Rheem Australia Pty Ltd ABN 21 098 823 511

Energy Security Board
Level 15, 60 Castlereagh Street
Sydney NSW 2000

By email: info@esb.org.au

19th August 2022

Subject: Electric Vehicle Smart Charging Issues Paper for Consultation – July 2022

Thank you for the opportunity to respond to the Energy Security Board Electric Vehicle Smart Charging Issues Paper published July 2022.

This is a joint response on behalf of both Rheem Australia Pty Ltd (Rheem) and Combined Energy Technologies Pty Ltd (CET), as we have a complementary interest in the Consultation Paper.

As the largest Australian manufacturer of water heaters with products in over 4 million Australian homes, we offer a wide range of traditional and renewable energy water heater models to the domestic water heating market under the Rheem, Solahart, Vulcan, Aquamax & Everhot brands. Under our Solahart brand we are the third largest supplier of photovoltaic (PV) systems in the country. Over the last four years we have also commenced the manufacture and installation of smart electric water heaters, controlled remotely by our technology partner, Combined Energy Technologies.

Combined Energy Technologies is an Australian technology company specialising in energy management for residential, commercial, and micro grid systems. CET provides site energy management systems and has extensive experience in the integration and orchestration of systems with multiple Customer Energy Resources (CER) including the integration of solar PV, batteries, water heating, electric vehicle chargers, pool pumps and A/C for the benefit of the homeowner, retailer and the grid. Our references to CER should be read to include both generation and flexible load assets.

Together, Rheem and CET are already actively participating in the emerging CER market with thousands of online, mixed, orchestrated CER sites across the NEM and the WEM which include a rapidly growing number of Electric Vehicle Supply Equipment (EVSE) stations. Over the past decade we have identified and resolved many issues (at live field sites) to ensure that mixed, smart CER sites can be orchestrated to achieve the best financial outcomes for consumers, whilst providing a foundation for grid support services and hence grid security of supply.

This experience has given us a unique insight and particular interest in the integration behind the meter of EVSE stations to ensure orchestration with other CER for the delivery of consumer

financial savings and participation in grid services such as Dynamic Operating Envelopes (DOE).

If the energy market is to be truly democratised, it is extremely important that any changes to market rules and associated technical specifications are made with the consumer at the centre of the solution. This will ensure that current and future investment in smart CER by households continues to be made. Fundamental to this approach will be that new rules do not favour a particular technology, technology class, or technology manufacturer, and that technology neutrality is not impeded by barriers to entry arising from modified energy market rules. For example, the energy consumed on average by a single EV[1] is less on a daily basis than the average energy consumption of a residential electric hot water service. It is therefore our view that residential EVSE stations should be managed no differently to other flexible CER in the household. Our specific comments and recommendations attached are underpinned by this approach.

As Australian based manufacturers we have made a large R&D investment in bringing to market cost effective CER products and technology for the integration and orchestration of CER behind the meter. Further we have a desire to ensure technology neutrality, support for standards, commercial fairness, and adherence to the principles of the NEO in the design of new market services and regulations.

Our comments and recommendations are primarily directed at home EV charging, as this is expected to account for more than 80% of EV charging events. It is supported by empirical data from an existing fleet of thousands of NEM consumer sites of mixed CER including EVSE stations. The data from these sites supports our technical, architectural, and commercial positions informing our responses to the consultation questions and which are in alignment with the principles of the National Electricity Objective (NEO).

In summary, our attached responses to the consultation questions:

- That EVSE stations support local control access, via standards based physical interfaces supporting standards based interoperable communications protocols, enabling consumer choice in their selection of an energy market service provider. This ensures that there is no CER lock-in to a single service provider.
- That EVSE stations support local interoperability to facilitate BTM orchestration with other site CER. This will enable compliance with a DNSP issued DOE, whereby multi CER sites must be coordinated under the CSIP-AUS (SEP 2.0) gateway model to comply with a single DNSP CSIP-AUS (SEP 2.0) control pathway at an NMI connection point.
- That smart EVSE stations support open standards based remote software update capability to ensure compliance with current and future standards.
- That market participants such as aggregators, retailers and the like are not precluded from being a Charge Point Operator (CPO).
- That EVSE stations should not be mandatorily assigned to a CPO. For instance, an EVSE station may be orchestrated BTM by an aggregator for the delivery of a DNSP DOE. The aggregator however may or may not offer CPO services. This should not preclude a CPO working with an aggregator for example, as the “Plug and share”

[1] The average passenger car in Australia travels 31km per day (ABS, Survey of Motor Vehicle Use, Australia 2020) and hence the daily kWh requirement for EV charging would be about 5-6 kWh per day.

operator, facilitating the accounting function of the EVSE station when charging a fleet vehicle at the employee's residence.

