**Rheem Australia Pty Ltd** ABN 21 098 823 511

Energy Security Board

By email: info@esb.org.au

3rd February 2022

Response to: **Energy Security Board**
**Interoperability Policy for Consultation**
**Stage 1: Inverter based resources**

Thank you for the opportunity to provide input into the development of the Interoperability Framework.

This response 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 ESB's consultation. We hope that this response will help inform the ESB's development of the post 2025 market, particularly as it relates to emerging DER devices such as water heating, and the orchestration of multiple DERs on any given site.

As the largest Australian manufacturer of water heaters, Rheem markets a wide range of solar, heat pump, high efficiency gas and electric water heater models to the domestic water heating market. Our brands include Rheem, Solahart, Vulcan and Aquamax. Additionally, we are now the number three supplier of photovoltaic (PV) systems in the country via our Solahart channel. Over the last three years we have also commenced the manufacture and installation of smart electric water heaters, controlled remotely by our technology partner, CET. Today Rheem has products in over 4 million Australian homes.

Combined Energy Technologies (CET) is an Australian technology company specialising in energy management for residential, commercial and micro grid systems. CET systems utilise a local Energy Management Gateway to provide secure communications and local orchestration of a wide range of DER devices and DER manufacturers. Local orchestration of DER devices is achieved through a suite of CET Energy Management modules that provide cost effective power metering, communication and control. CET has extensive experience in the integration and orchestration of systems with multiple DER devices 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.

Together, Rheem and CET are already actively participating in the emerging DER market with thousands of online, mixed, orchestrated DER sites (solar PV, batteries, smart water heaters, HVAC, pool pumps, EV chargers, other loads) across the NEM and the WEM. Over the past 8 years we have identified and resolved many issues (at live field sites) around how mixed, smart

DER sites can be orchestrated to achieve the best financial outcomes for consumers, whilst providing a foundation for grid support services such as Contingency FCAS.

We (Rheem and CET) are founding members of the ANU led CSIP-Aus working groups. Further, we have deployed thousands of mixed DER sites across the NEM and WEM. This gives us a unique insight into the issues facing the widescale economic deployment of consumer DER, the requirements and positive outcomes realised from interoperability, and the flow on effects realised such as the ability for the consumer to churn their sitewide orchestrated DER assets to the energy market service provider of their choosing.

The focus of our response is with respect to the "key findings" of the FTI Consulting report. These include:

- the assumptions and conclusions around the Mechanisms for Control and the flow on impacts to achieving the ESB Principles
- the subsequent evaluation against the criteria of the Assessment Framework (per Section 3 of the FTI Consulting report); and
- It is here that we believe our empirical field evidence can help refine the Assessment Framework to deliver on the specific ESB principles, which we will address.

We have split our response into 2 sections - an overview of our position on interoperability (pgs 3-10) and specific responses to the questions raised in the consultation (pgs 11-18).

As this submission has been prepared using the expertise of a number of Rheem and CET 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, if required, with the appropriate personnel within our organisations.

Yours Sincerely

**Ashraf Soas**
**General Manager Transformation**
**RHEEM AUSTRALIA PTY LTD**
ashraf.soas@rheem.com.au
M: +61 417 061 380

**Response Overview:**

In summary, our recommendations are as follows:

That support for CSIP-Aus be made mandatory:

- From DNSP/DSO to Aggregator
- From DNSP/DSO to DER (single DER device or site edge gateway where there is multiple DER at a site)
- From Aggregator to site (single DER device or site edge gateway where there is multiple DER at a site); and
- That DER interoperability is mandated as a minimum to realise the ESB principles. This includes all DER to support local standards-based communications interfaces and local standards-based communications protocols such as Sunspec Modbus. Noting that local (on site) device level DER interoperability for specific DER such as inverters / battery inverters may be achievable via CISP-Aus, Sunspec Modbus or other published standards-based communications protocols.

The technical capability for interoperability between a consumer's DER and a site edge gateway that supports CSIP-Aus (which enables a Dynamic Operating Envelope - DOE) already exists in the market for a majority of devices today. For example, Rheem has thousands of mixed DER sites orchestrating interoperable DER across the NEM and WEM under HEMS control via a single point of entry site edge gateway. Our sites embrace interoperability with more than 15 different PV inverter and battery inverter brands supporting local open access protocols. However, despite the technical simplicity, a few PV inverter and battery inverter brands refuse to enable a local standards-based control interface on their DER. This is wholly to the detriment of consumers financially and ensures they are locked in such that they cannot churn their asset to a retailer / provider of their choosing.

We are aware that this is of concern to the ESB, consumer organisations, and most of the industry. This walled garden approach to DER is also increasingly affecting consumer financial gain and affecting delivery of a grid security of supply response where, for example, one DER asset is enrolled in a VPP for FCAS. We acknowledge that FTI Consulting has recognised this issue, solutions for which we will expand on. (Ref Section 1.3 FTI Consulting Report "…– consumers' smart hot water system fails to coordinate effectively with the storage asset….")

We have many such examples of the issues that this walled garden approach creates across our mixed DER sites. For example, where the storage asset (BESS) is part of an FCAS VPP, a charge / discharge by the storage asset (BESS) which is not part of the site DER orchestration will invoke a response from other DER (via the HEMS) thus negating the FCAS response. This issue introduces a potential threat to grid security of supply.

