

Chapter 5

Seizing the opportunity and managing the risks

Introduction

5.1 Much of this report has focused on the opportunities that are available for Australian consumers and industry as a result of the increasing use of electric vehicles (EVs). This chapter explores some of the proposals put forward by submitters and witnesses in order to support EV uptake; assist manufacturing and value chain activities; and to manage the risks associated with the transition towards increased EV use.

Supporting EV uptake

5.2 At the Committee's final hearing in Canberra, Infrastructure Australia's Executive Director for Policy and Research, Mr Peter Colacino clearly laid out the role that incentives play in supporting EV uptake:

We see the patchwork of incentives that are available across Australian jurisdictions as naturally assisting electric vehicle adoption levels where they are provided. In jurisdictions where incentives are lower, it's obvious that the effect would be a dampening of electric vehicle demand. So our view of the range of incentives is that electric vehicle adoption rates are occurring at a rate that's commensurate to the scale of the incentives.¹

5.3 The Electric Vehicle Council also highlighted the value of incentives in creating market certainty and spurring investment decisions.²

5.4 Globally, sales of EVs are 'still largely driven by policy support' with 95 per cent of EV sales occurring in 'just ten countries with robust EV policies'.³ These countries are China, the United States, Japan, Canada, Norway, the United Kingdom, France, Germany, The Netherlands and Sweden.⁴ In Chapter 2, the Committee reproduced a table by ClimateWorks summarising the current policy approaches of Australian federal, state and territory governments that support EV uptake (see Table 2.3). The Committee notes that not all measures focus exclusively on EVs, for example, the higher luxury car threshold applies to fuel-efficient internal combustion engine (ICE) vehicles as well.

1 Mr Peter Colacino, Executive Director, Policy and Research, Infrastructure Australia, *Committee Hansard*, 18 October 2018, p. 1.

2 Electric Vehicle Council, *Submission 100*, p. 8.

3 NSW Parliamentary Research Service, *Electric vehicles in NSW*, May 2018, p. 11, <https://www.parliament.nsw.gov.au/researchpapers/Documents/electric%20vehicles%20in%20NSW.pdf> (accessed 11 July 2018).

4 NSW Parliamentary Research Service, *Electric vehicles in NSW*, May 2018, p. 11.

5.5 In broad terms, incentives or penalties work by reducing the relative cost of EVs compared to ICE vehicles, and by improving the number and geographic spread of charging stations. As discussed in Chapter 2, this trend has been seen in the reverse in Denmark, where removal of incentives resulted in a fall in the number of new EVs purchased.

5.6 This section will focus on a number of mechanisms that could provide support for increased EV uptake, including:

- Incentives (including registration and stamp-duty concessions, tax rebates, and grants);
- Targets;
- Vehicle emissions standards;
- Charging infrastructure;
- Education and familiarisation;
- Upskilling and training service technicians; and
- Importation of second-hand EVs.

Incentives

5.7 There are a range of direct consumer subsidies to encourage EV uptake that are explored below. Although each incentive is explored individually, a cumulative consideration of implementation of multiple incentives could yield a significant reduction in EV purchase and operating cost.

Registration and stamp duty concessions

5.8 A number of submitters have indicated that state and territory based annual vehicle registration fees and stamp duty payable on new EVs should be reduced or removed as they form a barrier to EV ownership.⁵ The ACT Government currently offers 'zero stamp-duty on new zero emissions vehicles' and a '20 per cent discount on registration fees'.⁶ 350 Canberra made the point that these discounts are often counteracted as EVs are heavier than conventional vehicles consequently attracting higher fees and recommended that any proposals around registration should not penalise EV owners for higher EV weights.⁷ In the absence of concessional registration fees, some EV owners are subject to higher registration charges.

Tax concessions and rebates

5.9 There are four federal taxes that apply to sales of all motor vehicles including EVs—the goods and services tax (GST); luxury car tax (LCT), fringe benefits tax (FBT) and import duties. Infrastructure Partnerships Australia submitted that

5 Electric Vehicle Council, *Submission 100*, p. 9. See, for example: ACE-EV Group, *Submission 4*; SEA Electric, *Submission 24*.

6 ACT Government, *Submission 48.1*, p. 2.

7 350 Canberra, *Submission 21*, p. 4.

'substantial upfront taxes' like these 'stifle the uptake of EVs as a mass market option'.⁸ The Committee were told that amendments to these taxes on EVs—either concessions or abolition—would increase EV uptake. The Electric Vehicle Council observed that New Zealand is applying tax concessions until EVs reach two per cent of the fleet.⁹

Luxury car tax

5.10 LCT is applied to any vehicle with a GST-inclusive value above the threshold (for the 2018–19 financial year, the threshold was \$66 331) at a rate of 33 per cent applied to any value above the threshold. There is a partial exemption for fuel-efficient vehicles that lifts the threshold to \$75 526.¹⁰ A fuel efficient car is defined by the Australian Taxation Office (ATO) as having 'a fuel consumption that does not exceed seven litres per 100 kilometres'.¹¹ Table 5.1 sets out the LCT threshold for both fuel-efficient vehicles and other vehicles over the last 10 years.

Table 5.1: Luxury Car Tax thresholds 2009–10 to 2018–19¹²

Financial Year	Fuel-efficient vehicles	Other vehicles
2018–19	\$75,526	\$66,331
2017–18	\$75,526	\$65,094
2016–17	\$75,526	\$64,132
2015–16	\$75,375	\$63,184
2014–15	\$75,375	\$61,884
2013–14	\$75,375	\$60,316
2012–13	\$75,375	\$59,133
2011–12	\$75,375	\$57,466
2010–11	\$75,375	\$57,466
2009–10	\$75,000	\$57,180

8 Infrastructure Partnerships Australia, *Submission 121*, p. 3.

9 Electric Vehicle Council, *Submission 100*, p. 1.

10 ATO, *Luxury car tax rate and thresholds*, 25 May 2018, <https://www.ato.gov.au/rates/luxury-car-tax-rate-and-thresholds/> (accessed 31 October 2018).

11 ATO, *Definitions*, November 2016, <https://www.ato.gov.au/business/luxury-car-tax/in-detail/definitions/> (accessed 31 October 2018).

12 ATO, *Luxury car tax rate and thresholds*, 25 May 2018. The 'fuel-efficient vehicles' category was introduced in the 2008-09 financial year and the threshold was set at \$75,000.

5.11 Many submissions simply called for the abolition of the luxury car tax on EVs. The Victorian Department of Environment, Land, Water and Planning (DELWP) proposed 'exempting zero emission EVs from the LCT until EVs become price competitive with ICEs'.¹³

5.12 The Australia Institute noted that an LCT exemption for EVs would 'better target the scheme's two-tiered threshold structure towards environmental outcomes'.¹⁴ The ACT Branch of the Australian Electric Vehicle Association argued that the original intent of the fuel efficient exemption had been eroded since its implementation in 2009:

We note that the Federal Government's Luxury Car Tax imposes a lower tax burden on the purchasers of fuel efficient vehicles. This difference in tax levels has been eroded over the past decade: it was 31% higher for less efficient vehicles in 2009, and is now only 16% higher, thus diminishing whatever encouragement there has been to prefer a luxury EV over a luxury petrol or diesel vehicle. Some commentators have called for the Luxury Car Tax to be abolished for EVs. We support this call, but if it is not heeded, we would alternatively support a restoration of the difference in tax levels which prevailed in 2009.¹⁵

5.13 On the issue of the reduced difference in the LCT threshold between fuel-efficient cars and other vehicles, the ATO's *Luxury Car Tax Determination* explains the methods of indexing for each threshold:

The LCT threshold [for 'other vehicles'] is indexed annually according to a factor to be determined by Parliament or, if such a factor is not determined by Parliament, indexed annually in accordance with movements in the All Groups Consumer Price Index (All Groups CPI).

...

The fuel-efficient car limit is indexed annually in line with movements in the motor vehicle purchase sub-group of the CPI, unless the indexation factor is 1 or less [in which case, no indexation is applied].¹⁶

5.14 CPI data from the Australian Bureau of Statistics demonstrates that the motor vehicle CPI expenditure class has been on an overall downward trajectory since 1995.¹⁷ The Committee understands this data to indicate that motor vehicles are

13 Victorian Government Department of Environment, Land, Water and Planning, *Submission 129*, p. 12.

14 The Australia Institute (TAI), *Submission 1*, p. 1.

15 ACT AEVA, *Submission 6*, pp. 8–9. See also: 350 Canberra, *Submission 21*, p. 7.

16 ATO, *Luxury Car Tax Determination – LCTD 2018/1*, 23 May 2018, available at: <https://www.ato.gov.au/law/view/document?docid=LCD/LCTD20181/NAT/ATO/00001#fp6> (accessed 12 December 2018).

17 See, for Australian Bureau of Statistics, Consumer Price Index, Australia, September 2018, Time Series Spreadsheet, Table 7, Index Numbers for Motor Vehicles, available at: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6401.0Sep%202018?OpenDocument#Time> (accessed 14 January 2019).

actually becoming cheaper on average over time, down 12.2 per cent since September 2008.

5.15 As can be seen in Table 5.1, since the introduction a higher LCT threshold for fuel efficient vehicles in 2008–09, the threshold for these vehicles has been lifted twice, \$375 in 2010–11 and \$151 in 2016–17. In the same period, the LCT threshold for standard vehicles, which has been based on the All Groups CPI rate since 2013–14, has increased by \$9 151.

5.16 The Committee also notes information provided by the Parliamentary Library as to the increasing number of vehicle models which use 7 litres of fuel per 100km, or less.¹⁸ In particular, the Committee notes that EVs make up a large percentage of vehicles consuming less than four litres of fuel per 100 km, and a large majority of vehicles using between four and seven litres per 100 km are petrol or diesel vehicles.

5.17 Table 5.2 summarises modelling by the Parliamentary Budget Office of the impact on revenue of amending several aspects of the LCT parameters over the 2018–19 forward estimates, namely narrowing the definition of 'fuel efficient vehicles' reducing the LCT threshold for standard vehicles and indexing the LCT threshold for standard vehicles using the motor vehicle expenditure class of CPI.¹⁹

Table 5.2: Impact of narrowing definition of 'fuel-efficient vehicles' and lowering LCT threshold for standard vehicles²⁰

Option number	LCT threshold for standard vehicles	Definition of 'fuel-efficient vehicles' (L/100km)	Fiscal balance to 2021–22 (\$m)
1.	\$57 180	7.0	850
2.	\$57 180	4.0	1,540
3.	\$57 180	2.0	1,560
4.	\$57 180	0	1,560

5.18 In the longer term, the Parliamentary Budget Office stated that Option 2 above would result in an increase to the Australian Government fiscal balance of \$5.77 billion to 2028–29.²¹

18 *Vehicles in Australia using 7L per 100 kms or less*, Parliamentary Library, Additional Information.

19 *Revenue implications of changes to vehicle taxation measures*, Parliamentary Budget Office, 4 December 2018, p. 4.

20 *Revenue implications of changes to vehicle taxation measures*, Parliamentary Budget Office, 4 December 2018, p. 3.

Import duties

5.19 The Federal Chamber of Automotive Industries (FCAI) noted that currently there is an import duty of 5 per cent on all imported motor vehicles (excluding those imported from countries with which Australia has a free trade agreement). FCAI argued that this 'acts as a brake on new environmental and safety technologies entering the Australian market'.²² Infrastructure Partnerships Australia contended that import duties should be reduced to zero to 'reduce upfront disincentives'.²³

5.20 Modelling from the Parliamentary Budget Office estimates that exempting newly purchased EVs from import tariffs from 1 July 2019 would decrease the Australian Government fiscal and underlying cash balances by \$300 million over the 2018–19 Budget forward estimates period (out to 2021–22).²⁴

Goods and services tax

5.21 The GST is applied at a rate of 10 per cent to the purchase price of a new motor vehicle. Currently, the only exemption to paying the GST on a motor vehicle is if it is used fully or partly to carry out business-related activities. There are currently no GST exemptions for motor vehicles purchased for personal use.²⁵ Some submitters called for a waiver or discount of GST on all new EV purchases, either for a specified period, such as three years, or until EVs had reached an unspecified proportion of the motor vehicle fleet.²⁶ The FCAI highlighted that Norway which has the highest proportion of new EVs currently exempts EVs from paying a tax similar to the GST called a value added tax (VAT). Norway's VAT is considerably higher at 25 per cent.²⁷

5.22 Modelling from the Parliamentary Budget Office estimates that exempting newly purchased EVs from GST from 1 July 2019 would decrease the Australian Government fiscal balance by \$190 million over the 2018–19 Budget forward estimates period (out to 2021–22).²⁸

21 *Revenue implications of changes to vehicle taxation measures*, Parliamentary Budget Office, 4 December 2018, p. 8.