Please find attached our full comments and recommendations to the consultation questions which have been made with a view to enhancing flexibility, security, interoperability, and cost-effective orchestration of EVSE stations with other BTM CER whilst ensuring no consumer lock-in to a single service provider.

As this submission has been prepared using the expertise of several of Rheem and CET's personnel, I would ask that any enquiries related to the submission are directed in the first instance to myself. I will then co-ordinate follow up responses to your enquiries or further meetings with the appropriate personnel within our organisations.

Yours Sincerely

Ashraf Soas
General Manager Energy Solutions
RHEEM AUSTRALIA PTY LTD

ashraf.soas@rheem.com.au
M: +61 417 061 380

Attached: Responses to ESB "Questions for consultation".

1. Questions for consultation

To inform development of policy advice to support effective integration of EV smart charging, the ESB welcomes stakeholder feedback on the following matters.

1.1 Questions related to domestic electric vehicle smart charging

1. *ESB welcomes stakeholder views and input on smart charging equipment standards settings including any input to inform the likely costs.*

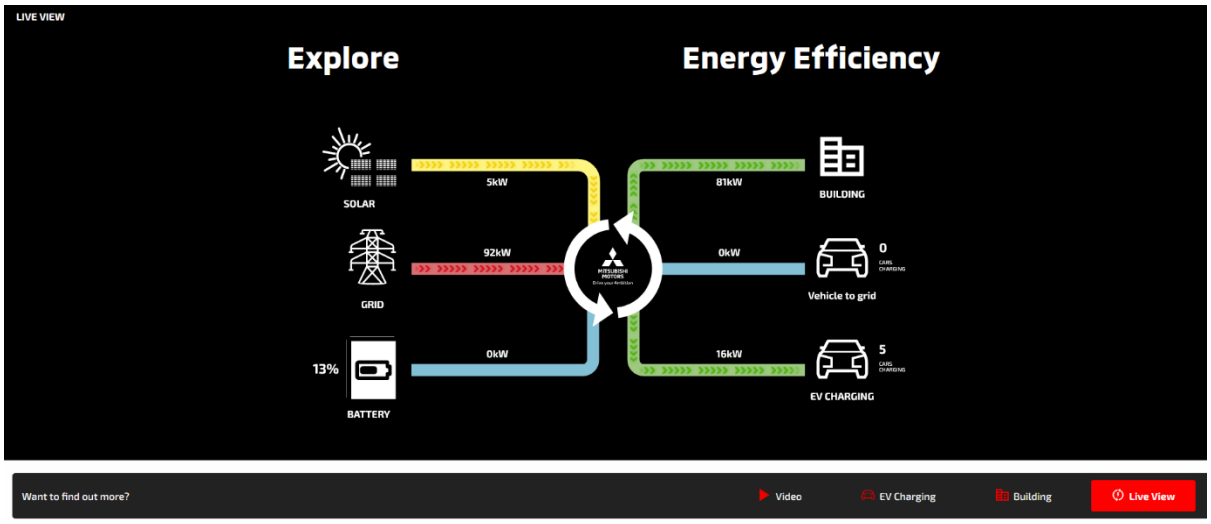
Response:
We have detailed throughout our responses our position on the adoption of standards for the control and orchestration of EVSE stations Behind the Meter (BTM) and the associated effect on deployment cost drivers. Our insights and recommendations are based on our experience in the deployment, monitoring, and control / orchestration of CER across thousands of sites in the NEM and WEM. We have highlighted important BTM deployment considerations for EVSE stations that should be taken into account such as consumer "whole of home" orchestration of CER, grid security of supply, and wholesale market and DNSP network services, (such as DOEs) that will require EVSE station flexibility of integration, support for local control access via interoperable protocols, and the delivery of consumer choice to select the energy market service provider of their choosing, ensuring no CER lock-in to a single service provider.

