@aph.gov.au)

Re: Submission to the Federal Senate inquiry into Electric Vehicles

On behalf of the Victorian Branch of the Australian Electric Vehicle Association Incorporated, please accept the following submission.

The AEVA is a not-for-profit, membership-based association dedicated to educating, advocating and promoting the use of electricity for private and public transport. Established in 1973, the AEVA has provided a forum for those interested in electric vehicle (EV) technology, and assists in the dissemination of information on the benefits of electric transport. It also supports informed policy concerning the uptake, supporting infrastructure and safety standards of EVs.

**The AEVA believes Australia should be a leader in the region in this area, and commit to a target of 100% of all new light vehicles sold in the country to be plug-in electrics, by 2025.**

We believe this is an achievable, affordable, and necessary goal.

All forms of motorised transport can benefit from electrification – it is cleaner, quieter, safer and more reliable than the internal combustion engine (ICE). Electric vehicles may be powered by electricity generated locally, meaning liquid fossil fuels need not be imported from overseas, affording significant savings for the nation.

Electric vehicles charged from the Australian grid still produce less CO<sub>2</sub>-e emissions per kilometre than petrol or diesel, despite the high proportion of coal in the mix. Even when emissions from EV manufacture are included, the EV will still emit less CO<sub>2</sub>-e over its lifetime. More significantly, electricity may be generated from renewable sources like solar, wind and hydro, effectively reducing transport emissions to zero.

Unfortunately the transition to electric propulsion in Australia is slow. The reasons for this are well known. Right now **there are very few EVs available to choose from**. This is because electric car manufacturers are reluctant to enter a small and highly competitive market like Australia without certainty around sales projections. Manufacturers also have little motivation to bring low emission vehicles to the Australian market **due to a lack of emission standards** for passenger vehicles.

### **ECONOMIC BENEFITS:**

Direct fuel cost savings of \$500M per year and \$100M in maintenance costs for every 1 million electric cars in the national fleet. A potential \$7.8 billion per year saving for 80% penetration. Up to \$15 billion per year in fuel import replacement and benefit to the balance of payments, with \$8 billion transferred to the local economy, and a subsequent improvement to fuel security against disruption. Disruption that could cost hundreds of billions of dollars to the economy. On-going health care cost reduction of up to \$90M per annum through improved air quality. Infrastructure power storage cost savings of at least \$10 billion.

### **ENVIRONMENTAL BENEFITS:**

Improvements in air quality, especially in cities. Potential to reduce 57 million tons of transport related CO<sub>2</sub> equivalent emissions substantially if combined with renewable generation. Reduction in oil demand would reduce incentive to exploit environmentally sensitive areas.

### **SOCIAL BENEFITS**

Reduced cost of transport for citizens. Reduction in traffic noise. Potential for improved road safety and reduction in driver stress. Improved health outcomes.

### **ELECTRIC VEHICLE MANUFACTURING OPTIONS**

To justify manufacturing a local market needs to exist or be created.

Australia does manufacture electric buses and trucks. In Victoria, buses by AVASS and trucks by SEA. But despite the proven cost savings and environmental benefits, they are not supported by any substantial public transport or local government electrification programs,

For manufacturing, a greenfield vehicle design from the ground up is the best option.

Other options are: CKD assembly, retro-fitting assembled vehicles, or any point in-between. There is a lack of suitable vehicles in the Australian and other markets which represents an opportunity.

With a 30% sales penetration there is potential for a \$10-20 Billion or more industry locally.

### **MEASURES TO SUPPORT ELECTRIC VEHICLE UPTAKE**

The availability of suitable affordable vehicles, public perception of utility and benefit, and concerns on re-charging are the main barriers to uptake. Vehicle emissions standards, concessions on costs and charges, public information programs and investment in charging infrastructure would address this.

Future proofing for eventual heavy goods transport infrastructure must be considered, Europe is already moving to replace heavy haulage diesel power with electric.

We will defer on suggesting measures to attract electric vehicle manufacturing and associated activities to other respondents, except to say the approach needs to be bi-partisan and long term to avoid a debacle like the current power supply situation.

