PROCEDURE

Evoenergy small embedded generation technical requirements

Key summary points

- This document details the technical requirements for safely connecting small embedded generation systems to Evoenergy's low voltage network.
- It provides guidance to installers and proponents on the safe, compliant connection and operation of small embedded generation systems on Evoenergy's network.

Disclaimer

Whilst this document contains material relevant to the electricity industry legislation, codes of practice and standards, it is not intended to provide legal advice on how electrical contractors can meet their own statutory obligations or comply with legislation, codes of practice or industry standards such as AS/NZS 3000 (Wiring Rules). Whilst care has been taken in the preparation of this document, Evoenergy does not guarantee that the information contained in this document is accurate, complete, or up to date at time of publication. To the extent permitted by the relevant legislation Evoenergy will not be responsible for any loss, damage, cost or expense incurred as a result of any error, omission or misrepresentation in relation to the information contained in this document.

Note

Printed versions of this document are "uncontrolled copies" - the latest version is available on the Evoenergy website.

This document was previously titled Evoenergy Micro Embedded Generation Technical Requirements. Any other Evoenergy documents referring to the old title are referencing this document. Change from micro to small is in line with ENA templates and to avoid confusion with micro inverters and conflicting NER definitions.

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1 Introduction

1.1 About Evoenergy

Evoenergy own and operate the electricity and gas distribution networks in the ACT, providing electrical power to over 220,000 residential and business customers. The electricity network delivers this power through over 2,400 km of overhead lines, over 2,700 km of underground cables, over 50,000 poles and over 4,700 distribution substations across a geographical area of 2,358 square kilometres.

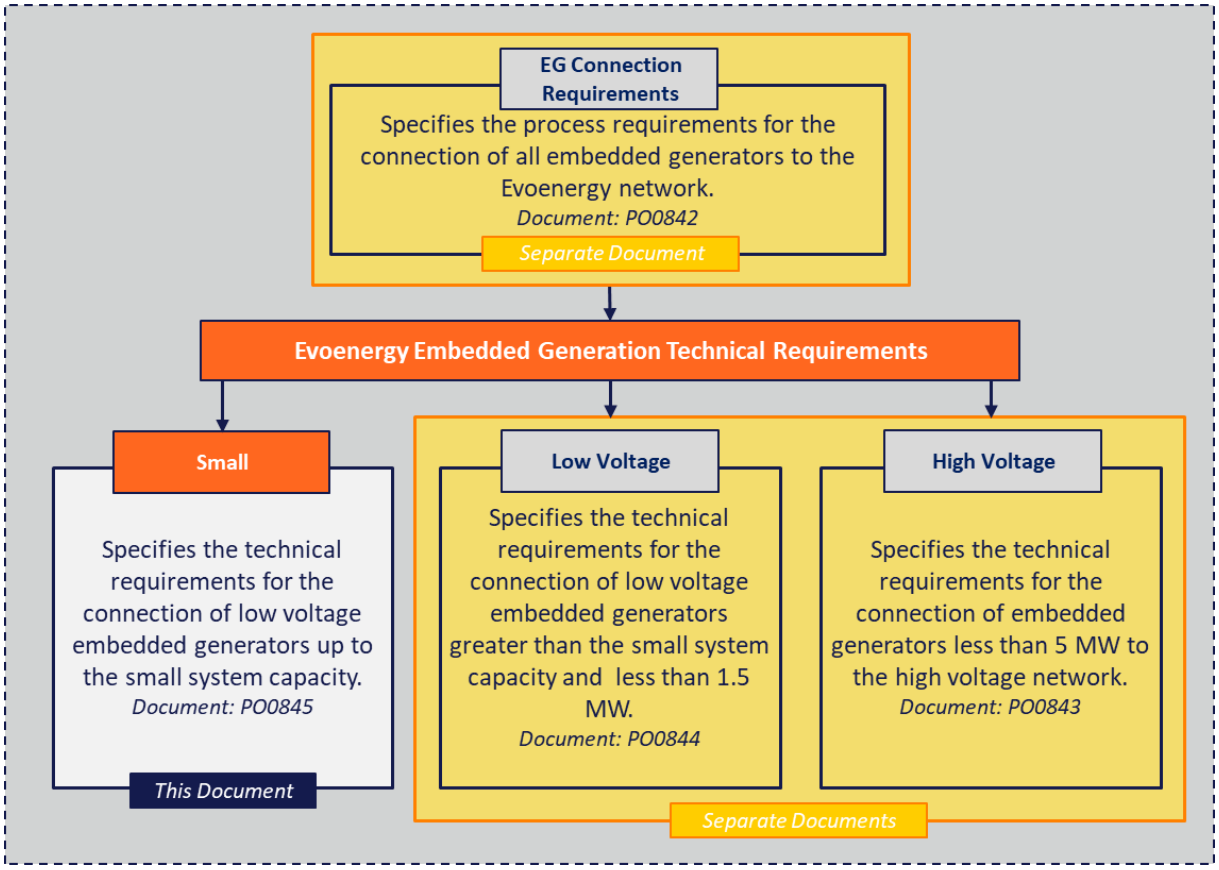
The Evoenergy network currently connects to more than 60,000 embedded generation systems, the majority of which are solar photovoltaic (PV) systems.

Evoenergy maintain and operate the network in compliance with relevant regulatory, technical and safety requirements. These requirements are adhered to in the long term interests of consumers particularly with respect to the price, quality, safety, reliability and security of the electricity supply system.

1.2 Scope and purpose

Evoenergy has developed these technical requirements to provide proponents of Small IES Embedded Generation Connections information about their obligations for connection to, and interfacing with, Evoenergy's low voltage distribution network. As outlined in Figure 1, this document is one of three documents defining the technical requirements for the connection of embedded generators to the Evoenergy network. These documents supersede the previous *Evoenergy Requirements for Connection of Embedded Generators up to 5MW to the Evoenergy Network (SM3201)* for the defined system capacities.

Figure 1. Evoenergy embedded generation document architecture



For the purposes of this document, a Small Embedded Generation System is defined as:

A small embedded generation system of the kind contemplated by AS/NZS 4777 with a total system capacity less than or equal to 30 kVA (excluding ESS), and a total system capacity less than or equal to 60 kVA (including ESS) that is:

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

All Small Embedded Generation Connections are subject to the requirements outlined in this document unless formally advised in writing by Evoenergy. These requirements are applicable to all new connections and modifications of existing systems where the system consists of an Inverter Energy System (IES), Energy Storage System (ESS) or combination of both including EVs and EVSE capable of reverse power transfer.

Embedded Generation Systems that are outside the scope of these requirements include:

- EG units covered by Evoenergy's Low Voltage Embedded Generation Connection Technical Requirements
- EG units covered by Evoenergy's High Voltage Embedded Generation Connection Technical Requirements
- Electric vehicles, unless the EV and EVSE are capable of reverse power transfer (in which case the requirements shall apply)
- Distributed energy resource systems that do not generate electricity, including demand response / demand management systems, unless they impact on the ability of the small EG system to meet the technical requirements
- Systems that are off-grid or operate in a non-parallel configuration

This document does not administer the eligibility for any feed-in-tariff or any other tariff. The requirements set out in this document shall be read in conjunction with the Evoenergy Service and Installation Rules which are located on the Evoenergy website.

This document contains technical requirements for the connection of small embedded generators to the Evoenergy network. Additional information regarding the connection process and associated timelines is available on the Evoenergy website.

1.3 Obligations

Embedded Generation Proponents and Evoenergy have certain obligations to ensure the purpose of these requirements is met. Proponents are required to:

- Comply with these technical requirements as well as relevant national standards, industry codes, legislation and regulations. In the event of inconsistency, legislation and regulations, followed by these technical requirements, followed by national standards and industry codes shall prevail
- Withhold from connecting additional inverters, undertaking system modifications or installing additional embedded generation units, including ESS, without prior written agreement from Evoenergy
- Maintain compliance with the Evoenergy Model Standing offer as detailed on the Evoenergy website
- Ensure the requirements are met with regard to the design, installation and operation of Small IES Embedded Generating systems

Evoenergy has an obligation to ensure the safe and reliable operation of the distribution system for operating personnel, customers and the general public.

1.4 Statement of compliance

This document complies with the National DER Connection Guidelines for Small IES EG Connections version 3, ENA DOC 039-2026 developed by ENA, with the exception of the deviations presented in Appendix A: Deviations from the National DER Connection Guidelines.

2 Definitions and abbreviations

2.1 Definitions

Table 1. Definitions

ACT Government – Electrical Inspectorate	The ACT Government Electrical Inspectorate is the inspecting authority in the ACT and is responsible for inspecting and approving the consumer's electrical installation *Contact number is (02) 6207 7775* *Email: electrical.inspections@act.gov.au*
Active power limiting	Where the electricity exported from an IES at the AC output terminals of the inverter(s) is limited below a defined threshold. See also Generation Limit.
Amp (A)	A unit of electrical current
Anti-islanding protection (Loss of mains)	A protection system to detect islanded conditions and disconnect the IES from the distribution network
Backup load	Any load to be supplied by an embedded generating unit during customer islanded mode
Basic Micro embedded generation connection	A connection between a distribution network and a retail customer's premises for a embedded generating unit of the kind contemplated by AS 4777, for which a model standing offer is in place.
Bi-directional metering	A meter capable of registering energy supplied to the premises and energy exported from the premises as separate data streams
Connection point	The agreed point of supply between the distribution network and the customer premises. This is generally at the consumer's main or distribution switchboard
Demand response	The alteration of an inverter's normal mode of operation in response to an initiating signal originating from or defined by a remote agent
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)
DRED (Demand response enabling device)	A device applying demand response signals to the inverter as documented in AS/NZS 4755.1
Embedded generation system	A system comprising of one or multiple embedded generating units. The system rating is defined based off the combined AC output nameplate rating of each generating unit
Embedded generating unit	A generating unit connected within a distribution network and not having direct access to the transmission network
Embedded Generation Point of common coupling	The point where embedded generation is connected to the customer's electrical installation. The point of common coupling shall have no upstream loads apart from those related to the embedded generation, such as batteries or power supplies for embedded generation control systems.

Embedded Network	Where an Embedded Network Manager manages the electrical connection of multiple child meters located behind a parent/gate meter.
Embedded Network Manager	The party responsible for managing an embedded network including the on sale of electricity to the end users.
Energy Source	Voltage or current source requiring conversion from one kind of electrical power to another kind suitable for connection to the electrical installation. E.g. battery energy storage, fuel cell, hydro turbine, photovoltaic or wind turbine.
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 The ESS rating is defined based off the total AC output nameplate rating of IES where batteries are the only energy source. Inverters with multiple energy sources (such as batteries and PV) will be counted towards the installed system capacity but will not be considered as ESS for the purposes of determining maximum system capacity.
Evoenergy	Evoenergy is the ACT's principal Distribution Network Service Provider (DNSP) and is responsible for the distribution of electricity to all customers within the ACT under a regulatory framework. Evoenergy designs, installs, upgrades, repairs and maintains the infrastructure which makes up the distribution network carrying electrical energy to ACT homes and businesses.
Export capacity	Combined power that all embedded generation 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 generation system to the distribution network. AS/NZS defines two types of export limitation function, namely (i) Hard limit: A limit that will require the IES to disconnect and (ii) Soft limit: A limit that will cause the IES to reduce its output, preventing ongoing export greater than the limit.
Export Limit Control	Function to limit the active power from an embedded generation system that can flow from an electrical installation towards the grid.
Export limiting device	Additional hardware installed to perform export limit control. This typically involves an export meter to monitor power flow at the utility connection point.
Generating unit	Plant used in the production of electricity (referred to as a 'production unit' in the NER), including ESS, EVs and EVSE capable of reverse power transfer (referred to in the NER as 'bidirectional units'), and all related equipment essential to its functioning as a single entity.
Generation	The production of electrical power
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 AS/NZS 4777.1 defines two types of generation limitation function, namely (i) Hard limit: A limit that will require the IES to disconnect and (ii) Soft limit: A limit that will cause the IES to reduce its output, preventing ongoing generation greater than the limit.