22 FCAI, *Submission 119*, p. 10.

23 Infrastructure Partnerships Australia, *Submission 121*, p. 3.

24 *Revenue implications of changes to vehicle taxation measures*, Parliamentary Budget Office, 4 December 2018, p. 4.

25 ATO, *Purchasing a motor vehicle*, 11 January 2018, <https://www.ato.gov.au/business/gst/in-detail/your-industry/motor-vehicle-and-transport/gst-and-motor-vehicles/?page=2> (accessed 31 October 2018).

26 See, for example: Australian Electric Vehicle Association, *Submission 8*, p. 4; Hyundai Motor Company Australia, *Submission 103*, p. [11].

27 FCAI, *Submission 119*, p. 11.

28 *Revenue implications of changes to vehicle taxation measures*, Parliamentary Budget Office, 4 December 2018, p. 5.

Fringe benefits tax

5.23 FBT is 'a tax employers pay on certain benefits they provide to their employees—including their employees' family or other associates. The benefit may be in addition to, or part of, their salary or wages package'.²⁹ The Committee's interest in FBT is where it is provided in relation to motor vehicles. DELWP noted modelling in a recent ClimateWorks and Electric Vehicle Council report that showed 'changes to FBT treatment for EVs is also an enabler for greater uptake'. EVs are currently at a disadvantage in regards to FBT due to the current price premium of EVs—that is, typically a higher rate of FBT is payable by a business or individual on an EV simply because of the higher purchase price. The removal of FBT on EVs would result in no disadvantage from a 'vehicle cost to business' perspective.³⁰ Hydrogen Mobility Australia (HMA) stated that the removal of FBT on EVs and other zero emission vehicles would help 'mitigate the typically higher costs of these vehicles'. Removal of FBT could be predicated on its reinstatement once price parity was reached with ICEs.³¹

5.24 Aside from the higher purchase price of EVs, Tesla noted a further disadvantage in the application of FBT:

For ICEVs, drivers are able to claim deductions against Fringe Benefits Tax for fuel. Electricity is not currently defined as a fuel for the purposes of FBT, and nor are EV-owners able to claim equipment used to charge for their EVs, such as solar panels, home batteries, and charging equipment.³²

5.25 Mr Greg Partridge, President of the Australian Electric Vehicle Association (AEVA) also commented that greater clarity on existing FBT and salary sacrifice rules would be required.³³ In its submission AEVA detailed its concerns in relation to salary sacrificing:

Employees who wish to claim electric vehicle expenses are confused by the existing tax provisions, and in some cases the legislation encourages profligate use of salary sacrificed ICE vehicles.³⁴

5.26 In an answer to a question taken on notice, AEVA recommended improved guidance on how to factor electricity costs into FBT operating calculations for EVs:

We believe the ATO needs to provide guidance on an accepted method of assessing this electricity cost, such a use of agreed Wh/km for EVs (or classes of EVs) x km travelled (end minus start odometer readings) x electricity tariff where the relevant 'rates' are statutory or supported by

29 ATO, *Fringe Benefits Tax (FBT)*, 2 August 2018, [https://www.ato.gov.au/General/Fringe-benefits-tax-\(FBT/](https://www.ato.gov.au/General/Fringe-benefits-tax-(FBT/) (accessed 31 October 2018).

30 DELWP, *Submission 129*, p. 13.

31 Hydrogen Mobility Australia, *Submission 73*, p. 14.

32 Tesla, *Submission 92*, p. [12].

33 Mr Greg Partridge, President, AEVA, *Committee Hansard*, 27 September 2018, p. 19.

34 Australian Electric Vehicle Association, *Submission 8*, p. 3.

taxpayer's documentation, as is permitted for petrol/diesel fuel in the absence of a complete record of all refuelling events (as might be provided by a fleet fuel card).³⁵

5.27 Modelling from the Parliamentary Budget Office estimates that exempting newly purchased EVs from FBT from 1 July 2019 would decrease the Australian Government fiscal and underlying cash balances by \$140 million over the 2018–19 Budget forward estimates period (out to 2021–22).³⁶

Subsidies to buyers

5.28 A number of countries have adopted one-off cash payments to encourage people to purchase EVs. Ms Gail Broadbent, a transport researcher from the University of New South Wales outlined some of the incentives available, which are summarised in Table 5.3.

Table 5.3: Comparison of one-off subsidies to encourage EV purchases³⁷

Country	Subsidy	Comments
Belgium	€4000	
France	€2500–€4000	
United Kingdom	£2500–£8000	Limited to total car price of £60 000
Portugal	€125–€2250	Trading in used ICE
Germany	€3000–€4000	Vehicles under €60 000
Denmark	\$AUD1470–\$AUD3675	Subsidy for businesses and local councils

5.29 In its submission, 350 Canberra outlined how a one-off grant might assist EV uptake:

We strongly support this approach to encouraging EV uptake in Australia. A purchase rebate of (say) \$5000 would significantly reduce the price premium paid by any Australians who purchase a moderately affordable EV (such as a Nissan Leaf, Renault Zoe or Hyundai Ioniq) in 2019 or 2020. We recognise that such incentives should last only long enough to "kickstart" the local market: to encourage auto makers to bring more EV models to Australia, to encourage dealers to offer and support them, and to encourage

35 Australian Electric Vehicle Association - answer to question on notice from public hearing in Brisbane on 27 September 2018 (received 22 November 2018).

36 *Revenue implications of changes to vehicle taxation measures (Fringe Benefits Tax)*, Parliamentary Budget Office, 14 December 2018, p. 2.

37 Ms Gail Broadbent, *Submission 15.4*, pp. 3–8.

a wider roll-out of charging infrastructure. For example, such incentives might begin to phase out once EVs constitute 2% of the national car fleet.³⁸

5.30 However, one submitter pointed out that as EVs are 'roughly twice the price of the petrol equivalent', that 'even a generous state grant of \$5 000 per electric vehicle still leaves a \$20,000 gap between electric and petrol vehicles in the same class'.³⁹ With price parity expected in six to eight years' time, the government 'can either wait and let the price of electric cars drop of its own accord or jumpstart the market by offering rebates or some other sort of financial incentive'.⁴⁰

Targets

National

5.31 The Committee has heard that establishing a national target for EV uptake would stimulate growth in this sector and signal to the global EV industry that government is supportive of EV uptake.⁴¹ Associate Professor Tim Nelson, Chief Economist at AGL Energy said that 'a national EV target would provide a powerful platform to drive coordinated, whole-of-government policy initiatives'.⁴² Associate Professor Nelson stated that a target in concert with other supporting measures would provide a clear signal to business to invest in EVs and supportive infrastructure such as charging stations.⁴³ Hobsons Bay Council advocated for a national EV target noting these 'targets provide leadership to business and the community' and 'provide assurance to manufacturers that a local market exists'.⁴⁴

5.32 Mr Tim Washington, Chief Executive Officer at JET Charge, a local company that installs EV chargers, told the Committee about the value of the national government having a vision as a means to underwrite support for the EV sector:

... unless you start at the start, where the government basically says, 'Yes, there is a vision for it,' and if you want to start a business in this space the government has already said you will be in an industry that the government supports, that's incredibly important. And the thing for me is that everybody says that EVs are coming. What I can say, being in the industry itself and working with these manufacturers, is that yes, vehicles are coming, but they're not going to come as soon as you necessarily think they will in the Australian market if those manufacturer head offices don't think the Australian market is suitable. We are in a supply-constrained market right

38 350 Canberra, *Submission 21*, p. 6.

39 Name withheld, *Submission 86*, p. 12.

40 Name withheld, *Submission 86*, p. 12.

41 See, for example: NRMA, *Submission 78.2*, p. 8; AITI, *Submission 5.1*, p. 3.

42 Associate Professor Tim Nelson, Chief Economist, AGL Energy, *Committee Hansard*, 31 August 2018, p. 79.

43 Associate Professor Tim Nelson, Chief Economist, AGL Energy, *Committee Hansard*, 31 August 2018, p. 79.

44 Hobson's Bay Council, *Submission 52*, p. 6.

now in terms of electric vehicles. So, [original equipment manufacturers] have the power to choose what markets they send the vehicle to.⁴⁵

5.33 Dr James Prest, Senior Lecturer from the College of Law at the Australian National University explained how a national target might work:

That may be in either policy or legislation. I recommend short-, medium- and long-term targets. Those targets don't necessarily have to be tied to a particular policy mechanism; they could just give a clear direction to the market and an expectation to international investors about where Australia is hoping to go to.⁴⁶

5.34 The Australian Industrial Transformation Institute (AITI) at Flinders University emphasised that there are a number of different forms that targets might take including:

Targets for EV manufacture and sales, replacement/reduction in conventional vehicles or fossil fuels, and EV parking spaces or charging stations are common forms of target-based policy.⁴⁷

5.35 Globally, there are many examples where targets are being employed; countries that adopt targets predominantly have higher EV uptake. The Chinese Government has a target of 5 million EVs on the road by 2020.⁴⁸ The New Zealand EV Programme is targeting 64 000 EVs by 2021, whereas the United Kingdom's Road to Zero Strategy is targeting new EV purchasing to constitute 50–70 per cent of the market by 2030 and 100 per cent by 2040.⁴⁹ In 2016, the South Korean Government announced 'targets of 250 000 electric vehicles and 1 240 000 hybrid vehicles on the road by 2020'.⁵⁰ The Netherlands also has a national target for electric buses of 680 by the end of 2019.⁵¹

5.36 Hobsons Bay Council also stated that some countries—such as The Netherlands, Norway, India, China, France, Germany and the UK—have taken step further and nominated dates for the phase-out of conventional vehicles.⁵²

Government fleet

5.37 As at 1 July 2018, the Australian Government Fleet comprised a total of 12 691 vehicles. Table 5.4 sets out the breakdown of the fleet across vehicle types.

45 Mr Tim Washington, Chief Executive Officer, JET Charge, *Committee Hansard*, 27 September 2018, p. 6.

46 Dr James Prest, Senior Lecturer, College of Law, Australian National University, *Committee Hansard*, 17 August 2018, p. 11.

47 AITI, *Submission 5.1*, p. 3.

48 AITI, *Submission 5.1*, p. 4.

49 Electric Vehicle Council, *Submission 100*, p. 1.

50 Hyundai Motor Company Australia, *Submission 103*, p. [9].

51 Infrastructure Victoria, *Submission 88.1*, p. 48.

52 Hobson's Bay Council, *Submission 52*, p. 6.

Table 5.4: Australian Government Fleet profile by vehicle type⁵³

Fleet Profile	
Vehicle Classification	Volume
Passenger (including SUV)	5 735
Light Commercial	4 816
Heavy Commercial	1 467
Others (trailers & equipment)	626
Motorcycles	47

5.38 There are 10 EVs in the passenger fleet of 5 735 vehicles.⁵⁴

5.39 Mr Jonathon Lathleiff, Senior Manager for Corporate and External Affairs at Toyota Australia, told the Committee that 'there's great value in government having proactive purchasing leadership' in relation to EVs and that this leads to a 'cascade effect' to the broader automotive fleet.⁵⁵ Associate Professor Nelson was also supportive of government fleet targets:

A government fleet EV target, not too dissimilar to AGL's business-specific target, would provide scale and could potentially create a second-hand market for depreciated EVs that would provide an additional avenue for private ownership.⁵⁶

5.40 The Electric Vehicle Council submitted that governments should adopt a 'buy electric first' approach:

Under this arrangement, when a suitable electric model is available, it or they will be the preferred purchasing option—to the exclusion of petrol and diesel alternatives.⁵⁷

53 Department of Finance, Australian Government Fleet Statistics as at 1 July 2018, Additional Information, received 22 January 2019.

54 Department of Finance, Australian Government Fleet Statistics as at 1 July 2018, Additional Information, received 22 January 2019.

55 Mr Jonathon Lathleiff, Senior Manager, Corporate and External Affairs, Toyota Australia, *Committee Hansard*, 31 August 2018, p. 64.

56 Associate Professor Tim Nelson, Chief Economist, AGL Energy, *Committee Hansard*, 31 August 2018, p. 79. See also: City of Adelaide, *Submission 93*, p. 2.