### **FEDERAL, STATE AND TERRITORY GOVERNMENT SUPPORT.**

There needs to be a consistency in the actions taken to support electric vehicle uptake. To this end there needs to be a government agency tasked with vehicle electrification at the federal and state levels.

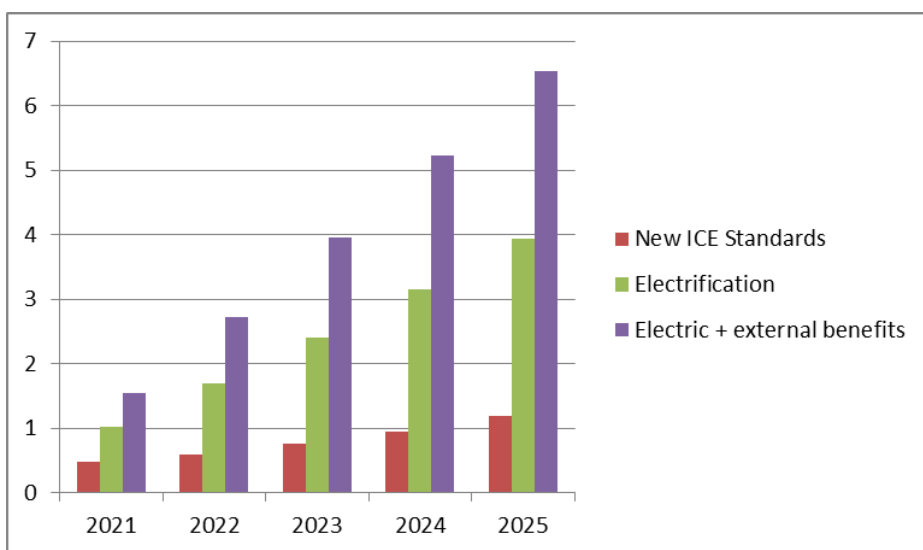
This is important for charging infrastructure, electrical standards and building regulation changes for future proofing.

There should be an aspirational target for the penetration of electric vehicles in the Australian market. Government at all levels should purchase only full electric or plug-in hybrid vehicles where these will fulfil vehicle needs. Concessions for parking, registration, other charges, road tolls and access should be given. Plus a rebate on purchase GST and duties considered. A further congestion easing and fuel saving option, is including other classes of vehicles; full electric motorcycles, 3 wheelers quadracycles, and electric bikes in the transport mix, concessions for these or new regulations, such as the american neighbourhood electric vehicle (NEV) class should be considered.

**OTHER RELATED MATTERS.**

We note that the viability of electric transport relies on the continued affordability of electric power. The benefits related to CO<sup>2</sup> emission reduction, and grid support, depend on continued de-carbonisation of the grid. According to reports the introduction of large scale renewables has reduced the wholesale cost of electricity in Australia. Any retrograde policy action in this area will reduce the benefits stated.

Below: Projected benefits in \$billions for electrification compared to proposed emissions standards.



**Body**

Transport represents a substantial portion of the Australian economy. Population growth and urban sprawl have increased the dependence of many Australians on their private car. With over 17.7 million vehicles on the road, of which 13 million are private passenger vehicles, Australia consumes about 32.4 billion litres of liquid fossil fuel a year. If 5 million of these cars were replaced by Electric Vehicles, a direct fuel cost saving to the national economy of at least \$2.5 billion annually in fuel costs could be realised. In addition to these savings, servicing and maintenance costs for electric vehicles are lower, further improving the value proposition. 5 million battery electric cars in the national fleet would lower the annual vehicle service cost by \$500 million annually.

### Security of Transport Fuel Supplies

Australia is increasingly reliant on imported oil for transport. The situation regarding oil for transport has gone from self-sufficiency at the turn of the century to an estimated 80% dependency after 2020. This reliance will expose the Australian economy to effects caused by price changes, exchange rates and global market fluctuations. Australia also holds very low fuel reserves should supply be interrupted. This poses a risk of extreme economic disruption.

