Jemena Electricity Networks (Vic) Ltd

Negotiated Connection Process (Embedded Generators)

(Embedded Generators with total capacity of up to 5 MVA)

Public

1 May 2024

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GLOSSARY

augmentation means work to enlarge the *distribution system* or to increase its capacity to distribute electricity.

basic micro embedded generator connection service means a *basic connection service* for a *retail customer* who has a *micro embedded generator*.

basic connection service means a connection service which involves a new connection or a connection alteration for which a *model standing offer* has been approved by the AER and that does not involve any *micro embedded generator*.

connection means a physical link between a distribution system and a *retail customer's* premises to allow the flow of electricity

connection applicant means an applicant for a connection service of one of the following categories:
(a) *retail customer*;
(b) retailer or other person acting on behalf of a *retail customer*;
(c) *real estate developer*.

connection assets means those components of a transmission or *distribution system* which are used to provide *connection services.*

connection charge means a charge imposed by Jemena for a *connection service* in accordance with Jemena's Connection Policy.

connection service means either or both of the following:
(a) a service relating to a new *connection* for premises;
(b) a service relating to a *connection alteration* for premises.

distribution system means a distribution network, together with the *connection assets* associated with the distribution network, which is connected to another transmission or distribution system. Connection assets alone do not constitute a distribution system.

embedded generator means a person that owns, controls or operates an *embedded generating unit.*

embedded generator connection service means a *connection service* for the connection of *embedded generator.*

embedded generating unit means a generating unit connected within a distribution network and not having direct access to the transmission network.

micro embedded generator 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).

micro embedded generator means a *retail customer* who operates, or proposes to operate, an embedded generating unit for which a *micro embedded generator connection* is appropriate.

model standing offer means a document approved by the AER as a *model standing offer* to provide *basic connection services*.

negotiated connection contract means a connection contract negotiated between Jemena and a *connection applicant* under rule 5A.C of the NER.

non-registered embedded generator means an embedded generator that is neither a *micro embedded generator* nor a registered participant in the National Electricity Market under the NER.

standard connection service* for *embedded generator means an *embedded generator connection service* (other than a *basic micro embedded generator connection service*) for a particular class (or sub-class) of connection applicant and for which an *embedded generator connection service model standing offer* has been approved by the AER.

ABBREVIATIONS

AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
DUoS	Distribution Use of System
JEN	Jemena Electricity Networks (Vic) Ltd
NER	National Electricity Rules
NMI	National Meter Identifier
PV	Photo-voltaic (i.e. solar)
SLD	Single Line Diagram

1. INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

This document has been developed to assist customers with the connection of their *embedded generating units* to Jemena's distribution network. The process described in this document applies to those customers who are eligible and elect to use the connection process outlined in Chapter 5A of the National Electricity Rules (**NER**). Generally this applies to embedded generators with total capacity ranging from 30 kVA to 5 MVA that are not registered with the Australian Energy Market Operator (**AEMO**) (i.e *non-registered embedded generators*). However, *basic micro embedded generator connection applicants* may also elect to negotiate a *connection contract* under this process.

The purpose of this document is to:

- inform customers of their right to negotiate with Jemena a *negotiated connection contract* for an *embedded generator connection service*;
- provide guidance to customers on the *negotiated connection* process for *embedded generator connection services*;
- outline the information to be provided by the customer and the information that Jemena will make available to the customer at the enquiry and application stages of the connection process; and
- outline the factors Jemena will take into account when assessing a *connection* application.

1.2 RELATED INFORMATION

This document should be read in conjunction with:

- Jemena Electricity Networks Connection Policy
- Jemena Electricity Networks Negotiated Connection Process (Load Connections)
- Jemena's relevant technical guidelines including:
  - Connection Guidelines for Inverter Energy Systems 30 kVA – 200 kVA (ELE GU 0014);
  - Embedded Generation Guidelines (JEN GU 0020);
  - Various embedded generation emergency backstop procedures and guidelines, including:
    - Embedded Generation Backstop Guideline (Above 30kVA) – DoE Over SCADA and Generator Monitoring Meter Methods (ELE-999-GL-EL-007);
    - Inverter CSIP-AUS Capability Commissioning Test Procedure; and
    - Embedded Generator Emergency Backstop Procedures.

