

# MAJOR CUSTOMER CONNECTION MANUAL



(For public dissemination)

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## PART A: INTRODUCTION

### 1. Purpose and Structure of this Manual

#### 1.1. Purpose of this Manual

The National Electricity Rules (**NER**) set out certain processes for Connection Applicants that wish to:

- (a) establish a new connection between their premises and Ergon Energy's Distribution Network; or
- (b) modify an existing connection between their premises and Ergon Energy's Distribution Network.

This Manual is intended to guide certain of these Connection Applicants (being the **Major Customers**) through the relevant process to obtain an offer to connect and enter into binding agreements with Ergon Energy.

The term "Major Customers" includes large customers and certain embedded generators. Please refer to section 2 for further details of who is covered by this Manual.

Please note that this Manual reflects Ergon Energy's policies and procedures and relevant regulatory arrangements as at 2014, and these may change over time. Please contact Ergon Energy's Major Projects group to obtain specific information concerning the connection, or modification of a connection, of relevant premises to Ergon Energy's Distribution Network.

#### 1.2. Structure of this Manual

The structure of this Manual is set out below:

- (a) Part A provides a brief introduction;
- (b) Part B sets out a holistic overview of the contractual, regulatory and commercial landscape;
- (c) Part C sets out the options for design and construction for different portions of the Major Customer Connection works;
- (d) Part D sets out a number of important aspects of the process to be complied with by Major Customers.

#### 1.3. Dictionary/Glossary

A glossary of terms used in this Manual is located in section 22. Additional reference documents are set out in section 21.

## PART B: THE CONTRACTUAL, REGULATORY AND COMMERCIAL LANDSCAPE

### 2. Manual applies to "Major Customers" (Large Customers and Embedded Generators)

#### 2.1. Overview

Where a Connection Applicant requests a new connection to the Distribution Network, or a modification to an existing connection, and the new or modified connection will result in that Connection Applicant being classified as a Major Customer (see section 2.2), then that Connection Applicant will have certain obligations and entitlements in respect of the new or modified connection.

This Manual is intended to form a useful reference for such Connection Applicants and to assist them in negotiating and entering into relevant agreements with Ergon Energy to facilitate the new or modified connection. Please note that this Manual reflects Ergon Energy's policies and procedures and relevant regulatory arrangements as at 2018, and these may change over time. Please contact

Ergon Energy's Major Projects Group to obtain specific information concerning the connection, or modification of a connection, of Major Customer's premises to Ergon Energy's Distribution Network.

## 2.2. Who is a "Major Customer"?

This Manual is designed for use by "Major Customers". Ergon Energy uses the term Major Customer to refer to certain customers, specifically, those that:

- (a) are large customers (being Individually Calculated Customers (ICCs) and Connection Asset Customers (CACs)); and
- (b) Embedded Generators (EGs).

The term Major Customer excludes Standard Asset Customers (**SACs**).

Specific descriptions of ICCs, CACs and EGs are set out in Ergon Energy's AER Approved Pricing Proposal, which is available on the Network Management: Network Pricing: Network Tariffs section of Ergon Energy's website. However, they can be broadly summarised as:

- (a) ICCs (Individually Calculated Customers): typically with energy consumption > 40 GWh/a, or otherwise a lower energy consumption where:
  - (i) the customer:
    - (A) has a dedicated supply system that is different from and separate to the Distribution Network;
    - (B) is connected close to or at a Transmission Connection Point; or
    - (C) inequitable treatment of otherwise comparable customers will arise from the application of the 40 GWh/a threshold; or
  - (ii) there are only two or three customers in the relevant supply system, making average pricing inappropriate.
- (b) CACs (Connection Asset Customers): typically have:
  - (i) capacity requirements > 1,500 kVA, or otherwise a lower capacity where the customer:
    - (A) has a dedicated supply system that is different from and separate to the Distribution Network; or
    - (B) inequitable treatment of otherwise comparable customers will arise from the application of the 4 GWh/a threshold; or
  - (ii) energy consumption > 4 GWh/a.
- (c) EGs: are typically customers that export electricity into the Distribution Network (except where they only have microgeneration facilities and are classified as a SAC).

## 2.3. Ergon Energy determines relevant classification

Ergon Energy will determine the appropriate classification of a Connection Applicant applying for connection in accordance with information provided by that Connection Applicant (in particular, import and export levels and energy consumption).

Ergon Energy's Major Projects Group deals with Major Customer connections.

## 2.4. Specific exclusions from the scope of this Manual

This Manual applies to all requests from Connection Applicants that will be classified as Major Customers in respect of the new or modified connection, and therefore does not apply to any of the following:

- (a) the construction of subdivisions that have been identified under section 2.1 of the Ergon Energy – Subdivision Developers Handbook;
- (b) the design, supply and installation of HV reticulation that is owned by a Connection Applicant and is beyond the Connection Point (except to the extent that the installation needs to be acceptable for connection to the Distribution Network);

- (c) low voltage equipment that is owned by the Connection Applicant (except to the extent that the equipment needs to be acceptable for connection to the Distribution Network); or
- (d) the removal or relocation of existing assets.

## 3. The Connection Processes

### 3.1. Overview

At present, there are two regimes for establishing new connection points or modifying existing connection points. Briefly:

- (a) clause 5.3A of the NER applies to all connection applications where there is an embedded generating system and the owner, operator or controller intends to register as an Embedded Generator with the Australian Energy Market Operator (AEMO), or is required to apply for an exemption (i.e. where the standing exemption for generating systems up to 5 MW does not apply); and
- (b) clause 5.3 of the NER applies to all other connection applications.

The Major Customer's initial contact with Ergon Energy will be via a selected Project Sponsor within Ergon Energy's Major Projects group.

### 3.2. Who is covered by clause 5.3A of the NER?

Broadly, clause 5.3A of the NER applies where a connection applicant wishes to connect an embedded generating system to the Distribution Network and the connection applicant:

- (a) intends to be registered with AEMO as a Generator for that generating system; or
- (b) is required to apply to AEMO for an exemption from the requirement to so register; and
- (c) makes a Connection Enquiry or an Application to Connect under clause 5.3A of the NER.

This will be a subcategory of the Embedded Generators.

Further details on this (including the Generator Registration Guide) are available on AEMO's website at: [http://www.aemo.com.au/](http://www.aemo.com.au)

As at the date of this Manual, Ergon Energy considers that clause 5.3A will generally apply to all Connection Applicants who are connecting a generating system to its Distribution Network, except where the "standing exemption" applies (which is for most generating systems of < 5 MW, unless the Connection Applicant has elected to register as a Generator anyway).

### 3.3. Who is covered by clause 5.3 of the NER?

Clause 5.3 of the NER is the relevant connection process for all other Connection Applicants.

However, please note that this Manual only applies to certain applicants under clause 5.3, being ICCs and CACs. For SACs (load customers other than ICCs and CACs), please refer to the Network: Connections section of Ergon Energy's website for appropriate procedural information.

### 3.4. A summary of the connection process

The Major Customer Connection process is outlined in the [Major Customer Connection Guideline](#) which is available on [this part](#) of Ergon Energy's website.

## 4. Relevant Contracts

### 4.1. General

In order to connect the Major Customer (or modify the connection), Ergon Energy will enter into (or amend, as required) the following agreements with the Major Customer:



- (a) a Construction Contract under which the parties agree to carry out the relevant works required to establish, or modify, (as relevant) the connection of the Major Customer's premises to the Distribution Network and facilitate the transfer of electricity across the relevant Connection Point. Further details about the works under the Construction Contract are set out in section 7.4; and
- (b) a Connection Agreement under which Ergon Energy allows the Major Customer to remain connected to the Distribution Network and transfer electricity across the Connection Point.

A list of the clauses in Ergon Energy's template Connection Agreements and Construction Contracts is set out in Appendix 7 and Appendix 8.

Other agreements may also be entered into depending upon the specific circumstances, such as:

- (a) for Transferable Connection Assets, deeds of warranty; and
- (b) where network support is required, a Network Support Agreement.

## 4.2. Construction Contract

Ergon Energy has template Construction Contracts, which set out:

- (a) the classification of relevant works, namely:
  - (i) the Ergon Energy works on the shared Distribution Network (that will be standard control services (SCS));
  - (ii) the Ergon Energy Connection Asset Works; and
  - (iii) the Major Customer Works (where some of the resultant Connection Assets may be Transferable Connection Assets);
- (b) works programs and milestones;
- (c) access by each party to the other party's site;
- (d) payments by the Major Customer for Alternative Control Services (ACS) works (which may involve provision of securities); and
- (e) for any Transferable Connection Assets, relevant construction obligations (including technical and materials specifications and approved contractors and suppliers), warranties, defects liability regime.

Ergon Energy and the Major Customer may negotiate on the specific terms of the Construction Contract where required to reflect the particular situation.

## 4.3. Connection Agreement

Ergon Energy has template negotiated Connection Agreements for use under the NER (which are usually used by Major Customers in preference to the deemed standard customer connection contracts that would otherwise apply, as the standard agreement does not provide for "guaranteed" demand requirements). The Connection Agreement typically covers, for a 30-year term:

- (a) details of the Connection Point;
- (b) details of the permissible import demand or export (which may include specified reduced levels where existing constraints exist);
- (c) an operating protocol (see section 17);
- (d) site access requirements;
- (e) SCS payment obligations; and
- (f) securities (if relevant).

Ergon Energy and the Major Customer may negotiate on the specific terms of the Construction Contract where required to reflect the particular situation.



## 4.4. Network Support Agreement

Where Ergon Energy identifies that the connection of the Major Customer could provide benefits to the Distribution Network (for example, through reducing load during peak times, or, where a generating unit is installed, generating additional electricity during peak or contingency times), then Ergon Energy will discuss the possibility of a Network Support Agreement with the Major Customer.

## 5. Relevant Regulatory Regime

### 5.1. Overview

As a monopoly service provider, Ergon Energy is subject to a stringent economic regime administered by the Australian Energy Regulator (**AER**) in accordance with the NER. Broadly, this regime involves the classification of services provided by Ergon Energy and, except in relation to certain unregulated services, the imposition of constraints on either the prices that Ergon Energy may impose in respect of, or the revenue that Ergon Energy may receive from, the provision of the service.

### 5.2. Classification of distribution services as SCS and ACS

Any services provided by means of, or in connection with, Ergon Energy's Distribution System are classified as "distribution services" under the NER. Depending upon the specific services provided, and who will benefit from those services, such distribution services are further broken down into SCS and ACS in accordance with the AER's Distribution Determination. Broadly, SCS are usually "shared services", and ACS is usually services provided to one or more specific applicants.

Ergon Energy will carry out the relevant classification, taking into account whether it will benefit a single new (or group of new) Major Customers, or whether it will also benefit other existing Connection Customers, and in conjunction with the determination of the location of the Connection Point and Network Coupling Point (which are both crucial points when classifying assets and are described in more detail in section 5.3).

Note that Ergon Energy provides a range of services in addition to the core connection and supply services, including:

- (a) the provision of general advice and specifications, including in relation to Major Customer assets etc.;
- (b) preparation of a Planning Report, Concept Scope or Detailed Response, or provision of data to complete such a report;
- (c) determination of indicative network charges;
- (d) site inspection; and
- (e) pre-application external design review and technical support.

A Major Customer interested in acquiring such services (see [here](#) for further details) may contact Ergon Energy, in which case (if the service qualifies as a chargeable service), Ergon Energy will provide the Major Customer with a quote tailored to their needs and setting out the elements of the service to be provided and the timeframe for the provision of these services.

Upon acceptance of the quote, Ergon Energy will issue an invoice in respect of such services that will be payable prior to the commencement of such work. Upon completion of the work, Ergon Energy will reconcile the amounts received from the Major Customer in respect of the services provided against the amounts to which Ergon Energy is entitled under the electricity laws. The parties will then make appropriate payments to each other so that Ergon Energy receives an amount from the Major Customer that is equal to the amount to which it is entitled.

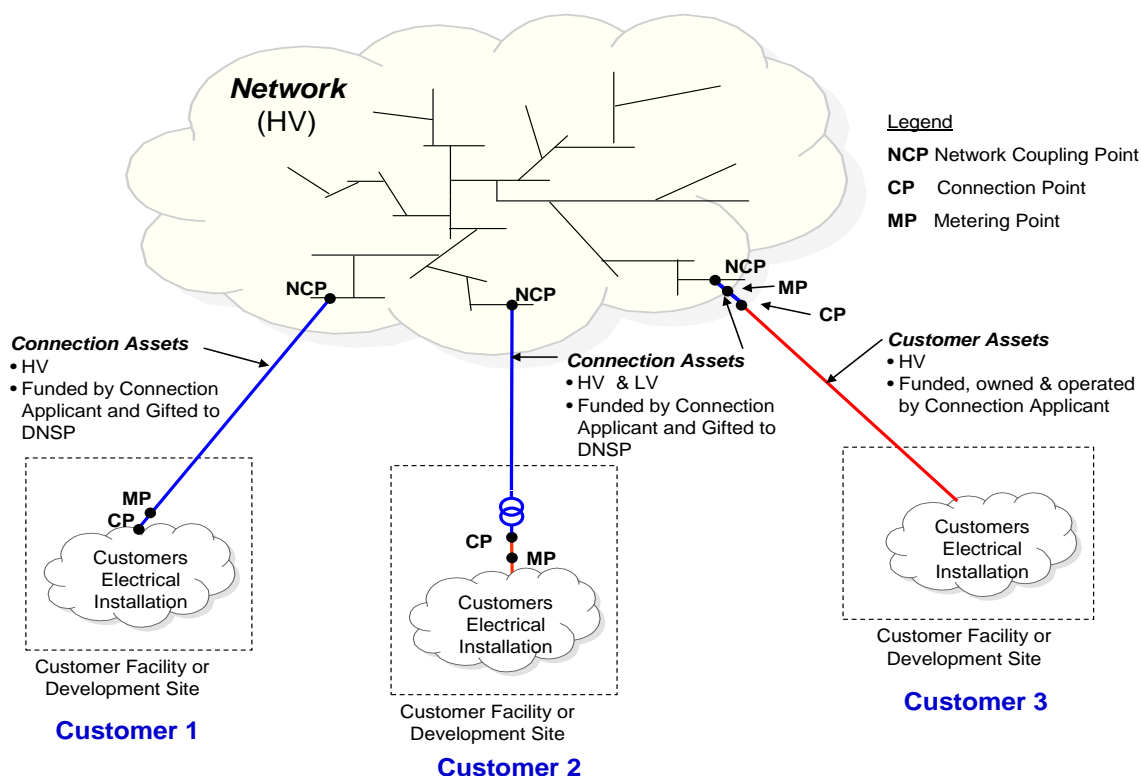
For some services provided by Ergon Energy for Major Customer Connections (including Planning Reports, Project Scopes and Detailed Responses) Major Customers may also choose to engage a third party service provider, provided that the third party service provider is suitably qualified and experienced.

### 5.3. Separation of Connection Assets from the Distribution Network

As part of determining the appropriate service classification under the AER's Distribution Determination, Ergon Energy separates relevant assets into certain categories based on their location and function. Relevantly:

- (a) Connection Assets (as the term is used in this Manual) can be viewed as including:
  - (i) those components of the Distribution System that are used to provide Connection Services (usually being dedicated to a single Connection Customer or group of such customers); and
  - (ii) any dedicated assets constructed by the Major Customer for the purposes of the connection (Customer Connection Assets);
- (b) the Connection Point is the agreed point of supply to the Major Customer, and hence is the physical point at which Ergon Energy's Connection Assets meet the Major Customer's Connection Assets. Ideally the Connection Point should be located as close as possible to the Network Coupling Point (see below). Note that assets upstream of the Connection Point will ultimately be owned and operated by Ergon Energy, and conversely, assets downstream of the Connection Point will generally be owned and operated by the Major Customer. Typically, a Connection Point will be on Ergon Energy's side of a Major Customer's isolating equipment; and
- (c) the Network Coupling Point is the point determined by Ergon Energy at which Ergon Energy's Connection Assets meet the "shared" Distribution Network (that is, the boundary between assets providing dedicated services (Connection Assets) and assets providing shared services (Shared Network Assets), such that all works in respect of assets upstream of the Network Coupling Point will be SCS). When determining the Network Coupling Point, Ergon Energy will take into account the current status of the Distribution System, existing Connection Applications and Ergon Energy's strategic plans out to the nominated planning horizon. The Major Customer can obtain further details on this from its Project Sponsor;
- (d) the Distribution Network comprises the assets that provide services to multiple Connection Customers;
- (e) Customer Assets comprise the Customer's assets located downstream of the Connection Point; and
- (f) the Metering Point is the point located as close as possible to the Connection Point at which the metering installation measures the throughput of electricity.

The diagram below illustrates some examples of these points. Table 1 of Appendix 2 also illustrates these in respect of various common network configurations.



## 5.4. Classification of commonly used services

For the purposes of this Manual, the following services are relevant:

- the design and construction by Ergon Energy of assets that are dedicated to one or more Major Customer Connection Applicants (which works will be classified as ACS, and are referred to in this Manual as MCC ACS);
- the design and construction by Ergon Energy of assets that will be shared between one or more Major Customer Connection Applicants and other existing Connection Customers (that is, elements of the Distribution Network) (which works will be classified as SCS);
- the operation and maintenance of Ergon Energy's Distribution System (both the Distribution Network and Connection Assets) (which activities will be classified as SCS); and
- the supply of electricity to the Major Customer via Ergon Energy's Distribution System (which activities will be classified as SCS).

Please note that this is a very high level overview of a complex regulatory regime. Ergon Energy will indicate the relevant service classification of the particular works or activities to a Major Customer in its discussions with the Major Customer.

## 5.5. Method of cost recovery – ACS

Broadly, for services where the services are for the benefit of the particular Major Customer (or group of Major Customer Connection Applicants), then Ergon Energy recovers the costs of such dedicated services (such as the dedicated design and construction works for Connection Assets referred to in section (a) (the MCC ACS)) from the particular Major Customer Connection Applicant(s).

