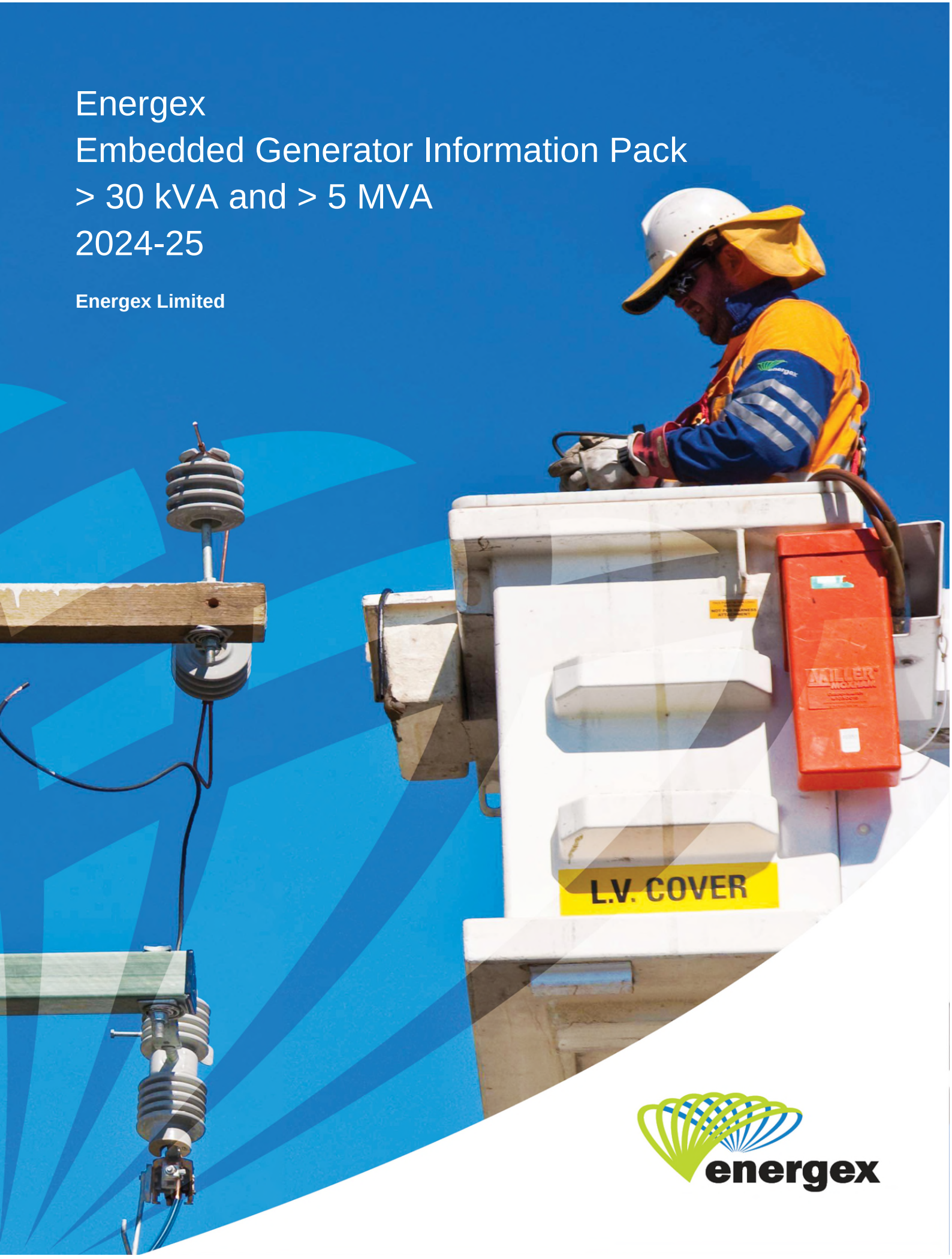
Energex
Embedded Generator Information Pack
> 30 kVA and > 5 MVA
2024-25

Energex Limited



Contents

Introduction to Embedded Generation

Renewable and other new technologies are continuing to expand and influence the operation of our distribution network and the energy market in Queensland. Energex has traditionally partnered with its customers in supporting the connection of solar, diesel and other renewable generation projects, and continues this partnership by advancing new technologies and industrial changes within Queensland's energy communities.

