



# Non-registered embedded generator application guidelines

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Part of NER 5A information pack

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Asset and Network Planning

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July 2015

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## Document Amendment History

Version No.	Publication Date	Prepared By	Comments
0.1	July 2015	Asset and Network Planning	

### Disclaimer

Endeavour Energy may change the information in this document without notice. All changes take effect on the date made by Endeavour Energy. All examples quoted are based on fees at the time of publishing this document and future fees will be based on the current Endeavour Energy Price List at that time.

## 1.0 Overview

These application guidelines provide details of the application process for embedded generators with capacity of between 10kW and 5MW and exempt by AEMO from the requirement to register as a generator in accordance with section 2.2.1(c) of the National Electricity Rules and guidelines issued by AEMO under that section. A standard connection service will be provided and the specific provisions set out in Schedule 3 of the Model Standing Offer for a Standard Connection Service will apply.

For non-registered embedded generators 5MW and greater connecting under Chapter 5A, a negotiated connection service will be provided that is largely based on a standard connection service. For non-registered embedded generators 5MW and greater who wish to connect under Chapter 5 of the National Electricity Rules please refer to the [Embedded Generators 5MW and greater connection service](#).

## 2.0 References

These guidelines will need to be read in conjunction with the following documents available on the Endeavour Energy website. Links have been provided to the current versions of these documents at the time of writing this document.

- The [Endeavour Energy connection policy](#);
- The Endeavour Energy [Network Price List](#); and
- The Model Standing Offer for a [Standard Connection Service](#)

## 3.0 Application process

### 3.1 Description for lodging an application

An overview of the application process is shown in Annexure A.

A connection applicant can submit a connection enquiry by completing a technical review request, Form FPJ6008 available on the Endeavour Energy website for '[Small and medium embedded non-registered generator connection services](#)'.

Once Endeavour Energy has provided a preliminary enquiry response, the connection applicant can lodge an application. Non-registered embedded generators connecting under Chapter 5A will generally fall under a Standard Connection Service with the terms and conditions provided in the Model Standing Offer for a Standard Connection Service. The application process is shown in Annexure A.

### 3.2 Contestable Connection Services

The *Electricity Supply Act 1995* specifies requirements relating to the provision of customer connection services and allows customers to choose suppliers for providing those services - these are contestable works (please refer to the NSW Trade and Investment Code of Practice – Contestable Works). Design, construction and connection works for network extensions and augmentations will generally be considered contestable connection services.

Where work needs to be done on critical or high risk assets, these works will be customer funded services provided by Endeavour Energy. Works fitting this category will be determined by Endeavour Energy and based on concerns for safety, reliability or the critical nature of the works. A list of Endeavour Energy provided services and the associated charges can also be found in the [Network Price List](#). Please refer to the [Endeavour Energy connection policy](#) for more details on contestable connection works.

Customers are required to engage Accredited Service Providers (ASP) of their choice to undertake these works and will be separately liable to those Accredited Service Providers for costs related to those

works. Contestable connection works must be carried out in accordance with Endeavour Energy's Standard Connection Service and associated Model Standing Offer for Standard Connection Service for Customers

Any work on the Endeavour Energy network will need to be conducted by Accredited Service Providers whose personnel are authorised to work on the Endeavour Energy network and can demonstrate an understanding of Endeavour Energy's Electrical Safety Rules.

Ancillary Network Services are provided by Endeavour Energy to cover our interactions with ASPs to ensure that the connection works undertaken by ASPs meet appropriate design and technical requirements to be connected to and form part of our network. The list of Ancillary Services and charges can be found in the [Endeavour Energy Network Price List](#).

## 4.0 Charges

### 4.1 Connection Charges

User pays principles are applied to connection works associated with extending the network to establish a connection point or augmentations of the existing network. Since the proponent of these works must fund them, they can engage their own designers and service providers to complete these contestable connection works.