2. *ESB welcome stakeholder views on the introduction of minimum EVSE equipment standards without remote management, and whether this will provide future optionality for managing peak demand.*

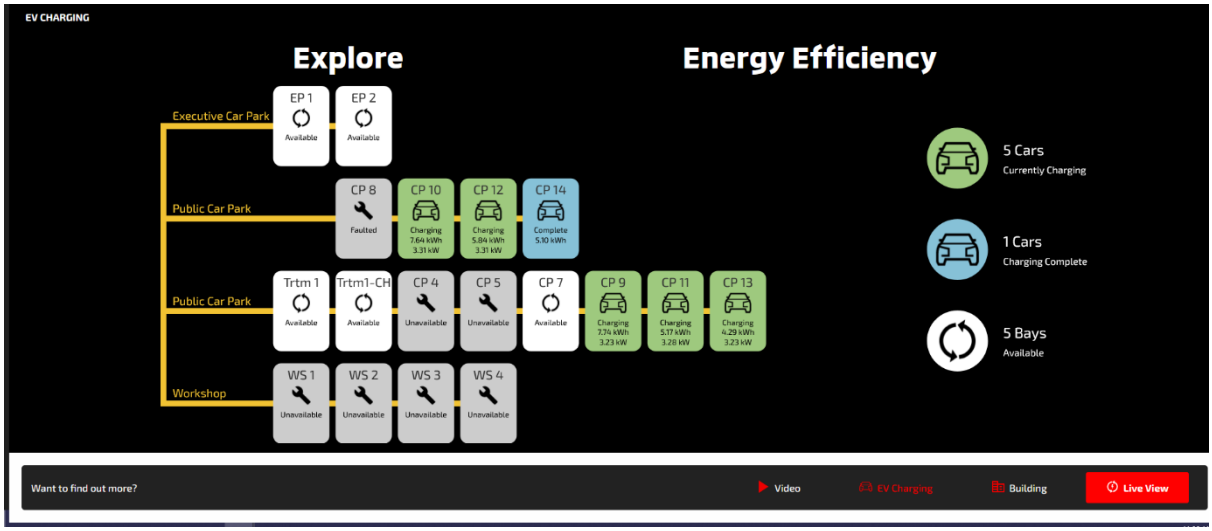
Response:
Of our thousands of Behind the Meter (BTM) orchestrated CER sites across the NEM and WEM, an increasing number of these installations encompass control of EVSEs under site edge gateway Energy Management System (EMS) orchestration.

These customer sites include residential, SME and Commercial EVSE installations. For example, we recently completed the physical EVSE installation and BTM orchestration of over 20 EVSE stations for an automotive manufacturer's Adelaide head office. Our site edge gateway operates as an EMS and also as an OCPP 1.6 (J) server, managing EVSE stations (including V2X EVSE stations) within site power constraints, along with provision of other services such as RFID based charge authorisation and site wide orchestration of building solar PV and battery storage.

Management of peak demand and provision of grid services is inherent in our deployment model of CER, including EVSE stations, whereby the CSIP-AUS site edge gateway model is adopted. Under this model, orchestration of a site/home CER is carried out by the CSIP-AUS compliant gateway operating within an EMS. This requires all CER (including EVSE stations) to support local standards based physical control interfaces and standards-based communications control protocols. Over the past years we have seen the migration to OCPP which is our preferred open standards based interoperable protocol for integrating an EVSE station BTM. Our orchestrated BTM CER sites are currently providing aggregated fleet services to Australian DNSPs for minimum and peak demand management.



User Interface Screen Capture 1:
Whole of site BTM CER orchestration.



User Interface Screen Capture 2:
EVSE Station orchestration via local site EMS gateway running an OCPP 1.6 (J) server.

On sites with multiple EVSE stations we implement the OCPP server locally within the site edge gateway EMS to manage the charging of multiple vehicles within the constraints of the building wiring system, incorporating price (e.g. Retail Tariff) / DNSP DOE signalling, and other site requirements to manage the EVSE stations. In the event communications is lost to the site, the site edge gateway EMS will still manage charging within the constraints of the site power systems / cabling. This cannot happen when the OCPP server resides solely on a cloud-based infrastructure. Other fall-back methods must be employed on loss of site internet connectivity.

In earlier days we integrated EVSE stations that supported locally (at the EVSE station) protocols such as Modbus and UDP. Over the past couple of years that has changed rapidly such that a growing number of EVSE station brands/models (but not all) support a local interface and OCPP, mostly 1.6 (J), with a move to support OCPP 2.0 as it matures in the market.

3. *ESB understands that most EVSEs on the market today come with smart charging as a minimum functionality – is this the case or do stakeholders see this as still an emerging functionality?*

Response:

In our deployment experience across residential and SME / commercial sites, the extent of smart charging capability on an EVSE station has been related to price. Basic units can be purchased that do not have smart charging options. And whilst many have smart capability, enabling that capability may require further installation and enablement costs.

