



2 August 2023

Executive Director, Energy Strategy
Department of Energy, Environment and Climate Action
By email: DER.Victoria@delwp.vic.gov.au

Dear Energy Strategy Team

Re: Submission on Victoria's emergency backstop mechanism consultation paper

On behalf of CitiPower, Powercor and United Energy, I am pleased to introduce our response to the consultation paper on the proposed emergency backstop mechanism to manage the future challenges posed by minimum system load.

We support the need for this mechanism as one of the initiatives necessary to maintaining confidence in power reliability for all Victorians while also supporting the integration of both large-scale renewable generation and all forms of consumer energy resources.

This submission provides an overview of actions we have been progressing to ensure the required network systems and processes are operational to support the proposed mandated mechanisms - for large systems by October 2023 and for small and medium systems by July 2024.

It also offers our recommendations on supply chain considerations and consumer education and information programs which we suggest are essential to ensuring the smooth introduction of the mandate. As we have seen previously with the introduction of new Australian Standards for solar inverters in 2019 and 2021, and the experience of South Australia Power Networks when introducing flexible export services and minimum demand response, industry readiness and consumer acceptance have been key determinants of timely compliance and targeted performance in the interests of all customers.

We strongly support the need for a consistent, state-wide approach to both the introduction of flexible export services and the management of minimum system load. To this end, we have been pleased to collaborate with the other distribution businesses, the Victorian Government and Australian Energy Market Operator on system security issues.

We look forward to this continuing collaboration as our networks enable the integration of renewables and support Victoria's carbon emissions reduction objectives.

Yours sincerely

Joanne Pafumi
General Manager, Corporate Affairs

RESPONSE TO CONSULTATION QUESTIONS

1. Do you understand the reasoning behind the proposal to implement an emergency backstop mechanism in Victoria to manage the risks of minimum system load? If not, please suggest where you would like more information.

We understand the reasoning behind the proposal to introduce an appropriate emergency backstop mechanism to manage minimum system load for new and replacement small and medium rooftop solar systems.

The challenges outlined in the consultation paper associated with minimum system load (page 6 and 7) are accurate to the risks we are actively planning to mitigate as part of our network response and in line with our commitment to keep power reliable for customers.

Importantly, we recognize the backstop mechanism is a one of a suite of load management tools and a last resort option only to be actioned under the direction of AEMO and after all other demand and load controls are exhausted to avoid local or state-wide blackouts.

We agree with the need for emergency backstop capabilities to be part of compliant installations of new and replacement solar systems.

However, we anticipate emergency backstop mechanisms will need to evolve over time. Figure 4 (page 10) of the Consultation Paper notes electric vehicle charging, batteries and virtual power plants as demand management opportunities. All these initiatives currently feature purely voluntary approaches to demand control and management and yet could potentially have a significant impact on network demand profiles as part of business-as-usual operations as well as emergency scenarios.

So while the current proposal concerns rooftop solar systems only, we recommend the Government consider other forms of evolving consumer energy resources so that these new systems also comply with emergency backstop capabilities at the point of installation.

2. Are you clear on the scope and the timelines of the emergency backstop mechanism? Please specify where you would like more clarity.

Planning is well underway in our business to develop and operationalise systems and processes to respond to minimum demand events.

The most significant action over the past two years is summarised as follows.

1. Promoted energy storage: We have installed or are constructing 1.45MW of pole-top and ground mounted neighbourhood batteries. Most recently, we have been involved in proposals for a further 59 batteries representing 32.5MW of energy storage submitted for consideration under the federal Community Batteries program.
2. Introduced High Voltage Distributed Energy Management Systems: We now have 36 wind and solar market and non-market generators totalling more than 1GW of installed capacity being managed in real time through this world first system. This is particularly significant given we have a pipeline of large-scale renewable generators representing a further 1.5GW of capacity that are either contracted or in the final stages of assessment for connection to our Powercor network.

