

## **Standing Committee on Climate Change, Energy, Environment and Water**

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

#### **(Individual Submission)**

#### **Summary**

This submission is recommending a pause or slowing of a transition to electric vehicles on the basis that:

- The fire safety of EVs is still under some doubt,
  - Infrastructure needed to power and charge EVs is inadequate and inappropriate,
  - Ownership costs of EVs are understated and an unnecessary imposition on cost of living,
  - The environmental benefits of an EV transition are overstated, greater benefits being available for lowering emissions by prioritising elsewhere,
  - The EV transition has the undesirable side effect of increasing our economic dependence on the only country presently seen as any threat to National security.
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This submission comes from a retired professional having spent a working lifetime in the fossil fuel industry, for most of that time also trying to raise industry and public awareness of the existence and possible ramifications of what was then known as the “greenhouse effect” (not always appreciated by employers). This raised my own awareness of the desirability and ultimate potential of renewable alternatives, and led to the installation of 5kW of PV on the family home.

In the time I have been observing it, the debate has shifted from a scientific one to a political one and is presently morphing into an evangelical one, so it troubles me that the Terms of Reference of this enquiry seem predicated on the assumption that a transition to electric vehicles is a foregone necessity. The headlong rush into lithium battery powered EVs appears to be one of those phenomena which has in the past resulted in the dual adoption of incompatible technologies (eg NTSC/PAL, Android/OIS) or the irreversible adoption of arguably inferior technology for entirely the wrong reasons (eg VHS/Beta, Blu-Ray/HD-DVD).

Our home solar was upgraded last year to 10kW and a 15kWh battery added, with a view to achieving some independence from the grid, and providing sufficient capacity to charge an EV, which I have been interested in acquiring for a couple of years. I narrowed the choice down to a model that I test drove last October which impressed me greatly. Although tempted to buy it on the spot, I experienced an uncharacteristic attack of caution and went home to do some due diligence.

As a result of this, I now believe that the rush to get Australians into EVs is unwise, and that I am presently not interested in buying one myself, for reasons which follow. Most of these directly address the Inquiry Terms of Reference, others fall under “any other relevant matters”.

#### **1. Safety**

EVs seem to have serious safety issues with present lithium battery technology. The safety of EVs is invariably compared statistically to ICE vehicles, although the risks are different.

- (a) Lithium batteries are highly flammable and there are numerous well documented cases of them catching fire as a result of traffic accidents, contact with the ground or debris, improper charging, and even spontaneous ignition. Two car-carrying ships have so far been destroyed by suspected EV fires which could only have started spontaneously; car ferry operators are being warned to take special precautions. Battery fires are difficult to put out and emergency services are not equipped to deal with an increasing number of them.

(b) Many EVs have NMC and NCA batteries which are favoured because they have weight and performance advantages over more conventional LFP batteries. These advantages are offset by some compromise in safety due to much lower thermal runaway temperatures, especially under high charging conditions.<sup>(1)</sup>

(c) Most Australian homes have a garage under the same roof as the living quarters and in many cases directly underneath them. As there is as yet no requirement to have a smoke detector in the garage and not much prospect of pushing a smouldering EV outside, it must be assumed that EV fires at home will inevitably result in more house fires and consequent fatalities.

(d) Home battery energy storage systems are required under Australian Standards to carry warning labels like those below (on our 15kWh LFP home battery):



If these warnings are to be believed then why are EVs not sold with the same labels? If they were, no-one would consider parking an EV with a battery five times the size of this one under their house roof, let alone charging it there. Those having knowledge of these risks but who still encourage people to buy EVs may expose themselves to litigation in future years (the asbestos industry comes to mind).

## 2. Infrastructure

Present charging infrastructure is woefully inadequate. Expanding it to accommodate projected EV uptake and powering it with renewable energy represents a near impossible challenge.

(a) A typical EV charging point would take about half an hour to fully charge a small EV with a 75kWh battery. If this EV uses 15kWh per 100km it has a range of 500km. The equivalent ICE vehicle can fill its 50L tank in under three minutes; it uses 6L/100km and has a range of over 800km. Simple maths indicates that the EV will need to top up more often and take ten times as long each time; a 100% uptake of publicly charged EVs would then require around 16 charge points to replace each and every bowser in the Country, if we aren't going to queue around the block (see 2(c) below).

