

National Distributed Energy Resources Grid Connection Guidelines

Technical Guidelines for Small IES EG Connections

ENA DOC 039-2026

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This document refers to various standards, guidelines, calculations, legal requirements, technical details and other information.

Over time, changes in Australian Standards, industry standards and legislative requirements, as well as technological advances and other factors relevant to the information contained in this document, may affect the accuracy of the information contained in this document. Accordingly, caution should be exercised in relation to the use of the information in this document.

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Key Information

Document Category	Guideline
Functional Domain	Connections
Designation	ENA DOC 039-2026
Version No	3.0
Title	National Distributed Energy Resources Grid Connection Guidelines – Technical Guidelines for Small IES EG Connections
Scope of Revision	Update to align with current versions of relevant Australian standards, include new sections relating to newer DER technology and address common DNSP deviations from previous version
Reason for review	Periodic review and recent updates to AS/NZS 4777 and other standards
Material changes	Added sections for dynamic DER management, ESS, Electric Vehicles, IPSD, phase balancing and backup power. Added standard tables for inverter size and export limits. Removed outdated preamble text and dependencies on original Framework and Principles guideline. Re-ordered some sections in line with common practice.
Review Leader	Energy Horizons
Revision Working Group	Ausgrid, Ausnet Services, ENA, Energy Queensland, Evoenergy, Horizon Power, Power and Water, SA Power Networks, TasNetworks, Western Power
Foundation work	A ‘Framework and Principles Guideline’ was produced, to guide the development of this and other connection guidelines
Supersedes	National Distributed Energy Resources Grid Connection Guidelines – Technical Guidelines for Small IES EG Connections, version 2, ENA DOC 039-2022
Filing Details	Energy Networks Australia Website
Review Period	Three years after publication date

Documents of Energy Networks Australia

History of Energy Networks Australia

Energy Networks Australia is the peak national body representing Australia's gas distribution and electricity transmission and distribution companies. Established in its current form in 2004, it has a long history of industry representation, operating under different names over the years to reflect the sector transformation.

With more than 16 million customer connections across the nation, Australia's energy networks provide the final step in the safe, reliable delivery of gas and electricity to virtually every home, business and industry in the country.

Documents

Part of Energy Networks Australia's role is the development and management of support material such as codes, specifications, guidelines and handbooks to support the energy industry and members of the public in the interpretation and application of legislation and standards. All documents are written in collaboration with the industry through reference groups and general consultation with Energy Networks Australia's members.

It should be noted that legislation and standards may alter between editions of Energy Networks Australia documents, and they will always take precedence. As such, all document users must be aware of the current national and jurisdictional regulations.

This guideline is just one document in a framework of information designed to support the energy sector. Network Operators and Service Providers should refer to all current Energy Networks Australia Guidelines. A full list of documents can be obtained from Energy Networks Australia at <http://www.energynetworks.com.au/industry-guidelines>.

Definitions

Note: definitions in *italics* are consistent with the definitions under the National Electricity Rules¹.

Alternative supply	A supply intended to maintain the supply in case of interruption to the normal supply to the premises, as defined in AS/NZS 3000
Connection point	The agreed point of supply between the distribution network and the customer premises
Embedded generating unit	A generating unit connected within a distribution network and not having direct access to the transmission network
Embedded generating system	A system comprising of one or more embedded generating units
Export capacity	Combined power that all embedded generating units installed at the consumer's premises are capable of exporting to the network
Export limit	A limit on the amount of electricity allowed to be exported from an embedded generating system to the distribution network
Distributed Energy Resources (DER)	Embedded generating units that are connected directly to the distribution network. Small DER are also referred to as Customer Energy Resources (CER)
Energy storage system (ESS)	A system (typically comprising one or more batteries) that stores electricity generated by distributed energy resources or directly from the network, and that can discharge the electricity to loads or export to the network
Generating unit	Plant used in the production of electricity (referred to as a ' <i>production unit</i> ' in the NER), including ESS, EVs and EVSE capable of reverse power transfer (referred to in the NER as ' <i>bidirectional units</i> '), and all related equipment essential to its functioning as a single entity.
Generation	The production of electrical power
Generator	A person who owns, operates or controls a generating unit
Generation limit	Where the active power generated by an IES is controlled so as to not exceed a specified limit that is lower than the inverter nameplate rating

¹ National Electricity Rules v243 at time of writing.