The LV emission standard RIS document notes that the cost of CO<sub>2</sub> emission abatement under a fuel efficiency standard is negative; that is, it saves money. The AEVA has calculated that the greater the proportion of ultra-low and zero emission vehicles (primarily electric powered vehicles) the greater the benefits to the populous and the economy. We also note that EVs could now be a cost neutral alternative to internal combustion engines (ICE) and when externalities are considered the benefits are extended further still. **Prioritising and facilitating electric vehicle adoption should be an imperative for government.** In order to gain full understanding of these economic benefits, a holistic view of the sectors that would benefit from increased electrification, including synergies with the energy sector must be undertaken.

Zero emissions also means a multiplier effect on the health benefits of reducing noxious emissions and avoids the “diesel paradox”, where increased fuel efficiency resulted in a decrease in air quality, eliminating any benefit. The current medical consensus is; that there is no safe level for the particulate emissions created by diesel engines.

### Cost Savings

Electric vehicles are far more efficient than internal combustion engine (ICE) vehicles. Electric drive efficiency can be as high as 95% and petrol as low as 25%. Even highly efficient diesel engines achieve only 35% thermal efficiency.

Future health costs would be reduced by \$5 to 9 million per year owing to the improvement in air quality in our cities. This also provides a huge social benefit in improved quality of life.

Electricity as a fuel replaces imported petroleum, this money injected into the local economy could support 8,000 or more new jobs for every million electric cars substituted into the fleet. Moreover, second life use of batteries can considerably reduce the cost of storage for renewable generation and electricity grid support. Re-use of batteries from just 1 million cars could save up to \$5 billion in capital costs, and provide between 2,000-3,000 MW of grid support, reducing the discounted cost of household PV with storage to \$0.21 per kWh, with a breakeven cost of \$0.155 /kWh.

Battery electric cars can be demand managed to best utilise grid resources and generating capacity, therefore can absorb intermittent supply from renewables and help lower the supply cost of electricity.

### Cost Justification

Battery costs per kWh for EVs currently sit at about AUD\$300, and is forecast to approach AUD\$208 /kWh within the next two years. Tesla expect to push the price below AUD\$200 per kWh assembled.

A compact 5-seater EV has a 22 kWh battery, which represents about \$6,600 of the total purchase price at current prices. This allows for a driving range of about 120 km, sufficient for 98% of urban/suburban trips. (The average Australian vehicle travels under 40 km a day) Despite this cost, the savings on fuel and service costs in usable service comfortably cover it. After seven years, or 100,000 km, the EV would have saved over \$7400 in wholesale fuel costs. Given the notable variation in costs for unleaded fuel, the payback period is likely less. Moreover, the used battery may be sold for 20% of its starting value in an energy storage application, recovering about \$1320 to the consumer and contributing to a reduction in additional generating capacity.

Transitioning to an EV fleet to achieve zero passenger vehicle emissions compares particularly favourably against the diesel option, which has a cost of \$4200 to \$5200 for emissions reductions of a mere 28-38%.

By way of comparison, petrol options for 2020 emissions targets are \$2997;= about 25% reduction). In addition, the ABMARC report for the LV emissions RIS notes that ICE technical improvements will plateau by 2025 whereas **electric power is already the lowest fuel cost, least emissions technology**.

The latest model electric cars have battery packs between 40 kWh and 100 kWh, with most expected to be around 40 to 50 kWh. Based on \$300/kWh, these batteries represent between \$12 k and \$15 k of the total vehicle price. When the target price of \$208/kWh is achieved, this drops to an effective premium of just over \$8k making it a viable consumer and economic alternative to ICE vehicles.

### Vehicle Manufacturing

The departure of Mitsubishi, Holden, Ford and Toyota represents a challenge to the local economy but also presents an opportunity to leapfrog to the vehicle manufacturing of the twenty-first century utilising existing labour capacity and expertise. This could be via a foreign automotive co-investment or local design expertise. The issue for local manufacture is achieving the volume required for economy of scale, with at least 50,000 and preferably 200,000+ sales per annum required. Developments in low volume manufacturing could ameliorate this, but without significant local sales, only supply to niche markets is available, and these are also well served by overseas builders.