Generator	A person who owns, operates or controls a generating unit
High voltage (HV)	Any voltage greater than 1 kV AC
Hybrid inverter	An inverter which can simultaneously manage inputs from both solar panels and a battery, charging batteries with either solar panels or the electricity grid
Installed capacity	Combined nameplate rating of all IES installed at the consumer's premises. This may be equal to or greater than the export capacity.
Installer	For **IES** systems installed in ACT; a person who holds an unrestricted electrician's licence with Distributed Energy Resources (DER) endorsement. For **IES** systems installed in NSW; a person who holds an unrestricted electrician's licence and SAA accreditation.
Integrated Resource Provider	A person who is registered by AEMO as in Integrated Resource Provider.
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 Interface Protection was previously referred to as Central Protection. Any references to Central Protection in other Evoenergy documentation is referring to Interface Protection.
Inverter	A device that uses semiconductor devices to transfer power between a DC source(s) or load and an AC source(s) or load
Inverter energy system (IES)	An embedded generation 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
Islanding	Any situation where the electrical supply from the distribution network is disrupted and one or more IES maintains any form of electrical supply, be it stable or not, to any section of that distribution network
kVA	kilo-Volt Amp, product of voltage and current; a measure of apparent power (combined real and reactive power)
kVAr (Reactive power)	kilo-Volt Amp Reactive; the rate at which reactive energy is transferred. Reactive energy is integral in an alternating current system with inductive or capacitive components. Although it is not useful energy it assists in regulating the local system voltage
kW	kilowatt or 1000 Watts; the rate at which active or real (useful) energy is transferred

Low Voltage (LV)	The mains voltages as most commonly used in any given network by domestic and light industrial and commercial consumers (typically 230 V)
Market generating unit	A generating unit whose generation is not purchased in its entirety by a retailer (and receives payment for generation through the National Electricity Market or Wholesale Electricity Market)
Meter Protection Device (MPD)	A fuse or other protection and isolation device located on the unmetered side of the installation, intended for the isolation and protection of the meter and its associated customer installation
Micro embedded generation connection	Means a connection between a micro IES and a distribution network of the kind contemplated by Australian Standard AS 4777 (Grid connection of energy systems via inverters)
Small IES	Small inverter energy systems (IES) up to size limits as specified in this document.
Model standing offer	A document approved by the Australian Energy Regulator as a model standing offer to provide micro embedded generation connection services or standard 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
Negotiated connection	A connection of an embedded generation unit which is neither a micro EG connection or standard connection for which technical requirements are negotiated between the DNSP and proponent
Network	Evoenergy's distribution network
Point of supply	The junction of the installation's consumer mains with Evoenergy's low voltage distribution network, normally at a connection device (see Evoenergy service and installation rules)
Proponent	A person proposing to become a generator (the relevant owner, operator or controller of the generating unit ,or their agent)
Rated apparent power	Output apparent power of the generating unit, which is a product of the rated current and rated voltage.
Registered generator	A person who owns, operates or controls a generating unit that is connected to, or who otherwise supplies electricity to, a transmission or distribution system and who is registered by the Australian Energy Market Operator as a Generator under Chapter 2 of the National Electricity Rules
Retailer	The holder of a retailer authorisation issued under the National Energy Retail Law in respect of the sale of electricity
Service Protection Device (SPD)	The first protection device located on the network side or forming part of the connection point.
Single phase	Connected between the active of a phase and neutral

Single wire earth return	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 generation aggregator	A person who has classified one or more small generating units as a market generating unit
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 60kVA and meeting the requirements of this document, 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
Small registered generator	A generator who elects to register a generator with the Australian Energy Market Operator as a market generating unit who would otherwise be entitled to an exemption to register based on size
Standard connection	A connection service (other than a micro embedded generation connection service) for a particular class (or sub-class) of connection applicant and for which an Australian Energy Regulator approved model standing offer is in place or for which an equivalent model offer is in place in jurisdictions not subject to Chapter 5A of the National Electricity Rules
Stand-alone mode	A generating unit capable of stand-alone mode will have the ability to supply electricity to a section of the customer's installation when disconnected from the Evoenergy network.
Supply, alternate	A supply intended to maintain the supply in case of interruption to the normal supply to the premises, as defined in AS/NZS 3000 For example, a multiple-mode inverter which typically operates in grid connected mode but will swap to stand-alone mode during a network outage.
Supply, grid	Where an electrical installation is supplied with electricity from the electrical distribution network.
Supply, independent	A supply to an electrical installation that is not supplementary to a grid supply, as defined in AS/NZS 4777.1 Supply system intended to supply the functioning of an electrical installation or part thereof, as an islanded operation instead of the grid supply, whilst the grid supply remains connected to the electrical installation. For example, a stand-alone inverter with grid input.
Supply, Substitute	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
Supply, Supplementary	A supply intended to operate in conjunction with the normal supply to the premises, as defined in AS/NZS 3000 For example, an inverter operating in grid connect mode.
System Capacity	The combined AC output nameplate rating of all embedded generating units connected to the generator's electrical installation.

Technical requirements document	The document produced by each Distribuioon Network Service Provider setting out their requirements for proponents to enable a grid connection, to which these guidelines apply
Three phase	Connected to all phases and neutral (star) or connected between phases (delta)
Utilities Technical Regulation Team	The ACT Government team responsible for the technical administration of utility requirements and administration of the *Utilities (Technical Regulation) Act 2014*
Volt (V)	Volt; the measure of electrical potential

2.2 Abbreviations

Table 2. Abbreviations

AC	Alternating Current
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AS	Australian Standard
AS/NZS	A jointly developed Australian and New Zealand Standard
CBD	Central Business District
CEC	Clean Energy Council
CER	Consumer Energy Resource (or in some cases Clean Energy Regulator)
DC	Direct Current
DER	Distributed Energy Resource
DNSP	Distribution Network Service Provider
EG	Embedded Generation or Embedded Generating
ENA	Energy Networks Australia
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

MW	Megawatt
NEM	National Electricity Market
NER	National Electricity Rules
NMI	National Metering Identifier
PV	Photovoltaic
ROCOF	Rate of Change of Frequency
SAA	Solar Accreditation Australia
SCR	Special Connection Request
SWER	Single Wire Earth Return
UPS	Uninterruptable Power Supply
UTR	Utilities Technical Regulation Team

2.3 Terminology

To assist with the interpretation and application of the requirements specified in this document, the following instructional terms have been used:

- The word ‘shall’ indicates a mandatory requirement
- The word ‘may’ indicates a requirement that may be mandatorily imposed on the proponent

The word ‘should’ indicates a recommendation that will not be mandatorily imposed on the proponent.

3 Relevant Rules, Regulations, Standards and Codes

3.1 Evoenergy documents

Table 3 lists the relevant Evoenergy documents that shall be considered in the application of the Small EG technical requirements.

Table 3. Related Evoenergy documentation

Evoenergy Service and Installation Rules	Sets out the requirements and associated obligations and procedures for the safe, reliable and efficient connection of electrical installations to an electricity network
Evoenergy Connection Policy	Sets out the circumstances in which connection charges are payable and the basis for determining the amount of such charges. The policy has been prepared in accordance with the requirements in Chapter 5A of the National Electricity Rules (Rules) and the Australian Energy Regulator’s (AER’s) Connection charge guidelines for retail electricity customers, under Chapter 5A of the National Electricity Rules, version 1.0 (AER connection charge guidelines)
Evoenergy embedded generation connection requirements	Sets out the requirements of the connection application process for embedded generation.

3.2 Standards and Codes

There are a number of Australian and International Standards which specify technical requirements for network connections of generating units and performance requirements. These are outlined in Table 4.

Table 4. Related Australian and International Standards

Standard Number	Standard Name	Standard Type
AS 3011	Secondary batteries installed in buildings	Australian Standard
AS 4086	Secondary batteries for use with stand-alone systems	Australian Standard
AS 60034.1	Rotating electrical machines, Part 1: Rating and performance	Australian Standard
AS 60034.22	Rotating electrical machines, Part 22: AC generators for reciprocating internal combustion (RIC) engine driven generating sets	Australian Standard
AS 60038	Standard voltages	Australian Standard
AS 60044	Instrument transformers (multiple parts)	Australian Standard
AS/NZS 3000	Electrical installations (known as the Australian/ New Zealand Wiring Rules)	Australian/ New Zealand Joint Standard
AS/NZS 3008.1.1	Electrical installations - Selection of cables. Part 1.1: Cables for altering voltages up to and including 0.6/1 kV – Typical Australian installation conditions	Australian/ New Zealand Joint Standard
AS/NZS 4755.1	Demand response capabilities and supporting technologies for electrical products –Part 1: Demand response framework and requirements for demand response enabling devices (DREDs)	Australian/ New Zealand Joint Standard
AS/NZS 4777	Grid connection of energy systems via inverters (multiple parts)	Australian/ New Zealand Joint Standard
AS/NZS 5033	Installation and safety requirements for photovoltaic (PV) arrays	Australian/ New Zealand Joint Standard
AS/NZS 61000.4.3	Electromagnetic compatibility testing and measurement techniques – Power quality measurement methods	Australian/ New Zealand Joint Standard
AS/NZS IEC 60947.6-1	Low-voltage switchgear and control gear - Multiple function equipment - Automatic transfer switching equipment	Australian/ New Zealand Joint Standard

IEC 60255-12	Electrical relays - Part 12: Directional relays and power relays with two input energizing quantities	International Standard
IEC 60255-127	Measuring relays and protection equipment - Part 127: Functional requirements for over/under voltage protection	International Standard
IEC 60255-26	Electrical relays - Part 26: Electromagnetic compatibility requirements	International Standard
IEC 60255-27	Electrical relays - Part 27: Product safety requirements	International Standard
IEC 62109	Safety of power converters for use in photovoltaic power systems	International Standard
IEC 62116	Utility-interconnected photovoltaic inverters – Test procedure of islanding prevention measures	International Standard
IEC 62786	Distributed energy resources connection with the grid	International Standard
IEEE standard 1547-2018	IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems	International Standard
SA/SNZ TR IEC 61000.3.14	Electromagnetic compatibility (EMC), Part 3.14: Limits – Assessment of emission limits for harmonics, interharmonics, voltage fluctuations and unbalance for the connection of disturbing installations to LV power systems	AU/NZ Technical Report
SA/SNZ TR IEC 61000.3.15	Electromagnetic compatibility (EMC), Part 3.15: Limits – Assessment of low frequency electromagnetic immunity and emission requirements for dispersed generation systems in LV network	AU/NZ Technical Report

In the event of an inconsistency between the Evoenergy technical requirements, Australian standards, international standards and industry codes, the Evoenergy technical requirements shall prevail.

3.3 Legislation and Regulation

This section provides a list of the relevant legislation and regulations which shall apply to the design, manufacture, installation, testing, commissioning, operations and maintenance of all plant and equipment for Small EG connections to the Evoenergy distribution network.

- Electrical Safety Act 1971
- Electrical Safety Regulation 2004
- Utilities Act 2000
- Utility Networks (Public Safety) Regulations 2001
- Utilities (Technical Regulation) Act 2014
- Electricity Feed-in (Renewable Energy Premium) Act 2008
- Electricity Feed-in Code 2020
- Electricity Service and Installation Rules Code Determination 2013
- Electricity Network Boundary Code Determination 2013
- Electricity Distribution Supply Standards Code Determination 2013
- Work Health and Safety Act
- Work Health and Safety Regulation
- National Electricity Rules (Chapter 5A)

In an event where there is any inconsistency between legislation and regulations and these technical requirements, the legislation and regulations 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

To assist proponents in the clear identification of what technical requirements that are applicable to a specific system, Evoenergy have defined several sub-categories. The definitions for each subcategory are outlined in Table 5.

For the purpose of this document ESS shall be defined as any inverter where batteries are the only generation source. Inverter ratings are taken as the inverter AC rating as listed on CEC list of compliant inverters and power conversion equipment.