3. Required Generator Monitoring Meters for large systems: The GMMs are now required for large generator systems (greater than 500kVA) installed on the CitiPower and Powercor networks and enable exports to be managed via our Advanced Metering Infrastructure (AMI).
4. Developed a Dynamic Voltage Management System (DVMS): We've used DVMS to significantly reduce average voltage on our networks and modified the system to be utilised in a minimum demand scenario to support system security. With support from the Essential Services Commission, we will be testing this system to validate its minimum demand response capability.
5. Championed solar inverter compliance: The introduction of a new commissioning sheet process has lifted compliance with Australia-A settings on residential solar systems from less than 50% in September 2022 to more than 80% in June 2023. This is raising awareness for the importance of technical compliance to the solar installer sector and maintaining system security.
6. Commenced development of flexible export service capability: We are developing systems and capability to manage flexible levels of solar exports while also planning a trial to demonstrate how we might build demand in the middle of the day through hot water direct load control.
7. Started to develop the sophisticated technology necessary for a full-scale network solution: We have completed the conceptual design and technology assessment for a Low Voltage Distributed Energy Management System (LV DERMS). We expect to have a level of system availability required to support new and replacement solar customers to respond to minimum demand by July 2024 using dynamic operating envelopes.

We have no concerns about the emergency backstop mechanism for large solar installations (greater than 200kW) to commence from October 2023.

A key change between previous communication from the Victorian Government and the Consultation Paper's release is the reference to the emergency backstop mechanism for new and replacement rooftop solar systems being in place "not later than 1 July 2024" rather than on that date. We appreciate this consultation is considering whether an earlier date is feasible for this mandate.

As outlined under our response to question 7, we are concerned about whether the full supply chain will be ready for this mandate from 1 July 2024. This includes some of the systems we have in development as well as:

- the approval by the Clean Energy Council of solar inverters that have the necessary CSIP-Aus capability by 1 March 2024 (as specified by the Solar Victoria Notice to Market 2023-2024)
- the availability of training materials from all Original Equipment Manufacturers to ensure the compliant installation of approved solar inverters and gateway devices
- the completion of the rule change and guidelines for flexible export limits proposed by the Australian Energy Regulator's Flexible Export Limits Final Response (31 July 2023) which will influence changes to Model Standing Offers (MSOs) with solar customers.

In addition, we believe it is important to allow sufficient time for consumer-facing education and information to build consumer support for this mandate. This would include:

- educating new solar customers on the expectations of their roles as generators and obligations particularly regarding internet connectivity and minimum demand scenarios
- ensuring solar customers are familiar with the function of flexible export services based on our deployment of dynamic operating envelopes and the reasons why these are necessary
- achieving the associated changes required to Model Standing Offers for owners of embedded generators as this requires Australian Energy Regulator (AER) approval
- managing expectations for solar customer experience in a minimum demand scenario including transparent communication regarding the time and cost implications of either full curtailment or minimum export adjustments.

We would be pleased to collaborate with the Victorian Government in the design and promotion of consistent industry-wide information as part of this campaign.

In any event, we suggest industry and consumer readiness for the introduction of a mandate in July 2024 will not make a material difference to our ability to urgently respond to any minimum demand events in late 2024 or early 2025.

Because the mandate is only on new or replacement small and medium sized systems, the level of generation capacity curtailed in a minimum demand event is limited by the number of new installations. The number of new solar customers connected to our three networks increased by an average of 3,800 per month in 2022, or by 10% overall to 316,000. For example, on the United Energy network, we report approximately 800 new solar installations monthly representing 4MW of curtailable capacity.