The relevant costs are first estimated in accordance with a specific formula approved by the AER, and the Major Customer usually pays this up-front under the relevant Construction Contract. However, in some circumstances, Ergon Energy may consent to the provision of a Security up-front, with the actual payment to occur later. Note that this differs from those regulatory arrangements that were in place prior to 1 July 2010, which involved Ergon Energy initially funding these services and then recovering costs through the Major Customer's network charges over the term of the Connection Agreement.

## 5.6. Method of cost recovery – SCS

In contrast, Ergon Energy recovers revenue in respect of services that are classified as SCS (for example, in relation to the shared distribution network and the operation and maintenance of Connection Assets) through network charges under the relevant Connection Agreement over the period of the connection. Again, Ergon Energy is required to comply with the specific processes in the NER and as administered by the AER in recovering such revenues.

## 5.7. Major Customer works

In addition to reimbursing Ergon Energy in respect of ACS and SCS provided, as discussed above, a Major Customer will also be responsible for the costs of any works that it carries out itself.

## 5.8. Powerlink works

Certain Major Customer Connections may potentially impact on Powerlink's transmission network. Where Powerlink needs to assess the impact on its network and/or perform relevant works to enable the Major Customer Connection, the costs of Powerlink doing so will be borne by the Major Customer.

## 5.9. Subsequent sharing of Connection Assets

In some situations, Connection Assets that are owned by Ergon Energy and are dedicated to the particular Major Customer Connection (including Connection Assets gifted to Ergon Energy by a Major Customer) may subsequently become used for the connections of other Connection Customers in accordance with relevant laws. Similarly, dedicated Connection Assets owned by Ergon Energy may subsequently be partially used for Ergon Energy Distribution Network purposes by agreement between the parties (such as an LV tie circuit to the Distribution Network from a Customer's Distribution Substation (refer to example 2 in Appendix 2)).

If this sharing occurs within seven years of the completion of the Connection Assets, then the original Major Customer(s) may be entitled to a reimbursement of a fair and reasonable portion of the original amount paid in respect of the construction of the now-shared Connection Assets (regardless of whether the Connection Assets were gifted or whether the original Major Customer(s) paid an amount of MCC ACS). In the situation where Connection Assets are shared with a new Connection Customer, that amount is recovered by Ergon Energy from the new Connection Customer and distributed to the original Major Customer(s). For the situation where dedicated Connection Assets are used for the Distribution Network, Ergon Energy may contribute to the cost on a gifted basis negotiated with the original Major Customer(s).

# 6. Contestability of Works

## 6.1. Background

Ergon Energy is responsible for carrying out all services that are classified as SCS (such as the design, construction, ownership, operation and maintenance of the shared Distribution Network).

However, the AER has recognised that the services of design and construction of assets that are dedicated to one or more Major Customer Connection Applicants (that is, works in respect of Connection Assets that are classified as MCC ACS) are potentially contestable (subject to meeting certain other relevant considerations and the outcomes of Ergon Energy's risk assessment process).

It is important to realise that a classification of works as MCC ACS in accordance with the AER Determination is directly relevant to the manner in which Ergon Energy can recover revenue in respect of providing this service, and does not automatically have the result that such works are contestable.

The process whereby works are assessed to determine if they are contestable is set out below.

## 6.2. Acceptable risk position for Ergon Energy

As a distribution network service provider, Ergon Energy has a range of statutory and regulatory obligations with which it must comply in order to protect the Distribution System and maintain the

standard of service to its existing Connection Customers. For example, Ergon Energy has specific binding obligations under:

- (a) the *Electrical Safety Act 2002* (Qld) and the *Electrical Safety Regulation 2002* (Qld);
- (b) the Electricity Industry Code (such as the minimum service standards); and
- (c) the NER (such as the guaranteed service level and service target performance incentive scheme).

Importantly, Ergon Energy will not compromise the nature or quality of the services provided to other Connection Customers as a result of a new or changed Major Customer Connection. Accordingly, Ergon Energy has a fixed acceptable risk position in relation to assets it is to own (regardless of whether a Connection Asset is to be designed and constructed by a Major Customer (or its subcontractors) or Ergon Energy), being that Ergon Energy will not accept a higher level of risk than the risk that would exist if Ergon Energy were to undertake the relevant services itself.

### 6.3. Potential options in relation to MCC ACS

Subject to the outcomes of the Ergon Energy risk assessment discussed in section 6.4 below, there are three conceptual options for the design, construction, ownership and operation of Connection Assets, being:

- (a) Ergon Energy Build, Own and Operate (EE BOO): in this option, the Connection Assets are designed, constructed, owned and operated by Ergon Energy. The design and construction services will be classified as MCC ACS and the relevant AER formula will be used to determine the relevant charges;
- (b) Major Customer Design, Construct and Transfer (DCT): in this option, the Connection Assets are designed and constructed by the Major Customer and, on completion, testing and commissioning of the Connection Assets, these are gifted to Ergon Energy for long-term ownership and operation (in which case there is no charge for design and construction, but other ACS and SCS fees may apply from time to time); and
- (c) Major Customer Build, Own and Operate (BOO): in this option, the Connection Assets are designed, constructed, owned and operated by the Major Customer. As Ergon Energy does not provide services in this option, there is no charge for this by Ergon Energy (except where Ergon Energy is actually providing other services, which may be charged as ACS or SCS).

The relevant option will be set out in the Construction Contract.

### 6.4. Ergon Energy's risk assessment process

Risks are present in the design, construction, commissioning and operations phases. Generally, a higher risk is involved where there could be impacts on safety, quality or the continuity of supply (e.g. working in close proximity to energised assets, having access to energised assets, and achieving all technical standards).

For any works that would be classified as MCC ACS if Ergon Energy were to carry out these works, Ergon Energy's Major Projects and Strategy and Planning teams will carry out a risk assessment against a pre-determined risk assessment methodology, starting with a qualitative assessment and moving to a more quantitative analysis if required for consideration of major risk issues.

Broadly, this will determine:

- (a) what risks could arise in allowing a Major Customer to carry out these works; and
- (b) whether these risks can be mitigated under the relevant Construction Contract to bring the risks back down to a level equivalent to those that would apply if Ergon Energy were to carry out these works (see section 6.5 for examples of mitigation strategies).

If the outcomes of the risk assessment are that the risks inherent in the Major Customer carrying out such works are acceptable (or can be appropriately mitigated), then the Major Customer can elect whether they would like to do these works themselves (or arrange for a third party to do them), or whether they prefer Ergon Energy to do these works (in which case they would be classified as an MCC ACS).

However, where the risk cannot be mitigated as discussed above (for example, which may occur in relation to works within operational substations), it may be that the only option available to the Major Customer is for Ergon Energy to design and construct the Connection Assets and for the Major Customer to pay Ergon Energy the price capped under the relevant MCC ACS formula.

Essentially, the risk assessment (which will be undertaken by Ergon Energy in relation to all Major Customer Connections) will determine whether certain works are:

- (a) works that only Ergon Energy can undertake; or
- (b) works that the Major Customer can undertake, which may further be categorised into:
  - (i) works that the Major Customer can elect to transfer to Ergon Energy (that will be subject to specific additional requirements in the Construction Contract); or
  - (ii) works that the Major Customer will retain the ownership of.

## 6.5. Methods of mitigation

Appropriate risk mitigation strategies may include, for example:

- (a) generic risk mitigators, such as:
  - (i) imposing design standards/materials specifications/quality control processes;
  - (ii) requiring design approval by an RPEQ;
  - (iii) use of the Approved Contractors' Register;
  - (iv) construction supervision by Ergon Energy; and
  - (v) engineering design and construction bona fides of consultants and contractors engaged by the Connection Applicant or the bona fides of the Connection Applicant; and
  - (vi) witnessing commissioning and testing; and
- (b) Major Customer-specific risk mitigators, such as:
  - (i) requiring Ergon Energy approval of the Major Customer's design;
  - (ii) imposing warranties and indemnities in respect of Transferable Connection Assets;
  - (iii) prudential requirements; and
  - (iv) waivers from service standards obligations.

## 6.6. Major Customer's election to gift or retain such assets

If a Major Customer carries out (or subcontracts) the works, then, at the completion of these works, the Major Customer generally has an option to either:

- (a) gift the resultant assets to Ergon Energy (provided that they are designed and constructed in accordance with Ergon Energy's standards and all relevant laws) so that they are thereafter owned and operated by Ergon Energy; or
- (b) retain the resultant assets (in which case the design, construction, ownership and operation is the Major Customer's responsibility and must comply with all relevant laws including the NER).

Note that should a Major Customer not utilise an Approved Contractor or source the Prescribed Materials and Equipment from an Approved Manufacturer/Supplier, as set out in section 12.3, Ergon Energy will refuse to accept ownership of the Transferable Connection Assets.

The Major Customer's intention to keep or gift Connection Assets should be made before submitting the Connection Application.

## 6.7. Option must be stated in the Construction Contract

The agreed design, construction and ownership options for each work component must be individually documented in the Construction Contract, and the location of the Connection Point will be set out in the Connection Agreement (see Appendix 7 and Appendix 8).



# PART C: OPTIONS FOR THE DESIGN AND CONSTRUCTION OF MAJOR CUSTOMER CONNECTIONS

## 7. Construction Options for Connection Assets

### 7.1. General

As flagged in section 6.3 above, there are broadly three “default” options which can be used for the construction and ownership of Connection Assets required for a Major Customer Connection. These options are clarified in Table 1 below.

### 7.2. Table 1 – Construction and Ownership Options for Connection Assets

Option	Acronym	Explanation
<b>Option 1</b> Major Customer designs, constructs, owns and operates their Connection Assets.	BOO	This involves the Major Customer carrying out the design, construction and ongoing operation and maintenance of its Connection Assets at its expense. These works are to be carried out according to the relevant Australian Standards, industry codes and statutory requirements. Any ACS works being done by Ergon Energy will be recovered up-front from the Major Customer, and the cost of any SCS will be recovered by Ergon Energy under relevant Connection Agreements.  Note some restrictions exist around the design of secondary systems such as communications, SCADA, protection and metering.
<b>Option 2</b> Major Customer designs and constructs the Connection Assets and then transfers these to Ergon Energy.	DCT	This involves the Major Customer carrying out the design and construction of some or all of their Connection Assets at its expense, and upon acceptable completion, transferring some or all of those assets (namely, the Transferable Connection Assets) to Ergon Energy.  Upon transfer, Ergon Energy will be responsible for the ongoing maintenance and operation of the transferred assets (any non-transferred assets remain the responsibility of the Major Customer).  Any Transferable Connection Assets must comply with Ergon Energy’s standards and guidelines, as well as all planning, environmental and cultural heritage laws and approvals, and be constructed using approved equipment and contractors (where specified) (refer to section 12.3 for details).  Auditing obligations will be imposed on the Major Customer under the Construction Contract. Additionally, Ergon Energy will inspect and audit works to ensure that they are designed, constructed and installed to comply with Ergon Energy’s standards and guidelines.  The use of approved equipment and contractors assists in maintaining common spare parts and standardising product training for Ergon Energy employees so that costs and the duration of outages caused by any failure of such transferred Connection Assets can be minimised.  Again, any ACS works being done by Ergon Energy will be recovered up-front from the Major Customer, and the cost of any SCS will be recovered by Ergon Energy under relevant Connection Agreements.
<b>Option 3</b> Ergon Energy designs, constructs, owns and operates the Connection Assets.	EECL BOO	This involves Ergon Energy carrying out the design and construction for the dedicated Connection Assets as ACS, including obtaining all required environmental and planning approvals. Ergon Energy will be responsible for the ongoing maintenance and operation of these assets. The AER-approved formula is used to determine the cost to the Major Customer.  Again, the cost of any SCS will be recovered by Ergon Energy under relevant Connection Agreements.



### 7.3. Ergon Energy works and subcontracting of Ergon Energy works

Ergon Energy (or its subcontractors) will therefore undertake all work that is:

- (a) classified as SCS works (such as in relation to the shared Distribution Network, including for augmentation, secondary systems and relay-operated switchgear that will be part of the shared Distribution Network, switching and operation and the final testing, commissioning, and connection of such works, and the energisation of a connection, and in relation to the operation and maintenance of Ergon Energy assets); and
- (b) classified as MCC ACS where either the carrying out of those works by the Major Customer would result in an unacceptable and unmitigable risk (for example, works in existing switchyards/substations) or the Major Customer does not wish to carry out those works itself.

In some cases, it may be more practicable and/or cost-effective for Ergon Energy to arrange for a subcontractor to carry out certain works. Ergon Energy is required to follow its usual tendering process to identify suitable Service Providers.

### 7.4. Construction Contract and works

- (a) Construction program: The relevant works program (together with project milestones and audit/test points) must be documented in the Construction Contract before any works are started.

The works program must identify any work involving outages of Ergon Energy assets, especially if it is necessary to isolate supply to existing Customers. If outages to existing Connection Customers are unavoidable, the Major Customer must pay for:

- (i) the provision of local generation to affected Connection Customers; and
- (ii) the advertising and notification of the proposed outages to relevant individuals and communities.

Ergon Energy is responsible for determining the time and length of any outages.

- (b) Safe system of work: The Major Customer will be responsible for ensuring that there is a safe system of work for all of its representatives that are involved in the project in compliance with all applicable standards, statutory requirements, the *Work Health and Safety Act 2011* (Qld) and the *Work Health and Safety Regulation 2011* (Qld).  
  
In addition, depending upon the size and complexity of the project, the Major Customer may need to develop a construction safety plan (and pay any required fees) in respect of the project.
- (c) Delays and variations: Any delays or variations to the construction works are to be managed in accordance with the relevant material change process in the Construction Contract;
- (d) Defects: Any defects identified during auditing must be promptly rectified.

## 8. Common Asset Categories and their Treatment

### 8.1. General

This section summarises the treatment of various categories of assets. It is a general overview and the relevant classification and risks in practice may vary depending upon relevant factors.

Please note that where this section refers to works being classified as MCC ACS, this refers to the classification if Ergon Energy were to carry out the works. If Ergon Energy's risk assessment permits, it is possible that Major Customers (or their subcontractors) could carry out these works.

## 8.2. Augmenting the Distribution Network

Works in relation to assets such as feeders, transformers or substations that are part of the Distribution Network are Ergon Energy's responsibility, and these works will be classified as SCS.

## 8.3. Adding new assets to the shared Distribution Network, or changing existing Major Customer Connection Assets

If the relevant design and construction works:

- (a) are not triggered by a Major Customer Connection Application, then they will be SCS;
- (b) are specifically requested by the Major Customer – then they will be ACS; and
- (c) are required to mitigate the impact of the Major Customer Connection on other Connection Customers (except for capacity issues) – then they will be ACS.

## 8.4. Existing switchyards and substations

Works in respect of existing switchyards/substations may be classified as SCS or ACS, depending upon which entities will benefit from those works. For example, the design and construction of feeder bays dedicated to a Major Customer would be classified as MCC ACS.

Where works within an existing switchyard/substation are classified as MCC ACS, there are elevated risks involved with a third party being involved in carrying out such works and owning assets in such a location, due to the operating nature of such a switchyard/substation.

As it is important to Ergon Energy that Ergon Energy own all assets within its switchyards/substations, Ergon Energy will usually carry out such works as MCC ACS and provide a point outside the switchyard/substation for the connection of the Major Customer's assets.

## 8.5. New switchyards and substations

Where a new dedicated switchyard/substation is to be established to connect the Major Customer, then:

- (a) the design and construction of the switchyard/substation may (subject to the risk assessment) be carried out by Ergon Energy as MCC ACS or may be carried out by the Major Customer; and
- (b) the commissioning will be SCS.

## 8.6. Bus creations and extensions in a shared switchyard/substation

Due to the nature of a bus, bus creations and extensions in a shared switchyard/substation will be classified as SCS (as the bus either already does, or will, provide services to multiple Connection Customers).

Accordingly, Ergon Energy will be responsible for these works.

## 8.7. Reconfiguration of existing feeder bays

As an existing feeder bay normally provides services to multiple Connection Customers, works to reconfigure an existing feeder bay will normally be classified as SCS, and Ergon Energy will accordingly be responsible for these works.

Note that where Ergon Energy has, in its 5-year Network Management Plan, allocated an existing feeder bay to other purposes within the next five years, then this feeder bay will not be available for use to connect the Major Customer Connection Applicant.

## 8.8. Protection systems

Protection systems are considered to be part of the Connection Assets to the extent they relate to the protection of the Connection Assets. Accordingly, the design and construction of such protection

systems may (subject to the risk assessment) be carried out by Ergon Energy as MCC ACS or may be carried out by the Major Customer.

## 8.9. Communications networks

Where dedicated communications networks are required to protect Connection Assets or to enable SCADA requirements for the Major Customer, these are also categorised as Connection Assets and the relevant design and construction works are classified as MCC ACS.

## 8.10. Metering

Normally Major Customers require Type 1-4 metering installations. The provision of such metering installations is an unregulated service (that is, not ACS or SCS) and not subject to economic regulation by the AER.

A Metering Point is, under the NER, to be located as close as possible to the Connection Point, but may be located on either side of that Connection Point.

Further details in respect of metering are set out in Ergon Energy's [Fact Sheet - Metering Installation Design](#)

## 8.11. Temporary Supplies

Temporary Supplies are considered Major Customer Connections and their removal at project closure may be subject to an ACS fee if undertaken by Ergon Energy.

