

# Submission on NSW Emergency Backstop Mechanism and Consumer Energy Resources Installer Portal



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## Abstract

An Emergency Backstop Mechanism is essential for providing network security during incidents of low system load. CSIP-AUS provides one possible mechanism, which also provides additional functionality at other times with dynamic export controls. Other mechanisms are possible.

A process for installing CSIP-AUS enabled systems onto the NEM in NSW is proposed, directed and assisted through an online portal for installers. This portal should be expanded to include visibility by energy customers and CER owners.

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# 1 Introduction

It is with thanks to the Department of Climate Change, Energy, the Environment and Water that this submission have been made.

This submission has been produced from the point of view of a home owner who has installed, or is looking to install, a new solar, home battery and EV charging system. This is seen as an investment in energy self sufficiency, set against the rising cost of energy from the electricity grid, and the drop in price of solar panels, home batteries and EVs.

The author has experience using a free and open source implementation of CSIP-AUS (Open Dynamic Exports), and has made submissions to consultations by AEMO and AEMC on relating to issues affecting retail energy consumers.

## 2 General Discussion

### 2.1 Small CER Owner Representation

With the decreasing costs of solar panels, battery and EV storage and the raising cost of electricity, it is becoming attractive to install a small system granting a level of self-reliance (all local energy produced can be locally consumed or stored), which has a short payback period of a few years. These systems do not typically sell excess power back to the grid, not do they want to.

There does not appear to be much representation or advocacy for this sector of the market in these discussions.

### 2.2 Behind the Meter Energy Storage and Generation

The emergency backstop mechanism needs to support the case where an increasing number of energy sources exist behind the NMI meter. eg. Solar generation plus vehicle to grid (V2G) capable chargers (probably multiple in a home). There is also the case where these sources may be intermittently attached. eg. V2G and Pluggable / Swap and Go batteries.

### 2.3 Price Signals

Concerning price signals, in the consultation paper the following is written on page 25.

If implemented in a holistic manner. these standards could also set a basis for enabling DOEs in NSW. This would allow DSNPs (and retailers) to adjust the amount of energy fed into the grid within a given range.

and

CSIP-AUS would allow pricing signals to be sent to consumers on when to use or export their solar energy and provide greater consumer control over solar export charges.

It should be noted that CSIP-AUS does not include a mechanism for distributing price signals, which is alluded to by the following from Pg.8 of the SEP2 Client Handbook Release 4 (30 Aug 2024) from Ergon Energy/Energex (QLD).

5 Site Configurations

A Home Energy Management System (HEMS) is a technology platform through which a household can monitor their energy generation and consumption in real-time. It should be able to control and coordinate managed energy resources from multiple manufacturers (such as a battery, Solar PV, or EV charger). Advanced HEMS should additionally be able respond to external control and price signals; providing additional value to households.

The SEP2 Client or End Device can be considered a HEMS, as it is required to manage all DER at a connection point. A valid SEP2 client can be a physical device or a virtual representation of downstream devices through a single client. The HEMS may be software built into the inverter itself, a physical hardware device, or exist completely in software running in the cloud.