We therefore expect other load management levers will be relied upon for minimum demand response until such time as a critical mass of compliant new small to medium sized solar installations is installed. These levers may include:

- Utilising HV DERMS to manage large scale solar to curtail up to 70MW non-market generation capacity during minimum demand periods.
- Shifting up to 80,000 hot water customer-controlled loads from midnight to during the day representing a potential increase in system demand of up to 66MW.
- Activating GMMs on current large generation systems and new systems (200kVA to 1MVA) connected from 1 October 2023.
- Utilising DVMS to increase voltage to a level at which the majority of solar inverters will reduce their generation output while some will trip out. This may be particularly relevant given the more than 316,000 rooftop solar systems already connected to our networks representing 1.4GW of installed capacity and only a minority with internet capability.
- Controlled disconnection capability via AMI as a last resort in lieu of disconnection of exporting high-voltage feeders. This scheme will be more effective than traditional reverse power feeder shedding schemes as far fewer customers would need to be disconnected to

achieve the same MW curtailment outcome. This scheme also enables us to be selective by targeting customers not impacted by other controls and high-solar exporting customers.

3. Are there scenarios where new and replacement rooftop solar systems should be exempt from complying with the emergency backstop requirement? For example, an inverter replaced under warranty. Please provide specific examples.

We propose the following scenarios should be exempt from complying with emergency backstop requirements.

1. Customers with less than 30 kW installed generation capacity with zero export approved and customers who do not have an internet (or alternative) communication connection.

This proposed exemption will allow customers who install a solar system only for self-consumption only to be unaffected.

It should be noted that the primary reduction in minimum demand is caused by export and that basic customers typically have very low load at minimum demand event times (i.e., 0.5 kW or less).

We believe that exempting zero export customers will have a minimal impact on decreasing minimum demand and that sufficient capacity will still be available to offset the minimum demand events in the long term because:

- the number of customers under this exemption is relatively few
- legacy systems which are replaced or upgraded will also be required to either go zero export or have emergency backstop controls.

Post 1 July 2024, if a customer's circumstances change from zero export, or they enable an internet communication connection, then their systems would need to be enabled for emergency backstop requirements.

2. Negotiated customers who have submitted a connection application prior to 1 July 2024 (only applicable for 30-200 kW systems).

These customers typically have longer equipment, installation, and connection approval lead times of up to 9 months. Therefore, we propose that customers who have completed the application stage prior to 1 July 2024 may need to be exempted from complying if the final connection to the network occurs after 1 July 2024. A transition period for these customers to comply subject to the launch of relevant consumer communications in late 2023 may be appropriate.

3. Embedded networks, with individual allotments and separate rooftop solar systems exceeding 200 kW

We recommend customers installing new systems in this category be exempted from the October 2023 mandate for large solar systems. As with negotiated customers, we propose a transition period for this customer segment until such time as technology is in place to allow individual site control.

These sites are installed with individual rooftop control mechanisms which manage generation output but are complex due to their unique design. It is neither practical nor economic for individual site control. We therefore recommend that such requirements are

delayed until the development of CSIP-Aus communication method to achieve the emergency backstop requirements with these installations.

In relation to the specific question about inverters replaced under warranty, we do not believe they should be exempt from the emergency backstop requirements.

We expect warranty replacements to adhere with the current approved product lists maintained by the Clean Energy Council and referenced as mandatory requirements by Solar Victoria's annual Notice to Market. For example, the current Notice to Market 2023-24 requires internet capable inverters and compliance with AS/NZS 4777.2:2020. Effective from 1 March 2024, it also requires CSIP-Aus compliant inverters.

This will ensure that systems installed prior to the introduction of the mandate are equipped with the emergency backstop capability at any time that the inverter is replaced and for whatever reason the replacement is required.

4. What do you think is the most appropriate technology to implement an emergency backstop mechanism for ≤200 kW systems? Please specify key benefits and challenges.

We support the adoption of Common Smart Inverter Protocol (Australia) (**CSIP-Aus**) as the standard communication method to achieve the emergency backstop requirements of new and replacement small and medium rooftop solar systems and agree that this should be consistent across all Victorian distribution businesses.

As previously mentioned, we are developing an LV DERMS utilising the CSIP-Aus technology protocol.