57 Electric Vehicle Council, *Submission 100*, p. 8.

5.41 NHP Electrical Engineering Products (NHP) asserted that a robust local second hand market for 3–4 year old EVs could be established in a 4–8 year timeframe as a result of government EV procurement.⁵⁸

5.42 In addition to the benefits to the second hand market for private buyers, Mr Sam McLean, Senior Manager at Tesla, remarked on some of the other benefits associated with increased EV purchasing in government fleets:

government fleet purchases, which are very important because they fuel the second-hand market, and it also means that fleet providers and companies that manage private fleets change their processes: they look at the total cost calculations, they update their way of rolling out vehicles to include charging stations et cetera. So government fleet targets are a very effective way of driving change not only in government fleets but beyond.⁵⁹

5.43 The UK Government has already committed to 25 per cent of the government car fleet being ultra-low emission vehicles by 2022 and recently announced a goal of 100 per cent of the government car fleet being ultra-low emission by 2030.⁶⁰

5.44 The ACT Government is integrating an increasing number of EVs into the territory government's fleet in the immediate future, and was flagged as an exemplar model for other Australian jurisdictions.⁶¹ The ACT Government outlined its strategy to the Committee:

The Action Plan includes a commitment to ensuring 50 per cent of newly leased Government passenger fleet vehicles are zero emissions vehicles in 2019–20, increasing to 100 per cent of newly leased vehicles from 2020–21. This will mean that the ACT has a zero emissions vehicle fleet of approximately 600 vehicles. There is also an expectation of a growing second hand market as leases expire. In this way Governments can help facilitate a community transition through their own fleet purchasing.⁶²

5.45 In January 2019, the NSW Government announced 'a 10 per cent target for new NSW Government general purpose passenger fleet cars from 2020/21—with 10 per cent of new vehicles purchased or leased by agencies to be electric or hybrid vehicles'.⁶³

58 NHP Electrical Engineering Products, *Submission 95*, p. [4].

59 Mr Sam McLean, Senior Manager, Tesla, *Committee Hansard*, 10 August 2018, p. 7.

60 Department of Transport (UK), *Road to Zero: Next steps towards cleaner roads transport and delivering our industrial strategy*, July 2018, p. 60, available at: <https://www.gov.uk/government/publications/reducing-emissions-from-road-transport-road-to-zero-strategy> (accessed 2 January 2019).

61 See, for example: Hyundai Motor Company Australia, *Submission 103*, p. [9].

62 ACT Government, *Submission 48*, p. 2.

63 NSW Government, *Future Transport 2056: Electric and Hybrid Vehicle Plan*, January 2019, available at: https://www.future.transport.nsw.gov.au/sites/default/files/media/documents/2019/Future_Transport_NSW_Electric_and_Hybrid_vehicle_plan.pdf (accessed 21 January 2019).

5.46 The Parliamentary Budget Office provided modelling setting out the budget implications for meeting government fleet targets of 30, 40 and 50 per cent by 2025 and 2030 respectively over the 2018–19 forward estimates, and these are presented in Table 5.5.

Table 5.5: Budget impact of government fleet targets⁶⁴

Government fleet target (per cent)	Target date – 2025 (fiscal balance \$m to 2021–22)	Target date – 2030 (fiscal balance \$m to 2021–22)
30	-3.0	-1.6
40	-4.0	-2.2
50	-5.0	-2.7

Vehicle emissions standards

5.47 Vehicle emissions standards were explained by the Royal Automobile Club of Western Australia (RACWA):

Vehicle emissions standards set a 'limit' for vehicle emissions. The limit for each vehicle is determined by the weight of the vehicle, known as the 'limit curve'. Vehicles that produce emissions greater than the designated limit have penalties imposed on the manufacturer. Credits and debits are accrued and offset against each other for vehicles that are 'under' or 'over' their designated emissions limit.⁶⁵

5.48 Mr Ali Asghar, Senior Associate, Power, Energy Storage and EVs, Bloomberg New Energy Finance, told the Committee that vehicle emissions standards are 'a major factor' in vehicle manufacturers introducing new EV models to any market.⁶⁶

5.49 Australia's current vehicle emissions standards for new light vehicles is based on the Euro 5 standards. The Ministerial Forum for Vehicle Emissions (Ministerial Forum) is currently reviewing whether Australia should adopt the Euro 6 standards for

64 *Revenue implications of setting mandatory Government fleet electric vehicle purchasing targets*, Parliamentary Budget Office, 11 January 2019, Additional Information, p. 2.

65 Royal Automobile Club of Western Australia, *Submission 117*, p. [5].

66 Mr Ali Asghar, Senior Associate, Power, Energy Storage and EVs, Bloomberg New Energy Finance, *Committee Hansard*, 31 August 2018, p. 11.

light vehicles.⁶⁷ However, as noted in Table 2.1, Australia does not have a light vehicle carbon dioxide (CO₂) emission standard in place.⁶⁸

5.50 The RACWA highlighted how Australia's CO₂ emissions intensity for passenger vehicles compared globally:

According to the National Transport Commission, the CO₂ emissions intensity for passenger cars in Australia during 2017 was 171.5g/km, 45 per cent higher than the European average of 118.5 g/km. The European Union currently has a CO₂ emissions standard of 130g/km which was introduced in 2015. This will be reduced to 95g/km for all new cars by 2021 (phased in from 2020) and plans to reduce that by a further 30 per cent by 2030, with the first 15 per cent reduction required by 2025. The United States' CO₂ standard will be approximately 99g/km by 2025.⁶⁹

5.51 Ms Sarah Fumei, Project Manager at ClimateWorks Australia explained the effect of applying a CO₂ vehicle emission standard:

Vehicle emissions standards would set an average emissions requirement across a manufacturer's fleet and would thereby encourage manufacturers to sell more electric vehicles with zero tailpipe emissions.⁷⁰

5.52 The Committee were told that the Ministerial Forum on Vehicle Emissions (Ministerial Forum) had modelled three standards, 105/119/135 grams of CO₂ per kilometre. Each standard was found to not only provide net economic benefits, but also environmental benefits through greenhouse gas abatement. Counterintuitively, the stronger the standard, the higher the economic benefit to the economy. Ms Fumei elaborated on the net benefits of establishing the most stringent standard of 105 grams of CO₂ per kilometre:

The standard would provide 65 megatons of abatement by 2030, \$27.5 billion in fuel savings and \$13.9 billion of net economic benefit. So it's an important policy and would provide benefits for the Australian economy and for emissions.⁷¹

5.53 At the Melbourne hearing, Mr Anthony Larkins, a member of Professionals Australia and engineer from GM Holden outlined his view on an approach to emissions controls and its benefits:

We should legislate a future-emissions-standard road map, commencing with the implementation of the complete Euro 6d standard, followed by a

67 Department of Infrastructure, Regional Development and Cities, *Vehicle Emissions Standards*, available at: <https://infrastructure.gov.au/vehicles/environment/emission/index.aspx> (accessed 7 January 2019)

68 ClimateWorks Australia, *Submission 46*, Attachment 1, p. 26.

69 RACWA, *Submission 117*, p. [5].

70 Ms Sarah Fumei, Project Manager, ClimateWorks Australia, *Committee Hansard*, 17 August 2018, p. 60.

71 Ms Sarah Fumei, Project Manager, ClimateWorks Australia, *Committee Hansard*, 17 August 2018, p. 60.

continued trajectory of reducing CO₂-grams-per-kilometre targets, helping to improve our fuel security and reduce greenhouse gas emissions. We should consider the implementation of clean-air zones around cities as per most European countries, which will help reduce air and noise pollution from our growing cities.⁷²

5.54 The DELWP submitted that improved fuel consumption labelling on all motor vehicles—new and used—would lead to more informed decision making by consumers and subsequently the types of cars they choose to drive:

The current Australian fuel consumption label on new vehicles discloses direct fuel consumption and CO₂ emission values. According to the International Energy Agency, a label combining direct disclosure and an eye catching comparative rating is the most useful to vehicle purchasers. This combined fuel economy labelling system has been applied in New Zealand. The fuel economy label for new vehicles in New Zealand displays their fuel economy values in litres per 100 kilometres alongside a star rating. The label also displays future financial savings. In addition, the United Kingdom provides an easy to read comparative bar graph that gives an immediate indication of where the vehicle's fuel economy fits within the market.⁷³

5.55 The submission continued:

In addition, several countries, including New Zealand and the United Kingdom, mandate the labelling of fuel economy on new and / or used vehicles. The current Australian labelling system only mandates it for new vehicles.⁷⁴

Evidence relating to the Ministerial Forum on Vehicle Emissions

5.56 At the Committee's first Canberra hearing held on 17 August 2018, the committee received evidence from the Department of Infrastructure, Regional Development and Cities (Department of Infrastructure) and other departments relating to the Ministerial Forum. Senator Patrick asked whether the Ministerial Forum produces minutes, to which Mr Alex Foulds, Executive Director, Surface Transport Division, Department of Infrastructure replied:

No, they don't produce minutes as such.⁷⁵

5.57 At the time, Mr Foulds acknowledged that departmental officials attended these Ministerial Forum meetings. The three departments agreed to provide on notice:

...notebooks of officials that have attended insofar as there are notes relating to electric vehicles.⁷⁶

72 Mr Anthony Larkins, Member, Professionals Australia, *Committee Hansard*, 31 August 2018, p. 48.

73 DELWP, *Submission 129*, p. 12.

74 DELWP, *Submission 129*, p. 12.

75 Mr Alex Foulds, Executive Director, Surface Transport Division, Department of Infrastructure, Regional Development and Cities, *Committee Hansard*, 17 August 2018, p. 75.

5.58 On 13 September 2018, Mr Alex Foulds, then Acting Deputy Secretary, Department of Infrastructure, wrote to the Committee correcting the evidence he provided at the hearing on 17 August 2018.⁷⁷ Mr Foulds noted in his evidence that he had stated that 'the forum had met three times'. Mr Foulds clarified this statement:

In my response I was referring to the number of official stakeholder consultation forums the [Ministerial Forum] has held (7 December 2015, 4 April 2016, 15 February 2017).

The [forum] has also met on nine other occasions (24 November 2015, 4 February 2016, 17 August 2016, 5 June 2017, 4 July 2017, 24 October 2017, 12 February 2018, 29 May 2018, 18 June 2018).⁷⁸

5.59 The Committee received responses to questions taken on notice in late September 2018 from the three departments. The Department of Infrastructure stated that it was unable to provide any further information to the Committee:

...the Department has asked all current officials who attended meetings of the Ministerial Forum on Vehicle Emissions to review their notebooks for meeting notes relating to electric vehicles. The Department can confirm that the relevant notebooks have been destroyed or contained no notes relating to electric vehicles.⁷⁹

5.60 The Department of Industry was also unable to provide additional information⁸⁰ whilst the Department of the Environment provided a more detailed response relating to the Ministerial Forum's meeting of 4 April 2016.⁸¹ The Committee were not provided with any copies of minutes as part of these responses.

5.61 Separate to the Committee's inquiry processes, Senator Patrick made a Freedom of Information (FOI) request on 18 August 2018 to the Department of Infrastructure requesting minutes of the Ministerial Forum. Senator Patrick was provided with draft minutes or notes relating to seven meetings of the Ministerial Forum. Senator Patrick made a second request asking the Department of Infrastructure to undertake an internal review of the FOI, which unearthed additional documents related to meetings of the Ministerial Forum.

76 *Committee Hansard*, 17 August 2018, pp. 75–76.

77 Correspondence from Mr Alex Foulds, Acting Deputy Secretary, Department of Infrastructure, Regional Development and Cities following the committee's public hearing in Canberra on 17 August 2018, dated 13 September 2018.

78 Correspondence from Mr Alex Foulds, Acting Deputy Secretary, Department of Infrastructure, Regional Development and Cities following the committee's public hearing in Canberra on 17 August 2018, dated 13 September 2018.

79 Department of Infrastructure, Regional Development and Cities - answers to questions on notice from public hearing in Canberra on 17 August 2018 (received 25 September 2018).

80 Department of Industry Innovation and Science - answers to questions on notice from public hearing in Canberra on 17 August 2018 (received 24 September 2018).

81 Department of the Environment and Energy - answers to questions on notice from public hearing in Canberra on 17 August 2018 (received 25 September 2018).

5.62 Senator Patrick circulated the FOI response to Committee members. The same material was also attached to correspondence provided to the Committee by Mr Alex Foulds on 22 November 2018.⁸² The minutes indicated that officials from the Department of Industry and the Department of the Environment were also at the Ministerial Forum meetings, as well as officials from the Department of Infrastructure. Meeting minutes for five meetings were not included.⁸³

Correspondence with departments seeking clarification of evidence

5.63 On 23 October 2018, the Committee wrote to Mr Alex Foulds, Department of Infrastructure, and the Secretaries of the Department of the Environment and the Department of Industry requesting a reconsideration of evidence provided to the Committee in relation to the Ministerial Forum in light of the minutes provided pursuant to Senator Patrick's FOI request.

