VACC's Response to the Australian Government's Future Fuels Strategy: Discussion Paper 2021

April 2021

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Contents

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About VACC

VACC is Victoria's peak automotive industry association, representing the interests of more than 5,000 members in over 20 retail automotive sectors, who employ over 50,000 Victorians.

VACC members range from new and used vehicle dealers (passenger, truck, commercial, motorcycles, recreational and farm machinery), repairers (mechanical, electrical, body and repair specialists, i.e. radiators and engines), vehicle servicing (service stations, vehicle washing, rental, windscreens), parts and component wholesale/retail and distribution and aftermarket manufacture (e.g. specialist vehicle, parts or component modification and/or manufacture), and automotive dismantlers and recyclers.

1. Introduction

The Victorian Automotive Chamber of Commerce (VACC) welcomes the opportunity to respond to the Australian Government's Future Fuels Strategy discussion paper. This submission considers the terms of reference outlined in the discussion paper and the Australian Government's direction and practical actions that will enable the private sector to commercially deploy zero and low emissions road transport technologies at scale.

VACC maintains that the uptake of electric vehicles (EV) or zero to low emissions vehicles (ZLEVs), can be of benefit to the national economy. New opportunities for business await in the form of safety inspections, maintenance, repair, disposal, replacement and remanufacture of lithium-ion batteries.

Further, opportunities for the manufacture of EVs and ZLEVs in Australia should be investigated, along with policies aimed at stimulating such investment.

Australia's automotive industry encompasses a wide variety of sectors. In aggregate, the industry employs 384,810 people across 72,521 individual businesses, and contributes $39.35 billion in industry value-added to Australia's economy (Table 1).

Table 1 – Australia's automotive industry by sector

ANZSIC Code	Industry Sector	Employment (No.)	Businesses (No.)	GDP Contribution* ($Billion)
941	Automotive Repair and Maintenance	140,850	40,220	11.0
391	Motor Vehicle Retailing	71,450	5,361	7.7
2311, 2312, 2313, 2319	Motor Vehicle and Parts Manufacturing	37,050	3,148	3.72
400	Fuel Retailing	34,450	3,972	3.38
392	Motor Vehicle Parts & Tyre Retailing	34,750	4,285	2.1
350	Motor Vehicle and Parts Wholesaling	26,200	5,488	6.13
2399, 2462, 2491, 2461	Other Specialised Machinery & Equipment Manufacturing	10,000	837	1.6
6611	Passenger Car Rental & Hiring	7,120	2134	1.7
4231, 9429	Outdoor Power Equipment	4,650	1285	0.3
4245, 9429	Marine Equipment Retailing	3,210	818	0.22
4241	Bicycle Retailing	5,020	1,103	1.3
4610	Towing Services	3,040	2,460	0.2
9429	Agricultural Machinery Retailing & Repair	7,020	1410	N/A
	TOTAL	**384,810**	**72,521**	**39.35 billion**

(Compiled using data from VFACTs, Redbook, Carsales.com.au and dealer portals)

The uptake of electric vehicles is anticipated to have a disruptive influence on key sectors of the automotive industry. Industry intelligence compiled by the VACC indicates the automotive industry will not be immune from some negative impacts. These include a reduction in the number of businesses trading and reduced employment due to the different maintenance requirements and the reliability of ZLEV technology.

It is VACC's view that the Future Fuels Strategy discussion paper fails to adequately take into consideration the impact increased ZLEV uptake will have on existing industries, including its related economic consequences. Subsequently, VACC presents its response with due consideration to this issue.

2. Charging and refueling infrastructure

2.1 Question 1: What are the highest priority charging and refueling blackspots that should be considered under the ARENA administered Future Fuels Fund?

The geographical zones outlined in the Future Fuels Fund Round 1: Public battery electric vehicle charging infrastructure guidelines are adequate for a phased transition towards battery electric vehicle uptake. However, VACC recommends the geographical zones are expanded to include main regional hubs such as Ballarat, Bendigo, Hamilton, Warrnambool, Shepparton, Wodonga and the Gippsland region in the initial or round two funding allocations. This will provide greater confidence for consumers considering a ZLEV as their next vehicle purchase.

Recommendation 1

Geographical zones are expanded to include main regional hubs such as Ballarat, Bendigo, Hamilton, Warrnambool, Shepparton, Wodonga and the Gippsland region in the initial or round two funding allocations.

2.2 Question 2: What technical issues remain for rolling out recharging and refueling in both metropolitan and regional blackspots?

Despite Norway being ahead of other countries, in terms of charging points (stations) per capita (roughly one station per 730 people, compared with one per 2,640 in the U.S.), there is still concern amongst car owners over the availability of stations[1].