We see the key benefits of adopting a CSIP-Aus solution are:

- Future-proofing our network by building a system that can respond to emergency backstop events and enable customers to maximise the value of their solar through flexible export services.
- Aligning with the direction of interoperability reforms through the Australian Energy Market Commission, Australian Energy Regulator and former Energy Security Board, as well as South Australia and West Australia that are leading Australia in the delivery of flexible export services and minimum demand response.
- Enabling smarter, lower impact, and more equitable export control, such as the ability to ramp down export in part or to zero, which enables customers to continue to generate for self-consumption rather than simply turning generation off.
- The ability to provide a staged emergency backstop control, from ramp down of generation initially to turning generation off as the last resort.

5. Do you have any concerns or suggestions regarding using an internet-based technology to communicate with rooftop solar systems?

Our concerns regarding internet-based technology relate to compliance, the reliability of telecommunications and cyber security. This is partly why we see the curtailment of rooftop solar as just one of a suite of tools required to manage minimum system demand.

Internet enablement

Our recent experience with AS/NZS 4777.2:2020 compliance has revealed that a high proportion of newly installed inverters are not internet-connected. Anecdotal feedback is that:

- some solar installers are not trained in how to ensure systems are internet enabled
- some solar inverters are easier than others to connect
- some customers have trouble providing the connection information necessary to make the connection
- when customers sell or move properties or change internet service providers then connections can be lost.

Where it is not possible to connect an inverter to the internet and validate its compliance, or when the internet connectivity drops out, it will be important to have a failsafe option. For example, this may include reverting to a lower static limit to restrict export to adequately manage minimum system load risks.

Cyber security protections

We appreciate that people may be concerned about the risk of bad actors hacking into internet-based systems and either influencing their generation or accessing private information. This may result from cyber security breaches at a consumer, OEM, energy retailer or aggregator, or network level.

As critical infrastructure and essential service providers, we adhere to a high level of protection and control on our network, incorporating best-practice measures and controls to reduce the likelihood of an intentional or unintentional cyber breach or security incident.

Using an internet-based communication system deviates from our normal practice, and if there was an option to use a separate, dedicated communication system, we would recommend it. To deliver a reliable minimum demand response, everyone involved in a customer's solar system operation and management will need to understand their responsibility to ensure their systems have the capability to monitor, detect and isolate any threat.

Compliance processes

As part of our LV DERMS, we expect to validate that new rooftop solar systems are compliant at the commissioning stage. This will further develop our current manual system for commissioning report checks.

We also plan to develop tools to monitor ongoing compliance. Where a system is unable to communicate with us or its performance is not as expected, we will develop and follow a defined process for contacting customers and outline how they can return to compliance.

We stress that the responsibility for maintaining ongoing compliance post installation rests with the owner of the rooftop solar system (the customer). High compliance will ultimately result in optimal outcomes for customers and effective management of minimum demand events in the future.

6. What mitigating measures, safeguards and 'fallback' limits would you recommend to manage the loss of internet connectivity?

As mentioned in our response to question five, the use of a static export fallback limit (known as the 'default' export under CSIP-Aus) will be required to manage the loss of internet connectivity for

minimum demand management purposes. The use of this fallback limit will also become applicable to enable flexible exports whilst also ensuring network limits are not exceeded.

We are proposing to adopt a low export limit with the capability to lower this limit temporarily to zero as required in a minimum demand event. In South Australia for example, the lower range in dynamic operating envelopes is 1.5kW per phase.

We note the AER has published its final response to consultation regarding flexible export limits on 31 July 2023. The response proposes a rule change to provide the AER with the powers to develop and publish a binding Export Limit Guideline governing methodology for export capacity allocation and provision of information to consumers. It also proposes the development and publication of interim guidance on export limits to establish expectations for the operation of both static and flexible export limits.

The distribution businesses will require discretion in the application of failsafe limits. The failsafe limits applied now may not be relevant in the future due to changes in system security requirements and may need to take into consideration the abovementioned regulatory guidance which will be application from 2026.

