



# **Clean Energy Council submission to the Energy Networks Australia**

## **Technical Guidelines for Basic Micro and Low Voltage Embedded Generation Connections**

The Clean Energy Council (CEC) welcomes the opportunity to provide feedback on the Energy Networks Australia (ENA) draft Technical Guidelines for Basic Micro Embedded Generation (EG) Connections and Low Voltage (LV) EG Connections.

The CEC is the peak body for the clean energy industry in Australia. We represent and work with hundreds of leading businesses operating in solar, wind, hydro, bioenergy, marine and geothermal energy, energy storage and energy efficiency along with more than 5,800 solar installers. We are committed to accelerating the transformation of Australia's energy system to one that is smarter and cleaner.

We welcome ENA's intention to establish National Distributed Energy Resources (DER) Grid Connection Guidelines. The CEC has supported and will continue to support changes to grid connection rules that improve the customer value proposition, safety and/or the DER hosting capacity of the distribution network.

To assist with the successful adoption of the National DER Grid Connection Guidelines, the CEC strongly advocates for a number of changes consistent with the following principles and approach:

- Recognise the value of a formal consultation process,
- Transparency and clarity of grid connection rules should be the highest priority,
- Clearly articulate the rationale for the rules proposed in the National Connection Guidelines,
- Allow flexibility for technology providers to solve for required outcomes, rather than simply comply with prescriptive requirements
- System sizes should not be limited if exports are already constrained,
- Draw upon Australian and international standards wherever possible,
- Avoid mandating capabilities that cannot be tested against a standard, and
- The aim for more consistency should not stifle innovation.

These issues are explored in greater detail below. This submission also outlines proposed next steps for implementing and improving the National DER Grid Connection Guidelines, including the potential roles for the Australian Energy Market Commission (AEMC) and the Australian Energy Regulator (AER).

We would be very happy to discuss these issues in further detail. We look forward to working with the ENA on the development, communication and implementation of this important area for program and policy development.

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## **1. CEC Response to the Draft Guidelines**

### **1.1 Recognise the value of a formal consultation process**

The National Connection Guidelines will be a very significant development for the industry and consumers. It will be crucial that there is enough time allowed for effective and meaningful consultation and that there are processes to enable industry and consumer representatives to provide detailed feedback.

The CEC welcomes the opportunity to provide feedback on the ENA's National Connection Guidelines. In addition to consultation with industry we urge ENA to undertake appropriate consultation with consumer organisations. We anticipate an adverse reaction from consumers where distribution network services providers (DNSPs) use the Guidelines to reduce the single phase basic micro EG connection from the existing standard to 5 kVA.

We recommend the following steps as part of the consultation process:

- Publish the National Connection Guidelines, preferably on the ENA website or another publicly accessible website,
- Set a date for feedback with an appropriate contact person and email address for submissions, and
- Publish the submissions received.

### **1.2 Transparency and clarity of grid connection rules should be the highest priority**

The highest priority for grid connection rules should be to improve transparency and clarity. CEC members agree that transparency of grid connection rules is a higher priority than moves toward greater consistency of the rules.

There is no web site or other reference point with a summary of the grid connection rules of Australian DNSPs.

The National Connection Guidelines project would be more useful if it were to produce a summary of current grid connection rules required by Australian DNSPs. What would be most useful would be a single portal or web site with up to date information or web links to the current grid connection rules of all DNSPs. This would greatly assist with addressing potential confusion that might arise in response to the National Connection Guidelines.

The ENA's National Connection Guidelines project has not proposed the creation of a single reference point with up to date information on DNSPs' grid connection rules. While this is disappointing, we understand that the ENA might not be the most logical host of a portal summarising DNSPs' grid connection rules. Given that DNSPs' grid connection processes are regulated by the AER, we are keen to explore whether it would be more appropriate for the AER or another organisation to host a web site that maintains an up to date summary of DNSPs' grid connection rules.

### **1.3 Clearly articulate the rationale for grid connection rules**

The CEC has supported and will continue to support changes to grid connection rules that:

- Improve the customer value proposition, including the work underway to allow for increased use and market participation from DER assets,
- Support improved product capability and service quality,
- Improve safety, and
- Improve the DER hosting capacity of the distribution network.