Support for interoperability must form part of regulatory reform as it provides a simple solution to this problem, as a voluntary approach to OEM based interoperability has failed. Further, Government can assist in the short term by mandating that PV inverters and battery inverters support standards based local control interfaces and communications protocols for interoperability as a requirement of entry into any Government rebate program, or preferably, as a requirement for connection to the distribution network. As there are only a handful of

devices that do not comply, there would be a negligible technical cost imposition on affected OEMs, and only benefits for consumers and the industry.

Note that simply mandating CSIP-Aus between the DNSP/DSO and the aggregator will not automatically deliver on the principles and will not enable practical consumer churn, nor site level DER orchestration for the delivery of DOEs, nor support for grid security of supply (see further discussion below).

**Improvements required to the Assessment Framework and Key Findings:**

Given the above, we wish to suggest that a review be undertaking of the finding in the FTI Consulting report, that have informed the ESB Consultation, specifically Section 5.3 - No gaps. "… based on the discussion with a range of stakeholders, the consensus seems to be that the criteria we have included cover all relevant issues identified to date. In other words, we have not identified any significant gaps in the criteria…"

We do believe, based on extensive empirical field data, that a substantial improvement to the Assessment Framework should be addressed within the Mechanism for Control. Otherwise, the ESB principles cannot be achieved, nor can the role of technical standards for interoperability be effectively delivered as per FTI Consulting Report Section 2.11:

> *"…..that the NEM successfully and efficiently integrates DER such that consumers can operate (or set-and-forget) their devices more effectively, for example by improving coordination between DER devices within a household (say, a solar panel and a battery), or allowing consumers to switch energy services providers easily to unlock greater choice and value."*

and in Section 1.3 (Ref FTI Consulting Report)

> *"Consumers can also benefit from greater interoperability of DER to the extent that their own assets can become better coordinated together (relative to a counterfactual situation where – for example – consumers' smart hot water system fails to coordinate effectively with the storage asset)."*

and in Section 2.12 (Ref FTI Consulting report)

To ensure that Consumer Switching can be effectively addressed thus ensuring delivery of the "principles".

and only then can the ESB principles be delivered on in full.

**Interoperability and suggested modifications to the Assessment Framework:**

To ensure a common understanding it is important that industry definitions such as interoperability are reconciled with the definitions as detailed within the FTI Consulting report and the ESB Interoperability Policy paper. Further, the definitions which feed into the Assessment Framework need to be aligned with the ESB Principles that can be used to guide efforts on the creation of standards and structures that incorporate active DER (load and generation) efficiently into the larger system.

From page 10 of the ESB Interoperability Policy, the ESB principles include:

- *Consumers should be able to share data with service providers.*
- *Consumers' DER assets should have a level of portability between providers.*
- *Control of and access to consumer devices should be limited to clear use cases.*
- *Consumers need to receive clear information about the compatibility of their DER assets.*

We have found, through our significant controlled DER experience, that interoperability is the foundation that enables the higher order principles detailed above to be achieved.

However, it is critical that we understand what the requirement is to define a DER asset as interoperable and importantly how that applies to a consumer's individual DER assets. For the Assessment Framework (Figure 2 of the ESB Interoperability Policy) to deliver the desired ESB Principles, the key technical features of the framework must be robust. It is here that interoperability must be understood and implemented.

Section 1.3 of the FTI Consulting report includes footnote 6 that encompasses FTI Consulting's understanding of interoperability, i.e. "There is a difference between DER interoperability and DER standardisation: DER interoperability can be facilitated by imposing a degree of standardisation in the system (e.g. such that DER supports system reliability and security, or such that consumers who own DER can switch their energy retailers). However, in other areas, flexibility and non-standardisation may be more appropriate, to encourage competition and innovation for the benefit of consumers."

Whilst the above may be somewhat true, we have seen less than optimal benefits to consumers or the grid where DER interoperability does not exist. This definition in our experience does not go far enough if the objective is to achieve the desired ESB Principles including the ability to switch between energy market service providers while maintaining grid / system security of supply.

**Alignment between DEL / DOE, Interoperability, CSIP-Aus and the Assessment Framework Principles:**

It is important to ensure alignment of the framework with the other key energy market reforms, as supported by DNSPs, DEIP, ARENA and the ESB. Part 4.1 of Section 4 of the FTI Consulting report lists four specific technical features to be evaluated against the criteria. These include Dynamic Export Limits (DEL) and Mechanisms for Control. There is also a close linkage between Mechanisms for Control and DEL that we believe is missing in the assessment.

The natural extension to DEL is the move towards NMI level Dynamic Operating Envelopes (DOE). Whilst DEL are a key technical feature of the expanded Assessment Framework per Figure 1 Page 5 of the FTI Consulting report, the logical extension of DEL is DOE. We detail why DOE should be considered in the assessment, its relevance to CSIP-Aus, to interoperability, and we draw your attention to the industry direction re DOE, for example:

- South Australian Power Networks / ARENA's Flexible exports program
- ARENA DEIP Dynamic Operating Envelopes program of works: https://arena.gov.au/knowledge-innovation/distributed-energy-integration-program/

- Energy Queensland (Ergon and Energex) Dynamic Customer Connections Initiative: https://www.talkingenergy.com.au/dynamicder

Further, the ESB Post-2025 Market Design emphasises the importance of DNSPs being able to implement DOE. It is generally accepted that this will need to be undertaken at the connection point for each NMI. An important improvement to the Assessment Framework would be the addition of the role of DOE as an extension to DEL.