Further, there a number of EVSE stations that have proprietary charge control[2] via, for example, smart phone APPs, but with no local, open standards-based communications connectivity options to control the EVSE station by, for example, a site edge gateway EMS that is implementing site / home orchestration of behind the meter (BTM) CER. This impacts the orchestration of BTM CER to a) optimise consumer financial savings, b) manage the site peak kW draw within the constraints of the wiring system and instantaneous power usage c) implement a DNSP site wide DOE, and d) provide grid services, such as for security of supply.

Recommendations:

All smart EVSE stations should support open standards-based protocols (e.g. OCPP 1.6 (J) with eventual support for OCPP 2.0 incorporating ISO 15118 being preferred - by remote update). EVSE station control should be accessible via a local (on the EVSE station) communications interface to enable integration of the EVSE station by a site edge gateway EMS for CER orchestration behind the meter. This will allow for implementation of DSNP DOEs (e.g. via CSIP-AUS), local orchestration optimisation with other site CER, and for firmness and predictability of response of EVSE stations in orchestration with other site CER to deliver grid services.

4. *What are stakeholder views regarding the adoption of these standards in the Australian context? Do stakeholders consider the OCCP 1.6 (J) the most appropriate international standard to adopt? Are there any additional standards or options that should be considered in the short term?*

Response:

As outlined earlier, many of our thousands of BTM orchestrated CER sites across the NEM and WEM include EVSE stations under orchestrated control of a site edge gateway (EMS).

In earlier days we integrated EVSE stations that supported protocols such as Modbus and UDP. Over the past couple of years that has changed rapidly such that many smart EVSE stations now support OCPP, currently 1.6 (J). We believe this will eventually move to OCPP 2.0 once this version has matured.

Worthy of note, there is a growing base of residential deployments of smart EVSE charge stations with proprietary protocols accessible only to the paired OEMs vehicles. These are closed systems whereby the EVSE station cannot be locally controlled / orchestrated by a site edge gateway EMS with other BTM CER as they do not support local (at the EVSE station) interoperability. This prevents the ability to

[2] Note: Proprietary charging control of EVSE stations comes in 2 broad forms:

a) Via a smart device APP that controls the charging time/kW from the vehicle side.
b) Via a smart device APP that controls the EVSE station output to adjust charge time schedule, duration and kWs delivered to the car.

orchestrate the EVSE with other BTM CER locally for consumer financial benefits (Solar PV self-consumption, tariff arbitrage, grid services) and it prevents the ability for the EVSE station to participate in a DNSP connection point-imposed DOE under the site gateway model of CSIP-AUS.

Recommendations:

We would encourage the ESB to recommend that smart EVSE stations support OCPP 1.6 (J) as a minimum with remote upgrade capability to enable future versions of EVSE standards such as OCPP 2.0 in conjunction with ISO 15118, or other standards as required. ISO 15118 data security and data structures are built into the OCPP 2.0 management protocol (but not the earlier OCPP 1.6 (J) variant).

Further, as founding members of the ANU CSIP-AUS (IEEE2030.5) working group we would encourage a "watching brief" on the development of DER (CER) Cybersecurity and 2030.5 (refer sunspec.org) profiles for both one way and V2X EV charging applications.

However, EVSE station interoperability is in our view the most important outcome to establish quickly. It is most important that smart EVSE stations support a local physical control interface capability, along with a fully featured open standards-based control protocol as a minimum technical capability.

5. *Is there a need for EV to EVSE communications (such as ISO 15118) to be minimum functionality, alongside the communications protocol from the Charge Point Operator to the EVSE (such as OCPP)? The ESB welcomes stakeholder views on why this might be necessary.*

Response:

As detailed previously, we believe that the industry is moving towards a preferred combination of OCPP 2.0 and ISO 15118. OCPP 2.0 in conjunction with ISO 15118 overcomes several concerns with respect to security, as the data security and data structures are built into the OCPP 2.0 management protocol (but not the earlier OCPP 1.6 (J) variant). This combination enables far more robust data protection and fraud minimisation (more of a concern for public charging) but also encompasses "Plug and Charge" capability which would enable charging accounting arrangements to be put in place for example in residential charging of company cars. Further, communications Transport Layer Security (TLS) is a mandatory requirement of any "Plug and Charge" implementation which is used in conjunction with public key digital certificates and signature-based authorisation.

