EVOENERGY EMBEDDED GENERATION CONNECTION REQUIREMENTS

General requirements and connection process for the connection of embedded generating units to the Evoenergy network

CONTENTS

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.

1. INTRODUCTION

1.1 About Evoenergy

Evoenergy own and operate the electricity and gas distribution networks in the ACT, providing electrical power to over 200,000 residential and business customers. The electricity network delivers this power through 2,394 km of overhead lines, 2,694 km of underground cables, over 50,000 poles and over 5000 distribution substations across a geographical area of 2,358 square kilometres.

The Evoenergy network currently connects to more than 25,000 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 is committed to connecting renewable generation to its distribution network, while ensuring at all times that power supply to its customers is delivered in accordance with Evoenergy and Industry standards. Under the National Electricity Rules (NER) Chapter 5 & Chapter 5A, Evoenergy has an obligation to review and process applications submitted for the connection, or modification of a connection, and must enter into a connection contract with the applicant.

Evoenergy has developed four documents to provide proponents of all embedded generator connections information about their obligations for connection to, and interfacing with, Evoenergy's network. This document describes the process for the connection of embedded generating units to the Evoenergy network and should be read in conjunction with the three *embedded generation connection technical requirements* documents. These four documents, and the relationship between them, are outlined in FIGURE 1.

All Embedded Generators 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), synchronous generators, asynchronous generators or any combination these categories.

Embedded Generators that are outside the scope of these requirements include:

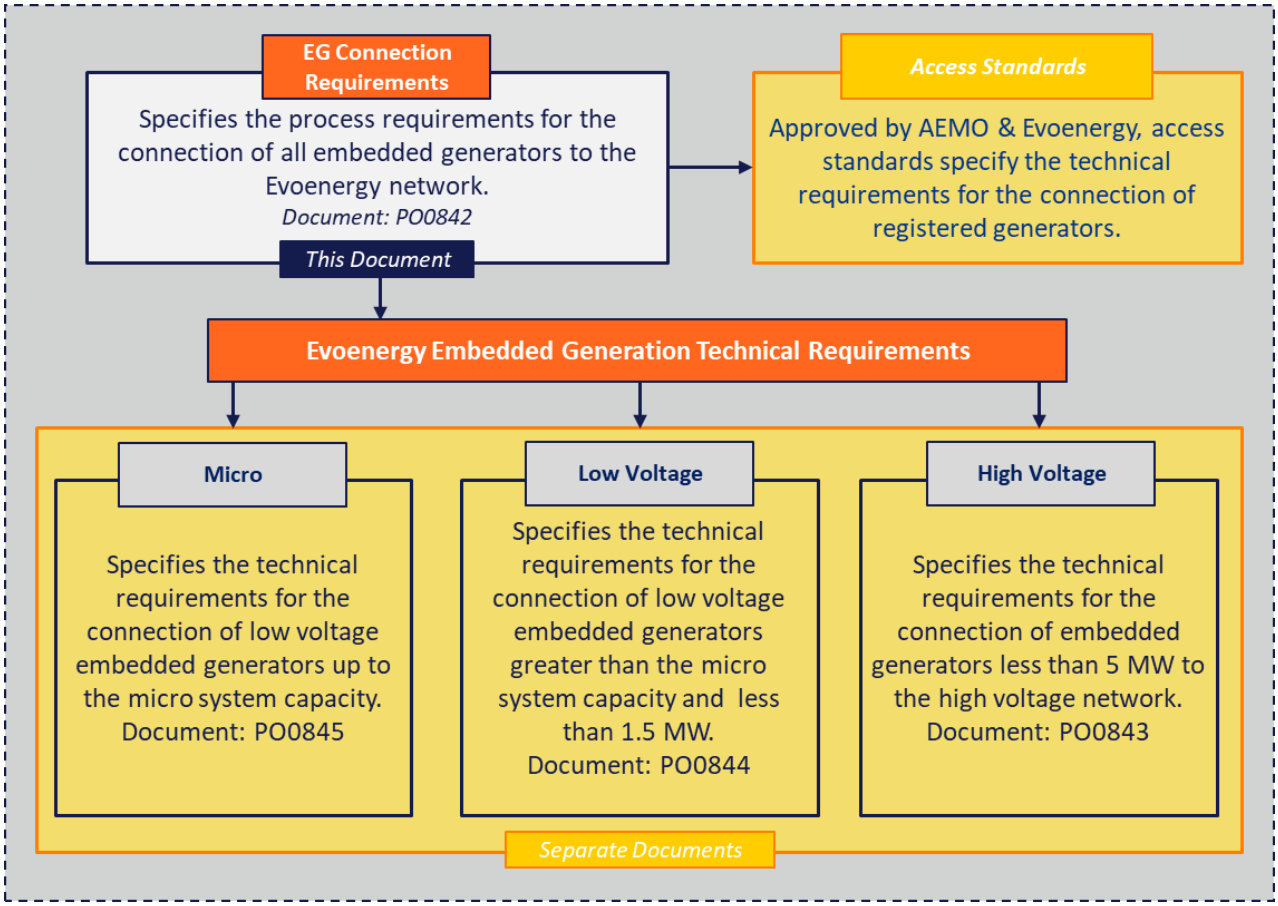
- Electric vehicles, unless the on-board battery storage system is capable of exporting to the network (in which case the requirements shall apply)
- Distributed energy resource systems that do not generate electricity including demand response / demand management systems, unless they impact on the ability of the system to meet the technical requirements
- Systems that are off-grid or operate in a non-parallel configuration

While this document pertains to the application of Embedded Generators that are registered within the National Electricity Market, additional technical requirements apply.

This document, and the three technical requirements documents, supersede the existing Evoenergy Requirements for Connection of Embedded Generators up to 5MW to the Evoenergy Network (SM3201) for all defined system capacities.

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.

FIGURE 1. EMBEDDED GENERATION DOCUMENT STRUCTURE



Category definitions are further explained in Section 2.3.1.

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 the technical requirements as well as relevant national standards, industry codes, legislation and regulations. In the event of inconsistency legislation and regulations, followed by the 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 connection agreement
- Ensure the requirements are met with regard to the design, installation and operation Embedded Generating systems
- Meet the connection and commissioning requirements to the Evoenergy network

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

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
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
Asynchronous Generator	Asynchronous generators draw their magnetising current from the distribution network during operation and are generally not capable of isolated operation
Micro Embedded Generation Connection	A connection between a distribution network and a retail customer's premises for a micro embedded generating unit, for which a model standing offer is in place or an equivalent model offer is in place in jurisdictions not subject to Chapter 5A of the National Electricity Rules
Bi-Directional Metering	A meter capable of registering energy supplied to the premises and energy exported from the premises as separate data streams
Central Protection	Central protection is the protection defined by AS/NZS 4777.1 (grid connection of energy systems via inverters) installed to perform the functions of; coordinating multiple inverter energy system installations at one site, providing protection for the inverter energy system installation and islanding protection to the connected grid as well as preserving safety of grid personnel and the general public
Connection Point	The point where the IES is connected to the rest of the electricity network. 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 Resource	Power generation or storage units that are connected directly to the distribution network
DRED (Demand Response Enabling device)	A device, integral or external to the inverter, which provides the functionalities and capabilities to achieve demand response and meets the requirements of AS/NZS 4755.1
Embedded Generating System	A system comprising of 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

Energy Storage System	A system comprising one or more batteries that store electricity generated by distributed energy resources or directly from the grid, and that can discharge the electricity to loads. The Energy Storage System rating is defined based off the AC output nameplate rating of IES connected to the batteries.
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 Limitation	Where the electricity exported from an IES to the distribution network is controlled so as to not exceed a specified limit. AS/NZS 4777.1 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 Limiting Device	Additional hardware installed to perform export limitation This involves monitoring the utility connection point, for clarification regarding export limiting devices please contact Evoenergy on embeddedgeneration@evoenergy.com.au
Generating Unit	The plant used in the production of electricity and all related equipment essential to its functioning as a single entity
Generation	The production of electrical power by converting another form of energy in a generating unit
Generator	A person who owns, operates or controls a generating unit
High Voltage	Any voltage greater than 1 kV AC
Hybrid Inverter	An inverter which can simultaneously manage inputs from both solar panels and a battery bank, 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; a person who holds an unrestricted electricians licence and CEC accreditation. For **non-IES** systems; an engineering consultant body or licensed electrical contractor with relevant knowledge, expertise or experience.
Inverter	A device that uses semiconductor devices to transfer power from DC source(s) or load to an AC source(s) or load (or vice versa)
Inverter Energy System (IES)	A system comprising one or more inverters together with one or more energy sources (which may include batteries for energy storage) including controls and one or more grid protection devices and where the inverter(s) satisfies the requirements of AS/NZS 4777.2 connected at a single point in an electrical installation
Islanding (Customer islanded mode)	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 portion (or all) of that installation location