## 8.12. Summary table

Component	Explanation	Classification	DCT available?	Responsibility for Capital Cost	Customer's ongoing costs
Augmentation of Distribution Network.	Works upstream of Network Coupling Point.	SCS	No.	Ergon Energy	Included in network charges.
Augmentation of dedicated assets.	Works between Connection Point and Network Coupling Point.	ACS	No.	Major Customer.	O&M included in network charges.
Customer's Assets	Downstream of the Connection Point.	N/A.	At Major Customer's discretion.	Major Customer	Major Customer's costs.
Dedicated asset	Usually a <i>connection asset</i> , can be located on Premises or otherwise, and is dedicated to facilitating the Major Customer's connection.	Refer to relevant one of internal/ external dedicated assets below.	Refer to relevant one of internal/ external dedicated assets below.	Refer to relevant one of internal/ external dedicated assets below.	Refer to relevant one of internal/ external dedicated assets below.
External dedicated assets.	Dedicated assets located outside Ergon Energy property/ substation or switchyard.	ACS	Yes. Design, build, own and operate	Varies depending upon arrangement chosen.	Varies depending upon arrangement chosen.
Dedicated Assets Internal	Dedicated assets located within Ergon Energy property/ substation or switchyard.	ACS	Usually not.	Major Customer.	O&M included in network charges

Component	Explanation	Classification	DCT available?	Responsibility for Capital Cost	Customer's ongoing costs
Dedicated secondary systems	Communication/ protection assets that are solely used by the Major Customer.	ACS	Yes.	Varies depending upon arrangement chosen.	Varies depending upon arrangement chosen.
Shared Assets	Those assets that are not Connection Assets or Customer Assets	SCS	No.	Ergon Energy	Included in network charges.
Shared Secondary systems	Shared communication and or protection asset.	SCS	No.	Ergon Energy	Included in network charges.
Metering	Dedicated to Major Customer, usually located adjacent to Connection Point.	Unregulated	Retailer to decide Metering Provider	Major Customer	Unregulated charges

## 9. Requirements for Construction

### 9.1. Overview

Regardless of which of the design, construction and ownership options set out in Table 1 in section 7.2 are selected:

- all works are to be carried out according to the relevant Australian Standards, industry codes and applicable laws and authorisations; and
- the Major Customer facilities to be connected must operate to comply with relevant technical and performance parameters as set out in the NER and the Connection Agreement (such as in relation to protection systems, control systems, load shedding facilities, metering, disturbing loads, harmonic emission limits and power factors).

Furthermore, Ergon Energy may require the Major Customer to provide support, such as supply to a number of auxiliary services, at no cost to Ergon Energy and/or its contractors during the construction period.

## 10. Early Works

In some limited circumstances the delay in starting preliminary project works as a result of the time taken to finalise negotiations in respect of the Construction Contract and Connection Agreement and execute these documents may have a significant adverse effect on the target date for completion of the relevant works.

Ergon Energy is in the process of implementing a staged approach into its Construction Contracts whereby the Major Customer can commit (by way of accepting quotes) first to the preliminary planning, concept scope and preliminary design stage (that is, Planning Report/Project Scope or Detailed Response stages), then to the detailed design stage and then to the construction stage. At each stage, the Major Customer will have the ability to terminate if it does not wish to progress further.

## 11. BOO Process Requirements

### 11.1. General

As discussed previously, the BOO option involves each party designing, constructing, owning and operating its own assets, and does not involve the transfer of any assets.

Where Ergon Energy designs and constructs Connection Assets for a Major Customer Connection, it will recover the amount recoverable under the AER MCC ACS formula from the Major Customer in respect of these works (this will include the cost of any external contractors retained by Ergon Energy).

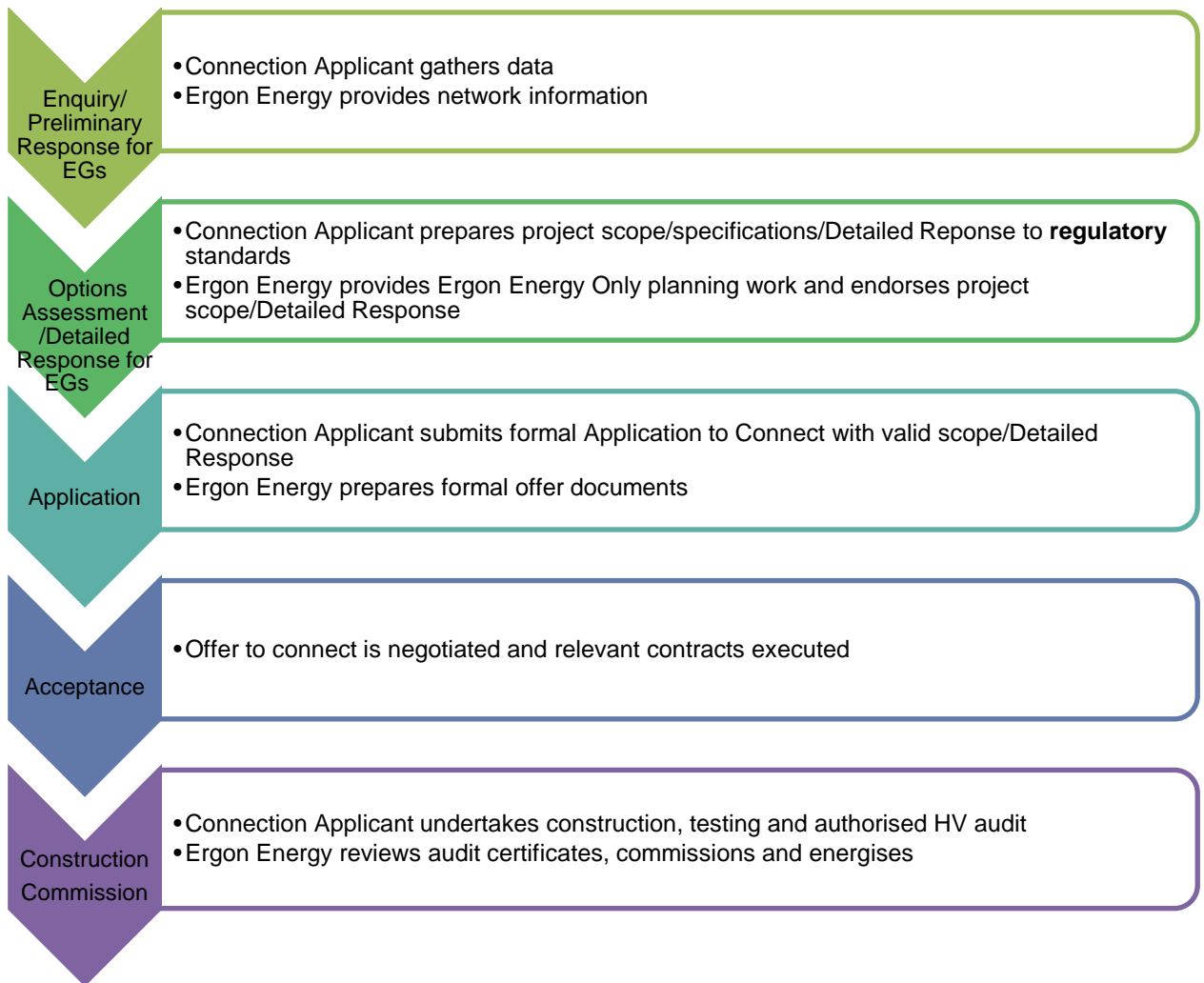
Where a Major Customer is considering the use of the BOO option to design, construct, own and operate the Connection Assets, it is advisable that the Major Customer discuss this with Ergon Energy, as asset ownership brings with it certain responsibilities (such compliance with legislation, approvals, licence and insurance requirements).

Generally, the BOO option is only available to Major Customers where:

- (a) the relevant Connection Assets will not be supplying any other Connection Customer of Ergon Energy; and
- (b) the Major Customer accepts full responsibility to comply with all laws, rules, regulations, applicable standards, environmental planning and approval requirements and community engagement obligations with respect to the relevant works, and to comply with Ergon Energy's technical and performance standards at the Connection Point.

### 11.2. Figure 2 – Steps in Connection Process relevant to BOO Major Customers

A summary of relevant steps in the connection process for BOO Major Customers is set out in Figure 2 below.



### 11.3. Testing and commissioning for the BOO option

The Major Customer must, prior to commissioning of any of its Connection Assets, give Ergon Energy a copy of an HV audit certificate for relevant HV assets that is audited by an accredited and authorised auditor.

The purpose of testing and commissioning is to prove that installed plant is fit for the intended purpose and will not compromise the safety of personnel or the safety and security of the existing system.

The Connection Applicant/Service Provider shall ensure that all electrical and mechanical tests are performed in accordance with the appropriate regulations and standards. Pre-commissioning tests on certain equipment may be required. These tests will be listed in the testing program.

Ergon Energy will need to be satisfied that all High Voltage equipment, control and protection equipment, auxiliary supplies and earthing requirements are in compliance with specific manufacturer's requirements and/or its own internal operational and maintenance requirements. This will be done through the appropriate party carrying out relevant tests, and where the appropriate party is not Ergon Energy, Ergon Energy will usually need to witness the relevant tests.

In addition, Ergon Energy will not energise the Connection Point or connect any HV equipment until it is satisfied that the Major Customer has met certain requirements set out in the Connection Agreement (such as provision of required Securities etc.).

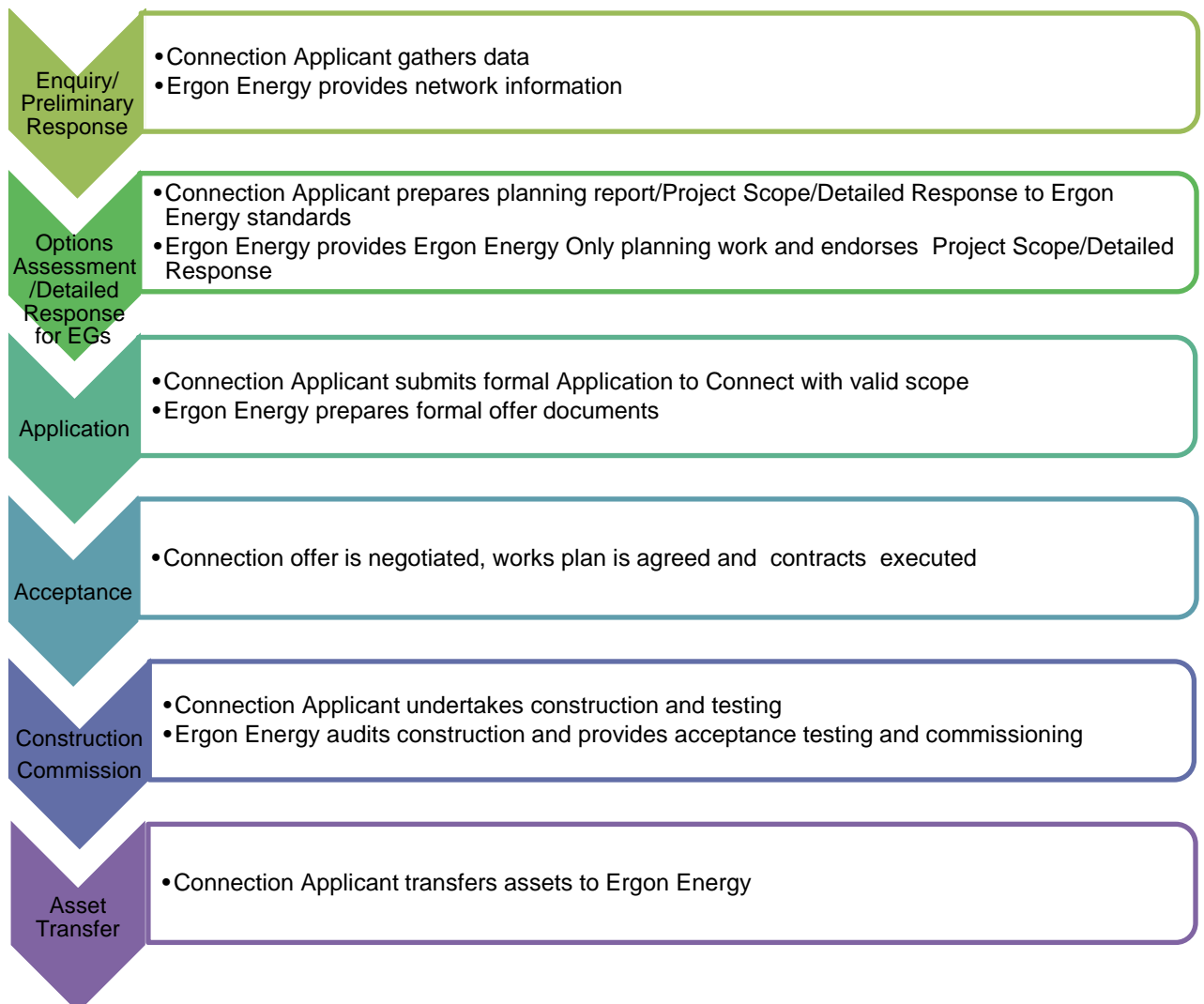
## 12. DCT Process Requirements

### 12.1. General

If a Major Customer is considering designing and constructing assets for transfer to Ergon Energy (so that Ergon Energy owns, operates and maintains the assets), it should determine this at an early stage and advise Ergon Energy of this as soon as possible (and in any event no later than when submitting the Connection Application).

### 12.2. Figure 3 – Steps in Connection Process relevant to DCT Major Customers

A summary of relevant steps in the connection process for DCT Major Customers is set out in Figure 3 below.



### 12.3. The Approved Contractors Register and Prescribed Materials and Equipment Register

Where a Major Customer will be (itself or through a third party) designing and constructing Transferable Connection Assets and transferring these assets to Ergon Energy, Ergon Energy generally requires that acceptable Service Providers (or other service providers who are otherwise



approved by Ergon Energy) and materials and equipment are used for these works. For this purpose, Ergon Energy maintains an:

- (a) Approved Contractors Register – which is a register of contractors that are technically qualified and suitably experienced to design, construct, install, commission, test and perform works in respect of assets that are to be owned by Ergon Energy; and
- (b) Approved Manufacturers Register – which is a register of manufacturers or suppliers of certain specific types of equipment (Prescribed Materials and Equipment) that are used in the Distribution System.

(Note that where a supplier is listed (rather than a manufacturer), this is because they are either the sole supplier in Australia or are the only supplier capable of meeting the technical requirements of the Distribution Network).

These registers provide a governance tool that ensures that relevant entities are experienced, competent and suitably qualified to be able to provide products and services of the relevant quality and technical standards required for inclusion as part of Ergon Energy's Distribution System and to ensure the maintenance of Ergon Energy's safety requirements and the minimisation of any adverse effects upon the quality and integrity of the Distribution Network or the reliability of supply to Ergon Energy's other customers. Furthermore, the use of approved equipment assists in ensuring technical compatibility with the remainder of the Distribution Network and in maintaining common spare parts and standardising product training for Ergon Energy employees so that costs, and the duration of outages caused by any failure of the Transferable Connection Assets, can be minimised. Furthermore, this reduces otherwise complex and time-consuming audits to assess the quality and performance of non-standard assets.

In addition, the service providers on the register must have current professional indemnity and public liability insurance (and, in respect of designers, hold RPEQ accreditation).

The Major Customer will retain the ability to select the particular contractor, consultant, manufacturer or supplier on the basis of price and commercial terms and conditions. The Major Customer will engage directly with their preferred firm and manage the delivery of the services.

If a Major Customer wishes to use a contractor, consultant, manufacturer or supplier who is not listed on the relevant register, the Construction Contract provides a mechanism for that Major Customer to propose the particular service provider to Ergon Energy and Ergon Energy can approve that service provider for the purposes of the particular project, based on the service provider's QA, WHS, EMS, capability, commitment, industry experience and performance.

Alternatively, the entity may apply for inclusion on the relevant register, which will streamline the process in respect of future Major Customer Connections for that service provider, and also improve the scope of Ergon Energy's registers and increase competition between the service providers on those registers.

In summary, where Connection Assets are to be designed and constructed by the Major Customer (or its subcontractors) and then transferred to Ergon Energy (that is, they are a Transferable Connection Asset), then, in order to maintain the integrity and consistency of the Distribution System, Ergon Energy requires these Connection Assets to:

- (a) be designed and constructed by a contractor who is either listed in the Approved Contractors' Register or who is otherwise approved by Ergon Energy in respect of the Transferable Connection Assets (Approved Contractor);
- (b) generally, be comprised of high quality, durable materials and equipment that are compatible with Ergon Energy's existing Distribution System and meet Ergon Energy's relevant specifications and technical requirements; and
- (c) where those Connection Assets comprise certain types of equipment (Prescribed Materials and Equipment), be constructed using particular prescribed materials and equipment from a manufacturer or supplier listed in the Approved Manufacturers' Register who is otherwise approved by Ergon Energy in respect of the Transferable Connection Assets (Approved Manufacturer).

Should a Major Customer not comply with the above, Ergon Energy will refuse to accept ownership of Transferable Connection Assets.

To enable this process, Ergon Energy lodged a third line forcing notification with the Australian Competition and Consumer Commission (**ACCC**) regarding the compulsory use of the Approved Contractors' Register and Approved Manufacturers' Register, and was granted immunity from prosecution for a potential breach of the *Competition and Consumer Act 2010* (Cth) based on the terms of the notification from 21 February 2012 (which is on the ACCC's public register and is available [here](#)).

## 12.4. Due Diligence prior to Transfer

Before Ergon Energy issues a Notice of Acceptance under the Construction Contract (which triggers the transfer of Transferable Connection Assets), Ergon Energy will carry out a due diligence process to confirm that various aspects of the Transferable Connection Works meet the relevant requirements, including in respect of:

- (a) tenure over such assets and sufficient access rights to such assets;
- (b) environmental, cultural heritage or social issues;
- (c) correct labelling of equipment; and
- (d) general compliance with relevant legislative and contractual requirements.

Primary Plant equipment details as shown in Ergon Energy's [Fact Sheet - Equipment Details](#) will be required to be supplied by the Connection Applicant/Service Provider and will form the basis of a ratings assessment and future maintenance program.

All associated design manuals and test certificates for Transferable Connection Assets must be provided to Ergon Energy prior to commissioning.

## 12.5. Warranties and Defects

Under the Construction Contract, Ergon Energy may request security from the Major Customer to cover the estimated costs of rectifying any defect. This security is to be for at least 10% of the estimated cost of construction and to be held for at least two years after the date of transfer of the Transferable Connection Assets. Ergon Energy may elect to increase the value of the Security for Defects or the length of the Defects Rectification Period, taking into account relevant factors such as complexity, maintenance requirements etc. Please refer to the [Fact Sheet - Security Requirements](#).

