Department for Energy and Mining

EV Strategy Consultation Summary Report

FOR PUBLIC RELEASE

11 November 2019

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Contents

Document Control

Version	Issue	Date	Author	Checked
1	Draft	25/09/2019	Matthew Varvounis	Jake Bugden
2	Final	11/11/2019	Matthew Varvounis	Jake Bugden

1 Executive Summary

Introduction

The Energy Project (TEP) was engaged by the South Australian Department for Energy and Mining (DEM) to review submissions to the DEM's *Targeted Industry Consultation Discussion Paper and Survey: To support the development of AN ELECTRIC VEHICLE STRATEGY FOR SOUTH AUSTRALIA*. This report summarises the findings of these submissions. Where information has been used from submissions the names of people and companies have been removed. This report is suitable for public release.

Theme 1: Strengthening the Local Market

Increasing the number of EVs in SA is seen as critically important. Key points raised follow:

- The overwhelming majority of submissions support incentives, namely financial, as the key solution to increasing the range of EV models in the South Australian market. The general consensus among the more detailed responses is the concept of tapering financial incentives - early adopters should receive the highest assistance. The opportunity to open up the SA Government Home Battery Rebate Scheme to EVs is highlighted.
- There is strong support in submissions for targets for EVs in fleets, in particular the SA Government fleet.
- A number of the detailed submissions support the simplification of second-hand EV imports into Australia.
- The opportunity for the SA Government to directly facilitate a heavy vehicle transition to EVs through the electrification of public transport is noted.
- Barriers to the deployment of heavy EVs relating to the Australian Design Rules and Gross Vehicle Mass are noted.

Theme 2: Raising Awareness

Key points raised follow:

- There is a high level of support for education and events.
- EV trial/drive days are identified as the strongest opportunity to provide an experience to potential users.
- Online resources and case studies are identified as key pillars of an education campaign.
- Public charging stations, EV fleets and public transport electrification are the main ideas supported by the majority of respondents in terms of improving the visibility of EVs.

Theme 3: Charging and Refuelling Infrastructure

Key points raised follow:

- Public funding should only be provided in areas where commercial ventures will not make sense (for example, regional areas and holiday destinations).
- Highly visible chargers in public areas, particularly state and local government buildings which support fleet vehicles, were commonly seen as the logical first step for slow AC charger distribution.

Theme 4: Managing Impacts to Electricity Supply

Given the unique situation in SA in regard to renewables penetration and peak demand, managing the impacts of EV charging is a critical issue/opportunity. Key points raised follow:

- The requirement to upgrade parts of the distribution network to avoid 'hot-spots' and/or issues with peak demand if charging is not managed carefully is widely recognised.
- Several strategies to manage the above are suggested, and the need for research studies/trials to understand charging impacts and opportunities on the grid in the SA context is commonly cited.
- Grid connection costs and uncertainties for charging stations that require large capacity are cited as an issue.
- Depots etc with the potential for large EV fleets are noted as likely hotspots.

Theme 5: Capturing Industry Development Opportunities

Key points raised follow:

- South Australia's key strengths include:
    - High penetration of and experience in managing renewable energy and storage.
    - Reputation as a leader in renewable energy and test-bed for new energy technology platforms.
    - Supply chain of resources and skills to complement EV manufacturing.
    - History in automotive manufacturing and associated commercial relationships.
- A number of submissions outline the key strengths and industry opportunity for both EV and battery manufacturing in SA.
- EV battery disposal, recycling and product stewardship are almost universally given as the key environmental challenges that will arise from large-scale EV take up.

Theme 6: Supporting Policy and Regulation

Key points raised follow:

- The need to provision for EV charging capacity in new apartment buildings is raised and it is noted that this could be achieved through provisions in the National Construction Code.
- The need for streamlined approval processes for public charging is raised.
- There is almost unanimous support for the variation of motor vehicle fees and charges according to CO_2 emissions, with general justifications relating to environmental and public health benefits and pricing signals to the market to increase EV uptake.
- The replacement of the fuel excise levy with a Road User Charge (RUC) is widely considered to be the fairest method of sharing the revenue raised from the fuel excise levy.

2 Introduction

2.1 Background

The Energy Project (TEP) was engaged by the South Australian Department for Energy and Mining (DEM) to review submissions to the DEM's *Targeted Industry Consultation Discussion Paper and Survey: To support the development of AN ELECTRIC VEHICLE STRATEGY FOR SOUTH AUSTRALIA*. This report summarises the findings of these submissions.

The report format is based on the BetterTogether.sa.gov.au template as requested by DEM. Due to the large amount of feedback, we have reformatted the template to suit, however the content will be presented in accordance with this template document.

2.2 Report Introduction

The purpose of the survey was to engage widely in order to understand different stakeholders' positions on key items such as:

- Electric vehicle and related supply chains.
- The roll-out of charging and hydrogen refuelling infrastructure.
- Electricity demand, distribution and storage.
- Public transport including new mobility services.
- Legislation and government revenue.

This consultation process will assist the Government of South Australia to develop 'near term' and 'long term' policies relating to electric vehicles.

The survey paper states:

> *The South Australian government seeks to identify a pathway for an orderly transition towards the uptake of electric vehicles that maximises opportunities and minimises risks. The Strategy will articulate and capture the growth opportunities, identify and overcome barriers and minimise any costs to consumers in the transition.*

The scope of this consultation included, Full Battery Electric Vehicles (BEV), Plug-in Hybrid Electric Vehicles with an electric only range adequate for daily driving needs (PHEV), Hydrogen Fuel Cell Electric Vehicles (FCEV), and Electric vehicles drawing power from roadside infrastructure.

The survey paper states:

> *The anticipated scope of policy extends to all registerable electric vehicles including passenger and light commercial vehicles, motorcycles, heavy vehicles and public transport vehicles. Electric bicycles are commended but are not a focus of this policy.*

The consultation officially opened on 30 May 2019 and closed at 5pm (ACDT) on 11 July 2019, however late submissions were accepted by the DEM up until 15 August 2019. Responses were coordinated by Yvette Booth via email.

The majority of contributors were contacted directly by DEM via email and were invited to provide a submission to the survey, however the survey was open to all industry participants wishing to provide feedback.

3 Methodology

The survey and engagement process was managed directly by DEM. Completed submissions were emailed to TEP from DEM.

TEP has created three summaries:

- A copy of submissions into excel for quick reference.
- A summary of all submissions by theme.
- This report.

In this report separate sections covering 'common' and 'novel' responses have been provided for each theme. Further commentary and specific recommendations taken from the submissions themselves are provided in 'Response Commentary' section for each theme. Finally, a selection of key points raised for each theme is provided.

In this report, EVs refers to all electric vehicle categories including BEV, PHEV and FCEV. Where a specific technology type has been called out, this will be nominated explicitly in the response summary.

4 Theme 1: Strengthening the Local Market

1.1 What should be done to increase the range and affordability of new and used electric vehicles available in South Australia?

4.1 Common Responses

Response	Theme

Incentives (financial) including:
• Direct upfront government rebate for all EVs.
• Exemption or reduction in stamp duty for all EVs.
• Exemption or reduction in registration fees for all EVs.
• Free or reduced fees for on and off-street parking, either:
  ○ In local government parking bays or;
  ○ Through government subsidisation of private car parking bays, dedicated to EVs.
• Free charging at public charging stations (either government or privately owned).
• Exemption or reduction in the Fringe Benefit Tax (FBT) for corporate fleets and/or salary packaged vehicles.
• Exemption or reduction on Luxury Car Tax on all EVs.
	1.1

Incentives (non-financial) such as use of priority lanes such as bus, pool vehicle and other specialised transit lanes for all EVs.	1.1
Fleet vehicle targets for: • Government (both State and Local) fleets. • Private commercial businesses fleets. • Commercial service providers such as taxi, chauffeur, on-demand and car share sectors. • Heavy and mass transit vehicles, including public transport (e.g. buses) and public services (e.g. rubbish trucks) fleets.	1.1
Creation of a **second-hand car market**. Measures to achieve this include: • Sale of government and corporate EVs as part of routine asset replacement. • Enable second-hand vehicle imports into the South Australian market.	1.1
Improving **fuel emissions standards**, including: • Advocate (with other states) for a comprehensive national EV Strategy including strong Federal Fuel Efficiency Standards in order to restrict ICE vehicles available in the Australian Market (further discussed in Theme 6 summary).	1.1

4.2 Novel Responses

Response	Theme
Incentives (financial) including: • Second-hand purchasers of EVs should be eligible for some of the financial incentives as nominated above, nominally whilst the uptake of EVs is low. • Government energy (electricity) subsidy agreement with retailers for EV charging. • Encourage retail energy (electricity) products specifically for EVs. • Concession on income tax (for private owners) and GST tax (for corporate owners) linked to CO_2 emission reduction through EV use. • Exemption or reduction on Import Duty Tax on all EVs. • Rebate for recycled EV batteries.	1.1
Combination of incentives and EV purchases with other government schemes including: • SA Government Home Battery Rebate Scheme. • Providing financial rebates to fixed property improvements to deliver ongoing benefits for current and future owners/tenants, such as fixed EV charger installations.	1.1
Fleet vehicle targets should provision for a 'structured residual value program' for all fleet purchasers of EVs.	1.1
Innovation fund to support EV investment. Examples of suitable projects are: • One-off cost funding includes funding ancillary costs such as infrastructure to allow fleets to electrify (e.g. Supporting a local charity or not-for-profit organisations). • Transitioning bus depots where infrastructure requirements are extraordinary to usual costs (e.g. May require grid upgrades or innovative energy/charging solution); • Allowing for accelerated depreciation of existing fleet to enable scale procurement (e.g. Reducing burden of running both an EV and diesel bus fleet at one site); • Encouraging the establishment of business operations in South Australia; • Supporting the development of innovative solutions, knowledge and feasibilities.	1.1

4.3 Response Commentary

4.3.1 Incentives

The overwhelming majority of submissions supported incentives, namely financial, as the key solution to increasing the range of EV models in the South Australian market.

