19 August 2022

Ms Anna Collyer
Chair
Energy Security Board

By email: info@esb.org.au

Dear Ms Collyer

CitiPower, Powercor and United Energy Response to Electric Vehicle Smart Charging – Issues Paper

CitiPower, Powercor and United Energy thank the Energy Security Board (ESB) for the opportunity to share our views on issues and opportunities relating to the development of arrangements for electric vehicle (EV) charging in domestic and public settings.

We own and operate electricity distribution networks servicing regions spanning 65% of Victoria. Our purpose is to ensure all forms of distributed energy resources, including EVs, are integrated efficiently and flexibly in a system that benefits all customers. This is being achieved while sustaining safe, reliable and affordable electricity supplies for our 1.9 million customers.

We recognise our networks are essential partners for public charging proponents, fleet managers and private customers who are seeking to make the most of investments in EV technology. Based on the projected and targeted take-up rates between 2030 and 2050, we also recognise the potential to dramatically increase the demand for electricity.

Our interest in the EV charging reforms has therefore been to ensure that demand growth generated by EV charging is managed as efficiently as possible, and to the extent further network investment is required, it is shared fairly amongst our customers.

Our recommendations

- Improving the visibility of electric vehicles on our networks is important to ensuring our networks have the capacity to support additional load, particularly in communities where EV ownership may be concentrated.
- The operation of smart electric vehicle supply equipment (EVSE) should be subject to terms and conditions, similar to a Model Standing Offer for solar connections, which would include consent for remote management capabilities to allow for load control when required under certain market conditions.
- Given smart charging equipment is designed and manufactured for a global market, the international standards (IEEE 2030.5 and ISO 15118) should be adopted in Australia to support communication between distributors and EVSE alongside the continued development of OCPP to align with IEEE 2030.5 and ISO 15118 as a comprehensive approach.
- Appropriate cyber-security standards for smart chargers are required to maintain security of the network and customer protection.
- The roles and responsibilities of charge point operators (CPO) need to clear and enforceable. These responsibilities should not be assigned indirectly through customers.
- Effective coordination between smart and fast charging, particularly public charging, and network planning is essential to ensuring the necessary configuration and capacity is available at the lowest cost.

40 Market Street
Melbourne VIC Australia
T (03) 9683 4444
F (03) 9683 4499

CitiPower Pty Ltd
ABN 76 064 651 056
General Enquiries 1300 301 101
www.citipower.com.au

Powercor Australia Ltd
ABN 89 064 651 109
General Enquiries 13 22 06
www.powercor.com.au

United Energy Distribution Pty Ltd
ABN 70 064 651 029
General Enquiries 13 22 09
www.ue.com.au

- Tariff incentives to promote the use of EV chargers outside peak demand periods is critical and needs support from government and energy retailers. The currently proposed flexible trading arrangements Rule is a threat to the usefulness of network tariff incentives.

Information to support these recommendations is provided below.

Improving the visibility of electric vehicles on our networks is important to ensuring our networks have the capacity to support additional load

We recognise that the ESB is progressing development of an EVSE dataset in its data strategy as a priority. However, to date we have not observed significant progress on an EVSE dataset or register and encourage the further prioritisation of this initiative.

To develop our own capability to identify and manage EV charging, we are taking steps to identify EVSE and better understand when, where and how customers charge their EVs. These initiatives include:

- Updating our connection policies based on our interpretation of the current Service Installation Rules under which the EV can be considered a 'Battery Energy Storage System' and to ensure EVSE installers apply to us for a connection agreement on behalf of their customers. We appreciate that only around 30% of current EV buyers install a dedicated EVSE so this will only capture some of the EVs being charged by our network.
- Participating in two important trials to identify EV charging behaviour in collaboration with other industry participants. The EV Grid trial being managed by Jemena, and the EV Orchestration Trial managed by AGL and Origin are both providing insights into customer behavioural responses to a series of demand response and price signals, which will inform our understanding of customer charging profiles on our networks.
- Developing smart meter data algorithms to detect when, where and how customers are charging their EVs. We are developing an automated system to detect, with high probability, the data profiles consistent with EV charging which will pick up the 70% of customers who don't use dedicated or smart EVSE. This will assist with future network planning to efficiently target network augmentation in an affordable manner for customers.

