

Jemena Electricity Networks (Vic) Ltd

Embedded Generation - Example Charges and Fees

Embedded Generation - 5 MW or Greater

ELE PR 0007 RG 01

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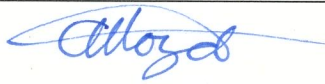

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TABLE OF CONTENTS

Abbreviations	iv
1. Introduction	1
2. Notes and Assumptions	2
3. Connection Enquiry and Application Assessment Fee Examples	3
4. Connection Service Charges	5
4.1 Worked Example of Connection Works for network augmentation	5

List of tables

Table 1: Example Connection Enquiry and Assessment Fees	4
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ABBREVIATIONS

AEMO	Australian Energy Market Operator
CYME	Cooper Power Engineering simulation software package
DNSP	Distribution Network Service Provider
EG	Embedded Generator
MW	Megawatts
NER	National Electricity Rules
PSS/E	Power System Simulator for Engineers software package
RTU	Remote Terminal Unit
SCADA	Supervisory Control and Data Acquisition
TNSP	Transmission Network Service Provider

1. INTRODUCTION

The objective of this document is to provide example estimates of the fees charged by **JEN** for the assessment of embedded generation connection enquiries and applications and the underlying assumptions. The estimates represent a typical connection with standard commercial terms.

To understand JEN's position on technical connection issues and the standard terms and conditions, it is recommended that this document be reviewed by the proponent in conjunction with the following:

1. Embedded Generators greater than 5 MW - Connection Principles and Guidelines (ELE GU 0004);
2. Embedded Generators greater than 5 MW - Technical Access Standards (ELE SP 0003);
3. Embedded Generators greater than 5 MW – Description of Connection Process (ELE PR 0007); and
4. Model Embedded Generation Connection Agreement (ELE PR 0007 RF 01).

JEN's costs are determined by a range of factors including, but not limited to:

- the location of the connection point and complexity of the connection proposed;
- the size of the generation project;
- technology of generation system;
- whether it is a new connection or for alteration of an existing generating system;
- the extent of negotiations on generator access standards;
- the extent of commercial negotiation required; and
- the extent of legal drafting required.

2. NOTES AND ASSUMPTIONS

JEN has made the following assumptions providing the indicative cost estimates:

- Cost estimates represent JEN's fees and charges only. Assessment fees and connection service charges as they pertain to the transmission network service provider (**TNSP**), other distribution network service provider (**DNSPs**) and **AEMO** are excluded and will be calculated on a project by project basis.
- The cost estimates are indicative only and actual costs may be higher or lower than indicated depending on the complexity of the project and the quality of information provided by the connection applicant. These estimates assume that:
 - the connection applicant provides JEN with all relevant technical data, protection and control studies reports, simulation models etc. that meet JEN's requirements at the connection enquiry and application stage;
 - JEN is not required to investigate supplier datasheets or technical manuals on its own accord;
 - the simulation models are provided in **PSS/E** or **CYME** format. If models are required to be built for simulation purposes, additional time will be required and additional cost will be incurred. The process clock for enquiry or application stages will be paused during this time;
 - the due diligence assessments of AEMO and any other network service providers are limited in scope and do not require extensive interaction with JEN; and
 - during commissioning or post-commissioning, the generating system performs as originally negotiated, and there is no need to change control system settings or renegotiate agreed performance standards.
- Extra costs will be incurred if applicants wish to negotiate non-standard commercial terms and conditions and/or raise issues that require the use of external lawyers and additional time for JEN's staff.
- Work is undertaken in normal working hours only. Extra costs will be incurred for work carried out outside these hours, either overnight or during weekends and public holidays.
- Estimates do not include:
 - AEMO registration fees;
 - Site visits for witnessing of commissioning tests or monitoring compliance; and
 - Any other JEN tasks not specifically mentioned within this document.
- Fees and hourly rates will be reviewed periodically.

3. CONNECTION ENQUIRY AND APPLICATION ASSESSMENT FEE EXAMPLES

Table 1 below lists itemized estimates for JEN's assessment of the proponent's connection enquiry and application. Note that these estimates apply for new connections of greater than 5 MW. Examples are provided below:

- Connection Type A – A 5 MW project connecting to the HV system that meets JEN Automatic Access Standards and requires limited technical analysis by JEN. Minimal negotiations between JEN and the proponent on technical access standards and commercial terms. Also, the connection does not require any network augmentation work.
- Connection Type B – A 10 MW project connecting to the HV system that requires JEN to perform detailed technical analysis and potential negotiation to JEN Access Standards. There are limited one to two rounds of negotiations between JEN and the proponent on technical access standards and commercial terms. The connection does not require network augmentation work.
- Connection Type C – A 30 MW project connecting to the sub-transmission system that requires JEN to perform significant technical analysis and negotiation to JEN Access Standards. There are up to three rounds of negotiations between JEN and the proponent on technical access standards. JEN Legal is extensively involved in negotiation of contractual terms. The connection requires augmentation works to the JEN network.