Studies of EV owners have revealed that the big challenge for electric-vehicle adoption is not range anxiety, but rather "charger anxiety" — the fear that once you reach a charging station there may be long queues, or the station is out of order.

Similar challenges for Australia exist, as the requirements of refueling stations will be significantly changed– particularly in Metropolitan areas, due to recharging requirements becoming more dependent on home and destination charging points (i.e. work and shopping centres). It would make sense for larger fuel retailing outlets (along the main highways), to heavily invest in charging stations due to their existing infrastructure and rest-stop facilities.

Recommendation 2

For larger fuel retailing outlets (along the main highways), to heavily invest in charging stations due to their existing infrastructure and rest-stop facilities.

2.3 Question 3: What are the biggest commercial barriers to installing new charging or refueling infrastructure?

In what is often described as the "chicken and egg" situation, the widespread adoption of ZLEVs relies on adequate fueling and charging infrastructure; however, without increased sales of these vehicles, or the absence of any policy framework, companies will be reluctant to invest in refueling and charging infrastructure. Inner suburban sprawl and high-density living has created a problem for prospective EV buyers. The a lack of car parking space and suitable charging infrastructure, resulting in owners or body corporates retrofitting existing buildings. This can be complicated and expensive for older type buildings, although more solutions are becoming available.

Home charging for Plug-In Hybrid Electric Vehicles (PHEV), with a small range requirement of 30-50km, requires a standard portable charger (sold with the vehicle). These chargers can plug into a 10amp or 15amp home socket and will trickle charge the car overnight (8-12 hours). A specific level 2 EV home charging station is the best solution to charge an EVgiven the increased charging speeds, enhanced safety features, and the connectivity to the vehicle. The cost of setting up a

1 Norway's EV Charger Rollout Shifts Up a Gear (2021). https://fuelsave-global.com/norways-ev-charger-rollout-shifts-up-a-gear/

home EV charging station can range from between $1000 up to $2500[2] - plus installation costs by a licensed electrician. This can vary depending on the level of complexity and location.

Public EV charging stations at workplaces, car parks, shopping centers and councils are more expensive when compared with home chargers. Costs can vary dramatically depending on the number of stations being set up, the type of installation and the specific site requirements. Wall mounted public EV charger options typically cost around $6000; however, curbside and pedestal mounted stations are more expensive due to additional civil works. Added costs will also increase if the stations require an internet connection for management and billing purposes.

Level 3 DC EV charging provides rapid recharge for EVs to around 80 per cent full in 30 minutes. Costs for a Public DC EV charging station are very expensive ranging from between $40,000-$100,000 per charging station – making it cost prohibitive for many small and medium businesses to invest, unless heavily subsidized by the government.

Effective federal, state and local government planning is essential to enable adequate and appropriately located stations for battery electric and fuel cell vehicles.

Recommendation 3

Government policies and actions should focus on reducing infrastructure costs for businesses so that charging and refueling costs for consumers can remain relatively low.

2.4 Question 4: What barriers are there to co-locating charging with existing infrastructure (for example carparks or service stations) compared to standalone charging stations.

VACC makes the point that the fuel and convenience retail industry globally is facing serious disruptive threats. Some predict the fuel retail network, in some parts of regional Australia, will become unprofitable by 2035. Research by Accenture forecasts North American fuel demand shrinking by as much as 26 per cent (40 billion gallons) within the next 15 years.[3]

Changing consumer preferences and the adoption of EV or ZLEVs will necessitate fundamental changes to the standard fuel retailing business model. It is predicted that retailers will need to move away from the current, vehicle-centric model to one that focusses on consumer needs and choices. This will require a significant investment in infrastructure and the development of new technologies and digital capabilities.[4] VACC recommends that any future infrastructure strategy, especially one that mandates the phasing out of ICEs, should include the provision of government financial assistance to aid existing fuel retailers to transition their businesses.

Many fuel retailing stations are compact and installing electric vehicle charging stations is simply not viable. These long-standing businesses will see a gradual loss of business and eventually will be forced to shut down their operations.

Recommendation 4

Any future infrastructure strategy that mandates the phasing out of ICEs should include a government fund to assist existing fuel retailers to transition their business.

3. Early Focus on commercial fleet?

3.1 Question 1 – What are the main barriers to adding new vehicle technology into light and heavy-duty vehicle fleets?

High up-front costs, insurance, a lack of model coverage (particularly light commercial and heavy vehicles), inadequate charging infrastructure, limited driving range, inadequate repairer networks; and an equitable secondhand car market are examples of barriers facing commercial fleet operators.