(b) Australians in passenger and light commercial vehicles go through around 25 billion litres of fuel per year<sup>(2)</sup>. To replace just those vehicles with EVs (using the 2.5kWh to 1L equivalence as above) would require an extra 62.5TWh of annual generation, equating to four power stations the size of Eraring<sup>(3)</sup> (which is 35 years old and slated to close in 2025 anyway), or in renewable terms about 875 square kilometres of solar farms (at 1.4ha per GWh of annual output<sup>(4)</sup>) or another 18 wind farms the size of the Nation's current largest (Macintyre Wind Farm Qld<sup>(5)</sup>).

(c) Charging at home or at work would have some mitigating effect on 2(a) above. Most workplaces and apartments won't be fitted with an adequate number of chargers, as it would be cost-prohibitive if not considered too risky. Solar charging would have some benefit under 2(b) above for owners of vehicles which aren't used extensively during the day. My provider (Western Power/Synergy) is evidently unable to answer the simplest questions in regard to EV charging at home.

(d) The requirement to charge an EV used in the course of employment is likely to have a negative effect on productivity.

### 3. Ownership costs

EV owners and prospective owners have been misled and are given little information on the actual ownership costs of these vehicles, which will only increase our cost of living.

- (a) EVs are expensive and prices have not come down, although the price of lithium has fallen 85% from its peak just a year ago and cheaper models have come on the market. Any further loss of ships may make EVs more expensive as cargo insurance costs increase. A worst case scenario would see these cargoes become uninsurable and the supply of EVs to Australia dry up.
- (b) Reasonably fast public charging seems to average about 55c/kWh<sup>(6)</sup>, which is actually more expensive than current fuel prices, given that:
  - EVs seem to need about 2.5kWh for every litre of fuel that a comparable ICE car needs to go the same distance, and
  - Fuel prices are currently distorted by a 49.6c/L excise levy<sup>(7)</sup>, which will in some way need to be applied to EVs (see 3(c) below).
- (c) Charging at home or at work might halve the cost if this is an option for the owner (ie does not live or work in a high rise, or need the car to travel long distances). Whilst considerable savings may exist for those who can charge an EV from their own rooftop solar, incentives for these installations have been substantially diminished by a punitive reduction in feedback tariffs, and the utilities' threats to turn them off altogether when they can't deal with the extra power.
- (d) Governments have not indicated how their present \$12 billion or so annual income from fuel excise will be replaced if ICE vehicles are phased out, but we can be sure that it will be replaced, and not by anything any cheaper or fairer.
- (e) Insurance costs already reflect the increased cost of EV repair or replacement, there also appears to be a probability that EVs will be more readily written off. Owners should not discount the possibility that home insurance costs will also increase (see 1(c & d) above).
- (f) There is insufficient information concerning the battery life of EVs, but there are indications that regular fast charging will shorten it.<sup>(1)</sup> It appears likely that a battery will not last beyond 10-15 years and that many EVs will be scrapped rather than having their battery replaced, thereby increasing depreciation costs.
- (g) People on a means tested pension can purchase a battery for the home without affecting their pension, as it becomes part of the home and thereby an exempt asset. If the battery happens to have wheels and a motor (desirably with bidirectional charging capability), it becomes an assessable asset, and if worth \$25k more than the ICE vehicle it replaces, may reduce their pension by up to \$75 per fortnight. This is a substantial disincentive to EV ownership for people who are likely to have the cash to buy one.

### 4. Environment

The environmental benefit and urgency of replacing our fleet of ICE vehicles with EVs seems to be considerably overstated.

- (a) The 25 billion litres of fuel referenced in 2(b) is responsible for about 60,000 tonnes of CO2 emissions annually, or less than 13% of the nation's total of 465 million tonnes<sup>(8)</sup>. Substantially greater benefit is to be had from phasing out fossil-fuelled electricity generation (33%) which in any case should be a higher priority (see 4(b) below). In passing it is noted that over 10% of emissions are attributed to fugitive emissions, which are presumably mostly natural gas. These emissions are only slightly less than those of the national car fleet, but seemingly attract little interest or concern.
- (b) It is frankly ludicrous that the Eraring Power Station is likely to be kept chugging along for years beyond its use-by date in order to meet an anticipated increase in electricity demand substantially resulting from EV uptake. In an incremental sense, these additional EVs will be arguably coal-powered, and responsible for a similar level of CO2 emissions to any ICE car (see 2(b) above). Deferring the EVs and building the proposed grid-scale battery on the Eraring site would seem to be a much better solution.