The CEC urges ENA to share the rationale for the changes proposed in the National Connection Guidelines in order to assist with collaboration on communications materials.

There will be stronger support for grid connection rules that have a clearly articulated purpose and rationale. Rules that appear to be ad hoc will enjoy less support from industry and consumers.

We anticipate an adverse reaction from consumers where distribution network services providers (DNSPs) use the Guidelines to reduce the single phase basic micro EG connection from the existing standard to 5 kVA. It will be crucial to explain the rationale for limiting generation behind the meter, particularly if exports are also to be limited to 5 kW. The current draft of the Guidelines does not provide a rationale for the proposed connection limit. We anticipate that customers will question the need for limits on generation behind the meter if it is in addition to an export limitation.

### **1.3.1 Improve the customer value proposition**

Moves toward dynamic management of DERs will enable improvement of the customer value proposition, while assisting with grid management and improving hosting capacity. Future iterations of the National DER Connection Guidelines should support the transition to dynamic management of DERs. This is explored in greater details in section 3, below ('Next steps to improve the National DER Grid Connection Guidelines').

### **1.3.2 Support initiatives that improve safety**

The CEC actively supports initiatives to improve the safety of DER systems. For example, we collect and publish information on the inverters that meet the anti-islanding requirements of the Australian Standard (AS 4777.2) and the international standard (IEC 62116). We have supported initiatives by some DNSPs to require inverters to demonstrate compliance with IEC 62116, which is above and beyond the minimum requirement of the Australian Standard. For example, Western Power currently requires inverters connecting to its network to demonstrate compliance with IEC 62116 and Energy Queensland will adopt a similar approach from 1 February 2019. The CEC supports the proposal to incorporate IEC 62116 into the National Connection Guidelines.

### **1.3.3 Support initiatives that improve grid management and hosting capacity**

The CEC supports initiatives that improve inverter standards to enhance grid management and increase DER hosting capacity of distribution networks. Some of these initiatives (such as Volt-Watt and Volt-VAr response) will reduce the value of DER exports and it will be important to communicate why this is expected from DER customers.

Several DNSPs already require volt-watt and/or volt-VAr capability for inverters connecting to their network and the CEC has actively supported this approach by collecting and providing information on inverters' volt-watt and volt-VAr capabilities to relevant DNSPs. The value of this approach for consumers can be communicated in terms of improved hosting capacity. By requiring DER to provide grid services (in the form of volt-watt and volt-VAr response) at times of maximum grid congestion the value of exports of affected DER will be reduced by a relatively small amount (say, around 10 per cent) for a relatively small proportion of the day (when solar generation is at its peak) and in return the DER hosting capacity of distribution networks will be increased significantly. Easily understood explanations like this should be provided as part of the rationale and communications strategy in support of National Connection Guidelines.

It is unclear why fixed power factor would be required if the option of volt-watt and volt-VAr response is available. Fixed power factor correction mandates provision of grid support services whenever power is exported from DER, rather than when the services are required by the grid. If there is a rationale for demanding grid services from DER all of the time (and not just when the grid requires those services) then that should be clearly articulated in the National Connection Guidelines.

If there is no sound rationale for preferring fixed power factor correction over volt-watt and volt-VAr response then the National Connection Guidelines should stipulate volt-watt and volt-VAr response in preference to fixed power factor, rather than as alternatives to each other. The fact that a DNSP has

previously stipulated fixed power factor correction is not, in and of itself, an adequate rationale for continuing to do so.

As outlined in section 3, DNSPs and customers should be encouraged to move from DER systems capable of autonomous response to systems that support dynamic management. The National Connection Guidelines must avoid adding barriers to the moves toward dynamic management.

#### **1.4 Allow flexibility for technology providers to solve for required outcomes, rather than simply comply with prescriptive requirements**

Providing a clear rationale for grid connection rules, with a description of the problem being addressed will enable technology providers to solve for an outcome, rather than simply adhere to strict prescriptions. The National Connection Guidelines should allow sufficient flexibility for DNSPs and technology providers to adopt this approach.