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	kilo-Watt 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 an embedded generating unit and a distribution network of the kind contemplated by Australian Standard AS 4777 (Grid connection of energy systems via inverters) currently up to 200kVA
Micro IES	Small inverter energy systems (IES) up to 30 kVA of installed capacity (excluding ESS)
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))
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 distribution network that use a single live conductor to supply single-phase or split-phase electric power with higher network impedances, and with distribution supplying low voltages to premises
Site Generation Limit	The generation threshold that the embedded generation system cannot exceed, measured downstream of the connection point
Small Generation Aggregator	A person who has classified one or more small generating units as a market generating unit
Small Registered Generator	A Generator who elects to register a generating unit with the Australian Energy Market Operator 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
Supervisory Control and Data Acquisition (SCADA)	A control system that remotely monitors and is capable of switching the embedded generating unit connected to the distribution network
Synchronous Generating Unit	Synchronous generating units can operate either in isolation from or connected to the distribution network. When connected to the distribution network, a synchronous generating unit is “locked into” the distribution network, i.e. operating at the same frequency.
System Capacity	The combined AC output nameplate rating of all embedded generating units installed at the premises
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
CPEng	Chartered Professional Engineer of Engineers Australia
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
FAT	Factory Acceptance Testing
GDL	Generation Dispatch Limiter
HV	High Voltage
IEC	International Electrotechnical Commission
IES	Inverter Energy System
LV	Low Voltage
MW	Megawatt
NBN	National Broadband Network
NEM	National Electricity Market
NER	National Electricity Rules
NMI	National Metering Identifier
PV	Photovoltaic

ROCOF	Rate of Change of Frequency
RPEng	Registered Professional Engineer of Professionals Australia
RPEQ	Registered Professional Engineer of Queensland
SCADA	Supervisory Control and Data Acquisition
SCR	Short Circuit Ratio
SWER	Single Wire Earth Return
UTR	Utilities Technical Regulation Team
xDSL	X Digital Subscriber Line

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

2.3.1 Categories

To assist proponents in identifying technical requirements that are applicable to a specific system, Evoenergy have defined several categories. The definitions for each category are outlined in Table 3.

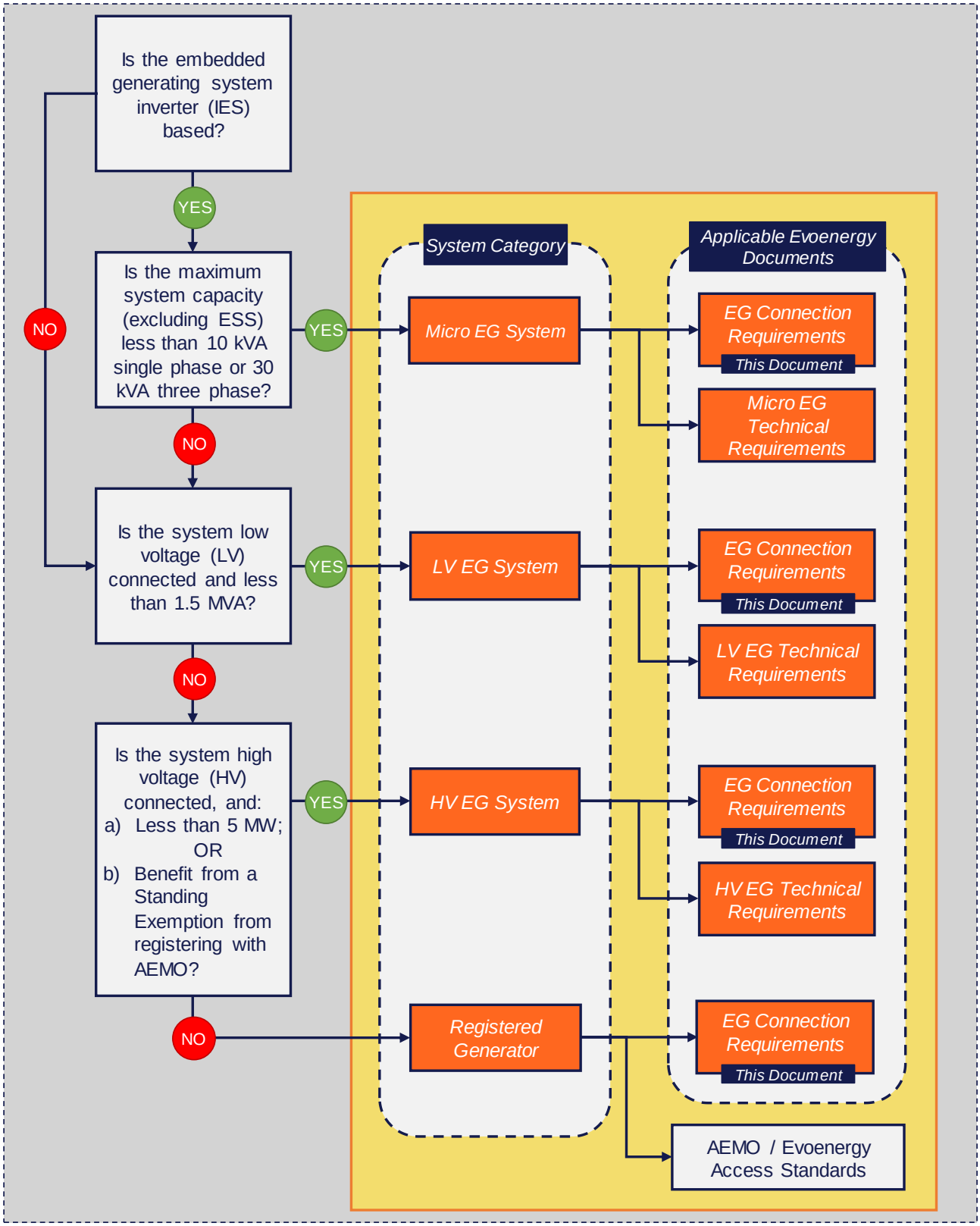
TABLE 3. CATEGORY DEFINITIONS

Micro EG	IES	Any Micro EG system with a total system capacity less than or equal to 10 kVA for a single-phase IES (excluding ESS) network connection or 30 kVA for a three-phase IES (excluding ESS) network connection, meeting all technical requirements for Micro EG connections set out in the Evoenergy Micro EG technical requirements document. These systems are further subcategorised as exporting or non-exporting
LV EG	IES	Any LV IES EG system, that is not a micro EG system, with a total system capacity less than or equal to 1.5 MVA* for a three-phase IES (excluding ESS) network connection, meeting all technical requirements for LV EG connections set out in the Evoenergy LV technical requirements document. These systems are further subcategorised as exporting or non-exporting
	Non-IES	Any LV EG system, that is synchronous or asynchronous, with a total system capacity greater than 0 kVA and less than or equal to 50 kVA for a single-phase network connection or less than or equal to 1.5 MVA* for a three-phase network connection, meeting all relevant technical requirements for LV EG connections set out in the Evoenergy LV technical requirements document. These systems are further subcategorised as exporting or non-exporting
HV EG	IES	Any HV EG system with a total system capacity less than 5 MW or with a system capacity greater than or equal to 5 MW that has been issued with a specific exemption by AEMO for a three-phase IES HV distribution network connection, meeting all technical requirements set out in the Evoenergy HV technical requirements document
	Non-IES	Any HV EG system that is synchronous or asynchronous with a total system capacity less than 5 MW or with a system capacity greater than or equal to 5 MW that has been issued with a specific exemption by AEMO for a three-phase non-IES HV distribution network connection, meeting all technical requirements set out in the Evoenergy HV technical requirements document
Registered Generator	IES	Any generator or generating system that is exempt from registration within the NEM by AEMO (generally over 5 MW). PO0842 and Evoenergy Access Standards apply to registered generators
	Non-IES	

*The maximum LV system capacity of 1.5 MVA is the indicative limit for proponents being required to implement a HV connection. Proponents applying to connect near or above this capacity should contact Evoenergy to determine if an LV connection is appropriate.

FIGURE 2 displays the application decision tree, which further assists proponents in identifying the technical requirements that are applicable to a specific system. Evoenergy can be contacted via the contact details on the Evoenergy website for any clarification regarding the definitions and application of the categories.

FIGURE 2. APPLICATION DECISION TREE



Exporting systems shall be considered as EG systems operating in parallel with the distribution network and capable of exporting electricity via partial or full export into the network, where:

- Partial-export EG systems limit the amount of export into the distribution network to an agreed export threshold defined in the connection agreement
- Full-export EG systems can export into the distribution network to the full nameplate capacity (full AC rating) as defined in the connection agreement

Non-exporting systems shall be considered as EG systems operating in parallel with the distribution network that are limited to ensure they cannot export electricity into the distribution network as defined in the connection agreement.

3. RELEVANT RULES, REGULATIONS, STANDARDS AND CODES

3.1 Evoenergy Documents

Table 4 lists the related Evoenergy documents that shall be considered in the application of EG requirements.

TABLE 4. 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)

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 5.

TABLE 5. 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 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 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

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

4. GENERAL REQUIREMENTS

4.1 Special Connection Request Form

A special connection request form is required to be submitted by all proponents for embedded generating unit and system proposals and can be accessed on the Evoenergy website.

Evoenergy Forms, Connection Applications & Publications

4.2 Generator Connection Contract

Proponents proposing to become an embedded generator are required to enter into a connection contract with Evoenergy.

In accordance with the applicable regulations listed in Section 3.3, a proponent proposing the installation of a micro embedded generating unit is offered Evoenergy's model standing offer for basic connection services to retail customers who are generators. The model standing offer sets out the terms of connection of the embedded generating unit to the distribution network.