As we have noted in our previous answers, the use of OCPP is not confined to a cloud-based Charge Point Operator. We run an OCPP client within our site edge gateway which can be used to manage multi EVSE stations on residential (e.g. strata), SME and Commercial sites to mitigate any complications with EVSE station management due to loss of communications to the site, and to locally manage the EVSE stations within the constraints of the building wiring system, and in the provision of grid services and for proposed DNSP DOE compliance of a site.

Recommendation:

In short, yes, an eventual move to OCPP 2.0 with ISO 15118 seems to make sense once the combination is mature. However, we stress that with the industry in its infancy it is extremely important that as a minimum EVSE stations support a local physical interface capability and a fully featured open standards-based control protocol, as a first priority step. Further OCPP should not be thought of as confined to a CPO.

6. *The ESB welcome stakeholder views on requiring default tariffs at the point of installation of a charging system. Do stakeholders have views on the merits of using network specific windows of time, or are state-wide defaults more appropriate?*

Response:

In our experience, we need to ensure flexibility here whilst encouraging network friendly EV charging. Controlled home EV charging offers significant potential to support the high variability of both supply and demand in a high penetration renewables-based grid. Smart EVSE stations can be orchestrated BTM via a site edge gateway (e.g. operating an EMS with a CSIP-AUS link to the DNSP for a DOE) such that EV charging is managed to optimise solar PV self-consumption (where installed) or in response to appropriate consumer price signals or incentives, which should be applied to the whole of the site. In this way the EVSE station is not orchestrated preferentially over other flexible demand in the household. This will ensure the EMS is able to optimise the financial outcomes and amenity for the consumer within the constraints of a DNSP DOE.

Recommendation:

Any discussion / implementation of default tariffs should not be solely focused on EV Charging. There are wider implications here and any decisions should involve the DNSPs, the AER, and the various DNSP Customer Consultative Committees to ensure that modifications (if any) to DNSP Tariff Structures do not adversely favour any particular socio-economic class or CER type without proper justification.

More importantly, we do not currently support decoupling the EVSE station from other CER for special treatment at the consumer site. Decoupling one form of CER under a separate control / tariff arrangement will impact the BTM orchestration of site wide CER, impacting consumer financial savings, increasing the complexity and effectiveness of both DOE implementation and EVSE station (and other CER) participation in grid services. Separate tariff / control mechanisms will add unnecessary costs, introduce unnecessary cybersecurity risks with additional entry point security vectors and may also include physical wiring change costs at a customer's site.

7. *The ESB welcomes stakeholder views on the appropriate timing considerations to enable a roll out of minimum technical standards for domestic EV charging systems. Do stakeholders see other considerations that need to be taken into account to facilitate jurisdictional policy settings?*

Response:

Please refer to our previous response to Question 6 above. Further, in respect to minimum technical standards, we again stress that it is important to consider many of the functional and security aspects that adoption of OCPP 1.6 (J) and later OCPP 2.0 and ISO 15118 brings. With the industry in its infancy, this should not be at the expense of an extended delay in mandating a minimum requirement that smart EVSE stations support a local physical interface capability and a fully featured open standards based control protocol in the first instance.

Further, mandating that EVSE stations support a remote software update capability to ensure forward compatibility with adopted standards would seem a sensible approach to ensuring consumers are not "locked in" (an ESB principle) and that their choice of EVSE station can adapt to any future technical and regulatory changes.

Whilst there is a large selection of smart EVSE stations available that support (with control access locally at the EVSE station) open control protocols such as OCPP, there is a large and growing

deployment of proprietary smart residential / destination EVSE stations in the market due to the dominance of a particular OEM brand of EV. Proprietary, closed EVSE stations exclude the implementation of site wide BTM orchestration of CER, impacting consumer financial savings and mitigating the ability for the EVSE stations to participate in grid services such as a DNSP DOE which requires the orchestration of all BTM CER including the EVSE station.

Recommendation:

With respect to timing, direction on standards adoption should be a priority. However, EVSE station interoperability is in our view the most important outcome to establish quickly. At a very minimum this could be achieved by a mandate that smart EVSE stations support a local physical control interface, along with a fully featured open standards-based control protocol as the minimum technical standard for residential and destination EV charging systems up to 22kW capacity. Further, the EVSE station should be able to accept remote software updates to accommodate new standards.

8. *What are stakeholder views regarding the potential costs and benefits of requiring consumers to participate in remote coordination capabilities for smart EV charging?*

Response:

We believe that flexibility is important here whilst encouraging network friendly EV charging.

As noted previously, price signals and incentives for controlled flexible demand will play an important role in managing the grid of the future. It is important that any remote coordination is managed in conjunction with the constraints of the DOE from the whole of home perspective, whereby multiple CER is managed by the site gateway model under CSIP-AUS.