Introducing stringent limitations for even a short period of time without providing alternatives can have a lasting impact on technological innovation in the Australian DER space.

#### **1.5 System sizes should not be limited if exports are already constrained**

The National Connection Guidelines propose a 5kW static export limitation requirement and a limitation on the maximum size of a system behind the meter (generation limitation). The National Connection Guidelines do not explain why there is a need to both limit the capability of a DER system to export to the grid and, in addition to that, also limit the allowable size of the system behind the meter. The rationale for applying limits to system size and export capability should be more clearly articulated. There should also be an explanation as to whether and why system capacity limitations would apply where DER systems are subject to dynamic control of exports.

There should be no limitation on system sizes behind the meter if there is a static export limitation applied or if the DER system is subject to dynamic control of exports.

#### **1.6 Draw upon Australian and international standards wherever possible**

The CEC encourages regulators, policy makers and DNSPs to draw upon widely adopted Australian and international standards, wherever possible. It is problematic when DNSPs or policy makers specify equipment capabilities for which there is no recognised Australian or international standard against which the capability can be tested. The CEC database on the capabilities of solar equipment is based on standards against which the capabilities can be tested. When capabilities are required and there is no standard against which they can be independently tested, demonstrating compliance becomes unnecessarily costly and complicated.

#### **1.7 Avoid mandating capabilities that cannot be tested against a standard**

The CEC maintains and publishes records of the capability of solar products. We also manage an independent program that tests products for the capabilities claimed by the manufacturer.

The CEC is concerned that the National Connection Guidelines propose to mandate inverter capabilities that cannot be tested against a widely used Australian or international standard. This will add an unnecessary administrative burden to the work of DNSPs, manufacturers of solar products, solar installers and organisations such as the CEC.

If the ENA proposes to mandate a 5kW export limitation for all future connections it should explain how product manufacturers will be expected to demonstrate compliance with this requirement. The CEC would also appreciate advice on which standards to use to test claims of compliance with the 5kW export limitation provision.

The National Connection Guidelines should list the Australian and international standards against which inverters and other DER products could be tested to demonstrate compliance with the requirements of the Guidelines.

### **1.8 The aim for more consistency should not stifle innovation**

Consistency in grid connection rules is desirable, particularly for businesses that operate across the jurisdictions of multiple states, territories and DNSPs. However, the aim for more consistency should not stifle innovation. The National Connection Guidelines should work alongside the Open Energy Networks (OpEN) project with appropriate transitions, rather than contradicting any of the work within OpEN. The National Connection Guidelines should not require individual DNSPs to revert to more prescriptive requirements than they currently employ.

Some DNSPs are already working closely with DER providers to develop Distribution System Operator (DSO) platforms, application programming interfaces (APIs) and dynamic export approaches. It is crucial to ensure that the National Connection Guidelines do not present any barriers to innovation by DNSPs or AEMO.

The National Connection Guidelines should clearly outline the anticipated processes for implementation and should ensure there is no impact on any business case development work for funding approval from the AER.

## **2 Implementation of the National DER Connection Guidelines**

### **2.1 Work with CEC to develop a communications strategy for the Guidelines**

A communications strategy will be needed to build support within the industry for the proposed National Connection Guidelines.

There is significant potential for confusion and the possibility of an adverse reaction to the National Connection Guidelines from installers and small businesses who may assume the worst and conclude that every export limit, generation limit and all other controls are required immediately even though this is not what the Guidelines will require. DNSPs will need to be prepared to communicate their position in case of confusion or an adverse reaction.

Without a sound communication strategy there is a significant risk that consumers, solar installers, advocacy organisations and media commentators will react negatively to new grid connection rules. The CEC is willing to work with the ENA and others to communicate the reasons for grid connection rules, where there is a sound and clearly articulated rationale for the rules. To assist with this work we have commenced a draft Q&A sheet (see section 5) to highlight questions raised by CEC members and what we understand to be the answer to those questions.