If Ergon Energy identifies any defective works during the Defects Rectification Period, Ergon Energy may direct the Major Customer to arrange (at its cost) for the prompt rectification of any such defects. However, if there are safety issues (e.g. where the supply of electricity to other electricity installations is jeopardised), Ergon Energy may complete the repairs and recover the cost from the Major Customer under the Construction Contract.

## Part D: Requirements to be complied with by Major Customers

### 13. Connection Process

#### 13.1. General

As discussed in section 3, the Major Customer Connection Process is set out in the [Major Customer Connection Guideline](#) and the [Embedded Generation Information Pack](#)

#### 13.2. Planning Reports, Project Scopes and Detailed Responses

To make a compliant Application to Connect, the Major Customer must submit valid planning, scoping and preliminary design documentation (where these documents are valid if they have been approved and endorsed by Ergon Energy within the previous three months). For the connection of an EG, the Major Customer must also submit in their application the information specified in the Detailed Response outlined under clause 5.3A.8 of the NER.

Broadly:

- (a) a Planning Report is a high level document for load-based Major Customers that reviews the specific Major Customer Connection and sets out the available options (usually up to three options) for the provision of the particular Major Customer Connection, depending upon the location and capacity of the Distribution Network in the relevant area. These are usually based initially on seven standard connection arrangements that have been developed to expedite the Major Customer Connection process (these standard arrangements are set out in Appendix 5), except where the standard options are either impracticable or inconsistent with Ergon Energy's network planning for the relevant area (in which case non-standard options may need to be considered);
- (b) a Project Scope is a more detailed document for load-based Major Customers that relates to a single one of the options identified in the Planning Report (i.e. the Major Customer's preferred option) and identifies the relevant works for Connection Assets that are required to be undertaken to achieve the Major Customer Connection. Although the Project Scope does not need to contain all of the relevant construction development information (other than key schedule information), it does need to contain sufficient details so that Ergon Energy can provide an appropriate Connection Point and undertake necessary upstream works; and
- (c) a Detailed Response is for Major Customer (EGs). It complies with Chapter 5.3A.8 of the NER and broadly incorporates the work completed under (a) and (b) above.

Further details about Planning Reports and Project Scopes are set out in Ergon Energy's [Fact Sheet - Planning Reports and Project Scopes](#), and further information about Detailed Responses is available in the [Embedded Generation Information Pack](#).

Where substantial upstream works are to be undertaken on the Distribution Network, Ergon Energy will also need to develop its own Project Scope for these works.

Note that Ergon Energy reserves the right to instruct the Major Customer (or its relevant Service Provider) in respect of the design of certain secondary systems, being the communication, SCADA and protection systems, as these are crucial elements that cannot be done by the Major Customer in isolation.

Generally, the preparation of these documents and other elements of the project planning phase can be undertaken by Ergon Energy (either itself or through an approved subcontractor), the Major Customer or the Major Customer's appointed Service Provider. Where Ergon Energy undertakes these services, this is a chargeable service and Ergon Energy will recover certain costs from the Major Customer in respect of this.

In preparing the above documents, the Major Customer should be aware that certain elements of the project design (for example the choice between overhead and underground distribution) may be

subject to conditions arising from applicable State or local government requirements or by the operation of agreements that currently exist between Ergon Energy and other parties such as State or local governments and Queensland Rail.

## 14. Alternative Energy Solutions

As part of the Planning Report/Detailed Response process, Ergon Energy normally reviews whether there are any potential benefits to the Distribution Network (such as avoiding or deferring upstream investment) from reducing the Major Customer's peak demand requirement. Such reductions could occur through:

- (a) shifting the Major Customer's peak load to a time not coincident with the general peak in that location on the Distribution Network;
- (b) energy efficiency and energy conservation measures; and
- (c) providing Distribution Network support via embedded generation or load shedding,

and may result in lower operating costs and lower connection costs for the Major Customer (and, where network support is provided, additional incentive payments).

If such benefits are identified, Ergon Energy will work with the Major Customer to investigate this prior to submission of relevant designs as part of a Connection Application. Any such investigation after a Connection Application is made will require a restart of the relevant process.

## 15. Design Requirements

### 15.1. Design standards and requirements

All designs submitted to Ergon Energy must comply with:

- (a) relevant Laws, Australian Standards and Codes of Practice; and
- (b) where the relevant asset is a Transferable Connection Asset, also with Ergon Energy's technical standards as published on the Design and Construction Contractors pages of the Ergon Energy website. Any variations to these standards or specific requirements will be included in the Construction Contract.

Ergon Energy's [Fact Sheet - Project Design](#) provides a list of design elements, type and format of information required and the relevant reference criteria.

### 15.2. Formats for design documents

All designs submitted to Ergon Energy must be in an electronic format suitable both for direct printing of drawings and in a CAD format suitable for transfer to GIS and asset management systems. The files provided must include:

- (a) Adobe PDF format with a paper size no larger than A1;
- (b) Line designs must be in CAD format readable and to data specification using Ergon Energy's External Design Tool (AutoCAD) using Smallworld/Ellipse Compatible Units; and
- (c) Zone substation design must be in CAD format readable by Microstation (Ergon Energy's preference) or AutoCAD and compliant with Ergon Energy's design specifications.

### 15.3. Design approval process

The Construction Contract sets out a process for the approval of relevant Major Customer designs (particularly in respect of Transferable Connection Assets) by Ergon Energy. The Major Customer must not commence any construction works until the relevant designs have been approved and any other requirements in the Construction Contract complied with.

The following minimum information is required to obtain Ergon Energy's approval to a design:

- (a) schematic and geographic diagrams of the HV and LV electrical installation;

- (b) a site layout identifying the positions and layout of substations, switch rooms, underground and overhead HV line routes (where substations and switch rooms must be identifiable within the schematic);
- (c) calculations of the anticipated demand at each substation and total demand;
- (d) calculations of the anticipated power usage and load profiles for each transformer and a load profile for the project;
- (e) underground cable routes and cable design data including cable installed in buildings. (e.g. trench cross sections, cable rating);
- (f) overhead reticulation routes and design data (e.g. design loads, component types, conductor ratings, line profiles);
- (g) design of substations including earthing designs;
- (h) design of switch rooms including earthing designs;
- (i) a table listing the types of protection to be used for each particular item of equipment including the size of fuses and relay settings. Details of protection cascading shall be provided. Ergon Energy will advise whether it may be necessary to change protection equipment or alter relay settings;
- (j) if SCADA or communication equipment is required (as notified by Ergon Energy), designs and details of equipment to be used;
- (k) position of metering (which will involve discussions with the relevant retailer, RP and Metering Provider);
- (l) table of the type and size of transformers and switchgear to be installed; and
- (m) planning, environmental and cultural heritage assessments and construction management plans that may impact on design.

## 15.4. Communications

Due to the importance of communications equipment and the necessity for such to operate with Ergon Energy's existing communications systems, the Major Customer will need to liaise with Ergon Energy's Telecommunications Group with regard to communications requirements to support SCADA communications, protection communications, and/or other applications as required for the associated secondary systems.

Ergon Energy will undertake the communications system design and provide equipment specifications and will be responsible for the equipment configuration, thus allowing Ergon Energy to provide equipment maintenance and support for ongoing management and operation of the communication systems.

The system design must meet NER requirements, including as set out in:

- (a) Chapter 4 of the NER;
- (b) section 12 of AEMO's Power System Security Guidelines under clause 4.3.1 of the NER;
- (c) clauses S5.2.6 and S5.3a.4 of the NER; and
- (d) AEMO's Standard for Power System Data Communications.

Communications transmission systems must meet Ergon Energy's existing standards.

The Major Customer will be responsible for installing the communications transmission and switching equipment as per the approved Ergon Energy Standard for Communications Equipment Installation.

The common transmission systems utilised include optical fibre (Optical Ground Wire (OPGW) and/or All Dielectric Self Supporting (ADSS)), microwave radio systems, and power line carrier.

Where a physical link such as optical fibre is utilised, suitable interfacing at the Connection Point is required, (e.g. joint at a communications pit).

Where the Major Customer is to own the assets it constructs, the typical requirement for communications is protection communications only. Where duplicated differential schemes are used,



there is usually a requirement for diverse communication links. Requirements involving generating units are typically more complex.

Where the Major Customer intends to provide and own protection relays, engineering access is not required, as the Major Customer will be undertaking to own and operate the relays.

Ergon Energy recommends that a Major Customer wishing to achieve inter-networking under this model should (as far as possible) use standard Ergon Energy equipment and configurations, as the introduction of non-standard or alternative equipment will require additional design, integration and testing between Ergon Energy and the Major Customer.

In certain cases there may be a requirement for control systems communications where an automatic load shedding scheme or plant overload protection scheme is required.

Details of the construction of communications assets must be provided through a series of engineering drawings relevant to the site or network, which must comply with Ergon Energy's CAD standards and the design, checking and approval process set out in these standards.

Ergon Energy may, upon request and for an appropriate fee, provide equipment installation and as constructed engineering drawings on behalf of the Major Customer.

## 15.5. SCADA Requirements

SCADA/control systems for Transferable Connection Assets must meet Ergon Energy's latest standards. The RTUs and HMI must be the same as those used by Ergon Energy. The Major Customer can design the RTU hardwiring connections to plant, but the RTU configuration and programming must be done by Ergon Energy. The HMI configuration and programming can be performed by the Major Customer to relevant Ergon Energy standards and guidelines.

Testing can be performed by the Major Customer at the substation as part of an integrated program to test the substation.

Any Major Customer (EG) that will export into the Distribution Network at a HV connection must provide SCADA indications for the state of the generating unit circuit breakers and the analogue of the Connection Point in MW, MVA and Amps. If the circuit breakers are LV (i.e. 415/433V) and indication is not available, then some type of remote indication is required from the Major Customer to enable Ergon Energy to assume that the generating unit is on-line. Where the Connection Applicant is an embedded generator (that is, not provided with a dedicated feeder), arrangements shall be made to allow for an Ergon Energy remote terminal unit RTU and associated equipment to be installed to provide remote monitoring. This RTU and associated equipment shall meet the SCADA DCT requirements.

Where an automatic load shedding scheme or plant overload scheme has been identified, interfacing to Ergon Energy's SCADA/control system would be required.

## 15.6. Equipment labelling

Ergon Energy will give the Major Customer details of the operational and identification labels that the Major Customer must place on items of equipment, substation buildings and enclosures comprising the Transferable Connection Assets. The Major Customer must give Ergon Energy a table identifying each item of equipment, label identification, make, model and serial number.

## 15.7. Material Standards

Prescribed Materials and Equipment on the Approved Manufacturers' Register necessary to construct the Transferable Connection Assets can be purchased from Ergon Energy or directly from the supplier. Materials and plant that are not on the Approved Manufacturers' Register that are to be used in Transferable Connection Assets must otherwise comply with Ergon Energy's specifications and standards.

All associated design manuals and test certificates for Transferable Connection Assets must be provided to Ergon Energy prior to commissioning.

In general, all equipment comprising Transferable Connection Assets must be approved by Ergon Energy. Ergon Energy will not accept equipment that does not meet its specifications or standards. Only in exceptional circumstances will consent be given to this equipment being installed after a

verification process has been undertaken. A formal request must be made requesting the use of this equipment, and the assessment of non-standard equipment will incur assessment costs, training and deployment costs and may require additional spares. An additional warranty may also be required.

## 15.8. Protection and control systems

Ergon Energy has developed a number of standard primary and secondary system options for offer to the Connection Applicant (refer to Appendix 2).

The Connection Applicant and/or Service Provider must liaise and negotiate with Ergon Energy's Protection Design Section as to the type and electrical characteristics of high voltage and associated secondary equipment to be installed. This will allow Ergon Energy to install and set appropriate protection schemes upstream and at the connection point and manage the system. If Ergon Energy needs to install new and/or replace existing protection schemes as a result of this process, the Connection Applicant must pay those costs.

## 16. Metering

Major Customers are required to ensure that their facility complies with metering requirements under Chapter 7 of the NER, and should discuss these requirements with their Electricity Retailer.

Metering infrastructure broadly comprises two sets of components, being:

- (a) the primary equipment of measurement transformers (i.e. CTs and VTs); and
- (b) the metering installations themselves which are housed in those measurement transformers (which must be allocated a National Metering Identifier or NMI by Ergon Energy).

A summary of the relevant metering requirements is set out below. Further information on metering requirements is available at Ergon Energy's [Fact Sheet - Metering Installation Design](#).

- (a) Types 1-4 unregulated: Typically, Major Customer Connections require Type 1-4 metering installations. The provision of such metering installations is unregulated (not ACS or SCS) and, accordingly, the ownership and charging for such metering equipment is a commercial arrangement.
- (b) FRMP ultimately responsible: Under the NER, an entity (the Financially Responsible Market Participant or FRMP (who is usually the retailer, or may be a Market Generator)) has to be responsible for the Connection Point before the transfers of electricity at that Connection Point can be included in the NEM (that is, be a market connection point). The FRMP has the ultimate responsibility for deciding which entity will be responsible for providing the metering installations (the Responsible Person). The Responsible Person (which may be Ergon Energy or another entity) is responsible for the provision, installation and maintenance of a metering installation (and may appoint one or more Metering Providers and a Metering Data Provider for these purposes). A Metering Provider (MP) is responsible for providing, installing and maintaining relevant metering installations.
- (c) If FRMP not yet appointed: In some instances where long project lead times are involved, a Major Customer may not have selected a retailer to act as the FRMP at the time of making the Connection Application. For reasons of practicality and expediency, Ergon Energy may then need to assume the Responsible Person role and negotiate the ownership of the measurement transformers.

In such a situation, the Responsible Person role will need to be passed to the FRMP as soon as one is appointed.

Note that a Connection Point cannot be energised until a FRMP has been nominated and has provided all necessary documentation to enable supply to commence.

- (d) CTs and VTs: The provision of relevant measurement transformers are considered to be Connection Asset works. Clause 12 in "[A Guide to the Role of the Responsible Person 15/10/2009 Document No: MT\\_RP622v004](#)" states that for High Voltage installations the measurement transformers are usually owned by the DNSP or the Major Customer. Where a Major Customer supplies these, the measurement transformers must comply with Schedule 5.3 of the NER before they can be used.



Regardless of ownership, Ergon Energy will require copies of the CT and VT test certificates prior to energisation.

Where the CTs and VTs are located in Ergon Energy's property, and Ergon Energy is not the relevant Metering Provider, then Ergon Energy will have to provide access to the Metering Provider to those CTs and VTs.

Generally, who bears the cost of installing and replacing measurement transformers is dependent upon the particular suite of agreements between Ergon Energy (as DNSP), the Major Customer, the Major Customer's retailer and relevant Metering Providers. Where it is agreed that Ergon Energy will own the CTs and VTs, these will be located on Ergon Energy's side of the agreed Connection Point. Conversely, any CTs or VTs to be owned by the Major Customer will have to be installed on the Major Customer's side of the Connection Point.

Regardless of ownership, Ergon Energy will require copies of the metering installation design (either from the Responsible Person or the Metering Provider) prior to energisation of the Connection Point, and is responsible for issuing a NMI in accordance with relevant guidelines.

## 17. Operating Protocol

Major Customers are generally required to have an operating protocol in place that will provide the operating basis for mutually agreed and uniform procedures relating to the Connection Point. Operational practices may evolve over time, thus requiring amendments to the Operating Protocol.

The Operating Protocol will be settled by collaboratively by nominated persons from Ergon Energy and the Generator/Customer. It will deal with:

- planned outages, repairs and maintenance;
- unplanned outages, repairs and maintenance; and
- switching procedures.

See Ergon Energy's [Fact Sheet - Operating Protocol](#).

## 18. Generators

Specific requirements apply to generation located at a Major Customer's Premises.

Ergon Energy's [website](#) sets out further information in this regard.

## 19. Tenure Requirements

In general:

- (a) Ergon Energy is responsible for obtaining all licences, permits and approvals required under planning, environmental and cultural heritage laws which relate to the construction of any works it carries out; and
- (b) the Major Customer is responsible for obtaining all licences, permits, agreements and approvals required under planning, environmental and cultural heritage laws which relate to the construction of any works to be carried out by or on behalf of the Major Customer.

However, where there are Transferable Connection Assets, the Major Customer will have to ensure that all relevant interests in land are provided to Ergon Energy so that it can own, operate and maintain those assets.

Please refer to Ergon Energy's [Fact Sheet - Tenure Requirements](#) for further information.

## 20. Dispute Resolution

Ergon Energy contracts for construction works and connection agreements contain dispute resolution provisions and clauses. A party may also have the right to access dispute resolution provisions under other legislation (e.g. the NER).

Please refer to Ergon Energy's [Fact Sheet - Management of Disputes](#) for further information.

## 21. Reference Material

Useful reference documents are set out below.