Our experience has shown that a "set and forget" whole of home approach to site management has the most reliable and "bankable" outcomes. Smart EVSE stations can be orchestrated BTM via a site edge gateway operating as both an EMS and OCPP server with a CSIP-AUS link to the DNSP for a DOE. EV charging should be managed alongside other BTM CER to optimise solar PV self-consumption (where installed) and in response to network price signals via cost reflective tariffs. A site under orchestration by an EMS can carry this out automatically but retain a consumer opt out function.

Recommendation:

The implementation of DELs and DOEs by DNSPs defines that only one CSIP-AUS signal path to a site (i.e. one path per NMI connection point) is to be implemented, which by default means that BTM orchestration of multi CER sites requires the CSIP-AUS connectivity option 2 - the site edge gateway model be implemented. This requires interoperability to be supported locally at the EVSE station. This then means that connectivity, security, communications, and other consumer costs are shared across all the BTM CER inclusive of EVSE stations, which is to the benefit of the consumer. We would recommend that the ESB supports this CSIP-AUS architectural approach as it minimises consumer costs, supports opt-in of remote coordination capabilities for smart EV charging and mitigates consumer site "lock in" - a key ESB principle.

9. *What are stakeholder views in regard to the use of CPOs for residential charging? What are stakeholder views on which parties (Traders (retailers, aggregators), DNSPs, OEMs, other parties) should be able to take on the function of CPO? Should the requirement for a CPO be mandatory?*

Response:

The requirement to use a CPO for residential (and private destination charging) should not be mandatory.

We do not support the mandatory need for Charge Point Operators (CPOs) in residential charging. In our view EV charging is just another CER that is managed BTM under local orchestration in conjunction with solar PV (where installed), cost reflective tariffs, and grid services such as proposed DNSP implemented site DOEs under CSIP-AUS.

To put this in perspective, the average passenger car in Australia travels 31km per day[3] and hence the daily kWh requirement for EV charging would be about 5kWh per day. That means that the energy consumed on average by a single EV is less on a daily basis than the average energy consumption of a residential electric hot water service. However, with 7+kw single phase and up to 22kW three phase residential EVSE station capability there is a peak kW issue to manage.

As we have detailed previously, we manage CER including EV charging rate (connection point kW peaks), and EV charge time and duration BTM via an EMS site edge gateway that incorporates heuristics, solar PV production, tariff and price signal information including DOEs in the control of CER. Further, EVSE stations in residential (SME and Commercial sites) are managed within the site power constraints. Multi EVSE station sites (even with only 2 EVSE stations at a residential site) are managed under the control of our CSIP-AUS site edge gateway operating as an OCPP server. This is consistent with a single point of site control of BTM CER orchestration, enabling a DNSP DOE and supporting the ESB desire to mitigate consumer CER "lock-in". However, this does not preclude the site participating with an external CPO for a subset of CPO services such as "plug and charge" accounting for residential EV charging of fleet vehicles at an employee's home. Further, having the option of a site gateway CSIP-AUS model of BTM CER orchestration, and hence EVSE station control, means loss of communications to a site ensures that the site (and hence the EVSE station) can still be effectively orchestrated locally within the constraints imposed by the site wiring, any DOE issued, and in response to the prevailing network tariff.

Recommendation:

That a CPO should not be mandatory, and the ESB should not be prescriptive as to the mechanism and entity that controls residential, (SME and Commercial) EVSE stations. However, flexibility should be maintained through minimum technical standards that enforce interoperability at the EVSE station. Further, market competition should be encouraged such that any NER market participants such as aggregators, retailers, DNSPs etc can perform the function of the CPO at a residential site based on consumer opt in. Any site constraints imposed should embody commercial and technology neutrality, supporting EVSE station interoperability, thus giving consumers the greatest choice whilst ensuring the best outcomes for the grid.

10. What are stakeholder views in respect of the relevant and appropriate responsibilities that should be taken on by CPO: e.g., ensuring rate limits, customer support, etc?

Response:

Please see our answer to Question 9 previous in respect to residential EVSE stations. Noting that remote charge control (on a site with a DOE enforced) would need to understand the site electrical

[3] ABS, Survey of Motor Vehicle Use, Australia, Dec 2020

constraints, prevailing tariffs, DOE constraints/opportunities, grid services being implemented, amenity priorities (e.g. hot water low) etc. As such the approach we have outlined in our response to Question 9 should not be precluded. There should not be a mandate to use a CPO for residential EVSE station control.