What is Embedded Generation?

Embedded generating units are generating units that are embedded within, and distributed along, the distribution network (rather than connected to the high-voltage transmission network). An "embedded generating system" (EG system) comprises one or more embedded generating units. Typically, EG systems are located at a home or business and are capable of generating electricity for that home or business's own use.

Technologies used in EG systems

EG systems use a variety of technologies to produce electricity, as set out below. Some EG systems use inverters, while others are based on rotating machines and do not use inverters. EG systems also vary in size, from (for example), a typical 1 kVA domestic solar photovoltaic system to a 50 MVA solar or wind farm.

- Solar photovoltaic cells
- Solar thermal
- Wind turbines
- Biogas
- Bagasse (the fibrous material left over from crushed sugar cane)
- Hydro
- Landfill generation
- Standby diesel generation

Technical configuration of EG systems

EG systems may be configured as the following (and may include storage solutions such as battery technology):

- Non-export, which means that they do not export electricity back into our distribution network
- Partial-export which means that they do export electricity back into our distribution network, but not to the full rated capacity of the EG system; or
- Full export, which means that they can export up to the full rated capacity of the EG system back into our distribution network.

Purpose of this Information Pack

Different connection processes apply depending upon the size and regulatory classification of the EG system – regardless of the technology used in the EG system and whether or not the electricity will be exported back into our distribution network. This Information Pack sets out some things that you'll need to know if you're planning on connecting an EG system to our distribution network, such as:

- the relevant connection process and requirements
- information on the services offered to support the connection of an EG system (including whether such services are contestable)
- examples of relevant costs
- technical requirements relevant to assessing the proposed connection of an EG system
- how to access more information via a Connection Enquiry or Connection Application
- commercial and contractual requirements

- Please note that the connection of EG systems up to and including 30 kVA is not covered by this Information Pack – please refer to the Energex solar connections and other technologies webpage for more information on this.

Introduction to the Major Customer Group and Solar and Renewables Team.

We understand that the connection of larger EG systems to the distribution network can be a complex process.

We have a dedicated Major Customer Group, who are here to guide and assist you through connecting your HV EG system over 30 kVA to our distribution network, from early inception right through to construction and energisation.

Our Solar and Renewables Team are here to guide and assist you through connecting your LV EG system over 30 kVA to our distribution network.

Our teams are dedicated to managing the connection of your HV or LV EG system from the Connection Enquiry stage through to construction and finally the commissioning of your EG system connection. Your allocated Project Sponsor will be your single point of contact throughout this time and will maintain contact with you regularly to ensure your needs are met.

For more information about the Major Customer Group or HV EG systems over 30 kVA, please contact:

Email: majorcustomers@energyq.com.au

For more information about the Solar and Renewables Team or LV EG systems over 30 kVA, please contact: Email: energexgeneration@energyq.com.au

REVIEW OF CONNECTION OPTIONS:

Changing customers, changing futures

Energex, like other network providers, is operating in a period of rapid change, especially in relation to the choices our customers are making in meeting their energy needs. The way our customers are using the electricity network is undergoing unprecedented change.

With the ongoing popularity of commercial EG systems such as solar PV systems and innovations in energy storage, Energex is working collaboratively with the industry to manage impacts to customers and the Energex network.

Overview of EG System Connection Classifications & Process

The National Electricity Rules (NER) set out different connection process for EG systems depending on the size and registration status of the particular EG system. The Energex connection processes comply with the NER and provide for transparency and detailed information to help you through the process of connecting an EG system to our distribution network.

These processes also set out certain requirements for the exchange of information between you and us, and clarify the requirements in regard to the process, timeframes and provision of information before and during the connection process, to assist you in understanding all stages of connecting an EG system to our distribution network.