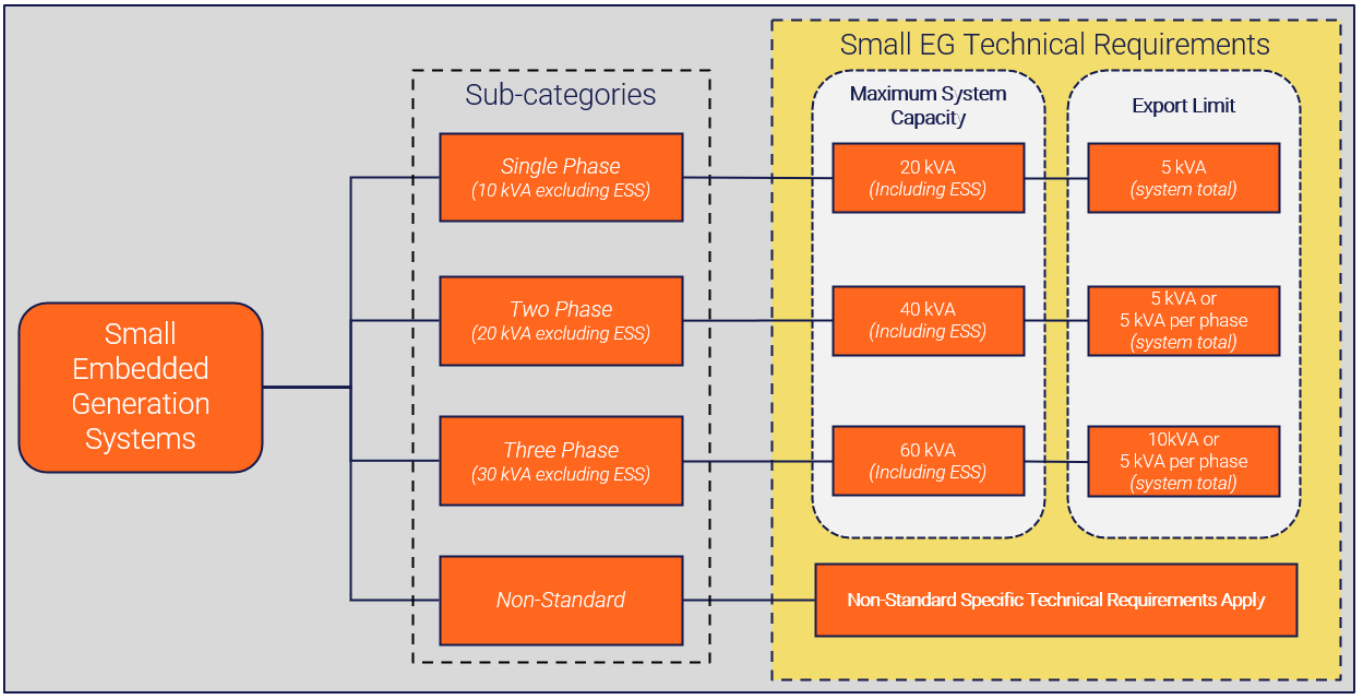
Table 5. Subcategory definitions

Single Phase	Any small IES EG system for a site with a single-phase network connection
Two Phase	Any small IES EG system for a site with a two-phase (or split phase) network connection
Three Phase	Any small IES EG system for a site with a three-phase network connection
Non-Standard	Any small EG system connecting to a non-standard part of the network including (but not limited to) SWER networks, isolated networks, and CBD networks

There are currently no geographical network restrictions on the Evoenergy distribution network that require a non-standard system classification. If future network conditions result in non-standard geographical locations, the information clearly identifying these areas will be provided on the Evoenergy website.

The relationship between the sub-categories and the associated technical settings is displayed in Figure 2.

Figure 2. Subcategory hierarchy



4.2 Maximum system capacity

This section specifies the maximum system capacity of the Small IES EG connections for each sub-category.

The system capacity is to be measured at the connection point, usually the retail meter. In cases where multiple small IES EG systems are connected to separate premises within an embedded network, Evoenergy may choose to assess the system capacity at the child meter location. Please refer to Evoenergy Embedded Generation Connection Requirements PO0842 for more information.

In some situations, embedded generation is connected to multiple places within a customer's electrical infrastructure or added in multiple stages. Evoenergy looks at the total connected system capacity when determining the fees and technical requirements that will apply.

Table 6. Maximum system capacity for each subcategory

Sub Category	Inverters with connected PV (including hybrid inverters with PV) Maximum Capacity	Total of all inverters (including PV, ESS, EVSE, etc) Total Maximum Capacity
Single Phase	10kVA	20kVA
Two Phase	20kVA	40kVA*
Three Phase	30kVA	60kVA*
Non-Standard	As there are currently no geographical areas requiring non-standard systems for connection to the Evoenergy network this limit shall be specified on a case by case basis	

*Note - If there is an IPSD as part of the installation, the maximum capacity for all inverters is 30kVA. More information can be found in section 4.4.3.

All columns in Table 6 must be met. In some cases generation limits may be used to meet the values listed in this table. More information can be found in section 4.3.1.

For multiple-phase connections, the phase balancing requirements in section 4.2.1 shall also apply.

Evoenergy considers the system capacity based on the connection point to our network, usually the retail meter.

4.2.1 Phase balancing

The design of a multiple-phase IES EG system should aim to keep the output at the grid connection point as balanced as possible. It is recommended wherever possible to use three phase products for new installations at a three phase property.

Multiple phase IES EG systems shall meet the requirements of this section which allow phase balance to be achieved with any of the methods listed below.

1. Limit the capacity of single phase inverters on each phase to 5kVA or less.
    a. Generation limits may be used to meet these limits if they meet the requirements in section 4.3.1
2. Or implement current balance protection across all available phases, for all single phase inverters exceeding 5kVA per phase as per section 4.7.3
3. Or implement export controls to prevent >5kW export on any individual phase at all times. You may need to provide evidence your selected inverter(s) are capable of this.

For example:

Table 7. Phase Balance Examples

Scenario (Three Phase Supply)	Preferred Solution
5kVA single phase PV inverter and, 5kVA single phase battery only inverter, on the same phase	3. one of the inverters implements a per phase export limit
10kVA single phase hybrid PV and battery inverter	3. inverter implements a per phase export limit or, 1. generation limit of 5kVA is programmed[#]
3x 10kVA single phase inverters (one per phase)	2. current balance protection enabled or, 3. all inverters implement a per phase export limit
2x 10kVA single phase inverters (one per phase)*	3. all inverters implement a per phase export limit
groups of micro inverters >5kVA per phase (spread across all phases)	2. current balance protection enabled

*Current balance protection is not permitted in this case as the third phase will be out of balance.

[#]Generation limits may apply in any scenario, but are only listed above in scenarios where they are common. They are conditional on meeting the requirements in section 4.3.1. and are only recommended for existing installations. If installing a new inverter, the designer should select an inverter that does not require a generation limit, such as a three phase model, or one with a rating matching the generation limit.

4.2.1.1 Phase connection

Single phase inverters installed in multi phase installations shall be balanced across available phases as much as possible, in line with the requirements in Table 8. PV and ESS shall be on the same phase to maximise charging from PV. Evoenergy may direct inverters (or DC items) to be installed in a specific phase arrangement as part of the approval process. Increased capacity for backup power is not considered as a valid design justification for an unbalanced IES.

Single phase IES with PV connected shall be installed on the phase with the lowest recorded voltage. The voltage shall be recorded with all generating units switched off. The installer must take phase to neutral voltage measurements of all available phases prior to installing the EG system and record these measurements and inverter phase connection as part of the commissioning information supplied to Evoenergy.

Table 8. Phase Connection Requirements

Scenario (Multi Phase Supply)	Requirement
single phase inverter with PV connected	Phase with lowest voltage
2-3 single phase inverters with PV connected	Largest inverter on phase with lowest voltage Next largest on different phase with next lowest etc.
4+ single phase inverters with PV connected *	Phase arrangement to give the lowest possible difference in generation capacity between any two phases. Phase with highest inverter rating to be the one with lowest voltage, etc.
Single phase battery only inverter	Phase with largest PV inverter
2-3 single phase battery only inverters	Largest inverter on phase with largest PV inverter Next largest on different phase with next largest PV inverter etc.
4+ single phase battery only inverters*	Phase arrangement to give the lowest possible difference in ESS capacity between any two phases. Phase with highest ESS inverter rating to be the one with highest generation, etc.

*For sites with two phase supply, these requirements apply where there is 3+ inverters.

Where installing a new three phase inverter would trigger the need for an export limit, and there is an existing single phase inverter on site, it is recommended to apply the export limit to the existing single phase inverter rather than the new three phase inverter. Proponents may be asked to provide design justification if proposing an export limit for a three phase inverter where there are fully exporting single phase PV inverters as part of the same installation.

4.3 Generation control

Small IES EG connections require generation control.

4.3.1 Site generation limits

It is recommended wherever possible to obtain an inverter of the correct size that does not require a generation limit. However, it is noted that in some situations this may not be practical.

Evoenergy does allow soft generation limits to be used for replacement systems to be considered like-for-like, such as with the replacements of fixed feed in tariff systems as detailed in section 7.1 Feed in Tariff (FiT) Replacements.

Evoenergy does allow the use of soft generation limits to meet size limits relating to total system capacity, or phase balance limits if the applicant can confirm the following:

- An inverter of the appropriate size is not available from the preferred manufacturer for sale in Australia, or the inverter has previously been approved by Evoenergy to be installed at this property.
- And the size of PV panels connected to the inverter does not exceed 1.4x the generation limit setting, unless a DC battery is connected to the same inverter, or adequate design justification is provided.

For example: a single phase customer already has a 6kVA single phase PV inverter and wishes to install another PV inverter on the same phase. A 5kVA inverter is proposed with a generation limit of 4kVA to meet the 10kVA single phase size limit. In this case a generation limit may be used if the preferred manufacture does not make 4kVA inverters, and 5.6kW panels or less are connected to the new inverter.

If a generation limit is to be used for any other purpose as part of a small IES, special approval must be sought from Evoenergy as per PO0842 clause 4.6 and may not be granted.

If a generation limit is a condition of your approval, evidence of the generation limit shall be provided with the commissioning form, such as a photo or screenshot of the setting.

4.3.2 Export limits at connection point

This section specifies the static export limits for small IES EG connections against each subcategory. These limits are defined in Table 7. Please note that embedded network managers and/or owners corporations may impose lower export limits for customers connected to an embedded or shared network.

Export limits are specified at the connection point, consistent with AS/NZS 4777.1 (3.4.8.2.3). Where multiple inverters are installed behind the connection point, they must be configured so that the connection point export limit requirements are met.

For multi-phase sites proponents may choose either:

1. an aggregate export limit calculated as a sum of kW on each phase. Aggregate export limits are covered by AS/NZS 4777.2 series and can be achieved by all inverters complying to this standard.
2. or a per phase limit where export is managed on each individual phase. If choosing this option, export limit devices shall be set to reduce generation when export exceeds 5kW on any phase. This includes battery systems that may export on one phase to offset a load on a different phase. The proponent may need to provide evidence that the inverter is capable of per phase export control.

Multiple-phase small IES EG connections shall also be balanced in accordance with section 4.2.1.

Table 9. Export limits

Sub Category	Static Export Limit
Single Phase	5 kW
Two Phase	5 kW or 5 kW per phase
Three Phase *	10 kW or 5 kW per phase
Non-Standard	*defined on a case by case basis*

*At a three phase site, inverters need to be connected to all phases in order to use the aggregate 10kVA limit. If inverters are only connected to one or two phases, and per phase export limit is not possible, then a 5kW aggregate limit will apply.

Export limitation shall be achieved through the use of an export limiting device; details of the configuration shall be provided on the single line diagram submitted to Evoenergy. The export limiting functionality shall be of the “soft” limitation type as defined in AS/NZS 4777.1.

In order to implement a per phase export limit, three phase inverters are permitted to use a current imbalance mitigation mode that does not conform to the requirements of AS/NZS 4777.2 section 2.11 current balance for three phase inverters,

The export limit is to be interpreted 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. Scenarios where inverter power output may need to be constrained include, but are not limited to:

- Where power quality response modes are in operation.
- Emergency backstop events
- Planned outages, or abnormal grid configuration
- Use of generators, such as to prevent a prolonged outage

Please note, where there is 5kVA or less of inverters installed per phase (for example a three phase 15kVA inverter), this is considered as meeting option 2, and an export limit will not be required.