Proponents proposing the installation of a Micro embedded generating unit may also request Evoenergy's terms and conditions for non-standard connections.

In accordance with the applicable regulations listed in Section 3.3, a proponent proposing the installation of LV or HV embedded generating units will be provided with Evoenergy's terms and conditions for non-standard connections. The terms and conditions for non-standard connections are subject to commercial negotiations between the parties and will encompass both the technical and commercial aspects of the connection, address the access standards and specify the terms and conditions, including the connection charge. The process regarding the formation of connection contracts contained in Chapter 5A of the NER will apply for non-standard connections.

The terms and conditions for non-standard connections also require the proponent to indemnify Evoenergy against any liability resulting from the proponent's use of the distribution network in a manner prejudicial to the safety and efficiency of the distribution network.

Non-standard connection offers have a twenty (20) business day expiry date where the terms and conditions must be finalised and signed by the authorised representatives of both parties.

Where required, Evoenergy will prepare and forward Evoenergy's terms and conditions for non-standard connections following the receipt of the proponent's full and complete connection application.

Commissioning and connection of the embedded generating unit to the network will not be permitted until this contract is executed by both parties and associated charges paid.

Proponents seeking to be a registered participant should contact Evoenergy as different terms, conditions and processes may apply.

Contractual queries surrounding incentive schemes for generation, including feed- in tariffs, should be directed towards the proponent's energy retailer.

4.3 Connection limits

Evoenergy's existing network assets were initially designed and constructed without consideration for embedded generation. As such, additional sources of supply may affect the fault level, or increase the thermal load, present on the network. As the penetration level of embedded generation continues to grow, a point may be reached where additional sources of supply will result in network assets exceeding their ratings.

Evoenergy thus reserves the right to limit the output of a proponent's application through export limitation or inhibit the output of an installed embedded generating unit (or embedded generating system) to ensure that the electricity distribution network is not compromised under such conditions. Inhibition of installed embedded generating units and systems may be provided via a control signal from Evoenergy such that the generating unit is either taken off-line (i.e. soft trip) or inhibited from starting up.

Alternatively to export limitation, Evoenergy may review the network configuration and identify network augmentation activities that remove the limitation. Any works undertaken to allow for the reduction in export limitation would be at the cost of the proponent.

Upon assessment of the proposed connection, Evoenergy will advise the proponent if any fault levels or network constraints exists whereby scheduling or export limitation may be required as part of the installation.

4.3.1 Queuing

Evoenergy assess applications on a first-come, first-served basis. When an application is received, the application is placed at the end of the queue. In some instances, multiple proponents at the same location may wish to become a generator and as an aggregate will cause capacity or fault level constraints on the network at the shared location. In accordance with Section 4.3, Evoenergy reserves the right to inhibit the output of an embedded generating unit or system to ensure that the electricity distribution network is not compromised under such conditions.

In such cases, proponents at the end of the queue will be provided with options to proceed with the connection of an embedded generating unit. These options include, but are not limited to, the following:

- Proceeding with the application for the requested connection (with full knowledge of potential limitations)
- Proceeding with the application for a revised connection
- Proceeding with the application for the requested connection and undertaking network augmentation to reduce the limitation (paid for by the proponent)
- Exiting the connection process or identifying an alternative location
- Sharing the cost of network augmentation with other proponents at the shared location to reduce network limitations

Application time frames for applications in a queue do not differ from standard time frames. Nothing in the above should be interpreted that a place in the queue confers a right upon a proponent to network capacity.

4.4 Alteration of Approved Design

The proponent must not modify the approved design of the embedded generating unit without receiving prior written authorisation from Evoenergy. This includes settings of protection relays and control equipment.

To obtain written authorisation to alter the design, proponents shall submit a new *Special Connection Request* to Evoenergy.

Relocations or proposals for equipment materially different from the original proposal may require Evoenergy to reassess the application. Upon receipt of a written request to modify the approved design and / or settings, Evoenergy will advise the proponent if it is considered necessary to undertake a new assessment on the impact on the distribution network, the associated costs involved and the timeframe expected to complete the study and associated report.

4.4.1 Energy Storage Systems for Existing Systems

If a proponent wishes to connect an ESS to an existing embedded generating system, a new special connection request and single line diagram shall be submitted by the installer showing sufficient detail as to how the proposed ESS will integrate with the existing embedded generating system. ESS applications for connection to the Evoenergy network and are only permitted through a parallel operating AS/NZS 4777 compliant inverter.

4.5 Electric Vehicles

Electric vehicles are not considered embedded generating units and are not subject to the requirements of this document, unless they are:

- Capable of exporting energy into the proponents premises but not the distribution network, resulting in a minimal-export configuration (also referred to as Vehicle-to-Building or V2B); OR

- Capable of exporting energy into the distribution network, resulting in either a full, or partial export configuration (also referred to as a Vehicle-to-Grid or V2G)

In which case they will be considered an embedded generating unit and these requirements will apply.

4.6 Special Approval

Special approval may be granted to embedded generating systems that are unable to comply with the defined requirements in this document. Any special approval outcome must not breach any essential requirement set out in the Evoenergy Service and Installation Rules. Installers shall notify Evoenergy if special approval is desired.

An Evoenergy service and installation officer will then attend the site in order to make an informed decision. Further advice may need to be sought from Evoenergy engineering personnel to come to a final decision. The installer will be notified of the final decision in writing within ten (10) business days from the initial special approval request.

5. FEES AND CHARGES

Fees and charges for all EG connections are specified in the Evoenergy schedule of charges available on the Evoenergy website. All fees are specified by system fee class. The fee class of EG systems are outlined in **Error! Reference source not found.**.

TABLE 6. CHARGING CLASS TABLE

SYSTEM FEE CLASS	SYSTEM CAPACITY
Class 1	≤ 30 kVA
Class 2	Exceeding 30 kVA and less than 60 kVA
Class 3	From 60 kVA and less than 120 kVA
Class 4	From 120 kVA and less than 200 kVA
Class 5	From 200 kVA and less than 1500 kVA
Class 6	From 1500 kVA up to 5000 kVA

In addition to the application charges, the system may be subject to Network Connection Charges will typically consist of the following items (where applicable):

- Network augmentation and design work
- Provision of data and technical study review
- Project management
- SCADA and Communications
- Inter-trip and Neutral Voltage Displacement
- HV EG Testing and Commissioning

These will be calculated on a case-by-case basis and a quotation will be provided to the proponent.

Additional fees apply for registered generators.

In addition to the above, an ongoing operational fee may be applicable for EG connections as outlined in the Evoenergy schedule of charges located on the Evoenergy website.

6. CONNECTION PROCESS

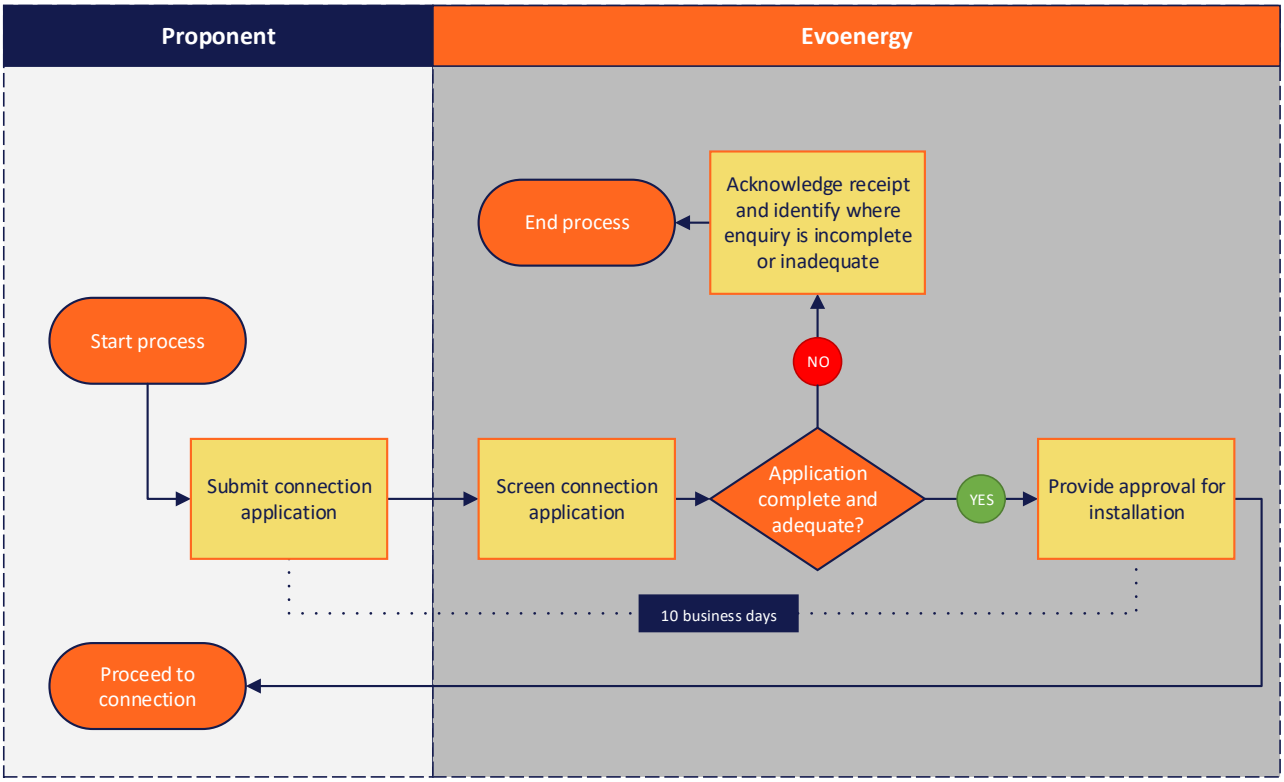
Proponents will be required to enter into contracts as described in Chapter 4. The processes for enquiring and applying to Evoenergy for connection of an embedded generating unit are subject to the regulatory requirements detailed in NER Chapter 5A.