- (a) AEMC. (2014). *National Electricity Rules* (Version 64). Retrieved from Australian Energy Market Commission website: <http://www.aemc.gov.au/Electricity/National-Electricity-Rules/Current-Rules.html>
- (b) AEMO. (2009). A Guide to the Role of the Responsible Person (Guideline). Retrieved from Australian Energy Regulator website: <http://www.aemo.com.au/Electricity/Retail-and-Metering/Metering-Documentation-and-Guides/Guide-to-the-Role-of-the-Responsible-Person>
- (c) Australian Energy Regulator. (2010). Distribution Determination 2010-11 to 2014-15, 4 May 2010 (ACCC Determination). Retrieved from the Australian Energy Regulator website: <http://www.aer.gov.au/node/3811>
- (d) Ergon Energy Corporation Limited. (2005). Ergon Energy Policy – Capital Contributions (Associated with Network Connections), QCA Approved 20 April 2005 (Policy document).
- (e) Ergon Energy Corporation Limited. (n.d). Design and Construction Standards Retrieved from the Ergon Energy website: <https://www.ergon.com.au/network/contractors-and-industry>
- (f) QLD Electricity Connection and Metering Manual. Retrieved from Ergon Energy Website: <https://www.ergon.com.au/network/contractors-and-industry/electrical-contractors/forms.-manuals-and-standards>
- (g) Standards Australia. (2008). Australian Standard: Substations and high voltage installations exceeding 1 kV AC (AS 2067 – 2008). Sydney, NSW: Committee EL-043.
- (h) Standards Australia. (2007). Australian/New Zealand Standard: Wiring Rules Incorporating Amendment Nos 1 and 2 (AS/NZS 3000:2007). Sydney, NSW: Joint Technical Committee EL-001.
- (i) Standards Australia. (2000). Australian/New Zealand Standard: Electromagnetic compatibility (EMC) (AS/NZS 61000.1.1 :2000). Strathfield, NSW: Joint Technical Committee TE/3.
- (j) Standards Australia. (2010). Australian/New Zealand Standard: Overhead line design standard (AS/NZS 7000:2010). Sydney, NSW: Joint Technical Committee EL-052.
- (k) Clean Energy Council – Embedded Generation Connection Guide: <http://www.cleanenergycouncil.org.au/technologies/grid/grid-connection/medium-scale-generation-connection.html>
- (l) [ENAGuideline for the preparation of documentation for connection of Embedded Generation within Distribution Networks](#)
- (m) Standard for Connection of Embedded Generators in the Ergon Energy Distribution Network: [https://www.ergon.com.au/\\_data/assets/pdf\\_file/0011/493472/STNW1174-Connection-of-EG-Systems-30-kW-to-1500-kW-to-a-Distributors-Network.pdf](https://www.ergon.com.au/_data/assets/pdf_file/0011/493472/STNW1174-Connection-of-EG-Systems-30-kW-to-1500-kW-to-a-Distributors-Network.pdf)  
[https://www.ergon.com.au/\\_data/assets/pdf\\_file/0007/671830/STNW1175-Connection-of-EG-Systems-to-an-HV-Network.pdf](https://www.ergon.com.au/_data/assets/pdf_file/0007/671830/STNW1175-Connection-of-EG-Systems-to-an-HV-Network.pdf)

**Note:** Internal Ergon Energy documents that are not available on the Ergon Energy website may be provided upon request by contacting the Project Sponsor.

## 22. Definitions, Abbreviations and Acronyms

A list of definitions is set out below. Where the definition is materially similar to that set out in Chapter 10 of the NER as at the date of this Manual, the relevant current definition in Chapter 10 of the NER is

to be used. In addition, any terms used in this Manual that are defined in the NER but not in this Manual are to have the meaning given in the NER.

Term	Acronym	Definition
Australian Competition and Consumer Commission	ACCC	The Commonwealth government commission of that name.
Alternative Control Services	ACS	Generally refers to services in respect of the Distribution System that relate to a specific Major Customer Connection – for example, the Connection of a Major Customer's premises to the Distribution System.  Ergon Energy recovers its costs in respect of Alternative Control Services through specific up-front charges that are calculated in accordance with specific formulae set by the AER.
Approved Contractor		A contractor who is listed on the Approved Contractors' Register, or who is otherwise approved by Ergon Energy in respect of carrying out Transferable Connection Assets.
Approved Contractors' Register		A register, maintained by Ergon Energy, of contractors and consultants who have been approved by Ergon Energy to undertake design, construction, project management, installation, testing, commissioning and performance of electrical work.
Approved Manufacturer		A manufacturer or supplier who is listed on the Approved Contractors' Register, or who is otherwise approved by Ergon Energy in respect of carrying out Transferable Connection Assets.
Approved Manufacturers' Register		A register maintained by Ergon Energy of approved manufacturers and suppliers as part of its procurement processes and quality assessment of materials and equipment used in the construction of electricity network assets. The register identifies the manufacturers and suppliers that are suitably qualified and experienced to produce materials and equipment for use in Ergon Energy's distribution network.
Australian Energy Market Operator	AEMO	The entity responsible for the management of the NEM and who oversees the system security of the "national" electricity grid in respect of which the NEM applies.
Australian Energy Regulator	AER	An independent statutory authority that is part of the Australian Competition and Consumer Commission, which is responsible for the economic regulation of electricity networks in the NEM and for compliance with various energy market legislation.
Build, Own and Operate	BOO	In this Manual, usually refers to where either: <ul style="list-style-type: none"> <li>• Connection Customer designs and constructs some Connection Assets and retains ownership and operational control over those assets; or</li> <li>• Ergon Energy designs and constructs some assets and retains ownership and operational control over those assets.</li> </ul>
Connection		The physical link to or through a Transmission Network or Distribution Network.
Connection Agreement		An agreement between Ergon Energy and a Major Customer under which Ergon Energy agrees to allow the Connection of the Major Customer's premises to Ergon Energy's Distribution Network and the transfer of electricity across the Connection Point.
Connection Applicant		A person who wants to establish or modify a Connection to a Transmission Network or Distribution Network and/or who wishes to receive Network Services and who makes a connection enquiry providing details as required by NER on the <a href="#">Major Customer Connection Enquiry Form</a>
Connection Application		An application to connect, or modify the connection of, a Major Customer's Premises to the Distribution Network.

Term	Acronym	Definition
Connection Asset		In this Manual, refers to assets that are dedicated to facilitating the Major Customer's Connection to the Distribution Network and the supply of electricity across the relevant Connection Point. Where Connection Assets are owned by Ergon Energy, they are also "connection assets" under the NER and typically comprise the assets from the Connection Point back up to the Network Coupling Point. This allows Ergon Energy to charge appropriately for the use of these assets by the specific Major Customer. Where Connection Assets are owned by the Major Customer, they are Customer Assets.
Connection Asset Customer	CAC	See clause 2.2.
Connection Customer		A customer connected to the Distribution Network.
Connection Point	CP	In this Manual, the agreed point of supply established between Ergon Energy and the Major Customer, representing the boundary between the parties' assets.
Construction Contract		An agreement between Ergon Energy and a Major Customer under which the parties agree to carry out works to either establish, or modify, a connection of the Major Customer's premises to Ergon Energy's Distribution Network.
Current Transformer	CT	
Customer Asset		Customer Assets include all assets that are owned and operated by a Major Customer downstream of the Connection Point.
Defect		In the Construction Contract, usually refers to a defect in the Transferable Connection Assets.
Defects Rectification Period		In the Construction Contract, a period during which Ergon Energy will hold Security to cover potential exposure in respect of any Defects.
Design, Construct and Transfer	DCT	In this Manual, refers to where a Major Customer constructs certain assets and gifts those assets to Ergon Energy upon completion.
Detailed Response		The detailed response referred to in clause 5.3A.8 of the NER, which must contain the information set out in S5.4B of the NER.
Distribution Determination		The determination made by the AER at 5-yearly intervals concerning the economic regulation of a Distribution Network.
Distribution Network		In Queensland, includes the electricity network owned and operated by Ergon Energy Corporation Limited.
Distribution Network Service Provider	DNSP	A person that owns, controls or operates a Distribution Network and the associated connection assets. Ergon Energy is a DNSP
Distribution System		Technically refers to the Distribution Network together with any Connection Assets owned and operated by the DNSP.
Electricity Act		<i>Electricity Act 1994 (Qld)</i>
Electricity Industry Code		The Electricity Industry Code under the <i>Electricity Act 1994 (Qld)</i> .
Electricity Regulation		<i>Electricity Regulation 2006 (Qld)</i>
Electricity Retailer		Person who holds a retail authority under the <i>Electricity Act 1994 (Qld)</i> .
Ellipse		The computer system used within Ergon Energy for works management, human resources and projects.
Embedded Generator	EG	See clause 2.2.
Environmental Management Statement	EMS	Refers to an environmental management statement under the <i>Environmental Protection Act 1994 (Qld)</i> .
Ergon Energy		In this Manual, generally refers to Ergon Energy Corporation Limited as a Distribution Network Service Provider.

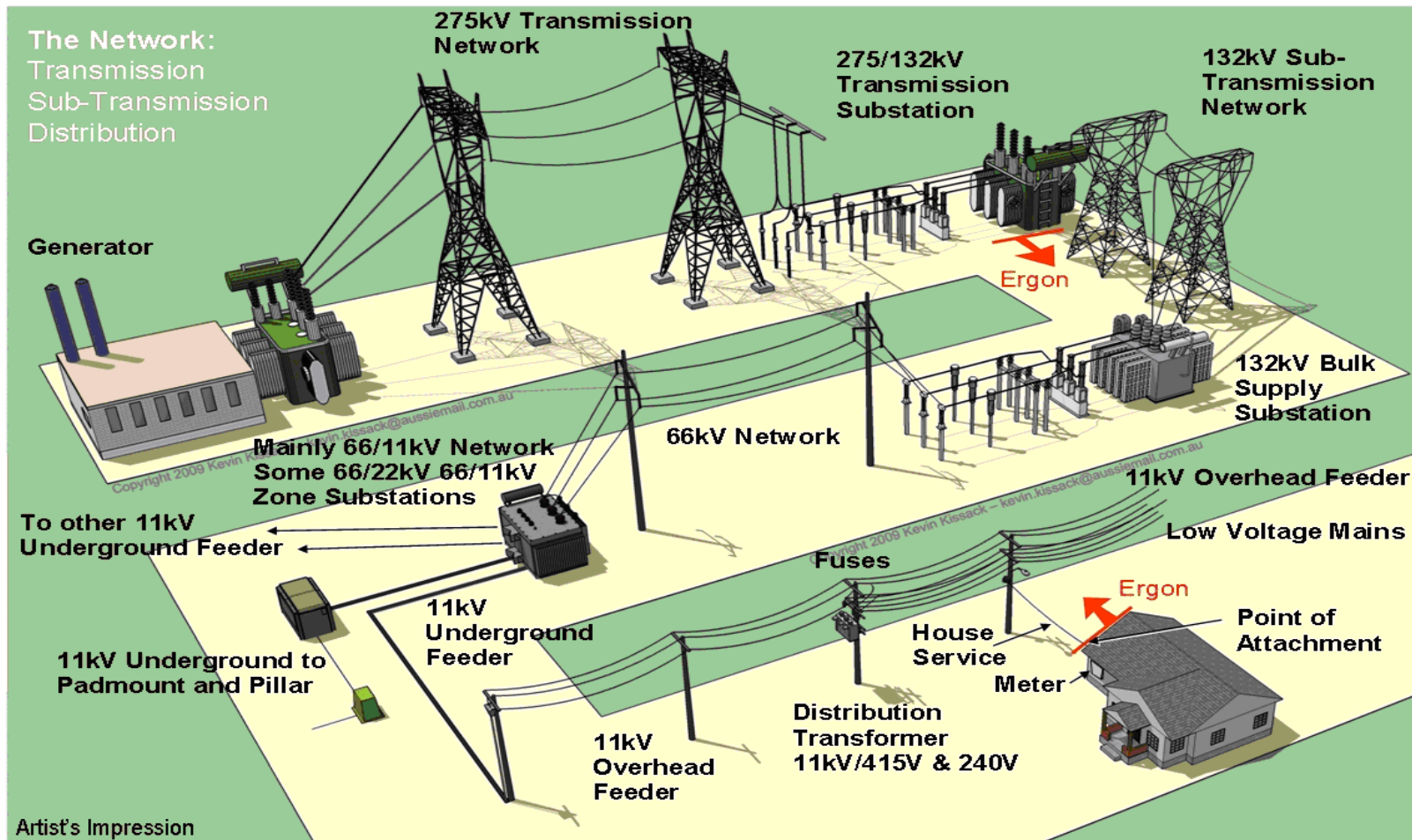
Term	Acronym	Definition
Financially Responsible Market Participant	FRMP	The entity that is financially responsible for a Connection Point under the NER.
Generator		Broadly, an entity who is registered with AEMO in respect of the ownership, operation or control of a generating system connected to a network.
High voltage	HV	A voltage greater than 1 kV.
Independently Calculated Customer	ICC	See clause 2.2.
Low Voltage	LV	Voltage of 1 kV or less.
Major Customer		A Major Customer is, for the purposes of this Manual, a Connection Applicant who is, or who will be when the connection or modification to the connection is finalised, any of an ICC, CAC or EG (see clause 2.2).
Major Customer (EG)		In this Manual, refers to a Major Customer who will have an embedded generator on its Premises.
Major Customer Connection Alternative Control Services	MCC ACS	In this Manual, generally refers to the design and construction of assets to establish, or modify, a connection between the Major Customer's premises and Ergon Energy's Distribution Network.
Major Customer Connection Applicant		A Connection Applicant who is, or will be, a Major Customer after completion of the establishment, or modification, of the Major Customer Connection.
Major Projects		The group within Ergon Energy that is responsible for Major Customers.
Manual		This Major Customer Connection Manual.
Metering Point		The point of physical connection of the metering installation measuring the flow of electricity across a Connection Point.
Metering Provider	MP	A person who provides certain metering services (including installation) under the NER.
National Electricity Law		The governing legislation of the NEM, under which the NER are established.
National Electricity Market	NEM	The name of the Australian wholesale electricity market and the associated interconnected national grid, which includes the majority of the electricity network in Queensland.
National Electricity Rules	NER	The NER are made under the National Electricity Law. The NER governs the operation of the NEM.
National Metering Identifier	NMI	This is a unique identifier for each Connection Point within the NEM. For every new connection, a NMI is required in the contract and is to be requested from Ergon Energy's Service Transaction Centre (STC).
Network Coupling Point	NCP	The point at which Connection Assets join a Distribution Network, used to identify the distribution service price payable by a Major Customer.
Network Services		Broadly, a service associated with the conveyance of electricity through a Distribution Network or a Transmission Network.
Network Support Agreement		In this Manual, an agreement between Ergon Energy and a Major Customer whereby the Major Customer provides network support services to Ergon Energy to maintain the stability of the Distribution Network in certain circumstances.
Notice of Acceptance		In this Manual, refers to the notice given under a Construction Contract when all Works required to facilitate the new or modified Major Customer Connection have occurred, which may trigger the transfer of any Transferable Connection Assets.
Operating Protocol		A protocol agreed between Ergon Energy and a Major Customer to deal with outages and switching.
Planning Report		A high-level document that reviews the specific Major Customer Connection and sets out the available options for that Connection.
Powerlink		Powerlink Queensland, the Transmission Network Service Provider in Queensland.

Term	Acronym	Definition
Prescribed Materials and Equipment		In relation to Transferable Connection Assets, certain materials and equipment in respect of which Ergon Energy has requirements concerning the source of such materials and equipment.
Project Scope		A more detailed document prepared after a Planning Report, which considers one only of the options listed in that Planning Report and scopes out the works.
Project Sponsor		Person/s within Ergon Energy who are responsible for managing the Major Customer Connection process.
Quality Assurance	QA	Refers to a quality assurance process.
Registered Professional Engineer Queensland	RPEQ	A person who is registered under the <i>Queensland Professional Engineers Act 2002</i> (Qld).
Responsible Person	RP	The person responsible under the electricity laws for the provision of metering installations at Connection Points.
Security		A financial security under an agreement, usually a Construction Contract or Connection Agreement.
Service Provider	SP	A person or organisation on the Approved Contractors' Register approved by Ergon Energy to carry out design and/or construction of certain electrical works for assets on the basis of experience and meeting registration and certification requirements.
Shared Network Assets		All the assets on the Distribution Network side of the Network Coupling Point.
Standard Asset Customer	SAC	See clause 2.2.
Standard Control Services	SCS	Generally refers to services in respect of the Distribution Network that benefit multiple customers – for example, operation and maintenance of the entire Distribution Network.  Ergon Energy recovers its costs in respect of Standard Control Services through network charges that are calculated in accordance with specific requirements set by the AER.
Transferable Connection Assets		In this Manual, refers to assets constructed by or on behalf of a Major Customer in respect of a Major Customer Connection where, under the terms of the Construction Contract, the ownership of these assets is to be transferred to Ergon Energy upon completion.
Transmission Connection Point		A point at which an entity's assets connect to a Transmission Network.
Transmission Network		In Queensland, the electricity network owned and operated by Powerlink.
Transmission Network Service Provider	TNSP	A person who engages in the activity of owning, controlling or operating a Transmission System.
Transmission System		Includes a Transmission Network together with any associated connection assets.
Voltage transformer	VT	
Workplace Health and Safety	WHS	Refers to workplace health and safety matters.
Works		In this Manual, refers to the design, construction, testing and commissioning works under a Construction Contract.



