



Chapter 5 Embedded Generation Information Pack

27.04.18



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This document is designed to guide the Connection Applicant through the connection process for Chapter 5.

It describes connection process and appropriate documents to be utilised when pursuing connection within United Energy's (UE) distribution network for registered generation systems (above 5MW – part of Chapter 5).

1. Connection Framework

The NER governs the NEM. Within the NER, Chapter 5 and 5A are dedicated to embedded generation connections amongst other connection matters.

For Chapter 5:

- Embedded generation with capacity above 5MW. The Connection Applicant must use the connection process defined by Chapter 5.

For Chapter 5A, the NECF (National Energy Customer Framework) applies to cover amongst other matters:

- Embedded generation with capacity below 5MW. The Connection Applicant may choose to use the Chapter 5 connection process, otherwise the connection process defined by Chapter 5A must be used.

The merits of each connection process is briefly outlined below:

Chapter 5	Chapter 5A
More defined and detailed	More flexible
Generally longer connection process	Generally shorter connection process

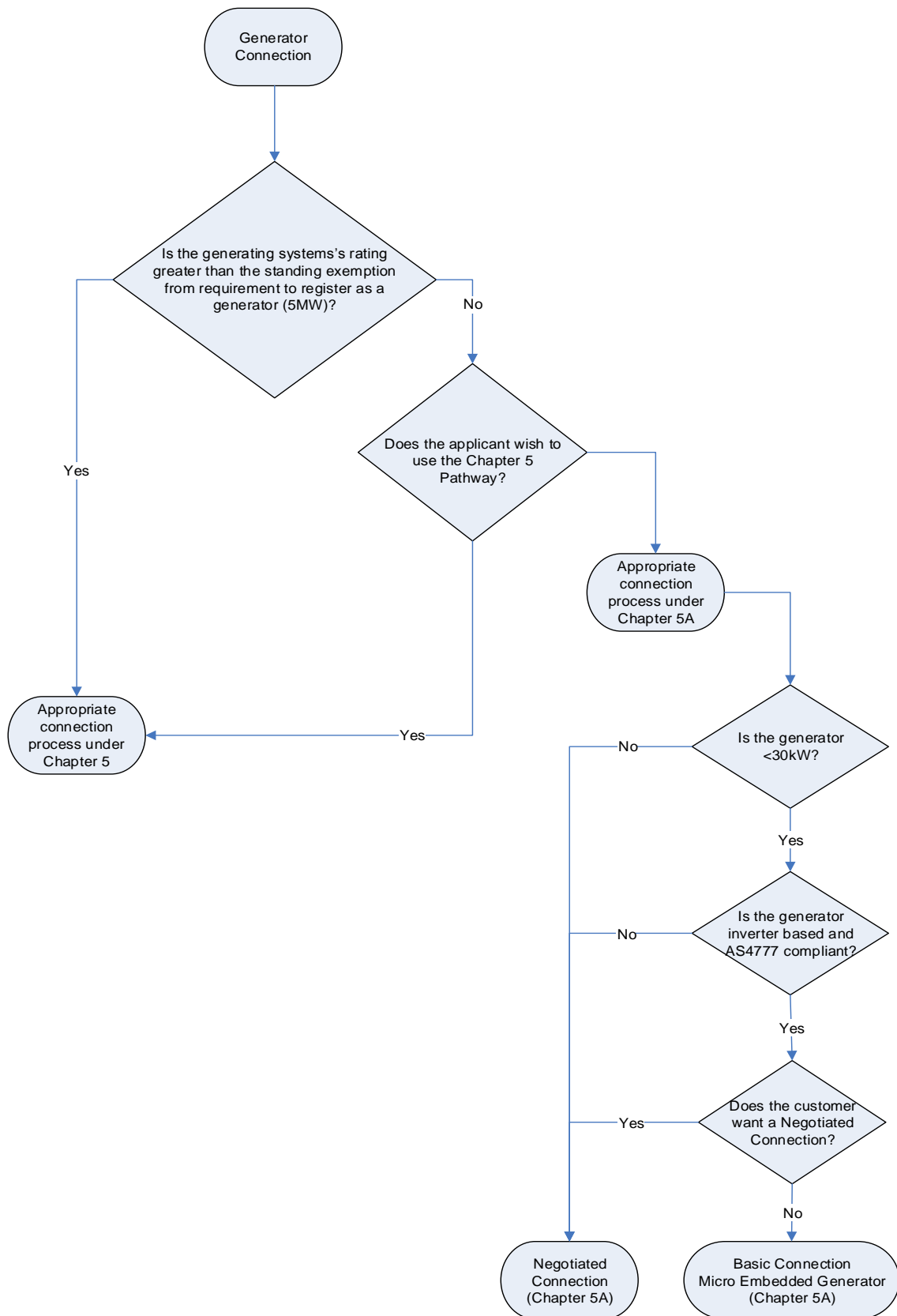


Figure 1 - NER Chapter 5 and 5A connection pathway



2. Negotiated Standards – Chapter 5

All embedded generator proponents are encouraged and in certain circumstances required to comply with the automatic access standards. However in certain situations a lower standard may be negotiated. Should this be required, the NER framework S5.2.5 – S5.2.7 will be referenced as the negotiating foundation. The Connection Applicant is also advised to consult this in conjunction Section 7.8 of UE ST 2008 (summary of UE's automatic and minimum access criterion).

Of particular note when seeking negotiation:

- Under no circumstances will a standard less than the minimum access standard be permitted.
- Negotiated performance is appropriate and set not to adversely affect the quality of supply and stability to other network customers and;