7. What is your view on supply chain readiness to implement emergency backstop mechanism for rooftop solar systems (up to 200 kW inverter capacity) by 1 July 2024?

As previously indicated, we expect the first phase of our LV DERMS system to be operational to support new solar customers in a minimum demand scenario by 1 July 2024.

Our perception is that the broader supply chain may not however, be fully ready to implement the emergency backstop mechanism by this date.

Whilst the adoption of CSIP-Aus as the standard communication method has been implemented in South Australia, we note the adoption of this solution will be new in Victoria for some cohorts of the solar industry such as the installer community.

We therefore believe there's a significant undertaking required by the entire solar industry in Victoria to ensure sufficient engagement and education is completed to meet the proposed timelines. For example:

- Original Equipment Manufacturers (OEMs) of CSIP-Aus enabled solar inverters are still undergoing certification in South Australia, and many of those are under transitional arrangements. We expect that South Australian accredited inverters assessed by the Clean Energy Council will be registered under the approved product lists for use nationally.
- A significant proportion of installers in Victoria are expected to have little or no exposure to CSIP-Aus, products and will require dedicated training on these products. (The notable exceptions are installers involved in trial projects, such as Flexible Exports for Solar PV.)
- Experience with the rollout of AS/NZS4777.2.2020 in December 2021 was that even after 12 months of communication from the Clean Energy Regulator, CEC, networks, and other professional bodies such as NECA, many installers were not sufficiently prepared for the mandated change. This resulted in a 6-month delay in compliance deadline and interim solutions which did not always meet network compliance requirements.

8. What information will installers, distribution businesses and consumers need to understand the proposed changes?

Installers and consumers alike will need to be supported with a major awareness and education campaign that should commence as soon as possible and emphasise their obligations and that compliance of rooftop solar system inverters is crucial, both at the time of installation of a system and ongoing compliance post installation.

The key piece of information for installers is that post 1 July 2024, they will need to complete two additional steps at the commissioning stage:

1. Ensure the inverter is connected to the internet
2. Follow a testing procedure to confirm that the inverter connects to the distribution businesses' systems and respond to remote signals.

Failure to successfully complete these two steps will result in additional work to confirm the inverter is commissioned correctly before the system is registered as compliant.

Moreover, installers and consumers must be made aware of the need for a smart meter so that the 'fail safe' limit can be applied to manage the loss of internet connectivity for minimum demand management purposes. The same meter can be used to enable flexible exports in the future.

Consumers will need to be educated on their responsibility to ensure their inverter is and remains connected to their internet or alternative communication medium and understand what might happen if this connection is lost, such as being export constrained. The earlier they are made aware of the changes the more likely they will be able to start asking the right questions of installers and ensure they are being quoted for the right technology.

Our suggestion is that consumer communication needs to be available from at least 1 January 2024 to support solar system sales in the first half of 2024.

9. How much forward notice will installers and distribution businesses need to implement the new requirements?

Our planning is well underway to develop and operationalise systems and processes to ensure all new rooftop solar systems will be installed and connected to us with the emergency backstop capability from 1 July 2024.

We recognise that compliance is a key concern for optimal management of minimum demand and network constraints, and that installers have a key role to play in achieving compliance.

We fully support the recommendations in the AEMC's *Review of Consumer Energy Resources Technical Standards Draft Report* concerned with promoting compliant installations and urge DEECA to encourage the CEC to play a greater role in overseeing the compliant installation of consumer energy devices.

10. What information can the Victorian Government provide to assist installers and distribution businesses to communicate the new requirements to consumers? Please provide specific examples.

We would appreciate the following information from the Victorian Government:

- details of the proposed requirements under the Ministerial Order for network implementation of the emergency backstop

- the development of a Technical Regulator Guideline or similar document to that produced by the South Australian Department for Energy and Mining to set out the rules under which flexible export services and the minimum demand emergency backstop are implemented
- any reporting or compliance requirements on networks
- consultation on the proposed Notice to Market update for April 2024
- confirmed dates for all requirements to be introduced.

