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To: Department of Industry, Science, Energy and Resources
Re: Future Fuels Strategy (FFS) discussion paper

To whom it concerns,

The Australian Electric Vehicle Association (AEVA) would like to thank the department for graciously extending the submission window for our organisation to contribute to this discussion paper. The (AEVA) is a not-for-profit, volunteer-run organisation dedicated to promoting electric mobility for Australia. Formed in 1973, we represent the interests of electric vehicle (EV) owners and enthusiasts as well as many from the industries which support and by extension, prosper from electrified transport.

Executive summary

The AEVA believes the Future Fuels Strategy discussion paper is a deliberately unambitious and strategically weak document. After waiting several years for a detailed EV policy framework, we are disappointed to read what amounts to a directionless list of talking points and already-underway measures. We are particularly disappointed with the focus on 'increasing consumer choices' rather than a strong commitment to eliminate transport emissions. The suggestion that hybrids represent a lower cost path to decarbonisation is based on pessimistic assumptions about vehicle lifespan, electricity prices and the emissions intensity of the Australian power.

Australia is a global pariah when it comes to greenhouse gas emissions. Transport represents one of the worst performing sectors, the bulk of which are due to internal combustion engine (ICE) passenger vehicles. This nation should be doubling down on the electrification of transport, not kicking the can down the road as the FFS document suggests we might.

The consumer choice myth

When it comes to new vehicle purchases, Australians will continue to choose to buy the vehicle which meets their needs and fits their budget. The only limitation then, is the availability of suitable options. For EVs to sell well in Australia, there needs to be a good selection of options across a range of market segments but frustratingly, the choices remain limited. Australia is a small, right-hand-drive market with no compelling national

strategy to move to EVs. Moreover, Australia actually offers tax deductibility to light trucks, vans and dual-cab utilities. For as long as we are incentivising diesel trucks, and discouraging EVs, we will continue to be overlooked by EV car makers.

Manufacturers are currently operating in a highly supply-constrained environment, so they will favour of other, more lucrative markets. The few EVs they do choose to sell here are expensive, high-margin luxury vehicles which are out of reach for most households. If Australia were to remove the luxury car tax on EVs, offer tax deductions on EVs and to improve fringe benefits tax arrangements around EVs, we would be signalling to EV manufacturers that we are a willing, receptive market. This would attract more makes and models to our shores, further improving choice and driving down prices.

Automotive manufacturers are already committing to ending the production of ICE vehicles, some as soon as 2025 and most by 2030. This means Australians will have no choice but to buy a plug-in vehicle anyway. By not offering a market signal that EVs are welcome in Australia, we will continue to be a market of last resort for EVs. This results in fewer choices for consumers, not more.

The AEVA recommends the federal government enact a suite of ambitious programs to signal to the world we are ready to embrace the future.

Eliminating transport emissions should be the main priority

Transport is responsible for 19% of all greenhouse gas emissions in Australia. Most of this is due to Australia's penchant for heavier SUVs, four-wheel-drives and dual cab utilities. As a result, the national average fuel economy is among the poorest in the world (~10 l/100 km). If the underlying goal is to reduce transport emissions, then addressing the appalling national average fuel economy must be the primary goal. Australia should set a strict vehicle emissions standard which requires all vehicles sold here to emit less than 105 g CO_2/km, which puts us on par with the European Union's Euro 6 mandate. Only when manufactures are compelled to sell low emission vehicles will our transport sector emissions fall. Right now, Australia serves as a dumping ground for inefficient, polluting vehicles which are too difficult to market in other parts of the world.

Complementing any measures to increase EV uptake should be an exchange scheme which rewards the retirement of their polluting vehicles. This will see a more rapid transition to EVs than by means of natural attrition and could be supported by the federal government through a subsidy.

Passenger vehicles aren't the only source of emissions – short haul trucking, airlines, shipping and rail freight can all be electrified, or at least rendered net-zero emissions. Rail can be electrified with overhead catenary and powered with renewable energy from the grid, while battery hybrid consists are being rolled out in the USA. Articulated electric trucks will be available for purchase in Australia as early as next year – these represent outstanding value for money given the reduced running costs. The high upfront purchase cost of these prime movers should be tempered through stamp duty relief, or even Green Loans to businesses willing to shift to zero emissions sooner. Long haul truck routes

should be replaced with better use of existing rail corridors, most of which may be electrified and powered with renewable energy.

AEVA believes it is both essential and practical to reduce Australia's transport sector emissions to zero. This must be a government priority. By encouraging the early retirement of ICE vehicles in exchange for an EV through a subsidised scheme, the transition to EVs will be further accelerated. Freight and passenger transport are also ripe for electrification and can be done with existing technology provided financial relief is made available through concessions and low interest loans.