The general consensus among the more detailed responses is the concept of tapering financial incentives - early adopters should receive the highest assistance and incentives should steadily reduce as the coupled objectives of increased EV uptake and price parity between EVs and Internal Combustion Engine (ICE) vehicles are achieved. Suggestions on how to implement incentive schemes are varied. Some advocate for quantitative targets such as stamp duty exemption for the first 5,000 EVs. Others suggest a similar stamp duty exemption but for an initial 3-4-year period after which this exemption is removed. There is support for a similar time-based policy and recommend implementation through a sunset provision within the incentives framework.

Some submissions supported more complex arrangements to achieve multiple objectives through financial incentive mechanisms. To achieve well to wheel[1] emissions reduction targets, a number of submissions believed linking the CO_2 emissions of the electricity source to the level of incentive available should be included. Some respondents supported the long-term scaling of incentives to encourage the purchase of locally manufactured vehicles (or vehicles with locally manufactured components) as a way of stimulating manufacturing in SA, whilst these same groups supported similar incentive scaling for EVs which could provide grid support services.

A concessions framework for incentive-based policies could include:

- *Make incentives visible at the point of purchase*
- *Make the value of incentives clear*
- *Ensure incentives are available to the full target market*
- *Commit to durable incentives to provide certainty for marketing*

4.3.2 Fleet vehicle targets

There is strong support in the submissions for targets for EVs in fleets, in particular the SA Government fleet. There is an extensive range of suggestions for setting targets for State Government EV fleets. Some

[1] Well to wheel' emissions concept refers to the total emissions required to provide a fuel source to a vehicle (well to tank) and the subsequent use of that fuel source (tank to wheel for ICE or battery to bitumen for EV). For example electric vehicles, the 'battery to bitumen' emissions are zero, while the 'well to tank' emissions can exceed that of a petrol vehicle depending on the type of power station used to generate the electricity.

submissions support a percentage target for the State Government fleet with one suggested target of 25% of EVs for all new light passenger vehicles by 2025. An electricity retailer supports similar targets however believe a quantitative target for different vehicle types would be more practical for planning purposes. A respondent identified a more pragmatic approach to EV procurement through a 'buy electric first policy':

> *A complementary measure to quantitative targets includes a 'buy electric first' preference. 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.*

More ambitious targets include setting a transition date for an all EV government fleet or a similar deadline for net zero emission from the government fleet.

It is widely agreed that the focus on fleet vehicles (government and corporate) is a key factor in creating a second-hand EV market, particularly in the absence of second-hand EV import regulations. Whilst the state government can directly control their own procurement conditions for EVs, achieving any stronger than 'business as usual' EV uptake target for local government and commercial fleets will require government facilitation, namely through financial incentives.

The State Government can directly facilitate a specific vehicle sector of the heavy vehicle transition to EV through support for electrification of public transport. A transport provider highlighted the fact that manufacturers are reluctant to provide trial vehicles, with nominal support for a 10% target of the existing bus fleet to EV type as a market signal to put downward pressure on the costs of EV buses and associated charging (or refuelling for FCEV) infrastructure.

The Australian Design Rules (ADRs) have also restricted the ability of businesses to transition heavy fleet vehicles to EV alternatives. A respondent stated:

> *The importation of new and second-hand buses from Europe and the UK requires an exemption from Australian Design Rules as most of these buses are 2.55m in width - whereas the current regulations provide for a maximum vehicle width of 2.50m.*

Furthermore, Gross Vehicle Mass (GVM) regulations were identified as a major barrier to the business case for the deployment of EV heavy vehicles to replace their ICE incumbents:

> *Allow heavy and commercial vehicles, such as garbage trucks, buses, delivery vehicles etc. to operate at the manufacturer's GVM. This allowance removes a key barrier to the adoption of heavy EV's while providing a zero-cost incentive for operators and customers. Currently limitations are based on government restrictions, meaning heavier EVs are limited in the load they may carry, reducing their commercial feasibility. A 'mass dispensation' system in Victoria, conducted through VicRoads is already implementing this allowance to*

ensure regulations are appropriate for supporting the adoption of EVs in the heavy rigid fleet.

For example, an IVECO ACCO rubbish truck is limited to operate by road authorities to 23.5t GVM yet is manufactured to operate at up to 26t GVM. An electric IVECO ACCO is approx. 700kg heavier than an internal combustion engine model. This means 700kg less payload, which is a substantial concern for operators as they need this payload.

4.3.3 Other comments

An excerpt from a vehicle manufacturer's submissions highlights the barriers vehicle manufacturers face when deciding whether to bring a greater range of EVs to Australia:

The most important factor to support an increase in the range and affordability of electric vehicles in Australia is for manufacturers to have a level of certainty of volume potential and demand within the marketplace. Given the significant investments required to introduce vehicles to the Australian market, including right hand drive engineering, ADR compliance, drivetrain and body style options, marketing campaigns and so forth, manufacturers need to understand if the market size presents an opportunity to recoup these costs.

The benefits of EVs, particularly BEVs with low ongoing costs of fuel (i.e. electricity) is dependent on electricity retailers' willingness to pass on the value of this opportunity to consumers. Such tariffs will provide further incentives to transition to EVs and/or signal operating behaviour that will support the grid (to be discussed in Theme 4).

Submissions also address the support needed in niche sectors that also wish to transition to EV alternatives. One respondent believes primary production vehicles and vehicles capable of towing heavy loads (i.e. towing of boats or caravans) are worthy of consideration in any future EV strategy. Similarly, another identifies that high-use heavy vehicles used for primary production, agriculture and mining are a good candidate for stronger financial incentives, particularly given the lower running costs when compared with existing equipment,

Finally, many of the responses include commentary around charging infrastructure in the Theme 1 summary. These responses are included in the Theme 3 summary.

4.4 Key points

- The overwhelming majority of submissions support incentives, namely financial, as the key solution to increasing the range of EV models in the South Australian market. The general consensus among the more detailed responses is the concept of tapering financial incentives -

early adopters should receive the highest assistance. The opportunity to open up the SA Government Home Battery Rebate Scheme to EVs is highlighted.

- There is strong support in submissions for targets for EVs in fleets, in particular the SA Government fleet..
- A number of the detailed submissions support the simplification of second-hand EV imports into Australia.
- The opportunity for the SA Government to directly facilitate a heavy vehicle transition to EVs through the electrification of public transport is noted.
- Barriers to the deployment of heavy EVs relating to the Australian Design Rules and Gross Vehicle Mass (GVM) are noted.

5 Theme 2: Raising Awareness

2.1. What should be done to increase South Australian's knowledge of and direct exposure to electric vehicle technologies?

2.2. How can industry and non-government organisations promote and provide opportunities to experience electric vehicles in a non-sales environment?

5.1 Common Responses

Response	Theme
Education/marketing campaign demonstrating benefits of EV ownership including: • Benefits to the electricity grid when coupled with grid services. • Case studies of EV owners, including sharing of information from on-board data and owner usage patterns. • Public health benefits. • Environmental benefits. • Available models. • Charging locations. • Pricing trends. • Vehicle driving distance range. • Knowledge sharing forum. • Recommended driving patterns and settings. • Myth busting. • Whole of life costs such as insurance, maintenance and fuel costs. • Infrastructure requirements for charging (for home and commercial). • Charging station standards. • Government policies and available incentive schemes. • Component recycling. • Local manufacturing benefits (current and future). • Cost comparison tools between EV and ICE vehicles. • Links to EV support groups. • Internet portal which provides above information. • Understanding of network management issues and the role EVs play.	2.1 2.2
Visibility of EVs and associated infrastructure including: • Highly visible charging infrastructure, particularly in public areas and adjacent government buildings. • EV fleets in the streets, particularly state and local government fleets. • EV public transport fleets. • Large range of EVs visible in showrooms. • Commercial EV fleets, including taxi, car hire, car-share businesses. • Non-commercial EV fleets, including at university campuses.	2.1 2.2
Events including: • Hosting of technical conferences. • Public trials and demonstrations, such as EV drive days. • Education sessions, including at the workplace. • EV race, including a Formula-E event.	2.1 2.2

Response	Theme
• Showroom days.	
Pilot projects including: • EV public transport fleet conversion. • Free/low-cost charging sites for public use.	2.1 2.2

5.2 Novel Responses

Response	Theme
Education campaign including: • Developing learning material and integrating EV technology content into courses/degrees at universities, vocational learning institutes (i.e. TAFE) and even high schools. • Creation of an EV learning hub. • Hosting a technical conference in Adelaide. • Government addressing negative campaign during 2019 federal election. • Creation of a Centre for Future Mobility at the Tonsley innovation district as a partnership with universities, TAFE, private companies and community groups.	2.1
Visibility of EVs and associated infrastructure including: • EV specific licence plates. • EV market updates through industry and RAA e-news forums. • Specialised government services fleet vehicles, such as police, emergency services and utilities.	2.1
Events including: • Royal Adelaide Show demonstration event. • Quarter mile drag race for EV class. • Creation of a national EV racing competition.	2.1 2.2
Pilot projects including: • Conversion of all O-Bahn buses to completely electric, potentially with autonomous, microgrid and emergency vehicle to grid testing applications. • Community transport project e.g. EV (potentially autonomous) bus in regional and tourist areas. • BEV or FCEV bus for metro transport run by state government. • Trial of hydrogen community as a test bed for hydrogen economy, potentially with microgrid, autonomous vehicle and novel ride sharing testing applications.	2.1
Government agency: • Creation of government funded agency/body to promote public awareness and increase EV knowledge base.	2.1
Advocacy: • State government to lobby federal government for a nationally aligned federal EV strategy roadmap.	2.1

5.3 Response Commentary

5.3.1 Education/marketing campaign

Most common responses suggest platforms such as internet websites, television, radio and social media to distribute educational material relating to EVs. A number of respondents support the idea of an app to deliver the same information outlined in the common response section. A functional app is of particular relevance to the charging infrastructure, where it is recommended as a tool to direct EV users to the nearest charging station, with information relating to charger type, infrastructure (i.e. plug type) and potential charge time. Another respondent identified the Australian Government Climate Solutions Fund and Pollution Levy as potential sources of funding for these education campaigns.