## **2.4 Future Development**

### 3 Response to Discussion Questions

	Description	Answer
<b>Proposed Approach</b>		
1.	Do you support the requirement for NSW DNSPs to harmonise their implementation of the backstop mechanism? If not, please explain why.	Y
2.	Are the scope and timelines of the emergency backstop mechanism feasible? If not, please explain why.	-
3.	Do you agree with the order of the hierarchy of the of measures to increase operational load in the grid during MSL events? If not, please explain why.	Y
<b>Implementation</b>		
4.	Are the design elements of the backstop mechanisms appropriate and feasible? if not, please identify why and provide any alternative suggestions.	X
5.	Are the roles and responsibilities of each organisation appropriate and feasible? If not, please explain why and provide any alternative suggestions.	-
<b>System Size</b>		
6.	Do you support the threshold for backstop mechanism using CSIP-AUS being 200kW and smaller? If not, please provide detail on what threshold you think is appropriate?	N
<b>Technical considerations</b>		
7.	Do you have any concerns or insights into using CSIP-AUS compatible inverters and an internet connection to control the backstop mechanism?	Y
8.	Is it appropriate for the emergency backstop mechanism to be implemented using technologies and systems consistent with enabling the future use of flexible export limits? If not, please explain why?	Y
9.	Which, if any, existing test protocols should be considered for implementation as the consistent test protocol for NSW?	X
<b>Conditions of Use</b>		
10.	Do you think the conditions under which the emergency backstop mechanism could be used are appropriate? If not, why? Please suggest any alternative conditions that should be considered.	Y
<b>Implementation Pathway</b>		
11.	Do you have any view on the proposed implementation pathway (variation of DNSP licencing conditions?)	-
12.	What information will manufacturers, installers, customers and distribution networks require to understand the changes to implement the backstop mechanism.  I. Who is best placed to communicate this information to the different audiences?  II. How should this information be best communicated to the different audiences?	-
<b>Installer Portal</b>		
13.	What CER should the NSW CER Installer Portal capture? Please explain the reasoning behind your answers.  I. What types of technology?  II. That size (capacity) of technology?  III. What technology should be excluded? Why?  IV. Should the Portal align with the Emergency Backstop Mechanism in capturing only systems under 200kW?  V. Should the Portal capture technology consistent with that recorded in AEMO's DER register? Is there additional technology that should be captured?	X
14.	Do you support the functions outlined in the CER Installer Portal? If not, please explain why.	Y

15.	Are there any additional functions you would like to see included within a CER Installer portal?	Y
16.	Are there any additional ways that the Portal should be designed to support installers?	-
17.	Do you agree that the party that applies for a CER connection should be responsible for ensuring the installers they have engaged rectify non-compliance? If not, please explain why?	Y
18.	Do you have any other views on compliance and the enforcement within the Portal?	-
19.	Are there additional ways that the Portal should be designed to support installers?	-
<b>Implementation of the Portal</b>		
20.	Do you agree with the phased approach for the delivery of the Portal? If not, please explain why.	-
21.	Do you think that there are any functions that should be included or excluded from the first phase of the Portal development?	-
22.	Do you support the proposed joint NSW Government-DNSP delivery of the CER Installer Portal? If not, please explain why.	-
23.	What information will installers and any other stakeholders require to support the roll out of the CER Installer Portal?  I. Who is the best placed to provide this information?  II. What are the best ways of communicating this information to stakeholders?	-

Key: X:Answered, Y:Yes, N:No, -:Not Answered or Unknown

### 3.1 Proposed Approach

**Question 1:** Do you support the requirement for NSW DNSPs to harmonise their implementation of the backstop mechanism? If not, please explain why.

**Answer:** Yes

**Question 2:** Are the scope and timelines of the emergency backstop mechanism feasible? If not, please explain why.

**Answer:** Unknown

**Question 3:** Do you agree with the order of the hierarchy of the of measures to increase operational load in the grid during MSL events? If not, please explain why.

**Answer:** Yes

MSL event signals should be used to control the enabling of CSIP-AUS controls of CER, which will allow owners of CER to have visibility into how their system should be reacting. This would also allow a longer runway prior to activating the emergency measures. (eg. Customers could prioritise battery/EV charging outside of CSIP-AUS controls.)

Outside of MLS Events, excluding installation, commissioning and testing, the Emergency Backstop mechanism should not be enabled on customer systems.

eg. The Emergency Backstop commands would require arming (eg. by AEMO issuing the MSL notice) otherwise they should be ignored by the end systems.

Condition MSL 1

- Publish MSL notice that the network is about to enter an MSL Event.
- Set the export amount to \$0/kWh or below (negative) to discourage solar export, and encourage additional loads.
- Arm CSIP-AUS systems to use the emergency backstop mechanism. If CSIP-AUS communication is not available to CER then default to zero-export.

Condition MSL 2

- CSIP-AUS dynamic export controls used to impose export limits.

Condition MLS 3

- CSIP-AUS used to disable behind the meter energy generation.

Implementation

**Question 4:** Are the design elements of the backstop mechanisms appropriate and feasible? if not, please identify why and provide any alternative suggestions.