11. What functions would CPOs be required to perform on behalf of customers? e.g. off peak charging.

Response:

Please see our answer to Questions 9 and 10 in respect to residential EVSE stations, extending to SME and commercial sites in many instances.

12. What obligations would be required by CPOs to ensure there are adequate protections for end consumers?

Response:

As detailed in our responses to Questions 9, 10 & 11, there are a multitude of considerations when a separate entity takes control over a particular CER that could be part of a whole of site BTM CER orchestration. We have already had extensive experience in this space. For instance, we have many sites that have vertically integrated Battery Energy Storage Systems (BESS) that cannot be locally controlled by the site edge gateway EMS. In those cases, the consumer is at a financial disadvantage with the separate cloud-controlled BESS "fighting" with other CER on the site resulting in financial loss for the consumer as well as impacting on grid services. For example, if the BESS is in a VPP and discharging for a contingency FCAS raise event, the site EMS only sees grid export and rapidly turns on load thus mitigating the BESS response. Similar issues also exist for vertical closed loop control of EVSE chargers now (though none are yet participating in FCAS) that cannot be locally controlled.

Recommendation:

Obligations may arise as for example when a CPO is involved in residential charging, as the "Plug and share" operator, facilitating the kWh accounting of the EVSE station when charging a fleet vehicle at the employee's residence, however this should be a light touch approach when for example the EVSE station at a site is already under orchestration by an aggregator with other BTM CER.

As we do not know all the obligations that may arise in this emerging market, consideration should be given to mandating that CPOs register as a market participant with AEMO. This may require a new participant category that can invoke default NER consumer protections. For instance, the new SGA (Small Generator Aggregator) is an example of a specific category. In fact, V2X EVSE stations may by default fall into the definition of an SGA.

13. Should there be a minimum requirement to capture installation of EVSE, to assist with effective planning and operational management, similar to that already in place for solar?

Response:

Yes, it makes sense to capture installation information on EVSE stations in a similar fashion to that already in place for solar. This could be implemented using DNSP connection rules as is the case when

applying for the installation of Solar PV. Further, minimum technical requirements could be enforced by the DNSP under their connection agreements as part of the installation approval process.

14. *Are there any minimum technical requirements that should be considered for EVSE interoperability?*

Response:

Yes, we have addressed minimum technical requirements throughout our responses.

As with all BTM CER the biggest issue we are facing in the industry today is with CER that does not support local interoperability. Flexibility in deployment and control of EVSE stations will be a function of the extent to which the EVSE stations support standards-based interoperability. Failure to mandate open standards impacts on customer financial gain, impacts on the provision of grid services, and is an impediment to the implementation of BTM orchestration of CER in the compliance with proposed DNSP issued site wide DOEs.

Recommendation:

Consideration should be given to whether a particular minimum technical standard should be adopted, such as OCPP 1.6 (J) with capability to upgrade EVSE stations remotely to OCPP 2.0 in conjunction with support for ISO 15118 (or any other standard(s)) as this market segment evolves.

However, what is most important (as a matter of urgency) is that any minimum technical standard should mandate that smart EVSE stations support interoperability via local, physical (at the EVSE station) interfaces, and industry standard open communications protocols for EVSE station control and remote software upgrades.

15. *Do stakeholders have any views on aspects of cybersecurity for EV charging that are specific to Australia, or that would require a departure from European and/or US standards?*

Response:

There are two considerations here.

a) Communications / end to end security, i.e. the protocols, certificates etc adopted for security.
b) Site connectivity security aspects.

Recommendation:

In respect to a) - it makes sense that Australia wherever possible adopts international standards for Transport Layer Security (TLS) (a mandatory requirement of any “Plug and Charge” implementation), and public key digital certificates and signature-based authorisation in line with international standards. One local departure may be to give consideration to setting up a local entity (possibly AEMO) to issue for Australia the public key digital certificates for EVSE stations, and for other CER.

In respect to b) - we are currently unique in the world regarding progress in the implementation of DOEs by DNSPs. A site DOE can only be effectively implemented via one connection to a site. As such, DNSPs only want one DOE for BTM CER per connection point. For multi-CER sites this requires adoption of the CSIP-AUS site edge gateway model, with the site edge gateway acting as both the CER EMS and

the CSIP-AUS connection point to the site. All site CER is then orchestrated behind the gateway to deliver the DOE. One entry point to the site means there are not multiple entry points with multiple security vectors to deal with.