**Assessment Framework – proposed changes to Dynamic Export Limits:**

A DOE is a logical implementation / use case of interoperability through the use of CSIP-Aus. The Mechanism for Control is defined in the 4th Key Technical Feature of the expanded Assessment Framework per Figure 1 Page 5 of the FTI Consulting report, i.e:

"Application of a standard for communication from the DNSP to the aggregator, and potentially to the end devices"

Referring to Figure 8 – Assessment Process of the FTI Consulting report, given our reasoning above, we believe that the 1st Key Technical Feature, the Dynamic Export Limits, should be updated to Dynamic Operating Envelopes.

**Assessment Framework – proposed changes required to Mechanisms for Control:**

This is the foundation statement or key technical feature of the assessment framework that requires change to ensure that true interoperability is achieved. It is our experience, based on thousands of mixed DER sites (load and generation) across the NEM and WEM, that the stated Mechanisms for Control definition in the key technical features of the framework needs to be expanded. This will ensure delivery of the principles above from page 10 of the ESB Interoperability Policy. We suggest the following revised wording:

"Application of a standard(s) for communication from the DNSP to the aggregator/site, and from the DNSP/aggregator to the customer site, and between DER devices at the customer site".

Full delivery of interoperability (which must include site level DER interoperability) and hence delivery of the associated ESB principles, requires support for both grid-facing CSIP-Aus standardisation and onsite DER support for local access and control via open standards-based interfaces (e.g. Ethernet / RS485 TCPIP and open standard based communications protocols such as Sunspec Modbus).

**Comments to "Assessment summary of Mechanisms for Control" Figure 12 FTI Consulting report:**

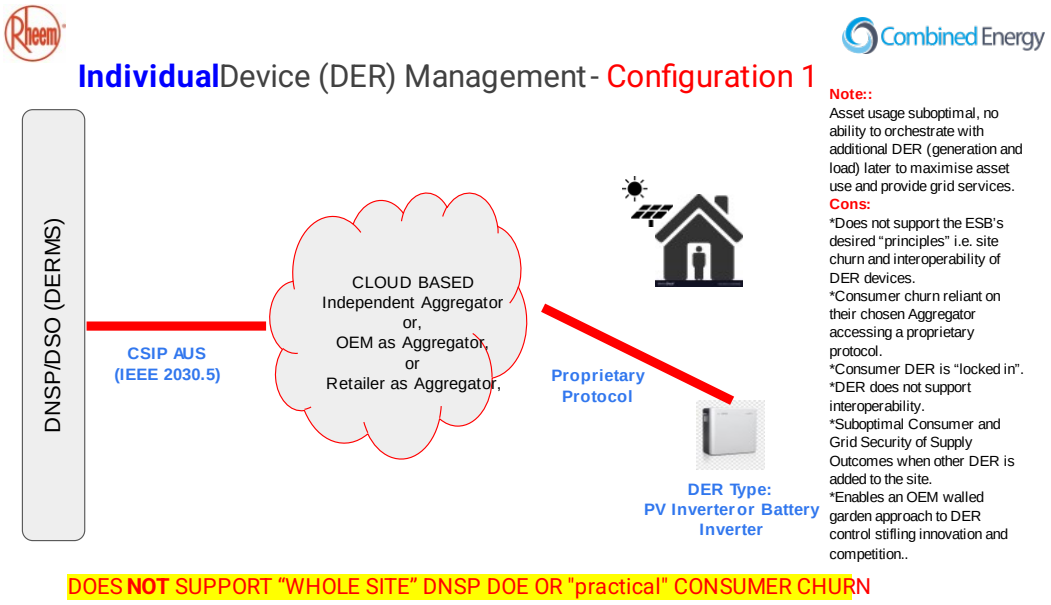
Referring to Figure 12 of the FTO Consulting report (pg 42), specifically Items 3, 5, 6 & 7 we disagree with the Option 2 assessment that introducing IEEE2030.5 (CSIP-Aus variant) down to all devices increases the negative impact on items 3, 5, 6 & 7. We offer up alternative approaches that are prevalent, working in the field now, across multiple vendors and that we believe will deliver positive impacts to Option 2 items (over Option 1). Noting Option 1 does not enable site wide interoperability, does not enable site wide DER orchestration (thus enabling greater DER flexibility), does not in our opinion lower DER costs, cannot deliver DNSP DOE, and does not provide better opportunities for consumers to leverage their DER assets through

site churn. We make these statements based on our experience in the deployment of thousands of mixed DER sites across the NEM and WEM. Modifications are however required to Option 2 to achieve positive outcomes to the aforementioned items which cannot be achieved via a simple direct to device extension of the IEEE2030.5 (CSIP-Aus variant) protocol.

We expand on our reasoning with the following examples based on our field experience. The following sample Configurations 1 through 5 show the various field implementations possible for the control and orchestration of DER on a consumer's site. Configuration 5 is recommended as the only configuration that can deliver on interoperability, customer churn, consumer financial gain and grid security of supply. Further, only Configuration 5 can deliver to the DNSP a site wide NMI level DOE.