Independent supply	A supply to an electrical installation that is not supplementary to a grid supply, as defined in AS/NZS 4777.1
<i>Integrated Resource Provider</i>	<i>A person who is registered by AEMO as in Integrated Resource Provider</i>
Interface protection	Interface protection is the protection contemplated by AS/NZS 4777 installed to perform the functions of: coordinating multiple generating installations at one site, providing protection for the entire generation installation and islanding protection to the connected grid as well as preserving safety of grid personnel and the general public
Inverter energy system (IES)	An embedded generating system of the kind contemplated by AS/NZS 4777 comprising one or more inverters that convert direct current to alternating current
Inverter Power Sharing Device (IPSD)	A device used to share the supplementary supply from an inverter or multiple inverters to provide supplementary supplies to a number of electrical installations that are part of a multiple electrical installation
Low voltage (LV)	The mains voltages as most commonly used in any given network by domestic and light industrial and commercial consumers (typically 230V)
Medium voltage (MV) / High voltage (HV)	Any voltage greater than 1kVAC
<i>Model standing offer</i>	<i>A document approved by the Australian Energy Regulator as a model standing offer to provide embedded generation connection services which contains (amongst other things) the safety and technical requirements to be complied with by the proponent. This definition also applies to an equivalent model offer for jurisdictions not subject to Chapter 5A of the National Electricity Rules</i>
Proponent	A person proposing to become a generator (the relevant owner, operator or controller of the generating unit, or their agent)
Single Wire Earth Return (SWER)	Parts of the electrical high voltage distribution network that use a single live conductor with the earth as the return current path. All premises are supplied at LV either as single-phase or split-phase electric power
Site generation limit	A generation limit that applies at the connection point
Small IES embedded generation connection	A connection for a small EG system of the kind contemplated by AS/NZS 4777 with a total system capacity less than or equal to 30kVA that is intended to be connected to and capable of operating in parallel with any part of the LV distribution network, involving minimal or no augmentation of the distribution network, for which a model standing offer is in place
Substitute supply	A supply provided via a single socket-outlet on or adjacent to an inverter that is not connected to the electrical installation, as defined in AS/NZS 4777.1

Supplementary supply	A supply intended to operate in conjunction with the normal supply to the premises, as defined in AS/NZS 3000
Technical requirements document	The document produced by each Distribution Network Service Provider setting out their requirements for proponents to enable a grid connection, to which these guidelines apply

Abbreviations

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AS/NZS	A jointly developed Australian and New Zealand Standard
CBD	Central Business District
CEC	Clean Energy Council
DER	Distributed Energy Resources. Small DER are also referred to as Customer Energy Resources (CER)
DNSP	Distribution Network Service Provider
EG	Embedded Generation or Embedded Generating
ESS	Energy Storage System
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
HV	High Voltage
IEC	International Electrotechnical Commission
IES	Inverter Energy System
IPSD	Inverter Power Sharing Device
LV	Low Voltage
MV	Medium Voltage
NEM	National Electricity Market
NER	National Electricity Rules

NMI	National Metering Identifier
SWER	Single Wire Earth Return
SWIS	South West Interconnected System
UPS	Uninterruptable Power Supply
WEM	Wholesale Electricity Market servicing the SWIS

About the National DER Connection Guidelines

The National DER Connection Guidelines set out the framework, principles, approach and technical settings for Australian DNSPs to adopt in the development and application of their technical requirements for grid connection of DER. The ultimate aim of the guidelines is to facilitate the efficient integration of DER into the grid from the perspective of networks, renewable energy proponents and Australia's electricity system more generally.

In preparing these guidelines, Energy Networks Australia has consulted broadly with industry including: the AEMO, the AEMC, state and federal governments and the Clean Energy Council as well as each of the DNSPs across Australia, who are our member organisations.

Objectives of the Guidelines

The objectives of the guidelines are to:

1. Give rise to clear, complete and accessible technical requirements for grid connection for each DNSP
2. Provide for a level of consistency between DNSPs' technical requirements for grid connection in terms of both structure of presentation and the requirements themselves
3. Ensure that DNSPs' technical requirements give regard to the long-term interest of consumers by appropriately balancing the economic benefits, costs and risks that the requirements impose upon their network, proponents and Australia's electricity system more generally; consistent with the National Electricity Objective to:
"Promote efficient investment in, and efficient operation and use of, electricity services for the long-term interests of consumers of electricity with respect to: (a) price, quality, safety, reliability and security of supply of electricity and; (b) the reliability, safety and security of the national electricity system; and (c) the achievement of targets set by a participating jurisdiction – (i) for reducing Australia's greenhouse gas emissions; or (ii) that are likely to contribute to reducing Australia's greenhouse gas emissions."
4. Establish a platform for DNSPs to develop common standards and protocols for future management of active DER.