2. NEGOTIATED EMBEDDED GENERATOR CONNECTIONS

2.1 RIGHT TO NEGOTIATE

A *connection applicant* has the right to negotiate a *negotiated connection contract* with Jemena for an *embedded generator connection service* including a *basic micro embedded generator connection* even though we have a *model standing offer* for *basic micro embedded generator connection services*.

In relation to *embedded generator connection services*, note the following:

- Jemena has a *model standing offer* for the connection of *micro embedded generators* with capacity up to 10 kVA per phase, at a single connection point to the network
- Jemena does not provide *standard connection services* for *embedded generators*; and
- A *non-registered embedded generator* may seek connection under the negotiation framework described in clause 5.3A of the NER rather clause 5A.C.3. The process for connection under this framework is described in Jemena's "Description of Connection Process for Embedded Generation 5 MVA or Greater (ELE PR 007)".

2.2 NEGOTIATION FRAMEWORK

Jemena's negotiation framework for *a negotiated connection contract* is set out below:

- Jemena and the *connection applicant* must negotiate in good faith.
- The *connection applicant* must provide Jemena with information it reasonably requires to negotiate on an informed basis.
- Jemena will provide the *connection applicant* with any information they reasonably require in order to negotiate on an informed basis.
- If Jemena considers it necessary, we may consult with other users of the distribution network who may be adversely affected by the *connection of the embedded generator*.
- When assessing the application we will determine:
  - the technical requirements for the embedded generator connection;
  - the extent and cost of any necessary *augmentation* of the *distribution system*;
  - any consequent changes to the distribution use of system (DUoS) service charge; and
  - any possible material effect of the proposed embedded generator connection on the network power transfer capability of our distribution network.

2.3 CONNECTION APPLICATION FEE

The *connection applicant* is required to pay a non-refundable connection application fee at the time the *connection applicant* submits the connection application. The application fee is to cover the reasonable costs of all work anticipated to be incurred by Jemena (and, if applicable, any other costs anticipated to be incurred by other Network Service Provides or AEMO) in responding to any information the applicant reasonably requires in order to negotiate on an informed basis, assessing the application and making the associated connection offer. It includes, but is not limited to, the following elements:

- Review of technical information;
- Attendance at meetings, discussions etc. as required;
- Analysis of possible network impacts including assessment of any network *augmentation* requirements;
- Power quality survey (if required);
- Prepare scope of work;
- Completion of high-level, front-end design;
- Preparation of an estimate for the conduct of works necessary to undertake the *connection service*; and
- Preparation of the *connection offer*;

The application fee will be commensurate with the size and complexity of the negotiated *connection service*. As it will vary between connection projects, Jemena will advise the connection applicant of the connection fee amount at the time of the response to connection enquiry.

2.4 CONNECTION CHARGES

A person who makes a connection application to connect an *embedded generator* (excluding retail customers who apply to connect a *basic micro embedded generator connection service*) must pay the full costs of the *connection assets* and any cost of removing distribution network constraints that are specific to the *connection* of the *embedded* generator.

If the *connection applicant* has an existing load connection and no network *augmentation* is required to facilitate connection to the *embedded generator*, there will still be some *connection charges* to cover the reasonable expenses of all work anticipated to arise from witnessing and reviewing test reports during testing and commissioning phase (including embedded generation emergency backstop related activities). If the connection application is also for new load connection, the capital contribution will be calculated based on the total cost of the connection works required to support both the generation (expected electricity output) and load components of the *connection service* in accordance with Jemena's Connection Policy.