# PART F: EXPLANATORY INFORMATION

## APPENDIX 1 DIAGRAM OF THE NETWORK





## APPENDIX 2

## EXAMPLES OF ASSET DETERMINATION

Table 1: Examples for Determining Network Assets and Connection Assets

Asset	General description of Works	Typical classification	DCT available?	Asset Type	Typical Connection Point	Typical Network Coupling Point
33-132 kV substation	New shared assets or augmentation of existing shared assets.	SCS	No	N/A	N/A	Downstream of shared assets.
	New dedicated assets that are not already identified in Ergon Energy's forward plan.	ACS	Yes (subject to risk assessment)	Feeder Bay	Outside substation at an ABS.	Connection to a shared bus.
				Transformer Bay	As above	For dedicated transformers, connection to the incoming bus.
11-132 kV feeders	New shared feeder or augmentation of existing shared feeder identified in Ergon Energy's forward plan.	SCS	No	N/A		
	New dedicated feeder that is not already identified in Ergon Energy's forward plan.	ACS	Yes	Dedicated feeder	Major Customer side of ACS	Where dedicated feeder connects to shared feeder.
	Assets either specifically requested by Major Customer or required to mitigate impact of Major Customer on other customers.	ACS	Yes		N/A	N/A

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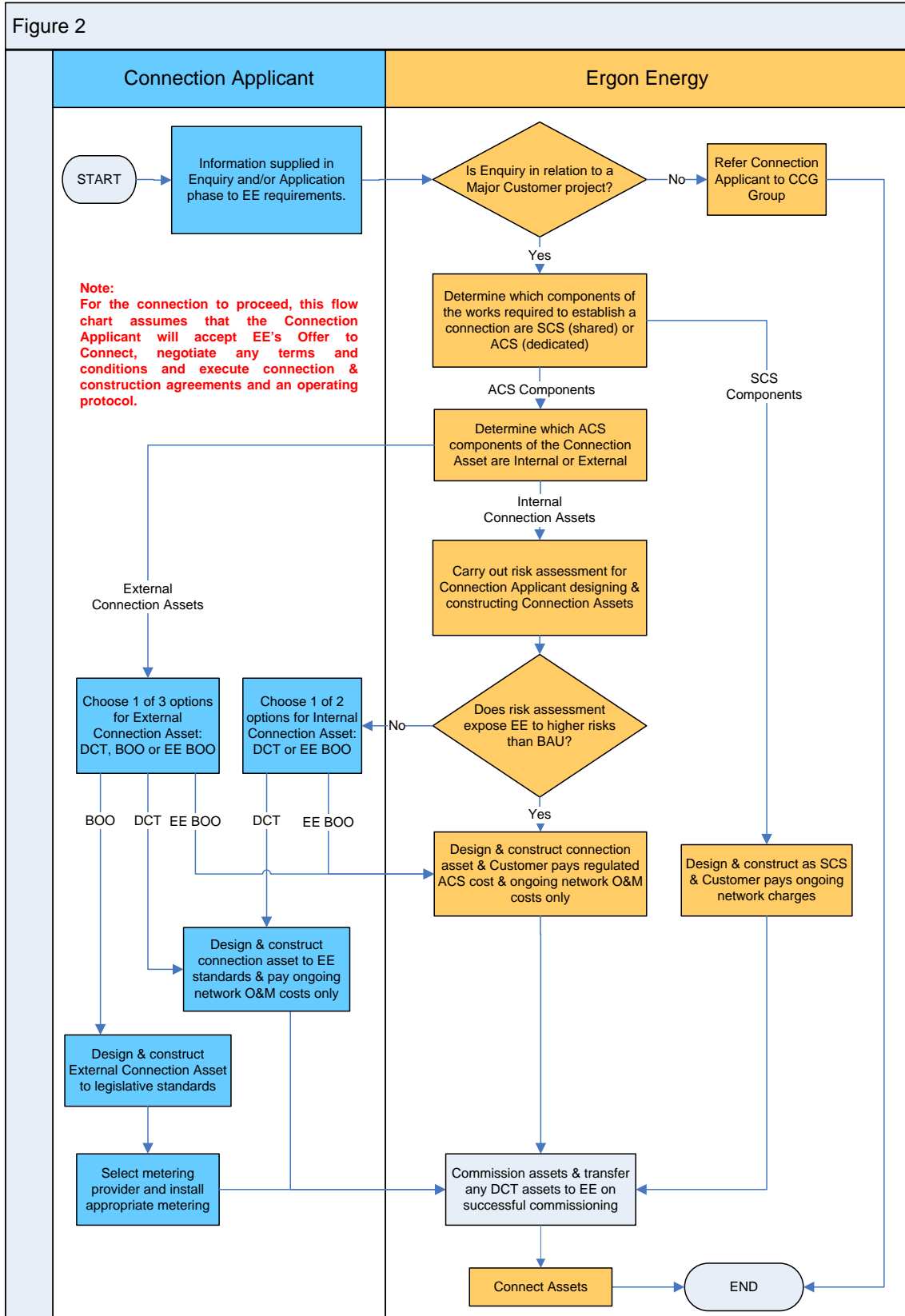
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Asset	General description of Works	Typical classification	DCT available?	Asset Type	Typical Connection Point	Typical Network Coupling Point
LV-22 kV substations on Major Customer's Premises	Transformers and switchgear dedicated to supply of Premises.	ACS	Yes	Dedicated distribution substation	At asset ownership boundary eg Major Customer side of switchgear.	Where the dedicated incoming feeder connects to shared network.
	Certain HV cables and switchgear where arrangement involves a single loop connection and there is no protection relay controlled HV network switchgear.	ACS	Yes	Dedicated ring main unit (RMU)	At Major Customer side of outgoing isolation switch on the RMU	Where dedicated cable connects to the RMU.
	Certain HV cables and switchgear where arrangement involves more than a single loop connection.	SCS	No	N/A		
	Dedicated HV feeder with protection relay controlled HV network switchgear.	ACS	Yes	Distribution Feeder	At Major Customer side of outgoing isolation switch.	Where dedicated distribution transformer connects to shared bus.

# APPENDIX 3 ROLE OF ACS SCS DETERMINATION IN ALLOCATING PROJECT RESPONSIBILITIES

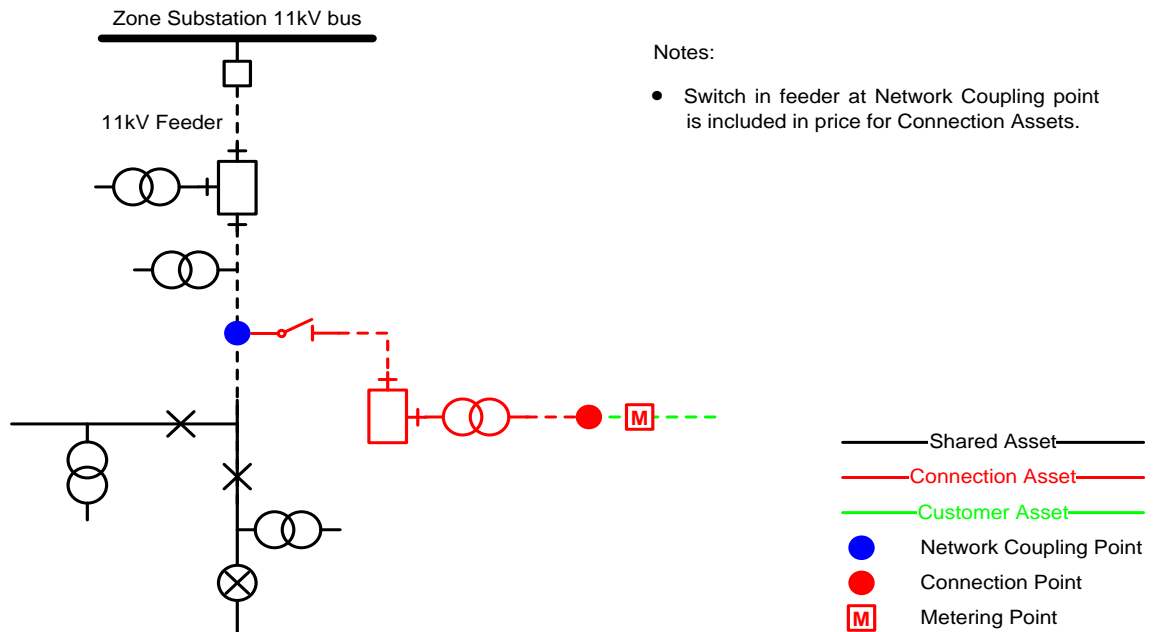
Flow Chart for determination and treatment of ACS and SCS components of Connection Assets



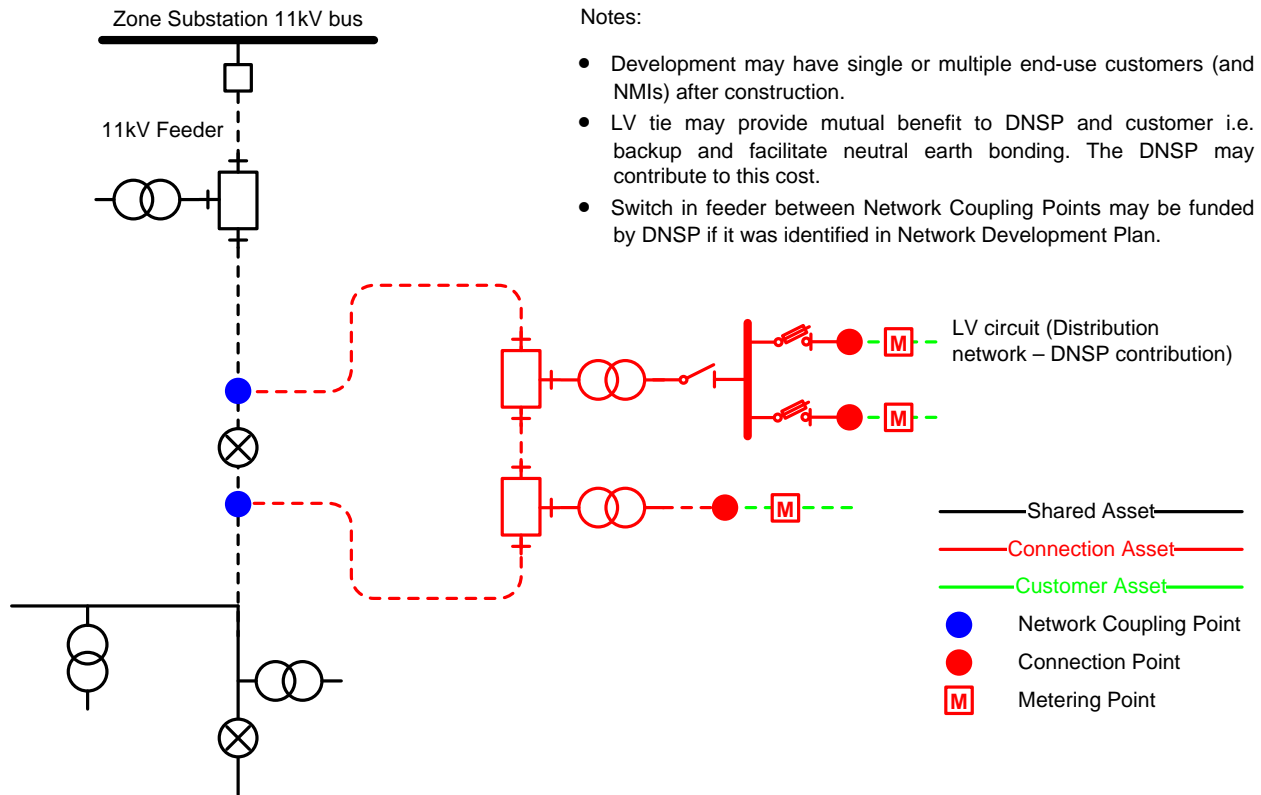
## APPENDIX 4 EXAMPLES OF MAJOR CONNECTION PROJECTS

In all of the following examples, the assets between the Network Coupling Point(s) and the Connection Point are defined as Connection Assets. The design and construction of these assets may be provided by Ergon Energy as an Alternative Control Service.

### 1. Simple Connection with 11 kV & LV Connection Assets



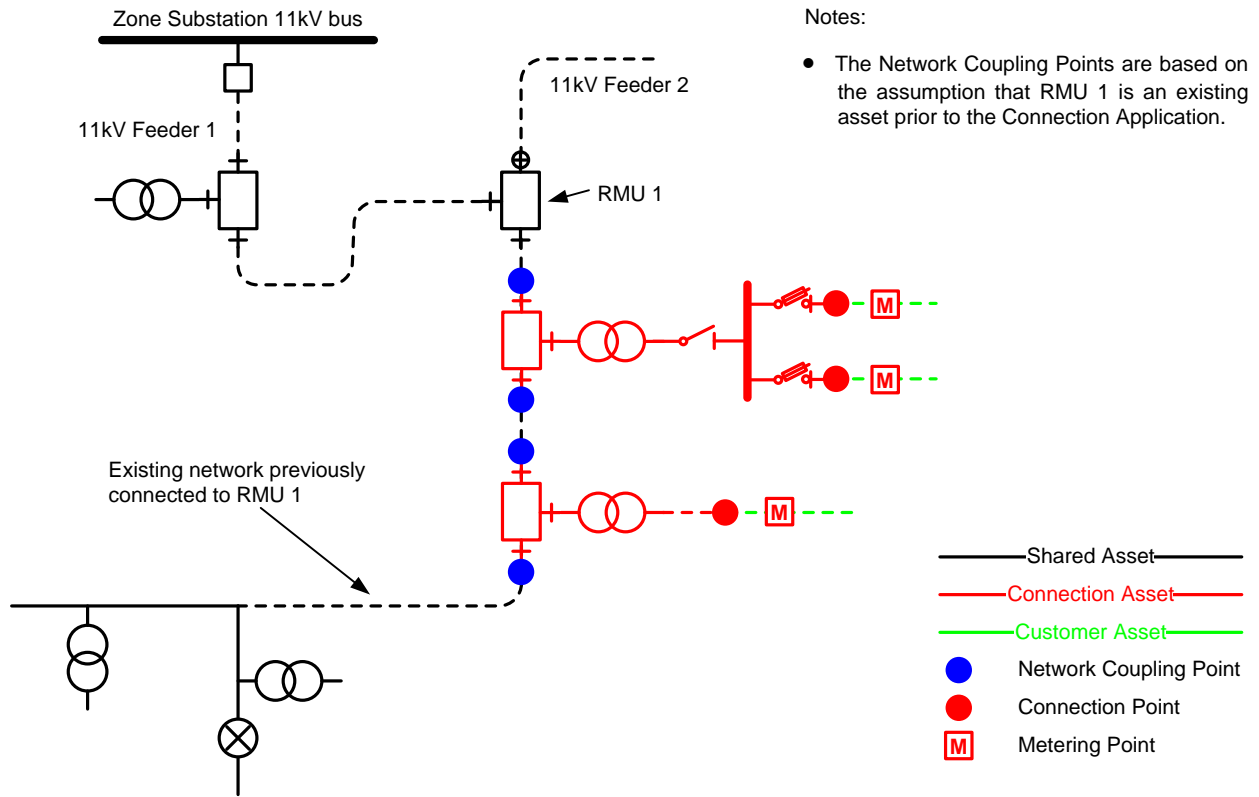
## 2. 11 kV & LV Connection Assets – Commercial and Industrial Development



**Notes:**

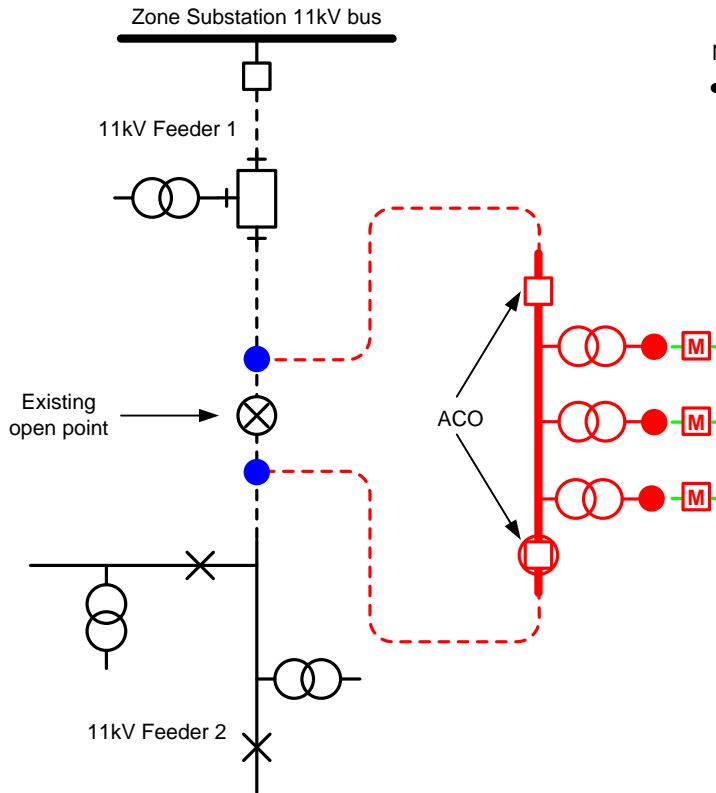
- Development may have single or multiple end-use customers (and NMI) after construction.
- LV tie may provide mutual benefit to DNSP and customer i.e. backup and facilitate neutral earth bonding. The DNSP may contribute to this cost.
- Switch in feeder between Network Coupling Points may be funded by DNSP if it was identified in Network Development Plan.

## 3. 11 kV & LV Connection Assets – Development with Multiple Feeder Connections



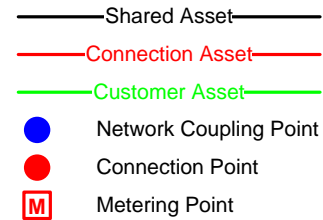


## 4. 11 kV & LV Connection Assets – Customer requests Improved Reliability

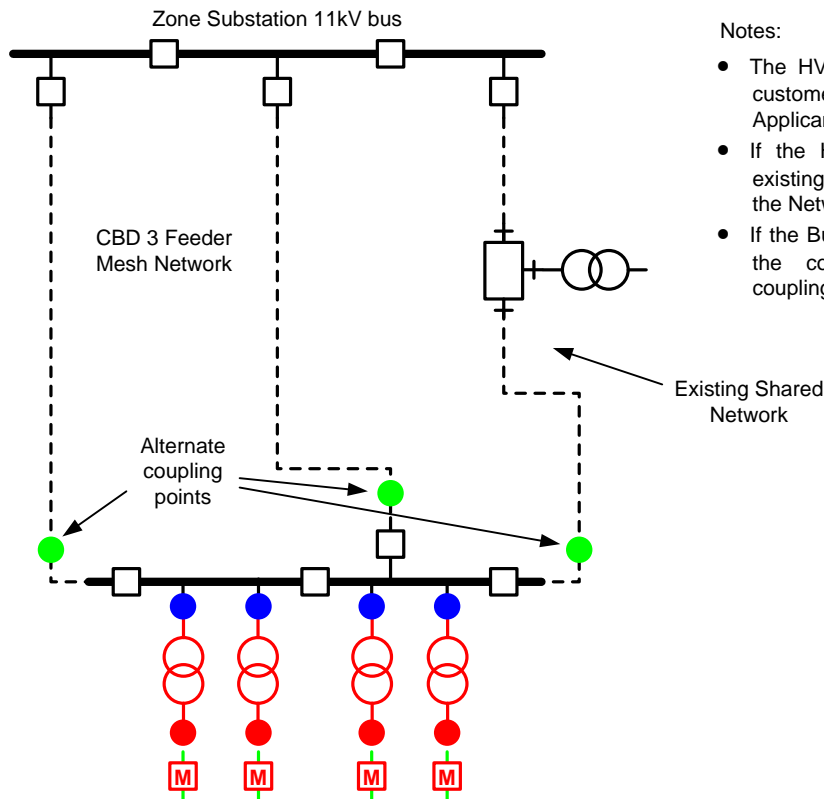


**Notes:**

- Customer requests high reliability connection assets – redundant transformer capacity, Auto Changeover (ACO) scheme. However, the Connection Assets supply the customer only and so are all Alternative Control Services.