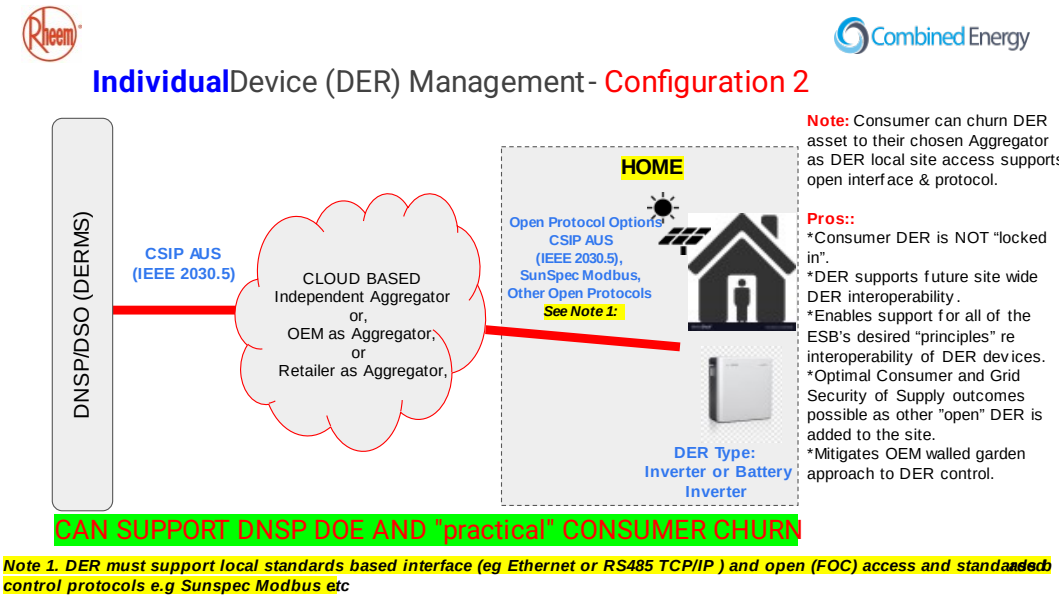
**Summary of possible DER control/orchestration configurations:**

**Configuration 1:**



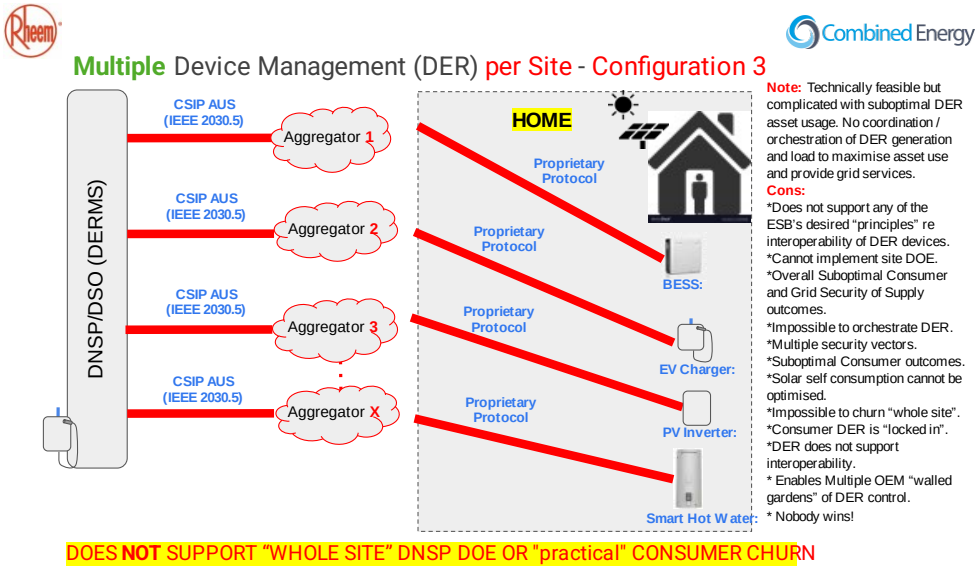

Notes to configuration 1: Configuration 1 is enabled by the current proposed assessment framework, in particular the Mechanisms for Control of the key technical features and cannot deliver on the ESB principles, a whole site DOE, or consumer churn.

**Configuration 2:**



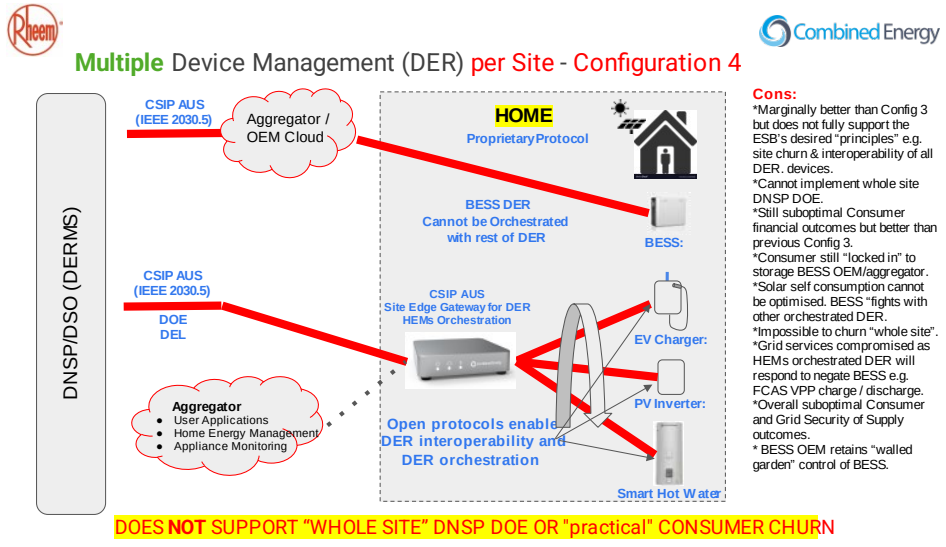

Notes to configuration 2: Configuration 2 is enabled by an extension to the current proposed assessment framework, in particular the Mechanisms for Control extends standardisation to the DER. This option for a single DER site can deliver on the ESB principles, be expanded to support whole site DOE, and can enable consumer churn.