3. CONNECTION PROCESS

The negotiated connection process for *connection* of *embedded generators* to the Jemena's distribution network is summarised in Figure 3–1 and described in the following sections.

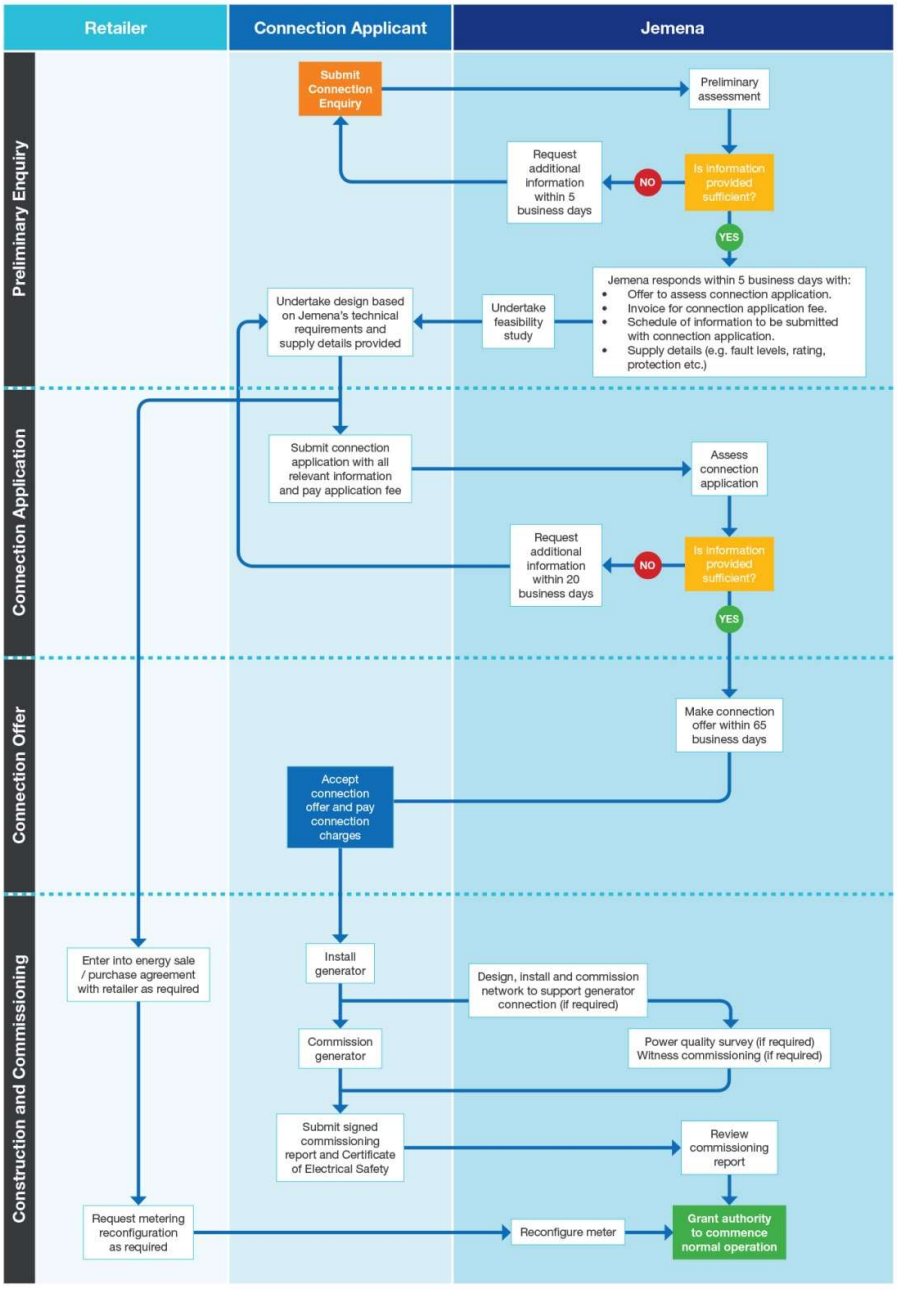

Figure 3–1: Negotiated connection process for embedded generators

3.1 PRELIMINARY ENQUIRY

To initiate the *negotiated connection process* for an *embedded generator*, you will need to submit a completed embedded generator connection enquiry form to Jemena. The following information should be provided in the enquiry form:

- *Embedded generator* details;
- *Connection applicant* details;
- Address of *embedded generator* installation;
- National Meter Identifier (**NMI**) if it's an existing connection;
- Energy source / fuel (e.g. natural gas, wind, solar PV etc.)
- Generator technology (e.g. synchronous turbine, inverter etc.);
- Generator installation capacity (kW and kVA);
- Number and rating of generating units (kW and kVA);
- Maximum / minimum site load (kVA); and
- Initial concept single line diagram (if available);

Jemena will provide a response to *embedded generator* connection enquiries within 5 business days (or as otherwise agreed). In responding to an enquiry, we will provide an offer to assess the connection application and an invoice for the connection application fee (refer to Section 2.3 for details). We will also include in our response a schedule of information that must be provided with the *connection application* and provide any network information that you reasonably require in order to prepare a connection application (e.g network fault levels and protection details).

3.2 INVESTIGATION AND FEASIBILITY STUDIES

Prior to submitting a connection application you may engage Jemena to undertake a site-specific connection feasibility study. This study can be tailored to meet your specific requirements, and may include (but not limited to) the following:

- Assessment of project feasibility;
- Network capacity assessment;
- Analysis of various connection options;
- Load flow, fault level and power quality studies;
- Advice on whether network *augmentation* is required to accommodate the proposed embedded generator connection;
- High level cost estimates for various connection options; and
- Indicative delivery timeframes.

Feasibility studies will be undertaken on a fee for service basis and you will be provided with a quote before proceeding. We will proceed with the agreed feasibility study upon receipt of payment.

3.3 CONNECTION APPLICATION

After considering the information provided by Jemena in the response to the connection enquiry, the *connection applicant* may make a *connection application* for the network connection service by submitting a completed embedded generator connection application form. The *connection applicant* must pay the application fee and include the information specified in the Connection Application – Embedded Generation form. The information to be provided with the connection application will vary depending on the size and technology of the proposed *embedded generating units*.

In general, confirmation of the location, proposed capacities, type of generator and connection arrangements need to be provided by the *connection applicant* for the assessment. In addition, the *connection applicant* must include the following information (where relevant), but not limited to, in a connection application:

- Maximum transfer capability (MW and MVA)
- Single Line Diagram (**SLD**);
- Site layout diagram highlighting location of generator and generator isolating device;
- Generator plant data;
- Size and rating of all relevant power transformers (and test certificates prior to connection)
- Protection and control philosophy and design
- Communication systems;
- Voltage control;
- Fault level and power quality analysis;
- Emergency backstop design report including, but not limited to:
  - Inverter, CSIP-AUS Gateway (if applicable) and central protection relay manufacturer and model details;
  - Proposed inverter and central protection relay protection settings including settings calculations and operate times;
  - Solution implementation details to demonstrate compliance to the requirements outlined in "*Embedded Generation Backstop Guideline (Above 30kVA) – DoE Over SCADA and Generator Monitoring Meter Methods (ELE-999-GL-EL-007)"* (if applicable)*;*
  - Intended system communication method including, but not limited to;
    - Communication Type (i.e. CSIP-AUS)
    - Is there internet connectivity with utility server?
    - Subsequent export limit chosen – refer to "Embedded Generator Emergency Backstop Procedures"
- Testing and commissioning program.

Upon receipt of a connection application we will undertake a review of the information provided to determine completeness. You will be notified within 20 business days if we require any additional information to assess the application.