Endeavour Energy will facilitate the contestable connection works by providing administration, design information, audit and project management services and collects costs by way of fees. All fees will be calculated using the hourly labour rates set by the AER and listed in the [Endeavour Energy Network Price List](#) located on Endeavour Energy's website under Fees, charges and bonds.

Endeavour Energy will undertake any Endeavour Energy Provided Chargeable Connection Services in accordance with the Connection Policy and the Model Standing Offer for a Standard Connection Service for Customers. Other fees or charges applicable to contestable connection works and network connection charges can be found in the Endeavour Energy Connection Policy. All of these documents are available on the Endeavour Energy website.

### 4.2 Enquiry Fee

The technical review request, Form FPJ6007, identifies the typical costs for processing an enquiry.

A simple enquiry for a generator would cover LV inverter connected generation systems or standby generators. The charge of \$101.43 is based on AER approved rates<sup>1</sup> and covers the cost for processing the enquiry and establishing the project.

As fees associated with normal applications for connection services represent a more cost effective solution. Applications for all generators connected at LV are encouraged, unless the projects are staged, of a complex nature, a review of supply availability is required or the application is not possible without an initial enquiry.

Generators above 1.5MW must be connected at HV so there is greater stakeholder involvement required. A number of studies will need to be conducted including a planning study, a protection study and a network impact assessment. The enquiry fee will depend on the generator connection and would vary from generator to generator.

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<sup>1</sup> Based on the AER approved rates stated in the Endeavour Energy Network Price List at the date of publishing this guideline.....

An example of an enquire fee breakdown is shown below<sup>2</sup>:

Coordinating, processing and assessing the connection application	16 hours (\$3,900)
Stakeholder engagement	40 hours (\$9,600)
<b>Enquiry fee total</b>	<b>56 hours (\$13,500)</b>

### 4.3 Application Fee

The application fee will depend on the level of work required by Endeavour Energy to review and assess a generator connection application and will vary from generator to generator.

An example for a generator connected at HV is shown below<sup>3</sup>.

Coordinating, processing and assessing the connection application	8 hours (\$1,600)
Planning Studies	62 hours (\$12,600)
Development of the project definition	132 hours (\$25,400)
Connection offer service fee for a standard connection	\$260.85
<b>Connection Application Fee Total</b>	<b>\$ 39,860.85</b>

The above estimates for the enquiry fee and application fee exclude the following charges which will be passed through to the customer:

- Consultant studies, specialist reports and other stakeholder involvement;
- Ancillary service fees;
- Protection testing and commissioning charges that may apply subject to the scope of work.

## 5.0 Generator Technical Requirements

### 5.1 Standards and regulations

The Service and Installation Rules of NSW state the technical requirements that apply to connections to the Endeavour Energy network. Endeavour Energy standards are also available providing additional information that apply to the design, construction and operation of network connections and substations. All standards are on the [Endeavour Energy Standards website](#). The connection applicant will need to ensure the latest version of the Endeavour Energy Standards is used at all times.

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<sup>2</sup> Based on the AER approved rates stated in the Endeavour Energy Network Price List at the date of publishing this guideline.

<sup>3</sup> Based on the AER approved rates stated in the Endeavour Energy Network Price List at the date of publishing this guideline.

The table outlines the technical requirements to be met by an embedded generator connection:

NER Clause	Requirement	Relevant Endeavour Energy Standard
5.3A.3(b)(6)(i)	protection systems and protection schemes;	PDI5000 - Protection of embedded generation systems
5.3A.3(b)(6)(ii)	fault level management principles;	PDI5000 - Protection of embedded generation systems
5.3A.3(b)(6)(iii)	reactive power capability and power factor correction;	MDI0043 - Grid connection of embedded generation through inverters
5.3A.3(b)(6)(iv)	power quality and how limits are allocated;	MDI0050 - Power Quality Limits and Levels
5.3A.3(b)(6)(v)	responses to frequency and voltage disturbances;	MDI0043 - Grid connection of embedded generation through inverters
5.3A.3(b)(6)(vi)	voltage control and regulation;	MDI0043 - Grid connection of embedded generation through inverters
5.3A.3(b)(6)(vii)	remote monitoring equipment, control and communication requirements;	PDI5000 - Protection of embedded generation systems ADI0012 - Substation automation systems
5.3A.3(b)(6)(viii)	earthing requirements and other relevant safety requirements;	MDI0043 - Grid connection of embedded generation through inverters
5.3A.3(b)(6)(ix)	circumstances in which augmentation may be required to facilitate integration of an embedded generating unit into the network; and	MDI0043 - Grid connection of embedded generation through inverters
5.3A.3(b)(6)(x)	commissioning and testing requirements;	PDI5000 - Protection of embedded generation systems