Many submissions believe educational campaigns and events, in particular EV trial days (also referred to as EV drive days), as the best opportunity to provide an experience to potential users that will leave them more open to choosing an EV in the future. Around 30% of the respondents advocate for the running of events in a non-sales environment through advocacy groups and non-government organisations (NGOs). Two respondents support a partnership model whereby the government provide financial support to the advocacy/NGO groups and the groups are allowed to run the events. Another noted that the uptake of EVs as fleet vehicles will offer similar experience to the fleet vehicle users as a 'soft trial' for employees.

The survey responses also provide online resources and case studies as key pillars of the education campaign. One response cites the Evenergi[2] report into EV uptake which nominates:

> *One of the key findings detailed in the Charge Together Report was that participants were 'stunned' by a lack of information in the Australian market with respect to buying EVs both online and through engagement with dealers …developed EV markets are characterised by easy access to consumer information that includes cost calculators, information concerning incentives, technical standards, infrastructure, case studies on user experience as well as myth busting information.*

An energy provider echo's similar sentiments with respect to their experience with a lack of public visibility and understanding of a new E10 biofuel products in NSW and Queensland:

> *Our experience in both NSW and QLD is that biofuels have received significant government support via mandates but…has not necessarily aligned with consumer preferences given*

[2] Evenergi, Unlocking Demand for Renewably Powered Electric Vehicles

penetration rates are currently well below the mandated percentages. In these markets, consumer have tended to switch to premium petrol products such as ULP95 and ULP98 instead of E10, despite fuel suppliers and retailers investing heavily in infrastructure and service station upgrades to make biofuels available…This experience is an important lesson in introducing new technology or fuel types in that the public needs to understand and trust the product and have a reason to switch as this will more likely drive support for and acceptance of electric vehicles.

A number of links to useful case studies have been provided below by one respondent:

Oregon, Forth Mobility: https://forthmobility.org/

United Kingdom, Go Ultra Low: https://www.goultralow.com/

California, Zero Emissions Vehicle Program:
https://ww2.arb.ca.gov/our-work/programs/zero-emission-vehicle-program

United Kingdom, Office of Low Emissions Vehicles:
https://www.gov.uk/government/organisations/office-for-low-emission-vehicles

New Zealand, Electric Vehicles Programme https://www.electricvehicles.govt.nz/

A respondent nominates the online resource *Charge Together*[3] as an existing resource which is available for consumers - this resource was used to facilitate an *AEVA* run 'Green Drive Day'[4] in Adelaide on 8 April 2018.

5.3.2 Visibility

The visibility of public charging stations and EV fleets are the two main ideas which the respondents support. Many highlight the importance of having visibility of charging infrastructure in regional and tourist areas to ensure there is no perception of a barrier to EV ownership outside of metro SA areas.

Direct government measures such as government EV fleets and public transport are another commonly cited idea. With respect to the buses, there is often a split between full electrification of the bus system, pilot projects or a middle ground such as EV buses on prominent bus routes for an initial rollout.

A respondent recognises the importance of the complete user experience when using EV charging infrastructure as a point of differentiation from ICE refuelling infrastructure:

[3] https://www.chargetogether.com/
[4] https://aevasa.kestar.com.au/GreenDriveDay_2018.htm

EV charging is a digitally native experience and enhanced customer experience is important. Customers will engage with digital apps for the purpose of:

- *Navigating to charging stations and assessing the availability of stations.*
- *Activating a charging session, providing the freedom.*
- *Monitoring the status of a charging session.*
- *Payment*

5.3.3 Pilot projects

There are numerous novel pilot projects which respondents suggest for implementation.

A respondent supports the promotion of 'iconic' projects, particularly where they relate to charging infrastructure. Such support plays the role of promoting the uptake of EVs whilst allaying public fears, particularly the common fear of range anxiety (and subsequent lack of fast-chargers available). It is noted that such iconic projects may benefit where EVs are entirely charged from solar or wind in order to champion the case for EVs to be true zero emission vehicles by charging from renewable energy sources.

5.3.4 Events

The importance of events and EV drive/trial days has been covered in the Education/Marketing campaign part of this section. There are specific recommendations relating to materials and resources that should be available at any industry events, regardless of whether this is a sales or non-sales environment. One respondent calls for technical members of EV companies and component manufacturers to be involved in non-sales events whilst another believes there should be a way of connecting businesses and private owners with a suitable advocacy group and/or public education initiative. An electricity retailer supports specific events and expos which target corporate fleet managers given this sector can influence the uptake of EVs through higher volumes of new car purchases and subsequent sale of second hand EVs.

5.4 Key points

- There is a high level of support for education and events.
- EV trial/drive days are identified as the strongest opportunity to provide an experience to potential users.
- Online resources and case studies are identified as key pillars of an education campaign.
- Public charging stations, EV fleets and public transport electrification are the main ideas supported by the majority of respondents in terms of improving the visibility of EVs.

6 Theme 3: Charging and Refuelling Infrastructure

3.1 What level and distribution of public charging infrastructure is required to give private and corporate fleet buyers the confidence to purchase their first battery electric vehicle?

3.2 How can public and fleet recharging and hydrogen refuelling infrastructure be rolled-out (including in regional locations) in an industry-led scalable model?

6.1 Common Responses

Response	Theme
Public area charging (metropolitan and regional) should include Level 2 chargers and DC fast chargers. The suggested distribution of this charging infrastructure is: • Public facilities (e.g. local council community centres or government offices). • Shopping centres. • Service stations. • Car parks. • Office buildings. • Taxi ranks. • Airports.	3.1
Major route charging should include Level 2 chargers, DC fast chargers and ultra-fast chargers. The suggested distribution of this charging infrastructure is: • Adelaide to Port Wakefield/Port Pirie/Port Augusta/Whyalla/Port Lincoln. • Adelaide to Murray Bridge/Tailem Bend/Mount Gambier. • Adelaide to Mildura. • Adelaide to Broken Hill (via A32). • Adelaide to Riverland Towns.	3.1
Home base charging should include DC fast chargers. The suggested distribution of this charging infrastructure is: • Government (local and state) main offices, headquarters and depots. • Local courier companies. • **For hydrogen only** - on-site electrolysers. • **For hydrogen only** - delivery of hydrogen to home base by tube trailer.	3.1
Off-Street charging (for residents without off-street car parking) should include slow chargers and level 2 chargers. The suggested distribution of this charging infrastructure is: • Curb-side bollards. • From street lights. • Designated EV parking/charging areas in adjacent public parks.	3.1
Incentive (financial) should be provided such as a direct upfront government rebate for all charging infrastructure.	3.2

6.2 Novel Responses

Response	Theme
Public area charging (metropolitan and regional) should be distributed at hotels for overnight charging.	3.1
Home base charging pilot projects such as the proposed hydrogen refuelling station at Tonsley should be supported.	3.1
Major route charging should include hydrogen production for major remote area transport fleets. The suggested distribution of this charging infrastructure is the Olympic Dam to Coober Pedy, including both home-base and on-route facilities.	3.1
Mobile and off-grid charging stations from wind and solar in the event of emergencies, remote area charging and off-grid users.	3.1
Research studies: • Identify specific SA needs for charging infrastructure. • Planning with industry about the charging infrastructure required for their specific fleets e.g. taxi companies. • Potential collaboration with South Korean/Japanese governments to support fuel cell technology in heavy vehicles such as buses and/or trucks.	3.1
Ownership models: • Structured parking plan with EV charging service. • Staggered government incentive program between car park and fleet vehicle owners. • Increase SA Government/City of Adelaide's partnership model with businesses and utilities. • Global EOI for submissions of industry led ownership models/solutions. • Privately owned FCEVs (such as buses and rubbish trucks) on long-term government contract. • Wholly government owned charging infrastructure in regional areas.	3.2

6.3 Response Commentary

6.3.1 Level and distribution of charging

There are a number of definitions, sometimes loosely used by respondents, to define the charging infrastructure required. The terms used in this report are broadly in line with the below submission, along with some commentary around the use cases for each:

> *Slower AC Chargers, which are relatively cheap to install, operate and maintain and are suitable for non-time critical or short-range travel. They will typically be installed in homes and businesses in local areas and are predicted to grow organically with the uptake of EVs.*
>
> *DC Fast Chargers, are more expensive and more complicated to install, operate and maintain. The power ranges from 50 to 150kW enabling charging in a matter of hours. The installed cost of DC Fast Chargers in the tens of thousands… Such chargers typically support destination charging, i.e. hotels, supermarkets, small towns; as well as basement charging in multi-family residences.*
>
> *Ultrafast Chargers range from 350kW and upwards enabling charging in tens of minutes, fast enough for highway charging of commercial fleets. The installed cost of a charging station is in the millions of dollars depending on the number of charging heads and cost of augmenting the electricity network. Therefore, these chargers are most likely to be deployed by specialist asset owners, highway rest stops or commercial fleet operators. Ultrafast chargers have much higher power draw, are typically connected at 11 kV level of the electricity network and must be carefully planned to integrate into the existing electricity systems. Ultrafast chargers are an essential requirement for highway driving, which equates to greater than 15% of total travel (Australian Bureau of Statistics, 2017).*

Highly visible chargers in public areas, particularly state and local government buildings which support fleet vehicles, are seen as the logical first step for slow AC charger distribution.