2 How much does it cost to set up an EV Charging Station? (2021). https://evse.com.au/blog/evchargercost/

3 A powerful shift for the fuel retail market (2020). https://www.accenture.com/au-en/insights/energy/ future-of-fuel-retail

4 Is There a Future for Service Stations? (2019). https://www.bcg.com/en-au/publications/2019/servicestations-future.

According to the Motor Vehicle Census Australia, electric vehicle sales remain less than 0.1 per cent of the fleet (excluding Tesla due to non-reporting). Should this trend of electric vehicle sales continue, it is unlikely a viable secondhand market will be realised in the immediate to medium term, further exacerbating the slow uptake of electric vehicles.

It is expected that vehicle fleets will be the "early adopters" of EVs, with registrations of fleets (e.g. public transport, taxis or public vehicles) expected to be the key facilitator of economies of scale and scope. When EVs no longer have substantial cost disadvantages, private customers are likely to enter the market in larger numbers. Presently, private customer acceptance remains low, even in fast growing markets such as China. For the majority of customers, price is the key criterion influencing their purchase decision[5], with 'green enthusiasts' and financially able consumers currently leading the initial uptake of EVs.

Residual values are another factor affecting adoption rates of ZLEVs as – as there is currently limited information. Government support and regulations could influence the overall ownership cost, meaning those early adopters will be severely financially penalised particularly where high interest loans are a factor.

There is also little information available regarding the durability of the electric battery. As the most expensive component on a vehicle, motorists and fleet operators will require a guarantee or indication regarding the lifespan of the battery. Most car manufacturers warrant their batteries for eight years or 160,000 kms. The current average vehicle age in Australia is 10.4 years for passenger vehicles and 15.7 years for heavy vehicles. The significantly high replacement costs of the battery may affect a motorist and fleet operators purchasing decision in future.

Electric battery remanufacturing and service innovations could provide a cheaper alternative for the repair of vehicles with declining battery performance, and an opportunity for a new industry to emerge. Such opportunities should be assisted by government and would support a more competitive repair market.

A recent study by Geotab found higher vehicle usage did not statistically increase rates of battery degradation. However, frequent usage of direct-current fast chargers, as opposed to 120V or 240V chargers, appears to accelerate degradation. Vehicles driven in hot climates (more than five days per year over 27°C) were also shown to have higher rates of battery degradation than those which remained in more temperate conditions[6].

Prior to the pandemic, ridesharing platforms built largely on ZLEVs had grown in popularity due to financial and social reasons. People are now taking fewer trips via public transport trips and shared-mobility services to reduce social contact. A study by McKinsey & Co found a considerable shift from shared mobility to private vehicle usage for intercity travelling. The report also found that a third of consumers value constant access to a private vehicle more so than pre-COVID-19[7]. Australia is now in the midst of a car shortage due to global supply chain disruptions, which is also causing adverse pressure on the secondhand vehicle market. Australians are paying almost 40 per cent more for used cars compared with pre-pandemic levels. The demand, particularly for SUVs, commercial utes and city runabouts, continues to strengthen with no end in sight[8].

There are now 29 Battery Electric Vehicles (BEV) (Table 2) for sale in Australia. It is expected electric vehicle sales and model ranges will increase rapidly over the next few years, which in turn will drive down prices, increasing demand.

More recently, Hyundai has announced the launch of the Hyundai Ioniq 5 model, with pricing expected to be around $70,000, placing it in direct competition with Tesla's model 3. This trend is

5 Proff, H., and Kilian, D.K. (2012). "Competitiveness of the EU Automotive Industry in Electric Vehicles: Final Report."

6 Geotab. (2019). https://electricautonomy.ca/2019/12/17/vast-majority-of-ev-batteries-will-outlast-their-vehicles-report/

7 How consumers' behavior in car buying and mobility is changing amid COVID-19. (2020). https://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/how-consumers-behavior-in-car-buying-and-mobility-changes-amid-covid-19

8 'Never seen anything like it': The used car market's wild coronavirus ride. (2021). https://www.theage.com.au/national/victoria/never-seen-anything-like-it-the-used-car-market-s-wild-coronavirus-ride-20210212-p57213.html

expected to continue as more automakers introduce ZLEVs to their product lines. Learnings from the Norwegian experience reveal that even with substantial incentives to induce consumers to purchase EVs, the market expansion ultimately depended on the number and variety of BEV and EV models on offer through the new and secondhand vehicle markets.