Fees and Charges are outlined in Chapter 5 – Fees and Charges.

6.1 Micro Embedded Generation

The process for the micro embedded generation connection to the Evoenergy distribution network has been developed in line with Chapter 5A of the National Electricity Rules as well as the National DER Grid Connection Guidelines, and is summarised below.

FIGURE 3. MICRO GENERATING UNIT CONNECTION PROCESS DIAGRAM



6.1.1 Connection Application

The proponent must advise Evoenergy of the proposed connection by submitting a completed *Special Connection Request* (SCR) form ensuring that the following required information, as well as the information required by the relevant embedded generation technical requirements, are provided:

- Location of the proposed installation (address and suburb or block and section)
- Details of embedded generating unit
- Site specific single line diagram showing proposed connection arrangement
- Details of protection

Where an application is reviewed and it is identified that an application is incomplete or inadequate the proponent will be notified and an amended application submitted.

6.1.2 Connection Offer

Following the review and acceptance of a connection application Evoenergy will respond to the proponent with approval for the installation.

6.1.3 Commissioning Form – Micro System

The proponent's principal contractor or installer must submit a C*ommissioning Form – Micro System* to Evoenergy. This form can be submitted at any time after the on-site installation has occurred and prior to connection to Evoenergy distribution network.

A copy of the *Commissioning Form – Micro System* can be found on the Evoenergy website.

6.2 LV and HV Embedded Generation

The process for either low voltage or high voltage embedded generation connection to the Evoenergy distribution network has been developed in line with Chapter 5 and Chapter 5A, Part F, Division 2 of the National Electricity Rules, as well as the National DER Grid Connection Guidelines, and is summarised below.

6.2.1 Preliminary Connection Enquiry

The proponent must advise Evoenergy of the proposed connection by submitting a completed *Special Connection Request* (SCR) form ensuring that the following required information, as well as the information required by the relevant embedded generation technical requirements, are provided:

- Location of the proposed installation (address and suburb or block and section)
- Details of embedded generating unit
- Site specific single line diagram showing proposed connection arrangement
- Details of protection
- Typical generation / load profile over a 24-hour period at point of connection
- Site plan
- Voltage rise calculations
- Any specific requirements for supply service levels and connection arrangements
- Additional information specific to the proposed installation as requested by Evoenergy in order for it to complete the assessment
- Anticipated dates for connection

This shall be provided prior to undertaking any detailed design or committing to any expenditure, material or resources.

Evoenergy shall address any reasonable request for information that would enable the proponent to prepare a connection enquiry that best meets the proponent's technical and commercial considerations.

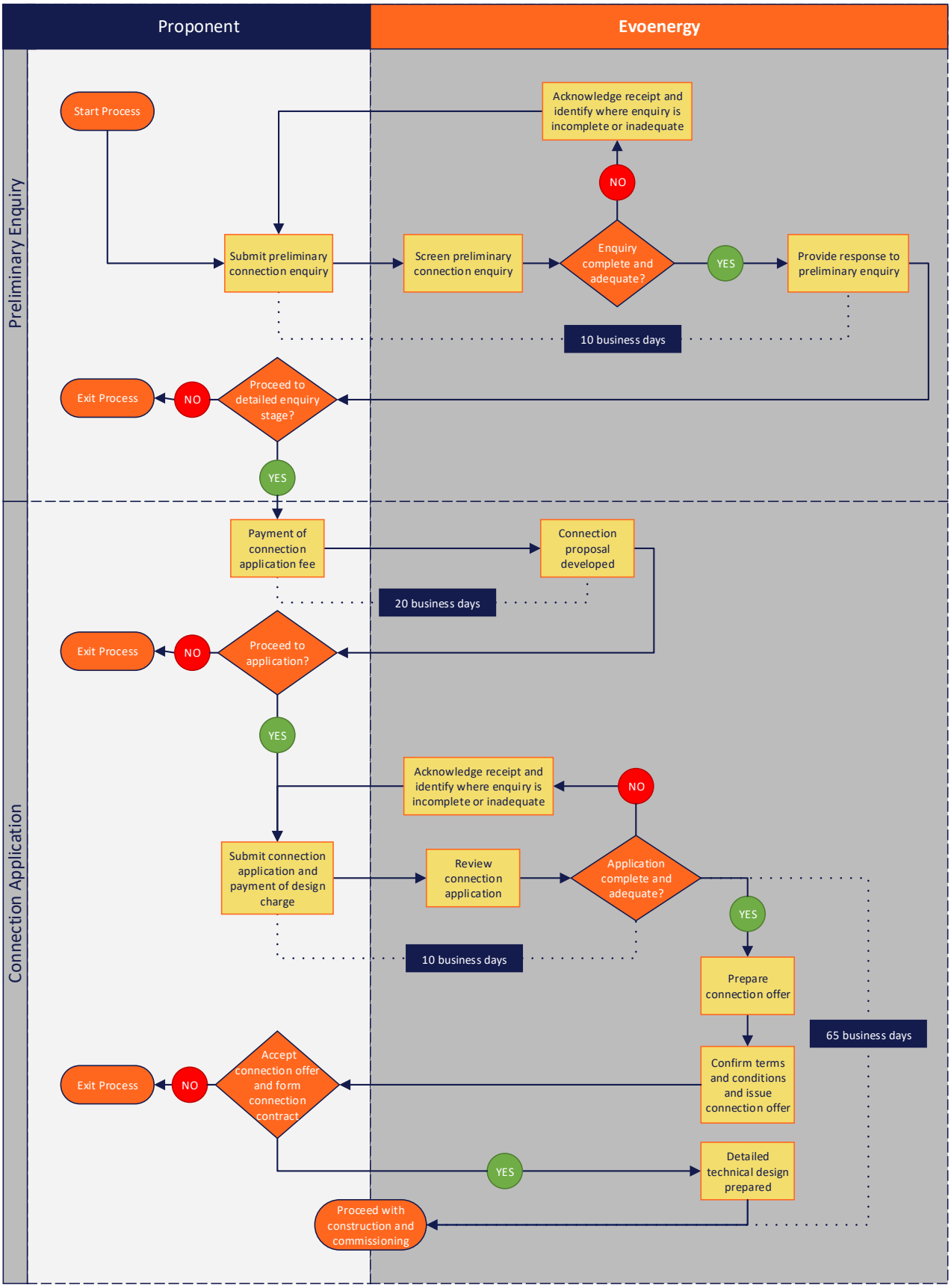
Requests for information on distribution network layout and ratings for a specific section of the distribution network are considered reasonable by Evoenergy.

6.2.2 Initial Response

Evoenergy will provide an initial response to the connection enquiry within five (5) business days of receiving the enquiry, advising whether or not the enquiry is complete and of the applicable charges.

The proponent may choose to continue with the connection process or exit at no incurred cost.

FIGURE 4. LV AND HV GENERATING UNIT CONNECTION PROCESS DIAGRAM


Proponent
Evoenergy
Preliminary Enquiry
Start Process
Acknowledge receipt and identify where enquiry is incomplete or inadequate
NO
Submit preliminary connection enquiry
Screen preliminary connection enquiry
Enquiry complete and adequate?
YES
Provide response to preliminary enquiry
10 business days
Exit Process
NO
Proceed to detailed enquiry stage?
YES
Connection Application
Payment of connection application fee
Connection proposal developed
20 business days
Exit Process
NO
Proceed to application?
YES
Acknowledge receipt and identify where enquiry is incomplete or inadequate
NO
Submit connection application and payment of design charge
Review connection application
Application complete and adequate?
YES
10 business days
Prepare connection offer
65 business days
Confirm terms and conditions and issue connection offer
Exit Process
NO
Accept connection offer and form connection contract
YES
Detailed technical design prepared
Proceed with construction and commissioning

6.2.3 Payment of Connection Application Fee

If a proponent wishes to proceed based off the response to a connection enquiry and pay the relevant charges, Evoenergy will issue a quote / invoice and submit to the proponent for payment.

6.2.4 Connection Proposal Developed

Following the payment of the application fee, Evoenergy shall conduct an assessment of the connection enquiry to determine its impact on the safety and operation of the network. The outcome of the studies and reviews will provide the basis for Evoenergy's preparation of a connection proposal for submission to the proponent.