3.4 CONNECTION OFFER

We will use our best endeavours to make a *connection offer* to you within 65 business days of the date of receipt of the complete *connection application*. This *connection offer* will be in the form of executable agreements to facilitate network *augmentation* works (if required) and the ongoing operation and maintenance of the *embedded generator* (Generator Connection Agreement) including, but not limited to, the following:

- Details of the connection point, the maximum capacity of the connection to import and export electricity and details of the premises connection assets;
- Embedded generation emergency backstop requirements;
- Metering requirements;
- Technical and safety obligations to be met by the *embedded generator*;
- Scope and cost of network *augmentation* works (if required);
- Commercial terms and conditions for the *connection service*;
- Ongoing fees to be paid by the *embedded generator* (if applicable); and
- Ongoing payments to be made by Jemena for services provided (if applicable);

The *connection offer* will remain open for acceptance for 20 business days from the date of the offer and then lapses unless the period for acceptance is extended by agreement between Jemena and the *connection applicant*.

3.5 CONSTRUCTION AND COMMISSIONING

You are required to undertake suitable testing to confirm compliance with the connection agreement including the intended design of all safety, protection, control, metering systems associated with the generator together with the electrical integrity of all primary circuit equipment.

A testing and commissioning program shall be submitted to Jemena as part of the connection application. The program should include the final protection settings as agreed with Jemena and should be of sufficient detail to allow us to understand what is being tested and the pass/fail criteria for each test. The testing and commissioning program (including embedded generation emergency backstop) shall detail testing methodology and test equipment which will be used.

You must provide an opportunity for Jemena to witness any tests and to request any tests to be repeated if the test results do not demonstrate compliance with the agreed access standard. The tests shall be performed by suitably competent testing personnel with appropriately calibrated test equipment.

Following commission of the generator, you must submit the following documentation for review:

- Signed and dated commissioning report (including embedded generation emergency backstop commissioning testing);
- Test software generated original test report of the secondary injection test (if available);
- Screenshot of the export limit settings used in the export energy smart meter and commissioning report showing export limit test results (if applicable); and

- Certificate of electrical safety demonstrating that the generator installation has been inspected by a licensed electrical inspector.

Once all documentation has been received and approved, Jemena will grant you permission to commence normal operation of the generator.

3.5.1 POWER QUALITY SURVEY

Jemena may require a power quality survey to be undertaken both prior to and following connection of the generator, particularly in cases where the connection to the Jemena's distribution network is in an area that has:

- high solar photo-voltaic (**PV**) penetration;
- a known power quality issue; or
- high supply impedance (i.e. weak connection point).

The requirement for a power quality survey will be determined on a case-by-case basis and will be undertaken by Jemena. The fee for this service will be factored into the *connection charge* and provided in the *connection offer*.

In cases where a power quality survey has been deemed necessary, Jemena will require at least one month notice prior to commencement of commissioning of the generator. Jemena will co-ordinate site access with the *connection applicant* as required.

3.6 GENERATOR MAINTENANCE

You are required to prepare and keep active a 5-year forward maintenance program. Jemena may request access to the maintenance program and maintenance and test reports for review in order to establish generator compliance with the program. Maintenance records should be maintained for at least 7 years.

3.7 GENERATOR ALTERATIONS

If you are proposing to alter your *generating plant* in a manner which might reasonably be considered to affect the performance relative to the technical requirements outlined in the Embedded Generator Connection Agreement, you must obtain prior approval from Jemena. Jemena may require you to conduct tests to demonstrate that the generating system has been modified in accordance with the proposed alteration and remains compliant with the technical requirements. No changes are permitted to tested protection, control, metering and monitoring systems without consultation with Jemena.

Modifications which do not require prior approval from Jemena are:

- Like for like replacement of the generator (i.e. same model, capacity and manufacturer);
- Like for like replacement of solar panels (i.e. no increase in rating); and
- Replacement of an isolator/switch with an equivalent isolator/switch.