We have two main connection processes, which are set out in Part A Connection Process for EG Systems > 30 kVA to 5 MVA and Part B Connection Process for EG Systems ≥ 5 MVA of this Information Pack.

Classifying your EG system under the NER

Micro EG Connections

- **Via an Inverter Energy System (IES) up to 30 kVA**

  The connection of inverter based EG systems up to and including 30 kVA to a distribution network is classified as a Micro EG under the NER and is subject to the relevant connection process outlined in Chapter 5A of the NER.

  Please refer to Energex solar connections and other technologies webpage for more information on the connection of these Micro EG systems, including the steps involved in buying and installing your EG system. Whilst our Solar and Renewables Team also manage the connection of these EG systems, they are not covered in this Information Pack.

- **Via an Inverter Energy System (IES) between 30-200 kVA**

  An inverter based EG system larger than 30 kVA, but less than or equal to 200 kVA, is also classified as a Micro EG connection under the NER, and as such, the relevant connection process is aligned with Chapter 5A of the NER.

  However, due to the nature and complexity of these EG connections, relevant connection applications and enquiries are managed by the Solar and Renewables Team. As such, please see Part A of this Information Pack for information on the connection process.

Non-Micro EG Connections (Registered or Non-Registered EG systems)

If your EG system is not a Micro EG, the connection process, as well as some other obligations, will differ depending upon the default registration status with the Australian Energy Market Operator (AEMO).

The default position under the NER is that all EG systems connected to our distribution network must be registered with AEMO, unless they have the benefit of an exemption, being either:

- a standing exemption – which is an exemption that automatically applies, usually where the EG system nameplate is smaller than 5 MVA; or

- an individual exemption – which requires the proponent of the EG system to make an application to AEMO – this may be sought where the standing exemption doesn't apply.

You will need to refer to AEMO's NEM Generator Registration Guide and other relevant AEMO information (available at http://www.aemo.com.au) to determine whether:

- your particular EG system will meet the conditions for the standing exemption;
- you may be able to obtain an individual exemption; or
- your EG system will need to be registered.

- **Part A of this Information Pack sets out the connection process for these EG systems. (Default Non-Registered EG systems)**

Default Non-Registered EG systems

By default, connections of EG systems that have the benefit of the standing exemption are covered in Chapter 5A of the NER (although note that these EG systems can elect, early in the process, to use the connection process below instead under chapter 5 of the NER).

- Part B of this Information Pack sets out the connection process for these EG systems (**Default Registered EG systems**)

Please note that for the purposes of our connection processes, we have assumed that 5 MVA represents the relevant boundary between the two connection processes, although of course this will depend upon your particular situation.

Default Registered EG systems

Connections of EG systems that don't benefit from the standing exemption (i.e. those that will be registered with AEMO or need to apply for a specific exemption) are covered in Chapter 5 of the NER, specifically under Rule 5.3A.

Relevant Technical Standards

Energex also has certain Technical Standards which can be found in the documents section of Large generation and batteries. These Technical Standards apply based on the EG system's size and voltage of connection rather than whether or not it is registered, so you will need to consider this when determining which standard applies to you.

The Technical Standards set out relevant technical information relevant to your connection, including:

- relevant single line diagrams (rule 5.3A.3(b)(2));
- protection and control system schematics (rule 5.3A.3(b)(3));
- relevant minimum access standards and plant access standards (rule 5.3A.3(b)(5)); and
- various other technical details that the EG system must comply with (rule 5.3A.3(b)(6)).

Please note that you may need to refer to more than one Technical Standard, as the Technical Standards for larger EG systems tend to contain more detail than the ones for smaller EG systems. For sites with an existing connection to the network looking to install >30kVA please refer to STNW1174.

Please note that STNW3522 Standard for Major Customer Connections applies for all major customer connections, regardless if generation is installed or not, and should be referred to for general requirements including connection arrangements.

Technical Standards for connecting EG systems to the distribution network

Low Voltage (LV) Connected EG > 30 kVA

If you wish to submit an enquiry to connect an LV EG system >30kVA to our LV Network, please review:

STNW1174 Standard for Low Voltage Embedded Generating Connections.