16. *The ESB welcomes stakeholder views on barriers in existing regulatory and legislative frameworks that may be acting to limit the introduction of more advanced EV services such as Vehicle-to-Home (V2H), Vehicle-to-Grid (V2G), and Vehicle-to-Anything (V2X)?*

Response:

A V2X (H, G etc) EVSE station performs in a similar way to a Battery Energy Storage System (BESS). As such many of the technical aspects of V2X integration with the grid are already covered by standards and connection rules governing inverter technology.

Recommendation:

Beyond technical integration of V2X we have not fully investigated this area. There are, however, obvious areas that require focus such as the use of V2G in supporting the grid where the vehicle may not always reside at its home location. This will require new services to be developed such as peer to peer trading, roaming grid support services, for instance for minimum demand abatement and contingency FCAS. Existing regulations and legislative frameworks will need to be changed to accommodate these new services as they evolve.

17. *The ESB welcomes stakeholder views on the issues raised in respect of residential charging, including whether there are further issues that should be considered?*

Response:

Our responses have covered the current issues and opportunities around EVSE stations, backed by empirical field data, with recommendations for compatibility with market directions (e.g DNSP DOE) based on our own deployment experiences.

Recommendation:

In addition to the issues raised in our responses, the ESB should consider working with Standards Australia to accelerate the mandatory implementation of EVSE charging circuit safety switches (RCBOs) that are of a type “B” designation. Currently under AS/NZS 3000 the type B RCBO is not mandatory in Australia for all EVSE station installations. (However, they are in New Zealand under AS/NZS 3000). For background, a Type B RCBO “safety switch” detects both AC and DC earth faults. DC currents can flow in the EVSE charging cable / supply circuit under some car / EVSE station fault conditions. A standard RCBO (e.g. Type A) specified for EVSE circuit protection under AS/NZS 3000 will not trip for DC current earth leakage faults. Only a Type B RCBO will trip under DC fault conditions. As a safety issue, we believe that this deserves priority attention by the ESB.

1.2 Questions related to public electric vehicle smart charging

18. *What are stakeholder views on the use of technology specific tariffs, approved by the regulator, but operate under different metrics. Would there be any unintended consequences of introducing EV CPO specific tariffs?*

Response:

To clarify, we view public charging as falling into two broad categories:

a) Slow and fast chargers deployed on highways and other typical public charging locations such as shopping malls, council car parks and the like.
b) Destination chargers, typically on private property that may be public or open only to say guests, company employees etc. These types of installations include hotels, motels, corporate car parks and the like.

In the case of b) above, referring to our responses to previous questions around residential charging, we do not support CPO involvement in managing the private BTM EVSE stations. For example, a BTM CER aggregator may be the entity that locally orchestrates the EVSE stations with other site CER in conjunction with appropriate financial incentives to ensure optimisation from the whole of home perspective.

Recommendation:

There are likely at least two different tariff scenarios to consider here in respect to technology specific tariffs. Per our previous answer to question 17 above, category b) style charging would notionally average longer charging times, whereas most category a) style charging would have a time-based imperative.

Any discussion / implementation of default tariffs should not be solely focused on EV Charging. There are wider implications here and any decisions should involve the DNSPs, the AER, and the various DNSP Customer Consultative Committees to ensure that modifications (if any) to DNSP Tariff Structures do not adversely favour any particular socio-economic class or CER without proper justification.

19. *What measures might be helpful to consider to streamline the connections process for public charging infrastructure?*

Response:

This is not our area of expertise:

20. *Aside from the grandfathering issues for existing equipment, are there any other metrology issues concerning public charging that should be considered?*

Response:

This is not our area of expertise:

21. *What mix of arrangements might facilitate flexibility in charge-point pricing to encourage more drivers to charge during times of excess renewable energy?*

Response:

We have not investigated this area. One consideration may be to publish, on a dedicated government website, kWh prices for public EV chargers for different times of the day in a similar fashion to the

"Fuel Watch" app. Pricing could be updated dynamically with predicted pricing based on network capacity, wholesale market prices etc, published in advance in a similar fashion to the AEMO wholesale market pricing predictions. This may encourage drivers to plan their public charging (such as highway fast charging) around times of excess renewable energy (using price signals), though consideration should be given to flow on effects such as charging station congestion.

22. *What do stakeholders view to be important considerations for ensuring protections are fit for purpose for consumers using public EV chargers with regard to payments and any associated disputes?*

Response:

This is not our area of expertise:

23. *The ESB welcomes stakeholder views on when they consider the issues associated with roaming might become a policy issue to address in Australia?*

Response:

This is not our area of expertise: