Distributed Energy Resources (DER) Connection Guidelines

Frequently Asked Questions

CutlerMerz

Energy Networks Australia

What are the Energy Networks Australia DER Connection Guidelines?

A set of National Connection Guidelines to facilitate streamlined grid integration of Distributed Energy Resources (DER). The guidelines are agreed to by the industry and facilitate a nationally consistent approach towards setting technical requirements for proponents applying for grid connections.

What is the aim of the DER Connection Guidelines?

- Develop a set of nationally consistent DER Connection Guidelines
- Respond to various studies which identify a benefit in streamlining technical requirements across DNSPs
- Allow a broader range of participants to partake in Australia's existing and emerging energy markets

CutlerMerz

Energy Networks Australia

What issues will the guidelines resolve?

- Current process can be perceived as being costly and time consuming for proponents and Network Service Providers (NSPs) due to a combination of:
  - Proponents' perception that requirements are too **onerous** and do not achieve the right balance between:
    - Mitigation of network risks / network costs
    - Efficiency in the connection process
- **Inconsistency** between NSPs in terms of technical requirements, documentation requirements and structure of connection guides
- **Lack of clarity** with respect to the technical requirements proponents are required to provide

CutlerMerz

Energy Networks Australia

What are the documents that make up the Energy Networks Australia DER Connection Guidelines?

- Framework and Principles
- Basic Connections Guideline
- LV Connections Guideline
- MV/HV Connections Guideline

Who are the DER Connection Guidelines for?

- Ausgrid
- Ausnet Services
- Endeavour Energy
- Energex and Ergon Energy
- Essential Energy
- Evoenergy
- Horizon Power
- Jemena
- Power and Water Corporation
- Powercor and CitiPower
- SA Power Networks
- TasNetworks
- United Energy
- Western Power

CutlerMerz

Energy Networks Australia

What is the level of engagement and consultation with stakeholders that has taken place in the development of the guidelines?

» Stakeholder engagement took place with NSPs (including all Distribution Network Service Providers), proponents, and industry including the Clean Energy Council (CEC), Australian Energy Council (AEC), Australian Energy Market Operator (AEMO) and the Australian Energy market Commission (AEMC).

» Consultation included DNSP workshops and the CEC, meetings with external stakeholders, public webinars, formal submissions and informal feedback and teleconferences

To what extent are the guidelines taking into account international developments?

» These guidelines are intended to be a point in time document, however expertise and learnings from the recent release of IEEE1547 as well as development in Australian studies of inverter operation in the field have influenced the guidelines particularly with regards to ride through capabilities of inverters and voltage regulation

» We foresee that areas of interoperability and cybersecurity will increasingly become pertinent in Australia through studies for incorporation into the guidelines

CutlerMerz

Energy Networks Australia

What are the subcategories of systems covered by the Basic and LV guidelines?

» **Basic guideline covers from 0 kVA**

– IES (inverter energy system) with a minimum system capacity of 5 kVA single-phase (the system capacity may be set higher by the DNSP) and this excludes ESS (energy storage system) meaning that the amount of storage is not limited through the guideline

– IES from 0 kVA to 30 kVA three-phase and this excludes ESS meaning that the amount of storage is not limited through the guideline

» **LV guideline covers**

– IES from 0 kVA to 200 kVA, excluding ESS

– IES from 200 kVA to the maximum indicative LV network capacity, excluding ESS

– Non-IES from 0 kVA to the maximum indicative LV network capacity

CutlerMerz

Energy Networks Australia

Are there thresholds for Inverter Energy System (IES) system capacity set through the guidelines?

- For **basic EG connections** the system capacity allowed is as per the following subcategories:
  - IES with a minimum system capacity of 5 kVA single-phase (the system capacity may be set higher by the DNSP), excluding ESS
  - IES from 0 kVA to 30 kVA three-phase, excluding ESS
  - Exceptions include non-standard network connections including SWER, isolated or CBD networks (the DNSPs may set lower system capacity thresholds up front within the guideline)
- For **LV EG connections** the system capacity allowed is as per the following subcategories:
  - IES from 0 kVA to 200 kVA, excluding ESS
  - IES from 200 kVA to the maximum indicative LV network capacity, excluding ESS
  - Non-IES from 0 kVA to the maximum indicative LV network capacity

Do the thresholds for Inverter Energy System (IES) maximum system capacity influence the size of a solar PV array that can be installed?

» **Yes,** solar PV arrays need to be appropriately sized relative to the IES system capacity

Are there limits in place for the combined Energy Storage System (ESS) capacity set through the guidelines?

» **No,** there is no limit for ESS capacity

CutlerMerz

Energy Networks Australia

What are the key differences that proponents will find with the impact of these guidelines on the DNSP technical requirements documents?

- Consistency in document naming conventions
- Consistency in document structure
- Clarity and consistency in terminology
- Clarity and consistency in technical requirements that aim to balance network risk and efficiency of DER uptake

Are the guidelines mandatory for DNSPs to follow?

- The guidelines are not legally required by DNSPs to comply with (voluntary guidelines), however all DNSPs have communicated an intention to adopt the requirements of the guidelines
- The guidelines will be reviewed independently to assess whether they are being complied with
- Where the guidelines are not effective in driving desired outcomes, then regulators and policy makers may consider mandatory (standards) based options

CutlerMerz

Energy Networks Australia

How will DNSPs comply with the guidelines?

- Although compliance with the guidelines is not legally required, all DNSPs have communicated an intention to adopt them
- To be deemed to comply DNSPs shall structure their technical requirements documents consistently with the guidelines and DNSPs will apply the technical requirements set out within the guidelines
- Where DNSPs choose to adopt an alternative setting, structure or approach they shall still be deemed to comply so long as the deviation is set out and explicitly justified (meeting a jurisdictional legislative or regulatory requirement and/or providing improved benefits to Australia's electricity system)

CutlerMerz

Energy Networks Australia

What is the difference between Inverter Energy Systems (IES) and non-IES?

» IES is an inverter energy system

» Non-IES is not an inverter energy system, instead it includes synchronous and asynchronous generators which have different technical requirements from inverter based systems

What is the difference between a ‘site generation limit’ and an ‘export limit’?

» An export limit is a form of generation control measured at the connection point that will cause the IES or non-IES to reduce its output and prevent ongoing export to the grid for safety, reliability or other critical reasons

» A site generation limit is a form of generation control, measured downstream of the connection point that will restrict the embedded generation system from generating more than the set threshold for safety, reliability or other critical reasons

CutlerMerz

Energy Networks Australia

Is it expected that proponents will be able to export at the limit?

- The export limit is to be interpreted by the proponent as a maximum
- The ability for the proponent's embedded generation system to export at the export limit is not guaranteed, but rather, will depend upon network characteristics which change over time
- DNSPs will be required to describe those scenarios where output may need to be constrained through their technical requirements document

What is the export limit for basic micro EG connections?

- Export limit is set to 5 kVA per phase giving due regard to a balance between safety/reliability risks and maximising uptake of DER

CutlerMerz

Energy Networks Australia

How is the export limit for LV EG connections set?

» Given large export potential of LV EG connections, the export limits are determined on a case by case basis at the time of application (where proponents may also request an export limit), through an analysis of

- Existing system capacities
- Existing power quality at the relevant network location
- Existing and forecast DER penetration at the relevant network location

What ongoing operations and maintenance requirements are customers of basic micro EG connections required to follow?

» DNSPs may inspect the system (at their own cost) and will require corrective actions to be taken for non-complying systems

» Operate and maintain the installation to ensure compliance with connection agreement and legislation/codes/regulatory instruments at all times

» Ensure that changes to the installation are carried out by qualified electricians and that a CoC (Certificate of Compliance) is issued for any changes

» Seek DNSP approval prior to altering the connection (e.g. changing inverter settings or adding/replacing inverters, batteries or panels)

CutlerMerz

Energy Networks Australia

What ongoing operations and maintenance requirements are customers of LV EG connections required to follow?

- DNSPs may inspect the system (at their own cost) at any time and will require corrective actions to be taken for non-complying systems

- Operate and maintain the installation to ensure compliance with connection agreement and legislation/codes/regulatory instruments at all times
  - Keep records of O&M reports, customers may be required by the DNSP to submit these to them at a specified interval (no more frequently than annually)
  - Ensure changes to the installation are carried out by qualified electricians and that a CoC is issued for any changes
  - Seek DNSP approval prior to altering the connection (e.g. changing inverter settings or adding/replacing inverters, batteries or panels)

Why are ongoing operations and maintenance requirements being introduced?

- Encouraging customers to operate and maintain DER in line with the expectations set out at the time of installation
- Each DER connection affects the power quality of the network in some way or the other, and so must be suitably maintained
- For LV EG customers, O&M reporting may be required and this will ensure that:
  - Systems continue to operate normally
  - Systems are less likely to impact the network negatively

Why are testing and commissioning requirements being introduced?

- To ensure that the system meets relevant standards and requirements and will operate safely with the correct settings

What are the testing and commissioning requirements required by proponents of basic micro EG connections?

» Testing and commissioning are to be as per AS/NZS 4777.1, AS/NZS 3000 and AS/NZS 5033, equipment manufacturer's requirements and the DNSP technical requirements

What are the testing and commissioning requirements required by proponents of LV EG connections?

» Testing and commissioning plans are to be produced by the proponent and may need to be signed off by DNSP prior to finalising the connection agreement

» Testing and commissioning acceptance is to be signed off by CPEng, RPEQ or a DNSP approved qualified person

» IES Testing and commissioning will be as per AS/NZS 4777.1, AS/NZS 3000 and AS/NZS 5033, equipment manufacturer's requirements and the DNSP technical requirements

» Non-IES Testing and commissioning will be as per the DNSP technical requirements

CutlerMerz

Energy Networks Australia

Do proponents of basic micro EG connections need to pay for technical studies?

- **No,** proponents of basic micro EG connections do not need to pay for technical studies since there are no technical studies required to be carried out by the proponent (nor at the proponent's expense) to enable connection to the distribution network
- Technical studies may be performed by the DNSP at the DNSP's cost, but the outcomes of the technical studies will not result in any change to the technical requirements for basic micro EG connections

Do proponents of LV EG connections need to pay for technical studies?

- **Yes,** proponents of LV EG connections need to pay for technical studies required under the DNSP technical requirements

- DNSPs will clarify which technical studies will be required to be completed by the DNSP, completed by the proponent or completed by either the DNSP or proponent

Why is metering required by some DNSPs and not others?

» Under the National Electricity Rules (NER), there are no requirements for metering

» For jurisdictions that are not subject to the NER, they may have jurisdictional metering requirements that will be set through the guidelines

Are there communications requirements for basic micro EG connections?

» For non-standard basic micro EG connections there may be communications requirements in place

» For all other basic micro EG connections there are no mandatory communications requirements in place however DNSPs may recommend them to proponents

What is the purpose of static data and information?

» For DNSPs to store data and information to build a database that may assist with planning and the establishment of static operating envelopes

» Eventually this will lead to contributing to a larger database that AEMO will manage for the Register of DER http://energylive.aemo.com.au/News/Register-of-DER

What is the purpose of dynamic data and information?

» For DNSPs to set out how DER can communicate data and information to the DNSP and other bodies

» Important for establishing dynamic operating envelopes for future dynamic management of DER