If export above the limits listed above is desired, then an application can be made for an LV EG system which includes an individual export assessment (fees apply). This assessment may determine a higher level of export is not possible.

Where export limitation settings can be changed via a keypad or switches, adequate security must be employed to prevent any tampering / inadvertent / unauthorised changes. Suitable locks or a password system shall be used.

For small embedded generation connections undergoing modification, Evoenergy may allow the proponent to maintain the previously approved export limit (which may be per phase). If any addition is proposed, the export limit shall comply with our current requirements which may be lower than the previously agreed limit.

4.3.3 DER management

4.3.3.1 Advanced DER management

Evoenergy does not currently offer dynamic or flexible export options for small IES EG systems.

Evoenergy may request manufacturers to remotely update inverters to agreed settings, or newer versions of Australian Standards.

4.3.3.2 Emergency DER Management

Evoenergy does not currently have requirements for an emergency backstop mechanism. This document will be updated once requirements are finalised.

4.3.4 Import limits for ESS

ESS shall manage import in line with our service and installation rules, particularly the section on Balancing of load. The proponent shall assess if a service upgrade is required and make a separate application for this if applicable.

4.4 Inverter energy system

4.4.1 General

The IES shall comply with the following general requirements:

- shall be tested by an authorised testing laboratory and be certified as being compliant with AS/NZS 4777.2 with an accreditation number
- IES shall comprise inverters that are registered with the CEC as grid-connect or multiple mode inverters approved for the mode(s) of operation in which they are to be used (alternative supply, supplementary supply, substitute supply or independent supply).
    - Stand-alone inverters with grid input will need to meet the relevant sections of this document and shall comprise of inverters that are tested by an authorised testing laboratory and certified as being compliant with IEC 62116 for active ant islanding protection as per AS/NZS4777.2
- shall have generation sources in line with the CEC listing.
- shall comprise of inverters installed in compliance with AS/NZS 4777.1

Where inverter serial number(s) are not visible without removing covers, a permanent label will be attached to the outside cover of the inverter clearly indicating the serial number. Appropriate label type will be selected to withstand degradation from weather. This does not apply to micro inverters mounted on or adjacent PV panels.

Small embedded generators shall not be energised without the correct metering arrangement in place. The consumer shall contact the retailer to ensure metering requirements for grid connected IES installations are fulfilled prior to energising the system.

4.4.2 Electric Vehicles

EVSE and EVs shall be considered an IES EG System where they are:

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

An EVSE and/or EV that is an IES EG system shall be considered as 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)

IPSDs shall be installed in accordance with AS/NZS 4777.1. The proponent must clearly show all possible points of connection on the SLD, and provide a list of all NMIs where it may be connected.

If an installation includes an ISPD, the total inverter rating (including inverters not connected to the IPSD) must not exceed 30kVA. Systems larger than this need to be applied as LV systems due to the requirement for interface protection. This size calculation is based on all inverters connected behind a point of entry, which may include multiple NMIs and multiple buildings on a single block.

4.4.4 Energy Storage Systems (ESS)

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

4.5 Network connection and isolation

4.5.1 General

Network connection and isolation requirements shall be as per AS/NZS 4777.1. As a minimum, mechanical isolation shall be as per AS/NZS 3000 in that the isolator must always be readily accessible. Any means of isolation (where lockable) shall be able to be locked in the open position. Where an ESS and IES are physically integrated, the isolation switches and isolation arrangements shall also comply with AS/NZS 5033.

There shall be an isolation method available for Evoenergy to ensuring the IES EG system is disconnected from the distribution network for all residential and commercial systems. The method of isolation shall:

- be safely accessible to Evoenergy personnel at all times.
- The location shall not be located behind residential fences, or inside residential buildings/garages and shall always be kept clear.
    - For commercial sites, access arrangements through fences or into buildings shall be documented on the site plan.
    - If access is obstructed, the embedded generator shall remove the obstruction or relocate the method of isolation.
- The isolation switch may be stand alone, or part of a distribution board, and shall not disconnect any loads not associated with the generation plant.
- The isolation point shall be clearly identified with permanent weatherproof labelling.
    - If not located in or adjacent the metering panel, labelling will be attached at the metering location describing where the embedded generation isolation point is located.
    - If more than one switch is required to isolate the IES EG system (e.g. a multiple inverter installation) the switches will all be labelled with the total number of switches. E.g. “EG isolation point 1 of 3”.

In the case where premises, such as townhouse complexes, are supplied by the same service cable to connect several consumers via dedicated service fuses, links and metering equipment located at the point of common coupling (PCC), the inverter main switch may be installed at the individual consumer’s residence. This isolation switch must be located in an accessible location that is external to the residence.

If the requirement for access as specified in this section cannot be achieved, special approval for the connection of the IES shall be sought from Evoenergy via the contact details on the Evoenergy website, or as part of the SCR application process.

4.5.2 Backup power

An IES EG 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.

Where an inverter model requires a gateway device to operate as a multiple mode inverter, and can be installed as a grid connect inverter without the gateway device, CEC may not list the inverter as multiple mode on the approval list. In this case the proponent may be asked to provide a letter from CEC stating that the inverter and gateway combination has been assessed as meeting the requirements of a multiple mode or alternate supply installation.

In addition to Evoenergy approval, the following conditions must also be satisfied:

- Embedded generating unit is electrically disconnected from the distribution network, either manually or as the result of automatic disconnection from a loss of supply, prior to becoming a customer island
- Reconnection of the customer island to the distribution network must not occur until the network supply has been fully restored and stabilised such that synchronisation from within the generator's installation can occur
- The islanded embedded generating unit must only supply the generator's installation, or a section of the generator's installation (backup loads), which have also been electrically disconnected from the distribution network
- The disconnection point and any backup loads must be clearly identified on the SLD

Generators with stand-alone inverters that do not connect to the Evoenergy network do not require approval from Evoenergy. Stand-alone inverters with grid input must meet the following conditions:

- The islanded embedded generating unit must only supply a section of the generator's installation (backup loads), which have been electrically disconnected from the distribution network
- The disconnection point and any backup loads must be clearly identified on the SLD

4.5.3 Changeover switches

This section specifies requirements relating to changeover switches, whether manual or automated.

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.

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:

- An IES connected behind a make-before-break switch that results in a 400ms, or longer, connection between grid supply and generation supply circuits when performing a changeover
- A multiple mode inverter that is grid-connected but also supplies an off-grid circuit.

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

The earthing requirements shall be as follows:

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

4.7 Protection

4.7.1 Inverter integrated protection

Inverter integrated protection requirements shall be as per Australia A settings in AS/NZS 4777.1 and AS/NZS 4777.2 for small IES EG connections.

In the case of additions to the system, or replacement of any inverter, all existing inverters shall be brought as close as possible to the inverter integrated protection settings as listed below, and have power quality response modes programmed as close as possible to those listed in section 4.11.1. This may require firmware updates, or other reprogramming of existing inverters. The proponent shall advise Evoenergy when changing settings, if any of the below settings are unable to be met by the existing inverters.

At any time, inverter integrated protection settings may be changed to our currently listed requirements. If one setting is changed, all settings shall be brought as close as possible to the currently listed requirements, including power quality response modes. Evoenergy shall be notified of any changes to inverter integrated protection settings or power quality response modes, so records can be updated including those in the AEMO DER register.

Where small embedded generating units can be remotely accessed by the manufacturer to adjust the inverter settings, we may direct the manufacturer to remotely adjust inverter settings to comply with these technical requirements. Inverter integrated protection shall be as per AS/NZS 4777.1 and AS/NZS 4777.2 for Small embedded generators. Passive anti-islanding protection set points are defined in Table 10.

Table 10.Passive anti-islanding inverter protection set-point values (As per AS/NZS 4777.2 section 4.4 Australia A)

Protective function	Protective function limit	Trip delay time	Maximum disconnection time
Undervoltage (V<<)	70 V	1 s	2 s
Undervoltage (V<)	180V	10s	11s
Overvoltage (V>)	265 V	1 s	2 s
Overvoltage (V>>)	275 V	-	0.2 s
Under-frequency (F<)	47 Hz	1 s	2 s
Over-frequency (F>)	52 Hz	-	0.2 s

Active anti-islanding protection shall be implemented as per section 4.3 of AS/NZS 4777.2 and shall operate the automatic disconnection device within two (2) seconds of disruption to the power supply from the grid.

Limits for sustained operation shall be enabled as per section 4.5 of AS/NZS 4777.2 using Australia A set points.

4.7.2 Interface protection

Interface Protection is not required for small EG systems.

4.7.3 Interlocking and current balance protection

Where any phase at a multi-phase site has more than 5kVA single phase inverters connected, current balance protection may be required to meet the phase balance requirements of section 4.2.1. Where required current balance protection shall be implemented with a limit of 21.7A in accordance with Clause 5.2 of AS/NZS 4777.2:2020 across all three phases.

4.8 Operating voltage and frequency

The nominated maximum voltage for sustained operation, Vnom-max, shall be as per the Australia A, setting specified in AS/NZS 4777.2.

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.

4.9 Power quality

The National Electricity Rules & Utilities (Electricity Distribution Supply Standards Code) Determination 2013 place certain responsibilities on Evoenergy for maintaining the quality of supply within the network. Evoenergy are responsible for adhering to relevant jurisdictional based regulations and licence conditions regarding power quality parameters including:

- Network Voltage Control
- Voltage Fluctuations and Step Voltage
- Harmonics
- Voltage Balance

The Small EG connection shall not adversely impact Evoenergy's ability to meet these requirements and shall comply with the applicable power quality requirements as well as relevant state based regulations and licence conditions.

4.9.1 IES power quality response modes

All IES small embedded generating units shall comply with section 3.3 of AS/NSZ 4777.2 Inverter power quality response modes. 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.

All IES small embedded generating units shall have volt-watt power quality response enabled as per AS/NZS 4777.2 Clause 3.3.2.2 with the Australia A settings detailed in Table 11.

Table 11.Volt-watt response

AS/NZS 4777.2 Reference	Voltage	Generation Power Level (% rated power)
V1	253 V	100%
V2	260 V	20%

In addition, small IES generating units with energy storage shall have volt-watt power quality response enabled as per AS/NZS 4.777.2 Clause 3.4.3 with the Australia A settings detailed in Table 12.

Table 12.Volt-watt response

AS/NZS 4777.2 Reference	Voltage	Charging Power Level (% rated power)
$V1_{ch}$	207 V	20%
$V2_{ch}$	215 V	100%

In addition, IES small embedded generating units shall have volt-var power quality response enabled as per AS/NZS 4777.2 Clause 3.3.2.3 with the Australia A settings detailed in Table 13.

Table 13.Volt-var response

AS/NZS 4777.2 Reference	Voltage	Var Level (% of rated VA)
V1	207 V	44% Leading/Supplying
V2	220 V	0%
V3	240 V	0%
V4	258 V	60% Lagging/Absorbing

The ramping requirements for IES power quality response modes shall be the default values specified in AS/NZS 4777.2, regardless of is a generation limit is applied for generation control.

In some cases, Evoenergy may request alternate settings be enabled, including application of fixed power factor, for specific installations and will communicate these to proponents upon receiving a connection application.

Proponents should ensure that power quality settings are uniform across systems with multiple inverters. The replacement of inverters, including warranty replacements, shall be configured to have power quality response modes enabled. IES power quality response modes and settings shall not be altered to settings other than those listed in this document, without written approval from Evoenergy.

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, if possible, the existing inverters should be updated to the settings listed in this document. If you are updating the settings of existing inverter(s) please indicate this in a note on your application.

4.10 Communication systems

Evoenergy do not currently mandate communication requirements for Small embedded generators. However, Evoenergy do engage in demand management programs that are implemented through third party aggregators. More information regarding these programs can be found on the Evoenergy website. Evoenergy may also direct manufacturers to perform remote updates to inverter settings.

4.11 Data and information

4.11.1 Static data and information

The static data and information required to be provided by the proponent to Evoenergy is specified in *Appendix D: Static Data and Information*.