The need for charging to enable long-distance (i.e. non-traditional trips for private EV owners) travel, particularly in regional and remote areas is another common response to this theme. The majority of commercial ventures appear to be targeting the major regional highways. Distribution distances between main route chargers is quantified by some respondents while another cites standards and examples implemented in Europe. The European Commission recommends a minimum of one fast charger per 60km of motorway whilst an even more assertive level is being targeted in Norway:

> *…the Norwegian Government launched a program in 2017 to finance the establishment of at least two multi-standard fast charging stations every 50km on all main roads in Norway.*

A respondent suggests a more pragmatic approach whereby chargers should be distributed for 80% of the 'real-range' expected of the future EV fleet. For example, if we expect the 'real-range' of a typical EV in 2025 to be 200km on a main road, then DC fast chargers should be found at least every 160km. This notion of 'real-range' needs to consider the driving conditions and range during extreme conditions (i.e. account for vehicle air conditioning, heavy loads, head winds, ambient temperature). One submission noted that in a recent survey, the distance between fast chargers is one of the largest factors in consumers' Willingness to Pay (WTP). Highway charging times were two of the top four WTP factors, with these WTP factors being EV range ($1,548 per 50km), highway charging time ($1,350 to change from 60 to 15 minutes), towing capacity ($1,244 per 250kg) and highway charging time ($1,137 to change from 30 to 15 minutes)[5]. It was also highlighted that ChargeFox are currently rolling out DC fast chargers every 200km on major highways in South Australia at a capital cost of $0.5m-$1m per site. Another respondent echo's this sentiment and believe that for private EVs, only long-distance travel will require public fast charging in order to ease range anxiety issues.

It is almost unanimously recognised that FCEVs are likely to be confined to heavy vehicles. As a result, hydrogen refuelling could be confined to home-base and major route refuelling. A vehicle manufacturer summarises the difference in the BEV and FCEV charging/refuelling needs:

> *(B)EVs require a higher density network due to range and charge times. As (B)EV volumes grow, additional capacity at existing sites and larger capacity new sites will be required to ensure owners or users can charge in a timely manner without delays due to infrastructure constraints.*
>
> *Given the longer range (500-800km) and refuelling times (3-5 minutes) of FCEVs, the density of stations can be less than that required for (B)EVs, however it is recommended they are located on major arterials linking the city with outer metro and regional centres. The existing fuel retailing network presents an ideal opportunity for hydrogen refuelling station rollout.*

A respondent sees multiple options for the production of hydrogen for heavy vehicles. These include home-base hydrogen production (particularly during daytime when solar generation in SA is high), delivery of hydrogen by tube trailers from a commercial hydrogen production facility (similar to the current diesel delivery arrangement) and the retrofit of existing service station refuelling infrastructure to deliver hydrogen. They highlight the work currently being done in Europe between ITM Power

[5] The Centre for International Economics, Demand for electric vehicles - A discrete choice survey, 22 January 2019.

(manufacturers of Hydrogen Electrolysers) and Shell as a solution leader for the cost-effective rollout of public hydrogen refuelling.

Home-base BEV charging for smaller commercial fleets (e.g. Council EV fleets) should not experience significant barriers for rollout based on feedback from another respondent:

> *…lack of visible charging infrastructure … need not present a significant barrier for corporate organisations to begin purchasing EVs or hybrid EVs for fleet use. Low-cost AC on-site charging facilities provide the ability for fleet vehicles to charge overnight or while not in use during the day, and demand management systems allow multiple EV chargers to be balanced concurrently without the need to increase site electricity demand.*

There will be some niche needs for non-home base charging of commercial vehicles that public charging will prove to be inadequate. One such example is dedicated public charging for delivery vehicles with no fixed route - these cases can be seen as exceptions and could be addressed by qualifying such projects for innovation funding to promote commercial EV transitions.

One submission notes that in order to achieve growth, charging infrastructure is needed prior to the market achieving scale. The current market failure to provide such infrastructure indicates a need for public funding in the short to medium term.

6.3.2 Incentives (financial) and funding models:

The general consensus amongst the stronger submissions is that in the medium to long term, public funding should only be provided in areas where commercial ventures will not make sense. In relation to public charging infrastructure grants a respondent states that:

> *…(a) Grants budget is established at Federal and State, including regional and vulnerable communities to support the rollout of highway and workplace EV charging infrastructure. Highway fast charging will be important in addressing motorists range anxiety. Government funding can play a major role in supporting broader coverage particularly in areas that may not yet be commercially viable.*

A similar statement was provided by another respondent who believes DC fast charging will become commercially viable, therefore government stimulus should be modest for early fast charger adopters on main routes (or highly populated areas) and should be more generous in regional and remote areas which are unlikely to see the same commercial returns in the future. A respondent nominates that local Councils need to champion regional area charging rollouts, potentially as a complementary measure to local government EV fleets in order to cover the charging of EVs not done at home.

An energy retailer supports a grant program as an effective mechanism for efficient investment where the criteria for funding allocations can be weighted by criteria such as charging station area, average vehicle throughput in the area, benefit for tourism and/or socio-economic areas. This notion of efficient investment must also be carefully considered for any grant program given the rapid development of charging infrastructure. For example, a case study in Norway[6] was cited which identified availability of fast charging as having the most influence of EV adoption. This consequently resulted in less use of publicly accessible slow/destination charging, even as EV uptake has increased. A respondent advocates for a similar grant funding mechanism where investment is matched (e.g. $1 for $1) between the government and implementation stakeholders. Specific to FCEVs is a suggestion that the government fix the price of hydrogen for FCEVs (nominally at less than $10/kg) using a subsidy to cover the difference in order to stimulate investment in both FCEVs and the associated hydrogen production facilities.

Sustainable ownership models are also a necessary consideration to complement financial incentives. Suggestions for structured programs to encourage car park owners and operators to invest in EV charging are:

> *To support car park owners/operators and improve the affordability of new vehicles, consideration could be given to incentives linked to electric vehicle drivers/fleets maintaining a contract for a permanent reserved bay for 3 years.*
>
> *The rebate design could require submission of reserved parking and electric vehicle charging service invoices for 12 consecutive months to secure release of a rebate of $1,500 to $2,500 per year for 3 years ($4,500 to $7,500). This approach would effectively bond a vehicle to a fixed location, enabling spot checks of registered vehicles, and substantially addressing the cost of ownership shortfall during the first 5 years of ownership.*

A submission suggests public-private ownership whereby chargers are owned (wholly or partially) by government and run by private industry in a profit-sharing arrangement. Another respondent advocates for operators to be placed on long-term government contracts in instances of privately owned and/or operated EVs (such as buses and rubbish trucks) in order to provide more security on any investment decisions by operators.

6.4 Key points

- Public funding should only be provided in areas where commercial ventures will not make sense (for example, regional areas and holiday destinations).

[6] https://www.euractiv.com/wp-content/uploads/sites/2/2018/09/Charging-Infrastructure-Report_September-2018_FINAL.pdf

- Highly visible chargers in public areas, particularly state and local government buildings which support fleet vehicles, were commonly seen as the logical first step for slow AC charger distribution.

7 Theme 4: Managing Impacts to Electricity Supply

4.1 What are the likely impacts of electric vehicles on the grid and how can they be managed?

4.2 Are there specific geographical areas, regions etc in South Australia that might be particularly at risk of projected future charging demand? If so, how can this be managed?

4.3 How can electric vehicles (including hydrogen fuel cell electric vehicles) assist in the transition to smart grids?

4.4 Is there scope for new business models to support electric vehicle uptake in return for benefits provided in energy storage (for example, by utilising 2-way charging within a Virtual Power Plant framework)?