Table 1: Example Connection Enquiry and Assessment Fees

	Connection Type A	Connection Type B	Connection Type C
Enquiry - Stage 1 (Preliminary)			
Client Liaising and Clock Management			
Review of Enquiry Form / Identify Deficiencies	\$ -	\$ -	\$ -
Prepare Preliminary Response			
Enquiry - Stage 2 (Detailed)			
Client Liaising and Clock Management			
Project Management			
Review of Customer Data / Identify Deficiencies	\$ 8,850	\$ 12,450	\$ 20,850
Prepare generator technical access standards			
Prepare Detailed Response			
Application Stage			
Client Liaising and Clock Management			
Project Management			
Review of Customer Data / Identify Deficiencies			
Review Customer Technical reports	\$ 25,400	\$ 39,800	\$ 80,800
Negotiate and finalize generator technical access standards			
Liaise with third parties (AEMO / NSP)			
Develop tariff, pricing and commercial contracts			
Negotiate commercial contracts			
Pre-Commissioning Activities			
Review of EG Detailed Design / Compliance			
Review of of EG Test Plan and Commissioning Plan	\$ 7,200	\$ 10,200	\$ 15,600
Witness Commissioning Tests			
Review Commissioning Test Report			
Jemena Cost Estimate	\$ 32,600	\$ 50,000	\$ 96,400

4. CONNECTION SERVICE CHARGES

The National Electricity Rules define Connection Service as ‘An entry service (being a service provided to serve a Generator or a group of Generators, or a Network Service Provider or a group of Network Service Providers, at a single connection point) or an exit service (being a service provided to serve a Transmission Customer or Distribution Customer or a group of Transmission Customers or Distribution Customers, or a Network Service Provider or a group of Network Service Providers, at a single connection point)’.

The charges associated with connection services vary on a project by project basis. JEN’s experience is that there is significant variation in charges based on a number of factors including, but not limited to:

- the location of the connection point and complexity of the connection proposed;
- the existing network infrastructure to support the new connection (e.g fault level limitations) and extent of network augmentation required;
- requirement for review of JEN’s existing protection and control systems; and
- requirement for and nature of network augmentation works.

As prescribed within Chapter 5 of the NER, so far as is relevant and in relation to the services that JEN intends to provide, JEN will provide in its response to the customer’s detailed enquiry an itemised estimate of connection costs including:

- connection services charges;
- costs of any network extension;
- details of augmentation required to provide the connection and associated costs;
- details of the interface equipment required to provide the connection and associated costs;
- details of any ongoing operation and maintenance costs and charges to be undertaken by the Distribution Network Service Provider; and
- other incidental costs and their basis of calculation.

4.1 WORKED EXAMPLE OF CONNECTION WORKS FOR NETWORK AUGMENTATION

A generic example of a 5 **MW** embedded generator proposed to connect to JEN HV network is provided below.

A 5 MW synchronous gas turbine generator project is connecting to the JEN HV network with 100% export capability. The proposed location of the generator connection requires 500m of new HV overhead lines to be extended on the closest HV 22kV feeder. A high level example on the scope of works and indicative cost for this connection is provided below.

- Install 500m of new 19/3.25AAC HV (22kV) overhead conductor on existing LV pole line (require replacement of LV poles to HV poles) to extend the existing HV feeder to the generator point of connection;
- Install a new HV switching cubicle;
- Install 80m of 240mm² XLPE Al cable to generator HV metering cubicle including cable termination at both ends;

- Review and if required revise the feeder and zone substation bus protection settings and coordination;
- Installation of hard wire remote inter-trip protection scheme between the feeder circuit breaker and the generator main incoming circuit breaker (cost assume relay upgrade at zone substation is not required);
- Installation of 3km of new optic fiber cabling for the remote inter-trip protection;
- Upgrade to zone substation **RTU** with installation of additional RTU cards;
- At zone substation, provide communications to the JEN Coordination Centre for remote monitoring of the generator status and loading which involves hard wire from primary devices to RTU (customer RTU to JEN RTU) and RTU configuration including point to point testing;
- Updates to JEN **SCADA** master host to show generator status and loading.

Indicative cost estimate for the above JEN network augmentation related works is \$700,000.

Note: customer site works has not been included.