Responses from the Department of Infrastructure

5.64 On 22 October 2018, prior to the Committee sending out its request for clarification, the committee received correspondence from Ms Pip Spence, Deputy Secretary, Department of Infrastructure. This letter noted Mr Foulds' evidence that the Ministerial Forum 'don't produce minutes as such' and acknowledged Senator Patrick's FOI request.⁸⁴

5.65 Ms Spence brought the existence of two Ministerial Forum meeting minutes from 'late 2015 and early 2016' to the Committee's attention (documents that were provided to Senator Patrick as part of an FOI request). Ms Spence acknowledged that the Department of Infrastructure should have clarified the record to draw attention to the draft minutes and apologised for this error. Ms Spence did not provide copies of the minutes.⁸⁵

5.66 On 22 November 2018, Mr Alex Foulds wrote to the Committee. In this letter, Mr Foulds:

- sincerely apologised for not personally clarifying his evidence of 17 August;
- provided draft minutes of some Ministerial Forum meetings as provided to Senator Patrick in an FOI. A subsequent request by Senator Patrick for an internal review of the FOI request identified an additional document that has also been provided to the committee.

82 Correspondence from Mr Alex Foulds, Executive Director, Surface Transport Division, Department of Infrastructure, Regional Development, and Cities, dated 22 November 2018.

83 The following meeting minutes were not included in this or subsequent correspondence to the committee: 17 August 2016, 4 July 2017, 24 October 2017, 29 May 2018, and 18 June 2018.

84 Correspondence from Ms Pip Spence, Deputy Secretary, Department of Infrastructure, Regional Development, and Cities, dated 22 October 2018.

85 Correspondence from Ms Pip Spence, Deputy Secretary, Department of Infrastructure, Regional Development, and Cities, dated 22 October 2018.

- Noted that 'minutes (draft or final) or notes for the other meetings of the Ministerial Forum were not provided as there were either no officials from the department present or no notes were taken'.
- Noted the past topics discussed at the forum.⁸⁶

Responses from the Department of the Environment and the Department of Industry

5.67 The Department of the Environment responded to the Committee's correspondence stating that it would not seek to correct the record and noting that it would defer to the Department of Infrastructure on this matter as Department of Infrastructure provide the secretariat to the Ministerial Forum. In addition, the Department of the Environment provided a brief summary of topics discussed at the Ministerial Forum relating to EVs.⁸⁷

5.68 The Department of Industry stated that it would not seek to correct the record as officers speaking with the Committee on 17 August 2018 were not familiar with the work of the forum. The Department of Industry also stated it would defer to the Department of Infrastructure as the secretariat to the Ministerial Forum. The Department of Industry raised one amendment to its earlier evidence noting that the official who attended Ministerial Forum meetings had actually only attended one meeting of the Ministerial Forum. The department provided a copy of minutes from the second stakeholder engagement session held on 4 April 2016.⁸⁸

5.69 On 4 December 2018, the Committee placed a number of questions on notice in an effort to understand if any records existed for the meetings for which minutes had not been provided. Furthermore, the Committee sought to understand the Department of Infrastructure's processes and obligations with respect to secretariat support for the forum.

5.70 On 17 December 2018, the Department of Infrastructure provided the Committee with answers to questions on notice confirming that notes and minutes for five meetings of the Ministerial Forum did not exist. For the meetings of the Ministerial Forum where no minutes exist, no departmental officials had attended the meetings and the Department of Infrastructure stated that it did not make arrangements for notes or minutes to be taken for meetings which are not attended by departmental officers.⁸⁹

5.71 All witnesses should remain mindful of their duty to correct or clarify evidence at the earliest opportunity. The *Government guidelines for official witnesses*

86 Correspondence from Mr Alex Foulds, Executive Director, Surface transport Division, Department of Infrastructure, Regional Development, and Cities, dated 22 November 2018.

87 Correspondence from Ms Jo Evans, Deputy Secretary, Climate Change and Energy Innovation, Department of the Environment and Energy, dated 5 November 2018.

88 Correspondence from Dr Heather Smith, Secretary, Department of Industry, Innovation and Science, dated 2 November 2018.

89 Department of Infrastructure, Regional Development and Cities, answers to written questions on notice, received 17 December 2018.

before Parliamentary Committees and related matters quite clearly specifies this obligation:

5.6. Correction or clarification of evidence

5.6.1. Witnesses will receive transcripts of their evidence in the days following their appearance. The transcript should be examined promptly to establish whether any evidence needs to be corrected or clarified. On occasions, a witness may become aware of the need for correction or clarification before the receipt of the transcript or, in the case of a written submission, before the commencement of hearings.

5.6.2. Once the need to provide a committee with revised information has been established, it is most important that the committee receive that revised information at the earliest opportunity. In the case of officials who made submissions or appeared as witnesses in relation to the administration and implementation of government policy (but not necessarily those covered by Part 3), the departmental secretary or agency head (or senior official who represented the secretary at the hearing) should be informed that revised information is to be provided. Depending on the nature of the correction, it may also be appropriate to inform the minister. Officials need to keep in mind that, while their evidence remains uncorrected or unclarified they are vulnerable to allegations that they have misled a committee.

5.6.3. Supplementary information for a committee should be forwarded to the committee secretary. If uncertain of the most appropriate way to provide a committee with additional or corrected information, officials should seek the guidance of the committee secretary.⁹⁰

Charging infrastructure

Tenancy laws and building codes for new units and detached dwellings

5.72 The Committee has been told that there are a range of constraints in relation to the installation of home charging infrastructure for current and prospective EV owners. In its submission, Tesla described these barriers, particularly for those who live in apartments or for those who rent their home who are not able to install charging equipment due to inflexible strata rules and landlords.⁹¹

5.73 The International Energy Agency (IEA) observed that a number of countries such as France, Spain, Portugal and the United States have taken steps to 'adapt property laws to simplify and accelerate the process of approval procedures for electric car owners to deploy (private) [charging] infrastructure, notably in rented and/or owned multi-unit dwellings, including in parking garages'.⁹²

90 *Government guidelines for official witnesses before Parliamentary Committees and related matters*, February 2015, pp. 18–19, https://www.pmc.gov.au/sites/default/files/publications/Gov_Guidelines_for_Official_Witnesses_Feb_2015.pdf (accessed 4 December 2018).

91 Tesla, *Submission 92*, p. 10.

92 Energy Networks Australia, *Submission 60.3*, p. 35. See also: Tesla, *Submission 92*, p. 10.

5.74 Consideration also needs to be given to new developments and future EV charging requirements. In its submission, NHP specifically called for mandated charging infrastructure in all new apartment complexes:

NHP recommends that consideration be given to incorporating a clause in the National Construction Code, to require that a given percentage of car parking spaces in new multi-residential builds include AC electric vehicle chargers in the 7kW range. This percentage could start relatively low (for example 5%, one car parking space provided with EV charging per 20 on the plan) and scale up as the transition to electric vehicles in the national fleet increases. The cost of this would be negligible in the scheme of the overall construction cost but would very effectively remove a barrier to early adoption of electric vehicles by residents of apartments. Arrangements for how the energy delivered is metered and paid for can be left to the private sector – many solutions around this already exist and will be deployed wherever deployment of EV charging equipment is required by the code.⁹³

5.75 The submission continued, flagging the indirect benefits of this approach:

An added benefit of this approach is that it will cause every electrician working in apartment construction to become familiar with electric vehicle charging equipment, supporting the future large-scale rollouts that will be needed.⁹⁴

5.76 The IEA noted that France and the EU are taking steps to ensure that all new and renovated apartment complexes are ready for EV charging when it is required:

In France, recent legislation mandated that 50–75% of parking bays in any new or renovated residential building must be pre-installed with conduits that allow the easy installation of [electric vehicle supply equipment (EVSE)] ranging between 7 kW and 22 kW. In commercial buildings, 5–10% of parking bays must have conduits suitable for installing [EVSE] with a power rating of at least 22 kW. The European Commission included similar provisions in a proposal aiming to revise the EU Directive on the Energy Performance of Buildings.⁹⁵

5.77 NHP reported that one of the current Australian Standards for electrical installation in new buildings is acting as a barrier to new developments being ready for EV chargers. NHP noted that if building plans included capacity for EV chargers, the electrical system needs to be wired to 'assume all the [EV] chargers will be running at full capacity all the time'.⁹⁶ The submitter continued:

93 NHP, *Submission 95*, p. [5]. See also: Name withheld, *Submission 86*, p. 15. See also: *Committee Hansard*, 31 August 2018, pp. 51–52.

94 NHP, *Submission 95*, p. [5].

95 Energy Networks Australia, *Submission 60.3*, p. 35.

96 NHP, *Submission 95*, p. [6]. The relevant AS is AS/NZ3000:2018 (Electrical installations: Wiring Rules).

This conservative assumption leads electrical system designers to require a significantly larger upstream supply and network connection than would otherwise be required. This, in turn, leads to the provision for electric vehicle charging being removed from the scope of construction as a cost saving measure. The cost of the electric vehicle charging equipment is often quite small, by comparison to the costs associated with the larger network connection.⁹⁷

5.78 A more measured approach would be to include a smart load management system that schedules EV charging to occur when other electricity use within the complex is at its lowest such as late at night or early in the morning. That would allow EVs to be recharged overnight, but not require a considerable network upgrade that prohibits any EVs being charged in the development. Accordingly, NHP recommended that the Australian Standard be amended in the following way:

Where a smart load management system **is not implemented**, assume all the electric vehicle chargers will be running at full capacity all the time. Where a smart load management system **is implemented**, assume electric vehicle charging load will be effectively limited by the parameters of this system.⁹⁸

Public charging infrastructure

5.79 The Electric Vehicle Council has observed that increasing the number of charging stations is a key factor in increasing EV uptake. The availability of sufficient charging facilities and provisions within the electricity market will be essential to avoid consumer disruption and potential impacts on the power grid. A lack of charging locations to service specific journeys, emergence of queues at charging stations or grid impacts causing localised brownouts (as has occurred in some locations in the UK) would quickly discourage EV uptake.⁹⁹

5.80 Energeia put forward a similar view noting that 'investment in public charging infrastructure, particularly Direct Current Fast Chargers (DCFC), is correlated with high levels of EV uptake globally, as evidenced by the impact of DCFC deployment in Norway'.¹⁰⁰ Energeia also found that under its moderate EV uptake scenario (described in Chapter 2) that 28 370 fast charge "hoses" would be required up to 2040 at a cost of nearly \$1.7 billion (excluding land).¹⁰¹

5.81 The Electric Vehicle Council also flagged that 'access to suitable roadside sites and costly connections to state-owned electricity grids are major inhibitors to

97 NHP Electrical Engineering Products, *Submission 95*, p. [6].

98 NHP Electrical Engineering Products, *Submission 95*, p. [6]. Emphasis in original.

99 Energy Networks Australia, *Submission 60*, p. 5. See also: PwC, 'Recharging the economy: The economic impact of accelerating electric vehicle adoption', July 2018, p. 11, <http://electricvehiclecouncil.com.au/wp-content/uploads/2015/05/Recharging-the-economy.pdf> (accessed 1 November 2018).

100 Australian Renewable Energy Agency, *Submission 99.2*, p. 3.

101 Australian Renewable Energy Agency, *Submission 99.2*, p. 8.

establishing charging stations.¹⁰² Furthermore, 'processes to plan, assess or construct electric vehicle charging sites are non-existent within most governments', and the lack of information and regulatory capacity are impeding the roll-out by private companies.

5.82 With the bulk of charging occurring at home, the rollout of public charging infrastructure will need to be driven by a coordinated strategy to ensure that high value infrastructure is located where needed and not duplicated. The ACT Government has called for 'a coordinated approach to supporting installation of a strategic network of charging stations in capital cities, at national institutions, regional centres and rural areas'.¹⁰³

5.83 In Chapter 4 of the report, the Committee has discussed the public charging infrastructure plans of the Queensland and ACT Government, the RAC in Western Australia, and the NRMA in NSW. The IEA has stated that some countries are aiming to establish EV charging stations along major highways at an interval of between 45 and 115 kilometres (kms). As an example, the Chinese Government aims to install a total of 800 highway chargers with a minimum distance between chargers of about 50km by 2020.¹⁰⁴ By comparison, the United States aims to install 900 chargers at a minimum interval of approximately 115km in the same time period.¹⁰⁵ Fast Cities Australia cited recent research that found that 'a national network of 200 regular DC fast chargers (100 x dual-charger sites)...would be equivalent to a \$1 000 direct consumer incentive'.¹⁰⁶

5.84 Mr Rodger Whitby, Chief Executive Officer, St Baker Energy Innovation Fund, explained that the public confidence and increased uptake of EVs hinged on the rollout of public chargers, but that private investors took on huge risk in the early years until demand for the chargers caught up:

...the Fast Cities project is a bold move to build critical infrastructure here in Australia well ahead of the minimal viable uptake level of EVs. It's a chicken-and-egg scenario. If the infrastructure is not built, the EVs will not come, but, until the EVs come, the infrastructure is not viable. So this investment is a huge risk for private investors such as ourselves, and we are actively seeking ways to share that risk with others, including, for instance, [Australian Renewable Energy Agency (ARENA)].

5.85 In addition, the DELWP identified regional and rural areas as 'less enticing for private investment':

Tourists and residents are more likely to rely on public charging stations in regional and rural areas. Those living in rural areas travel further to access

102 Electric Vehicle Council, NRMA, St Baker Energy Innovation Fund, PwC, 'Recharging the economy: The economic impact of accelerating electric vehicle adoption', July 2018, p. 11.

103 ACT Government, *Submission 48*, p. 4.

104 International Energy Agency, *Global EV Outlook 2018*, May 2018, pp. 47–48, <https://www.iea.org/gevo2018/> (accessed 1 November 2018).

105 International Energy Agency, *Global EV Outlook 2018*, May 2018, pp. 47–48.

106 FCA, *Submission 64*, p. 6.

services than metropolitan residents, including education and employment precincts, and do not have as many public transport options. Vehicle ownership is perceived as more of a necessity for those living in regional Victoria. Similarly, tourists driving through regional Victoria need easy access to public charging infrastructure along popular tourist routes.¹⁰⁷

5.86 Environment Victoria submitted that the federal, state and territory governments need to establish targets for public charging stations and adopt policies that encourage the rollout of public charging station infrastructure:

This can be achieved by offering rebates for developing public charging stations in the locations where they are most needed to encourage a broad coverage of charging stations across the state and avoiding clusters in affluent areas. Governments can draw from the experience of New Hampshire in the USA, where the government has successfully incentivised the rollout of charging stations through reverse auctions for publicly available charging stations in priority areas. Under this scheme the government has subsidised bids that offer best value-for-money stations in priority locations.¹⁰⁸

5.87 The Australian Logistics Council advocated that the Clean Energy Finance Corporation (CEFC) should 'provide low interest finance to companies in order to install' EV charging infrastructure.¹⁰⁹

5.88 In its submission the CEFC noted it 'is in discussion with EV charging network developers with a view to investing in commercial EV charging networks'.¹¹⁰

Education and familiarisation

5.89 One of the challenges the Committee covered earlier in the report was concerns that consumers have about the reliability or range capability of EVs. The AITI explained that increased familiarisation of drivers with EVs can improve their acceptance of the new technology:

...research has noted through the experience of drivers that a 'learning phase' is essential to successful behavioural change processes. Drivers must be immersed in the experience of driving an EV to feel confident in the knowledge that a range of factors—such as the 'quietness' of EVs and the need to plan lifestyles around the much shorter range of EVs compared to ICEs—defines the parameters of their attitude and behavioural changes.¹¹¹

5.90 In its submission, the Tesla Owners Club of Australia (TOC) spelt out the benefits of an education program to dispel some of the myths around EVs:

107 DELWP, *Submission 129*, p. [9].

108 Environment Victoria, *Submission 102*, p. [2].

109 ALC, *Submission 104*, p. 13.

110 Clean Energy Finance Corporation, *Submission 31*, p. 1.

111 AITI, *Submission 5*, pp. 3–4. See also: Labeye, E., Hugot, M., Brusque, C., & Regan, M. A. (2016). The electric vehicle: A new driving experience involving specific skills and rules. *Transportation Research Part F: Traffic Psychology and Behaviour*, 37, pp. 27–40

Whilst much focus is placed upon the green credentials of electric vehicles, we see a surprisingly diverse set of drivers from [TOC] members in choosing a Tesla electric vehicle. These include outright performance of the vehicle, the technology, freedom from the oil supply chain, reduced running costs, disruptive change to the automotive industry and the overall superior driving experience. Much of the public resistance to electric vehicles relates to outdated concepts regarding the range, charging times, cost of electricity and a reduction in the fun of driving.¹¹²

5.91 The Australian Electric Vehicle Association of South Australia remarked on the use of sport as a means to 'capture the public's imagination' and to show that EVs are high performance machines. The submitter called for Adelaide to host a round of the Formula E:

There is growing interest in the electrification of motor sports. Recently an electric vehicle won Pikes Peak and the Goodwood Festival of Speed. Motor racing captures the public's imagination. In the case of EVs it removes the myth that EVs do not perform.

By hosting a round of the Formula E in Adelaide, there would be more than just the race, but a host of aligned activities with a focus on e-mobility.

Racing also spawns innovation. For example Renault and Jaguar have used Formula E as a testing ground for their road going vehicles, in particular battery management.

This event would dovetail nicely into EV manufacturing in the state, as the innovation demonstrated on the track has the potential to be transferred quickly to the road going vehicles.

By hosting a round of the Formula E in Adelaide, it would build on Adelaide's rich history of staging major motor sports events and see Adelaide become the focal point for electric vehicles within the region.¹¹³

5.92 The DELWP observed that 'some manufacturers use their own fleet and demonstrator vehicles for promotion and education',¹¹⁴ but TOC reported that car dealerships were not providing prospective EV buyers with all of the facts:

It is noted that traditional car dealerships have generally not been good at promoting electric vehicles either due to lack of staff education or a conscious decision to not promote the new technology which needs less after sales service support (which drives their profitability).¹¹⁵

5.93 FCAI said that original equipment manufacturers, through their dealerships, were willing to bring EVs to the market, and provide ongoing maintenance and service to the vehicle over its life. Dealerships are investing in the equipment required to service EVs as Mr Tony Weber, Chief Executive Officer, FCAI explained:

112 Tesla Owners Club of Australia, *Submission 28*, p. 6.

113 AEVA—SA, *Submission 69*, p. 4.

114 DELWP, *Submission 129*, p. 7.

115 Tesla Owners Club of Australia, *Submission 28*, p. 6.

we don't sell just a product; we also sell a service to consumers. Part of that service is that we train the technicians or the mechanics so that they are in the right place to actually be able to service and maintain your vehicle. They provide the dealerships with the right diagnostic tools so that they can actually work on the vehicles. So, the important part is not only to bring the vehicle to market but to actually maintain and service that vehicle across its life.¹¹⁶

5.94 A number of submitters recommended that a consumer education campaign be developed to raise awareness of the benefits of EVs.¹¹⁷ HMA suggested that an education program could include EV demonstrations and trials.¹¹⁸ AITI noted the establishment of an EV Experience Centre in the UK and the "Plug'n'Drive" EV Discovery Centre in Toronto, Canada which 'aims to help residents understand the benefits of EVs'.¹¹⁹ The AITI has suggested that a similar centre known as a Future Mobility Centre could be established in Australia to enable members of the public to become familiar with EVs in a non-sales environment.¹²⁰

Upskilling and training service technicians

5.95 The forecast increase in EVs will require service centres and the technicians they employ to focus on developing new skills and the use of new diagnostic equipment. The Australian Automotive Dealer Association expressed their views on expected changes in the vehicle servicing sector:

It is also important to note that when these vehicles do need repairs, they will require appropriately trained technicians as EVs pose an increased risk of electrocution and fire. In fact, the emergence of EVs will necessitate significant changes in skills and training requirements which will be needed to service and maintain an increasingly electrified fleet.¹²¹

5.96 The Australian Automotive Aftermarket Association articulated a similar concern noting the possible future shortage of suitably qualified service technicians:

The most immediate concern is likely to be the availability of suitably trained technicians to service and maintain vehicles to ensure roadworthiness and road safety. Whilst these vehicles will have fewer serviceable components, EVs generate heat and friction and these components will require maintenance and servicing.¹²²

116 Mr Tony Weber, CEO, FCAI, *Committee Hansard*, 18 October 2018, p. 19.

117 See, for example: Electric Vehicle Council, *Submission 100*, p. 6; Mr David Lloyd, *Submission 22*, p. 3; AEVA—SA, *Submission 69*, p. 1; ITM Power, *Submission 74*, p. [3].

118 HMA, *Submission 73*, p. [4].

119 AITI, *Submission 5*, p. 3.

120 AITI, *Submission 5*, p. 4.

121 Australian Automotive Dealer Association, *Submission 54*, pp. 5–6.

122 Australian Automotive Aftermarket Association, *Submission 37*, p. 2.

5.97 The Victorian Automobile Chamber of Commerce (VACC) was mindful that the servicing sector would face the competing pressures of less work for businesses (as EVs require less servicing than conventional vehicles) whilst also fundamentally changing the types of skills required by technicians in the sector:

[There] will also [be a reduction in] the volume of work for automotive mechanical repair businesses given the greater reliability of EVs and their need for less servicing and maintenance. The technical sophistication of electric vehicles will also require investment in upskilling within the sector. Diagnostics, programming and coding skills for vehicle technicians will be essential to remedy 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, as EVs establish a greater presence in the vehicle fleet.

5.98 On this point, Sage Automation advised that 'as our vehicles become smarter, traditional mechanical jobs will become high-end technician roles, responsible for vehicle control systems that integrate with intelligent road technology'.¹²³

5.99 VACC recommended that a comprehensive Certificate 3 level training qualification for emerging [EV] technician roles' be developed with a focus on 'appropriate theory and training in electrical and battery systems, diagnostics, programming and other core requirements pertaining to the service and repair of EVs'.¹²⁴

Importation of second hand EVs

5.100 Vehicle pricing forms a significant barrier to uptake as the costs of new model EVs are considerably higher than conventional counterparts. As raised earlier in this chapter, the formation of a large second hand EV market would help to underpin a more affordable entry point for prospective private EV buyers. The Australian Imported Motor Vehicle Industry Association (AIMVIA) observed that:

A large proportion of Australian car buyers are simply not in a position to afford a new environmental vehicle, irrespective of their desire to reduce their vehicle running costs or carbon footprint.¹²⁵

5.101 AIMVIA continued:

Sluggish sales of new environmental vehicles in Australia over a number of years has meant that used environmental vehicles are in exceptionally short supply, representing just 0.07% of the total used vehicle market. This chronic lack of availability has in turn pushed up the price of used EVs, making them even less attractive to potential buyers.

123 Sage Automation, *Submission 84*, p. [6].

124 VACC, *Submission 26*, p. 15

125 AIMVIA, *Submission 57*, p. 4.

5.102 Nichibo Australia submitted that allowing the import of second hand vehicles will 'mean that car manufacturers will need to be more price competitive on Environmental Vehicles otherwise they will risk losing market share to vehicles imported via the concessional pathway'.¹²⁶

5.103 The AEVA referred to the experience in New Zealand where barriers to second hand imports have been removed and there has been a surge in EV uptake as a consequence.¹²⁷

5.104 Currently, second hand vehicles can be imported into Australia under the specialist and enthusiasts register if they meet two of four criteria relating to appearance, unusual design features, performance and appearance in specialist motoring magazines. AIMVIA noted that the Road Vehicle Standards (RVS) Bill 2018 is currently being considered by the Australian Parliament.¹²⁸ The then Minister for Urban Infrastructure and Cities, Hon Paul Fletcher MP, explained one of the purposes of the bill:

The bill simplifies and clarifies arrangements for the importation of vehicles granted concessions against the national standards by consolidating the current pathways into one concessional entry pathway. It also expands the range of vehicles that can be considered under the specialist and enthusiast vehicle provisions.¹²⁹

5.105 As part of this bill, a new Environmental Vehicle criterion is to be included under the Specialist and Enthusiast Vehicle Scheme. AIMVIA explained the effect of this proposed change:

In essence, the proposed Bill and Rules will soon permit the independent importation of vehicles (both new and used) that use an alternative method of propulsion to internal combustion engines, or use an alternative method or propulsion in conjunction with an internal combustion engine.¹³⁰

5.106 AIMVIA suggested that the current RVS rules be amended to 'allow all environmental vehicles to be considered eligible for independent importation, irrespective of whether have been previously sold by the OEM in Australia, but only after they cease being sold new in dealerships'.¹³¹ AIMVIA argued that this change would result in 'approximately 2000 more environmental vehicles [entering] the Australian market per annum, at far more affordable prices than the new EVs currently available'.¹³²

126 Nichibo Australia, *Submission 118*, p. 4.

127 AEVA, *Submission 8*, p. 3.

128 AIMVIA, *Submission 57*, p. 6.

129 Hon Paul Fletcher MP, Minister for Urban Infrastructure and Cities, Road Vehicle Standards Bill 2018, *Second Reading Speech*, 7 February 2018, pp. 494–495.