## Configuration 3:



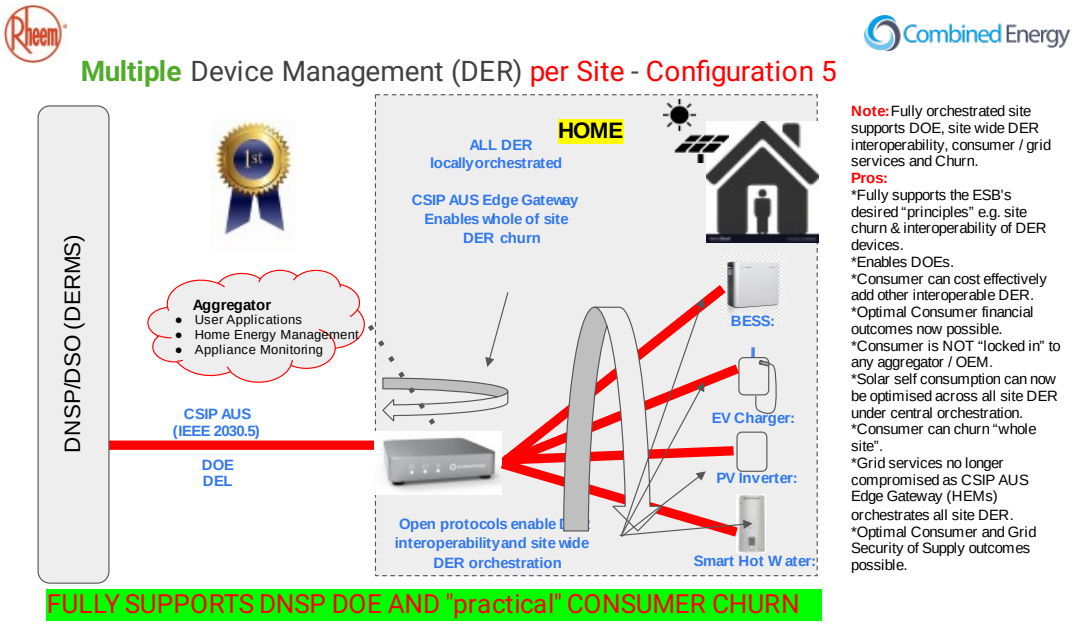

Notes to configuration 3: Configuration 3 is allowed by the Mechanisms for Control under the current proposed assessment framework but does not support/deliver on the ESB principles. This architecture encourages a walled garden approach to DER deployment at a consumer's home. There is no support for interoperability nor ability for the consumer to churn their DER assets. Further, DNSP / AEMO desired site DOE cannot be implemented.

## Configuration 4:




Notes to configuration 4: Configuration 4 is allowed by the Mechanisms for Control under the current proposed Assessment Framework but does not support/deliver on the ESB principles. Whilst better than Configuration 3, this architecture still encourages a walled garden approach to DER deployment at a consumer's home. Whilst interoperability is supported by some DER, the consumer cannot churn their whole of site DER assets. Suboptimal consumer and grid outcomes result, and a site wide DOE cannot be implemented.

**Configuration 5:**




Notes to configuration 5: Configuration 5 shows how the Mechanisms for Control could be updated within the proposed Assessment Framework, ensuring the foundation for support/delivery on all the ESB principles. In particular, full DER interoperability is achieved, enabling the consumer to fully leverage their DER assets locally, for grid services, and via whole of site churn of their DER assets to the Energy Market Service Provider of the consumer's choosing. Optimal consumer and grid outcomes are possible with full support for a site wide DOE.

**Summary of recommendations:**

Updates to the Mechanisms for Control of the Assessment Framework are required to support deployment of full interoperability in line with configuration 5 above and as summarised earlier in our response overview.

## EXTRACT OF CONSULTATION QUESTIONS:

### 4.1 Questions related to the assessment framework

**Q1 What are stakeholder views on the framing of the feature sets as described in Chapter 3 (and in the accompanying FTI paper)?**

We have not specifically addressed the framing of the feature sets as we believe there are more fundamental issues that are required to be addressed in the first instance. Please see our Q3 response below.

Further, please refer to our main response for our suggested review of / changes to the Assessment Framework.

**Q2 What are stakeholder views on the selected the groupings of functionality for the feature sets? Are these the most appropriate grouping of feature sets, or are there others that should be considered?**

We have not specifically addressed the groupings of functionality for the feature sets as we believe there are more fundamental issues that are required to be addressed in the first instance. Please see our Q3 response below.

Further, please refer to our main response for our suggested review of / changes to the Assessment Framework.