Table 2 – List of Battery Electric Vehicles

OEM	Battery Electric Models	Price	Battery Size	Volts	Range (km)
Audi	e-Tron 50 quattro	$ 155,983	71 kWh	396	336
	e-Tron 55 quattro	$ 146,700	95 kWh	396	436
	e-Tron Sportback quattro	$ 148,700	71 kWh	396	336
	e-Tron 55 Sportback quattro	$ 157,700	95 kWh	396	436
BMW	i3s	$ 83,029	42 kWh	352	260
Hyundai	Ioniq Electric Elite	$ 53,363	38.3 kWh	319	373
	Ioniq Electric Premium	$ 57,603	38.3 kWh	319	373
	Kona Electric	$ 60,740	64 kWh	356	557
	Kona Electric Highlander	$ 65,290	64 kWh	356	557
Jaguar	iPace S	$ 128,248	90 kWh	388	446
	iPace SE	$ 137,848	90 kWh	388	446
	iPace HSE	$ 151,448	90 kWh	388	446
Mercedes Benz	EQC Base	$ 139,700	80 kWh	405	434
	EQC Art Line	$ 145,600	80 kWh	405	434
MG	ZSEV	$ 43,990	44 kWh		220
Nissan	Leaf	$ 49,990	40 kWh	350	315
Renault	Zoe	$ 49,490	41 kWh	400	403
	Kangoo Maxi	$ 33,490	33 kWh	400	200
Tesla	Model S Standard	$ 108,100			490
	Model S Long Range	$ 123,500			660
	Model S Performance	$ 133,000			650
	Model S Performance LM	$ 142,300			650
	Model X Standard	$ 116,500			425
	Model X Long Range	$ 131,900			575
	Model X Performance	$ 141,100			550
	Model X Performance LM	$ 149,600			550
	Model 3 Standard	$ 66,900	50 kWh	360	508
	Model 3 Long Range	$ 83,201	75 kWh	360	657
	Model 3 Performance	$ 94,901	75 kWh	360	657

3.2 Question 2 - How could the Future Fuels Fund help address these barriers?

VACC has cautioned that the mandated and accelerated introduction of ZLEVs to Victoria would likely result in a decline to the number of automotive retail businesses trading, and subsequently, negatively affect employment levels. The automotive sectors most likely to be affected include fuel retailing, automotive repair and maintenance, car wholesaling, motor vehicle used parts, dismantling, car retailing and motor vehicle parts retailing.

Accelerating the uptake of ZLEVs could be achieved through the leadership of local, state and national governments. . Publicly government entities are viewed as non-commercial and it is likely that local and business communities will encourage this leadership stand. Building the EV used car fleet size will also be accelerated through this action.

Greater reliability of EVs, in conjunction with fewer moving parts, will severely impact parts retailing businesses. For example, there is an expected reduction in sales for catalytic converters, engine components and many other ICE vehicle parts and consumables. This will likely result in a significant contraction in investment within the sector, along with multiple business closures.

These same factors will also reduce the volume of work for automotive mechanical repair businesses – given the improved reliability of EVs and reduced servicing and maintenance requirements. The technical sophistication of EVs will also require investment in upskilling within the sector. Diagnostics, programming and coding skills for vehicle technicians will be essential to address vehicle faults – including the customisation of EVs.

Given the high voltages inherent with EVs, there will also be greater occupational health and safety compliance required to protect both staff and the general public. These cost pressures and the imminent decline in volume of repair work, is anticipated to reduce the number of operators and employment within the sector.

An investment in new technical skills and training will be critical to the safe service and maintenance of EVs and ZLEVs. The battery's high voltage necessitates proper safety protocols be developed and implemented for the correct de-powering of EVs, along with other service aspects of these vehicles. VACC recommends the development of appropriate career pathways for apprentices, including relevant upskilling for the current workforce to adequately prepare workers to safely service EV and ZLEVs.

EVs present new skill requirements for the automotive industry. Essentially, there are two streams of specialist training required to meet the emerging needs of battery electric: hybrid and fuel cell vehicles.

These include:

- skill sets around safety and the effective de-powering of electric vehicles
- technical training in the field of diagnosis, service and repair of electric vehicles and the
- rebuilding of electric batteries.

EVs contain high voltages that have the potential to kill persons untrained in the safe de-powering of their electrical systems. Whilst there is skill-set training available for hybrid vehicles, it is recommended that specific units of competency be developed for the safe work on battery electric vehicles for vehicle technicians. In terms of diagnosis, service and repair, there are currently no stand-alone qualifications specifically designed for electric vehicles. Due to the specialist nature of these vehicles, VACC recommends the development of a new Certificate 3 level qualification, specifically for electric vehicle technicians. It is envisaged that this qualification would encompass personal and shop safety procedures, specialised electronics and battery system training, diagnostics, programming and other core requirements for the service and repair of electric vehicles.