- Approved by AEMO and where applicable other NSP and stakeholders.

Assessment Considerations

The following high level factors are taken amongst the considerations relative to the proposal at each stage during the Connection Enquiry and Application to Connect process;

- Network Safety, Security and Stability;
- Network infrastructure availability, capability and capacity to facilitate the proposal;
- Infrastructure and commercial demarcation and crossover, especially when multiple jurisdictions are involved;
- Depending on proposal, suitable communications infrastructure to facilitate technical as well as NEM market control requirement (protection and or generator scheduling operation);
- Embedded generation network impact (and nearby customers);
- Network and Proposal Interconnection Protection
- Network Infrastructure Thermal Capacity;
- Network Voltage Control;
- Generator Fault Level Contribution;
- Power Factor of Generator Operation;
- Power Quality of Supply Generated;
- Generator Operations (Modus Operandi: Renewables, base, peaking etc...).
- Network augmentation (i.e. infrastructure upgrade) likely to be required to facilitate the proposal and commercial model such as contestability, construction, ownership, the classification of services provided and associated costs.
- Other jurisdiction approvals (lease, easements, council planning etc.);
- Network scope of work delivery timeframe;
- Legal, commercial and financial due diligence of the entity entering into the agreement.
- All other suitable considerations unique to the proposal.

UE's Embedded Generator Access Standard UE ST 2008 is recommended as the starting reference point for generator connections in this category.

UE ST 2008 Embedded Generation Technical Standard is available on the UE website.



3. Connection Process

The Chapter 5 connection process is employed as illustrated in Diagram 2. Please consult the document UE ST 2008 Section 5.2 for additional details and references.