With smart charging technology having the potential to be utilised for both vehicle to grid and vehicle to home applications, we recommend it is appropriate that they be captured under the Distributed Energy Resource Register. This will ensure all forms of DER – solar, EVs and batteries – are captured within the one data source.

Adopting the IEEE 2030.5 standard is appropriate, while also developing OCPP functionality to integrate with ISO 15118 and IEEE 2030.5

In these early stages of EV uptake, we consider it prudent to adopt an approach to standards that delivers immediate functionality but preserves future optionality.

Our preferred standards adoption approach is to align to the IEEE 2030.5 and ISO 15118 standards used in the United States. Several of our internal systems such as our distributed energy resources management system (DERMS) operate under the IEEE 2030.5 standard. We understand this is the case with the majority of distributors across the country.

Adopting IEEE 2030.5 would facilitate communication between distributors and EVSE and maintain alignment across DER services (including ISO 15118 and applications such as vehicle to grid/home) and between the internal systems of distributors, delivering cost efficiencies for Australian customers.

We also understand that open charge point protocol (OCPP) is the dominant communication protocol for current operators of charging infrastructure and is widely used by EVSE manufacturers. Designing standards in a manner that maintains optionality and does not preclude some parties from performing the CPO function is practical and in customer's best interests. OCPP working groups are currently working towards interoperation with IEEE 2030.5 and ISO 15118 and we support this ongoing work program.

Whilst we believe network tariffs are an appropriate measure to incentivise customers to charge EVs in off peak times, there remains a role for remote control and operation of charging equipment. There may be instances where remote control of charging equipment delivers benefits to customers, for instance to adjust EV charging during critical peak periods or during minimum demand scenarios to avoid rolling blackouts. We recommend that remote management capabilities be included as a standard setting in EVSE. This will improve distributors' capability to efficiently manage their networks and reduce the need for further network investment.

Ensuring appropriate cyber-security standards are in place to support EVSE is an important consideration. We believe this is best achieved though continued engagement of the ESB in the ARENA-facilitated distributed energy integration program's cyber security working group.

Defining the CPO and the role of customers in remote charging

The roles and responsibilities of the CPO must be defined to provide certainty to customers, as well as providing the boundaries and operating requirements the CPO must comply with. Whilst there remains uncertainty as to which party(s) maybe best placed to perform the CPO role, we welcome continued engagement by the ESB and stakeholders to explore different options.

The roles and responsibilities of the CPO should be developed through further consultation however at the minimum we believe they should:

- be able to receive and publish dynamic operating envelopes (DOEs) received from distributors
- remotely manage residential charging demand (based on receiving customer consent)
- have the ability to control residential charging demand within reason for the purposes of maintaining system security and preventing widespread loss of supply events (emergency situations)
- have regard to network requirements e.g. protection settings, voltage compliance and interoperability requirements
- be subject to enforceable compliance obligations to remain within defined operating limits.

It is important CPOs be required to comply with distributor DOEs. Failure to do so can lead to poor customer outcomes, not just to their client, but other unrelated customers across the network.

Distributors currently have use of system agreements with retailers that define compliance obligations and enforcement processes. No equivalent use of system agreement exists between distributors and aggregators (or CPOs). We see this as a major anomaly in the regulatory arrangements. Connections agreements with the customer are not an alternative given the complexity of the obligations and that customers are unlikely to have visibility or understanding of the actions of their aggregator (or CPO).

Aggregators/CPOs have a myriad of incentives to bid loads and exports into wholesale, FCAS and RERT markets that are unlikely to align with the interests of the customer or efficient use of the network. It is thus important that incentives for efficient use of EV charging at the residential level apply to both the customer and aggregators to ensure everyone's interests are aligned.

