

19 September 2022

Anna Collyer
Chair
Energy Security Board
Emailed to: info@esb.org.au

Electric Vehicle Smart Charging Issues Paper – for Consultation

Dear Anna,

Thank you for the opportunity to respond to the Electric Vehicle Smart Charging Issues Paper (Issues Paper), to support the development of drafting directions and advice to government on the adoption of minimum standards for electric vehicle (EV) smart charging.

As you know, Energy Consumers Australia is the national voice of residential and small business energy consumers. We advocate for a modern, flexible, and resilient energy system that meets consumer values, expectations, and needs. We recognise that delivering such a vision, requires consideration of and planning for the projected increase in EV ownership and eventual transition to a full EV fleet.

In this way, we appreciate that standards to support the effective integration of charging devices for EVs have been identified as a priority activity for the Consumer Energy Resources (CER) Implementation Plan, and that the consultation questions have been raised to enable the EV charging needs of consumers.¹ However, we see that much of the Issues Paper is framed around the potential system challenges for widespread EV uptake, such that suggested measures may restrict consumer choice and control. In our view, consumer participation in the future energy system, to benefit themselves and other consumers must start with consumer agency and consent. In this context, consumers need to have an understanding of the choices available, and the benefits and costs to themselves and others.

As we discuss in our submission, implications for forecasting energy demand across the National Electricity Market (NEM) and the potential impact on future peak demand requirements should not be considered in the context of the worst-case scenario. While undeniably the transition to a full EV fleet will be transformative on the energy supply chain, in reality, the worst-case scenario is unlikely to occur. EVs present significant opportunities to reduce costs and maximise benefits for all electricity users, particularly as they are likely to put downward pressure on unit network prices for all Australian consumers and reduce the potential level of future network investment in capacity. As such, it is important that policy advice for the development of effective arrangements for EV smart charging is framed as an opportunity, not as a threat to the energy system.

In developing policy, we must also be mindful that Australian consumers do not yet see themselves in this electric mobility future.

¹ <https://www.datocms-assets.com/32572/1658376992-esb-electric-vehicle-smart-charging-issues-paper-final-for-publication.pdf>
p 6.

Our June 2022 Energy Consumer Sentiment Survey results revealed that only 1 in 3 household consumers think they will buy an EV in the future.² Small business consumers are more confident, with half thinking they will.³ While the development of minimum standards for EV smart charging is sensible, at this stage we do not want policy to discourage uptake of EVs, and instead should encourage consumers to make convenient and efficient charging choices.

To this end, we advocate fit for purpose retail pricing and standards that support the delivery of value and optionality for consumers, so long as they do not limit the control consumers may want over their EVs and devices.

In the context of the Issues Paper, specifically, we support:

- nationally consistent communication capability requirements, namely that of OCPP 1.6J;
- minimum functionality for domestic chargers to be installed with build-in scheduling and remote management (and consumer over-ride capabilities), provided that these activities are opt-in for consumers and that the cost impacts are not prohibitive

At the moment we are also thinking deeply about tariffs and prices generally, including in the context of EVs. We are not in a position to fully outline this yet, and do not want to hold up our submission any further while we develop it. Generally, we support specific retail tariffs that are structured for the different EV charging choices that incentivize uptake and optimisation, (and in the case of residential charging, choice to have an EV tariff that is unbundled from the remainder of a consumer's electricity supply). There are various reform options that need to be linked, including network tariff design, flexible trading arrangements, and interoperability behind the connection point which is being developed by the Interoperability Steering Committee.

Finally, we note that charging issues are only one element of a broader EV environment that is vital for a successful transition to our electrified mobility future. Standards for smart charging do not mitigate all barriers for EV uptake, with the Electric Vehicle Council identifying key barriers as that of cost, supply, consumer awareness, and range anxiety.⁴

Should you have any questions or require clarification, please contact Isabella Darin at isabella.darin@energyconsumersaustralia.com.au.