7.1 Common Responses

Response	Theme
Increase in network demand due to EV charging and/or hydrogen production. This may result in: • Requirement to upgrade distribution network to avoid 'hotspots'. • Higher demand during 5pm-6pm i.e. worsen the 'duck-curve'. Suggested management strategies include: • Time-of-Use tariffs to create price signals during times of peak network demand. • Installing charging stations in areas with available network capacity as 'destination charging'. • Smart charging regimes with demand management. • Off-grid/skinny grid connections with behind the meter renewable energy/storage for regional areas. • Couple chargers with behind the meter generation and/or storage. • Conduct further research studies to understand specific SA demand increase.	4.1 4.2
Increase in network voltage management issues due to vehicle to grid (V2G) export. Suggested management strategies include the use of smart chargers.	4.1 4.3
Geographical areas/regions identified as being at risk of projected future charging demand included: • Residential areas with high EV penetration. • Regional areas with weak existing network. • Fringe-of-grid (i.e. remote) communities.	4.2
Transition to smart grids and new business models will include: • V2G platforms. • Vehicle to home (V2H) platforms. • Virtual Power Plant (VPP) platform through V2G export. • Smart charging/load management chargers	4.3 4.4

7.2 Novel Responses

Response	Theme
Increase in network demand due to EV charging and/or hydrogen production (as identified in the Common Responses). Suggested management strategies include: • Autonomous microgrids to reduce reliance on central generation to satisfy demand requirements. • V2G to provide grid demand support services (both as a load and generation source). • V2G to provide grid frequency support services. • Installation of chargers greater than 15Amp (~3.5kW chargers) on controlled load circuit. • Increase uptake of demand response programs and energy efficiency products & services for EV owners. • FCEVs for areas with weak networks that require large home-base charging, such as regional bus depots. • Regional pricing mechanisms in hotspot areas. • Hydrogen generation load curtailment for demand response.	4.1
Geographical areas/regions identified as being at risk of future charging demand included: • Areas with high energy costs due to reliance on diesel generation (i.e. Coober Pedy). • Regional areas which are part of load shedding schemes for NEM energy security.	4.2
New business models including: • Dynamic pricing mechanisms with access to spot market. • Relationship between EVs, automation and ride-sharing for purposes of grid service management (i.e. DR, renewables balancing and aggregation). • Load curtailment through demand response for EV fast-charging and/or load curtailment of private owner's charging.	4.1 4.3 4.4

7.3 Response Commentary

7.3.1 Summary

One submission provides a deep insight into the potential benefits and barriers relating to the uptake of EVs on a large scale in SA. AEMO scenario modelling is used as the basis for forecasting for EV uptake and there is an acknowledgement of CSIRO modelling. From this modelling and analysis, it is inferred that:

> *…if EV charging predominantly occurs outside of peak times, the impact of this increased energy throughput will be that customer bills will, on average, be 20% lower in 2050 than they would otherwise have been. This outcome relies on a timely transition to cost-reflective network tariffs to drive efficient charging behaviour.*

The respondent's submission conveys a set of pragmatic high-level solutions to distribution network issues as EV ownership increases. For residential charging, there is support for compliance of smart chargers with Australian Standards for demand response modes (AS 4755) and grid connected inverters (AS 4777) that are commonplace for solar power systems. It is noted that enforcement of these standards and measuring the effectiveness of regulation will be aided where information sharing is possible, namely using locational EV registration data from relevant government agencies. Where appropriate control of charging behaviour is possible, EVs are identified as a potentially beneficial load to the network as they can charge from surplus solar generation, especially given in SA a new off-peak has emerged in the middle of the day.

It is stated that:

> *The network has adequate capacity to support at-home charging so long as (a) home chargers are limited in size to 4-8kW (noting that a 15A or 3.6kW AC charger is more than sufficient to re-fill overnight from normal daily vehicle use) and (b) charging occurs outside of peak demand times… Already the network allows the connection of up to 32A (7.6kW) sized EV chargers to the off-peak controlled load register, allowing customers to charge off-peak at cheaper rates… SA Power Networks has proposed new Time of Use tariffs for the 2020-25 regulatory period that are intended to provide an incentive to move loads into the middle of the day.*

There are similarly proposed tariffs which promote beneficial charging behaviour for large customers (i.e. those wanting to invest in home-base chargers or charging stations). There will be changes to both the method for peak demand calculation and the demand window (moving to 5pm to 9pm for non-CBD in summer months only). The practical result is that customers with either short/peaky loads or those who stay out of the afternoon peak (i.e. duck-neck) will benefit. There is also support for opportunities for reduction in augmentation costs for infrastructure owners who *manage their charging in flexible ways* however no substantial detail on these flexible conditions is given. Flexible (or skinny) network connections are identified as key to limiting the cost of network augmentation/connections in rural and remote communities and further identify holiday areas as potential seasonal hotspots where *smart, manageable residential charging will be critical to mitigate this*.

The below response provides a positive outlook on the role of EVs in future V2G and VPP platforms:

> *There is a clear opportunity for EV chargers to participate in aggregated demand-response schemes…on 2-way charging/discharging…from a network perspective there is no specific obstacle as V2G chargers would be treated like any other grid-connected battery…to the* implementation of *flexible connection offerings for smart DER will support the efficient integration of VPPs and solar PV, which could be extended to support 2 way EV operation.*

7.3.2 Changes to network demand and management

By and large the suggestions are consistent with the industry view on effective mechanisms to manage the future demand on the grid from EVs. Common responses include limiting 'uncontrolled' charging through the use of smart chargers[7] and tariff reform to charge in off-peak periods or during the middle of the day to act as a 'solar sponge'. Some believe different tariff products are required for distinct market segments, namely commercial and residential customers.

An energy retailer cites the network pricing as an effective management tool, including state specific tariffs for dynamic demand management strategies for EVs. Another makes no such mention of price signals as a mechanism to provide behavioural signals to EV owners.

Respondents regularly state that to effectively address both the environmental and network concerns, chargers should be coupled with renewable energy sources. One respondent states that AC chargers up to 7kW are suited to residential solar. Another believes the coupling of residential solar, EV charging and behind the meter storage is an effective way to maximise customer benefit whilst minimizing the impact on the grid from excessive residential solar export.

An energy retailer provides an important point relating to grid utilisation and EVs:

> *If managed correctly, EVs could potentially improve network asset utilisation and cost outcomes for consumers… while EVs present a 'hotspot'…demand management can address most hotspot situations by providing price signals to encourage ideal charging behaviour, using vehicle-to-grid opportunities, or using local storage.*

A submission suggests the use of controlled load circuits for EV chargers:

> *To avoid electric vehicles adding to this demand, consideration could be given to a requirement that chargers, with an output greater than the portable charger (2.4kW/10A to 3.6kW/15A) that are not on an agreed or actual demand tariff, be installed on a controlled load circuit.*

7.3.3 Grid connection costs

Grid connection costs are considered the biggest barrier to the installation of chargers. A submission states:

> *Upfront capital expenditure at our sites to augment the network and secure capacity as per DNSP standards – the new or upgraded point of supply is designed by DNSP internal*

[7] A smart charger is a general term for an intelligent electronic charger with capabilities that may include dynamic load balancing, pre-programmed timer clocks and/or responding to grid parameters.

engineers, or by accredited 3rd party designers as per DNSP requirements, and typically several hundred thousand dollars per site must be outlaid to contribute a fair share towards the extra network capacity required for high-power EV charging sites.

For fast chargers, particularly in areas of weak grids, many responses support skinny grid connections[8] to meet the charging demand of fast chargers (or charge stations) using on-site generation, minimising the grid import and storing the majority of energy behind the meter - this is referred to as the 'opportunity charging model'. Some respondents identify off-grid chargers as being important solutions for areas where connection charging infrastructure will be prohibitively expensive (particularly in remote and fringe-of-grid communities).

With respect to heavy vehicles, one respondent provides some lessons learned from an 'Electric Bus Pilot' project. For this project the electrical infrastructure cost was underestimated. Subsequently upgrades to the site main switchboard and the Ausgrid substation were required in order to simultaneously charge all buses at the same time. This case study also illustrated that hydrogen may be a viable alternative in such instances:

… the heavy demand at peak consumption periods make the EV solution difficult to manage from a grid perspective. This is where HFCBs provide a good balance where the hydrogen can be produce(d) with green electrons from solar or wind during non-peak times for the electricity grid….The hydrogen fuel cell bus solution does not have the same constraints on charging time as the hydrogen gas can be produced in regional areas at non-peak grid times using electrons from green sources such as solar farms.

7.3.4 Strategic areas at risk

The overwhelming response from submissions is that regional and remote areas with weak networks are at risk of future charging demand, as has been discussed already in the response commentary. The consultation identifies other more unique issues which must be dealt with in the future to enable equal access to EVs in the future. One such issue was highlighted in a submission:

Regional councils are at risk of paying higher prices for energy to power domestic EVs. Particularly municipalities such as Coober Pedy which is entirely reliant on diesel power generation presently. In this locality, a switch to EV's would likely result in higher diesel consumption at the generator in order to recharge those EVs. Coober Pedy is also a tourist destination and a mid-way point for travellers and so there would be increasing demand for

[8] A 'skinny grid connection' is a situation where the network connection is undersized and in order to meet the full electrical load, on-site generation and storage is required and connected behind-the-meter.

a recharging station in Coober Pedy in the future if EVs are widely adopted. Kangaroo Island would experience similar issues although it is connected to the mainland electricity network.

One respondent believes EV model range (travel distance) may pose a risk for uptake in regional areas due to the need for larger private vehicles and there appears to be minimal scope in the consultation for the electrification of primary production vehicles.

7.3.5 Smart grids

With respect to smart grids, it is identified that the cost premium of hydrogen technology, particularly residential hydrogen production, will be prohibitive and therefore it will be less likely to incorporate hydrogen technology into smart grids. New platforms, such as VPPs and V2H applications, will present issues for premature battery degradation and the voiding of warranty due to the cycle frequency of the batteries. Furthermore, it is identified that the CHAdeMO plug is one of only a few bi-directional plugs available, meaning the participation opportunities for all EV owners may be limited until other plug manufacturers are able to develop and certify their products for the Australian market. A number of responses believe that trials of V2G/VPP platforms will benefit from financial incentives in order to have a statistically significant and varied source of users to robustly test these platforms in the unique SA context. A number of respondents support the use of the SA Home Battery Scheme to increase participation rates of EVs in next generation platforms.

7.3.6 Other comments

Submissions also cite the benefit of EVs in the rollout of smart meters. This will have a twofold benefit; to provide industry and government detailed information for consumer charging behaviour and to give consumers access to time of use tariffs, which should be developed by electricity retailers through a combination of both network tariff and wholesale electricity price signals.