Recommendations 4

VACC recommends the development of a new Certificate 3 level apprenticeship training qualification for EV technicians. Existing technicians also require a pathway to upskill via through a Certificate 4 training, specifically for zero emission vehicle technology (both light and heavy vehicles) with prerequisites of one of the following: AUR30620, AUR31120, AUR30320. This qualification should include appropriate theory and training in electrical and battery systems, diagnostics, programming, and other core requirements pertaining to the service repair and diagnostics of electric vehicles.

Recommendation 5

VACC recommends government provide funding support to employers, trade associations, apprenticeship group training organisations to address zero and low emission training needs for existing and new workers. Coordinate efforts and funding across state programs. Support training partnerships between business and training programs and link employers to existing training programs to ensure their employees acquire requisite skills as they are needed.

Recommendation 6

VACC recommends an education program within university undergraduate and graduate programs in science, engineering and business that provide the skills and knowledge necessary to develop new ventures and contribute to the growing zero and low emission vehicle industry.

3.3 Question 3 – In what ways (other than direct funding) could the Government assist businesses to increase uptake of new vehicle technologies in their fleets?

Governments can assist by setting out a clear policy framework, including a comprehensive timeline on vehicle emission standards leading to the eventual phasing out of ICE vehicles.

The European Commission Green Deal roadmap includes a proposal for more stringent air pollutant emissions standards for combustion-engine vehicles by 2021, which will foster the transition to ZLEVs. Stricter emission standards (Euro7) are currently being developed, coming into force from 2025, for all petrol and diesel cars, vans, trucks and buses. This standard will permit vehicles to emit 30mg NOx (nitrogen oxide) per kilometer and in a second scenario, only 10 mg per kilometer. The current limit in Europe Euro 6d is 60 mg NOx for petrol and 80 mg for diesel vehicles[9]. In comparison, Australia's current vehicle emission standard ADR 79/04 for light vehicles and ADR 80/03 for trucks is based on Euro 5 standards, which permits 180 mg NOx for cars and between 180-280 mg NOx per kilometer for trucks exceeding 3.5 tonnes[10]. The Australian Government is currently considering more stringent noxious emission standards. Considering all this, any information regarding future standards and conformity requirements would be beneficial for businesses when considering vehicle acquisitions.

Many countries have adopted policies designed to incentivise consumer uptake of EVs. These incentives include tax credits, rebates and price subsidies for electric vehicles, often amounting to many thousands of dollars per vehicle. This is evidenced in the United States, the United Kingdom, Germany, Denmark, Norway, Sweden and many other countries. Further initiatives include exemptions from registration and road taxes, parking fees and other motor vehicle charges. Such policies have contributed to an early surge in the global uptake of EVs. VACC asserts that significant financial incentives of the magnitude offered by many countries, are

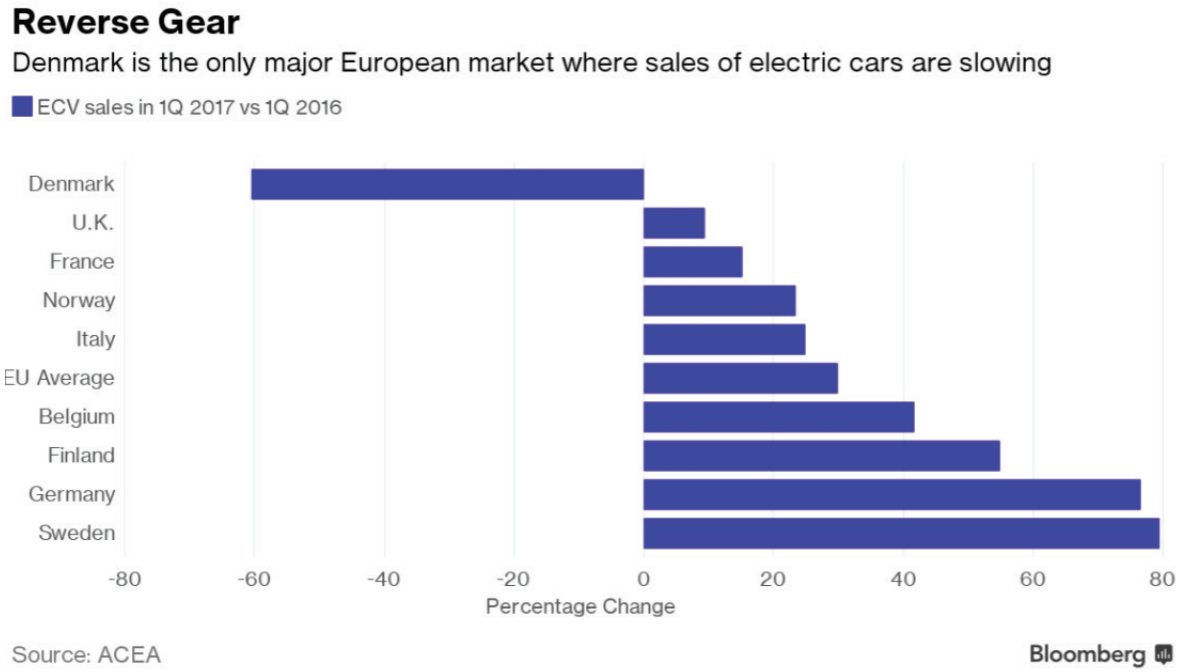
9 Politically wanted end for combustion engines with dramatic consequences for Germany as a business and industrial location. (2021). https://www.foundry-planet.com/d/no-to-the-euro-7-emissions-standard/