Yours sincerely,



Lynne Gallagher
Chief Executive Officer

² <https://ecss.energyconsumersaustralia.com.au/sentiment-survey-june-2022/featured-content-household-sentiment-june-2022/>

³ <https://ecss.energyconsumersaustralia.com.au/sentiment-survey-june-2022/featured-content-small-business-sentiment-june-2022/>

⁴ <https://electricvehiclecouncil.com.au/wp-content/uploads/2022/03/EVC-State-of-EVs-2022-1.pdf> p 18.

Submission to the Electric Vehicle Smart Charging Issues Paper

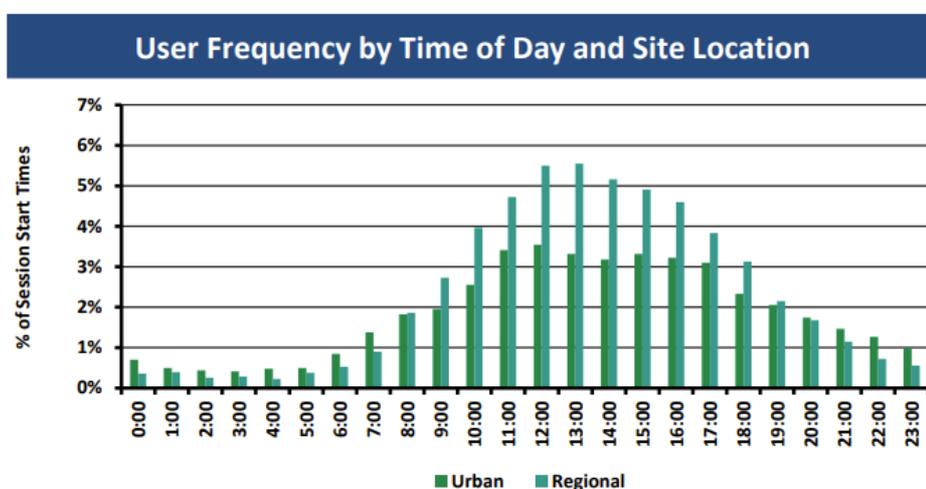
1. Framing the issues

The diversity of consumer preferences as a strength

Consumers' needs and preferences regarding EV charging are diverse and cannot be assumed. While there is much concern about the impact of potentially significant and peaky increases in consumption because of EV uptake, our October 2021 Behaviour Survey highlights that the time of day when current household users typically charge their EVs, is varied.⁵ The survey also reveals that household and small business preferences cannot be considered as homogenous, with divergence in when they typically charge their EVs.⁶

Additionally, Figure 1 from a recent ARENA study show site usage of EV public charging throughout the day.

Figure 1 EV charging times (distribution)



Source: ChargeFox, Evie, Energeia

(Source: Energeia Ultra-Fast Charging Data Analysis – Webinar Materials August 2021)⁷

⁵ For household consumers, 29% say they typically charge in the day, 28% overnight, 16% it varies too much to say, 14% in the evening, and 13% in the morning. <https://ecss.energyconsumersaustralia.com.au/behaviour-survey-oct-2021/how-people-use-energy/>

⁶ For small business consumers, 37% say they typically charge overnight, 26% it varies too much to say, 17% in the evening, 11% during the day, and 9% in the morning. <https://ecss.energyconsumersaustralia.com.au/behaviour-survey-oct-2021/how-businesses-use-energy-attitudes-towards-changing-behaviour/>

⁷ <https://arena.gov.au/assets/2021/08/ultra-fast-charging-data-analysis-webinar-materials.pdf> p 20.

The results align with work by the Electric Vehicle Council, which finds that Australian consumers are currently choosing to self-manage their charging to a significant degree, with comparatively little charging occurring during 'peak' time.⁸ Such consumer diversity should be seen as a strength for the system, and system design must take this into account to ensure best outcomes for consumers.