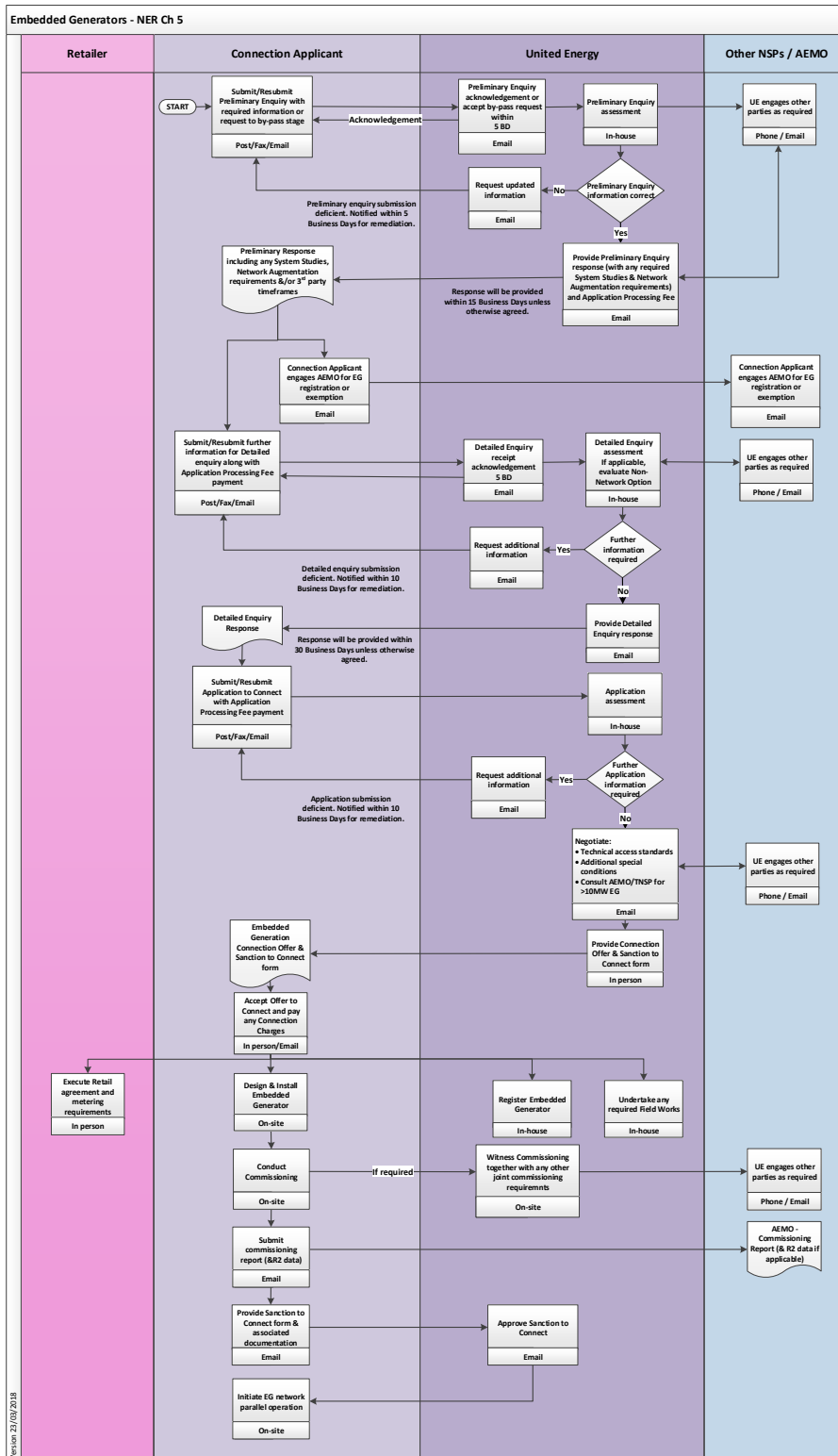


Figure 2 – Chapter 5 Connection Pathway



4. Key Documents

Available on UE's website as part of the 'Chapter 5 Information Pack' are documents to enable the respective connection process. These are:

- [Preliminary Enquiry Form – Above 5MW Capacity:](#)

To be used for generator system capacity above 5MW. Submission of the preliminary enquiry initiates the official engagement with UE.

- [Detailed Enquiry Form – Above 5MW Capacity:](#)

The Connection Applicant commits to continuing with the connection process with above 5MW generating system. This form is completed and submitted by the Connection Applicant after receiving UE's 'Preliminary Enquiry Form' feedback. An Enquiry Fee relative to proposal complexity is applied and requires settlement before the Detailed Enquiry Response can be commence by UE.

- [UE ST 2008 Embedded Generation Network Access Standard v1.3](#)

The technical performance standard employed by UE for generator compliance. Note: generator capacity above 5MW could be subjected to third party requirements such as AEMO and or other DNSP/TNSP, beyond UE's own requirements. Where appropriate and or applicable, other standards and technical requirements may apply.

- [Connection Service Charges and Fee Estimate](#)

This provides the Connection Applicant with some general perspective on potential fees and service charges to facilitate the connection of the embedded generation system. It's highlighted that each embedded generation connection can be unique and only a proper assessment respective to the proposal specifics can determine more accurate estimates and costs.