Structure of Guidelines

The guidelines are separated into four distinct documents:

1. **Framework and Principles guideline** – Specifies the number, scope and structure of the technical requirements documents which all DNSPs shall develop as well as the principles DNSPs shall adopt in setting technical requirements
2. **Technical Guidelines for Small IES EG Connections** (this document) – Specifies how DNSPs shall develop and apply technical requirements for the connection of a small IES EG unit with a total system capacity less than or equal to 30 kVA to an LV distribution network
3. **Technical Guidelines for Low Voltage EG Connections** – Specifies how DNSPs shall develop and apply technical requirements for the connection of an EG unit (which is not a small IES EG unit) to a LV distribution network

4. **Technical Guidelines for Medium Voltage and High Voltage EG Connections** – Specifies how DNSPs shall develop and apply technical requirements for the connection of an EG unit (which is not a small IES EG unit or an LV EG unit) to a MV/HV distribution network, for which the generator is not required to be registered in the NEM ($\leq 5\text{MVA}$) or WEM ($\leq 10\text{MVA}$) or is within other jurisdictions and is $\leq 5\text{MVA}$ ².

How to Comply with the Guidelines

Compliance to the Energy Networks Australia DER Connection Guidelines is not legally required by DNSPs, however, all DNSPs have communicated an intention to adopt the requirements of the guidelines. To be deemed to comply with the guidelines, DNSPs shall:

- » Structure their technical requirements documents consistent with the relevant Guideline (this document)
- » Develop and apply technical requirements set out in the relevant 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 justified.

Justification shall include:

- » That the alternative setting is required to respond to a jurisdictional legislative or regulatory requirement and/or
- » That the alternative setting promotes improved benefits to Australia's electricity system (in terms of both network and proponent benefits, risks and costs).

Each deviation shall be listed in a table within the appendix of the DNSPs' technical requirements document, consistent with the format provided in Appendix A: Deviations from the National DER Connection Guidelines.

Terminology

In these guidelines the following terminology is used:

- » The word *shall* indicates that adopting the setting or approach is mandatory in order for DNSPs to be deemed to comply with these guidelines
- » The word *may* indicates an optional setting or approach that DNSPs shall consider. DNSPs will still be deemed to comply with the guidelines if they do not adopt that setting or approach.
- » The word *should* indicates a setting or approach that DNSPs are recommended to adopt. DNSPs will still be deemed to comply with the guidelines if they do not adopt that setting or approach.

Relationship to Other Documents

The guidelines are intended to be consistent with and to complement existing legislation and regulations.

To the extent that the application of these guidelines results in any inconsistency between existing legislation and regulations and DNSPs' technical requirements, existing legislation and regulations shall prevail. The implications of any inconsistency on DNSP's ability to comply with these guidelines shall be

² Note that the guidelines still apply to generators who elect to register with AEMO as either a generator or an Integrated Resource Provider operating individual generating units of less than 5MW.

set out within a table of deviations as per Appendix A: Deviations from the National DER Connection Guidelines.

These guidelines are also intended to be consistent with relevant Australian/International Standards and Industry Codes. In some cases, these guidelines require DNSPs to apply additional requirements or additional specificity beyond Australian/International Standards and Industry Codes. Any inconsistency shall be interpreted as deliberate and shall not be used as justification for a deviation.

Preparing Small IES EG Connection Technical Requirements

DNSPs shall produce a technical requirements document for small IES EG connections that shall follow the structure and content detailed in these guidelines. The DNSP shall include the terms “Small IES EG Connection Technical Requirements” in their key search terminology for their technical requirements document. The DNSP document title shall include the terms “*Small IES EG Connection Technical Requirements*”. The document may include other terms, where required for consistency with the DNSP’s document classification system.

1 Introduction

This section shall include an introduction to the DNSP’s technical requirements document that provides proponents with an overview of the technical requirements for the equipment and installation of small IES EG connections to the DNSP’s LV network.

The introduction shall include:

1. The definition of a small IES EG connection, being:
“a small EG system of the kind contemplated by AS/NZS 4777 with a total system capacity less than or equal to 30kVA:
 - a. *intended to be connected to and capable of operating in parallel with any part of the LV distribution network*
 - b. *involving minimal or no augmentation of the distribution network*
 - c. *for which a model standing offer is in place*
 - d. *meeting all other technical requirements set out in this document”*
2. The purpose of the DNSP’s technical requirements document being:
“to provide proponents of small IES EG connections information about their obligations for connection to and interfacing with the LV distribution network”
3. An outline of the scope of connections to which the technical requirements document applies, being new connections of small IES EG systems or modifications to existing small IES EG systems, where the small IES EG system consists of IES, ESS or a combination of both, including EVs and EVSE capable of reverse power transfer
4. An outline of the scope of systems to which the technical requirements document does NOT apply, being:
 - a. EG units covered by the DNSP’s LV EG Connection Technical Requirements
 - b. EG units covered by the DNSP’s MV/HV EG Connection Technical Requirements
 - c. Electric vehicles, unless the EV and EVSE are capable of reverse power transfer (in which case the requirements shall apply)
 - d. DER systems that do not generate electricity, including demand response/demand management systems, unless they impact on the ability of the small IES EG system to meet the technical requirements.