In general, the technical requirements for generators provided within Chapter 5 of the NER will form the starting point for connecting embedded generators under the Chapter 5A process.

The schedules listed below are stated in the National Electricity Rules Chapter 5 Schedule 5.2 – Conditions for connection of generators available on the [Australian Energy Market Commission Website](#).

- Reactive power capability (S5.2.5.1);
- Quality of electricity generated (S5.2.5.2);
- Generating unit response to frequency disturbances (S5.2.5.3);
- Partial load rejection (S5.2.5.7);
- Protection of generating units from power system disturbances (S5.2.5.8);
- Protection systems that impact on power system security (S5.2.5.9);
- Asynchronous operation of synchronous generating units (S5.2.5.10);
- Frequency Control (S5.2.5.11);
- Stability (S5.2.5.12);
- Excitation control system (S5.2.5.13);
- Remote monitoring (S5.2.6.1);
- Communications equipment (S5.2.6.2);
- Fault level (S5.2.8).



## 5.2 Voltage Levels for Connections

The maximum generator output that may be connected at each voltage level will be assessed on an individual basis. The table below provides indicative voltage levels at which embedded generators can connect to the network.

Consideration may be given in special situations to permit higher outputs at each voltage level in the network where the capacity is available in the network and there are identified advantages to Endeavour Energy in doing so.

Network Connection Voltage	Maximum Generator Capacity
230V single phase	16kW
400V Three phase	50kW
11kV	3MW
22kV	5MW

## 5.3 Preferred Connection Arrangements

Embedded generator connection arrangements will be assessed on an individual basis and will depend on the generator requirements and the available network capacity. The connection arrangement together with the metering arrangements will need to comply with all relevant Australian Standards, Endeavour Energy standards and technical requirements.

There are a large number of possible combinations of generation type, size and connection voltage hence only a sample schematic is shown in Annexure B. This schematic is only indicative as customers will be required to design protection schemes and general arrangements as per the network requirements at the point of connection.

## 6.0 Dispute resolution

The Connection Applicant may ask Endeavour Energy to review its decisions and processes in relation to the Connection Offer.

Endeavour Energy's procedures for dealing with complaints, disputes and requests for review of its decisions are set out in the Endeavour Energy Procedures for Customer Complaints, Appeals and Disputes which are available on request, and on Endeavour Energy's website at [www.endeavourenergy.com.au](http://www.endeavourenergy.com.au).