130 AIMVIA, *Submission 57*, p. 6.

131 AIMVIA, *Submission 57*, p. 6.

132 AIMVIA, *Submission 57*, p. 6.

5.107 Mr Tony Weber, Chief Executive Officer of the FCAI argued against allowing second hand imports pointing out that there are a range of safety and regulatory issues associated with importing second hand vehicles into the Australian market:

The problem is that the individual who buys that car has no rights under the domestic law and is subject to the laws of the original country of that vehicle. So, if I purchase a second-hand Japanese car and I have an issue with it, I need to go to the Japanese legal system for my protections.¹³³

5.108 Nichibo Australia advocated for a 'cautious, staged approach, combined with appropriate consumer protections, would go a long way to increase the Environmental Vehicle fleet in Australia without subsidies'.¹³⁴

Supporting manufacturing and value chain activities

5.109 Chapter 4 examines the opportunities and challenges for manufacturing and value chain activities associated with EVs. This section builds on that discussion and explores a range of mechanisms that would support Australian industry including:

- Industry assistance;
- An industry plan; and
- Training.

Industry assistance

Boosting domestic EV demand

5.110 Earlier parts of this chapter have focused on how governments might directly support consumers to purchase new EVs through a range of incentives. Increasing domestic demand could help to stimulate local supply chains.

5.111 There are a number of other countries that are providing funding and support to increase EV uptake. The New Zealand Energy Efficiency and Conservation Authority (EECA) has 'established a contestable fund to encourage innovation and investment in promoting, enabling and/or accelerating the uptake of electric and other low emission vehicles in New Zealand'.¹³⁵ Mr Tony Fairweather, Group Managing Director at SEA Electric described how his Australian-based company is a beneficiary of this fund:

Yes, it's been a fantastic initiative that we've benefited from as a supplier of commercial electric vehicles in New Zealand, as have the operators over there. It's a funding program through EECA...the EECA contestable fund. The concept behind the fund is that every three months the New Zealand

133 Mr Tony Weber, Chief Executive Officer, Federal Chamber of Automotive Industries, *Committee Hansard*, 18 October 2018, p. 17.

134 Nichibo Australia Pty Ltd, *Submission 118*, p. 5.

135 New Zealand Energy Efficiency and Conservation Fund, *Low Emission Vehicles Contestable Fund*, August 2017, <https://www.eeca.govt.nz/funding-and-support/low-emission-vehicles-contestable-fund/> (accessed 5 November 2018).

government releases a certain amount of funding, somewhere in the vicinity of \$4 million or \$5 million. Companies, end users, have the ability to submit an EV, an electric-vehicle-related initiative, that they would like some funding for from that fund on a quarterly basis.¹³⁶

5.112 Mr Fairweather continued:

The funding is 50 per cent of what's required to approve submissions, up to a million dollars. Most of them are around the \$200,000 or \$300,000 mark. Typically, for one vehicle or a couple of charging stations on a property, they try to approve different submissions. There's been some rubbish trucks that we've been lucky enough to supply over there. But, once rubbish trucks in Auckland have been fulfilled, they'll look at other initiatives like concrete mixers. We were also lucky enough to be able to supply five delivery vehicles for a company over there called Countdown, which is essentially Woolworths. We supplied them with their first electric home-delivery vehicles with refrigerated bodies, which were 50 per cent funded by the New Zealand government. The initiative has very much accelerated EV uptake for those wanting to test and try and feel and get an understanding for EV. I think the initiative is great and it's proven extremely successful in New Zealand. They're up to around [round] five, I think, at the moment.¹³⁷

Existing government programs and grants

5.113 The Department of Industry, Innovation and Science (Department of Industry) indicated that the Australian Government is supporting Australian industry in a number of ways:

The Australian Government has a range of programs that build business capabilities in many aspects of Australian manufacturing and services. These programs can help businesses to participate in the global supply chains of multinational car makers manufacturing EVs. The programs include the: \$100 million Advanced Manufacturing Fund; Automotive Transformation Scheme; Entrepreneurs' Programme; Industry Growth Centres Initiative; Cooperative Research Centres (CRC) program; R&D Tax Incentive; and CSIRO.¹³⁸

5.114 These schemes are briefly described below:

- The Research and Development (R&D) tax incentive 'is the government's key mechanism to stimulate Australian industry investment in R&D' offering 'tax offsets for eligible R&D expenditure'.¹³⁹
- The Automotive Transformation Scheme (ATS) is discussed in Chapter 4. The ATS was established in 2011 to encourage businesses in the automotive

136 Mr Tony Fairweather, Group Managing Director, SEA Electric, *Committee Hansard*, 31 August 2018, p. 2.

137 Mr Tony Fairweather, Group Managing Director, SEA Electric, *Committee Hansard*, 31 August 2018, p. 2.

138 Department of Industry, Innovation and Science, *Submission 112*, p. 11.

139 Department of Industry, Innovation and Science, *Submission 112*, p. 15.

sector to upgrade equipment and engage in innovation and R&D. The ATS 'encourages competitive investment and economic sustainability in the Australian automotive industry'.¹⁴⁰

- The \$155 million Growth Fund was established as a joint exercise between the federal, Victorian and South Australian Governments, and Toyota and Holden in response to the announced closure of the Toyota and Holden car-making plants in Australia. The majority of this funding has been allocated as grants to a number of companies seeking to diversify their businesses away from Toyota and Holden. The balance of the fund is dedicated to training and job placement for retrenched staff.¹⁴¹
- The Advanced Manufacturing Growth Fund is valued at \$100 million and was established to 'help industry in South Australia and Victoria be more competitive through innovative processes and equipment'.¹⁴² The Department of Industry has also flagged the importance of the industry growth initiative—in particular, the Advanced Manufacturing Growth Centre and the Mining Equipment, Technology and Services Growth Centre—and the Cooperative Research Centres Program, specifically iMove CRC.¹⁴³

5.115 The Australian Renewable Energy Agency (ARENA) described its remit and what projects are eligible for funding:

Under the *Australian Renewable Energy Agency Act 2011*, ARENA is permitted to provide financial assistance (grants) for research, development, demonstration, commercialisation and deployment of renewable energy technologies and the storage and sharing of information and knowledge about these technologies. Renewable energy technologies include "hybrid", "enabling" or "related" technologies. These can include technologies and approaches such as energy storage, load shifting, electrification, fuel switching and energy efficiency, where these use, enable or support greater deployment of renewable energy.

5.116 Notwithstanding ARENA's broad remit, its direct investment in EV projects is currently limited to research projects with no clear engagement with industry.¹⁴⁴

5.117 State governments are also providing industry support. The Centre for Energy and Environmental Markets at the University of NSW (CEEM UNSW) submitted that 'the South Australian Government has awarded Precision Buses a \$2 [million] grant for electric buses and the Victorian Government [awarded] SEA Automotive \$517 000 for commercial vehicles'.¹⁴⁵

140 Department of Industry, Innovation and Science, *Submission 112*, p. 13.

141 Department of Industry, Innovation and Science, *Submission 112*, p. 12.

142 Department of Industry, Innovation and Science, *Submission 112*, p. 12.

143 Department of Industry, Innovation and Science, *Submission 112*, pp. 14–15.

144 ARENA, *Submission 99*, pp. 2–3.

145 CEEM UNSW, *Submission 65*, p. 13.

Importance of industry grants and government support

5.118 The Committee heard that Australian-based public charger manufacturers Chargefox and Tritium had applied for ARENA grants in the past and were in the process of seeking funding from ARENA.¹⁴⁶

5.119 Dr Paul Sernia, Chief Product Officer, Tritium explained the importance of grants as the stimulus for Tritium's growth during its formative years:

I'd also add that really we have benefited from government grants. There are two things which are always important: the amount of money you get and the timing of the money. So often, early in the day, we weren't getting a lot of money out of those grants, but they were very important in pushing us along to the next stage. I'd highlight that one of the key ones was, at the time—this was in 2011—that there was a federal Commercialisation Australia innovation grant scheme, and that was fundamental to us receiving our first private investment into the company. That matched those funds 50-50, so we received a \$1.15 million grant and were able to raise \$1.15 million in private investment. A part of the conditions of that investment was a successful grant outcome, so that's a good example.¹⁴⁷

5.120 Whilst acknowledging that Tritium had received about \$6 million in grants since 2005, Tritium also noted that some grant programs were not able to be accessed by those in the EV supply and value chain:

...access to grants and funding specifically focused on the Automotive sector are not readily applicable for businesses in the EV industry. For example, the Automotive Transformation Scheme (ATS) criteria are not applicable for businesses in the EV supply and value chain.¹⁴⁸

5.121 Dr Sernia also reasoned that requirements relating to eligibility for CEFC and ARENA grants could be broadened to recognise the embedded energy storage inherent in EVs:

Perhaps another example is the potential for electric vehicles to be used as energy storage devices. Similar to solar schemes, if energy storage schemes are being looked at in the future, perhaps electric vehicles should fall within the scope of those as well.¹⁴⁹

5.122 Tritium indicated that it had benefited from existing federal R&D tax incentives.¹⁵⁰ Mr Warren Pearce, Chief Executive Officer of the Association of Mining and Exploration Companies expressed concerns about the government's proposed changes to the R&D tax incentives:

146 Dr Paul Sernia, Chief Product Officer, Tritium, *Committee Hansard*, 27 September 2018, p. 4.

147 Dr Paul Sernia, Chief Product Officer, Tritium, *Committee Hansard*, 27 September 2018, p. 3.

148 Tritium, *Submission 58*, p. [5].

149 Dr Paul Sernia, Chief Product Officer, Tritium, *Committee Hansard*, 27 September 2018, p. 3.

150 Dr Paul Sernia, Chief Product Officer, Tritium, *Committee Hansard*, 27 September 2018, p. 3.

Our concern is that, in this space where we're trying to encourage companies to get into processing and refining and potentially into electrochemical processing into the third stage, there is going to be a significant R&D component to that and we wouldn't like to see that opportunity lost as an unforeseen consequence of the change.¹⁵¹

5.123 In a report produced for ARENA and the CEFC, Energeia found that government grants assisted public charging network operators offset the high cost of establishing the network:

Our research has identified a number of clear winners in the public charging infrastructure market including ChargePoint, SemaConnect and New Motion, all originally independent players focused on [Level 2 slow] charging technology development that have leveraged revenue from government grants and third party charging infrastructure owners and operators to address the high capital requirements of infrastructure deployment.¹⁵²

5.124 Mr Paul Fox, Head of Corporate Development at Fast Cities Australia explained that Fast Cities Australia is seeking to develop a fast charging network around Australia. Mr Fox contended that his company would benefit if it could successfully acquire a government loan equating to about 50 per cent of the network's cost with the remaining 50 per cent being funded by private investors.¹⁵³

5.125 The Australian Logistics Council suggested that the Smart Cities and Suburbs Programs (known as City Deals) should be leveraged to 'further develop charging infrastructure and encourage planning regimes favourable to' EV use.¹⁵⁴

5.126 Deakin University explained that its battery materials research program, BatTRI-Hub is funded through both Australian Research Council and Centre of Excellence grants. Deakin explained the value of this work:

This research is geared towards the development of the next generation of battery technologies such as lithium-sulphur and lithium metal batteries that offer substantially longer battery life, improved safety and high temperature operation. The research group has engaged with international companies including Honda, Toyota and Cytec/Solvay to develop new materials and now has a state-of-the art, flexible prototyping facility for electrochemical devices including advanced Li-ion, Li metal, sodium-ion and battery-supercapacitor hybrid prototypes.¹⁵⁵

151 Mr Warren Pearce, Chief Executive Officer, Association of Mining and Exploration Companies, *Committee Hansard*, 17 August 2018, p. 28. See also: AMEC, *Submission 20.3*, p. 3.

152 Energy Networks Australia, *Submission 60.5*, p. 64. See also: Energeia, *Australian Electric Vehicle Market Study*, May 2018, prepared for ARENA and CEFC.

153 Mr Paul Fox, Head, Corporate Development, Fast Cities Australia, *Committee Hansard*, 27 September 2018, p. 27.

154 ALC, *Submission 104*, p. 14.

155 Deakin University, *Submission 35*, p. 4.

5.127 The submission continued, explaining the commercial linkages that this research has fostered:

The research program has led to the filing of several materials patents and the group has engaged with local chemical companies such as Boron Molecular on the synthesis and upscaling of materials for wider use in battery research. The battery materials characterisation expertise within the group offers a major opportunity to support the chemical synthesis and characterisation for an electric vehicle manufacturing sector.¹⁵⁶

Procurement

5.128 Some submitters raised government procurement policy as an area which could be used to support local EV manufacturing. State and territory governments in Australia are also acting to boost demand. The Queensland Government's fleet manager QFleet 'has committed to doubling the number of EVs in its leased fleet each year over the next four years'.¹⁵⁷ The City of Adelaide told the Committee that it will seek to transition its entire fleet to EV by 2030.¹⁵⁸

5.129 Public transport procurement is another area which could drive EV demand and associated local job creation. Mr Christian Reynolds, Director of Precision Buses observed that the City of London aims to convert its entire fleet of 4 000 buses to EVs by 2020. Australia has nearly 100 000 buses with about 500 replaced annually.¹⁵⁹ One submitter argued that the bus manufacturing sector could be the catalyst to rebuild Australia's industrial base:

Australia has a nascent electric bus manufacturing industry in South Australia and Victoria and there exists an opportunity there to revive Australia's manufacturing expertise.¹⁶⁰

5.130 In a response to a question taken on notice, the Queensland Department of Transport and Main Roads (DTMR) explained the role of the Local Benefits Test within the Queensland Government's procurement policy:

The Queensland Procurement Policy does not prevent suppliers tendering for its contracts. The Policy requires the application of a Local Benefits Test for all significant procurement. The Local Benefits Test focuses on the benefits that any supplier can bring to the local area.¹⁶¹

156 Deakin University, *Submission 35*, p. 4.

157 Queensland Government Department of Transport and Main Roads, *Submission 43*, p. 4. See also: ACT Government, *Submission 48*, p. 2.