Low voltage generating systems also have the option of a dynamic connection, in which case review:

STNW3511 Dynamic Standard for Low Voltage Connections

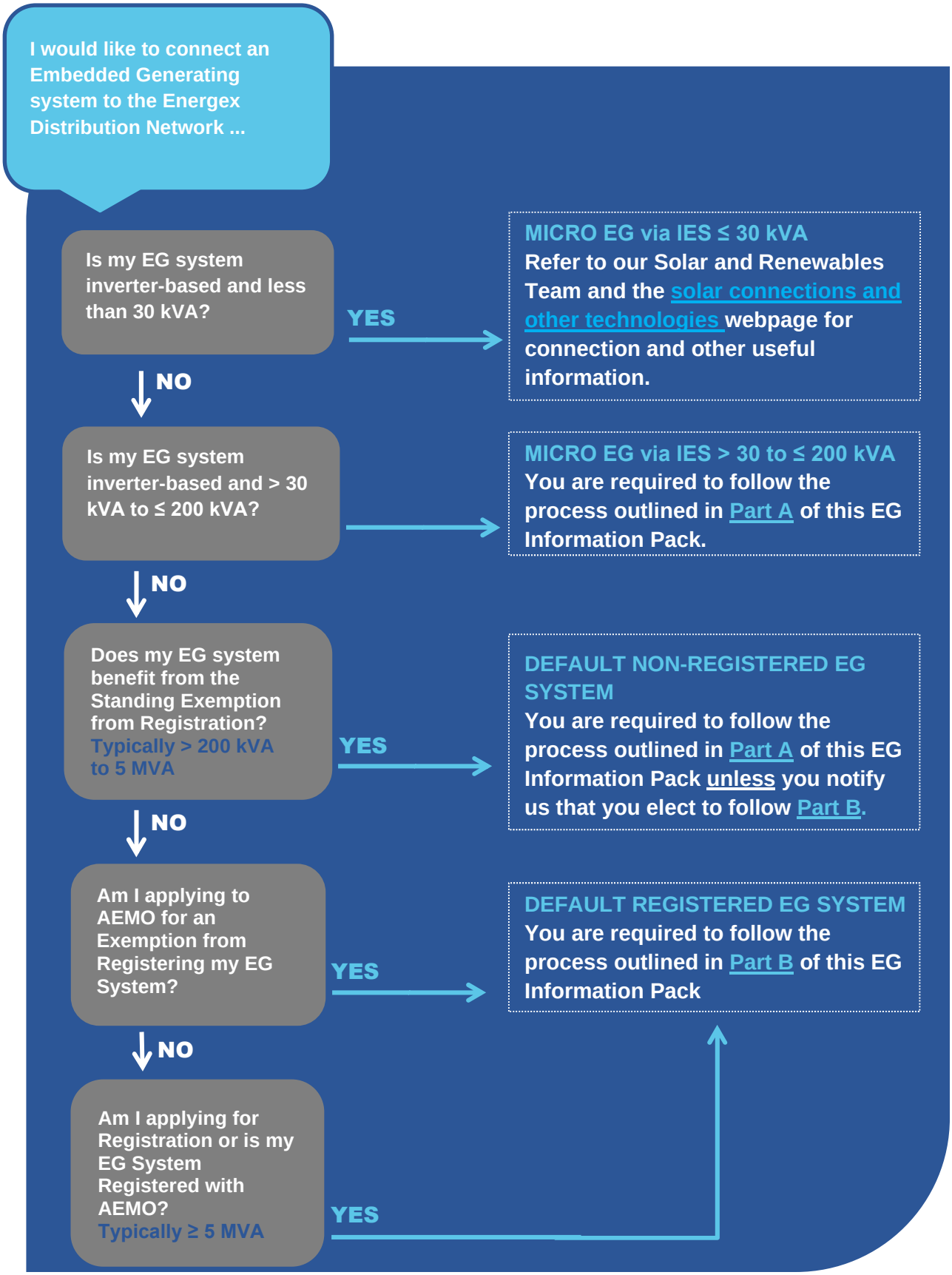
High Voltage (HV) Connected EG > 30 kVA

If you wish to submit an enquiry to connect an EG system where your connection point is on our HV network, please review:

STNW1175 Standard for High Voltage Embedded Generation Connections

Choosing your Connection Process - Decision Flow Diagram

We understand that the above information can be quite complicated to understand and, for simplicity, we have summarised the relevant processes below.



