Clean Energy Council submission to the Energy Policy WA Discussion Paper: Low Load Responses – Distributed Photovoltaic Generation Management

The Clean Energy Council (CEC) welcomes the opportunity to provide feedback on the Energy Policy WA Discussion Paper on distributed photovoltaic (PV) generation management for low load responses.

The Clean Energy Council is the peak body for the clean energy industry in Australia. We represent and work with Australia's leading renewable energy and energy storage businesses, as well as rooftop solar installers, to further the development of clean energy in Australia. We are committed to accelerating the transformation of Australia's energy system to one that is smarter and cleaner.

The CEC understands the challenges presented by low minimum demand and the reasons why Energy Policy WA and the Australian Energy Market Operator (AEMO) would want to ability to remotely curtail PV generation and load in an emergency. We encourage utilisation of excess zero marginal cost electricity in preference to spilling it, wherever possible. Alternatives to curtailing generation would be to increase load on the network, using options such as production of hydrogen, charging of electric vehicles, household batteries and installation of community-scale batteries on the distribution network. Western Australia (WA) has the lowest uptake of residential energy storage of all the mainland states of Australia[1]. Reasons for the low uptake could include the fact that WA is the only mainland state that has never introduced an incentive for batteries and Western Power's connection requirements are more onerous than elsewhere, with a generation limit rather than an export limit and a 3kVA phase imbalance requirement. Although this submission is focused on the remote curtailment proposals and use of the smart meter and/or the inverter, we would also urge Energy Policy WA to consider whether WA has the right suite of policies to incentivise the uptake of storage and load shifting to help address the issue of excess zero emissions, zero marginal cost generation during daylight hours.

There are important lessons that Western Australia (WA) can learn from the experience of South Australia (SA). They include the following:

- It is important to allow for multiple compliance pathways. Some options may be impractical. For example, the customer might not have an internet connection, or it might not be possible to source an adequate supply of dual element smart meters. It will therefore be important to confirm that a permanent, static zero export limit is deemed to comply with the requirements for remote disconnection and reconnection. This is the case in SA.
- It will be important to ensure that the process to approve connection of distributed energy resources (DER) and training of designers and installers is explicit regarding the need for home internet to be available for options other than the multi-element meter. The experience in SA is that many installers will plan to use the application programming interface (API)-based approach and will not realise that the customer has no internet until the time of installation.

[1] See https://aemo.com.au/energy-systems/electricity/der-register/data-der/data-dashboard

- It is highly desirable to avoid pushing customers toward technology dead ends (such as the dual element smart meter) and, wherever possible, to support solutions that lend themselves to the use of Dynamic Operating Envelopes.
- The industry is moving toward adoption of the Australian Common Smart Inverter Profile (CSIP-Aus) for implementation of IEEE2030.5, commencing July 2022 in SA. WA should consider aligning with SA in this approach.
- It will be very important to explain how the new regulatory requirements integrate with the WA Distributed Energy Resources (DER) Roadmap. Manufacturers are understandably reluctant to invest significant time and resources into product development if they think it will be made redundant when the rules change again.

We would be happy to discuss these issues in further detail with representatives of Energy Policy WA. We look forward to contributing further to this important area for policy development.

RESPONSES TO QUESTIONS FOR STAKEHOLDERS

(a) Are there any practical considerations Energy Policy WA should have regard for in implementing the proposed DPV Management model?

Yes. We have many concerns about the practicality of the Energy Policy WA proposal. As noted in the Discussion Paper (p.11) the proposed methods for DPV Management include a:

- Western Power meter configuration and wiring solution, or
- Communication channel to an inverter system such that the inverter can receive a signal (e.g. via broadband, Wi-Fi or 4/5G cellular communications), or
- Communication channel to a device, such that the device can receive a signal from an authorised agent (Synergy, the retailer), or
- Device connected to the Demand Response Mode port of an inverter (i.e. a Gateway device) causing the inverter to disconnect or cease to generate on receipt of a signal from an authorised agent (Synergy, the retailer).

We have numerous questions about the details of the proposal and some concerns about its practicality. They include the following:

- Dynamic export limitation should be the end goal,
- The meter configuration option is a blunt dead end,
- Dual-element smart meters are in very short supply,
- Implications for customers who do not have home Wi-Fi,
- The cost of a communication channel to a device,
- The cost of a device connected to the Demand Response Mode port of an inverter,
- The arrangements for the communication channel to a device,
- The distinction between zero export and disconnection,
- Whether a permanent, static zero export limit is compliant,
- Anticipated issues with commissioning and compliance,
- Warranty issues,
- Compatibility with Project Symphony, and
- Allowing alternative approaches that achieve the same result.

<u>Dynamic export limitation should be the end goal</u>

There is a shared commitment across industry, researchers, distribution network service providers (DNSPs) and energy policy makers to the adoption and staged implementation of the international standard, IEEE 2030.5. This should be the end goal. It would be a mistake to prescribe interim solutions that will create legacy issues and will deflect from the end goal.