As the Energy Security Board (ESB) *Customer Insights Collaboration Release 1 Report* notes, consumer behaviour cannot be reduced to the binary classification of those with CER and those without.⁹ Consumers have their own opportunities and barriers when it comes to making decisions for how they use their EVs, which will have consequences for the grid. The Release 1 report reinforces the need to place consumers at the centre of decision-making, as consumer centric thinking will facilitate better outcomes.¹⁰ Ultimately, the success of EV integration will rely on policy settings that are shaped by an understanding of consumers' mobility needs and behaviours, rather than policy settings that attempt to force consumers' lives to benefit the grid through EVs.

Certainly, policy must be mindful of why people buy EVs. The Issues Paper rightly notes that consumers will primarily buy EVs to meet their mobility needs.¹¹ Given that this is the case, policy should not underestimate that the consumer expectation is to use them as such, not principally as an energy source as with solar PV or on-site batteries. Consumers may use their EVs in certain ways that limits the flexibility of their charging behaviour, unless charging infrastructure can anticipate these needs.

We also note the ongoing importance of engaging with consumers as EV uptake increases, as the current cohort of EV users (as early adopters) do not necessarily reflect the preferences and behaviours of consumers when there is widespread use in later years. For example, the University of Melbourne found that acceptance of supplier-managed smart charging is higher among EV early adopters than for mainstream consumers.¹² Further, the regulator Ofgem reports that current EV users in Great Britain are more likely to be engaged with energy and the environment and are more likely to have other CER technologies.¹³

It is also the case that technology and infrastructure will adapt and respond to EV usage patterns and needs over time, in ways that cannot be anticipated before there is widespread uptake. In this context, it is highly speculative to assume that having the technological capability for consumers to use their EV as an energy source for themselves or the grid means it will become a common social practice. The history of the smart phone suggests that it is consumers who will decide the subsequent evolution in technological innovation and uses.

How does mobility change in a future electrified transport system

As the Issues Paper notes, EVs could reshape consumers' energy needs and practices.¹⁴ It is important to consider how an electrified future may change mobility patterns and consumer behaviour, for example consumers' driving and charging routines. Will they be comparable to current practices for

⁸ <https://electricvehiclecouncil.com.au/wp-content/uploads/2022/08/Home-EV-charging-2030.pdf> p 1.

⁹ https://www.datocms-assets.com/32572/1658964111-esb-cic-knowledge-share-report-final_250722.pdf p 30.

¹⁰ <https://www.datocms-assets.com/32572/1658376992-esb-electric-vehicle-smart-charging-issues-paper-final-for-publication.pdf> p 11.

¹¹ <https://www.datocms-assets.com/32572/1658376992-esb-electric-vehicle-smart-charging-issues-paper-final-for-publication.pdf> p 5.

¹² <https://www.energynetworks.com.au/miscellaneous/electric-vehicle-charging-consumer-survey-report/> p 2.

¹³ <https://www.ofgem.gov.uk/publications/consumer-survey-2021-summary-research-findings-electric-vehicle-users> p 3.

¹⁴ <https://www.datocms-assets.com/32572/1658376992-esb-electric-vehicle-smart-charging-issues-paper-final-for-publication.pdf> p 7.

internal combustion engine vehicles, or could they better reflect how people charge their mobile phones or other smart devices?

Here are just some indications of potentially changing mobility patterns.

- In the UK, Ofgem found that 36% of EV users try and plan when they are going to charge their EV to get the best electricity price, while 25% tend to charge after every journey they make, and 23% only charge when the battery gets low.¹⁵
- They also report that most people use their EVs for local trips, with just under half using them for longer-distance trips.¹⁶ We note of course the differences in geographies and public transport infrastructure between Great Britain and Australia.
- Meanwhile in Australia, Monash University's Digital Energy Futures project has found that especially urban households and younger people are participating in a broader shift towards owning less or no cars or using their cars less often.¹⁷

Specifically for charging infrastructure, understanding mobility patterns is important when deciding where infrastructure would be best placed within localities to ensure it gets the highest usage and delivers maximum convenience for consumers. In this way, considering how mobility and consumer preferences change in a future with widespread EV usage is essential to delivering a fit-for-purpose system that reflects contemporary mobility patterns and consumer practices.