**Q3 What are stakeholder views on each of the proposed criterion as described in Chapter 3 (and in the accompanying FTI paper)?**

Please refer to our main response document for our views and suggested changes to the Assessment Framework, specifically within the Mechanism for control, to ensure end to end interoperability of all DER (load and generation). Without this interoperability the ESB Principles cannot be achieved.

**Q4 Are there considerations that have not been captured in the assessment framework?**

Yes, we have provided a comprehensive response within our main response. Specifically, we have suggested changes within the Mechanism for control that are required to ensure interoperability of all DER (load and generation), without which the ESB Principles cannot be achieved. Without the suggested changes customers, will remain locked to some vendors, and unable to churn their DER assets. Further, there will be suboptimal financial outcomes for the customer, and grid security of supply issues on sites with DER that does not support interoperability. We base our statements on our experience across the NEM and WEM in the deployment of thousands of mixed DER (load and generation) sites.

Please refer to our main response for further information and our suggested review of / changes to the Assessment Framework.

**Q5 This assessment framework has been established to assist consideration of the CSIP-Aus standard for inverter based DER (solar PV and battery storage); however, it could also support consideration of other technology groups, such as EV smart charging and smart appliances. What are stakeholder views in respect of the applicability of this framework to other technologies, e.g., could the framework be applied to electric vehicle charging standards as a subsequent exercise?**

As founding members of the ANU CISP-Aus (IEEE2030.5) API Working Group it is our view that CSIP-Aus is best confined to communications between:

a. A DSO/DSNP and an Aggregator (cloud to cloud);
b. A DSO/DNSP and a single type of DER on a site (solar PV or battery storage);
c. An Aggregator and a single type of DER on a site (solar PV or battery storage);
d. The DSO/DNSP to a site edge gateway (e.g. a HEMS orchestrating multiple DER (load and generation) on a site;
e. An Aggregator to a site edge gateway (e.g. a HEMS orchestrating multiple DER (load and generation) on a site;

Further, we do not recommend that CISP-Aus be used for electric vehicle charging, nor for orchestration of multiple individual DER types behind the meter on a single site.

To clarify the above; where there is more than one form of DER (load and generation – e.g. battery, PV inverter, smart water heater, EV charger, pool pump, air conditioner etc) on a site, all DER must support interoperability to enable connection to a site edge gateway for orchestration. This is consistent with the industry / DNSP move to the implementation of Dynamic Operating Envelopes (DOE) whereby all DER (load and generation) on a site must be orchestrated for compliance with the DOE.

It is the site edge gateway that would typically perform the orchestration and support CSIP-Aus to enable site churn and provide backhaul out of the site as per the scenarios d) and e) above. Communications within the site (i.e. behind the meter) between multiple DER and the site edge gateway (supporting CISP-Aus to the DSO/DSNP and/or Aggregator) is typically by way of industry standard physical interfaces (ethernet or RS485) and any industry recognised, standards based, published open protocols.

Sunspec Modbus or variants thereof are widely used and supported by most DER with the exception of those manufactures that either restrict local access to their DER, or fail to provide open interfaces – i.e. the walled garden approach (please see our main response). DER that does not support open local interfaces and protocols for orchestration at a site level are detrimental to both consumer financial gain and the delivery of grid services.

In the case of electric vehicle (EV) chargers, the global industry trend is for smart EV chargers to standardise on OCPP (the Open Charge Point Protocol). Note that a site edge gateway can support multiple open protocols (e.g. Sunspec Modbus + OCPP etc) to interface to other on site DER (load and generation) simultaneously.

We have shown in the body of our main response that the Assessment Framework requires review, specifically the Mechanism for control. This requires change to ensure end to end interoperability, so that the ESB principles such as whole of site churn of a customer's

orchestrated DER assets, to the energy market service provider of their choice, can be realised. The DEL also requires review and we have suggested that this key technical feature be replaced by the DOE.

Please refer to our main response for further information including explanatory configuration diagrams.

### 4.2 Questions related to application of the policy

**Q6 Understanding consumer needs will be important to support effective interoperability settings and secure acceptance for application of standards. What might be implications for the way households and businesses use their DER devices and how they may choose to interact with systems and markets?**

We have and continue to deploy many thousands of mixed DER (load and generation) sites across the NEM and WEM and have acquired a unique understanding of many aspects of the optimal deployment of DER at a consumer's site. Specifically, interoperability has been a key focus of our DER selection and deployment process to ensure optimised consumer outcomes, (including financial outcomes) and to ensure that a consumer's site wide DER assets operate to provide orchestration for grid services, thus supporting grid security of supply.

Our experience suggests that consumers are largely unaware of the issue of interoperability and continue to make suboptimal choices when purchasing DER. The consumer therefore becomes unknowingly locked-in and unable to churn specific DER assets that do not support interoperability, nor are they able to expand their DER asset base effectively as particular closed DER assets cannot be orchestrated. As a result, these consumers are excluded from interacting with systems and markets effectively as their site DER assets grow.

Further, closed DER assets that do not support interoperability and site wide orchestration cause issues in the effective use of excess solar PV for self-consumption, cannot be orchestrated for tariff arbitrage and can interfere with a site's HEMS in the provision of supply services such as contingency FCAS. DER Interoperability based on open standards-based interfaces and protocols is key to resolving these growing issues faced by consumers and the grid.

Please refer to our main response for further information including explanatory configuration diagrams.