158 Ms Michelle English, Associate Director, Sustainability, City of Adelaide, *Committee Hansard*, 10 August 2018, p. 52.

159 Mr Christian Reynolds, Director, Precision Buses, *Committee Hansard*, 10 August 2018, p. 23.

160 Doctors for the Environment, *Submission 50*, p. 9.

161 Department of Transport and Main Roads Queensland - answers to questions taken on notice from public hearing in Brisbane on 27 September 2018 (received 19 October 2018)

5.131 The ACT Government acknowledged that it has a similar procurement requirement for 'local industry participation' which includes 'employment of local people, the training of local people or commitment to a trades course'.¹⁶² Ms Michelle English, Associate Director, Sustainability, City of Adelaide said that 'council's procurement policy certainly has a weighting for South Australian companies'.¹⁶³

5.132 Mr David Smith, Secretary of the Vehicle Division at the Australian Manufacturing Workers Union suggested how local content rules within a procurement framework might take practical shape:

Ensuring that those cars that we bring into Australia have local content in them with the battery would be a good place to start.¹⁶⁴

5.133 In a response to a question taken on notice, the ACTU called for a re-write of the Commonwealth Procurement Rules:

The rules must be required to be applied in a manner that consistently and correctly ensures overall economic benefits from tenders are considered when assessing value for money, rather than just an assessment of the cheapest cost.¹⁶⁵

5.134 Sage Automation claimed that there is a need for a step-change in how procurement is undertaken moving away from open tenders to more collaborative processes that allow for specifications to be developed and optimised throughout the procurement process:

Procurement models need to move from the current open tender process to a collaborative procurement model based upon an agile framework. Whilst transport tender writers have a view of what they are looking to achieve, they lack the technical expertise to clearly specify it within tender documents. This results in missed opportunities to deliver the step change advancement of our transport and infrastructure we require. Agile tender documentation includes the vision and outcome but uses a collaborative approach and specialist expertise to specify advancement and an outcome that is more cost effective in the end. Some upskilling of governments and councils in this area will also help to acquire the understanding of incorporating fast advancing technology into long-term programs of work.¹⁶⁶

162 Mr Geoffrey Rutledge, Deputy Director-General, Sustainability and the Built Environment, Environment, Planning and Sustainable Development Directorate, Australian Capital Territory, *Committee Hansard*, 17 August 2018, pp. 5–6.

163 Ms Michelle English, Associate Director, Sustainability, City of Adelaide, *Committee Hansard*, 10 August 2018, p. 52.

164 Mr David Smith, Secretary, Vehicle Division and Assistant National Secretary, Australian Manufacturing Workers Union, *Committee Hansard*, 31 August 2018, p. 49.

165 Australian Council of Trade - answers to questions on notice from public hearing in Melbourne on 31 August 2018 (received 27 September 2018).

166 Sage Automation, *Submission 84*, p. 7.

An industry plan

5.135 The Committee has received no evidence of a clear, coherent and comprehensive federal government policy position supporting the development of an EV industry. Further, it is also not clear whether there is any crossover or overarching strategy in relation to the transitional automotive sector funds—ATS, the \$155 million Growth Fund—the Advanced Manufacturing Growth Fund and research grants.

5.136 This lack of leadership by the federal government was highlighted in evidence to the Committee. Mr Lance McCallum, National Campaign Coordinator at the Australian Council of Trade Unions spoke about whether Australia should have started making plans some time ago for the domestic manufacture of EVs and associated componentry:

if you've got a time machine, or if you had one, I would say we should definitely have a serious conversation about maybe getting in that time machine and going back five years or seven years, or possibly even 10 years and maybe doing things a bit differently, in terms of creating a space for EVs domestically here in Australia.¹⁶⁷

5.137 Mr McCallum noted that 'it would be nice to have some industry plans in a number of different industries' including EVs.¹⁶⁸ Ideally, these plans would recognise the development of advanced manufacturing techniques, the rise of Industry 4.0 and the specific needs of the local Australian EV sector.¹⁶⁹

5.138 CEEM UNSW explained some of the risks of a coordinated approach:

The risk is of course that the price of such coherence in Australia would often seem to be "lowest common denominator" outcomes that stifle technology innovation and progress.¹⁷⁰

5.139 Whilst acknowledging these risks, CEEM UNSW described the role of different jurisdictions in developing and adopting an industry strategy:

particularly in still emerging electric mobility areas, we need frameworks that allow different jurisdictions to support different pilots and trials, while seeking federal and State government policy measures to drive wider deployment and value adding progress.¹⁷¹

5.140 Sage Automation stated that any policy approach should be driven by a focus on local Australian businesses through targeted grants whilst noting that 'attracting off-shore manufacturers to set up shop in Australia' could become possible with new

167 Mr Lance McCallum, National Campaign Coordinator, Australian Council of Trade Unions, *Committee Hansard*, 31 August 2018, p. 54.

168 Mr Lance McCallum, National Campaign Coordinator, Australian Council of Trade Unions, *Committee Hansard*, 31 August 2018, p. 54.

169 Mr Lance McCallum, National Campaign Coordinator, Australian Council of Trade Unions, *Committee Hansard*, 31 August 2018, p. 54.

170 CEEM UNSW, *Submission 65*, p. 13.

171 CEEM UNSW, *Submission 65*, p. 13.

models of automotive manufacturing focused on upgrading vehicles. Sage Automation cautioned that this could only happen in the presence of an efficient and capable workforce.¹⁷²

Training the EV workforce

5.141 Building on the discussion in Chapter 4 about the large, highly skilled and experienced automotive workforce in Australia, the Committee has been told that with specific and targeted training, this workforce is ready to employ their expertise in the emerging EV sector.¹⁷³ The DTMR highlighted the prospective job opportunities in this sector:

Clean energy and eco-friendly jobs are considered to be one area of future job growth. These industries will require new skills and training programs to ensure these future industries have a capable and available workforce. This includes ensuring that future workforces are appropriately qualified in science, technology, engineering and mathematics (STEM) fields. Industry development programs should also be considered alongside appropriate education and skills training programs.¹⁷⁴

5.142 The DTMR continued:

These industries will require new skills and training programs to ensure that these future industries have a capable and available workforce. Industry development programs should also be considered alongside appropriate education and skills training programs.¹⁷⁵

5.143 The ACTU also supported training workers in this area and acknowledged that the EV sector's workforce requirements would be quite diverse:

The training of qualified workers in this field must be a priority. While small, there is already a growing electric conversions industry in Australia and it is integral that this work is done by trained and qualified workers to ensure that it is done safely. Building a qualified and effective EV production workforce would also serve to provide safe and qualified workers to industries like EV conversions and battery production.¹⁷⁶

5.144 The TOC indicated that any future manufacturing would most likely take place in the context of automation requiring a highly skilled workforce.¹⁷⁷

5.145 Deakin University noted that there is currently a shortage of skilled graduates in the automotive sector. Acknowledging the increased role of automation, Deakin University highlighted the diverse range of skills that graduates in this sector would require in the future:

172 Sage Automation, *Submission 84*, p. 8.

173 See: CEEM UNSW, *Submission 65*, p. 11.

174 DTMR, *Submission 43*, p. 5.

175 DTMR, *Submission 43*, p. 5.

176 ACTU, *Submission 107*, p. 5.

177 Tesla Owners Club of Australia, *Submission 28*, p. 5.

Higher degree content in this sector will need to evolve to provide skills such that these students will become leaders in the Australian advanced manufacturing sector. Training in leadership, intellectual property, marketing, business management and finance would make these graduates more industry ready and desirable for the sector. Provision of substantial stipends to attract the best students to this sector will be required.¹⁷⁸

5.146 Ensuring that the industry is growing and ready to employ these graduates is also an important factor in attracting graduates and undergraduates to study in these fields.¹⁷⁹

5.147 The Electrical Trades Union suggested a number of initiatives that would support the development of an EV workforce:

- Transition incentives for workers to return to the industry. For [example], a transition centre was set up at Elizabeth [South Australia] for workers leaving the industry. There is capacity to turn this initiative around and use it to return workers to the industry.
- Apprenticeships and in particular, mandatory apprentice rations linked to all forms of Government support to the industry;
- Development of an appropriate training package consistent with the historical concept of ensuring skills learnt are transportable.¹⁸⁰

5.148 In his submission, Mr Larkins suggested that the EV 'industry could be fostered by providing investment into PhD scholarships and university research grants administered through the CSIRO'.¹⁸¹

Managing the risks

5.149 The transition from conventional vehicles to EVs is not without risk and needs to be undertaken in a coordinated manner to mitigate against any unintended consequences. This section explores the following:

- Coordination and planning;
- Standards; and
- Road user charging.

Coordination and planning

5.150 Earlier in the chapter, the Committee discussed a range of ways in which governments can act to increase EV uptake, ranging from establishing a vision, through to concrete proposals that can incentivise people to purchase EVs. The Committee has heard that after establishing this policy framework, there is a need to plan and coordinate its implementation.

178 Deakin University, *Submission 35*, p. 6.

179 Deakin University, *Submission 35*, p. 6.

180 ETU, *Submission 110*, p. 13.

181 Mr Anthony Larkins, *Submission 32*, p. 2.

5.151 The Committee has heard about a number of different models used globally to coordinate the transition to EVs. In the United Kingdom, the Office for Low Emission Vehicles (OLEV) works across government to 'support the early market for ultra-low emission vehicles' including 'development, manufacture and use'.¹⁸² Mr Daniel Hilson, Founder and Managing Director of Evenergi provided more detail noting that OLEV's function is to 'develop and coordinate strategy and to create and manage grant programs, research, awareness programs, infrastructure, strategy and standards'.¹⁸³

5.152 Mr Tim Washington, Chief Executive Office at JET Charge described the overarching coordination role that the OLEV plays in implementing the United Kingdom Government's approach to EVs:

Then you have a practical means of delivering that vision, which is something like the UK's Office of Low Emission Vehicles, whereby basically all the government policy is channelled through that office. Then you have very specific policies that the office enforces, which are the kinds of things that Tritium were just talking about, like toll roads and all that kind of stuff, and vehicle incentives.¹⁸⁴

5.153 Mr Hilson talked about how OLEV also functions as an independent consumer advocacy body in addition to its other functions:

Essentially, under the Office for Low Emission Vehicles they've established Go Ultra Low. They invited the manufacturers and government to participate, and they implemented a number of measures to coordinate things like the grants, consumer awareness and creating a path to purchase. So through that mechanism you could work out how to install a charging station, how to claim grants, and essentially where you could do a test drive and the various steps along the journey to buying an electric vehicle. That just doesn't exist in Australia at the moment. If you go online tonight and try to buy a petrol powered vehicle, you go to carsales.com and you know exactly what to do. If you go to buy an electric vehicle—I challenge any of you to figure out how you can actually execute on that.¹⁸⁵

5.154 The South Australian Government was mindful that the United Kingdom's model allowed for a whole of government response to a profound change in the transportation system with implications on a number of interrelated areas including energy:

182 United Kingdom Office for Low Emission Vehicles, *Homepage*, <https://www.gov.uk/government/organisations/office-for-low-emission-vehicles> (accessed 6 November 2018).