The importance of a strong social licence

The *ESB Customer Insights Collaboration Release 1 Report* identifies that a critical barrier in public acceptance and adoption of new technologies is a lack of trust in institutions, organisation and products and services.¹⁸ Successful policy settings that unlock greater value for consumers will require trust that any EV charging services are in consumers' best interests, including providing them control and agency, privacy and cyber security, and value sharing.

When it comes to automating devices generally, the energy industry has a way to go to develop sufficient trust for consumers to be happy to hand over control. Our October 2021 Energy Consumer Behaviour Survey found that only 7% of household consumers would be happy for smart appliances to be fully automated; half are happy for smart appliances to be automated only if they are able to override the settings; and a further 42% would prefer to set smart appliance timings themselves so they remain in complete control.¹⁹ This is largely consistent with small business consumer preferences.²⁰

Such findings align with Monash University's Digital Energy Futures work, which found that while some EV owners have charging settings automated, others had developed manual workarounds to override the car's automated functions to better fit into their existing routines.²¹

We note that while services such as vehicle-to-home or vehicle-to-grid may be promising for the effective integration of EV charging devices, they rely on a strong social licence. If consumers do not trust that giving control over their vehicle to another party is in their best interests, they will simply

¹⁵ <https://www.ofgem.gov.uk/publications/consumer-survey-2021-summary-research-findings-electric-vehicle-users> p 4.

¹⁶ <https://www.ofgem.gov.uk/publications/consumer-survey-2021-summary-research-findings-electric-vehicle-users> p 3.

¹⁷ https://www.monash.edu/_data/assets/pdf_file/0011/2617157/DEF-Future-Home-Life-Full-Report.pdf p 41.

¹⁸ https://www.datocms-assets.com/32572/1658964111-esb-cic-knowledge-share-report-final_250722.pdf p 23.

¹⁹ <https://ecss.energyconsumersaustralia.com.au/behaviour-survey-oct-2021/how-people-use-energy/>.

²⁰ <https://ecss.energyconsumersaustralia.com.au/behaviour-survey-oct-2021/how-businesses-use-energy-attitudes-towards-changing-behaviour/>

²¹ https://www.monash.edu/_data/assets/pdf_file/0011/2617157/DEF-Future-Home-Life-Full-Report.pdf p 46.

choose not to take part in these programs or make the intended behavioural changes, even if the standards are created to enable it.

External controls as opt-in, not mandated

We support opportunities for introducing standardisation where it supports the delivery of value and optionality for consumers, provided such minimum standards do not limit consumers' control over their EVs and charging devices.

Regarding the suggested equipment standard requirements, we support (1) minimum functionality for domestic chargers to be installed with built-in scheduling and (2) remote management and consumer over-ride capabilities, provided that such scheduling and management is opt-in for consumers and that the cost impacts of such a standard are not prohibitive. This allows greater choice for consumers when charging their EVs, enabling options for charging scheduling or remote management if they desire.

We note that we do not support requirements like those in Great Britain, wherein chargers must be configured to a pre-set default 'off-peak' period that can be changed.²² This feature was only brought into effect June this year, such that it is too early to determine outcomes for consumers, and we see adopting such a measure as premature. Particularly since in Australia we are yet to see EV offers that incentivise benefits for consumers, aligning with the high rates of solar generation during the day. Currently most retail time varying rates (in dollars per kilowatt hour) only make off-peak rates available between the hours of 10pm and 7am.

Further, we do not support requirements that consumers must participate in remote coordination capabilities for smart EV charging. Consumer permission for involvement is a reasonable and fundamental expectation for the use case of smart charging coordination of EVs. Consumers should not only have the option to opt-out of a particular event, but also should not have to participate in such schemes at all. A system design that removes this control is unlikely to be well received or effective, and will likely result in consumer workarounds, such as disincentivising the use of EV chargers in favour of regular power points.

Communication standards

We see it is sensible to introduce requirements for EV domestic charging equipment to have communication capability that aligns with a proven successful international approach, namely that of OCPP 1.6J or higher. We do not see value in unique Australian standards, which could limit manufacturers of vehicles and charging equipment from entering the market and make products more expensive for Australian consumers. Further, we recommend that such standards are nationally consistent, for these same reasons.

We note generally that it is important when considering international or jurisdictional examples to ensure they are in fact delivering good outcomes for consumers.

2. Structural improvement in network capacity utilisation

Australia's poor network utilisation rates reflect decades of growth in the use of air-conditioners on the hottest days, and the hollowing out of consumption by households with solar generation. This can only worsen as increasingly consumers also move to electrify their heating needs, further potentially contributing to the "peakiness" of the electricity network.

²² <https://www.legislation.gov.uk/uksi/2021/1467/regulation/10/made>

The widespread adoption of EVs provides an opportunity to offset these impacts and achieve lower current and future network costs for all Australian households and small businesses, including those who do not own or drive electric cars (or have solar generation).

Transportation electrification increases network value in a way that may significantly benefit all consumers in the long-term

Most retail electricity pricing is charged volumetrically, that is, on a dollar per kilowatt hour (\$/kWh) basis, outside of the fixed supply charge or in retail tariff structures which include a kilowatt demand charge for some or all of the network component. There are two ways to lower such a price: reduce the total costs of the energy system (the numerator) more rapidly than the volume of energy decreases or increase the amount of energy that flows through the system (the denominator) more rapidly than costs increase.

Electric cars use a lot of energy – a typical electric car will consume nearly half of the electricity of an average household without an electric car. Notwithstanding that total network usage comes from many consumers with various load profiles and tariff structures – for simplicity's sake, if we assume an overall 33% increase in network usage from electric cars with no increase in network costs, and fully volumetric pricing, the existence of those EVs would reduce network prices by 25%.²³ That reduction in prices would benefit all network users – not only those that own and charge EVs.

Indeed, modelling undertaken by Dynamic Analysis suggests that average network prices in Australia would be about 20 percent lower by 2050 if customers predominantly charge vehicles in the day and overnight periods in a well-coordinated approach.²⁴ This is due to improved utilisation of network assets, with minimal new investment required to meet peak demand. Any new investment required would achieve a higher capacity utilisation over its lifetime than the current network, so also achieving lower network costs than would otherwise be the case.

Network costs historically account for the largest portion of the electricity price for households. According to the AEMC's November 2021 Residential Electricity Price Trends report, regulated networks account for 45% of the total retail price of electricity for the average household in the National Electricity Market (using the base year, 2020-21).²⁵ The distribution system alone is itself nearly the most expensive single component of prices historically – accounting for 34% of the total retail price; while the wholesale cost of energy is 35%. Ultimately, significant reductions in network prices benefits all consumers, not just those with electric cars.

According to AER's State of the Energy Market 2021, while overall zone substation capacity has increased significantly in the past 15 years, average network utilisation in Australia has remained below 50% for the last 10 years (see Figure 2).²⁶ As a productivity measure, network utilisation indicates the extent to which a network business's assets are being used to meet maximum demand.

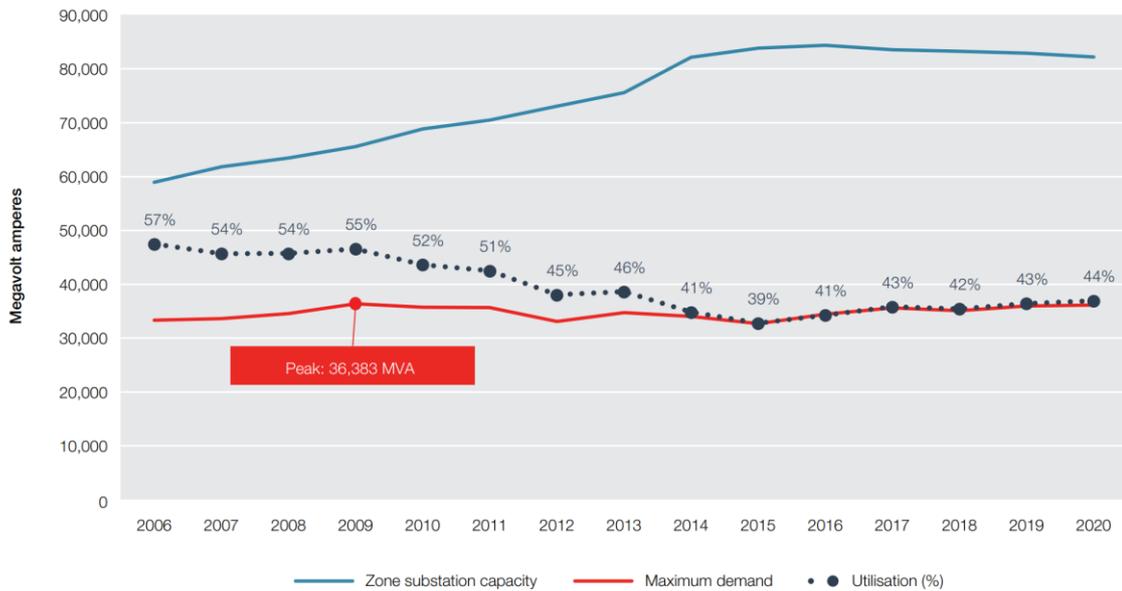
²³ As a simple, fantastical thought experiment, assume a network cost structure of \$3/3MWh. A 1/3 increase in usage would change the cost structure to \$3/4MWh, a 25% reduction in overall prices.

²⁴ <https://app.dynamicanalysis.com.au/>

²⁵ https://www.aemc.gov.au/sites/default/files/2021-11/2021_residential_electricity_price_trends_slide_pack.pdf

²⁶ <https://www.aer.gov.au/system/files/State%20of%20the%20energy%20market%202021%20-%20Chapter%203%20-%20Electricity%20Networks.pdf>

Figure 2 – Australian electricity distribution networks capacity and utilisation



MVA: megavolt amperes.

Note: Network utilisation is the non-coincident, summated raw system annual peak demand divided by total zone substation transformer capacity.

Source: Economic benchmarking regulatory information notice (RIN) responses.

(Source: AER’s State of the Energy Market 2021)

A report from the Electric Power Research Institute (EPRI, a US-based electricity research organisation) on the Value of Transportation Electrification highlights that available network system capacity may be more than sufficient to handle the added load from electric vehicle charging.²⁷ Well-coordinated EV charging, therefore, provides an opportunity to maximise network utilisation (of fixed investments) to more efficient levels and benefit all consumers (EV and non-EV owners) by reduction in network costs, without contributing significantly to local and system peak loads. The more efficient utilisation of capacity means that the fixed cost of each unit of capacity is being recovered from a larger customer base.

It’s important to note, of course, that electric vehicles could serve to increase overall network prices if their impact on peak network demand is larger than their overall impact on rates through a greater increase in volume of energy.

We consider such a case unlikely for several reasons. As highlighted in Section 1 of our submission, much evidence today in Australia and overseas indicates that electric vehicles typically charge off peak, when supported by retail pricing design. For example, the more mature EV market of Norway has seen a negligible increase in peak demand, despite a noticeable increase in electricity consumption.²⁸ We understand that AEMO has under consideration significantly changing the baseline assumptions in the next Integrated System Plan to better recognise the de facto beneficial grid impacts of electric cars.

²⁷ <https://www.epri.com/research/products/3002007751>

²⁸ <https://electricvehiclecouncil.com.au/wp-content/uploads/2022/08/Home-EV-charging-2030.pdf> p 3.

Electric cars are likely to behave in ways that are good for the grid because doing so is simple. Car charging, particularly home car charging, is not like air-conditioning – it does not require being used at specific times to provide or maintain its utility for the consumer. While many cars may return home during the evening peak – and indeed be plugged in at that time by their owners – the vehicles themselves (not to mention the chargers) are usually smart and should enable the vehicle to only accept a charge at times when prices are lowest. Many electric cars include apps that are used by their owners for many reasons and during setup, those apps ask owners if they want to charge at times when prices are lowest. Saying yes once basically enables the vehicle to charge at the best at times when retail rates could be cheaper (overnight and during the day when solar is abundant), with perhaps rare overrides to enable a special trip. Requiring that level of functionality would seem a reasonable regulatory requirement.