### **2.2 Work with CEC to drive improvements to standards for inverters**

The CEC maintains and publishes records of the capability of solar products (including inverters, PV modules, battery systems and other DER technology), some of which is publicly available on the [CEC web site](#). We provide information on solar products (including inverters and power conversion equipment (PCE), solar PV modules, battery systems and battery energy storage systems (BESSs) to members with a demonstrated need for the information, such as regulators, government agencies, REC agents and DNSPs. This information is used to assess the eligibility of inverters, PV modules, battery systems and other DER products for government support and for compliance with DNSPs' grid connection rules.

Maintaining and publishing databases about mandatory and optional elements of product standards enables rebate programs (such as those under development in South Australia and Victoria) to be linked to optional standards. This has proven to be a more agile approach compared to the Standards Australia process.

The CEC is keen to support innovation and improvement in solar product capabilities and standards.

We are keen to work with organisations such as ENA to improve grid connection rules and communicate the rationale for them. Rules that are clearly explained and have a solid rationale will be supported. However, industry support for new rules should not be taken for granted and we reserve the right to oppose rules that are not clearly explained or for which a rationale has not been clearly articulated. We are concerned that the draft National Connection Guidelines do not, in their present form, provide sufficiently clear explanation of grid connection rules and the underlying rationale.

### **3 Next steps to improve the National DER Grid Connection Guidelines**

#### **3.1 Outline timeframes and next steps**

It is crucial that the National Connection Guidelines continue to evolve and that there is a clear process for that. We understand that there will be a process to review the National Connection Guidelines, with the first review scheduled six months from the publication of the Guidelines.

Representatives of DNSPs, who are members of the ENA and CEC, have expressed concerns regarding timeframes and have noted that changes to their web portals can take between 12 and 18 months. A strategy will be needed to deal with the transition from the current grid connection rules to whatever new rules might be adopted by DNSPs. At this stage it is unclear whether the first review would propose further improvements to the National Connection Guidelines or whether it will focus on how the process of implementation could be improved.

#### **3.2 Explain how the Guidelines relate to other processes**

There are multiple initiatives and processes that are reviewing, or propose to review, inverter capabilities and grid connection rules. These other processes include a proposed review of AS 4777.2, changes to DNSPs' grid connection rules, work by the Australian Energy Market Operator (AEMO) on standards for Virtual Power Plants (VPPs), and funding eligibility requirements of state and territory governments (including South Australia, NSW and Victoria).

It will be important in the communication of the National Connection Guidelines to explain how these initiatives fit together and the scope of the National Connection Guidelines project. For example, it would be helpful to identify which inverter standards will be actively supported through the National Connection Guidelines and which have been deferred for consideration as part of the review of AS 4777.2. Where the National Connection Guidelines propose to mandate capabilities that are not defined in AS 4777.2 it would be helpful to explain how the ENA anticipates these capabilities would be verified in future.

The National Connection Guidelines should propose a timetable for its implementation and ongoing review, taking account of related processes such as the proposed review of Australian Standards for inverters and power conversion equipment.

#### **3.3 Support moves toward dynamic management of DERS**

The current generation of 'smart' inverters are capable of autonomous response, such as the ability to use volt-watt and volt-VAr capabilities to support voltage management of the grid when it is needed. The next generation of inverter standards are expected to support dynamic management, enabling DER systems to provide data and respond to instructions from a DNSP, DSO or others. The CEC supports the move toward dynamic management. For example, we support the work being undertaken by AEMO, SA Power Networks and others to develop a definition of 'VPP-capable' that draws on the international standard, IEEE 2030.5.

It will be important to ensure that the National Connection Guidelines are consistent with the intention to move toward dynamic management in future. Enablement of volt-watt and/or volt-VAr response should be considered with a view to enabling customers to be paid for these services in the longer term.

#### **3.4 Allow dynamic export control to supersede static limits**

DER systems with dynamic export control should not be subject to static export limitations. There should be provision for consumers and DNSPs to move to the next generation of export control and this innovation should not be limited by the National Connection Guidelines. Dynamic export arrangements could be proposed as a preferred approach over static lower limits.