5. The general obligations of proponents, including:
 - a. The obligation to comply with the technical requirements as well as relevant national standards, industry codes, legislation and regulations. The instrument that shall prevail in the event of any inconsistency shall be the legislation and regulations, followed by the technical requirements, followed by national standards and industry codes
 - b. The obligation to not connect additional inverters, make modifications or install additional small EG units, including ESS, without prior written agreement from the DNSP
 - c. The obligation to comply with the DNSP's model standing offer
 - d. The obligation to meet the requirements in the design, installation and operation of the small IES EG system.
6. A statement of acknowledgement from the DNSP of their obligations to ensure the safe and reliable operation of the distribution system for operating personnel, customers and the general public
7. A statement that the technical requirements conform with the National DER Connection Guidelines for Small IES EG Connections version 3, ENA DOC 039-2026, with the exception of the deviations presented in Appendix A: Deviations from the National DER Connection Guidelines.

2 Definitions and Abbreviations

2.1 Definitions

This section shall provide a tabulated list of definitions for any technical or industry terms used throughout the technical requirements document. The definitions should be consistent with the definitions provided within this document, as relevant.

2.2 Abbreviations

This section shall provide a tabulated list of all abbreviations used throughout the technical requirements document. The abbreviations shall be consistent with the abbreviations provided within this document, as relevant.

2.3 Terminology

DNSPs shall outline how instructional terms are to be interpreted, being:

1. The word 'shall' indicates a mandatory requirement
2. The word 'may' indicates a requirement that may be mandatory in some circumstances, or a permitted option
3. The word 'should' indicates a recommendation that will not be mandatorily imposed on the proponent.

3 Relevant Rules, Regulations, Standards and Codes

3.1 Standards and Codes

This section shall provide a list of all relevant Australian and international standards and industry codes which shall apply to the design, manufacture, installation, testing and commissioning, and operation and maintenance of all plant and equipment for small IES EG connections to the distribution network in the DNSP's jurisdiction.

This section shall also state that in the event of any inconsistency between Australian and international standards and industry codes and the DNSP technical requirements, the DNSP technical requirements shall prevail.

3.2 Legislation and Regulation

This section shall provide a list of all the relevant legislation and regulations which shall apply to the design, manufacture, installation, testing and commissioning, and operations and maintenance of all plant and equipment for small IES EG connections to the distribution network in the DNSP's jurisdiction.

This section shall also state that in the event of any inconsistency between legislation and regulations and the DNSP technical requirements, the legislation and regulation shall prevail.

4 Technical Requirements

4.1 General

This section specifies the detailed technical requirements for small EG connections. The technical requirements set out in this document shall apply to all subcategories of small IES EG system connections. All equipment shall be designed, manufactured, installed and tested in accordance with the requirements of all relevant Statutory Authorities and Acts and the latest relevant Standards and Codes of Practices.

4.1.1 Network Categories

This section shall state the network categories for which different technical settings may apply, being:

1. Single-phase small IES EG connection – any small IES EG system for a site with a single-phase network connection
2. Two-phase small IES EG connection - any small IES EG system for a site with a two-phase (or split-phase) network connection
3. Three-phase small IES EG connection – any small IES EG system for a site with a three-phase network connection
4. Non-standard small IES EG connection – any small IES EG system connecting to a non-standard part of the network for example SWER networks, isolated networks, and CBD networks.

This section shall also provide guidance for proponents as to how to identify whether their connection is to a non-standard network (this may include a hyperlink or website reference to a map, list of postcodes, or equivalent).

This section shall also provide contact details in case there is any doubt as to which subcategory applies.

This section shall specify that the technical requirements set out in these guidelines should be interpreted as applying to all subcategories of small IES EG connections unless otherwise specified.

4.2 Maximum System Capacity

This section shall specify the maximum system capacity of small IES EG connections for each subcategory using a table consistent with the below:

Subcategory	Inverters with connected PV	Total of all inverters (including PV, ESS, EVSE)	
	Maximum capacity	Maximum capacity	Total maximum capacity
Single-phase	10 kVA	10 kVA	10 kVA
Two-phase	5 kVA (per phase)	5 kVA (per phase)	10 kVA
Three-phase	10 kVA (per phase)	10 kVA (per phase)	30 kVA
Non-standard	<i>DNISP-specific</i>	<i>DNISP-specific</i>	<i>DNISP-specific</i>

Note:

- » The table shall include rows for any non-standard connection types that have defined capacity limits (e.g. SWER)
- » For other non-standard connection types where the maximum capacity is not pre-determined, this section shall specify how they are treated, e.g. using notes below the table.