10 Vehicle Emission Standards (2021) https://www.infrastructure.gov.au/vehicles/environment/emission/index.aspx#:~:text=The%20current%20minimum%20standard%20for,Japanese%20standards%20accepted%20as%20alternatives.

largely unsustainable and distort the market for EVs respectively. There is also the risk that once such price supports and financial incentives are removed, sales of EVs could stall or go backwards.

This is evidenced by the dramatic fall of EV sales in Denmark, dropping 60.5 percent in the first quarter of 2017 following the phasing out of its tax incentives on EVs in 2016 (Chart 1). This dramatic reduction suggests clean-energy vehicles are not currently attractive enough to compete against ICEs, without some form of subsidy. Furthermore, the cost of policies designed to accelerate the uptake of EVs, including subsidising the cost of home or public EV charging infrastructures, can potentially translate into billions of dollars. This warrants both careful consideration and budgetary planning, including an assessment of the wider impacts on the community.

Chart 1: Decline of Denmark's Electric Vehicle sales



Overall, the international experience suggests, that whilst financial incentives towards the purchase of EVs have helped motivate the EV market in many countries, fundamentally, it is the cost competitiveness of EVs versus conventional ICE vehicles that will ultimately sway consumers in the mass vehicle market over the longer term. Based on the evidence presented, this price competitiveness is expected to occur between 2025 and 2030.

Recommendation 7

VACC asserts that for most consumers, it is the price competitiveness of an electric vehicle that is the most important factor in the uptake and overall sustainability of the EV market. Government policies aimed at providing price support and other financial incentives to encourage EV purchases by consumers are viewed to be unsustainable and can distort the EV market.

4. Improving Information for motorists and fleets

4.1 Question 1: What is the most important information to provide to motorists and fleets about new vehicle technologies and future fuels?

When Norwegian car owners were asked about their motivation for buying a BEVs, they placed the highest importance on competitive purchase price, the low operating cost, toll free road use and that the vehicle meets their everyday needs. Secondary to this was the fact the vehicle was environmentally friendly[11]. Australia could assist in accelerating the uptake of EVs by raising consumer awareness of operational costs savings, accessible public charging infrastructure, and the publishing all federal grants/incentives via the government's web portal. Other important information to provide to motorists or fleets could include the following:

- Fuel quality, vehicle emissions and health impacts are not widely publicised and may not be clear to many consumers, limiting their ability to make informed decisions about the type of car they drive. Governments have a role to play in educating consumers and fleet operators about the harmful impacts of emissions generated by ICE vehicles and the benefits to human health – as well as economic, safety productivity and efficiency gains of owning a ZLEV.
- BEVs are more expensive to produce than ICEs, but are more energy efficient. Information relating to emissions generated from the electricity grid resulting from increased power supply the battery electric vehicle may give rise to more emissions of CO2 than current ICE cars. A study and findings relating to the production cost of electricity versus fossil fuel would be beneficial, as would the emissions generated by the mining of resource material for the production of battery electric vehicles.
- Australia's primary energy consumption is dominated by coal (around 40 per cent), oil (34 per cent) and gas (22 per cent). Coal accounts for about 75 per cent of Australia's electricity generation, followed by gas (16 per cent), hydro (5 per cent) and wind around (2 per cent)[12]. Australians are facing increased financial pressure from rising electricity the cost. In Australia the average cost of electricity supplied to the home and business are $0.3025 per kWh. If Australia were to shift towards a more renewable energy source what impact is this likely to have on future electricity supply? Any comparison or future projections on electricity costs would greatly assist in determining the value of electric vehicle ownership.
- Ultimately, when it comes to investment by fleet operators, accelerated uptake of ZLEVs largely depends on consumer demand, greater productivity, performance and monetary gains on the overall cost savings attributed to a zero-emission vehicle fleet.
- Costs attributed to installing home charging points and home energy storage units is another factor for motorists to consider when buying a BEV. These costs need to be made available so that prospective buyers can make an informed decision when factoring in the total cost of electric vehicle ownership.
- Regarding charging and refueling, the government should consider mandating standardised pricing information to ensure consumers know exactly what they are being charged for, similarly instrumentation indicating prices per unit of measure similar to what occurs now with petrol bowsers should be also be made mandatory and in a standardised way so consumers can simply and universally quantify and understand vehicle refueling capacities.
- Training for first responders and emergency workers, as well as guidance information for the general public on what to do in the event of an accident and how to avoid endangering themselves when attending to a critically injured person involved in a collision. Training for building and fire inspectors when assessing hydrogen and electric charging stations for compliance with relevant codes, standards or regulations is also important.
- Any fiscal support measures provided to consumers from all levels of government should