- [Chapter 5 Distribution Connection Generator Agreement – Sample](#)

This provides the Connection Applicant a sample copy of the formal agreement employed by UE for the Chapter 5 process.



5. Contestable Works

If a customer wishes to connect an embedded generator and:

- A new connection service is required,
- A connection alternation is required or
- Network Augmentation is required

The works (excluding generation) may be contestable.

5.1. Contestability Options

If the customer wishes to pursue the contestable pathway, UE offers the following tender options:

1. Customer may choose UE to undertake both the design and construction of the project as per the connection offer and waive its rights to call for tenders.
2. Customer may choose UE to undertake the design request UE to call tenders on their behalf for the construction of the project.
3. Customer may choose UE to undertake the design only and choose to call tenders themselves for the construction of the project.
4. Customer may choose to call tenders and undertake both the design and construction of the project utilising contractors approved by UE.

It should be noted that under options 2, 3 and 4 the customer is choosing to undertake the works themselves whether under a UE tender or its own tender process. Under options 2, 3 and 4, the customer is required to sign a UE Contract/Agreement to ensure that the works are undertaken:

- ✓ By approved contractors
- ✓ To the required standards
- ✓ Use of approved materials
- ✓ To provide audit access to UE representatives
- ✓ To indemnify UE
- ✓ To provide defects liability and warranty cover

For the following UE documents:

- Connection Policy
- Tendering Policy

Please see the UE website.



6. Sample SLD, Connection Service Charge and Fee Estimate

This sample exemplifies a hypothetical proposal of connecting a 6MW generation system to the United Energy (UE) network (contents primarily being generic in nature). The high level process aims to inform the Connection Applicant with the envisaged spectrum of fees and network augmentation costs required to achieve successful connection. The sample is structured to present a sequence of hierarchy for the Connection Applicant to review.

1. High level conceptual Single Line Drawing (SLD):

Based on the preliminary enquiry or otherwise, consultation/engagement is initiated between the Connection Applicant and the DNSP. Throughout this process, the concept matures and high level consensus is derived for the Connection Applicant to create a SLD. Amongst the various identified factors, a dedicated 'Remote Trip Scheme' is deduced to be one of the network connection criteria (network augmentation). This requires the Connection Applicant to fully contribute to its funding which invokes the connection service charge.

The SLD illustrates the Connection Applicant's proposal and its relativity to the DNSP assets. System segregation is highlighted which articulate contestable and non-contestable elements.

2. Enquiry and Application to Connect Fee:

The fee estimates highlight the two stage sequence of enquiry process.