**Q7 Is there an assumption that existing fleets of devices would need to be grandfathered? If so, how long might be appropriate? Would sunset arrangements need to be considered to address potential issues of inequity issues?**

From a technical perspective – NO.

This is overwhelmingly a commercial and regulatory issue. Our many thousands of deployed mixed DER sites embrace interoperability with more than 15 different inverter / battery inverter brands / models supporting local open access protocols. However, despite the technical simplicity of interoperability, a few inverter / battery inverter manufacturers refuse to enable a

local standards-based control interface on their DER. This is wholly to the detriment of consumers financially and ensures they cannot churn their asset to the retailer / provider of their choosing.

It is our view and experience that the dominant DER brands that do not support local standards-based access can be made to be interoperable via a simple software download to enable a physical communications port and the installation of industry standard communications software such as CSIP-Aus and Sunspec Modbus. This is not technically difficult. The DER brands in question are regularly update software from cloud servers. We do not see the need for any grandfathering nor sunset arrangements for the brands in question.

Government has a role to play given that their DER battery storage rebate programs enable these closed walled garden systems through subsidies. As a first (overdue) step, changing program participation rules to require DER to support local standards-based interfaces and standards-based protocols for interoperability (as a requirement of program participation and hence rebates), would go a long way to delivering on the ESB principles for consumers.

Please refer to our main response for further information including explanatory configuration diagrams.

**Q8 Is it appropriate for new standards to apply to all retailers? How would aggregators and embedded network providers be treated?**

Yes. A level playing field is required. New standards should apply equally to retailers, aggregators and embedded network providers.

Please refer to our main response for further information and our suggested review of / changes to the Assessment Framework that supports this position.

**Q9 How might we assess timing of industry readiness? Is it appropriate for timing to be considered as part of the feature sets, rather than conformance to the entire standard, to allow gradual phasing in of functionality over time?**

In respect to CSIP-Aus; current DNSP DER initiatives such as deployment of Dynamic Operating Envelopes (Ref SA Power Networks) and Dynamic Export Limits (Ref Energy Q) are specifying the use of CSIP-Aus interfaces to be developed for interfacing to customer DER / site edge gateways supporting site wide DER orchestration. Industry is already engaging in this process.

As the standard evolves with different releases embracing new features, certification updates will be carried out with vendor equipment. This is a normal industry process to ensure interoperability is maintained to enhance functionality over time. To assess industry readiness, wider engagement should be considered with DNSPs, supportive equipment vendors, and those that have deployed, and support, interoperable DER across the NEM and WEM.

We would be happy to engage in further dialogue on this subject, having deployed many thousands of mixed DER sites.

**Q10 Is there a case for phasing in introduction of the standard (or relevant aspects of the standard) across different jurisdictions based on need? What might these considerations include?**

Please refer to our response to Q9 above. As a vendor, implementing multiple versions of CSIP-Aus or indeed any standard is an undesirable exercise. Adherence to the current certified version of CSIP-Aus, against which Australian test servers are validated, ensures commonality across DER and hence mitigates issues in deployment, spares holding, maintenance etc.

**Q11 Are there other parameters (additional to those described in Table 1) that may also be valuable for consideration of inclusion in this process?**

Any indicative framework for a feature set roadmap and subsequent industry adoption and certification testing should be designed in coordination with the ANU led CSIP-Aus (IEEE2030.5) working group of which we are founding members. Please contact the working group Chair Mr Benjamin Weise (benjamin.weise@anu.edu.au) for further information.

## Related Questions

**Q12 How and when is the certification and compliance mechanisms determined? What are the likely lead times to establish such a capability?**

Per our response to Q11 above; information on certification and compliance mechanisms and the associated lead times should involve the ANU led CSIP-Aus (IEEE2030.5) working group of which we are founding members.

Please contact the working group Chair Mr Benjamin Weise (benjamin.weise@anu.edu.au) for further information.

**Q13 What might be likely systems and processes required to ensure that customers can easily switch providers that conform to these new standards? How does this relate to other IT and systems upgrades identified as part AEMO regulatory and IT systems roadmap?**

We recommend reading our response to question 14 below, and our main response document prior to reading our response to question 13.

We believe that increasing consumer knowledge and awareness of the benefits of interoperable and controllable DER will be key to the functioning of the Post 2025 market envisaged by the ESB. To build this consumer awareness, it may be of benefit to look at the evolution of other industries and how those systems and processes evolved. For example, the Telecommunications industry originally created barriers to consumers moving between mobile phone carriers, however phone number portability (and supportive legislation) overcame this. Allowing the change of carrier to be provisioned at the device level allowed this process to work smoothly and simply. This is a good model for the DER industry.

Unfortunately, the ESB Consultation proposes that proprietary connections between DER assets and aggregator / OEM clouds are allowed within the proposed Mechanisms for Control of the Assessment Framework. We believe that this will work against the delivery of ESB principles such as practical customer churn. For example, a competing energy market service

provider must gain access to the aggregator / OEM cloud to control the DER asset. Simply specifying that the DSO/DNSP interface to the aggregator / OEM cloud must conform to a CSIP-Aus does not solve the commercial issues that may arise if the aggregator / OEM seeks to maintain a walled garden approach to the DER asset.