Public charging infrastructure connections and tariffs

We are already receiving large numbers of requests for connection of EV chargers across our networks. The requests vary markedly in characteristics as highlighted in the table below:

	AC chargers (residential)			DC chargers
Type	10 amp wall socket	32 amp 1 phase	32 amp multi phase	Can be multiple chargers installed
Capacity	2 kW	7.4 kW	22 kW	50 to 350 kW
Charge time (60 kWh battery)	30 hours	6 hours	3 hours	15 to 30 minutes (80% charge)
Cost	$0	$1,000 to $3,000 plus installation costs	$3,000 plus installation costs (if premise already connected to 3 phase supply)	Quoted on a case by case basis

The high energy needs of public charging stations can require space for a distribution substation on the connection site and require connection to the three-phase distribution system. In regional and rural areas, three -phase distribution systems are not commonly available making connection of public charging stations difficult. Further existing service stations (which have been a common connection point request) do not have the necessary electrical infrastructure to support DC chargers.

Public charging infrastructure connections requires a large amount of network capacity that is generally poorly utilised. This results in a higher contribution being sought from the proponent toward the connection. International research in markets where EV penetration is well progressed found the highest utilisation of public charging is in Denmark at 13.6 per cent. Our present experience is utilisation in our networks is closer to 2-6 per cent.

Connection of residential EV chargers share the same issues as public charger connections. Connections requests to SWER and single-phase distribution substations can be limited by capacity, requests for multi-phase connections (to support larger residential EV chargers) may require network upgrades and in much of our regional and rural network, multi-phase upgrades may not be available at all.

Residential EV chargers replicate the low utilisation experienced with public EV chargers. The highest rate of utilisation we are aware of is Finland at 11 per cent but our experience has been closer to 6.7 per cent.

Connection costs for public chargers especially, could be better managed through a coordinated approach led by governments for the rollout of public charging stations. As part of this process, early input from distributors to help identify target locations with sufficient system capacity to accommodate public EV charging stations at least cost which could ameliorate concerns with respect to connection costs and timeliness.

Tariff incentives are needed to manage EV charging behaviour

The Victorian Government has determined customers consuming less than 160 MWh per annum (which covers all residential EV chargers) can opt to be assigned to an energy only network tariff. For context, 160 MWh per annum is the equivalent of charging about eight EVs daily. Further they have mandated that we must not assign a flat rate network tariff to a customer if we are aware that at least part of the electricity taken at the customer's supply point is for use by an EV charger with a capacity of 3.6kW or more.

From July 2021, a new Time of Use network tariff was introduced for customers to incentivise the use of electricity at off-peak times. This is the default setting for customers purchasing an electric vehicle if we receive the appropriate notifications. It is dependent however, on the tariff being mirrored within the customers' retail energy plan.

For public charging infrastructure, we have applied energy-only network tariffs (despite them consuming above 160 MWh per annum). However, at some point, public charging stations may no longer be suitable for an energy only network tariff and may need to be assigned to a demand-based tariffs that will result in a step increase in network charges. Whether public charging infrastructure remains subject to energy only network tariffs is something we will be consulting on with stakeholders and the Victorian Government as part of our preparations for the 2026-2031 regulatory reset.

Consultation is due to commence on the flexible trading arrangements (FTA) Rule change. We are concerned that if allowed, this Rule change will serve to undermine the effectiveness of tariff incentives to manage EV charging behaviour. This is because the aggregator/CPO is not subject to network tariffs levied by the distributor and rather the parent meter retailer. What relationship may exist between the aggregator/CPO and retailer is unclear, and as it stands, there is no relationship between distributors and aggregators/CPOs. On this basis, the FTA Rule proposal appears to eliminate the effectiveness of network tariffs as a tool to manage EV charging behaviour in the absence of further regulatory reform.

In conclusion

We look forward to working with the ESB and stakeholders throughout the consultation to develop EV smart charging frameworks. If you have any questions about this submission, please contact Jimmy Stojkovski at jistojkovski@powercor.com.au or 0423 589 132.

Yours faithfully,

Mark Clarke
General Manager Electricity Networks
CitiPower, Powercor and United Energy