The connection proposal will include the following:

- Advice on the maximum embedded generation capacity and the details of the connection arrangement that can be accepted at the proposed location
- Details of network augmentation or modification, if required, to enable the proposed connection
- A schedule of itemised estimated costs to be funded by the proponent, including network augmentation or modification costs if required
- A program of works to complete the connection, including augmentation or modification works if required
- Applicable service standards
- Non-refundable design charge

Evoenergy will provide the proponent with the connection proposal with twenty (20) business days.

6.2.5 Connection Application

Upon receiving the connection proposal, the proponent must decide if the connection conditions are acceptable and must advise Evoenergy in writing of their acceptance. At this point the proponent may also choose to exit the connection process.

At this point the proponent must pay the non-refundable design charge with the application acceptance. This design charge shall be offset against the cost of construction should the proponent choose to progress to that point.

Upon receipt of the payment Evoenergy will prepare the connection offer and detailed design which shall include the cost to augment the electricity network to enable a connection to occur.

If the application is in relation to a connection proposal that is older than three (3) months Evoenergy may choose to not accept the connection application.

6.2.6 Connection Offer

Evoenergy shall issue a connection offer within sixty five (65) business days of receiving the connection application and applicable payment.

The connection offer will be in the form of a Non-Standard Connection Agreement including a quote / invoice for the proponent contribution, a works program and the terms and conditions of the connection contract.

Upon acceptance by the proponent of the connection offer, and once payment is received for the proponent contribution, Evoenergy will proceed with the detailed technical design, construction and commissioning as per the works program.

If SCADA is being installed, the following also applies:

- The proponent is required to provide the SCADA information as detailed in the relevant embedded generation connection technical requirement (PO0844 or PO0843). In addition, the proponent shall also provide the contact details for their SCADA technician.

- Proponents proposing a programmable logic controller (PLC) or protection relays, which have not previously been interfaced with Evoenergy's SCADA system, shall be required to provide their equipment to Evoenergy for bench testing to confirm the correct functioning between the proponents generating unit and Evoenergy RTUs.
- Evoenergy will advise on SCADA costs (including commissioning) in the connection offer.

6.2.7 Detailed Technical Design

Evoenergy will undertake a detailed technical design following the acceptance of the connection offer.

A project manager may be appointed, depending on the size of the project, who will liaise with the proponent's principle contractor. Procurement of long lead equipment will be undertaken once the detailed design and specification has been approved.

6.2.8 Construction and Commissioning

6.2.8.1 Construction (if required)

The proponent's principal contractor and Evoenergy's project manager will co-ordinate the joint works during the construction stage including the testing, commissioning and project handover as per the schedules within the Non-Standard Connection Agreement.

6.2.8.2 ACT Government Electrical Inspection

The proponent's principle contractor or installer shall notify ACT Government Electrical Inspectorate that the generating unit installation is ready for inspection through filing the Certificate of Electrical Safety (CES).

ACT Government Electrical Inspectorate may carry out an inspection of all electrical work. If the installation passes the inspection, the electrical inspector will place an approval sticker adjacent to the existing metering installation or in the meter box.

6.2.8.3 Commissioning

The proponent's principal contractor or installer must give Evoenergy at least ten (10) business days' notice to enable Evoenergy personnel to witness commissioning of the generating unit. Refer to Chapter 7 – Testing and Commissioning for more detail.

Following the successful commissioning of the generating unit, the proponent's principle contractor is responsible for submitting a detailed commissioning report to Evoenergy for approval. The report must include results of testing all protection schemes (main and backup), control systems, SCADA (if applicable), all protection settings and documentation detailing the correct operation of safety features.

6.2.8.4 Commissioning Form – LV and HV Systems

The proponent's principal contractor or installer must submit a *Commissioning Form – LV and HV Systems* to Evoenergy. This form can be submitted at any time after the on-site installation has occurred and prior to connection to Evoenergy distribution network.

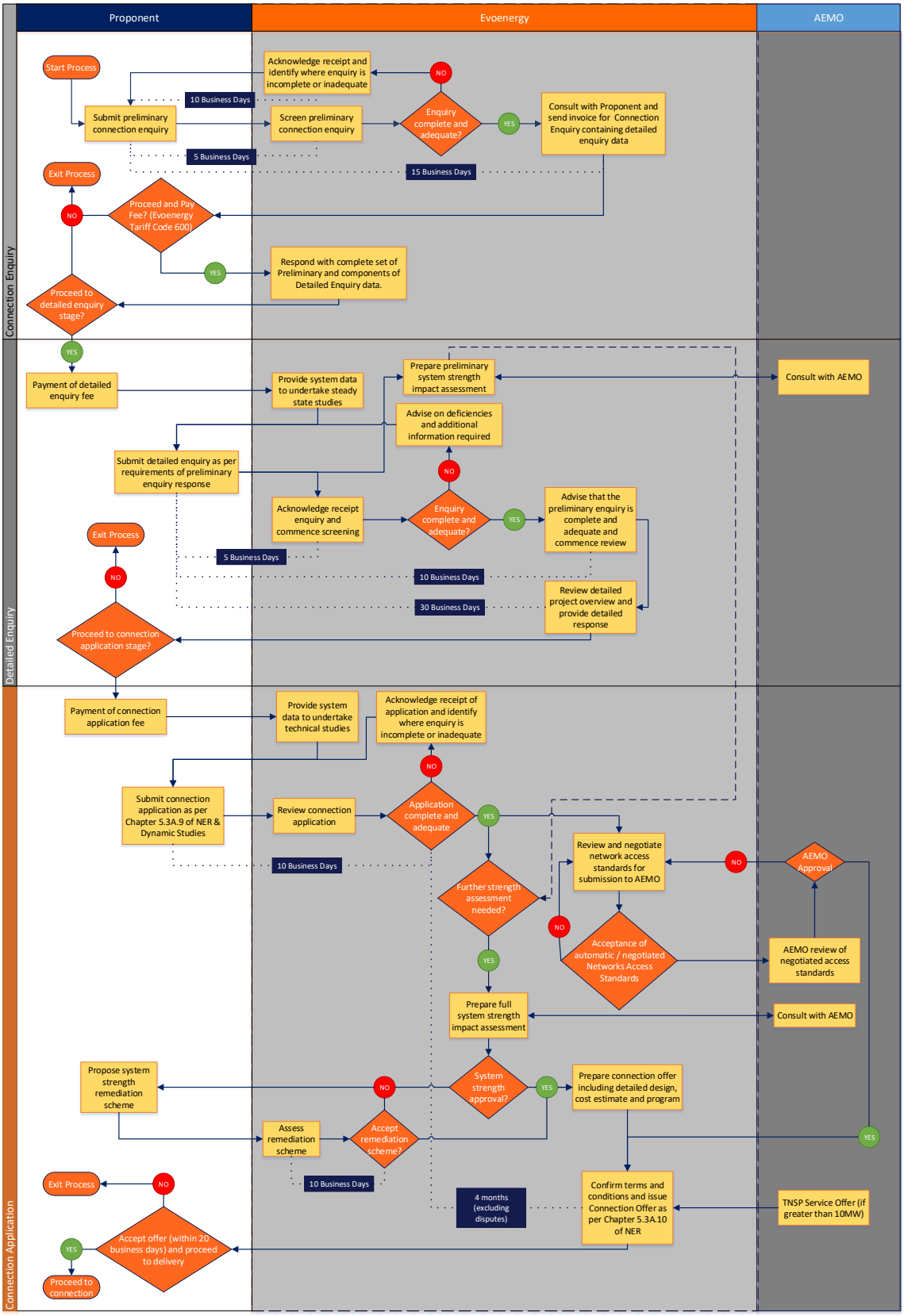
A copy of the *Commissioning Form – LV and HV Systems* can be found on the Evoenergy website.

6.2.8.5 SCADA (if applicable)

Evoenergy SCADA technicians will attend site to perform site acceptance testing of the SCADA equipment during the commissioning of the system. The site acceptance test requirements can be made available to proponents upon request.

6.3 Registered Generator Connections

FIGURE 5. REGISTERED GENERATOR CONNECTION PROCESS DIAGRAM



The process for connection of a registered generator to the Evoenergy network has been developed in line with Chapter 5 of the NER, as well as the National DER Grid Connection Guidelines, and is summarised below.

6.3.1 Preliminary Connection Enquiry

As per Schedule 5.4 of the NER, the proponent must advise Evoenergy of the proposed connection by submitting a completed *Special Connection Request* (SCR) form ensuring that the following required information are provided:

- Location of the proposed installation (address and suburb or block and section)
- Details of embedded generating unit
- Site specific single line diagram showing proposed connection arrangement
- Details of protection
- Typical generation / load profile over a 24-hour period at point of connection
- Site plan
- Voltage rise calculations
- Any specific requirements for supply service levels and connection arrangements
- Additional information specific to the proposed installation as requested by Evoenergy in order for it to complete the assessment
- Anticipated dates for connection

This shall be provided prior to undertaking any detailed design or committing to any expenditure, material or resources.

Evoenergy shall address any reasonable request for information that would enable the proponent to prepare a connection enquiry that best meets the proponent's technical and commercial considerations.

Requests for information on distribution network layout and ratings for a specific section of the distribution network are considered reasonable by Evoenergy.