Charging infrastructure will further accelerate EV uptake and strengthen the grid

The FFS discussion paper rightly states that deployment of fast EV chargers (50 kW or more) on our inter-city and regional highways will significantly further drive EV uptake. While certain transit corridors will lend themselves to immediate private investment owing to high traffic volumes, many regional and remote parts of Australia will be left out unless more public money is slated for DC fast chargers in these areas. Currently, state and territory governments are investing in seed networks of DC fast chargers, and even our own Association has resorted to fundraising for chargers on key regional routes. Until regional and remote Australians feel confident to travel with ease in an EV, uptake in the bush will be low. Strategic placement of DC chargers will address this immediately.

Some key charger locations are on the fringe of the electricity grid or are even completely off-grid. These sites will need a substantial on-site renewable energy generation and storage system. Several battery-buffered DC fast charger products are already on the market; these incorporate a large battery which delivers the bulk of charging power, but the battery is topped up by a low powered connection. Alternatively, the entire locality may benefit from a more comprehensive standalone power system (SPS) which provides power security and charging utility. The flow-on benefits to this approach includes lower maintenance and running costs, more reliable power supplies and substantially reduced network costs, if any are required at all. Western and Horizon Power in WA are finding these systems to be substantially more reliable than the poles and wires they replace.

AEVA strongly recommends the federal government substantially increase seed funding available for key EV charging routes including the Bruce, Eyre, Newell, New England, Pacific, Princes, Stuart and Great Northern Highways. State and federal cooperation around the deployment of fast charging infrastructure and associated standalone power systems will ensure a rapid roll-out of such equipment.

Slow EV charging (under 7 kW) at workplaces should also be encouraged. Our networks are already experiencing record low demand for power in the middle of the day due to increasing solar PV generation. The subsequent ramping to meet evening demand risks destabilising the grid. By better utilising electricity generated in the middle of the day, negating the need to charge at night, demand on the grid is smoothed. Since more than 90% of all EV charging will be done at home or at work, ideally during the day, the impact on networks would be minimal. By providing the electricity market with a dependable load during periods of high renewable energy penetration, wholesale electricity prices

will be driven down. Unlike air conditioners which are a major source of electricity demand at peak periods, EV charging may be postponed until later in the evening or even the next day. Tariff structures would further incentivise daytime and off-peak charging.

The AEVA highly recommends the federal government support initiatives which encourage workplace EV charging, along with any other incentives to encourage greater utilisation of renewable energy for EVs. EVs will not present a burden to the electricity grid; rather they are a unique opportunity to strengthen the grid and allow for higher utilisation of existing transmission and distribution infrastructure.

A grid-charged EV can still emit less CO_2 per km than a hybrid

The FFS document compares the emissions per kilometre of an EV to that of a conventional ICE hybrid. There are several issues with the comparison. The current Greenhouse Accounts Factors for 2020 determined that the National Electricity Market (NEM) emits a long-term average of 0.79 kg CO_2/kWh. Taking an average EV efficiency to be around 18 kWh/100 km from the power point, this implies the grid-charged EV emits 142 g CO_2/km. Compared to most conventional ICE hybrids which emit 105 g CO_2/km, this is certainly higher, but it must be noted the current Australian fleet average is an embarrassing 182 g CO_2/km. This comparison ignores the fact that EVs are frequently charged from home solar arrays, making their on-road emissions effectively zero. Even those without home solar may choose to charge at midday when renewable energy comprises over half of supply. This is an option that conventional hybrids and ICE vehicles simply don't have. Only EVs allow for the full decarbonisation of the transport sector.

In terms of cost-effective emissions reduction strategies, the FFS document suggests subsidising EVs would be too expensive on a dollars per ton of CO_2 mitigated. This is disingenuous – the smarter thing to do would be to clean up the electricity grid because it simply must happen anyway. Then when all transport is electrified, they are already at zero emissions. It is not the fault of the EV that Australia's grid is currently dominated by fossil-fuelled thermal generators. In fact, it's all the more ironic that the FFS report suggests grid charged EVs are dirtier than hybrids, given the federal government for the past 15 years has deliberately constrained efforts to reduce emissions across all industry sectors including the grid!

The AEVA strongly suggests that financial support for EVs would go a long way and complement the necessary efforts to increase the proportion of renewable electricity on our main grids. This represents both a cost effective and rapid path to complete decarbonisation of transport.