Finally, many submissions, particularly the less detailed, believe further detailed investigations are needed to understand where and how EV charging infrastructure should be efficiently rolled out in SA. This is counterbalanced by the stronger submissions who cite studies, some of which involve participation from organisations such as ARENA, AEMO and SAPN. This highlights that more can be done in the distribution of detailed research about the future of EVs.

7.4 Key points

- The requirement to upgrade parts of the distribution network to avoid 'hot-spots' and/or issues with peak demand if charging is not managed carefully is widely recognised.

- Several strategies to manage the above are suggested, and the need for research studies/trials to understand charging impacts and opportunities on the grid in the SA context is commonly cited.
- Grid connection costs and uncertainties for charging stations that require large capacity are cited as an issue.
- Depots with the potential for large EV fleets are noted as likely hotspots.

8 Theme 5: Capturing Industry Development Opportunities

5.1 What industry development opportunities do you see arising from the transition to electric vehicles and how can they be captured in South Australia?

5.2 What do you view as South Australia's key capabilities and strengths in regard to the electric vehicle value chain and how can these be built upon?

5.3 What environmental challenges do you see arising from electric vehicles and how can those challenges be managed cost effectively (for example reuse, refurbishment or recycling of components)?

8.1 Common Responses

Response	Theme
Electrical services industry development opportunities, particularly for local installers and maintenance of charging infrastructure.	5.1
Research and development industry developments including: • Control and monitoring platforms. • Best-practice battery end-of-life repurposing, recycling and upcycling, including valuable metals. • User interface to EV platforms (i.e. through mobile phones). • Autonomous EV driving, particularly for remote/regional communities. • Charging load management technology.	5.1
EV battery and associated equipment industry developments including • Stationary and EV battery manufacturing. • Software and hardware for battery management systems.	5.1
Local manufacturing industry developments including: • Advanced equipment manufacturing (typically unspecified) such as super-capacitors, microswitches, contactors. • Advanced automotive manufacturing. • Hydrogen for domestic use (EV and energy) and for export.	5.1
Skills and training industry developments including • EV maintenance regime. • Third party replacement of EV batteries. • Technical support. • Creation of new and highly skilled jobs.	5.1
South Australia's key strengths include: • High penetration of renewable energy, namely solar and wind energy. • Experience in managing high penetration of renewable energy. • Reputation as a leader in renewable energy and test-bed for new energy technology platforms. • Supply chain of resources and skills to complement EV manufacturing. • History in automotive manufacturing and associated commercial relationships.	5.2
South Australia key capabilities include:	5.2

Response	Theme
• Research and development history in renewable energy technology. • Manufacturing experience, particularly for advanced products (although typically unspecified).	
Environmental challenges from EV production including: • Recycling, re-purposing or upcycling of batteries at end of life, including minerals such as lithium and cobalt. • Refurbishment and re-use of hydrogen fuel cells. • Mining of rare materials such as lithium. • Training workforce to ensure best-practice end of life battery handling is maintained.	5.3
Environmental challenges from EV operation where it is important to maximise EV charging from renewable energy.	5.3

8.2 Novel Responses

Response	Theme
Electrical services industry development opportunities including export of local installation knowledge to global industry i.e. remote/regional charge stations.	5.1
Research and development industry developments including: • EV integrated charger technology i.e. smart on-board charger. • EV specific IT security development.	5.1
Manufacturing industry developments including: • Local bus manufacturing.	5.1
Skills and training industry developments including: • Establish support and skills training through Australian Hydrogen Centre of Excellence. • Vehicle collision repairs. • Third party (i.e. non-dealership) mechanical repairs. • Address skills shortage in SA through future skills.	5.1
Other industry development opportunities including: • Modular and mobile microgrid platform development. • Confined space working with zero emission EVs. • Longer working hours for EVs due to quieter operation, particularly for heavy commercial vehicles. • Attract start-up companies to set up business in SA. • Solar component manufacturing. • Lithium mining. • EV 'hot climate' testing facility, similar to cold climate testing in New Zealand's Southern Hemisphere Proving Ground. • Capability to showcase SA developed technology and developments at international forums. • Energy security opportunity to address Australia's lack of strategic fuel reserves. • Use City of Adelaide's Tier 1 communications network as a test-bed for industry trials for advanced DER platforms.	5.1

Response	Theme
• Increased car/ride sharing fleets. • Industry partnerships/trials with specific technology vendors. • Third-life repurposing of batteries for minor applications such as water pumps or electric gates on rural properties.	
South Australia key strengths include: • Waste management industry and high resource recovery rate. • Waste management policy. • Experience in smart grid technology development, such as VPPs through trial projects. • Potential utilisation of currently underused facilities for manufacturing i.e. old Holden site.	5.2 5.3
Other environmental challenges include: • For HFCBs, recycling of superconductors and/or supercapacitors.	5.3

8.3 Response Commentary

8.3.1 Industry opportunity

The overwhelming majority of responses see SA as a potential leader in EV manufacturing and related support industries in Australia. Many cite the combination of a recent history in car manufacturing, a high penetration of renewable energy and a reputation for innovation in the energy field as a platform to launch SA as an Australian market leader. From the common responses, a recurring theme is for SA to be a developer of 'best-practice' systems and procedures, particularly for recycling, skilled labour and skills training. For example, many identify the recycling and repurposing of EV batteries as a significant opportunity for SA to develop best-practice standards:

> *There are significant economic drivers to support the recovery of valuable materials such as metals (e.g. cobalt, lithium, nickel, and zinc) from EV and other lithium-ion batteries. Recycling provides an opportunity for recovery of high-value materials and avoiding the cost of hazardous waste disposal…Given EV batteries have a life of 10 years or more, there is time to develop an efficient and environmentally sound resource recovery industry in Australia. This needs to be developed consistent with circular economy principles, the national Product Stewardship Act 2011[9], National Waste Policy 2018[10], South Australia's Waste Strategy[11] and the Environment Protection Act 1993. The EPA encourages new*

[9] https://www.environment.gov.au/protection/waste-resource-recovery/product-stewardship
[10] https://www.environment.gov.au/protection/waste-resource-recovery/national-waste-policy
[11] https://www.greenindustries.sa.gov.au/sa-waste-strategy

> *schemes, such as for EV batteries, to maximise recyclability and sound end-of-life management to better promote a circular economy. EPA.*

A submission supports 'best-practice' development but also further highlights that existing industry participants need to ensure adequate adjustment to new practices. This adjustment is needed to ensure existing businesses can participate in future industries altogether, let alone be market leaders, otherwise there is a risk that SA industry is left behind.

With respect to manufacturing, some submissions outline the key strengths and industry opportunity for both EV and battery manufacturing in SA. A respondent identifies the growth of existing supply chains in SA, including raw materials, as a cornerstone in developing an EV manufacturing industry. By *value adding rather than shipping raw minerals and heavy metals*, as a respondent suggests, SA could achieve both the development of a sustainable EV manufacturing industry and assist the growth of support communities and small business based around manufacturing centres.

It is also suggested that a balance between stimulating a second-hand import market, advanced industry and EV product benefits needs to be found:

> *Although the increase in near new second hand Electric Vehicles…will provide additional supply, governments should focus on a balanced approach. With a significant increase in second hand imports this could potentially work against the encouragement of manufacturers to focus on bringing the advanced technology in Electric Vehicles into the Australian market, compared in prioritising other markets.*

Research into innovative platforms is already underway in SA. A number of trials for VPP platforms have been run by groups like *SAPN* and *AGL*. A respondent nominates current businesses developing EVs and advanced manufacturing in SA which may benefit from support:

- *EV components (GELCOservices and REDARC)*
- *EV conversions (RETRO EV)*
- *EV manufacturing, (ACE EV and BYD)*
- *Solar Vehicles (TAFE and Universities)*

Another opportunity is the attraction of investment in SA. Generally, responses identify the existing relationships with industry leaders, such as Tesla, as an advantage. Subsequently respondents support development of further relationship strengthening through trial projects and/or industry partnerships. This reputation is seen as a way to attract both start-ups and large international businesses to SA, either to set up offices or entire businesses in SA.

8.3.2 Environmental challenges

EV battery disposal, recycling and product stewardship are almost universally given as the key environmental challenges that will arise from large-scale EV take up. A respondent identifies that circular economy principles[12], which have been strongly promoted by Green Industries SA since 2017, as the guiding principle that should govern decisions for changes to national frameworks. Such frameworks include the Product Stewardship Act 2011, National Waste Policy 2018, South Australia's Waste Strategy, and the Environment Protection Act. Given the majority of these policies and frameworks are national, SA can be advocates for national change.

SA appears to be in a strong position to take advantage of the emerging recycling industry opportunities given:

> *South Australia has well developed recycling industry capabilities and the highest resource recovery rate in Australia. In 2017-18, 86% (3,874,000 tonnes) of all recovered material reported were reprocessed in South Australia.*

Other potential mechanisms to be adopted within the recycling industry include the adoption of EU regulations which require makers to finance the costs of collecting, treating and recycling EV batteries[13] and/or adoption of similar US regulations for product take back schemes, disposal fees or product refund schemes[14]. A vehicle manufacturer also promotes the need for future vehicles to follow a "Design for Recycling"; they claim that 70% of their car weight is from recycled materials with the goal to be 95%.

8.4 Key points

- South Australia's key strengths include:
    - High penetration of renewable energy, namely solar and wind energy.
    - Experience in managing high penetration of renewable energy.
    - Reputation as a leader in renewable energy and test-bed for new energy technology platforms.
    - Supply chain of resources and skills to complement EV manufacturing.
    - History in automotive manufacturing and associated commercial relationships.
- A number of submissions outline the key strengths and industry opportunity for both EV and battery manufacturing in SA.