This shall be provided via an SCR application on the Evoenergy DER portal.

4.11.2 Dynamic data and information

As outlined in Section 4.12 Evoenergy do not currently mandate the requirement for dynamic data and information for Small embedded generators.

4.12 Cyber security

As outlined in Section 4.12 Evoenergy do not currently mandate communications for Small embedded generators and therefore do not specify cyber security requirements.

4.13 Technical studies

Technical studies are not 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. Technical studies may be performed by the DNSP at the DNSP's cost.

5 Fees and charges

All fees and charges relating to network services and tariffs are located on the Evoenergy website.

Small IES EG systems compliant with the requirements specified in this document are considered as Class 1 systems for the purposes of fees and charges.

6 Testing and commissioning

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. These tests shall be installation tests, not type tests.

The installation shall also be approved for connection by the ACT Government Electrical Inspectorate and the completed Certificate of Electrical Safety shall be included in the IES manual.

The proponent shall submit commissioning information to Evoenergy via the Evoenergy DER portal as specified in *Appendix D: Static Data and Information*.

7 Operations and maintenance

The Small IES EG system shall be operated and maintained to ensure compliance with the connection agreement (model standing offer) and all legislation, codes and/or other regulatory instruments at all times.

Evoenergy may inspect small IES EG systems at any time, at the expense of Evoenergy.

The generator shall be responsible for the following:

- Maintaining the electrical installation at the supply address in a safe condition
- 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
- Seeking Evoenergy approval prior to altering the connection in terms of an addition, upgrade, replacement, extension, expansion, augmentation or any other kind of alteration, including changing inverter settings
- Perform periodic verification of the system every five years for systems >30kVA as per the Evoenergy periodic inverter test procedure. The test declaration and test records forms can be accessed via the Evoenergy website. The consumer shall maintain records of periodic tests and provide Evoenergy with a copy of the test results.

In the event a system is deemed to be non-compliant, Evoenergy may contact the installer, installation company and/or generator in addition to the ACT Electrical Inspectorate and request that the system is rectified within a specified timeframe. If the generator fails to adequately address the non-compliance within the timeframe, Evoenergy will take steps to have the system disconnected from the network to ensure its obligations regarding the safe and reliable operation of the distribution system for operating personnel, customers and the general public are met. This process may vary depending on the severity of the safety risk posed by the system.

Evoenergy may review data from the Clean Energy Regulator regarding STC claims, and inform them of installations making claims without the required distributor approval or other non-compliance issues.

7.1 Replacements

A replacement is considered like-for-like if the AC rating and DC rating of the replacement system is not increasing. If either the AC or DC rating is increasing, it is instead considered as an addition. The manufacturer and model number of new products may be different and still considered as a life-for-like replacement. All replacements require approval from Evoenergy, however like-for-like replacements will be processed for free.

It is preferred that any replacement products will be current on the CEC approval lists and meeting current versions of Australian standards and these technical requirements. If an older product is being proposed as part of a warranty replacement, the exact model number must be matching what was previously installed, and it must be programmed as close as possible to these technical requirements. The proponent shall specify any requirements that can’t be met in their application.

7.2 Feed in Tariff (FiT) Replacements

In the event of an inverter failure for a system with a fixed feed in tariff the generator shall replace the inverter with a compliant inverter with a generating capacity less than or equal to the failed inverter in accordance with the *Electricity Feed-in (Renewable Energy Premium) Act 2008*.

Where for technical reasons a “like-for-like” inverter compliant with the Electricity Feed-in *(Renewable Energy Premium) Act 2008* is not available, Evoenergy may consider an appropriately sized replacement inverter with a generation limit enabled as per requirements of section 4.3.1. The generation limit must be set to be the same or less than the rating of the existing approved inverter capacity for the IES.

Panel replacements shall always be strictly the same size or less in order to continue receiving the premium rate.

Where the existing FiT system is using single phase inverter(s) and is unable to meet the export and/or phase balance requirements in this document, you may be required to replace a single phase inverter with an equivalently sized three phase inverter. This does not impact the eligibility for the premium rate.

Where removal of a FiT system is proposed, customer written consent must be attached to the SCR application stating:

- they understand faulty FiT systems can be replaced like for like,
- and they understand both a FiT and net system can be installed at the same time,
- and they understand they will stop being paid the premium rate.

8 Version control

Version	Details	Updated
1.0	Initial release version	W. Cleland – Asset Standards Mgr
1.1	Minor adjustment for final release	W. Cleland – Asset Standards Mgr
1.2	Updated connection diagrams	W. Cleland – Asset Standards Mgr
1.3	Template change	W. Cleland – Asset Standards Mgr
1.4	Volt Var/Watt – V1; 216 to 207	W. Cleland – Asset Standards Mgr
2.0	Changes to Section 4.5 Update document number from SM5061 to PO0845	W. Cleland – Asset Standards Mgr
2.1	Update to figures for change of document numbering	M Lloyd – Customer Technical Services Manager
2.2	Placed phase connection and earthing clauses back into document	M Lloyd – Customer Technical Services Manager
2.3	• Definition updates • Update inverter setting to match AS/NZS 4777.2:2020 • Included information regarding embedded networks • Included additional requirements around the phase connection of ESS • Update of example SLDs including export limit devices and a gross system example. • Clearer requirements for static data including SLDs • Other minor changes	B Harvey – Market Transactions Manager
2.4	• Change Customer Islanded mode to stand alone mode. • Added requirements for stand-alone inverters with grid input. • Reduced the maximum system size of three phase systems to 30kVA inclusive of battery inverters. • Updated SLD examples.	B Harvey – Market Transactions Manager (26/09/2022)
3.0	• Renamed document from Micro to Small. • Updated definitions, including licencing requirements. • Added information about when Inverter integrated protection is updated. • Added clarifications for when generation limits can be used. • Added clarifications about phase balance. • Removed SLD requirement for replacements.	B Harvey – Market Transactions Manager

3.1	• Updates to meet AS/NZS4777.1:2024 • Increased size limits for ESS • Changes to phase balance, especially the use of single phase inverters at three phase sites • Added the option of an aggregate export limit instead of per phase	B Harvey – Market Transactions Manager
4.0	• Major revision to match updated ENA guideline. • Addition of per phase export limits as an option to manage phase balance. • Changing size limits to be aggregate instead of per phase.	B Harvey – Market Transactions Manager
4.1	• Changed the periodic inverter testing to only apply to systems >30kW • Minor clarification added to section 4.2 to address confusion with previous wording.	B Harvey – Market Transactions Manager

9 Document control

Document owner	Document custodian	Published date	Review date
Group Manager Customer Delivery	Embedded Generation Team Lead	30/10/2026	30/10/2029

Appendix A Deviations from the National DER Connection Guidelines

Table 14.Deviations from the National DER Connection Guidelines

Section	Description of Deviation	Type of Deviation	Justification
Introduction	Addition of subsections	Administrative	To improve ease of understanding and clearly state the context, scope, purpose obligations and compliance relevant to this document
Introduction	Three phase systems up to 60kVA are permitted	Promote improved benefits to Australia's electricity system	To allow for battery additions to existing PV systems. PV inverter capacity remains limited at 30kVA in line with ENA guide.
Definitions and Abbreviations	addition of extra definitions and clarifications to definitions as appropriate, and removal of unused definitions.	Administrative	To remove ambiguity in the interpretation and application of definitions throughout the document
Relevant Rules, Regulations, Standards and Codes	Addition of Evoenergy Documents subsection	Jurisdictional	Identification of jurisdictional documentation that is applicable to the Evoenergy network Allows for a complete list of applicable rules in one section.
Phase Balancing	Addition of sub-section for phase connection	Administrative	Easier reading, break up a large section
Phase Balancing	"the power imbalance of all IES shall not exceed 5kVA between phases" is not included	Promote improved benefits to Australia's electricity system	The options listed encourage the same outcome without being too restrictive for battery additions, which typically support overall network performance.
Inverter Energy System - General	Added metering and labelling requirements	Promote improved benefits to Australia's electricity system	No specified location for this in the template
Inverter Energy System - General	Added clarification for stand alone inverters with grid input	Jurisdictional	To address confusion about if these requirements apply
Inverter Energy System - General	Additional requirement for energy source to align with CEC listing	Promote improved benefits to Australia's electricity system	To ensure correct assessment has been performed by CEC.
Changeover Switches	Changed "momentary" to 400ms to align with current practices	Jurisdictional	Clear requirement that does not contradict other documentation

Protection	Added information regarding what triggers the need for protection settings to be updated	Promotes improved benefit to electricity system	Updating settings of older inverters strengthens the network and should be encouraged
Power Quality	Duplicated tables from 4777.2	Administrative	for easier reference and tracking of historic settings
Testing and Commissioning	Added requirements for CES form and filling in Evoenergy commissioning form	Jurisdictional	Legal requirement, and mandatory data collection for AEMO reporting
Operations and Maintenance	Addition of subsections	Administrative	To improve ease of understanding and searchability

Appendix B Connection arrangement requirements

The figures in this Appendix display the common connections for Small Embedded Generating units. The connections shall comply with retailers metering requirements. For additional information regarding connection arrangements please contact Evoenergy via the contact details listed on the website.

Please note that Single Line Diagrams are not required for like-for-like replacements.

Connection arrangements are shown for indication only with all loads shown as three phase for consistency. Actual connection arrangements are dependent on specific installation configurations.