**Answer:** More needs to be done.

The part of the emergence backstop mechanism as implemented by CSIP-AUS is a large proportion of the required functionality, but more needs to be done to inform and empower the end customer to be an equal partner.

The customer needs to receive MLS notices and be told of export limit changes as they occur. This should be done outside of CSIP-AUS.

Without this, the take-up of the emergency backstop mechanism will suffer from the same social contract issues and discussion that occurred with the smart meter roll-out.

**Question 5:** Are the roles and responsibilities of each organisation appropriate and feasible? If not, please explain why and provide any alternative suggestions.

**Answer:** Unknown

### 3.2 System Size

**Question 6:** Do you support the threshold for backstop mechanism using CSIP-AUS being 200kW and smaller? If not, please provide detail on what threshold you think is appropriate?

**Answer:** No

An additional lower threshold category (eg. up to 20kW) should to be added.

There could be an additional lower threshold for a system that uses a backstop mechanism that responds to just AEMO MSL Notices and wholesale pricing signals.

Systems which have been sized for self-reliance and self-consumption (typically smaller in size) do not benefit from the CSIP-AUS functionality for dynamic export limits. These systems could use existing network signals (eg. ripple).

These smaller systems with solar, battery and EV storage usually have been sized to provide a level of self reliance (all local energy produced can be locally consumed or stored), and do not typically sell excess power back to the grid.

They do not depend on the grid during regular operation (up to and including MLS 1 events), so it is inferred that the grid should not need to rely on them. At MLS 2, they would be set to not export any energy, but charge batteries and run controlled loads; and at MSL 3, in addition, they should derate or disable their solar inverter.

These systems would only need access to publically available MSL notices, and not need to be configured with CSIP-AUS.

**These systems would also not be able to participate in any subsequent Dynamic Export Arrangement (or VPP), but this is less of a concern due to the small amount of energy available for export.**

- I. Do you agree with the approach for systems above 200kW? If not, please explain why and provide any alternative suggestions.

No opinion.

### 3.3 Technical considerations

**Question 7:** Do you have any concerns or insights into using CSIP-AUS compatible inverters and an internet connection to control the backstop mechanism?

**Answer:** Yes

While an inverter may come with CSIP-AUS certification, there are increasingly common situations where multiple inverters are behind a single NMI meter point, which need to be controlled from the single NMI CSIP-AUS limit schedule.

This is an active area of research and development and the control methodology needs to be matched to the structure of the CER.

The CSIP-AUS and related standards need to be released and made available free of charge to allow systems to be developed, from multiple vendors, which can work together.

**Question 8:** Is it appropriate for the emergency backstop mechanism to be implemented using technologies and systems consistent with enabling the future use of flexible export limits? If not, please explain why?

**Answer:** Yes, but emergency operation needs to be kept separate from normal operations.

In my opinion, it is appropriate and desirable, that where CSIP-AUS is implemented for the emergency backstop mechanism, it is also used for the flexible export limits. The reasons being:

- A system which is enrolled in the emergency backstop mechanism needs to be actively connected to a controlling server for emergency operation.
- The expectation is that the emergency backstop mechanism should only occur rarely, if at all, but when it does it need to reliably operate. If is part of a larger mechanism that is regularly being used then that part doesn't need additional testing to confirm availability.
- The CSIP-AUS backstop mechanism requires a reliable Internet connection, typically at the expense of the customer, However small the cost it is the responsibility of the customer to maintain this service (unless other arrangement are made). This internet connectivity needs to be continuously maintained for the rare time it is needed, regardless of any other household internet activity.
- In addition to the backstop mechanism, allowing the customer to use flexible export limits allows them to get some benefit from their setup, during normal operation, if they have a system which produces and stores excess energy over the day.

As mentioned in the Question 6, systems that have been sized for self-sufficiency rather than energy generation, will not directly benefit from a CSIP-AUS backstop mechanism (with the extra cost).

Systems that are able generate energy for export may receive benefits when also enabled with dynamic export limits.

**Question 9** Which, if any, existing test protocols should be considered for implementation as the consistent test protocol for NSW?

**Answer:** Requiring installers to remain onsite while waiting on the confirmation of correct operation of CSIP-AUS will cause unnecessary delays and frustration for both the installer and the system owner. (The Installer Portal is essential in this regard.)