This information will help inform our engagement with the solar industry and preparing communication for customers.

11. What is the best way to ensure that rooftop solar systems with emergency backstop functionality are commissioned correctly at installation stage and continue to maintain a connection over the lifetime of the system?

Compliance is critical to the success of this emergency backstop mechanism for rooftop solar systems. In their Compliance of Distributed Energy Resources with Technical Settings report, released in April 2023, AEMO identified non-compliance as “the most serious and urgent barrier to achieving successful, secure and reliable operation of the NEM.”

We have taken a proactive approach to enforcing compliance related to rooftop solar systems and as a result, have seen a steady improvement. This has involved:

- improved communication with solar installers and customers on installation compliance requirements
- remote correction of inverter settings where possible with the support of Original Equipment Manufacturers (OEMs)
- direct correspondence with customers and solar installers for suspected non-compliant systems
- industry education through various information evenings and events and direct communication
- advocacy for default settings on inverters to be more easily identifiable for Australia A
- introduction of a new commissioning sheet process requiring demonstrated compliance with Australia A settings.

The enforcement steps we are able to progress are typically after installation.

To ensure systems are commissioned correctly we recognize the importance of:

- Mandatory training for solar installers on what now constitutes a compliant installation
- Effective manuals, information and training by OEMs on the installation of their devices.

From a network perspective, we recommend consistency in the processes, systems and enforcement of inverter compliance. This would require two steps. Firstly, the five Victorian distribution businesses to align their commissioning processes as much as practical, adopting a similar approach to South Australia, including interoperability between distribution businesses’ utility servers and inverters, and testing procedures. To this end, we are already coordinating with AusNet Services and Jemena about Victorian alignment on key technical matters such as export limitation methodologies, commissioning, and registration. Secondly, a clear and concise set of guidelines for Victoria, similar to the Technical Regulator Guidelines produced by the South Australian Government.

Post installation, monitoring of and support for inverter compliance is crucial to maintaining rooftop solar as a viable emergency backstop mechanism, and we are supportive of the AEMC's recommendations that:

- distributors develop and follow a defined process:
 - for contacting customers suspected of non-compliance and explain options to those customers for returning to compliance.
 - for addressing non-compliant installation / commissioning of solar systems by an installer
- jurisdictions subsidise re-configuration, remote update, or re-installation of non-compliant DER devices on behalf of customers.

Lastly, we consider that some sort of enforcement mechanism will be required to maintain high levels of compliance. This enforcement mechanism could be informed by distribution businesses that have access to compliance data, and actioned by OEMs, installers, and consumers alike, depending on the nature of the compliance.

12. Are there any additional roles and responsibilities that need to be considered?

The consultation questions ask for information that installers, distribution businesses and consumers will need, but do not specifically identify Original Equipment Manufacturers (OEMs).

OEMs have considerable influence over the compliance rate of their products, with some having the ability to remotely view and update settings. We have had considerable success in addressing non-compliance in inverters already connected to our networks by working with OEMs with remote update capability already, and we propose that the ability to remotely update inverter settings be strongly considered as an effective tool for maintaining compliance of rooftop solar systems.

We believe there is a need for clarity on the organization/s to be responsible for the following roles:

- Testing and certifying inverters and gateway devices that are internet-capable and CSIP-Aus. While the CEC accredits AS4777 inverters and batteries, they rely on testing done by South Australia Power Networks (SAPN). We welcome a national approach to this to ensure consistency in Victoria and Australia.
- Availability of instruction details on 'installing and configuration' accredited inverters and gateway devices for installers. This may form part of the accreditation requirement as stipulated above.
- Co-ordinating all relevant solar industry stakeholders in the development of cyber security requirements for consumer energy resources.
- Consumer protection and dispute resolution related specifically to the performance of consumer energy resources and including installation non-compliance and internet failure.