Figure 3. Methods of depicting phases

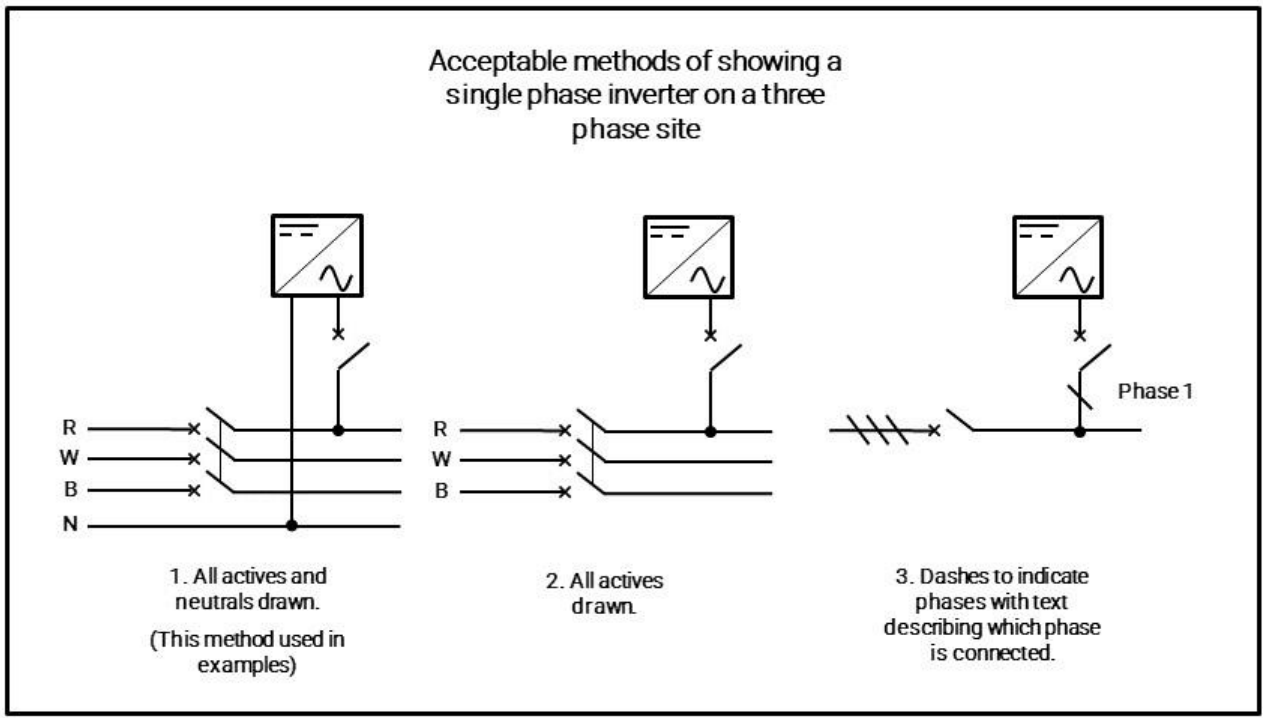


Figure 4. Single phase PV connection

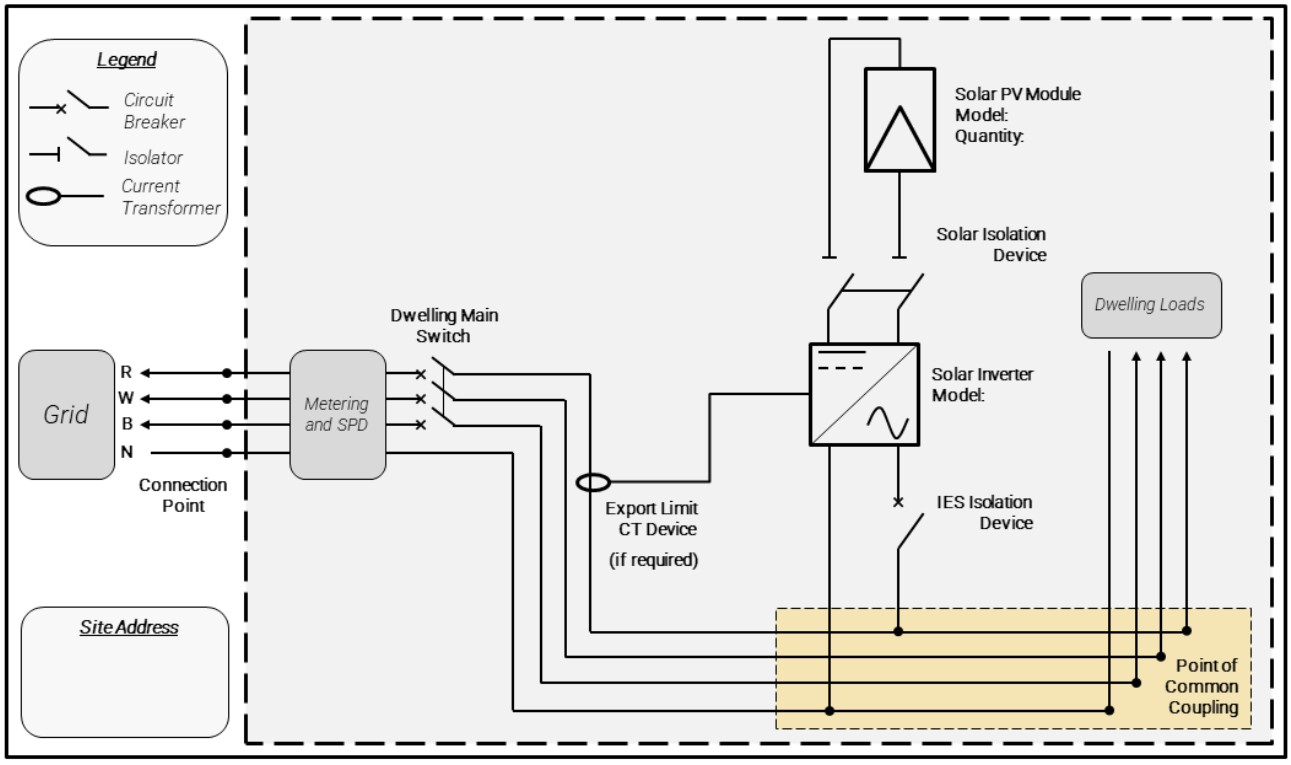


Figure 5. Single phase hybrid inverter connection

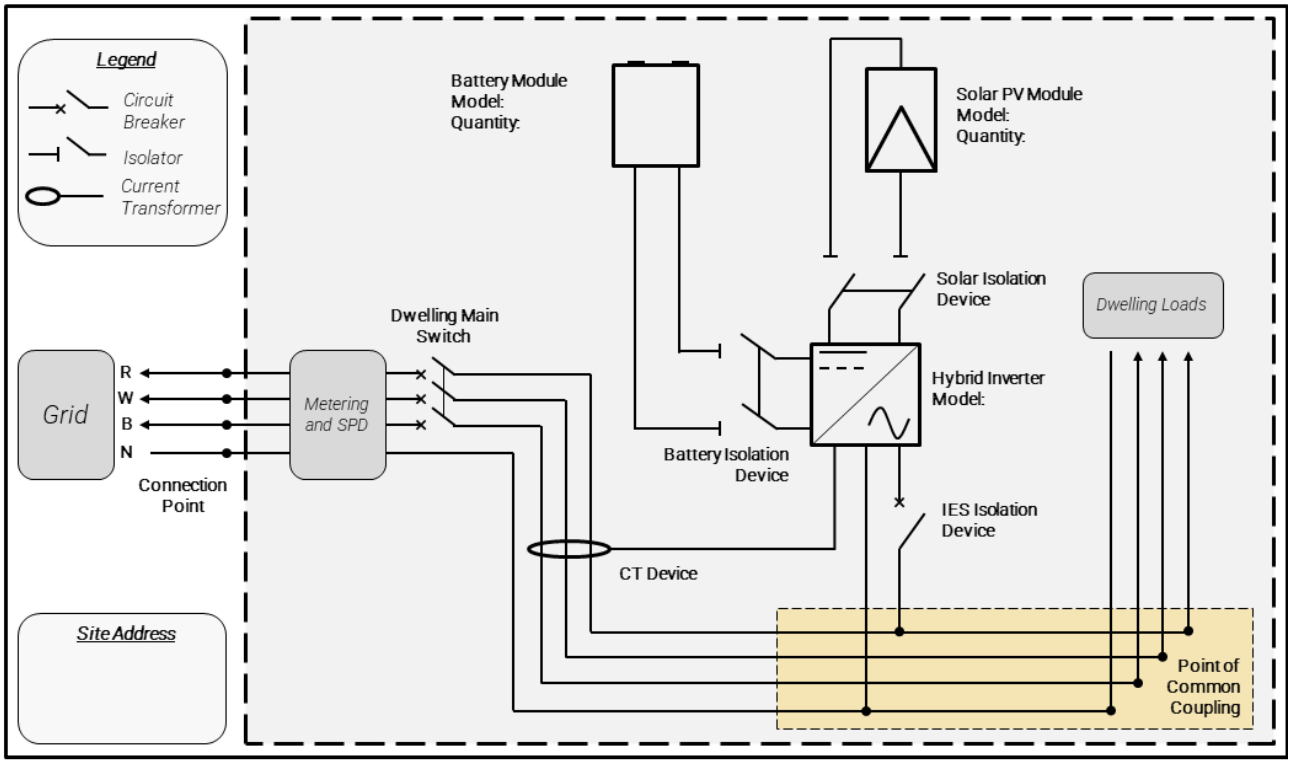


Figure 6. Single phase ESS and PV connection with dual inverters

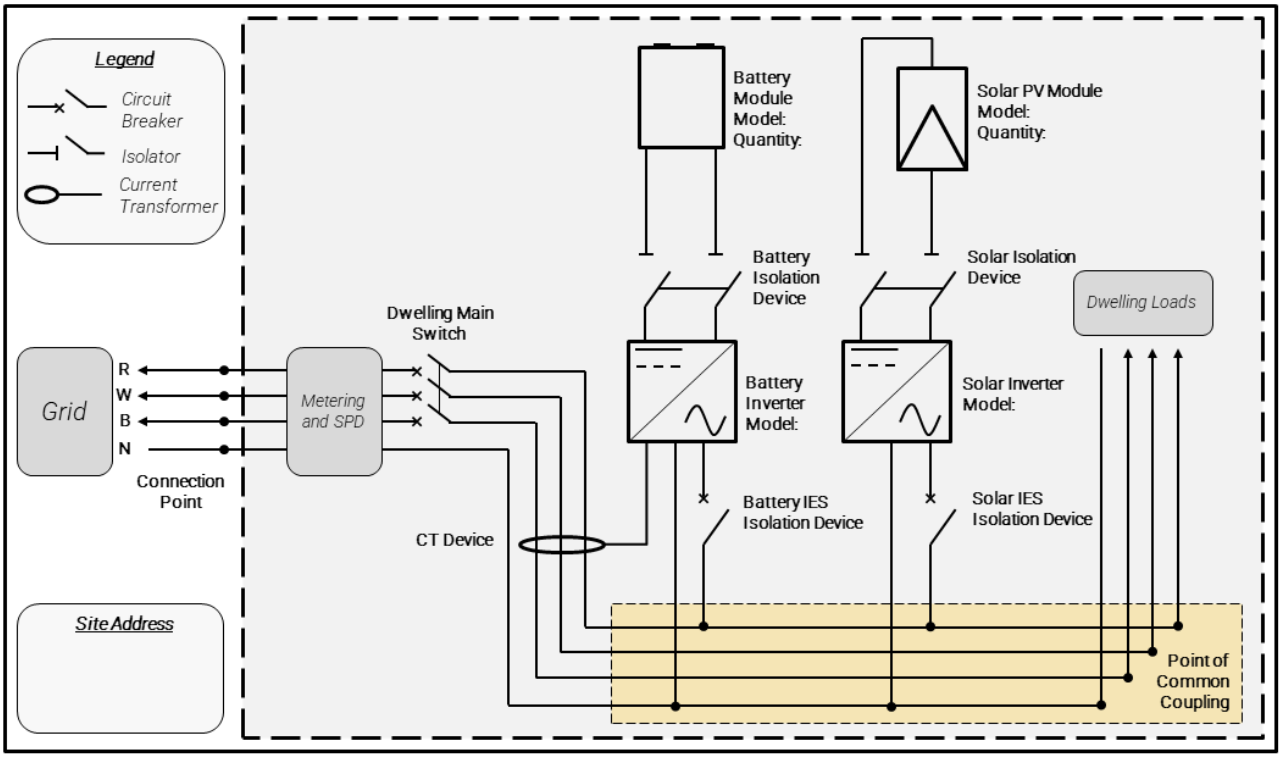


Figure 7. Three phase PV connection

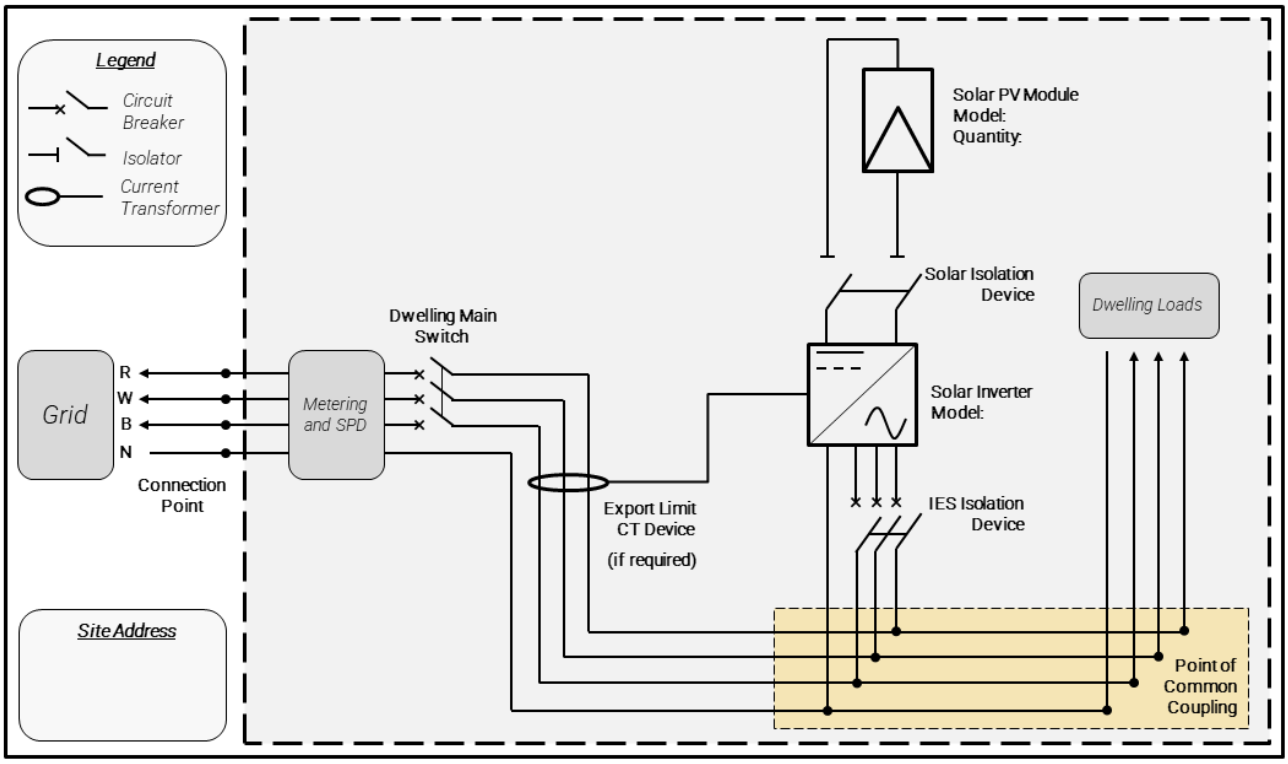


Figure 8. Three phase hybrid inverter connection

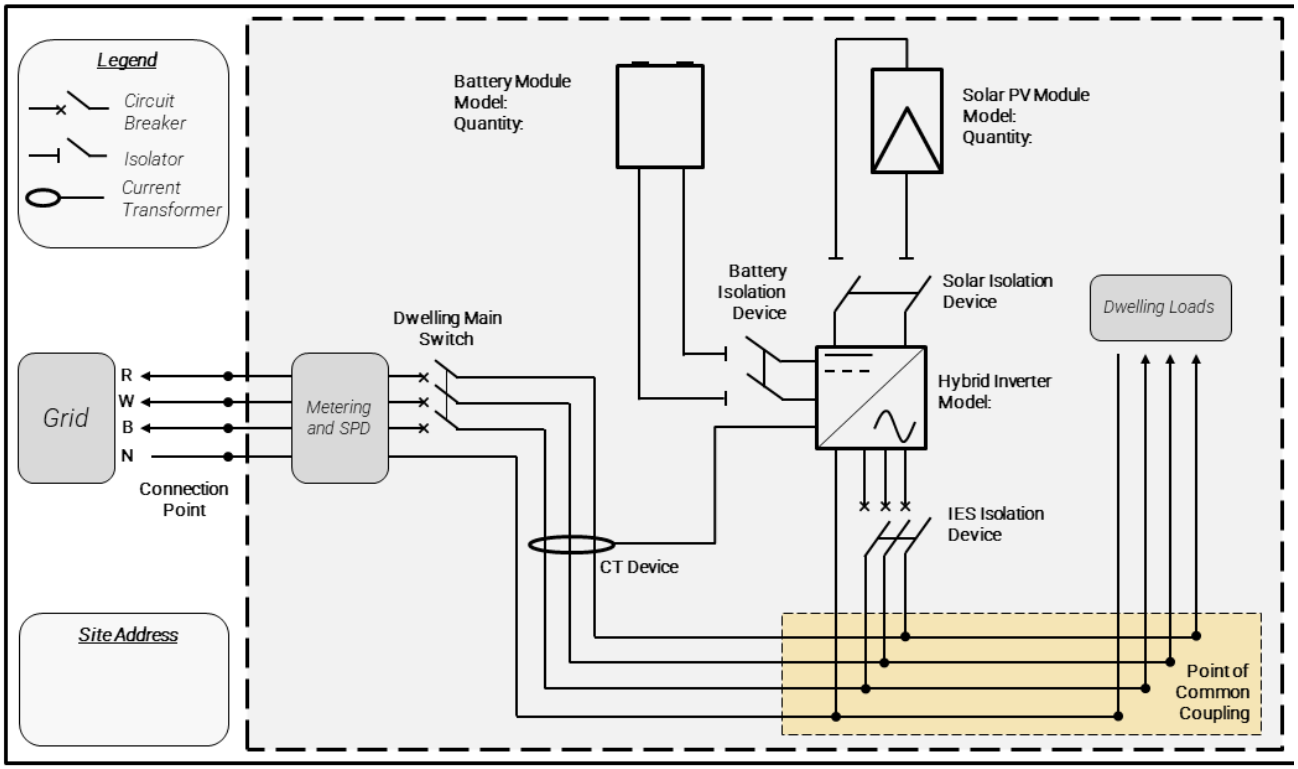


Figure 9. Three phase ESS and PV connection with dual inverters

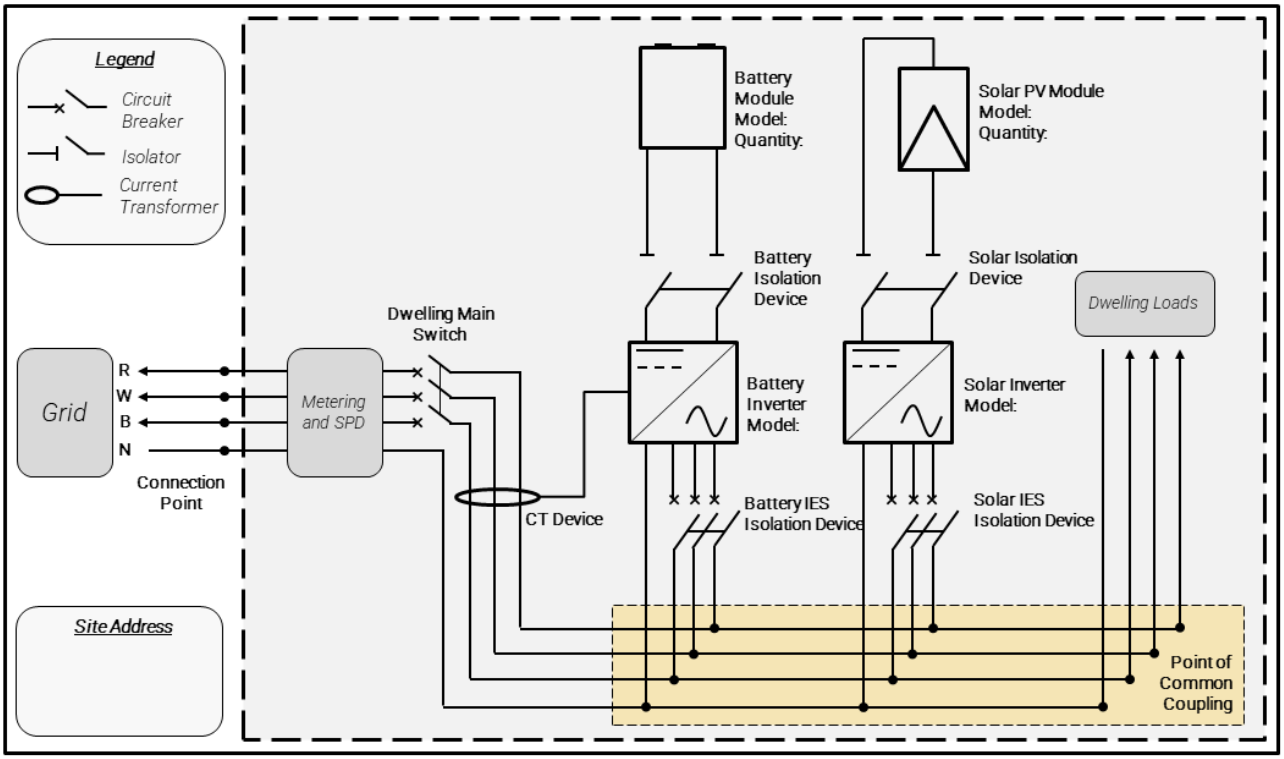


Figure 10. Single Phase ESS system with full site backup

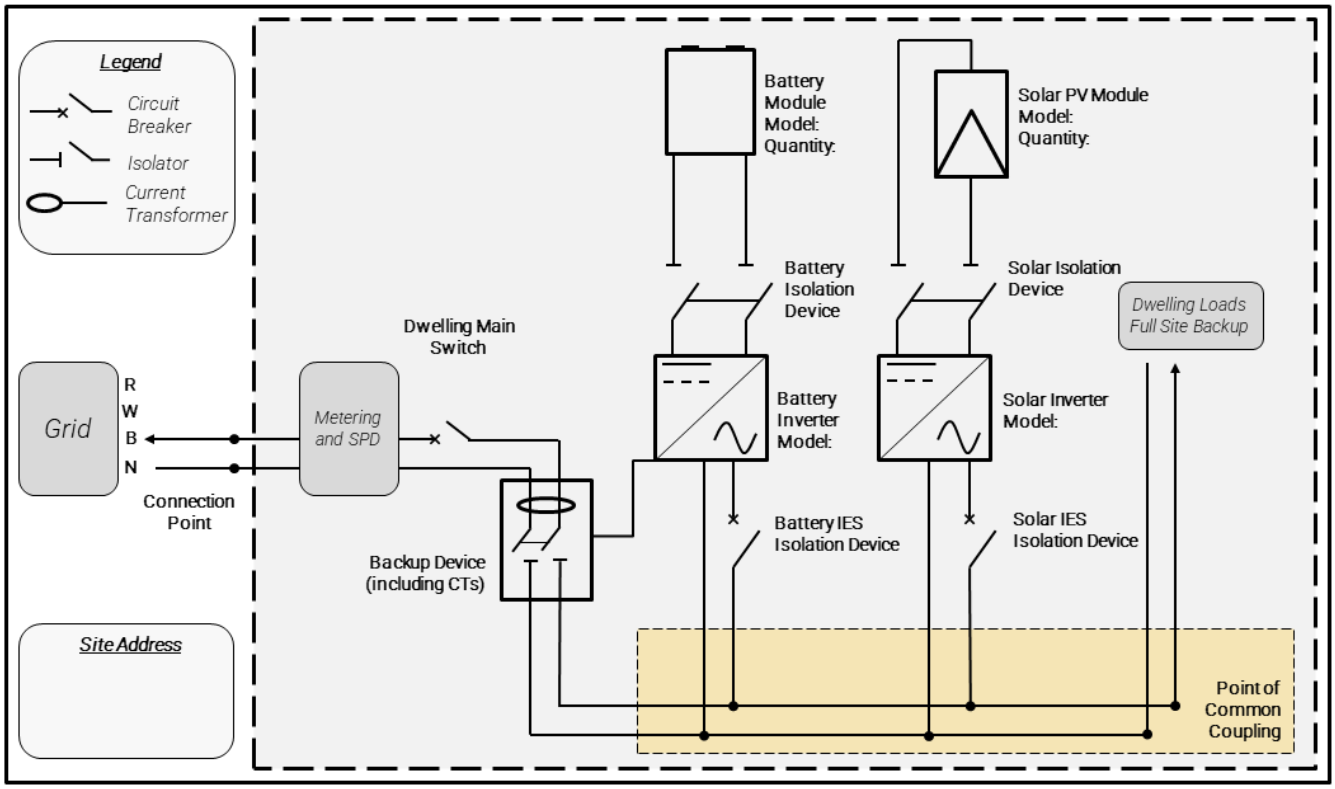


Figure 11. Single Phase ESS system with partial backup

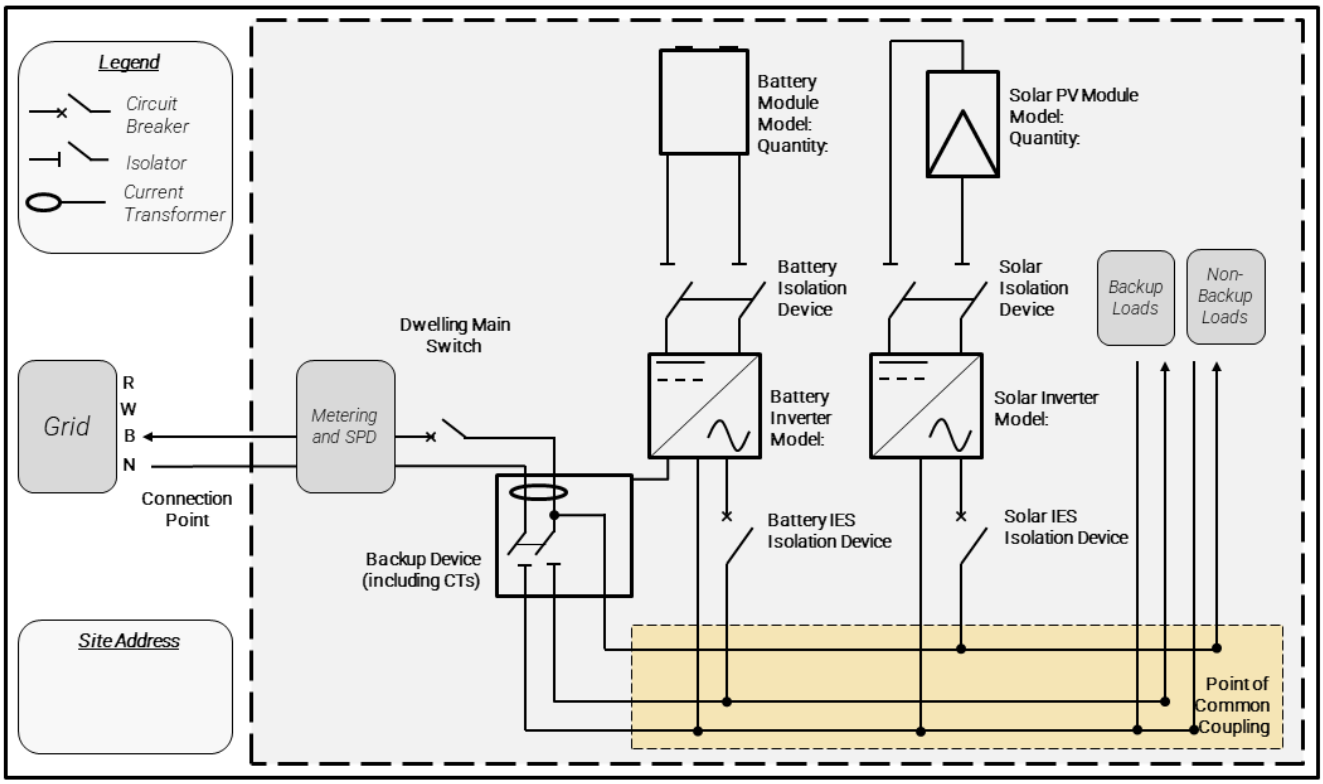


Figure 12. Micro inverters connected to three phases

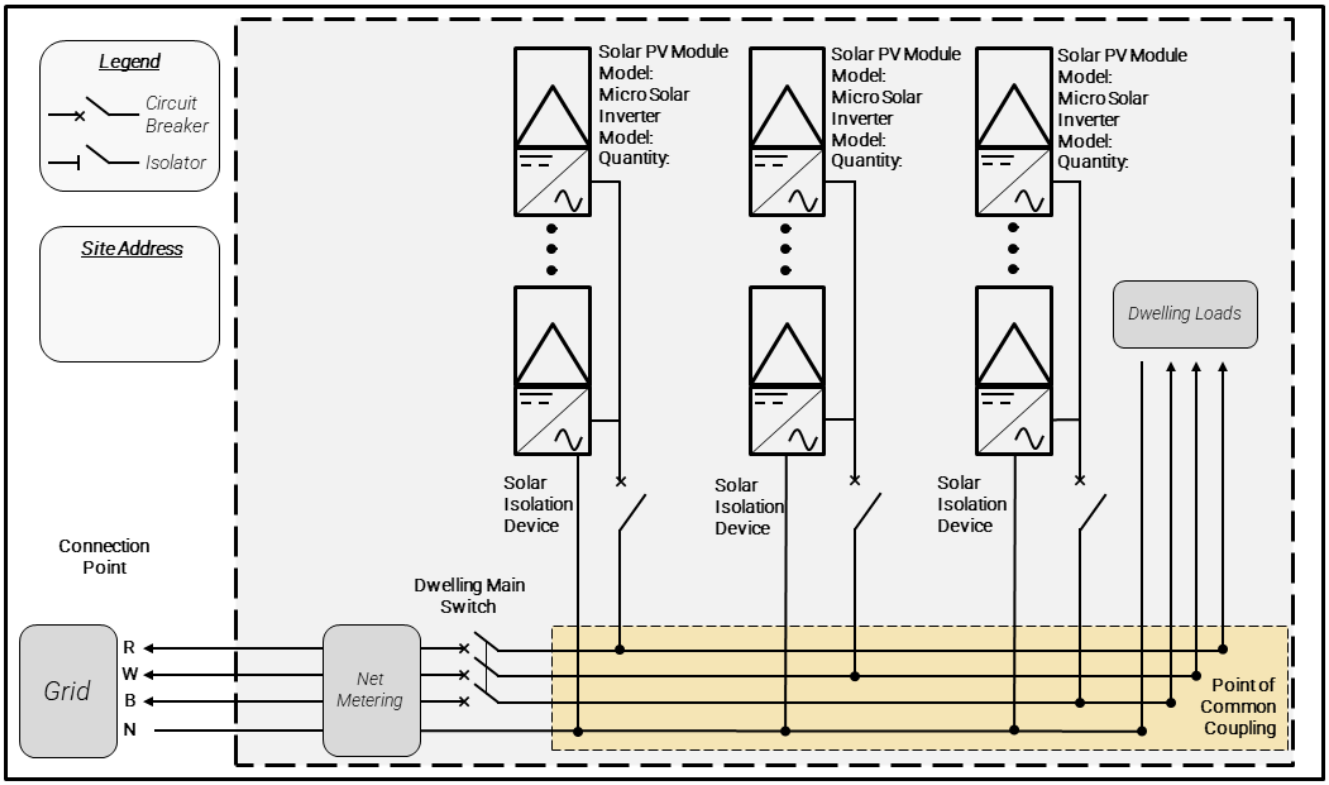
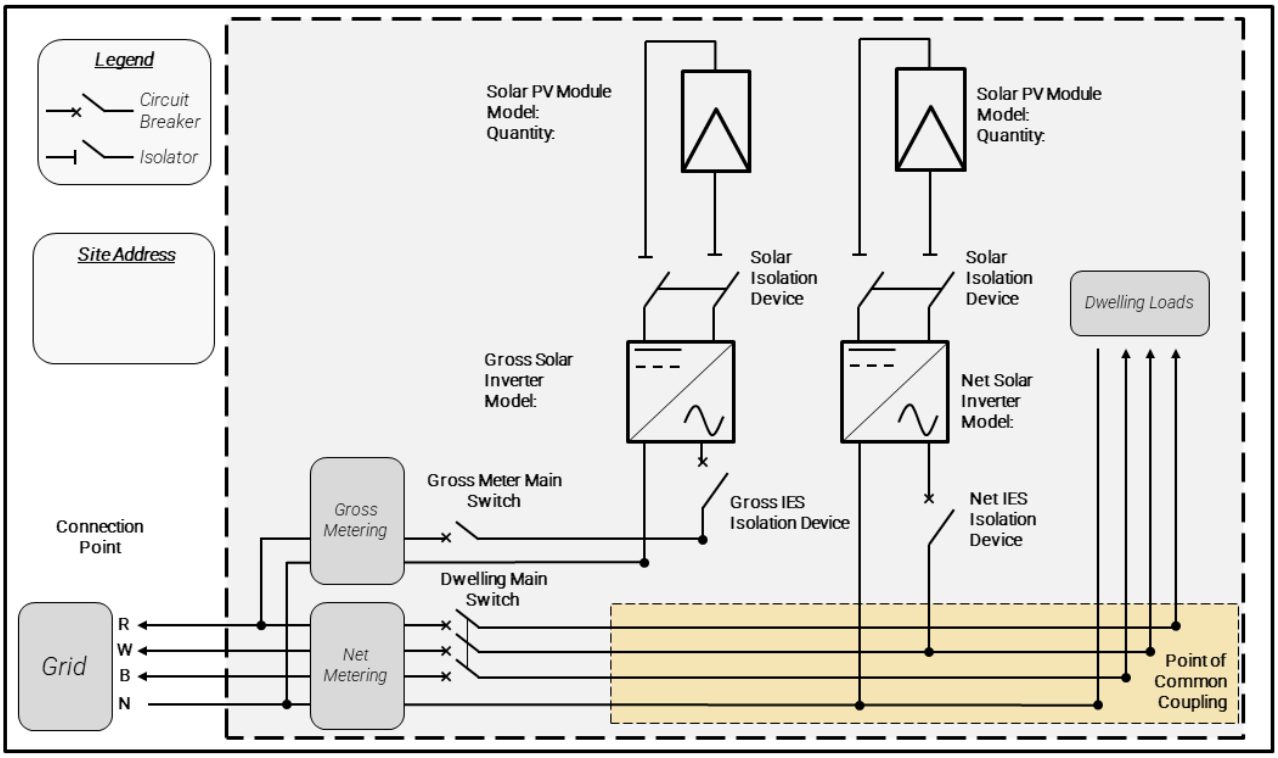


Figure 13. Single phase gross metered PV and single phase net metered PV at the same site (typical arrangement for additions to FiT systems)



Appendix C Model standing offer

The model standing offer for the connection of Small Embedded Generator connections to the Evoenergy network can be found on the Evoenergy website.

Appendix D Static data and information

The static data requirements are defined as per the SCR application form available on the Evoenergy DER portal.

The information to be provided on the DER portal includes, but is not limited to:

- NMI meter number (10 digit)
- Generation source
- Make, model and manufacturer of all DER devices
- Equipment ratings (kW/kVA) and storage capacity (kWh) as applicable
- Installer details
- Site Supply