6.3.2 Response to Preliminary Connection Enquiry

Evoenergy will provide an acknowledgement receipt to the proponent within five (5) business days of receiving the Preliminary Connection Enquiry. In another five (5) business days, an initial response will be provided by Evoenergy advising whether or not the enquiry is found to be complete. In the event of an incomplete enquiry, the relevant information required to be addressed will be highlighted to the proponent for resubmission.

Evoenergy may provide an additional set of information to the proponent, which may include portions of the detailed connection enquiry phase. At this stage, if the proponent wishes to proceed with the enquiry, an invoice for the Preliminary Connection Enquiry response fee will be sent to the proponent. Details on fees and Charges are outlined in Chapter 5 – Fees and Charges.

If the proponent decides to proceed and provides confirmation of payment; a Preliminary Connection Enquiry response will be provided to the proponent within fifteen (15) business days, detailing the following relevant information:

- An indicative response to proponent objectives
- Available options at alternative connection points
- Relevant technical requirements
- Whether and how the TNSP is to be involved
- Whether any of the services required are contestable

- Estimate of relevant network limitations and constraints
- An indication of network augmentation required
- Any expectations for adverse system strength impacts
- Contact details for Evoenergy Case Manager
- Further information required for the Detailed Connection Enquiry
- Analysis to be undertaken by Evoenergy for the Detailed Connection Enquiry response
- An estimate of the fee for the Detailed Connection Enquiry response

After receipt of all the information provided by Evoenergy, the proponent can then decide to continue with the Detailed Connection Enquiry stage of the Connection Application.

6.3.3 Payment of Detailed Connection Enquiry Fee

If the proponent decides to proceed based on the response to the Preliminary Connection Enquiry; Evoenergy will issue a formal quote / invoice to the proponent for payment. Upon receiving payment confirmation, Evoenergy will provide an acknowledgement receipt and the next phase of the Connection Application will commence.

6.3.4 Detailed Connection Enquiry

At this stage, the proponent must prepare system data to undertake steady state studies. Evoenergy will provide the relevant network data to the proponent to conduct the steady state studies.

6.3.4.1 Submit Detailed Connection Enquiry

The proponent will then need to submit a Detailed Connection Enquiry including information specified in the Preliminary Connection Enquiry response, including:

- Details of proponent connection requirements, and specifications of the facility to be connected
- Proponent expectations of the level and standard of service of power transfer capability from NSP network
- Proponent proposal for any system strength remediation scheme
- Proponent proposal for any system augmentation and network support that is required

6.3.4.2 Acknowledge Submission

Evoenergy will provide an acknowledgement receipt to the proponent within five (5) business days of receiving the Detailed Connection Enquiry. In another five (5) business days, an initial response will be provided by Evoenergy advising whether or not the enquiry is found to be complete. For a complete enquiry, a detailed project overview will commenced. For an incomplete enquiry, the relevant information required to be addressed will be highlighted to the proponent for resubmission.

6.3.4.3 Review of Detailed Project Overview

Evoenergy will review the detailed project overview, and will provide a detailed response to the proponent within thirty (30) business days, which will include:

- Contact details for Evoenergy Case Manager (if changed)
- Relevant technical requirements
- Details of the connection requirements based on proponent specifications of the facility to be connected
- Details of the level and standard of service of power transfer capability at the location of the connection point(s)
- Negotiated access standards that require AEMO's involvement
- Details of the connection point minimum three phase fault level

- The results of Evoenergy preliminary assessment of the impact of the connection on system strength impact
- Technical data to be included in the application to connect
- Commercial information to be supplied to allow Evoenergy to make assessment of proponent ability to satisfy prudential requirements
- Itemised estimate of connection costs including connection services charges; costs associated with the proposed metering requirements for the connection; costs of any network extension; details of required augmentation and associated costs; details of the interface equipment required and associated costs; details of any ongoing operation and maintenance costs and charges
- All risks and obligations in respect of the proposed connection associated with planning and environmental laws
- A draft connection agreement that contains the proposed terms and conditions for connection
- The further analysis to be undertaken by Evoenergy as part of the application to connect
- Information required for Evoenergy to assess the application to connect
- Outline of proposed milestones (and timeframes) for connection
- Indicative costs and timetable for non-contestable works (and any costs to fast track the non-contestable work)
- Application fee payable upon submission of Application to Connect

6.3.5 Payment of Application to Connect Fee

If the proponent decides to proceed based on the response to the Detailed Connection Enquiry; Evoenergy will issue a formal quote / invoice to the proponent for payment. Upon receiving payment confirmation, Evoenergy will provide an acknowledgement receipt and the next phase of the Connection Application will commence.

6.3.6 Application for Connection

At this stage, Evoenergy will reserve network capacity for the registered generation connection consistent with the level and standard of service of the power transfer capability specified in response to the proponent's Detailed Connection Enquiry.

6.3.6.1 Provision of Information

Within twenty (20) business days of the payment receipt, Evoenergy will provide information, including:

- Description of network connection
- Description of relevant network assets
- Design criteria
- Scope of non-contestable works
- General design information
- Provide proponent with dynamic studies modelling data to conduct technical studies

Based on this information, the proponent can then proceed to submit an Application for Connection as per the Chapter 5.3A.9 of the NER.

6.3.6.2 Submit Application for Connection

The application to connect should contain the following information:

- A connection application including information specified in the detailed enquiry response
- Negotiated access standards (if relevant)
- Proponent proposal for system strength remediation scheme (updated to reflect the results of Evoenergy preliminary assessment undertaken at the detailed enquiry stage)

- Metering installation properties
- Network & Plant Technical Data of Equipment at or near the connection point
- Network Plant and Apparatus Setting Data
- Load characteristics at Connection Point
- Metering Test Reports (available from the manufacturer)
- Recloser Test Reports (available from the manufacturer)
- Transformer Test Reports (available from the manufacturer)
- Details of land tenure and easement requirements that remain outstanding
- Details of assets to be transferred to Evoenergy
- Certified Design Plans
- A complete and comprehensive single line diagram of the HV assets to be owned by proponent including; the T-off point, connection point and the connection point asset number
- Proposed commissioning date

6.3.6.3 Acknowledge Submission

Evoenergy will provide an acknowledgement receipt to the proponent within five (5) business days of receiving the Application for Connection. In another ten (10) business days, an initial response will be provided by Evoenergy advising whether or not the application is found to be complete. For a complete application, the review and negotiation of network access standards will be commenced. For an incomplete application, the relevant information needed to be addressed in an Application for Connection resubmission will be highlighted to the proponent.

6.3.6.4 Review and Negotiate Network Access Standards

The proponent must provide Evoenergy with the proposed negotiated network access standards in their Application for Connection.

The proponent will be required to liaise with AEMO and obtain written approval of the proposed negotiated access standards.

The proponent should, at this point in time, commence the generator registration process with AEMO.

Evoenergy will review the proposed negotiated access standards. If required, Evoenergy will also undertake a system strength impact assessment. Evoenergy will then consult with AEMO and other Registered Participants as required.

6.3.6.5 Preparing Detailed Design

Evoenergy will prepare a detailed design, cost estimate and program as per Chapter 5.3A.10 of the NER. This includes a detailed design, costing for non-contestable works and establish delivery program (as it relates to non-contestable works). If the enquiry is greater than 10MW, Evoenergy will consult the TNSP regarding the impact on fault levels, line re-closure protocols, and stability aspects.

Evoenergy will undertake a detailed technical design following the acceptance of the connection offer.

A project manager may be appointed, depending on the size of the project, who will liaise with the proponent's principal contractor. Procurement of long lead equipment will be undertaken once the detailed design and specification has been approved.

6.3.6.6 Construction (if required)

The proponent's principal contractor and Evoenergy's project manager will co-ordinate the joint works during the construction stage including the testing, commissioning and project handover as per the schedules within the proposed Connection Agreement.

6.3.6.7 ACT Government Electrical Inspection

The proponent's principal contractor or installer shall notify ACT Government Electrical Inspectorate that the registered embedded generating unit installation is ready for inspection through filing the Certificate of Electrical Safety (CES).

ACT Government Electrical Inspectorate may carry out an inspection of all electrical work. If the installation passes the inspection, the electrical inspector will place an approval sticker adjacent to the existing metering installation or in the meter box.

6.3.6.8 Commissioning

The proponent's principal contractor or installer must give Evoenergy at least ten (10) business days' notice prior to commencement of commissioning, to provide sufficient time Evoenergy to schedule personnel to witness commissioning of the registered embedded generating unit. Refer to Chapter 7 – Testing and Commissioning for more detail.

Following the successful commissioning of the registered embedded generating unit, the proponent's principal contractor or installer is responsible for submitting a detailed commissioning report to Evoenergy for approval. The report must include results from the testing of all protection schemes (main and backup), control systems, SCADA (if applicable), all protection settings and documentation detailing the correct operation of safety features.

6.3.6.9 Commissioning Form – LV and HV Systems

The proponent's principal contractor or installer must submit a *Commissioning Form – LV and HV Systems* to Evoenergy. This form can be submitted at any time after the on-site installation has occurred and prior to connection to Evoenergy distribution network.

A copy of the *Commissioning Form – LV and HV Systems* can be found on the Evoenergy website.

6.3.6.10 SCADA (if applicable)

Evoenergy SCADA technicians will attend site to perform site acceptance testing of SCADA equipment during the commissioning of the system. The site acceptance test requirements can be made available to proponents upon request.