Where the DNISP allows it, this section shall state that inverter generation limiting may be used in meeting maximum capacity requirements as specified in section 4.3.1.

This section shall state that for multiple-phase connections, the phase balancing requirements in section 4.2.1 shall also apply.

This section shall also specify how the system capacity for small IES EG connections on different strata titles, but at the same network connection point (e.g. retirement villages), are to be treated. That is, whether they are to be treated as individual small IES EG connections or whether the connection type is to be defined by the capacity at the connection point.

Where the DNISP reduces the maximum system capacity setting from their current setting for any of the subcategories, they shall include this as a deviation in Appendix A and provide a justification accordingly.

4.2.1 Phase Balancing

This section shall include any requirements relating to phase balancing for IES, including as a minimum that, in accordance with AS/NZS 4777.1:

1. The output of a multiple-phase IES EG system shall be balanced across all phases

2. Where one or more single-phase inverters, or a combination of single-phase and multiple-phase inverters, are connected to a multiple-phase connection point, the power imbalance of all IES shall not exceed 5kVA between phases.

If the DNSP has requirements relating to current balance protection or interlocking for multiple-inverter installations, these shall be included in the relevant subsections under section 4.7 and referenced here.

4.3 IES Control

This section shall specify that small IES EG connections require generation control.

4.3.1 Site Generation Limit

Where the DNSP adopts a site generation limit and/or allows for the use of inverter generation limiting this section shall specify all applicable requirements, including, but not limited to:

1. Any specific site generation limits that apply to each subcategory of small IES EG connection
2. The extent to which the inverter Generation Limit control function as specified in AS/NZS 4777.2 may be used to meet system capacity and phase balancing requirements
3. Any requirements related to the treatment of aggregated generation capacity
4. Any circumstances where site generation limits may vary, e.g. when systems run in alternative supply mode (in which case this section may reference sections 4.5.2 and 4.5.3 as appropriate).

Where the DNSP does not have any site generation limit requirements for small IES EG connections, this section shall be retained, but noted as intentionally blank.

4.3.2 Export Limits at Connection Point

This section shall specify the static export limits of small IES EG connections for each subcategory using a table consistent with the below:

Subcategory	Static export limit at the connection point	Dynamic / flexible export limit at the connection point
Single-phase	1.5 kW	1.5 – 10 kW
Two-phase	1.5 kW	1.5 – 10 kW
Three-phase	1.5 kW	1.5 – 30 kW
Non-standard	<i>DNSP-specific</i>	<i>DNSP-specific</i>

Note:

- » The table shall include rows for any non-standard connection types that have defined export limits (e.g. SWER)
- » For other non-standard connection types where the export limit is not pre-determined, this section shall specify how they are treated, e.g. using notes below the table. This section may also specify additional generation control requirements
- » Export limits shall be expressed in kW
- » Export limits shall be specified at the connection point, consistent with AS/NZS 4777.1 (3.4.8.2.3). Where the DNSP defines per-phase limits these shall be included in brackets after the connection point limit value for multiple-phase connection types

- » If the DNSP has only static export limits and does not use dynamic export management (e.g. dynamic / flexible export limits or backstop schemes that enable a higher export limit) the third column in the table shall be omitted and the title of the second column shall be simply 'Export limit at the connection point'.
- » DNSPs may replace the static / lower limit of 1.5 kW in the table with their own value if appropriate, e.g. if the DNSP only offers a static limit then it is likely to be higher. Where the DNSP offers a dynamic or flexible export limit, the value for the static export limit shown in column 2 should equal the lower-bound of the dynamic limit shown in column 3.

This section shall state that the export limit is to be interpreted as “soft”, consistent with the definition of soft export limits within AS/NZS 4777.1.

This section shall state that where multiple inverters are installed behind the connection point, they must be configured so that the connection point export limit requirements are met.

This section shall state that for multiple-phase small IES EG connections exports shall be balanced across all phases in accordance with section 4.2.1.

This section shall state that the requirements for dynamic / flexible export limits are set out in section 4.3.3 below (if applicable).

This section shall specify that the export limit is to be interpreted by the proponent as a maximum. The ability of the proponent’s small IES EG system to export at the export limit is not guaranteed, but rather, it will depend upon network characteristics which change over time. This section shall describe those scenarios where output may need to be constrained including, but not limited to inverter power output where power quality response modes are in operation.

4.3.3 DER Management

4.3.3.1 *Advanced DER Management*

Where the DNSP offers dynamic connection or flexible export options for small IES EG connections, or has other advanced DER management requirements, these shall be detailed in this section. The DNSP may change the heading of this section to align with their terminology for these connection types.

Any associated requirements for communications, data and/or cyber security shall be included in the relevant sections 4.10, 4.11 and/or 4.12, and those sections referenced here as appropriate.