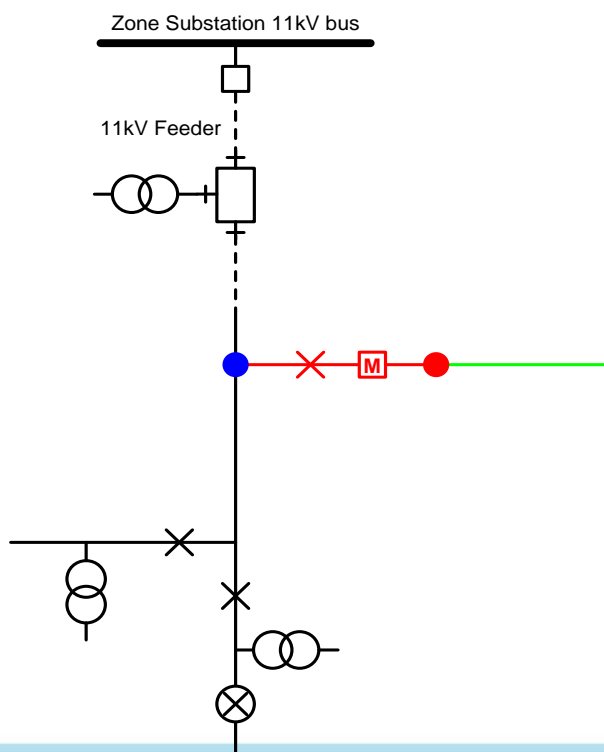
## 5. CBD 11 kV or 22 kV Mesh Network Connection with LV Metering



**Notes:**

- The HV network provides supply to multiple customers in addition to the Connection Applicant's property.
- If the HV bus at the connection points is existing or required for other customers, then the Network Coupling points are as shown.
- If the Bus is provided purely as a response to the connection application, the network coupling points would be as shown in **green**.

## 6. Simple HV Connection – Overhead Network

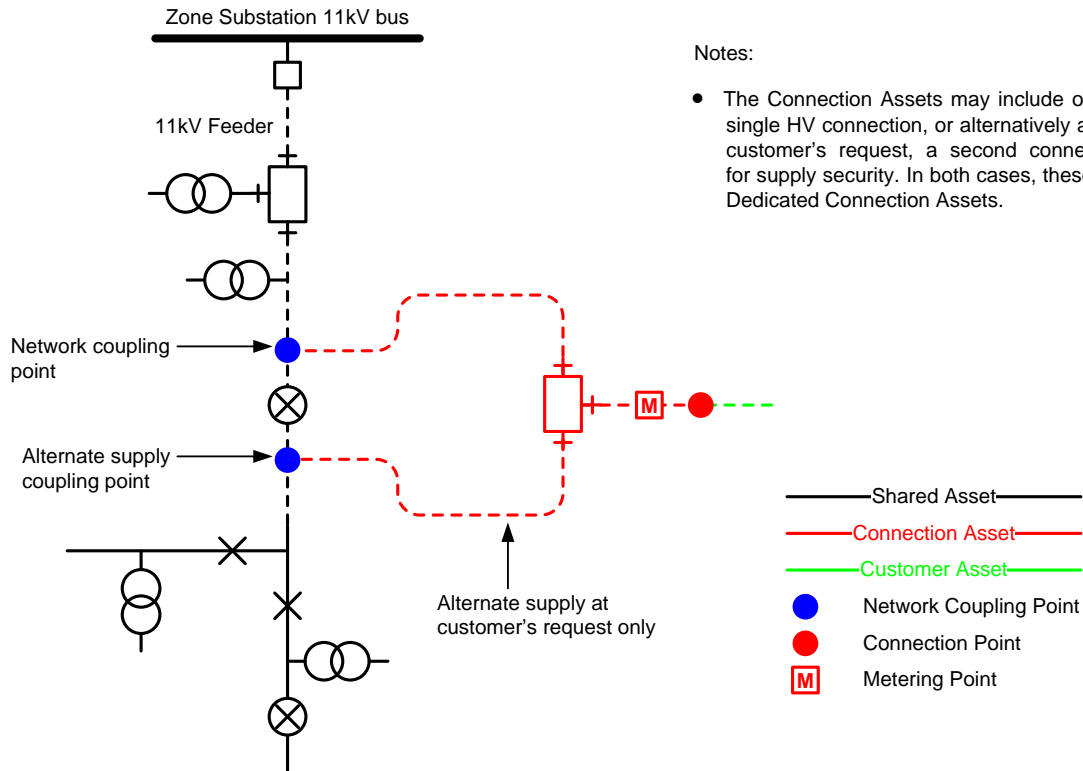


**Notes:**

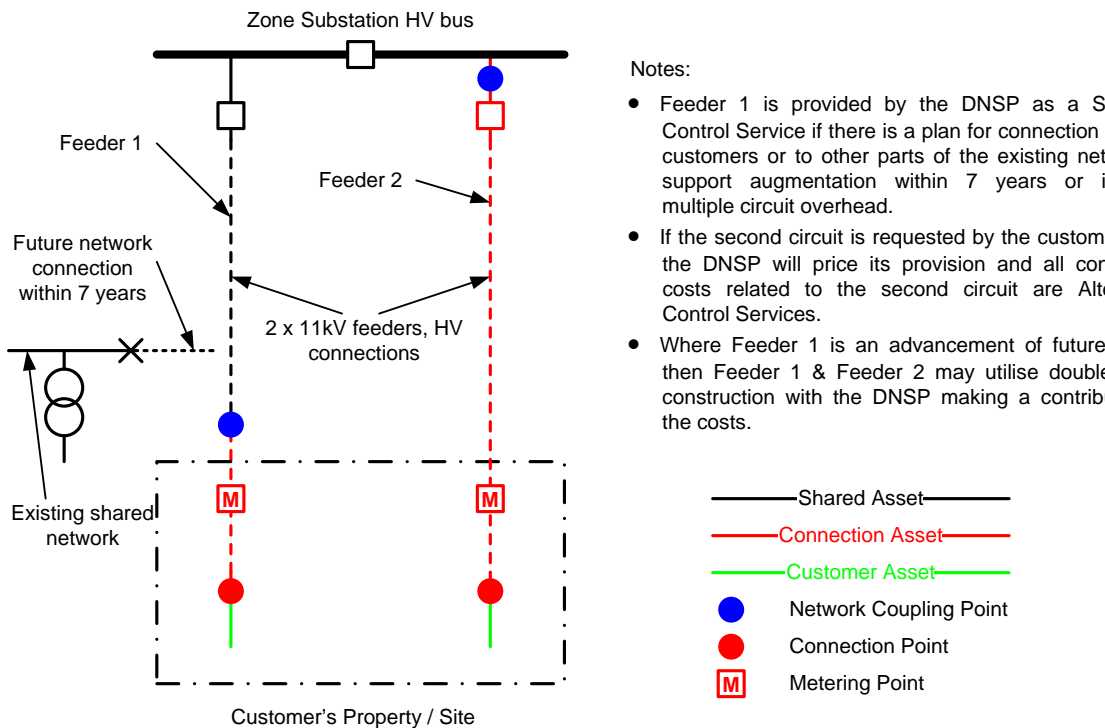
- Simple tee off from Shared Network where all the Dedicated Assets are on or adjacent to the customer's installation.

Check this is the latest version before use.

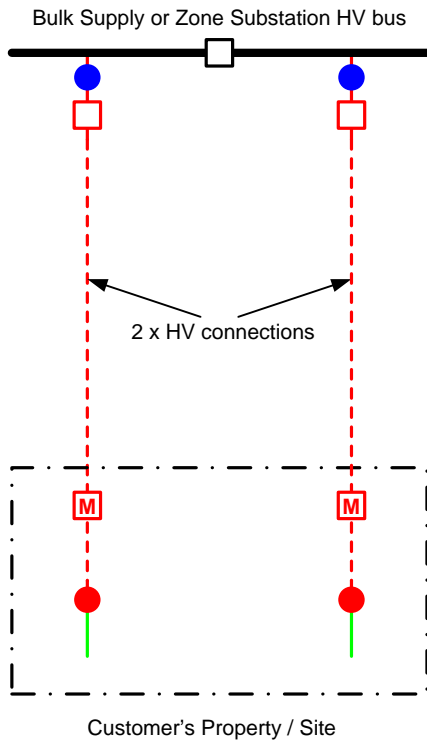
## 7. Simple HV Connection – Underground Network



## 8. HV Connection to Network Feeder Assets

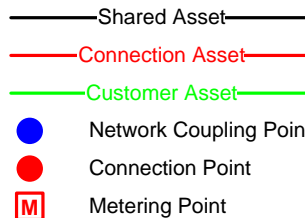


## 9. HV Connection – Feeder Connection Assets

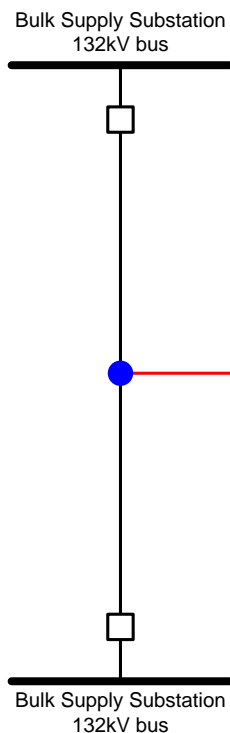


**Notes:**

- HV feeders are Connection Assets if there is no future plan for connection of other customers or does not involve construction servicing other customers.
- The Network Coupling Point is the HV circuit breaker terminals busbar side. Feeder protection schemes may be provided as part of Alternative Control Services.
- The second circuit is only at the request of the customer and all costs associated with the second circuit connection are Alternative Control Services.

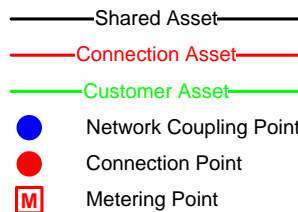


## 10. Transmission Network Connection



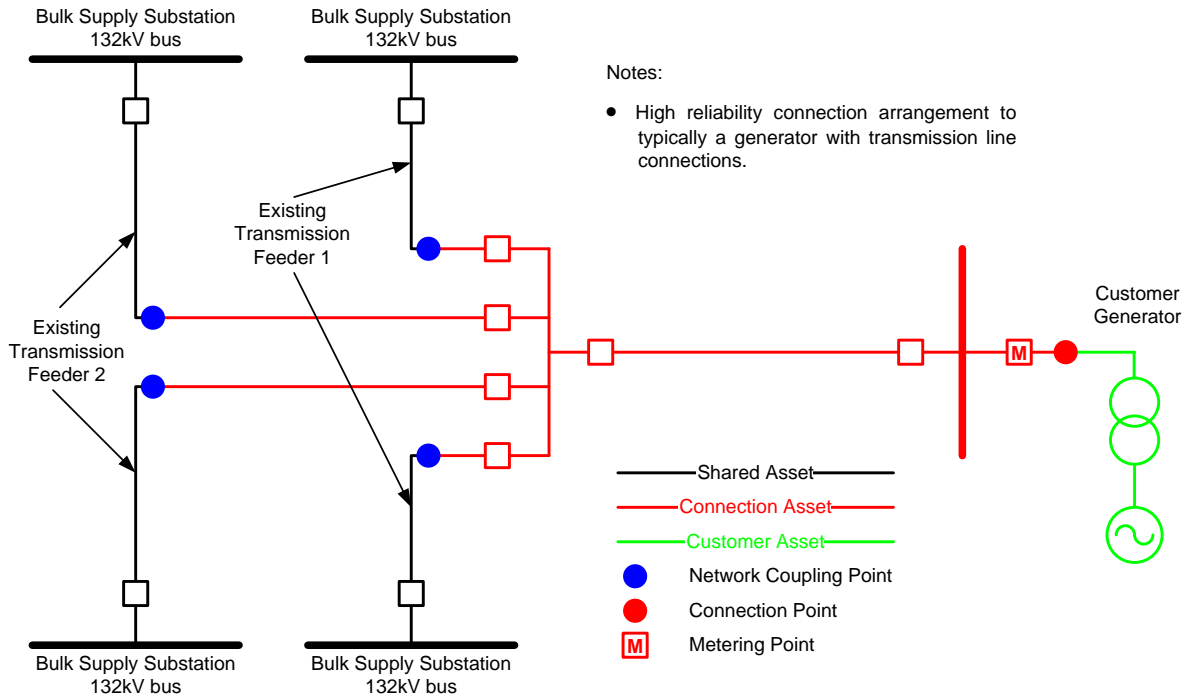
**Notes:**

- In general, transmission connections are similar to Example 9 with the Network Coupling Point being the circuit breaker dedicated to the Customer in the Bulk Supply Substation.
- Tee feeder arrangements at transmission level are not preferred due to the potential reduction in supply reliability to other customers and can only be considered where this risk is adequately addressed. Where a customer requests a connection at a point on a transmission line, the alternatives in Example 11 & 12 of switched tee arrangements should be offered.

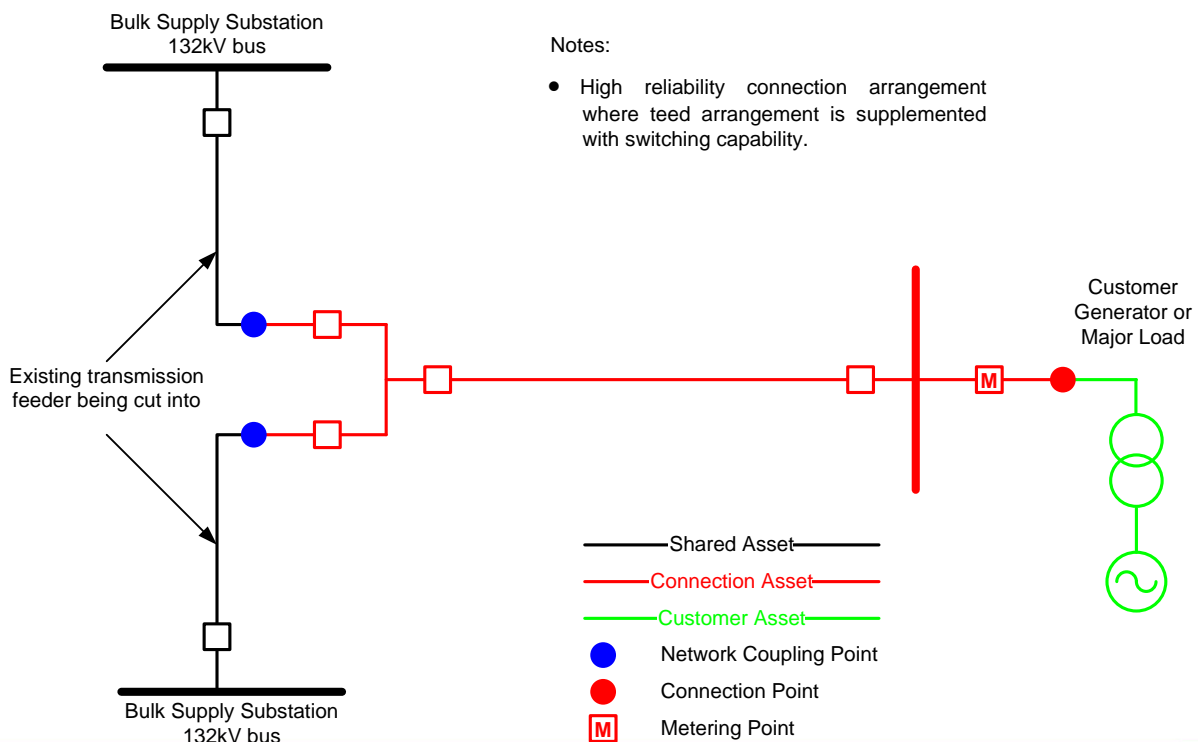


Customer Generator or Major Load

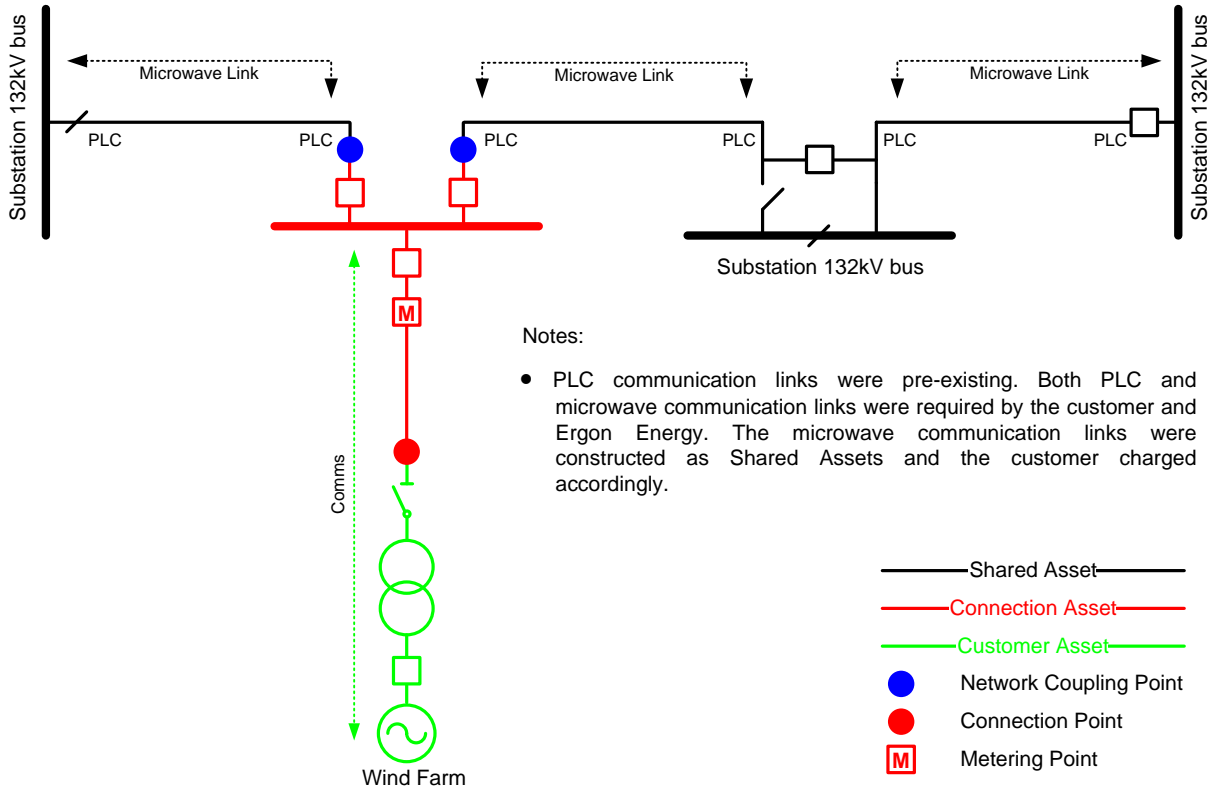
## 11. Transmission Network Connection with Alternate Supply to (typically) a Generator



## 12. Transmission Network Connection with Alternate Supply and Switching Capability



## 13. Shared Communications



**Notes:**

- PLC communication links were pre-existing. Both PLC and microwave communication links were required by the customer and Ergon Energy. The microwave communication links were constructed as Shared Assets and the customer charged accordingly.