(c) Supply chain emissions involved in the manufacture of EVs and the infrastructure needed to support them are for the most part accounted for overseas, as are the 1.2 billion tonnes of CO<sub>2</sub> resulting from annual Australian exports of coal and LNG used in part to make them. Global warming sees the whole picture; we should too.

(d) The environmental (and in some cases, social) cost of mining and refining battery metals (graphite, nickel, manganese, lithium, cobalt etc), rare earths for motor magnets, and the usual aluminium, copper and steel seems to be seldom accounted for against the perceived benefits of transport electrification and decarbonising of the economy generally.

(e) A substantial industry for the recycling of EV components would have some mitigating effect on 4(c), 4(d) and possibly 3(d) above, but is yet to materialise.

My 10 year old 4 cylinder ICE car will go 100km on 6 litres of fuel; it emits about 1800kg of CO<sub>2</sub> in a full year, which has been wholly offset by my PV generation over the last 10 weeks. I suspect I would be doing the environment a favour by driving it for another 10 years in preference to buying a new EV.

## 5. Security

It is imperative that Australia reduce its economic dependence on the only country seen as any threat to security in the Western Pacific. We have all the resources needed to manufacture EVs here and could improve on the product which is currently imported. If we are determined to have EVs this might be the best way to guarantee a continued supply (see 3(a) above).

### Bottom Lines

The fact that Australia is lagging behind some other nations in EV adoption gives us opportunity to pause and question the herd mentality that appears to be driving it. That may also give the EV industry opportunity to lift their game to a new generation of EVs with less emphasis on consumer gadgetry and bling, and more emphasis on features of universal benefit:

- Standardisation of charging connectivity and infrastructure.
- Full bi-directional charging capability, providing seamless integration with home PV systems and the grid interface.
- Battery interchangeability. In an ideal World, an EV would have a standardised modular cassette battery, with the option to have a spare on charge while the car was being used.

The EV genie has, however, already escaped; management of the situation needs more focus on the transition to renewable power generation and storage, public safety and education, and the minimisation of ICE fleet emissions.

It is suggested that:

- Current incentives for EV uptake and the rollout of public charging facilities should be suspended pending a more rigorous examination of the risks and benefits of EV technology.
- Priority should be given to the replacement of fossil-fuelled generation by renewable alternatives (especially those with storage capability eg solar thermal with sodium storage) and other storage facilities. Non-lithium storage options should be considered where practical (eg pumped hydro and V<sub>2</sub>O<sub>5</sub> redox batteries).
- New EVs should carry appropriate battery warnings and the public should be more adequately informed of the ownership risks and costs.
- Importation of EVs with NMC and NCA batteries should be suspended.
- New homes and all homes with EVs should have smoke detectors in garages.
- A parallel examination should evaluate viability in the Australian context of alternative low or zero emission technologies which may not have such a huge infrastructure requirement or can share ICE infrastructure, eg ethanol or biodiesel blends, and hydrogen fuels.
- More will be accomplished in the short term by:
  1. Mandating fuel efficiency standards for all new vehicles.
  2. Providing incentives for the use of smaller fuel-efficient vehicles, along with disincentives for the private use of unnecessarily large 4WDs, utes, and SUVs which are in any case too big for our garages and car parks.

## References

Not all references are up to date, but they are the latest I could find.

1. <https://batteryuniversity.com/article/bu-205-types-of-lithium-ion>
2. <https://www.abs.gov.au/statistics/industry/tourism-and-transport/survey-motor-vehicle-use-australia/latest-release>
3. [https://en.wikipedia.org/wiki/Eraring\\_Power\\_Station](https://en.wikipedia.org/wiki/Eraring_Power_Station)
4. <https://list.solar/plants/largest-plants/australia/>
5. <https://www.acciona.com.au/macintyre/>
6. <https://www.whichcar.com.au/car-advice/how-much-does-it-cost-to-charge-an-electric-car>
7. <https://www.aaa.asn.au/fuel-excise-explained/>
8. <https://www.csiro.au/en/research/environmental-impacts/climate-change/climate-change-qa/sources-of-co2>