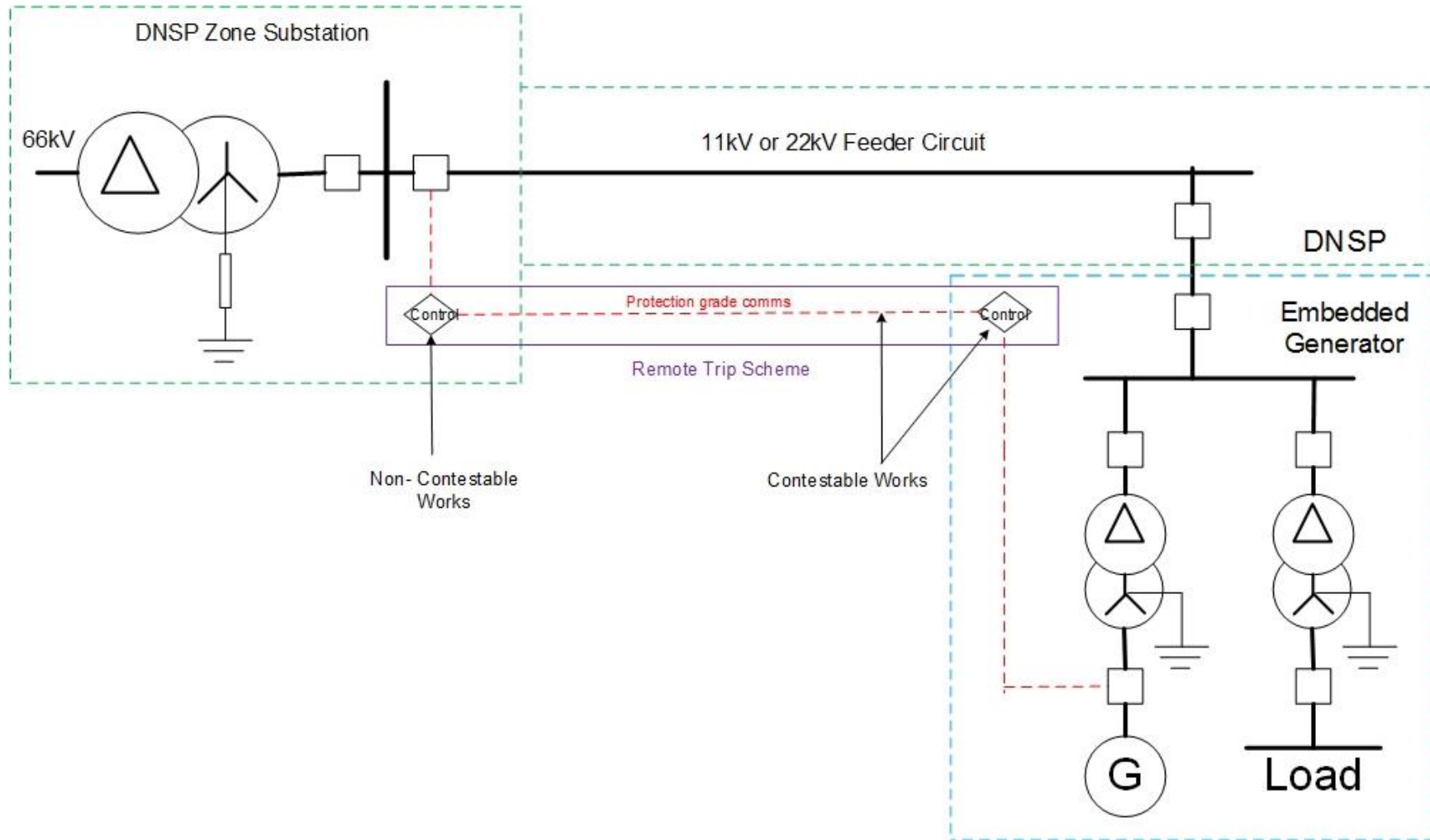
- The 'Detailed Enquiry' incurs an 'Enquiry Fee'. This itemises the various components for the DNSP to assess the Connection Applicant's proposal in order to provide a 'Detailed Response'.
- Depending on proposed generator capacity, complexities and connection point specifics, it could involve third parties and their associated requirements.
- When the project becomes committed, the 'Application To Connect Fee' is applied. This is also accompanied by the Connection Applicant's supporting material submissions. Upon all submissions being satisfactory, this process constitutes the major body of engineering and technical review undertaken by the DNSP for connection. Should there be deviations which alter from the original condition, the DNSP reserves all rights to recoup compensation for the variance.

3. Service Connection Charge for Remote Trip Scheme:

This equipment is specifically designed and exclusively dedicated to protect both the generator and DNSP from abnormalities. It does not directly benefit any other network customers. If the project is fully committed, the installation (i.e. network augmentation) of a 'Remote Trip Scheme' incurs a service connection charge for the Connection Applicant to fully contribute (with best endeavours exercised to coordinate with the Connection Applicant). The deliverable terms and conditions are articulated



6.1. Sample Connection Service Single Line Diagram





6.2. Sample Enquiry Fee Estimate

Project	Customer Generation Project
Rating	6MW
Type	<i>Synchronous Machine</i>
Mode	<i>Synchronised</i>
Feeder	<i>HV Feeder</i>
Substation	<i>N/A</i>

Description	Total
Client liaising	\$ 1,089.00
Assessment - Network (Review of data provided, review of the connection arrangement, meetings, assessment of fault contributions, perform load flow and voltage studies, assessment of primary plant and generator performance standards)	\$ 1,633.50
Assessment - Protection (Review of data provided, assessment of protection, control, monitoring and communication requirements, perform a protection review, meetings, site visit)	\$ 1,633.50
Correspondence with AEMO	\$ -
Preparation of an assessment report (Prepare an overview report summarising the connection arrangement, system study results, protection review results and compliance assessment)	\$ 1,633.50
Total	\$ 5,989.50