The only solution to this problem is to mandate that open standards based physical interfaces (Ethernet/RS485) and open standards-based communications protocols (with fully featured monitoring and control access) be supported by/at the DER asset. By decoupling the DER asset from the aggregator/OEM cloud, the consumer can freely leverage their use of the DER asset in a way of their choosing. This does not preclude an OEM having a secondary path to the DER asset for maintenance and support arrangements.

Adopting the above approach, which is proven in other markets, will drastically reduce costs by harmonising systems and processes associated with switching energy market services providers. Driving interoperability and commonality in control functionality across similar types of DER will also provide for better outcomes in the integration of DER into the AEMO regulatory and IT systems roadmap.

**Q14 Are there other cross-cutting issues that stakeholders consider need to be raised and explored as part of this policy assessment?**

We mostly agree with the list of technical features to be assessed as detailed in Section 3.1 of ESB Consultation, however as we have detailed in specific responses to previous questions and in our detailed main response (and included configuration diagrams) we do not believe that the assessment framework can deliver on the ESB principles in its current form.

Proper design of an end-to-end architecture for the control and orchestration of DER (load and generation) at a site to enable future market directions such as Dynamic Operating Envelopes, customer DER asset churn, and firmness / predictability in the dispatch of customer DER for grid services supporting grid security of supply requires a bottom up design approach. Ensuring the foundation, (the site DER load and generation) can be orchestrated successfully delivers the aforementioned capabilities and hence the ESB principles.

As we have detailed throughout our response, with configuration examples and supporting information derived from thousands of mixed DER sites across the NEM and WEM, interoperability of DER (load and generation) is the foundation that the Assessment Framework must and should be built on.

In Section 3.1 Technical features to be assessed, Mechanisms for Control has been the primary focus of our response. We disagree with the first half of the statement that “These protocols may be via an aggregators proprietary API / language...” but agree with the second option of “…standardised based on IEEE2030.5” (CSIP-Aus.)

The Mechanisms for Control of the Assessment Framework must mandate a foundational requirement that open standards based physical interfaces (Ethernet or RS485), and open standards-based protocols are supported by all DER for the Mechanisms for Control under the Assessment Framework to deliver on the ESB principles.

If modifying the Mechanisms for Control to ensure interoperability at the DER is not an outcome of the ESB Consultation, then the current situation in the market where consumers are

locked in will continue. Consumers will be unable to churn, DOE cannot be implemented by DNSPs at the NMI, and grid security of supply will deteriorate as further closed DER is deployed.

**Q15 The burden of compliance with implementing the technical standards will fall in the immediate term on the vendors across the solar and storage industry. In the medium term, the upfront and operational costs for compliance will likely be passed back to customers via Traders (retailers and aggregators). What are the key issues for retailers in ensuring this can be delivered at low cost? Are there aspects of the feature sets that have significant cost implications? Is there merit in staging the introduction of functionality over time?**

In our experience the vast majority of PV inverters and battery inverters support Sunspec Modbus or published variants as their open communications platform. However, some major brands do not support open local interfaces. This must be addressed under the Assessment Framework within the Mechanisms for Control.

Where the DER is a PV or battery inverter with only 1 active DER under control at a site, then there is a case for CSIP-Aus compliance. Once there are multiple active DER on a site, an edge gateway must be introduced (along with NMI level metering). Control of the PV inverter and/or battery inverter and other DER (load and generation) needs to come via the site edge gateway to enable site orchestration, whole of site churn, and coordination in the support of grid services. In this scenario a local open protocol (typically Sunspec Modbus based) is more appropriate. (Refer California Rule 21).

We see looming issues for retailers, aggregators and DNSPs in the low-cost delivery of site wide orchestration of DER (not only PV inverters and battery inverters but also flexible load). The only way for this to be addressed is through mandating that DER supports open, standards based local physical interfaces, and open standards-based protocols giving access to fully featured monitoring and control of the DER.

We do not foresee any large compliance costs in providing for the above as most modern DER devices are supplied with physical or Wi-Fi interfaces and also support remote software updates for product maintenance and enhancements. The most pressing issue to resolve is that of DER that does not offer local access via open standards-based communications protocols. Given that all of these devices are capable of remote software updates, enabling existing DER with the standards-based communications protocols is not an expensive or difficult exercise.

As we mentioned in our response to Q10 above, the interface that enables site churn, (i.e., between the DSO/DNSP and/or aggregator and the site e.g. CSIP-Aus) is the one that requires careful consideration. Implementing multiple versions of CSIP-Aus (or indeed any standard) is an undesirable exercise where churn is the end game. Adherence to the current certified version of CSIP-Aus, against which Australian test servers are validated, ensures commonality across customer sites and hence mitigates issues in deployment, spares holding, maintenance etc.

Aggregators, particularly energy retailers, have significant opportunities to create value for their customers based on control of residential DER. The profitability from services such as FCAS and wholesale energy market price arbitrage is profitable when considering the operational

costs. The only caveat is that the customer must own and control access to their DER with no licensing fees payable to OEMs.

Finally, one of the largest costs to a consumer in the deployment of DER is that associated with the need for NMI level metering for site orchestration of DER assets, for dynamic export limits /dynamic operating envelopes and grid services to be implemented successfully. Currently, additional metering is required to be installed at a significant cost to consumers. This cost could be greatly reduced by enabling local read only, real time access to the site revenue metering installation in accordance with the "NEO rule making test". This would ensure equitable standards-based site level access to real time metering data so that DER assets can be cost effectively deployed to participate in site wide orchestration, DOEs and grid services.