Fleets are great – but they still represent less than half of all sales

Federal and state government departments should continue to replace all feet vehicles with EVs wherever possible. The FFS document suggests that the financial viability of an EV fleet is poor, but it erroneously uses implausibly high electricity prices in its calculations. Not only can the electricity be sourced locally from rooftop solar for free,

but retail grid power would cost well under $0.15 / kWh for most customers, and even less if sensible tariffs are employed to encourage midday charging. Secondly, fleet purchased EVs are invariably issued at a higher specification than the lowest spec option for a petrol or diesel equivalent. Again, carmakers will always try to sell the most profitable EV option into a market as difficult as Australia unless measures are taken to encourage more options. A fairer comparison would be to compare ICE vehicles built to a higher specification, and therefore sticker price.

Still, as bulk-buyers of motor vehicles, the savings potential on sticker prices is large, in addition to the ongoing operation and maintenance savings. On-site charging infrastructure for these fleet vehicles means solar electricity powers the fleet, and as mentioned earlier, ensures minimal demand on the grid during peak periods. It also eliminates the need for fuel cards and associated accounting. Finally, government EVs may be sold into the second-hand market at the end of their term, offering more affordable EV options for Australian used car buyers. The current high purchase price of EVs, coupled with short operational terms does mean that fleet buyers won't see the operational savings EVs offer. However, we argue that the act of incentivising EV sales and the creation of demand through fleet purchases will serve to drive prices down through increased competition.

It should be pointed out though, that private vehicle sales still dominate the new car market and incentives for private buyers to embrace the EV transition should be a priority as well. Many car buyers are looking to the second-hand market for a safe, but more affordable option, but right now the demand for EVs is so high that used EVs are fetching unusually high prices. What is needed is an influx of new EVs at affordable prices.

The AEVA recommends that fleet purchases of EVs should occur at all levels of government, despite the currently high prices of these vehicles. Inducing demand for EVs at this stage will drive prices lower more broadly. The benefits of EVs will still be apparent for organisations regardless.

Electrikhana shows Australians the way forward

For the past two decades all state branches of AEVA have been hosting some form of 'Electrikhana' – a public electric car or bike try-drive expo. Our members offer up their own vehicles for the public to test drive and help them learn about EV technology. Through these low-cost, highly accessible community events we have been improving literacy around energy and transport, further arming consumers with the information they need. We hold an annual conference and EV expo which rotates around the country which sees thousands of visitors and delegates. The next one is to be held in Adelaide later this year.

Nothing has resulted in greater interest and enthusiasm for EVs than 'putting bums in seats' and letting people experience EVs firsthand. Anecdotally, we often see an influx of interest on our website enquiry lines, social media and events after Electrikhana, and dealerships often report increased sales in the following weeks.

The incredible success of these events stems from AEVA's core strength – community engagement offering friendly, unbiased advice from the people who live and breathe EVs. We host events in family-friendly places, not private facilities, to ensure we get maximum community exposure. As we represent the owners and end-users, the public are far more receptive and will help share the experience through word of mouth.

The AEVA is always keen to run as many Electrikhanas and EV Expos as possible, provided we have the resources. We encourage the government to establish more community grants which allow us to expand these events and continue to inform the public about electric mobility.

Hydrogen for passenger vehicle transport is poor use of energy and resources

Hydrogen fuel cell vehicles might work but are very poor use of resources to achieve emissions reductions. The process of generating emissions-free electricity to hydrolyse water to afford H_2 gas, compressing and transporting the gas, to finally powering a vehicle through a fuel cell is typically around 30% efficient. Compared to an EV which is closer to 85% efficient, hydrogen fuel cell vehicles represent appallingly poor use of resources. Globally, over 5 million battery EVs are on the roads, while fuel cell vehicles number in the tens of thousands. The growth in EVs has been exponential, while fuel cell vehicles have stagnated. Hydrogen refuelling infrastructure is expensive and slow to install. Unlike EVs which already have the backbone of the energy transmission network in place (the grid) and in most cases have the dispensing infrastructure in place (power outlets) hydrogen refuelling is very much embryonic.

The benefits of hydrogen fuel cell vehicles over EVs are fast becoming liabilities, especially as EV are already matching them on driving range and are roughly equivalent for recharging time. Australia should develop a clean hydrogen industry for export, refining and processing, and for large scale stationary electricity generation, or even heavy vehicles like locomotives and ships. But for passenger transport it is a dead end and would only take valuable resources away from known-viable technologies like EVs. In short, anything hydrogen can do, electricity can do better, more efficiently and cheaper.

The AEVA recommends that public money should be spent on implementing the most rapid emissions reduction technology, and that technology is EVs. Hydrogen does have a place in Australia's economy, but that place is not passenger transport.