183 Mr Daniel Hilson, Founder and Managing Director, Evenergi, *Committee Hansard*, 31 August 2018, p. 57.

184 Mr Tim Washington, Chief Executive Office, JET Charge, *Committee Hansard*, 27 September 2018, pp. 5–6.

185 Mr Daniel Hilson, Founder and Managing Director, Evenergi, *Committee Hansard*, 31 August 2018, p. 58.

A well-led national response may require a new national policy structure, for example the UK Office for Low Emission Vehicles that sits across the Transport and Energy/Industry portfolios, and the better use and coordination of existing [Council of Australian Governments (COAG)]-related transport, energy and environment groups, for example the Transport and Infrastructure Council (TIC) and Transport and Infrastructure Senior Officials Committee (TISOC). If so, then any group should consider the inter-relationships with wider future mobility disruptors including autonomous vehicles.¹⁸⁶

5.155 On this point of coordination, the Committee has noted the recent COAG Transport and Infrastructure Council communiqué, which discussed a coordinated national approach to encourage the uptake of low and zero emission vehicles, particularly electric vehicles:

It was agreed the Transport and Infrastructure Senior Officials' Committee will develop a program of work to address the barriers and challenges impeding the uptake of these vehicles for Council consideration in the first half of 2019. This work could include initiatives to support infrastructure development, measures to reduce upfront costs and increase model availability, and programs to educate and improve the awareness of consumers of the benefits of shifting to low emission vehicles, while acknowledging the need for a market-based response.¹⁸⁷

5.156 A number of submitters also expressed support for the New Zealand Government's EECA EV program which coordinates the government's effort to increase EV uptake.¹⁸⁸ During the course of the inquiry, the Committee met with EECA officials.

Standards

5.157 The Committee has been told that the early stages of the transition to EVs is the ideal time to establish a number of national standards across the industry to ensure a uniform approach in key areas such as charging adaptors. In a supplementary submission, Flinders University described the establishment of EV standards at the national level as an 'enabling initiative'.¹⁸⁹ Hyundai Australia called for the introduction of 'internationally harmonised regulations, codes and standards'.¹⁹⁰ The South Australian Government went further saying that the absence of national coordination could result in a similar situation to the ad-hoc development of rail

186 South Australian Government, *Submission 130*, p. 3.

187 Transport and Infrastructure Council, Communiqué, Sydney, 9 November 2018, available at: <https://transportinfrastructurecouncil.gov.au/communique/> (accessed 2 January 2019).

188 See, for example: Isuzu Australia, *Submission 67*, p. 3; SEA Electric, *Submission 24*, p. [3]. See also: New Zealand Energy Efficiency and Conservation Authority, *Electric Vehicles*, October 2017, <https://www.energywise.govt.nz/on-the-road/electric-vehicles/> (accessed 6 November 2018).

189 Flinders University, *Submission 5.1*, p. [9].

190 Hyundai Australia, *Submission 103*, p. 5.

networks in Australia during the mid- to late- nineteenth century which resulted in Australia having a number of different rail gauges across the national network.¹⁹¹

5.158 The Australian Electric Vehicle Association put forward its preferred charging standard:

Embrace the Type-2 charging standard as Australia's national charging standard. This is important for preventing further delays in infrastructure roll-outs. DC fast charging should also shift to the CCS-2 standard. Financial support should be offered to convert vehicles over to this standard, where applicable.¹⁹²

5.159 Type-2 is the predominant charging standard in Europe.¹⁹³ FCAI and its membership are supportive of the Type-2 standard¹⁹⁴ with the City of Adelaide indicating that it had also adopted this standard.¹⁹⁵ In its submission, FCAI outlined its support for a harmonised approach:

Recognising the need for rapid deployment of battery electric vehicle charging infrastructure, the FCAI membership has made a public commitment to supplying vehicles from 2020 that meet a set of international charging standards. Certainty in these standards within Australia will enable vehicle manufacturers and EV charging infrastructure providers to make investment in future electric vehicle-related product plans with reduced risk, and encourage government to develop programs to incentivise uptake of electric vehicles.¹⁹⁶

5.160 Furthermore, FCAI highlighted that lack of certainty on the charging standard is also providing another level of uncertainty for organisations considering installing public charging equipment.¹⁹⁷ iMove Australia commented that 'adoption of charging standards would help to avoid incompatibility issues with proprietary technologies'.¹⁹⁸

5.161 The need for standards around battery technology and battery management systems were also raised as a priority area, particularly in seizing the opportunity to develop standards that are suited for Australian conditions.¹⁹⁹ Ms Gail Broadbent called for the public recharge stations to be 'signposted with standardised signage' to

191 South Australian Government, *Submission 130*, p. 3. See also: Productivity Commission, *Progress in Rail Reform: Inquiry Report*, Report No. 6, 5 August 1999, Attachment C, pp. C1–2, https://www.pc.gov.au/data/assets/pdf_file/0020/34526/rail.pdf (accessed 6 November 2018).

192 AEVA, *Submission 6*, p. 3.

193 International Energy Agency, *Global EV Outlook 2017*, June 2017, p. 30.

194 FCAI, *Submission 119*, p. 16.

195 City of Adelaide, *Submission 93*, p. 5.

196 FCAI, *Submission 119*, p. 14.

197 FCAI, *Submission 119*, p. 14.

198 iMove Australia, *Submission 124*, p. [1].

199 Deakin University, *Submission 128*, p. 1.

'improve accessibility for customers' and to maximise network value.²⁰⁰ TOC raised concerns that not having a national signage standard for accessing charging infrastructure would inconvenience interstate travellers.²⁰¹

5.162 The Committee also received evidence in relation to the weight of EV trucks. The Committee were told that EV trucks weigh five to ten per cent more than ICE equivalents due to the batteries. Mr Fairweather spoke about the difficulties this causes for operators of 4.5 tonne gross vehicle mass (GVM) trucks:

The particular issue that we've spoken about as part of this only relates to one segment of the commercial vehicle space and it's at the smallest end of the truck area—what's referred to as the 4.5 tonne GBM truck area, which is the threshold upon which a passenger car licence needs to become a truck licence, a commercial vehicle licence. That's why you see many small 4.5 tonne trucks around Australia. Hire companies and rental companies et cetera use them by the thousands, because a passenger car licence driver can use them. An example is New Zealand of Countdown, who've got those five vehicles for delivery vehicles. New Zealand has a six tonne limit for exactly the same trucks. So it just seems unusual that 4.5 is required here. It seems unnecessary. I think it's a terrific opportunity to be able to open that space—just for electric vehicles for the time being and for our professional fleets maybe initially, maybe without the allowable towing capacity that normally comes with a passenger car licence, so you're compensating.²⁰²

5.163 In its submission, SEA Electric anticipated that battery weights would decline over the short term due to technological advances, and noted that any measures to increase vehicle masses would only be required in the short term.²⁰³

Road user charging

5.164 Earlier in the report, the Committee discussed the erosion of the fuel tax excise. Bloomberg New Energy Finance estimated that loss excise could range from about \$1 billion per year by 2030 up to about \$5.5 billion by 2040.²⁰⁴ With the risk of this continued erosion as vehicle fuel efficiency improves and EV uptake increases, many submitters and witnesses advocated for the introduction of a road user charge as a replacement funding measure. This measure could be introduced for EV owners who do not pay fuel excise tax as they do not use fuel. In addition, EV owners are currently a relatively small grouping which would allow for a pilot program to trial the new revenue mechanism.

5.165 Infrastructure Partnerships Australia called for 'a new distance-based road user charging mechanism' in conjunction with other upfront disincentives for EV

200 Ms Gail Broadbent, *Submission 115*, p. [4].

201 Tesla Owners Club of Australia, *Submission 28*, p. 9.

202 Mr Tony Fairweather, Managing Director, SEA Electric, *Committee Hansard*, 31 August 2018, p. 2.

203 SEA Electric, *Submission 24*, p. [4].

204 Bloomberg New Energy Finance, *Submission 127*, p. 26.

owners (such as LCT and vehicle import duties) to be reduced to zero, which would reduce the purchase price of an EV.²⁰⁵ Mr Adrian O'Dwyer, Chief Executive Officer of Infrastructure Partnerships Australia put forward his organisation's view that levying the charge on EVs would be a way to slowly introduce it on vehicles that are not subject to fuel tax excise:

I see electric vehicles as an opportunity to introduce that type of system, but, at the thin end of the wedge, that will grow over time so that there's less upfront cost for that transition [from fuel excise tax to a road user charge].²⁰⁶

5.166 A separate approach has been used in New Zealand where a distance-based Road User Charge (RUC) applying to all vehicles has been in place since 1977.²⁰⁷ Dr James Prest, from the College of Law at the Australian National University stated that the New Zealand Government currently provides an exemption from RUC for light EVs 'until they make up two percent of the light vehicles fleet'.²⁰⁸ This exemption takes effect until the end of 2021, with a similar exemption in place for heavy commercial EVs.²⁰⁹

5.167 The Parliamentary Budget Office provided the Committee with modelling on the budgetary implications of introducing a road user charge on electric vehicles.²¹⁰ The Parliamentary Budget Office assumed the charge would be phased in over five years, levied on a per kilometer driven basis at an equivalent rate to fuel excise, and collected from EV owners monthly. The Parliamentary Budget Office modelled four options for the starting date of the scheme. Table 5.6 sets out the fiscal balance (revenue generated minus departmental expenses) for the road user charge at 2028–29 for each of the starting dates.

205 Infrastructure Partnerships Australia, *Submission 121*, p. 3.

206 Mr Adrian O'Dwyer, Chief Executive Officer, Infrastructure Partnerships Australia, *Committee Hansard*, 31 August 2018, p. 26.

207 Road User Charges Review Group, *An Independent Review of the New Zealand Road User Charging System*, 31 March 2009, p. 20, <https://www.nzta.govt.nz/assets/resources/road-user-charges/docs/ruc-final-report.pdf> (accessed 28 November 2018).

208 Dr James Prest, College of Law, Australian National University, *Submission 101*, pp. 10–11.

209 New Zealand Ministry of Transport, *Electric Vehicles*, <https://www.transport.govt.nz/multi-modal/climatechange/electric-vehicles/> (accessed 28 November 2018).

210 *Applying a road user charge to electric vehicles*, Parliamentary Budget Office, 7 December 2018.

Table 5.6: Fiscal balance 2028–29 for road user charge²¹¹

Start date for road user charge	Revenue generated to 2028–29 (\$m)
1 July 2022	1 229
1 July 2023	1 089
1 July 2024	899
1 July 2025	639

Concluding comments

5.168 This chapter has canvassed a comprehensive suite of measures that would encourage and facilitate the increased use of EVs, and support the local manufacture of EVs and their components. The Committee has heard those jurisdictions that provide incentives, such as vehicle registration and other tax concessions (including luxury car tax and import duties), help to reduce EV purchase price and in turn increase EV uptake. One-off grants to new EV purchasers provide a similar type of support.

5.169 The Committee was told about the role that national EV targets play in outlining a vision and the expectations that individual countries have for EVs as part of the transport system. National targets can provide a level of certainty to vehicle manufacturers, charging infrastructure operators and local industry, indicating the extent to which they should engage in particular markets.

5.170 The Committee heard that government can add to this certainty through committing to government fleet EV procurement targets. Government fleet targets increase demand, encouraging vehicle manufacturers to introduce additional and cheaper models to market, whilst also underpinning a second-hand market providing more affordable access to EVs. Relaxing restrictions on second hand imported EVs would also support the used EV market and provide a lower price entry to EV ownership.

5.171 Evidence received during the inquiry supports the introduction of more stringent vehicle emissions standards, including on carbon dioxide, noting that this would not only make EVs more competitive, but also lead to improved economic, public health, and environmental outcomes.

5.172 A coordinated approach to the rollout of public EV charging infrastructure and amendments to tenancy laws and building codes that will provide EV owners with a supportive eco-system, offering certainty that EVs can be charged as required at home or in public. Some states and territories, motoring associations and the private

211 *Applying a road user charge to electric vehicles*, Parliamentary Budget Office, 7 December 2018, pp. 6–7.

sector are taking the first steps in rolling out public infrastructure, but federal government support could accelerate this process and ensure that rural and regional parts of the country are not left behind.

5.173 Consumer education and vehicle demonstrations will assist in allaying any concerns or misconceptions around EV use. Whilst amendments to national training requirements for vehicle service technicians to include EVs will ensure that trade qualifications evolve with the changing transport fleet and that sufficient qualified technicians are able to meet the growing demand.

5.174 The Committee has heard about the positive flow-on effects that increased EV uptake—both in Australia and globally—will have on the local manufacturing sector. There are some businesses who are already taking advantage of these opportunities. Currently, there are a number of federal schemes such as the ATS, the Growth Fund and the Advanced Manufacturing Growth Fund that are providing grants to eligible companies involved in the conventional and EV automotive space. Notwithstanding this investment, there is a lack of an overarching national strategy to ensure that this funding is more effectively targeted to emerging automotive sectors including electric and automated vehicles.

5.175 Targeted government procurement can also help to drive a growing manufacturing sector based on EV components, assembly and supply-chain products. Part of a coordinated national approach should also factor in the growing need for a highly skilled workforce that utilises and augments existing skillsets, whilst nurturing the next generation of workers.

5.176 Finally, this chapter has examined the need for a comprehensive coordinated approach from the federal government, anticipated the need for harmonised national standards and considered applying a road user charge mechanism as a strategy to replace failing fuel excise revenue.

5.177 The next chapter outlines the Committee's conclusions and recommendations.