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[12] "A Circular Economy is an alternative to the wasteful traditional 'linear' economy based on 'take, make, use and dispose'. It is a self-sustaining system driven by renewable energy and an imperative to keep material resources in use, or 'circulating' for as long as possible." Benefits of a Circular Economy in South Australia, Government of South Australia.

[13] https://www.gov.uk/guidance/waste-batteries-producer-responsibility

[14] https://www.sciencedirect.com/science/article/pii/S0926961401800125

- EV battery disposal, recycling and product stewardship are almost universally given as the key environmental challenges that will arise from large-scale EV take up.

9 Theme 6: Supporting Policy and Regulation

6.1 What regulatory reform is required in South Australia to remove barriers and/or to create new standards/laws in support of the transition to electric vehicles?

6.2 Are there specific gaps in research and development knowledge that need to be addressed to support the early transition of the electric vehicle industry/sector?

6.3 Is it reasonable to vary government motor vehicles fees and charges according to the CO2 or environmental impact?

6.4 How can electric vehicles make a fair contribution to road and infrastructure costs if they don't pay the fuel excise levy?

9.1 Common Responses

Response	Theme
Reform to building codes, laws and standards. Specific documents cited are: • National Construction Code (NCC) (formerly known as the Building Code of Australia). • AS3000 - Wiring Rules. • Council development application rules. Reform outcomes include: • Mandatory spare electrical capacity in new apartments and multi-dwelling buildings to enable EV charging points. • Minimum percentage of EV parking spaces in car parks, particularly in the CBD. • Planning regulation for all new regional petrol stations and transport hubs to include EV charging facilities or capacity. • Standardisation of charger plugs. • Council planning pre-approval for public charging.	6.1
Reform to professional qualification standards. Reform outcomes include EV maintenance certification/qualifications for maintenance, repair and component handling (both BEV and FCEV).	6.1
Reform to energy industry regulation. Specific documents cited are: • Development of new framework within National Electricity Rules. Reform outcomes include a new legal framework for commercial rollout of V2G type VPP platforms which are not orchestrated by an electricity retailer.	6.1
Reform to vehicle laws and standards. Specific documents cited are: • Development of Australian acceptance standards for new and used acceptance standards for EVs. • Adoption of National Vehicle Emission standards. • Adoption of updated Fuel Standards. Reform outcomes include:	6.1

Response	Theme
• Federal advocacy/lobby with other states for federal Fuel Efficiency Standards, including mandatory target for new zero emissions vehicles. • Simplify import of second-hand EVs into Australia.	
Reform to vehicle registration, vehicle tax and parking regulation. Reform outcomes include: • EV specific parking and traffic exemptions. • State tax regulation to enable financial incentives from Theme 1.1 such as stamp duty and vehicle registration fees. • Federal tax regulation (advocacy only) to enable financial incentives from Theme 1.1 such as luxury car tax and fringe benefit tax.	6.1 6.3
Reform to vehicle consumer law and regulation. Reform outcomes include a new legal framework to assist with warranties, particularly where EVs are used for non-driving services such as grid support.	6.1
Reform to waste management regulation and law. Specific documents cited are: • Product Stewardship Act. • National and state waste policies. • Environmental Protection Act. • Development of new industry wide stewardship program specifically for EV batteries. Reform outcomes include: • End of life management of EV and components including battery collection, transport, handling recycling, discharge, and re-use of EV batteries for stationary storage applications. • Support for best practice re-use of secondary materials in accordance with the waste management hierarchy.	6.1
Change government fees and charges to pay finance EV uptake, including: • New levy on ICE vehicles to cover EV financial incentives. • Pollution levy i.e. carbon tax.	6.3
Replace Fuel Excise Levy with Road User Charge.	6.4

9.2 Novel Responses

Response	Theme
Reform to building codes, laws and standards. Specific documents cited are: • ISO standards for hydrogen technology. • Develop new standards-based framework and code of conduct for FCEVs. • AS4777 - Grid connection of energy systems via inverters. • AS4755.2 - Demand response capabilities and supporting technologies for electrical products. Reform outcomes include: • Mandatory spare capacity in new public buildings and commercial ventures such as car parks, sporting venues and tourist centres to enable EV charging points. • Technical standards which make it mandatory that EV chargers greater than 3.6kW must be smart chargers. • Technical standards which specify charging infrastructure and data interfaces to enable move to smart grids. • New standards for FCEV safety standards, components, driver capability and mechanic skills recognition. • Mandatory solar to vehicle charging for behind the meter charging in areas with weak grid. • Mandating or incentivising smart EV chargers that are capable of responding to demand response signals or pricing incentives.	6.1
Reform to distribution network connection standards. Specific documents cited are: • National Electricity Rules (Chapter 5). • SAPN connection policy. Reform outcomes include: • DNSPs to better align connection requirements and provide more consistency and transparency in approval responses and timeframes.	6.1
Reform to city planning regulations. Reform outcomes include the creation of clean air zones where zero emissions vehicles are allowed and ICE vehicles limited (or excluded), particularly in densely populated areas.	6.1
Reform to vehicle laws and standards. Specific documents cited are: • Australian Road Rules. • Australian Consumer Law. • Insurance Code of Conduct. Reform outcomes include: • Creation of national definition for PHEV, BEV and FCEVs. • Standardisation of the charging port locations at front of vehicle to support safer and cost-efficient provision of EV charging infrastructure. • Consumer guarantees for EV range (travel distance) e.g. who is liable for misrepresentation of range capability if consumer is 'stranded'. • Original Equipment Manufacturers (OEMs) being legally obliged to provide information to qualified repairers, regardless of whether repairer has completed OEM specific training course.	6.1

Response	Theme
• Ensure insurers' order repair method is 'fair and reasonable' particularly if different to method prescribed by OEM. This should allow for subsequent liability where non-prescribed repair is faulty.	
Reform to heavy vehicle laws and standards. Specific documents cited are: • Australian Design Rules. Reform outcomes include: • Exemptions in Australian Design Rules to enable BEV and/or HFCB imports from EU and UK. • Gross Vehicle Mass (GVM) limits to enable heavy vehicles to operate to manufactured operating GVM.	6.1
Reform to waste management regulation law and regulation. Specific documents cited are: • State Solid Waste Levy. • Environmental Protection Act. Reform outcomes include: • Creation of true closed waste system. • Labelling and design for efficient separation and sorting. • Specific (i.e. explicitly called out) banning of EV batteries to landfill.	6.1
Research and knowledge development relating to **EV usage** including: • SA population vehicle usage assessment (i.e. traffic flow analysis) to understand future EV behaviour trends. • Programs to encourage workplace charging and subsequent monitoring of fleet charging activity.	6.2
Research and knowledge development relating to **lithium battery recycling**, specifically relating to how to extract value from EV battery waste.	6.2
Creation of new government bodies such as a Hydrogen and Fuel Cell Technology department (similar to the National Organisation Hydrogen and Fuel Cells in Germany).	6.2
Creation of a federal EV roadmap with support from SA government.	6.2
Research and knowledge development relating to **economic analysis** including comprehensive analysis of the cost benefits of increased EV adoption and the indirect impacts to tax revenue and expenditure.	6.2

9.3 Response Commentary

9.3.1 Regulatory reform

Submissions strongly support regulatory reform which can drive the incentives identified in Theme 1.1 of the consultation paper.

A submission provides a useful insight into less frequently discussed barriers within the automotive retail, service and repair sector. They identify issues with franchise agreements which *both prevent the introduction of the OEM to Consumer Sales channel, as well as limit the ability of dealerships to hold stock for low demand vehicles*. Other issues highlighted are the need for tighter regulation of access to information from OEMs and a vehicle insurer code of conduct.

> *The lack of a legislative or regulatory framework to enable Repairers and Vehicle Dealerships to access vehicle servicing and repair information (from OEMs) while protecting the security (of) electronic and networked components…no effective regulation of vehicle insurer conduct towards vehicle body repairers means that electric vehicle crash repair costs are unlikely to be fully recovered by repairers from insurers…EV industry awareness and preparedness in relation to these barriers is minimal, which may lead to an expanding field of dispute as additional scenarios are brought into each of the relevant policy debates.*

A related field is the warranty issues for uses of EVs for grid support services. Many submissions support changes to legal frameworks to assist with warranties where platforms supported by the government, such as VPPs, will render a warranty void as the EV is used in a way it was not designed for.

A very common theme relating to the National Construction Code is the need to provision EV charging capacity for new apartments and multi-dwelling buildings. Many provide non-prescriptive recommendations however one response recommends a dedicated 30 Amp circuit to the garage or carport with a 15 Amp outlet.

It also strongly supports making changes to two Australian Standards:

> *Now is the opportune time to ensure EV chargers are considered in Australian standards as AS4755 (Demand response capabilities and supporting technologies for electrical products) is currently under review, and AS4777 (Grid connection of energy systems vis inverters) is soon to be…The upcoming review of AS4777 should apply to EV chargers and ensure standardised ramp rates, ride-through, disconnect settings, and reconnect services…The current review of AS4755.2 should make clear that EV chargers are in-scope, are able to be made compliant, and be used as demand response devices.*

Another common theme within the submissions is for adoption of best-practice policies and standards, particularly where they have already been implemented. For example, a number of submissions cite New Zealand's second-hand import standards for EVs as a suitable third-party import regulation which could be adopted by SA. In Theme 1, there are recommendations relating to the GVM of heavy vehicles - a submission suggests that a mass dispensation system has been implemented by VicRoads for the Victorian market and a similar system could be implemented in SA to enable these changes. A similar 'exemption' for importation of new and second-hand buses within the Australian Design Rules is identified as an important way of driving strategic deployment of HFCBs and increasing the range of EBCBs. With respect to hydrogen, a submission highlights work currently being undertaken with Hydrogen Mobility Australia and other federal agencies. Such work demonstrates the opportunity to develop an international industry best-practice with respect to items such as FCEV safety systems, components, driver capability and mechanic skill recognition.