Where no advanced DER management requirements apply, this section may be omitted.

4.3.3.2 *Emergency DER Management*

Where the DNSP has requirements to support an emergency backstop mechanism they shall be specified in this section. Any associated requirements for communications, data and/or cyber security shall be included in the relevant sections 4.10, 4.11 and/or 4.12, and those sections referenced here as appropriate. Any relevant jurisdictional requirements should also be referenced.

Where no emergency management requirements apply, this section may be omitted.

4.3.4 Import limits for ESS

Where the DNSP adopts static or dynamic import limit requirements for ESS, they shall be specified in this section. Any associated requirements for communications, data and/or cyber security shall be included in the relevant sections 4.10, 4.11 and/or 4.12, and those sections referenced here as appropriate.

Where no specific ESS import limit requirements apply, this section may be omitted.

4.4 Inverter Energy System

4.4.1 General

This section shall state the general requirements that apply to IES, including that:

1. IES shall be tested by an authorised testing laboratory and be certified as being compliant with AS/NZS 4777.2 with an accreditation number
2. IES shall comprise inverters that are registered with the CEC as grid-connect inverters approved for the mode(s) of operation in which they are to be used (alternative supply, supplementary supply, substitute supply or independent supply)
3. IES shall comprise inverters installed in compliance with AS/NZS 4777.1

4.4.2 Electric Vehicles

This section shall state that an EVSE and EV shall be considered an IES EG System, where it

- a. is capable of reverse power transfer; and
- b. provides a supplementary or alternative supply to the electrical installation.

This section shall specify that an EVSE and EV that is an IES EG system shall be considered as an ESS for the purpose of these requirements, unless stated otherwise, and shall comply with all applicable requirements.

4.4.3 Inverter Power Sharing Device (IPSD)

This section shall specify that an IPSD shall be installed in accordance with AS/NZS 4777.1. Where a DNSP has additional requirements in relation to IPSD that are not included elsewhere they shall be included here.

4.4.4 Energy Storage Systems (ESS)

This section shall state that an ESS that provides a supplementary or alternative supply to the electrical installation is an IES EG system for the purpose of these requirements.

This section shall include any DNSP-specific requirements relating to ESS that are not included in other sections.

Where no specific ESS requirements apply, this section may be omitted.

4.5 Network Connection and Isolation

4.5.1 General

This section shall specify that network connection and isolation requirements shall be as per AS/NZS 4777.1.

In addition, this section may provide further specificity, including, but not limited to:

1. As a minimum, mechanical isolation shall be as per AS/NZS 3000 in that the isolator must always be readily accessible
2. Any means of isolation (where lockable) shall be able to be locked in the open position only.

Any requirements that are additional to AS/NZS 4777.1 and AS/NZS 3000 shall be clearly stated as such.

4.5.2 Backup Power

This section shall specify that an embedded generating system that is a multiple mode IES installation in accordance with AS/NZS 4777.1 that provides a substitute supply, alternative supply or independent supply shall be installed in accordance with AS/NZS 4777.1 and shall be certified by the CEC for this mode of operation.

This section shall include any requirements relating to IES used for backup power that are not included in the above.

4.5.3 Changeover Switches

This section shall specify any requirements relating to changeover switches, whether manual or automated, and shall include, as a minimum, the following:

1. Any device that transfers supply from the grid supply to an alternative supply shall comply with the requirements of section 5.3 in AS/NZS 4777.1
2. If an IES meets either of the following criteria it shall be considered to be an IES EG system for the purpose of these requirements:
 - a. An IES connected behind a make-before-break switch that results in a momentary, or longer, connection between grid supply and generation supply circuits when performing a changeover
 - b. A multiple mode inverter that is grid-connected but also supplies an off-grid circuit.
3. Any IES EG connected behind a break-before-make switch that isolates the changeover circuit when transferring between grid supply to generation supply will be considered as an off-grid system and is not an IES EG for the purpose of these requirements.

4.6 Earthing

This section shall specify that the earthing requirements shall include:

1. For IES, including EVSE capable of reverse power transfer, earthing requirements shall be as per AS/NZS 4777.1 and AS/NZS 3000
2. For ESS (excluding EVSE or EV), earthing requirements shall be as per AS/NZS 5139 and AS/NZS 3000
3. For PV systems, earthing requirements shall be as per AS/NZS 5033.

4.7 Protection

4.7.1 Inverter Integrated Protection

This section shall specify that inverter integrated protection requirements shall be as per AS/NZS 4777.1 and AS/NZS 4777.2 for small IES EG connections.

This section shall state the regional settings requirement as per AS/NZS 4777.2 as either Australia A, B or C setting and may reproduce Table 4.1 and 4.2 of AS/NZS 4777.2.