The CEC's strong preference would be for Energy Policy WA to commit to the implementation of the IEEE 2030.5 CSIP-Aus as the pathway to achieving remote curtailment, emergency shedding and dynamic export limitation. IEEE 2030.5 is already being utilising successfully in Australia. The Onslow Project, for example, is in the latter stages of completion and Horizon Power has control of more than 200 DER installations via IEEE2030.5. Dynamic export limitation using the international standard, IEEE 2030.5, would also enable remote reduction of PV output to zero.

The meter configuration option is a blunt dead end

The metering/wiring configuration change is a blunt instrument and experience in South Australia shows it is not at all compatible with the move to dynamic operating envelopes. Requiring net zero export is far preferable to switching off all generation.

We understand that a new single element meter costs customers about $95 and dual element meters cost more.

Dual-element smart meters are in very short supply

There are reports of a severe supply shortage of dual element, single phase smart meters and we understand that multi-element three phase smart meters are not available on the Australian market. Three phase customers make up a significant proportion of Western Power customers. We recommend that Energy Policy WA publish an estimate of the number of multi-element meters (including single phase and three phase) that Western Power has in stock, so that the viability and limits of the dual element metering option are better understood.

Implications for customers who do not have home Wi-Fi

Internet-capable solar inverters depend on home Wi-Fi. Without home internet, it is not possible to access the application programming interface (API)-based approach for remote disconnect / reconnect (equivalent to the “Communication channel to an inverter system such that the inverter can receive a signal” option).

The cost of a communication channel to a device

Where this option requires installation of a separate device to receive the signal the customer will be required to bear the cost of the device plus ongoing data fees. This represents additional data costs of $100 to $200 per year for customers without home internet.

The cost of a device connected to the Demand Response Mode port of an inverter

Where this option requires installation of a separate device the customer will be required to bear the additional cost.

The arrangements for communication to a device

The description of the options imply that devices will receive a signal directly from Synergy. This would add unnecessary costs to the consumer. The lowest cost approach will be for Synergy to send the signal to an aggregator (which could include the device manufacturer or provider of a virtual power plant (VPP)), and the aggregator would ensure the system is disconnected or reduced to zero export for the duration of the system instability. For most systems, that is how the South Australian arrangement works. For the avoidance of confusion, we recommend the description of the third option be revised as follows:

- Communication channel to a device, such that the device can receive a signal from an authorised agent (Synergy, the retailer) either directly or indirectly

We need more information as to how the communication of instructions is proposed to work. In South Australia, for example, instructions are communicated to the Relevant Agent using phone calls, automated calls or sms and work is under way to automate this procedure using APIs. We need to understand how Synergy proposes to communicate instructions and its plans to develop APIs and other communications infrastructure.

Distinction between zero export and disconnection

Low load conditions can be addressed by reducing DER exports to zero or by switching off the DER system entirely. For the customer, reducing exports to zero is preferable because it allows self-consumption to continue.

The Discussion Paper appears to imply that limiting exports to zero or disconnecting the DER system entirely will both be acceptable response. We seek clarification that this is the case.

A similar issue arises for AC-coupled storage systems, which are designed never to export to the grid. Will a customer who purchases an AC-couple storage system that never exports to the grid be deemed to comply with the new requirements?

Whether a permanent, static zero export limit is compliant

A permanent, static zero export limit should be deemed to comply with the requirements for remote disconnection and reconnection. This is the case in South Australia. It gives customers another option that avoids the additional expense of more sophisticated and expensive solutions.

Anticipated issues with commissioning and compliance

We anticipate there will be significant difficulties experienced with the commissioning process. As we understand it, an installer will have to set up each system to Synergy's cloud server. This will require electricians to develop a new skill set, accessing a unique API token, and linking this to the server at Synergy. This is not something electricians are trained for. We seek clarification as to whether Synergy will take responsibility for training or whether inverter manufacturers are expected to be responsible for commissioning by installers. We also seek clarification regarding who will take responsibility for commissioning if it doesn't work.

Warranty issues

By taking responsibility for the Relevant Agent role from Original Equipment Manufacturers (OEMs) and placing it in the hands of Synergy, there could be issues with warranty claims. We seek clarification of how Synergy proposes to manage warranty issues.

Compatibility with Project Symphony

We are keen to understand how compatible the different methods are with Project Symphony. Synergy has just launched an EOI for third party aggregators. It is unclear how this will align with Synergy being the only 'Relevant Agent' for remote disconnection and reconnection.

Allowing alternative approaches that achieve the same result

In addition to multi-element smart meters or DRM0, there are also other options that would work (e.g. a separate control circuit breaker that works the same as the proposed smart meter, or direct control of the inverter, rather than explicitly via DRM0). These alternatives should also be allowed.