The options for local manufacturing are:

1. A complete greenfield operation, with Australian or licenced design to build cars from the ground up.
2. Building of CKD (completely knocked down) units from an overseas manufacturer with Australian content and/or modification for local use.
  - a. Any point in-between #1 and #2 utilising more overseas input and materials.
3. Provision of flyers (complete cars without drivetrains) from overseas and fitment of electric drive and battery packs and any modification locally.
4. Retro-fitting of late model second hand cars to full electric drive.

The best technical solution as demonstrated by BMW and Tesla is an electric drive specific design from the ground up. Such designs provide a base platform on which a variety of motor, battery packs and body designs can be fitted.

As inducement, the original legislative remedies for encouraging local manufacture could be re-enacted specifically for electric vehicles, such as: unique Australian design rules. Australian content regulations and high tariffs on imports (in tandem with higher tariffs on conventional cars).

This may however be un-feasible in the current economic climate.

### Recommendations for support of electric vehicle uptake

**Recommendation:** That the Federal Government introduce as soon as possible and with the earliest feasible introduction dates all the recommended changes to light vehicle emissions regulations.

**Recommendation:** That Government at all levels purchase only full electric or plug-in hybrid vehicles where these will fulfil vehicle needs. Type: according to vehicle task. These vehicles should be sold locally and replaced every 2 years in the short term. The percentage of passenger or non- tow capable vehicles that travel less than 200 km in a day should be the initial target.

**Recommendation:** That the Federal Government create a department of Vehicle Electrification with full Ministerial power to investigate, facilitate and co-ordinate initiatives in the area of vehicle electrification across all states and territories and all forms of transport, with the set goal of achieving a pre-determined percentage of migration by a specified date.

**Recommendation** That all levels of government support the roll-out of fast charging infrastructure – As the number of EVs steadily grows, so too does the need for fast charging infrastructure on our roads and highways

**Recommendation:** That the following incentives in urban areas be considered. Permit electric vehicles to access transit and taxi lanes. Reduce tolls for electric vehicles on tollways. Exempt electric vehicles from parking fees in street parking and reduced fees in parking structures.

**Recommendation:** To support local manufacture Buses in all metropolitan areas should immediately transition to all electric drive trains for new purchases, and analyse the cost benefit timeline for 100% transition.

**Recommendation:** That all building regulations be revised so that a percentage of planned parking spaces in new multi dwelling buildings must make provision for electric vehicle charging. Supply authority maximum demand, cable and other relevant requirements also need review to accommodate EV charging in new buildings.

**Recommendation:** That a study be made to determine which measures would best incentivise the supply of at work, or place of business recharging for electric vehicles. With a focus on combining this with solar PV installation.

**Recommendation:** That the government legislate specific rules for the disposal and re-cycling of modern chemistry batteries used for medium to large scale power storage, and consider in partnership with one more States to entice a suitable party or else independently establish a large scale modern battery manufacturing and re-cycling facility, as a strategic imperative.

**Recommendation:** That the Federal Government actively engage with the opposition parties to formulate a bi-partisan approach and agreement to the policy considered by this inquiry so that prospective investors can have confidence in their investment in the future of vehicle manufacturing in Australia.

**Recommendation:** That a carbon credit scheme for zero-emissions vehicles be introduced, applicable to vehicles under 3 years old and calculated according to kilometres per year travelled, paid as a credit on Registration/TAC/other charges, and therefore capped at the amount payable per year. (This recommendation is an alternative to reduced or zero registration cost and TAC premium but has a higher administrative cost)

The Victorian Branch of the AEVA thanks the Senate Committee for the opportunity to comment.

Christopher Nash  
Chairperson

Daryl Budgeon  
Secretary

Bryce Gatton  
Executive committee

Representatives from the Victorian branch committee are available to attend hearings in Melbourne.