### **3.5 Allow customers to transition to a new connection arrangement**

Where a new connection agreement or guidelines supersede an earlier agreement, customers should have the right to elect to remain on their current agreement or alternatively transition to the new connection arrangement, even if there is no change to their connected DER. Without a means of transitioning from old connection agreements some customers will be locked out of new markets and prevented from moving to use of dynamic export controls in place of static limits.

#### **4 The Role for AEMC and AER in Grid Connection Guidelines**

It is unclear whether and to what extent the ENA envisages a role for policy makers and regulators in the decision making and communication regarding grid connection rules.

There could be a useful role for the AER in maintaining a central portal for all grid connection rules and guidelines, building on its current approval and regulatory role.

There will also be an important role for the AEMC in deciding which types of network services can be mandated as a requirement of grid connection and which should be remunerated. This will become increasingly important as we move from the current system of autonomous response to a future system of dynamic control.

## 5 Summary of Recommendations

- a. Recognise the role for the Australian Energy Market Commission (AEMC) in deciding which types of network services can be mandated as a requirement of grid connection and which should be remunerated.
- b. Establish a single web portal where all grid connection rules are accessible by industry. If the ENA is not the appropriate organisation to host this web site, support a proposal for the Australian Energy Regulator (AER) to host a web site with all relevant grid connection rules.
- c. The National Connection Guidelines must not require individual distribution network service providers (DNSPs) to revert to more prescriptive requirements than they currently employ.
- d. There should be no limitation on Distributed Energy Resources (DER) system sizes behind the meter if there is a static export limitation applied.
- e. DER systems with dynamic export control should not be subject to static export limitations.
- f. The National Connection Guidelines should list the Australian and international standards against which inverters and other DER products could be tested to demonstrate compliance with the requirements of the Guidelines.
- g. The National Connection Guidelines should propose a timetable for its implementation and ongoing review, taking account of related processes such as the proposed review of Australian Standards for inverters and power conversion equipment.

## Annex 1: Draft Q&As (these have not yet been reviewed or confirmed by ENA)

- Q Do the draft National Connection Guidelines propose limitations on the size of solar PV arrays?
- A Yes. The Guidelines propose that the connection limit for solar PV arrays must be no less than 5 kVA on single phase connections. [\[confirm ENA agrees with this interpretation\]](#)
- Q Can DNSPs continue to allow solar PV arrays larger than 5 kVA on single phase connections?
- A Yes. DNSPs can continue to allow solar PV arrays larger than 5 kVA on single phase connections. [\[confirm ENA agrees with this interpretation\]](#)
- Q Can DNSPs set a limit on solar PV systems that is lower than 5 kVA?
- A Yes, for non-standard basic embedded generation (EG) connections. [\[confirm ENA agrees with this interpretation\]](#)
- Q Do the draft National Connection Guidelines propose limitations on exports?
- A Yes. They propose a 5 kVA limit on exports for single phase connections. [\[confirm ENA agrees with this interpretation\]](#)
- Q Can DNSPs that allow more than 5 kVA exports continue to do so?
- A Yes. DNSPs can accept more than 5 kVA under the draft Guidelines. [\[confirm ENA agrees with this interpretation\]](#)
- Q Can DNSPs require an export limitation of less than 5 kVA (including zero)?
- A Yes. This would be considered a deviation from the Guidelines. The Guidelines propose to allow DNSPs to set lower export limits for non-standard basic EG connections. [\[confirm ENA agrees with this interpretation\]](#)
- Q Do the draft National Connection Guidelines stipulate a limit on the combined inverter capacity behind the meter (ie. the combined capacity of the solar inverter and the battery inverter)?
- A No. [\[confirm ENA agrees with this interpretation\]](#)
- Q Do the draft National Connection Guidelines stipulate a connection limit for energy storage systems on single phase connections?
- A No. [\[confirm ENA agrees with this interpretation\]](#)
- Q Why place a limit on generation capacity behind the meter if there is already a 5 kVA export limitation?
- A [\[Check with ENA why this is considered necessary\]](#)