6.3.6.11 Offer to Connect

Within four (4) months from receiving a complete and adequate connection application, Evoenergy will prepare an Offer to Connect with details, including:

- Network access standards (as agreed to by AEMO)
- Connection service charges
- Costs associated with metering requirements
- Costs of any network extension
- Costs of any impact to TNSP on fault levels, line reclosure protocols, and stability aspects
- Interface equipment required and associated costs
- Ongoing operation and maintenance costs and charges
- Advice on the maximum embedded generation capacity and the details of the connection arrangement that can be accepted at the proposed location
- Details of network augmentation or modification, if required, to enable the proposed connection
- A schedule of itemised estimated costs to be funded by the proponent, including network augmentation or modification costs if required
- A program of works to complete the connection, including augmentation or modification works (if required)
- Non-refundable design charge.

The connection offer will be in the form of a Non-Standard Connection Agreement including a quote / invoice for the proponent contribution, a works program and the terms and conditions of the connection contract.

Upon acceptance by the proponent of the Offer to Connect and once payment is received for the proponent contribution; Evoenergy will proceed with the detailed technical design, construction and commissioning as per the works program.

If SCADA is being installed, the following also applies:

- The proponent is required to provide all SCADA information as requested by Evoenergy. In addition, the proponent shall also provide the contact details for their SCADA technician
- Proponents proposing a programmable logic controller (PLC) or protection relays, which have not previously been interfaced with Evoenergy's SCADA system, shall be required to provide their equipment to Evoenergy for bench testing to confirm the correct functioning between the proponent registered embedded generating unit and Evoenergy RTUs
- Evoenergy will advise on SCADA costs (including commissioning) in the Offer to Connect.

Evoenergy will provide the proposed Connection Agreement, including:

- Details of the connection point including network coupling points
- Metering arrangements
- Authorised demand
- Details of each access standard agreed and all related conditions
- Any system strength remediation scheme and any system strength connection works
- Connection service charges
- Payment conditions;
- Agreement duration and termination conditions
- Terms, conditions and constraints including rights to disconnect
- Agreed standards of reliability of service
- Testing intervals for protection systems
- Operating protocols for maintenance
- Terms and conditions of access to the metering installation
- Circumstances under which the terms of the connection agreement would require renegotiation

6.4 Guidelines for Backup Energy Generators

Any device capable of generating energy in parallel with the Evoenergy network must apply to be connected via the standard Special Connection Request (SCR) form located on the Evoenergy website.

Backup generators are any energy generators which operate off-line from the Evoenergy distribution network during power outages. Where backup generators are designed or required to operate in parallel with the Evoenergy network for more than 400ms, Evoenergy embedded generator connection requirements will apply.

Evoenergy may determine the need to implement SCADA and protection and monitoring infrastructure as a mandatory requirement for the connection on a case by case basis. All works to facilitate this connection must be funded by the proponent.

6.5 Removal of an Embedded Generating Unit

The proponent shall inform Evoenergy and their selected energy retailer if they wish to remove an embedded generating unit from the distribution network. Evoenergy will remove the generating unit from the register of embedded generating units within the ACT.

7. TESTING AND COMMISSIONING

All embedded generation systems shall be commissioned as per the requirements outlined in the relevant Evoenergy embedded generation technical requirements document.

For systems falling under the LV and HV embedded generation connection technical requirements, Evoenergy will provide formal documentation on completion of commissioning testing to acknowledge that all equipment has successfully completed the required commissioning testing.

Registered generators must agree with Evoenergy on a testing and commissioning plan.

This formal documentation alone does not allow the system to be energised. It is to prove that Evoenergy personnel have witnessed the commissioning process and are satisfied all technical requirements in the relevant embedded generation connection technical requirements have been met.

8. METERING

The proponent shall pay the costs of the supply and installation of metering equipment and arrange the metering by their chosen energy retailer. The operational requirements of the proponent and National Grid Metering must be addressed, with the appointment of the retailer / metering provider / meter data agent to be decided by the proponent.

Two forms of bi-directional metering are possible, '*Net*' or '*Gross*', however, depending on the electricity tariffs offered for the particular installation by the retailer, only one form will be offered. This document does not administer the eligibility for any feed-in-tariff or any other tariff.

The location of the bi-directional meter must comply with the requirements of the *Evoenergy Electricity Service & Installation Rules*. The metering point shall be within the proponent's installation and be as close as practical to the network connection point as per Chapter 7 of the NER.

The proponent / installer is responsible for ensuring adequate space to accommodate the new metering arrangement in the meter box. Any meter box or metering upgrade work is to be carried out by a licensed electrician / installer at the proponent's expense.

For a site of an existing installation with a proposed embedded generating unit, the proponent should contact their electricity retailer to arrange for the appropriate metering.

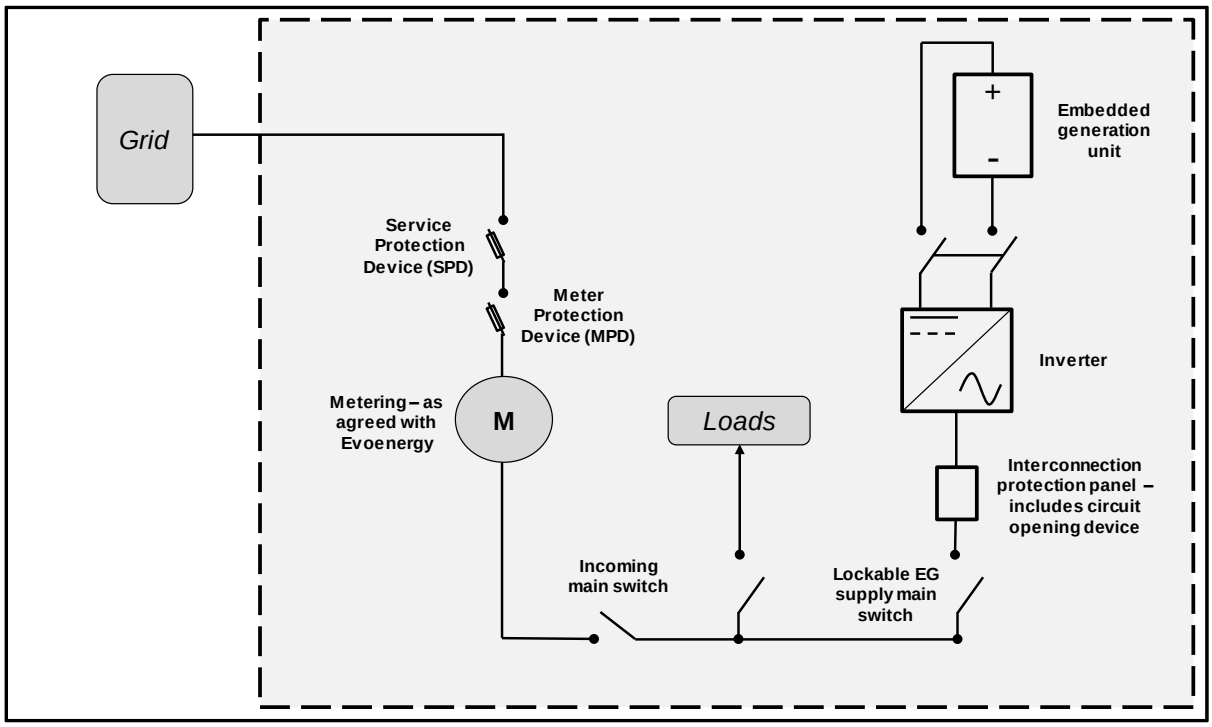
All metering must comply with the AEMO national metrology test procedure. For further details refer to Chapter 7 of the NER.

8.1.1 Net Metering

Net meters contain two registers, one to record energy flow into the installation and the other used to record energy flow out of the installation.

Net metering will not record the energy consumed within an installation that was produced at the same time by the embedded generating unit within the installation. Similarly, net metering will not record the energy produced by the embedded generating unit within the installation that was consumed at the same time by the load within the installation.