Notes:

- These estimates are a general guide only.
- It assumes no project complications or any other project specific matters.
- Cost rates refer to UE's internal resources and excludes 3rd parties.
- UE reserves all rights to recoup connection related cost, if in UE's reasonable opinion, the final outcome exceeds original estimate.
- The standard hourly labour rates are based on the Summary of UE Schedule of Charges approved by the AER and published on UE's website



6.3. Sample Application to Connect Fee Estimate

Project	Customer Generation Project
Rating	6MW
Type	<i>Synchronous Machine</i>
Mode	<i>Synchronised</i>
Feeder	<i>HV Feeder</i>
Substation	<i>N/A</i>

Description	Total
Client liaising	\$ 2,972.50
Assessment - Network (Review of data provided, review of the connection arrangement, meetings, assessment of fault contributions, perform load flow and voltage studies, assessment of primary plant and generator performance standards)	\$ 9,982.50
Assessment - Protection (Review of data provided, assessment of protection, control, monitoring and communication requirements, perform a protection review, meetings, site visit)	\$ 9,982.50
Correspondence with AEMO	\$ -
Preparation of an assessment report (Prepare an overview report summarising the connection arrangement, system study results, protection review results and compliance assessment)	\$ 3,811.50
Contract preparation and execution (Update Connection Agreement, prepare technical schedules)	\$ 1,976.00
Total	\$ 28,725.00

Notes:

- These estimates are a general guide only.
- It assumes no project complications or any other project specific matters.
- Cost rates refer to UE's internal resources and excludes 3rd parties.
- UE reserves all rights to recoup connection related cost, if in UE's reasonable opinion, the final outcome exceeds original estimate.
- The standard hourly labour rates are based on the Summary of UE Schedule of Charges approved by the AER and published on UE's website



6.4. Sample Connection Service Charge - Remote Trip Scheme

XXXXXX

XXXXXX

XXXXXX

Our Reference: UED-COM-XXXXXX

RE: Establish Remote Trip Scheme between UE Zone Sub and Customer Generator

In response to the enquiry regarding Establishing Remote Trip Scheme between UE's Zone Substation and Customer Generator, the following offer is made.

The total cost for the project is \$112,950 of which the Customer will be required to contribute \$112,950 + \$11,295 (GST) = \$124,245. United Energy will supply and install the electrical infrastructure with United Energy's contribution being limited to \$0. **All cheques are to be made out to United Energy Distribution Pty Ltd.**

Please refer to the Terms of Offer for further details regarding this offer.

Please note that United Energy engages its authorised service provider and contractor in the nominated region of the network to carry out the design, construction and project management activities on United Energy's behalf.

Should you require further information about this proposal please contact the Project Manager.

Yours faithfully,

United Energy

Enclosed

Terms of Offer

Customer's Rights and Obligations



6.5. Sample Terms of Offer

1 SCOPE OF WORKS

The basis of this offer is limited to the scope as detailed in the document: **Establish Remote Trip Scheme between UE Zone Substation and Customer Generator facility.**

Please note the following clarifications and exclusions:

- No allowance has been made for any works at the Customer end including design, installation, testing and commissioning;
- No allowance has been made for the BDSL communication service setup, termination, configuration and testing;
- It has been assumed that the BDSL communication service boundary point will be the TLIU;
- The offer is based on the work being completed in one sequential and continuous operation, including site works and testing in conjunction with the Customer;

2 CONTESTABILITY OPTIONS

For information relating to the calling of tenders as well as a brief explanation of United Energy's connection policy, under which customer contributions are calculated, please refer to the enclosed "Customer Rights and Obligations".

Your options in regard to contestability are listed in the "Customer Rights and Obligations" document.

3 VALID ACCEPTANCE

A valid acceptance of this proposal will require all items specified below to be completed and returned within two months of the date of the accompanying letter:

- Letter stating your acceptance to United Energy's offer.
- Payment of the customer contribution as specified in the covering offer letter, with cheques made out to United Energy Distribution Pty Ltd.
- Sheet 2 of the Customer's Rights and Obligations, completed and signed indicating your client's chosen option for the design and construction works.