Further, given the volume of electricity used by EV owners, we expect retailers to tailor plans to meet the needs of these consumers. This will likely include high peak prices and low off-peak prices and long periods off-peak rates and ensuring simplicity in organising the vehicle or the charger or both to an appropriate charging schedule. Careful monitoring and reporting on retailer EV offerings to see precisely what options consumers have and how they are evolving would be a fruitful area for ESB attention and would enable stakeholders to see if our expectations are becoming reality.

3. Inclusion and fairness

As the Issues Paper notes, public charging will be a key enabler to uptake of EVs.²⁹ Our June Consumer Sentiment Survey reveals that two main reasons why households³⁰ and small businesses³¹ have not yet bought an EV are that there are not enough charging stations, and that they don't have anywhere to charge an EV at home.

This is consistent with a University of Melbourne consumer survey, who found that the majority of current EV household owners can charge at home, with only 7.7 percent saying they cannot.³² Policy must facilitate the ubiquitous availability of charging, to address consumer concerns and provide opportunities for those facing barriers for uptake, such as renters, or those without access to off-street parking. Ensuring protections are fit-for-purpose for consumers, particularly regarding public charging is also important for a future that does not leave anyone behind. Consumers should feel they have agency to make the decisions that benefit them and their circumstances, and we are supportive of principles-based policy that enshrines the concept of consumer agency and protects consumers and their rights when needed. Looking to European learnings, this may include standards to support user choice on where to charge and how to pay, and on network reliability and customer service.³³ For example, we would support requirements that public chargers must make available credit or debit cards as a method of payment, such that they do not require use of a particular mobile app, which can be a barrier to access for consumers. We note however that this type of detail may be better addressed through other instruments.

As the Issues Paper raises, the transition to EVs could increase network costs and lead to higher electricity prices. This is a concern when households and small businesses are facing across the board cost of living increases, and at a time when we see energy prices remaining high in (at least) the short term. Consumers in rural and regional areas which might require greater upgrades to the

²⁹ <https://www.datocms-assets.com/32572/1658376992-esb-electric-vehicle-smart-charging-issues-paper-final-for-publication.pdf> p 29.

³⁰ <https://ecss.energyconsumersaustralia.com.au/sentiment-survey-june-2022/featured-content-household-sentiment-june-2022/>

³¹ <https://ecss.energyconsumersaustralia.com.au/sentiment-survey-june-2022/featured-content-small-business-sentiment-june-2022/>

³² <https://www.energynetworks.com.au/miscellaneous/electric-vehicle-charging-consumer-survey-report/> p 26.

³³ https://cdn.eurelectric.org/media/5699/power_sector_accelerating_e-mobility-2022_eyeurelectric_report-2022-030-0059-01-e-h-3270E9C2.pdf p 9.

poles and wires, and households in financial pressure are likely to be disproportionately impacted by higher network charges. Measures to assist those households and small businesses could differ across networks and should be tailored to the needs of those consumers.

While we see potential for optimised network utilisation to place downward pressure on prices, it is important that there is visibility for government, regulators and industry to see when and where adverse distributional impacts may emerge. The AER – as an element of its draft Consumer Vulnerability Strategy – is considering approaches to monitor and report their impact on consumers at risk of vulnerability.³⁴ This includes Ofgem’s work in assessing the distributional impacts of its regulatory decisions.³⁵ We recommend as a priority that the ESB consider what mechanisms could ensure that visibility of distributional impacts to decision-makers.

³⁴ <https://www.aer.gov.au/sites/www.aer.gov.au/files/Consumer%20Vulnerability%20Strategy%20-%20Draft%20for%20consultation.pdf> p 52.

³⁵

https://www.ofgem.gov.uk/sites/default/files/docs/2020/05/assessing_the_distributional_impacts_of_economic_regulation_1.pdf