Where a DNSP has variations to the standard regional setting they shall list the circumstances where changes apply and nominate the parameters and values that apply.

4.7.2 Interface Protection

This section may state that interface protection is not required for a small IES EG connection.

Where there are cases where interface protection may be required, this section shall list those cases and shall include set points for voltage and frequency parameters in conformance with AS/NZS 4777.1.

4.7.3 Interlocking and/or Current Balance Protection

If the DNSP has requirements for interlocking when multiple single-phase inverters are connected to more than one phase, the requirements, and the circumstances in which they apply, shall be stated here.

If the DNSP has requirements for current balance protection where multiple single-phase inverters are connected to more than one phase, the requirements, and the circumstances in which they apply, shall be stated here.

If there are no requirements for interlocking or current balance protection for small IES EG connections this section may be omitted.

4.8 Operating Voltage and Frequency

This section may specify the operating voltage and frequency supply characteristics of the network.

This section shall specify that the nominated maximum voltage for sustained operation, $V_{nom-max}$, shall be as per the relevant Australia A, B or C setting specified in AS/NZS 4777.2.

This section shall also specify that the maximum allowed voltage rise between the point of supply from the grid and the inverter grid-interactive port shall not exceed 2% of the nominal voltage at the point of supply from the grid and shall be calculated in accordance with AS/NZS 4777.1 and any jurisdictional requirements for voltage rise calculation.

4.9 Power Quality

4.9.1 IES Power Quality Response Modes

This section specifies where power quality response modes are required as per AS/NZS 4777.2.

This section shall state the regional settings according to AS/NZS 4777.2 as either Australia A, B or C settings. If there are any variations or DNSP-specific requirements they shall be specified in this section.

This section shall state that for an ESS inverter the volt-watt and volt-var modes shall be enabled for charging and discharging through the grid-interactive port of the inverter in accordance with AS/NZS 4777.2.

This section may specify that where an additional small IES EG unit is being added to a site with an existing small IES EG connection that has legacy power quality settings, the DNSP may provide site-specific voltage response mode settings.

This section shall specify whether there are ramping requirements of the IES as per AS/NZS 4777.2, where a site generation limit is applied for generation control.

4.10 Communications Systems

Where DNSPs have communications systems requirements for small IES EG connections, this section shall specify the communications systems requirements that proponents should adopt for small IES EG connections with reference to other requirements.

This section may specify communications systems requirements for non-standard small IES EG connections.

Where the DNSP does not yet have any communications systems requirements for small IES EG connections, this section shall be retained, but noted as intentionally blank.

4.11 Data and Information

4.11.1 Static Data and Information

This section shall specify the static data and information that is required to be provided by the proponent to the DNSP as per Appendix D: Static Data and Information.

This section may specify the format and method for providing static data but shall not impose any additional communications systems requirements.

4.11.2 Dynamic Data and Information

This section may specify the requirements for communicating dynamic data and information between the proponent, the DNSP and any other bodies, which proponents shall adopt where communications systems are in place.

Where the DNSP does not yet have any communications systems requirements for small IES EG connections, this section shall be retained, but noted as intentionally blank.

4.12 Cybersecurity

Where DNSPs have communications systems requirements for small IES EG connections, this section shall specify the cybersecurity requirements including but not limited to:

1. Ensuring monitoring and communications devices are in lockable enclosures
2. Protection and control from the network systems (firewalls)
3. Privilege settings and password protection
4. Limiting access to only that which is required to monitor the generating unit.

This section may specify the relevant standards and documents relating to cybersecurity.

Where the DNSP does not yet have any communications systems requirements for small IES EG connections, this section shall be retained, but noted as intentionally blank.

4.13 Technical Studies

This section shall state that no technical studies are required to be carried out by the proponent or at the proponent's expense to enable connection to the distribution network for a small IES EG system.

This section may state that technical studies may be performed by the DNSP at the DNSP's cost.

4.14 Metering

This section shall not include any requirements for metering and shall be retained but noted as intentionally blank for DNSPs in jurisdictions subject to Chapter 7 of the NER.

This section may include requirements for jurisdictional metering for DNSPs in jurisdictions which are not subject to Chapter 7 of the NER.

5 Fees and Charges

This section shall specify fees and charges applicable to proponents and any jurisdictional requirements including, but not limited to:

1. The types of connection fees that shall be applied
2. Any ongoing charges applicable regarding the installation and operation of the generating unit while maintaining the connection to the distribution network and how these are determined
3. The fees payable and/or how the fees are determined
4. How the fees are to be paid by the proponent.