4 VALID OFFER PERIOD

The supply proposal remains open for a period of two months from the date of the accompanying letter. Failure to accept this proposal by the due date will cause the proposal to lapse. In that event, you are obliged to initiate new negotiations for the works to be undertaken.

5 PROGRAMMING

After acceptance of this proposal, the Project Manager, will contact you to discuss the date by which works will be scheduled. Assuming acceptance within the valid offer period, the commissioning is planned to be completed by the nominated date. This date will be contingent upon satisfactory and timely completion of customer side works.



The Customer's and United Energy Distribution Pty Limited's (UE) rights and obligations are set out in the Essential Services Commission's Guideline 14.

1. Basis for Calculation of Customer Contribution

United Energy's Connection Policy under which the customer contributions towards augmentation of the distribution network, necessary to facilitate the connection of the customer are calculated as follows:

- **Customer contributions** = [Project cost (LCTA) + cost of upstream use of network – net present value of expected distribution use of system (DUOS) revenue] + [Project cost (actual) – Project cost (LCTA)].
- **Least cost, technically appropriate (LCTA)** is the term used to describe the type of connection, network extension or augmentation which results in the least capital cost to meet the customer's real and immediate need, and which satisfies UE's technical specifications and safety requirements.
- The **project cost (LCTA)** of customer initiated works is the LCTA cost of the supply assets between the *point of supply* or supplies in the case of subdivisions to the *tie-in point* to an existing distribution network.
- The **project cost (actual)** of customer initiated works is the actual cost of the supply assets between the *point of supply* or supplies in the case of subdivisions to the *tie-in point* of an existing distribution network.
- The present value calculation of **expected DUOS revenue** is based on an assumed life of 30 years for residential connection and 15 years for business connection. The revenue earned will be based on the average consumption of a customer in the tariff category. Where a particular project is clearly expected to have an economic life of less than 15 years, then that shorter life should be used.
- The reinforcement **costs of upstream use of network** assets is the estimated cost of the incremental demand on the upstream network up to and including the sub transmission network from the point of connection. The cost is calculated on a \$/kVA basis.

2. Customer's choice in relation to Connection Services

When the Customer is required to contribute towards the provision of connection services, the following options are available,

1. Customer may choose UE to undertake both the design and construction of the project as per the connection offer.
2. Customer may choose UE to undertake the design and request UE to call tenders on their behalf for the construction of the project.

If the Customer elects this option, the Customer is required to pay a tender fee, for UE to prepare, evaluate and issue the tenders for construction. The fees will be commensurate to the project size and complexity. An approximate guide is as follows:

- \$3,900 + \$390 (GST) = \$4,290.00 where UE uses a preferred tender panel of 3 to 5 contractors from its list of Approved Contractors; or
 - \$7,755 + \$775.50 (GST) = \$8,530.50 where UE is requested to use an open tender process.
3. Customer may choose UE to undertake the design and the customer to undertake the construction of the project utilising contractors approved by UE.
 4. Customer may choose to undertake both the design and construction of the project utilising contractors approved by UE.

Should the Customer wish to pursue option (2), (3) or (4) by calling tenders themselves for design and construction or construction only, then the Customer would be required to enter into a contract with UE for the performance of the work undertaken by the Customer including warranties in relation to post commissioning defects and faults.

In your response to UE's letter of Connection Offer you are required to indicate which of the above options you wish to pursue by completing the below sheet and return it to the issuing office.



Connection Services

Please tick one of the boxes below to indicate your choice and return to United Energy:

I wish United Energy to undertake the design & construction works and I waive my right to call tenders.

I wish United Energy to carry out the design and to call tenders, at my cost.

- Preferred tender panel
- Open tender process

I wish United Energy to carry out the design and I wish to call my own tenders for the construction works utilising constructor's approved by United Energy.

I wish to call my own tenders and undertake the design and construction works, utilising designers and constructor's approved by United Energy.

Customer Signature: _____

Customer Name: _____

Date: _____



7. UE Contacts

Head Office

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40 Market Street

Melbourne VIC 3000

PO Box 449

Mt Waverley VIC 3149

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F: 03 8846 9999

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Embedded Generation Enquiries

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