(b) What mechanisms should be used to provide information to consumers about DPV Management events and what form should this information take?

Customers should be informed when their systems have been curtailed and the duration of each curtailment event.

Where possible, customers should also be informed in advance when curtailment events are anticipated. This will allow customers to plan their consumption and battery charging to minimise inconvenience and losses.

(c) What sort of customer support information should be made available by Synergy to assist customers to maintain compliance with remote communication – for example, if a Wi-Fi connection needs to be re-established?

An email and/or text that communication has been lost and that their system is being unnecessarily curtailed whilst offline.

(d) What assistance or training might be provided for installers to help meet requirements for validation, at the point of installation, on an ongoing basis?

The CEC is working with SA Power Networks to host training for installation and commissioning of hardware for remote disconnection and reconnection. We would be happy to explore a similar arrangement with Synergy and/or Western Power.

(e) Energy Policy WA will assist customers and installers in providing fact sheets and other communication tools to support the changes. Do you have any suggestions for information that you would like included within these fact sheets?

The Discussion Paper does not provide any rationale for the decision to export limit systems to 1.5 kW or 5% of rated capacity. This is a significant change. At the very least, we would have expected the Discussion Paper to explain why this is necessary and why the limit of 1.5 kW was chosen.

Energy Policy WA should explain to customers the conditions under which rooftop solar PV systems will be curtailed and whether this will be limited to genuine 'emergency' situations.

(f) Do you have any other questions or comments?

The best solution to the 'problem' of too much zero marginal cost electricity is to find economically productive uses for the excess energy available. Options such as production of hydrogen, charging of electric vehicles and installation of community-scale batteries on the distribution network should always be considered in preference to curtailing PV generation. Curtailing generation should be a last resort.

We seek clarification on the following questions and suggestions:

- Which meter will verify DER output is reduced to zero when required?
- Incentives to address legacy systems

<u>Which meter will verify DER output is reduced to zero when required?</u>

AS/NZS 4777.2:2020 states that if an external meter is utilized (for example to meet Section 6 Generation control functions) then the external meter should be tested with the inverter and meet measurement accuracy requirements as per Table 2.5. The Standard does not specify any particular tests to demonstrate measurement accuracy, all that is expected is a 'Pass' result for Clause 2.13 and for Clause 7.3.4. The test report should also note the brand and model number of any external devices that are used with the inverter to meet the requirements of the Standard. Where an inverter utilizes an external device to meet the requirements of the Standard the device needs to be tested with the inverter together to the requirements of the Standard.

AS/NZS 4777.2:2020 Clause 2.13 states "Where the inverter utilizes an external measurement device, the measurement and calculation of the accuracy of the system (including the combination of the inverter and external measurement device) shall conform to the measurement and calculation accuracy requirements specified in Table 2.5)".

2.13 Measurement accuracy

To ensure the stable and reliable operation of the inverter protective functions and all modes of operation, the inverter shall conform to or exceed the measurement and calculation accuracy requirements specified in Table 2.5. Where the inverter utilizes an external measurement device, the measurement and calculation accuracy of the system (including the combination of the inverter and external measurement device) shall conform to the measurement and calculation accuracy requirements specified in Table 2.5.

Table 2.5 — Specification for measurement and calculation accuracy

Quantity	Measurement accuracy	Measurement time	Measurement range
Voltage	±1 % $V_{nominal}$	100 ms	0 to 280 V
Frequency	±10 mHz	100 ms	45 to 55 Hz
Active power	±4 % S_{rated}	200 ms	0 to 120 % S_{rated}
Reactive power	±4 % S_{rated}	200 ms	0 to ± 120 % S_{rated}
Apparent power	±4 % S_{rated}	200 ms	0 to ± 120 % S_{rated}
NOTE For the purposes of measurement accuracy, $V_{nominal}$ refers to 230 V of AS 60038.			

Voltage at the grid-interactive port shall not be conditioned by an external device such that the voltage measured at the grid interactive port does not reflect the grid voltage.

This means that exports are limited to zero in response to a 'disconnect' instruction. This allows the consumer to self-consume energy, which is a much better outcome than simply turning off the inverter. This process requires the pre-tested external meter as referenced in the test report of the vendor to be used and not simply a control signal from the Western Power meter, unless there is a separate DER meter installed. Our question is, which device will measure the DER output and ensure it is zero?

We recommend that Energy Policy WA require Western Power to provide local access to the revenue meter for the purposes of dynamic operating envelopes and the other functions which are undertaken by the 'Relevant Agent' in SA and which will be undertaken by Synergy in WA. This would reduce the cost the consumer by leveraging the existing metering, rather than requiring a separate meter installation.

Incentives to address legacy systems

There might be opportunities to retrofit remote curtailment capability to legacy systems, although this could not be mandated. Energy Policy WA could consider providing an incentive for those who can provide this capability for legacy systems e.g. via control of the inverter.