This section may provide hyperlinked website addresses with short descriptions where information is published separately on the DNSP's website

6 Testing and Commissioning

This section shall state that testing and commissioning shall be undertaken in accordance with AS/NZS 4777.1, AS/NZS 3000 and AS/NZS 5033 (where applicable), the equipment manufacturer's specifications, and the DNSP's technical requirements to demonstrate that the small IES EG system meets the requirements of the connection agreement.

This section shall specify that the tests shall be installation tests not type tests.

7 Operations and Maintenance

This section shall state that small IES EG systems should be operated and maintained to ensure compliance with their connection agreement and all legislation, codes, and/or other regulatory instruments at all times.

This section shall state that the DNSP may inspect small IES EG systems at any time at the DNSP's expense.

This section shall include any DNSP requirements relating to periodic testing or inspections, or compliance audits.

This section may also describe the general expectations for operating and maintaining small IES EG systems including, but not limited to:

1. Maintaining the electrical installation at the supply address in a safe condition
2. Ensuring that any changes to the electrical installation at the supply address are performed by an electrician lawfully permitted to do the work and that the customer holds a Certificate of Compliance issued in respect of any of the changes
3. Seeking DNSP approval prior to altering the connection in terms of an addition, upgrade, extension, expansion, augmentation or any other kind of alteration, including changing inverter settings
4. How the DNSP proposes to respond to non-complying small IES EG systems
5. Inverter replacement requirements.

Appendix A: Deviations from the National DER Connection Guidelines

This appendix shall include a register of all deviations from this technical guideline in the format provided in Table 1 with the title ‘Table of deviations from National DER Connection Guidelines for Small IES EG Connections version 3, ENA DOC 039-2026’.

Table 1 Table of deviations from National DER Connection Guidelines

Section	Description of deviation	Type of deviation	Justification
<i>{Section of this technical guideline document to which the deviation applies}</i>	<i>{High level description of the deviation}</i>	<i>{whether the deviation is to meet a jurisdictional requirement or is to promote improved benefits to Australia’s electricity system}</i>	<i>Justification {Either N/A where the deviation is to meet a jurisdictional requirement or provides link to justification documentation}</i>

Appendix B: Connection Arrangement Requirements

This appendix shall include:

1. Single line diagrams of the DNSP's preferred connection arrangements, and a range of other possible connection arrangements for integration of small IES EG connection, showing:
 - a. the connection point
 - b. the point of common coupling
 - c. the EG unit(s)
 - d. load(s)
 - e. meter(s)
 - f. isolation device.
2. A sample schematic diagram of the protection system and control system relevant to the connection of a small IES EG unit to the distribution network, showing the protection system and control system, and including:
 - a. All relevant current circuits
 - b. Relay potential circuits
 - c. Alarm and monitoring circuits
 - d. Back-up systems
 - e. Parameters of protection and control system elements.

Appendix C: Model Standing Offer

In jurisdictions subject to Chapter 5A of the NER, this section shall include the AER approved model standing offer for small IES EG connections.

In jurisdictions not subject to Chapter 5A of the NER, this section shall include an equivalent model offer used as the basis to form a connection agreement with proponents of small IES EG connections.

The model standing offer (or equivalent) shall be entirely consistent with the technical requirements document.

This section may provide hyperlinked website addresses with short descriptions where information is published separately on the DNSP's website.

Appendix D: Static Data and Information

This appendix shall include the static data and information that is required to be provided by the proponent to the DNSP, including as a minimum:

1. NMI meter numbers (10 digit)
2. DER Devices
 - a. Fuel source – primary {renewable/biomass/waste; fossil; hydro; geothermal; solar; wave; wind; tidal; storage}
 - b. Fuel source – descriptor {as per appendix 8 of the NEM Generator registration guide}
 - c. Make, model and manufacturer
 - d. Maximum capacity (kW or MW)
 - e. Storage capacity (kWh/MWh of available storage)
 - f. Installer
 - g. Whether the device is registered for ancillary service provision (Y/N)
 - h. Whether the device is part of an aggregated control (Y/N)
 - i. Whether the device is remotely controllable (Y/N)
 - j. Compliance with Australian Standards
3. Inverter
 - a. Make, model and manufacture
 - b. Whether the installer has changed the inverter default manufacturer settings (Y/N)
 - c. Maximum capacity (kW and kVA)
 - d. Date of installation
 - e. Compliance with Australian Standards
4. Inverter enabled modes of operation
 - a. Demand response modes enabled and enablement method
 - b. Power quality modes {power response (frequency control); voltage response (voltage-watt or voltagevar); Q (reactive power), PF (power factor); standalone}
5. Trip settings
 - a. Frequency trip settings {none, over-frequency, under frequency}
 - b. Voltage trip settings {none, over-voltage, under-voltage}

This has been prepared by Energy Networks Australia for the benefit of its members. A full list of member businesses is available at www.energynetworks.com.au/ena-members

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