- Shared Asset —
- Connection Asset —
- Customer Asset —
- Network Coupling Point
- Connection Point
- Ⓜ Metering Point



## APPENDIX 5 STANDARD CONNECTION ARRANGEMENTS

### 1. Standard Primary and Secondary System Connection Arrangements

Seven standard options have been developed to expedite the Major Customer Connection process, facilitate compliance with expected NECF requirements and maintain Distribution Network reliability at acceptable levels. In some cases exemptions to the standard options may need to be considered, for example where it is not possible to implement the standard option (due to lack of available line routes, inability to expand substation connections, etc.), or where the standard option is not consistent with Ergon Energy's strategic network development plans for the area. Note that the proposed standard minimum primary and secondary system connection arrangements for Major Customer Connections preclude the use of tees, and are instead centred on the use of a dedicated feeder bay emanating from the nearest zone substation to the Major Customer. These shall be used on all new greenfield installations and should also be considered for brownfield and legacy installations.

Appropriate discrete primary protection schemes and isolation requirements are to be provided at the remote Major Customer end to adequately protect the Major Customer's assets, and some level of remote back-up protection reach may be available from the Ergon Energy-owned protection schemes to the Major Customer's assets. The Major Customer is to determine the zones of protection and back-up protection reach required in these schemes and advise Ergon Energy protection staff of these.

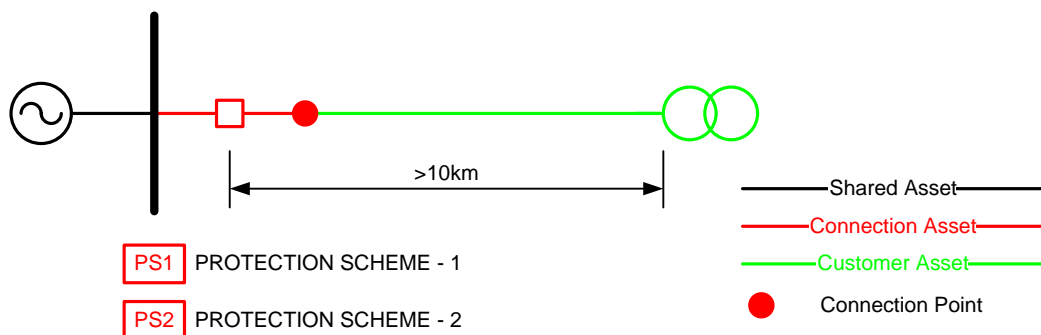
Information on protection schemes for embedded synchronous generators and inverter based systems with a total nameplate rating of up to, but not exceeding 5 MW at a single Connection Point, that are intended to be connected to and operate in parallel with, any part of Ergon Energy's distribution network under normal operating conditions is given in [Standard for Connection of Embedded Generating Systems to a Distributor's HV Network](#) Ergon Energy will, on a case-by-case basis, specify protection requirements for generation exceeding 5 MW at a single Connection Point.

The preferred protection schemes to be implemented in the standard connection arrangements are set out below.

### 2. Transmission / Sub-transmission

#### 2.1. Option 1: Distance Protection – No Communications

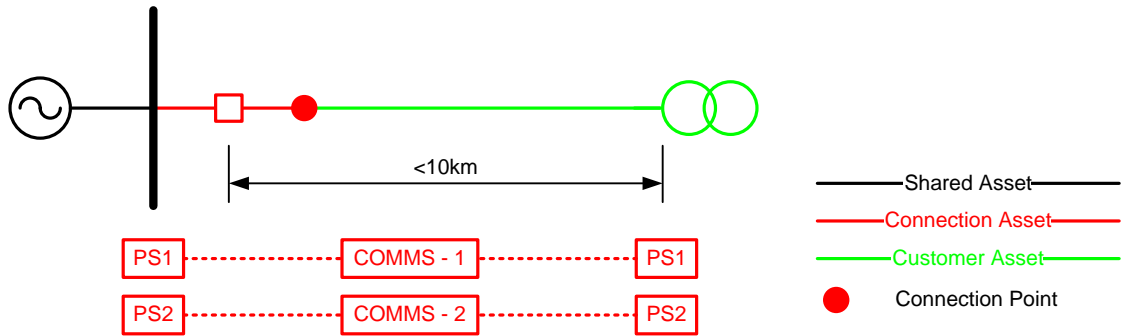
This involves a dedicated feeder bay emanating from a zone substation with only radial load and a line length greater than 10 km for voltages 220/132/66/33 kV, and involves, at the Ergon Energy end, two distance protection schemes, relays as per current relay period contract. Protection communications are not mandatory for this option, though other customer communication requirements may need to be provided.



PS1 & PS2 – Distance – No Comms (Line length >10km, for voltages 220/132/66/33kV).

## 2.2. Option 2: Line Differential Protection + Communications

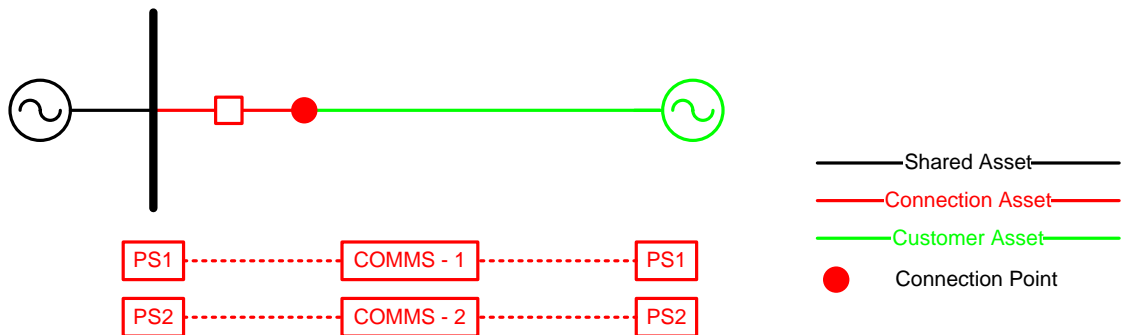
This involves a dedicated feeder bay emanating from a zone substation with only radial load and line length less than 10 km for voltages 220/132/66/33kV and involves, at the Ergon Energy end, two line differential protection schemes, relays as per current relay period contract, with compatible relays at the remote Major Customer end. Protection communications suitable for line differential protection communications will be needed, duplicated and diverse paths should be provided for 220/132 kV applications. 66/33 kV applications may have an alternative scheme negotiated.



PS1 & PS2 – Line differential protection & Comms (Radial load line length <10km, for voltages 220/132/66/33kV).

## 2.3. Option 3: Line Differential Protection + Communications

This involves a dedicated feeder bay emanating from a zone substation for all generation applications for voltages 220/132/66/33 kV, and involves, at the Ergon Energy end, two line differential protection schemes, relays as per current relay period contract, with compatible relays at the remote Major Customer end. Protection communications suitable for line differential protection communications will be needed, duplicated and diverse paths should be provided.

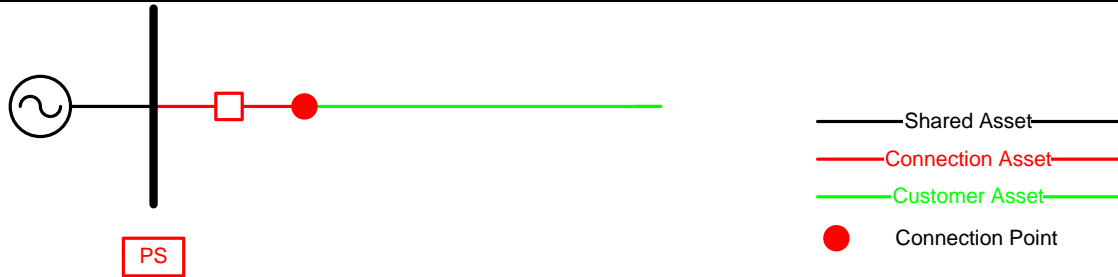


PS1 & PS2 – Line differential protection & Comms (All generation application for voltages 220/132/66/33kV).

## 3. Distribution

### 3.1. Option 4: Over Current Feeder Management

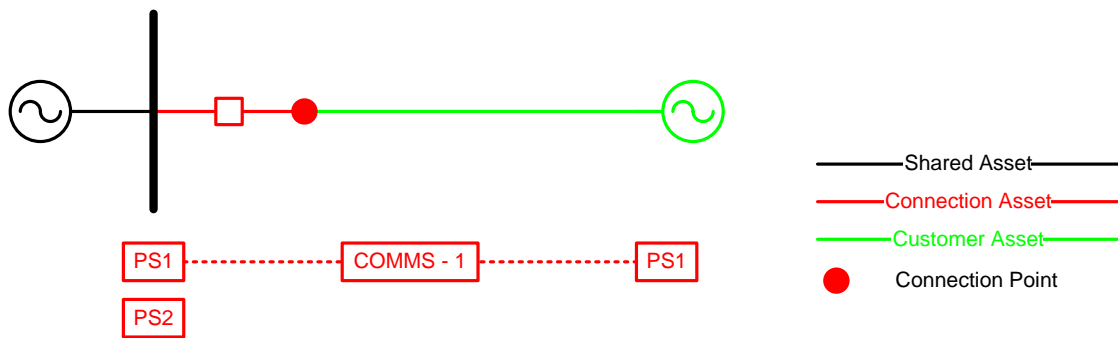
This involves a dedicated feeder bay emanating from a zone substation for a radial load of 4MVA and above for voltages 22/11 kV, and involves, at the Ergon Energy end, a feeder management relay or relays depending upon the level of available back-up protection to meet NER requirements. Relay/s as per current relay period contract.



PS – Over Current feeder management for a radial load of 4MVA and above (for voltages 22/11kV).

## 3.2. Option 5: Line Differential & Feeder Management

This involves a dedicated feeder bay emanating from a zone substation for all generation applications of 4MVA and above for voltages 22/11 kV and involves, at the Ergon Energy end, a line differential protection scheme and a feeder management relay, relays as per current relay period contract with a compatible line differential relay at the remote Major Customer end. Protection communications suitable for line differential protection communications will be needed.



PS1 – Line differential protection & comms  
 PS2 – Over current feeder management relays  
 (Generation applications of 4MVA and above for voltages 11/22kV).

## 4. Switching Stations

### 4.1. Option 6: Intermediate Switching Station

If an intermediate switching station is to be established on a radial feeder to facilitate a Major Customer Connection, the interconnector to the switching station is to be developed in line with Option 7 and the associated sketch, and the dedicated bay to the Connection Point (and the new feeder if created by the sectioning) will be considered against Options 1-5 above.

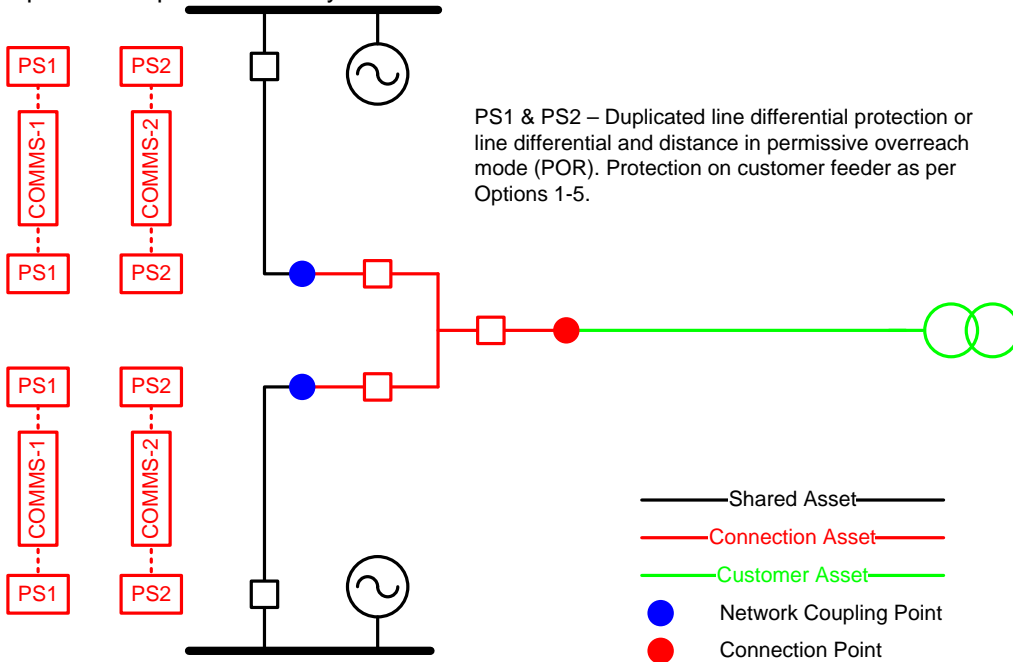
If the existing protection is not capable of providing the required functionality, a remote upstream protection upgrade will be required in these instances to facilitate the Major Customer Connection.

### 4.2. Option 7: Intermediate Switching Station

If an intermediate switching station is to be established between two existing zone substations to facilitate a Major Customer Connection, then each inter-connector to the switching station will require either duplicated line differential or line differential and distance protection in permissive over reach mode (POR) and the further dedicated bay to the Connection Point will be considered against Options 1-5 above.

Protection communications suitable for the combination of line differential and/or POR schemes will be required. If the existing protection is not capable of providing the required functionality, remote upstream protection upgrade will be required in these instances to facilitate the Major Customer Connection.

The Major Customer is required to fund the costs of establishing new communications links and additional or replacement protection relays.



## APPENDIX 6 TYPICAL TIMEFRAMES

Description of Works involved in Connection Application	Design and Construction <sup>1</sup> by Ergon Energy (from executed Connection Agreement)
Greenfield Zone Substation (does not include property acquisition)	27 months
Existing Zone Substation modification (Simple <sup>2</sup> ) (e.g. feeder protection upgrade)	9 months
Existing Zone Substation modification (Complex <sup>3</sup> ) (e.g. new feeder bay or switchboard upgrade)	21 months
Greenfield 132/110kV Overhead (OH) & Underground (UG) transmission works or 66/33kV Sub-transmission works	27 months
Modifications to Sub Transmission UG works (33kV or 66kV)	15 months
Modifications to Sub Transmission OH works (33kV or 66kV)	12 months

These time frames are indicative only and assume that Ergon Energy will follow its Gated Methodology processes for Network Investment.

Property acquisitions, easements, environmental approvals, plant procurement, could affect these dates significantly. Property or easement acquisitions can add significant time (up to 24 months) to these indicative periods if Cultural Heritage, Environmental or Material Change of Use issues are encountered.

<sup>1</sup> Approximate time taken to energise the project after receiving a signed Connection Agreement from the Connection Applicant.

<sup>2</sup> Simple = No augmentation of existing Network.

<sup>3</sup> Complex = Augmentation of existing Network required, relay protection switchgear required, zone substation, 132/110 kV, 66 kV, 33 kV, 22 kV works.

## APPENDIX 7 CONTENTS OF A TYPICAL ERGON ENERGY CONSTRUCTION CONTRACT

A typical Construction Contract contains provisions dealing with:

- (a) definitions and interpretation;
- (b) term;
- (c) agreement about works;
- (d) scope of works;
- (e) cooperation and liaison, and a works protocol;
- (f) metering;
- (g) specifications;
- (h) design documentation;
- (i) construction requirements including relevant technical requirements;
- (j) insurance requirements;
- (k) changes to works;
- (l) the commissioning and transfer process (if transfer is envisaged);
- (m) warranties, defects and rectification;
- (n) land access and ownership of equipment;
- (o) audits;
- (p) charges, billing, securities and default interest;
- (q) GST;
- (r) force majeure events;
- (s) default and termination;
- (t) compliance with laws;
- (u) liability and indemnity;
- (v) dispute resolution;
- (w) confidentiality;
- (x) notices;
- (y) amendment and assignment;
- (z) general boilerplate provisions;
- (aa) Connection Point details; and
- (bb) program of works.



## APPENDIX 8 CONTENTS OF A TYPICAL ERGON ENERGY CONNECTION AGREEMENT WITH A MAJOR CUSTOMER

A typical Connection Agreement contains provisions dealing with:

- (a) definitions and interpretation;
- (b) term;
- (c) core obligations regarding connection services;
- (d) land access and ownership of equipment;
- (e) charges, billing, securities and default interest;
- (f) GST;
- (g) force majeure events;
- (h) default and termination;
- (i) compliance with laws;
- (j) liability and indemnity;
- (k) dispute resolution;
- (l) confidentiality;
- (m) notices;
- (n) amendment and assignment;
- (o) general boilerplate provisions;
- (p) Connection Point details;
- (q) relevant technical requirements;
- (r) operating protocol requirements; and
- (s) reliability, quality and interruptibility.