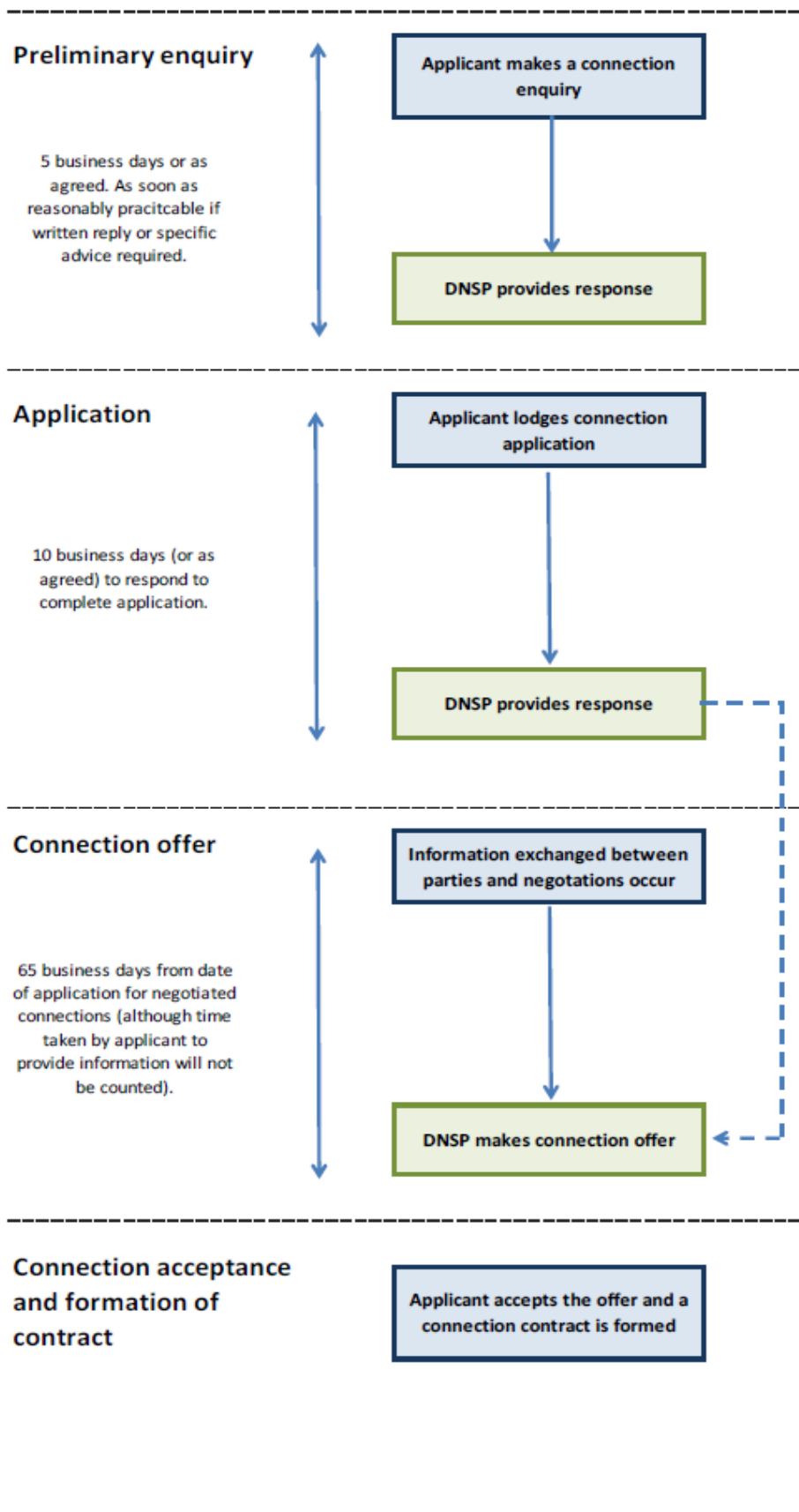
If the Connection Applicant is a Small Customer, the Connection Applicant may, without any cost to the Connection Applicant, refer any complaint or dispute arising in connection with Endeavour Energy's decisions and process for negotiating and making a Connection Offer to the Energy and Water Ombudsman of NSW (EWON) and Endeavour Energy agrees to abide by any decision of EWON made in relation to such a dispute.

The Connection Applicant acknowledges that:

- (i). EWON may require the Connection Applicant to provide Endeavour Energy with an opportunity to address the Connection Applicant's complaint or dispute in accordance with the Endeavour Energy Procedures for Customer Complaints, Appeals and Disputes before it will investigate the Connection Applicant's complaint or dispute; and
- (ii). generally EWON expects Connection Applicants to have attempted to resolve the complaint or dispute with Endeavour Energy before contacting EWON.



## Annexure A – Application Process



## Annexure B – Sample Connection Arrangement and protection schematic