It should also be possible to use the spare capacity in the Audio Frequency Load Control (AFLC) ripple decabit codes to test GSD backstop operations. Control can be confirmed via smart meter data.

**Note:** AFLC is difficult to hack/exploit and an has proven to be 98% reliable over 80 years of use. It exists in every zone substation at no cost and will always be more resilient than CSIP-AUS over WiFi.

### 3.4 Conditions of Use

**Question 10:** Do you think the conditions under which the emergency backstop mechanism could be used are appropriate? If not, why? Please suggest any alternative conditions that should be considered.



**Answer:** Yes

The emergency backup mechanism should be required to be explicitly activated through AEMO MSL Notices. These notices should be sent to and exposed to the end system, and the system owner.

### 3.5 Implementation Pathway

**Question 11** Do you have any view on the proposed implementation pathway (variation of DNSP licencing conditions?)

**Answer:** Unknown

**Question 12:** What information will manufacturers, installers, customers and distribution networks require to understand the changes to implement the backstop mechanism.

**Answer:** Unknown

- I. Who is best placed to communicate this information to the different audiences?
- II. How should this information be best communicated to the different audiences?

### 3.6 Installer Portal

**Question 13:** What CER should the NSW CER Installer Portal capture? Please explain the reasoning behind your answers.

- I. What types of technology?  
As much as possible. Starting with Solar Inverter capacity, Battery input capacity (switchable load), EV charging rate. Also whether the equipment is capable of receiving signals via AFLC, LoRa or via cellular network.
- II. That size (capacity) of technology?  
Greater than 20kW (exporting)
- III. What technology should be excluded? Why?  
Customer 2.4GHz Wifi. This technology can be unreliable due to customer activity.
- IV. Should the Portal align with the Emergency Backstop Mechanism in capturing only systems under 200kW?  
Yes
- V. Should the Portal capture technology consistent with that recorded in AEMO's DER register? Is there additional technology that should be captured?  
Yes. Additional technology - Supply and Power condition measurements as measured by the smart meter (phase measurement, power factor etc.)

**Question 14:** Do you support the functions outlined in the CER Installer Portal? If not, please explain why.

**Answer:** Yes

**Question 15:** Are there any additional functions you would like to see included within a CER Installer portal?

**Answer:** Yes

Customers should have access to the information recorded and stored about their site and equipment.

**Question 16:** Are there any additional ways that the Portal should be designed to support installers?

**Answer:** Unknown

**Question 17:** Do you agree that the party that applies for a CER connection should be responsible for ensuring the installers they have engaged rectify non-compliance? If not, please explain why?

**Answer:** Yes

As the backstop installation is part of the system safety, integrity and control the responsibility needs to be audited in a manner similar to a "Certificate of Compliance". (This process can be automated.)

**Question 18:** Do you have any other views on compliance and the enforcement within the Portal?

**Answer:** Unknown

**Question 19:** Are there additional ways that the Portal should be designed to support installers?

**Answer:** Unknown

### **3.7 Implementation of the Portal**

**Question 20:** Do you agree with the phased approach for the delivery of the Portal? If not, please explain why.

**Answer:** Unknown

**Question 21:** Do you think that there are any functions that should be included or excluded from the first phase of the Portal development?

**Answer:** Unknown

**Question 22:** Do you support the proposed joint NSW Government-DNSP delivery of the CER Installer Portal? If not, please explain why.

**Answer:** Unknown

**Question 23:** What information will installers and any other stakeholders require to support the roll out of the CER Installer Portal?

**Answer:** Unknown

I. Who is the best placed to provide this information?

Unknown

II. What are the best ways of communicating this information to stakeholders?

Unknown

## 4 Conclusion

These questions have been answered from the point of view of an owner of CER resources connected to the NSW NEM.

While using CSIP-AUS is a good start for implementing an emergency backstop mechanism, leading nicely into dynamic export controls, the subsequent benefits are not available to customers with systems sized for self-reliance and self-consumption.

An emergency backstop mechanism that responds more directly to AEMO MSL Notices would be more suitable to systems with low exports, and allow larger to systems to be more reliable and secure in their emergency backstop mechanism response.