The proponent shall inform Evoenergy as part of their application if any of the below are true for any DER device connected at the application NMI:

- registered for ancillary service provision
- part of an aggregated control
- remotely controllable
- Islanded operation
- Inverter or protection settings different to those specified in this document

Photos of all existing inverters greater than 1kVA shall be provided for all sites not part of an embedded network. These photos shall clearly show:

- Full inverter name plate
- Inverter model number
- Inverter serial number

Photos or other proof of existing to remain panel model numbers and ratings may be requested on a case by case basis, such as when panel quantities are not matching Evoenergy records, or for validation of gross metered systems.

For commercial properties a site plan shall be provided to Evoenergy as part of the SCR application. These shall:

- Identify locations of panels, inverter(s) and any relevant switchboards
- Identify a lockable AC isolation point in 24-hour accessible location
- Show access path from street to AC isolation point, and detail access arrangements through any obstructions such as gates.

For all applications other than like-for-like replacements, the proponent shall provide at least one single line diagram (SLD) to Evoenergy as part of the SCR application. These single line diagram(s) shall:

- Be site specific and display the site address
- Match what is submitted in the connection application
- Be in an electronic format (i.e. not hand drawn/ written)

The contents of the single line diagram(s) shall contain the following information at a minimum:

- Quantity, manufacturer, and model number (as shown on relevant Clean Energy Council Approved List if applicable) for all new embedded generation equipment including inverters, panels, batteries and other equipment.
- As much information as is known about existing embedded generation equipment. Quantity of existing panels and inverter model number(s) at a minimum must be provided.

- Clearly show how panels are distributed between multiple inverters if present.
- Identify phases involved in proposed system and all phases at each switchboard. It should be clear if the site has a single or three phase supply, and if inverters are connected to the same or different phases. SLDs shall use a consistent method of identifying phases throughout.
- Location of site loads.
- All current transformers (CTs) or energy meters used for export monitoring or limiting devices and where they are taking readings from. It should be clear which inverter(s) each device controls. All export limits and/or generation limits shall be clearly stated.
- Clearly show metering arrangement as gross, net or both as applicable.
- Include the wiring from the embedded generation to the connection point or retail meter. All points where the customer's embedded generating unit and the Evoenergy distribution network can be connected/disconnected (such as circuit breakers and isolators / load break switches) must be clearly shown.

After the installation is complete, the following commissioning information shall be provided to Evoenergy within 20 business days.

- Date of installation
- Inverter serial numbers of new inverters, and photo of new inverter nameplate (over 1kVA)
- Voltage readings (phase to neutral) of all present phases (with inverters switched off)
- Phase connection of new inverters
- Evidence of generation limits or other information as agreed during the approval process