Biofuels and synthetic fuels can be worse than doing nothing

Like most manufactured goods, synthetic hydrocarbons require large inputs of primary energy. The laws of thermodynamics dictate the uphill energy battle required to turn simple molecules like water and carbon dioxide into combustible fuels. While one could argue that so long as the energy came from zero emission sources it would be an improvement, but the resources and energy associated with generating the primary energy could have been used to power the vehicle directly. This is the biggest issue with synthetic fuels – they represent a wasteful energy pathway.

That said, efforts to chemically convert otherwise wasted resources like tyres and soft plastic into liquid fuels is worth pursuing, simply to minimise the risk of these materials winding up in the environment. But the sheer volume of liquid fossil fuels currently consumed for transport dwarfs even the most advanced industrial processes.

The same limitations present in biofuels. The quantities of petroleum products consumed by the current transport fleet exceeds biofuel production by several orders of magnitude. Biofuels will demand yet more land, water and fertiliser that could have been used for food production, and still only satisfy a sliver of the total demand for transport energy. While the agriculture sector may be able to dedicate a proportion of their crop to making fuel for the following season, it will remain a niche which will soon be overtaken by EV technology anyway.

Synthetic and biofuels may see opportunities in niche applications where high energy density and rapid refuelling is essential and unavoidable – primarily agriculture, but the collateral costs are substantial.

The AEVA recommends that public money not be allocated to technologies which are demonstrably unfit for purpose. We must decarbonise transport using the most effective means possible. Propping up unviable pursuits like synthetic and biofuels is poor use of funds, especially when large sections of industry can be electrified already.

Supporting Australian EV manufacturing capability

The FFS report reassuringly presents a case for supporting research and development for EVs and their manufacture, along with associated technologies such as charging infrastructure. Our organisation supports ongoing assistance for the sector and looks forward to seeing more players get similar levels of support for their endeavours. Additional vocational training in and around EVs and power conversion equipment will be necessary as well – TAFE colleges need additional resources to further equip young Australians with these skills for the future.

Manufacture of EVs and related parts is just the start. Australia is the world's largest exporter of lithium for battery manufacture, and a major supplier of nickel, manganese, iron, aluminium and cobalt. We have an incredible opportunity to be a global powerhouse of battery manufacturing. Sending raw resources overseas so that other nations can profit from their conversion into high value goods is lazy economics. Thousands of high paying jobs may be created through development of these manufacturing opportunities. Global demand for electricity storage for vehicles or stationary applications is soaring and will not see a levelling off for at least half a century.

In addition to making batteries, we have an obligation to manage these batteries at the end of their service life. We have the knowledge and the know-how to develop more competitive battery recycling facilities which can produce bulk quantities of battery chemical feedstocks for more cell manufacture. Companies specialising in taking EV battery packs and turning them into stationary energy storage systems will also need assistance in getting established, certified and promoted.

AEVA recommends that public money be spent on supporting advanced manufacturing of EVs and EV components through competitive grants and ongoing trade support. Resources should also be set aside to help develop battery chemical feedstock production here in Australia – not only does this generate jobs, it ensures a more secure supply of cells in a highly competitive global market. We see a pressing need for a nationally consistent battery re-purposing and recycling scheme, and the business opportunities this presents.

Concluding remarks

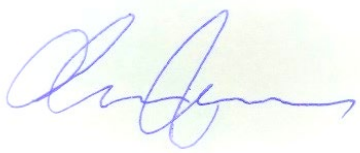
After several years of inaction on reducing greenhouse gas emissions in general, and for the transport sector more specifically, the AEVA was hopeful that the federal government would release a comprehensive plan for electric mobility in Australia. Unfortunately, the Future Fuels Strategy document was not that plan. We see many deficiencies in the strategy paper and have made suggestions to address these deficiencies. *Reducing greenhouse gas emissions must be a priority, and EVs are a major key to driving transport emissions to zero*. There are numerous ways to encourage greater EV uptake, while at the same time, measures to discourage ICE vehicles should also be put in place.

At the time of this submission, the SA and Victorian state governments are proposing EV-specific road user charges (RUCs). The AEVA has previously given qualified support for a general road user charge, provided all vehicles (electric, petrol or otherwise) were liable to pay it. But as these proposed RUCs are only targeting EVs, are being introduced at a time when EV uptake is still very low, and the proceeds of which are not being earmarked for transport infrastructure, we cannot support such a move. A federally collected road user charge for *all road-going vehicles* would make far more sense, especially if the proceeds were used to directly fund many of the initiatives suggested above.

An outstanding opportunity for Australia to show some real leadership and genuinely reduce transport emissions awaits us. It must not be wasted.

Yours Sincerely,

Chris Nash, President, AEVA



Dr Chris Jones, National Secretary, AEVA