11 Policy strategies for vehicle electrification. (2015-16). https://www.econstor.eu/bitstream/10419/121946/1/826766692.pdf

12 Energy Basics. (2021). https://www.ga.gov.au/scientific-topics/energy/basics#:~:text=Australia's%20primary%20energy%20consumption%20is,around%20(2%20per%20cent)

also be considered as one of the highest priority information resources that motorists and fleet operators receive, about new vehicle technologies and future fuels.

There needs to be a government strategy relating to the impact of waste generated by End-of- Life vehicles (ELVs). The lifespan of electric vehicles is closely associated with the life expectancy of their component lithium-ion batteries. Most manufacturers warrant the lithium-ion batteries contained in EVs for eight years and generally, this is considered to be their life expectancy. An unanswered environmental question, however, is what happens to the approximately half-tonne of lithium-ion batteries in each vehicle when they wear out? EV batteries carry a risk of releasing toxic gases and chemicals if damaged, and the extraction of core ingredients such as lithium and cobalt can lead to water pollution and other negative environmental consequences.

Furthermore, given their size, worn out EV batteries cannot be stored at home and landfilling is an undesirable option. This necessitates the introduction of a suitable ELV EV policy. The European Union (EU) enforces regulation that requires the makers of batteries to finance the costs of collecting, treating and recycling of expended batteries. This has encouraged partnerships between carmakers and recyclers. For example, Umicore, who has invested €25m into an industrial pilot plant in Antwerp to recycle lithium-ion batteries, has deals in Europe with Tesla and Toyota to use smelting to recover precious metals such as cobalt and nickel.

Recommendation 8

VACC recommends the government leverage the network of industry associations to assist with the dissemination of information regarding ZLEVs to both businesses and consumers.

4.2 Question 2: What are the highest priority knowledge sharing ideas to be targeted in future fleet trials?

VACC suggests the following:

- Any relevant costs saving for consumers resulting from reduced fueling and service and maintenance costs.
- Issues relating to vehicle charging due to out-of-service charging infrastructure.
- Projected job opportunities for new industries should be a focus for any knowledge sharing ideas.

4.3 Question 3: What additional guidance do businesses need on technical or taxation matters in relation to new vehicle purchases?

Businesses and accountants need clearly defined information relating any fiscal support measures targeting companies and consumers, including any proposed or current tax benefits, new levies, such as fuel excise or road user charging for ZLEVs, as well as any asset depreciation schedules for EV infrastructure site improvements.

5. Integrating battery electric vehicles into the grid

5.1 Question 1 – What are the highest priority issues to consider when integrating large numbers of battery electric vehicles into the electricity grid?

Question 2 – What further action is needed to ensure consumers and the electricity grid can benefit from bidirectional charging technology?

The Australian government needs to develop interoperability standards for EV charging stations, which will enable drivers of different makes and models to charge at a station regardless of vehicle or charging station manufacturer. A roadmap to commercialise vehicle-to-grid charging services and demonstrated smart charging capabilities for EVs would help consumers understand the potential costs/revenue generated from bi-directional charging.

VACC believes that insufficient analysis has been undertaken concerning the energy requirements of a mass uptake of electric vehicles, including the mix of energy sources that will effectively deliver the expected benefits in terms of emissions reductions for the community.

Primarily, substantial reductions in emissions through the greater uptake of electric vehicles can only realistically be achieved through the use of renewable energy sources. The capacity of renewable energy sources to meet the added power requirements of millions of electric vehicles in the future, is yet to be proven. VACC advises that this represents an area of business and public concern, and further analysis of these issues is necessary.