A respondent identifies the practical case for creation of a national definition of EVs in the Australian Design Rules:

> *To support the effective regulation and incentivisation of electric vehicles, the Australian Road Rules (Road Rules) and related legislation could be further updated to include a separate and nationally consistent definition for plug-in hybrid electric vehicles (PHEV) and battery electric vehicles (BEV). Differentiation of these vehicles from conventional hybrid electric (HEV) and FCEV would enable tailoring of incentives to the specific infrastructure needs of different vehicle types…For example, differentiation between PHEV, BEV and FCEV, that require an external electricity supply, and HEV and FCEV that do not require these services to refuel, would enable targeting of financial and non-financial incentives to the area of greatest need or technology that delivers the greatest community benefit.*

A handful of submissions support parking exemptions for EVs, particularly in CBD areas. A vehicle manufacturer raises a point relating to rule enforcement whereby special EV number plates can assist with enforcement of any traffic and/or parking measure. Furthermore, another submission notes that the Road Traffic (Light Vehicle Standards) Rules 2018 have been adopted in SA, meaning new EVs from January 2019 onwards should have special identifying number plates, therefore distribution of number plates to pre-January 2019 EV owners may be required for efficiency in rule enforcement.

A number of respondent's support changes to end of life regulations through the framework of the Product Stewardship Act, one submission states:

> *The National Waste Policy provides a high-level framework for collective action by businesses, governments, communities and individuals until 2030. It identifies principles to promote the achievement of a circular economy, including improve resource recovery.*

Product stewardship manages the impacts of different products and materials. The Product Stewardship Act 2011 provides the framework to effectively manage the environmental, health and safety impacts of products, and in particular those impacts associated with the disposal of products. Those producing, selling, using and disposing of products have a shared responsibility to ensure that those products or materials are managed in a way that reduces their impact, throughout their lifecycle, on the environment and on human health and safety.

A retailer nominates bodies such as the Battery Stewardship Council and the Australian Battery Recycling Initiative as suitable groups to further develop product stewardship regulations.

A number of responses support the standardisation of development approval requirements to remove barriers to charger uptake, particularly smaller public area level 2 chargers. One submission provides an insight into their experience of such processes around Australia and state:

Infrastructure is subject to the individual South Australian Local Council Planning Schemes with no exemptions…In NSW, QLD, and VIC, state planning schemes acknowledge EV charging infrastructure as permitted development provided installations meet some basic criteria. This enables EV operators to proceed with EV charging installations with a simple notification to Local Planning Authorities, removing the need to complete Development Applications. This legislative approach allows for a streamlined and speedy rollout of EV charging infrastructure, and hence we seek support from the SA Government to facilitate these changes to the SA state planning framework.

One respondent supports such a pre-approval system whereby prescriptive specifications are used to ensure planning approval processes are consistent across states and do not slow down infrastructure investment, whilst another respondent supports such reform on a national level.

Finally, another submission identifies the connection approval process as another process which can act as a significant barrier to the rollout of fast EV charging infrastructure (albeit as a national issue as SAPN's connection policy is governed by the National Electricity rules):

Currently there are minimal obligations under the National Electricity Rules (Chapter 5) requiring a Network Service Provider (NSP) to respond to grid connection applications in a timely manner. The…process can take more than 6 -8 months to receive a response from initial inquiry. These delays not only adversely impact the rollout of the chargers but are very costly. Each application cost can vary between $3,000 to $30,000 depending on the number of times we are required to resubmit due to inquiries and with up to $500,000 upfront CAPEX spend on augmentation of a site once we receive the design standards and

requirements from the DNSP…While these issues can be attributed to the lack of obligations in the NER, there remains scope for DSNPs to better align connection requirements and provide more consistency and transparency in approval responses and timeframes.

9.3.2 Research and knowledge development

Across the balance of the responses it was shown that there is already a wealth of research into the uptake of EVs and associated equipment in Australia and SA.

A submission (among others) identifies EV driver information as the next step in research and knowledge development in the field of EVs:

Both technical, operational and driver experiences can be collected for future policies, training and information sharing.

9.3.3 Government motor vehicle fees

There is near unanimous support for the variation of motor vehicle fees and charges according to CO_2 emissions, with general justifications relating to environmental benefits, public health benefits and pricing signals to the market. The majority seek to put a pollution levy on carbon emissions whilst some seek a similar price difference through a concession linked to lower and zero carbon emission vehicles.

A respondent supports the pollution levy but only after a wide uptake of EVs rather than using this as a measure only to support early adopters. Another identifies the need to ensure this doesn't adversely affect vulnerable consumers:

…it should be linked to investment needs to grow the sector for decades to come and there will be a need to replace (fuel) excise tax. It would need to be structured in such a way (as) not to impact those that can least afford it and also cannot afford to purchase more fuel efficient vehicles especially rurally and regionally where there is no alternative but to drive i.e. no public transport.

Others support a similar pollution levy with exemptions to lower income earners to ensure they're not left worse off in an EV future.

Other mechanisms which the respondents recommend include the phasing out of tax credit programs such as fuel tax and diesel fuel rebate scheme and replacing with EV financial incentives, a congestion charging mechanism, an increase to the Fuel Excise Levy, and a tyre excise levy.

One submission simply states that the variation of motor vehicle fees and charges should change according to CO_2 output but other vehicle users should not cross-subsidise these incentives. This is one

of only a few contrasting views on this topic which don't suggest punitive measures on ICE drivers to support EV uptake.

9.3.4 Fuel excise levy and road user charges

The replacement of the Fuel Excise Levy with a Road User Charge (RUC) is widely considered to be the fairest method of recovering a future Fuel Excise Levy revenue shortfall. There are many different factors which respondents nominate in order to create a fair and equitable RUC including annual distance travelled, vehicle weight (gross weight, axle weight or load at weigh stations for trucks), emissions factors and contribution to congestion.

Detailed responses generally suggest that given the complexity of this mechanism, a RUC will require detailed and wide industry consultation to ensure it is fair and equitable. Some suggestions for implementation include waiving charges on EVs before uptake reaches a specified public target, implementing a RUC after a specified public EV target is reached or an offset of charges based on grid support assistance.

Another suggestion is a more rounded approach which includes a RUC as a feature of a broader range of measures to cover the falling revenue from the Fuel Excise Levy:

> *The mass adoption of EVs will have an improvement on air quality within cities, with a reduction in respiratory disease and a saving on the health budget. There would be a cost reduction on importing, storage, and transportation of fossil fuel.*

A most detailed response to this section, with their response being in support of recommendations provided in the Deloitte Road Pricing and Transport Infrastructure Funding: Reform Pathways for Australia discussion paper is:

> *1. The Australian Government should direct the Productivity Commission to establish a detailed Public Inquiry into the funding, regulation and pricing of Australia's road transport market, and related impacts in the broader transport market.*
>
> *2. State-based registration and administration charges for light vehicles should be progressively harmonised, eventually leading to a single national pricing structure for light vehicle registration.*
>
> *3. State-based regulations for light vehicles should be progressively harmonised, delivering a single regulatory regime for light vehicles across Australia including registration, safety and licensing.*
>
> *4. Consistent and detailed data should be collected to inform decisions on, and design of, any future road pricing mechanisms*
>
> *5. Australia's governments, motoring clubs and broader industry stakeholders should formally partner together to increase the public's awareness and understanding of the flaws and challenges posed by the existing system of road regulation.*
>
> *6. Large scale trials of road pricing should be developed and deployed to concept test different scheme design options. This process should be commenced in concert with the Productivity Commission review; allowing these trials to inform and shape the Productivity Commission's Public Inquiry process and final report.*

9.3.5 Other comments

The submissions also include references to state plans and groups which it may be useful to align future EV strategies with. A submission identifies the 30-year Greater Adelaide Plan as a framework that any future EV strategy should refer to, including waste management. A local Council see the use of the Power Line Environment Committee (PLEC) as potential lever to install charging stations.

9.4 Key points

- The need to provision for EV charging capacity in new apartments and multi-dwelling buildings is raised and it is noted that this could be achieved through provisions in the National Construction Code.
- The need for streamlined approval processes for public charging is raised.
- There is almost unanimous support for the variation of motor vehicle fees and charges according to CO_2 emissions, with general justifications relating to environmental and public health benefits and pricing signals to the market to increase EV uptake.
- The replacement of the fuel excise levy with a Road User Charge (RUC) is widely considered to be the fairest method of sharing the revenue raised from the fuel excise levy.

10 Other information

7.1 Please include additional information and views that are relevant to the development of an Electric Vehicle Strategy for South Australia that are not captured in the above themes.

Where information relevant to the Themes 1-6, or any other important information has been provided by the respondents, these are included above in the summary of the suitable theme.

11 Disclaimer

This report provides a summary of the responses to the SA Government Department for Energy and Mining's discussion paper. The report identifies key findings from the industry submissions however it is not able or intended to completely replicate the detailed responses of all respondents to the discussion paper. Where specific recommendations are made necessary due diligence is required prior to implementation. This should include the development of a business case including a full cost benefit analysis, a review of the specific industry submission and further contact with industry participants in this consultation process.