FIGURE 6. EXAMPLE OF NET METERING CONFIGURATION

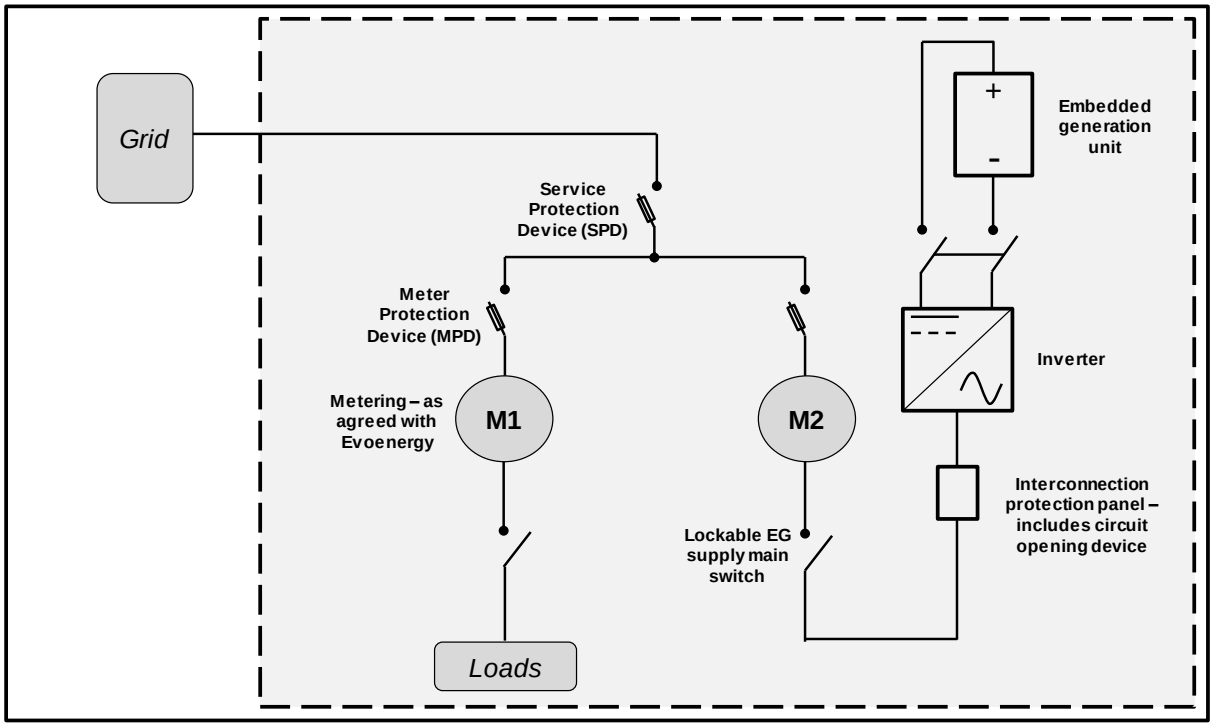


8.1.2 Gross Metering

Gross meters contain two registers, one to record energy consumed by the load and the other to record the energy produced by the embedded generating unit within the installation.

Gross metering will allow the recording of the energy consumed by the installation that was simultaneously produced by the embedded generating unit.

FIGURE 7. EXAMPLE OF GROSS METERING CONFIGURATION



8.2 Metering Location

The location of the bi-directional meter must comply with the requirements of the *Evoenergy Electricity Service & Installation Rules* – refer to section 5. The metering point shall be within the proponent's installation and be as close as practical to the network connection point as per Chapter 7 of the NER.

8.3 Metering Services Upgrades

The proponent / installer is responsible for ensuring adequate space to accommodate the new metering arrangement in the meter box. Any meter box or metering upgrade work is to be carried out by a licensed electrician / installer at the proponent's expense.

Please refer to the metering provider for further information.

8.4 Metering Provider

The proponent is responsible for engaging an accredited metering service provider through their electricity retailer

For a site of an existing installation with a proposed embedded generating unit, the proponent should contact their electricity retailer to arrange for the appropriate metering.

8.5 Current Transformer (CT) Metering

Current metering equipment is required for all embedded generating units connecting to the network that are rated at 60kW or greater.

8.6 High Voltage Metering

Any metering installation unit to be connected to the national grid and to operate under market conditions must have Voltage and Current Transformer National Association of Testing Authorities (NATA) traceable test certificates provided by the installing contractor or manufacturer. All metering must comply with the AEMO national metrology test procedure.

For further details refer to Chapter 7 of the NER.

9. OPERATIONS AND MAINTENANCE

The embedded generation system shall be operated and maintained to ensure compliance with the connection agreement and all legislation, codes and / or other regulatory instruments at all times.

The generator responsibilities shall include, but are not limited to, the following:

- Development of an operation and maintenance plan that will be provided to Evoenergy
- Maintaining the electrical installation at the supply address in a safe condition
- Changes to the electrical installation are performed by suitably qualified personnel and the generator holds a certificate of compliance issued in respect of any of the changes
- Approval is obtained from Evoenergy prior to altering the connection for any addition, upgrade, extension, expansion, augmentation or any other kind of alteration, including changing inverter settings
- Protection systems are to be tested by suitably qualified personnel at an interval no greater than five years after commissioning

Category specific (Micro, LV, HV & Registered Generators) operations and maintenance responsibilities are outlined in the relevant Evoenergy embedded generation technical requirements documents (PO0845, PO0844 & PO0843) and in Evoenergy Access Standards (for registered generators).

If Evoenergy wish to inspect a system at any time, they may do so at no cost to the generator.

In the event a system is deemed to be non-compliant, Evoenergy will contact the generator to 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 network are met. This process may vary depending on the severity of the risk posed by the system.

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*.

VERSION CONTROL

VERSION	DETAILS	APPROVED
1.0	Initial Document	M Lloyd – CTS Manager
1.1	Initial updated based on UTR feedback. Minor edit to one clause and format change to align headings	M Lloyd – CTS Manager
1.2	Minor adjustments	M Lloyd – CTS Manager
1.3	Template Change	M Lloyd – CTS Manager
1.4	Inclusion of Section 6.3 for registered generators	M Lloyd – CTS Manager
1.5	Adjustments throughout to provide consistent terminology	M Lloyd – CTS Manager
1.6	Changes made to SLD requirements in Appendix A	M Lloyd – CTS Manager
1.7	Update to remove RFS form and replace with Commissioning Form	M Lloyd – CTS Manager
1.8	Addition of Backup Generation Requirements	M Lloyd – CTS Manager
2.0	Update of document number from SM5060 to PO0842 and content to reflect	M Lloyd – CTS Manager

DOCUMENT CONTROL

DOCUMENT OWNER	PUBLISH DATE	REVIEW DATE
Customer Technical Services Manager	5 November 2020	5 November 2022

APPENDIX A – STATIC DATA AND INFORMATION

The complete static data requirements are outlined on the Embedded Generation application form available on the Evoenergy website. Static data that may be requested includes, but is not limited to, the following:

Generating Unit/s Description

A description of the proposed embedded generating unit, with the information included below, where applicable:

- Proposed operating mode(s) for systems; for example, peak lopping control regime, demand response regime, any storage strategies
- Proposed interaction with the Evoenergy distribution network under abnormal network conditions for example, network support operation and or customer islanded mode operation
- Details of any voltage control or power factor control strategies proposed
- Details of any energy storage capability
- Proposed local customer loads to be supplied from the embedded generating unit where applicable
- Known future staging / development of the embedded generating system and / or local customer loads

Single Line Diagram

Detailed single line diagram(s) shall be provided which must be :

- Site specific
- Match what is submitted on the connection application.
- Be in an electronic format (i.e. not hand drawn/ written)
- Show the manufacturer/model of each inverter, panels, relay, generator etc. (in line with the relevant Clean Energy Council Approved List)
- Identify phases involved in proposed system and all phases at each switchboard.
- Include the wiring from the panels to the connection point or meter.

Single line diagrams shall show the configuration of all embedded generating unit(s) / customer equipment with circuits between the generating unit(s) and the network connection point; including as a minimum:

- All primary circuit equipment such as main switchboards, other switchboards, circuit breakers and isolators / load break switches. In particular, all points where the customer embedded generating unit and the Evoenergy distribution network can be connected / disconnected must be clearly identified from end-to-end. It must be shown which phases the system will connect to
- All secondary protection and control equipment associated with the embedded generating unit's connection and parallel operation with the Evoenergy distribution network including, current transformers, voltage transformers, protection and control elements (using ANSI codes), SCADA and sensing points
- Local customer load connections including any interconnections with other parts of the customer's installation. In particular, where interconnection with other parts of the customer's installation is proposed the means to prevent paralleling of Evoenergy substations / transformers and / or unsynchronised connection to the distribution network shall be clearly identified
- All metering equipment associated with the embedded generating unit and the import and export of power from / to the Evoenergy distribution network
- All proposed power factor correction equipment that will be installed within the part of the customer's installation that is supplied directly from the embedded generating unit

Protection Information

Detailed functional block / schematic diagram of the protection and control systems relevant to the embedded generating unit's connection to the Evoenergy distribution network which includes an in-depth technical philosophy of the protection and control systems including:

- All relevant relay current circuits and relay potential circuits
- Alarm Circuits, monitoring circuits and Back-up systems
- Auxiliary power supply systems
- Proposed parameters / settings of all protection and control system elements

APPENDIX B – EMBEDDED GENERATION CLEARANCE FORM

Embedded Generation System Information

Site Name:	
Site Address:	
Block / Section:	
Substation Number:	
Embedded Generation System Size:	
Number Of Inverters And Size:	
Commissioning Date:	

System Installer Details

Name:			
Company:			
Telephone / Mobile:		**Email:**	

Commissioning Technician Details

Name:			
Company:			
Telephone / Mobile:		**Email:**	

Commissioning Endorsement Sign Off

Signing the endorsement below indicates that the relevant system satisfies all requirements set out in relevant Evoenergy Embedded Generation Technical Requirements, Embedded Generation Connection Requirements and the Evoenergy Service and Installation Rules.

Name	Title	Signature	Date
	Commissioning Technician		
	Evoenergy Representative		

Notes:

1. This document is to be submitted prior to the energisation of relevant embedded generation system
2. The commissioning technician is responsible for undertaking all commissioning tests and checks
3. This form does not specify the requirements for connection, please refer to the relevant Evoenergy Embedded Generation Technical Guidelines and Connection Process for detailed requirements

Comments