Recommendation 9

VACC recommends government instigate a detailed study into the impact of electric vehicles on the nation's energy network, including emission reductions and their overall viability based on a growing mix of renewable energy sources.

5.2 Question 3 – What further action is needed for tariff innovation or reform to support the rollout of public charging infrastructure?

The Australian Government can accelerate the uptake of zero emission vehicles by supporting the roll out of public charging infrastructure in various ways. VACC has assessed the strategic action plans implemented by California's State Government in 2012 and submits the following for consideration.

The Federal Government work with state and local governments to:

- Develop a strategic plan for the roll out of public infrastructure with several and specific milestones.
- Streamline infrastructure plans and funding.
- Increase access to affordable, convenient electric vehicle charging and to define how the market for charging is regulated.
- Streamline the permit process of installing EV charging infrastructure and in future, hydrogen refueling stations.

5.3 Question 4 – How could motorists be incentivised to charge their battery electric vehicles outside periods of high electricity demand to help keep prices low?

The Federal Government should evaluate ways to reduce costs of home charging using the smart metering options available for most residential buildings and consider working with energy suppliers to achieve structured electricity rates, based on charging data to incentivise off-peak charging, increase customer understanding and maximise consumer savings.

6. Supporting Australian innovation and manufacturing

6.1 Question 1 – What are Australia's niches in future fuels to maximise high-value domestic and export outcomes?

The uptake of EVs by consumers presents new growth opportunities for automotive businesses. Lithium-ion batteries have a limited lifespan (approximately 8 years) and this has the potential to raise new business service offerings pertaining to their inspection, safety, maintenance, including their repair, disposal and replacement. Whilst passenger car manufacturing has now ceased in Australia, it is not beyond possibility that the assembly of EVs may become a viable business option. EVs have fewer components than traditional ICE vehicles, thus eliminating the need for many costly manufacturing processes such as engine casting, tooling and the creation of component parts.

Given the inherent residual engineering capacity that is available in Australia, business models involving the importation of electric motors and the assembly of EVs from Completely Knocked Down packs (CKDs) using robotics and other automated processes may be viable. This represents a business opportunity that should be considered by federal and state governments. It should also be noted that concise and clearly communicated policy statements in relation to EVs, as witnessed in countries such as the UK, the EU and China, assist considerably in manufacturers' plans for automotive investments in design, plant and machinery.

Australia produces roughly 5,000 tonnes of cobalt per annum, the third highest in the world behind the world after the Democratic Republic of the Congo (DRC) and Russia. This is three per cent of global production and over 16 per cent of the world's cobalt resource[13]. Cobalt is one of the primary minerals used to manufacture lithium-ion batteries for EVs. Cobalt mining has often been a subject of controversy due to the unethical practices of miners subjected to dangerous working conditions in the DRC, the largest supplier of cobalt. The DRC produces around 70 per cent of the world's cobalt. However, roughly 20 per cent of DRC cobalt comes from cheap manual labour, with a portion of operators violating environmental and human rights standards. Companies have turned away from using unethically mined cobalt in their products. Australia's emerging cobalt sector has a chance to lead the way for ethical and environmentally responsible cobalt mining in the future can also lead to new opportunities and local manufacture of Lithium-ion batteries.

Some examples of EV manufacturing already being undertaken in Australia (not including charging infrastructure) include:

- a 3.9 metre-long Cargo vanette, the first prototype in a series of vehicles planned by Australian Clean Energy Electric Vehicle (ACE-EV) Group to be manufactured along with the ACE Urban, a city car, and the ACE Yewt, a utility[14].
- The New South Wales government last year announced a $700 million facility in Moss Vale dedicated to the local production of electric cars.
- Varley Electric Vehicles design and construct high quality electric vehicles of all types that minimise pollution and other forms of environmental degradation[15].
- SEA Electric launched its first model in 2017, since then has released 7 x, SEA-Drive® models, to power rear-wheel drive cargo vans/commuter buses and cab/chassis trucks from 3.5t (7,700 lbs) GVM to 29t (64,000 lbs) GVM[16].

Recommendation 10

The Federal Government should investigate the feasibility of EV assembly in Australia, including policy measures to attract appropriate investment and facilitate the establishment of electric EV manufacturing operations.

13 Australia's Opportunity in the Global Cobalt Industry – featuring Cobalt Blue. (2020). https://www.cobaltblueholdings.com/australias-opportunity-in-the-global-cobalt-industry-featuring-cobalt-blue/

14 ACE Electric Vehicles. (2021). https://www.ace-ev.com.au/

15 Varley Electric. (2021). https://www.varleygroup.com/site/electric-vehicles

16 SEA Electric.(2021). https://www.sea-electric.com/products/

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