Part A & A.1Connection Process

EG SYSTEMS > 30 kVA TO 5 MVA

The following information is an overview of the steps involved in the connection process applicable to:

- **Micro EG connections > 30 kVA (up to the maximum 200 kVA)**
- **EG systems who have the benefit of the standing exemption (typically those < 5 MVA) and who haven't elected to use the Part B process**

Please refer to AEMO's NEM Generator Registration Guide and Chapter 5A of the NER if you require additional information.

Part A High Voltage – Connection Process for EG Systems > 30 kVA to 5 MVA

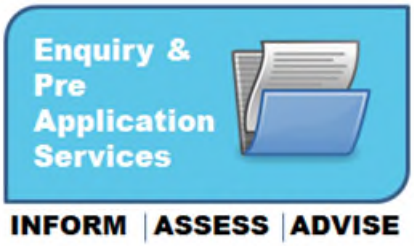
Overview

The below information is an overview of the steps involved in connecting an EG system > 30 kVA to (typically) 5 MVA to the Energex distribution network. As mentioned above, this includes those Micro EG systems > 30 kVA to 200 kVA and those EG systems that benefit from the standing exemption (typically up to 5 MVA).

Chapter 5A (Electricity Connection for Retail Customers) of the NER sets out a prescribed connection process for the connection of both Micro and (by default) Non-Registered EG systems and details a multistage process which provides for timeframes, actions and information exchanges between parties.

This process is designed to assist you by providing a more flexible approach to the proposed connection of an EG system > 30 kVA to 5 MVA, while providing agreed timeframes, thereby supporting the relationship between you and Energex.

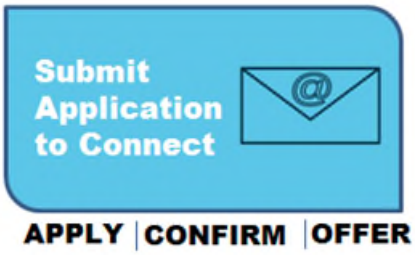
A summary of the connection process is outlined below.



The purpose of this stage is for you or your consultant to submit a Preliminary Enquiry and provide Energex with information about your proposed connection. Energex will respond to your Preliminary Enquiry within 5 business days to acknowledge the receipt of your enquiry.

Depending on the size, configuration, and network location of your proposed EG system, you may be required to complete one or more selected pre-application services to progress to an Application to Connect.

Note that some pre-connection services offered by Energex attract a fee, which will be quoted for acceptance prior to commencing any work. For more information, see the Connection Costs and Charges section on page 24.



The purpose of this stage is to assess your proposed Application to Connect and:

- identify any impacts on the safety and security of Energex distribution network
- ensure that your EG system is fully compliant with relevant technical and operational requirements
- provide you with a negotiated offer to connect your embedded generator to the Energex distribution network within 65 business days.

The purpose of this stage is to complete the installation of your EG system and facilitate the connection and energisation of your EG system.

You will need to provide evidence that your EG system complies with all the relevant technical and operational conditions outlined in your Connection Offer (Connection/Consent Agreement) and the relevant Technical Standard applicable to the size and connection voltage of your EG system.

Please note that for EG systems connected to Energex HV network, additional audit requirements may apply.

Assessing your High Voltage > 30 kVA to 5 MVA EG Connection

When assessing the proposed connection of your EG system, Energex considers the following factors (at both the Connection Enquiry and Application to Connect stage):

- The type and nature of the EG system (e.g. inverter energy system or rotating machine such as a diesel generator), and whether the EG system will export to our distribution network, or will operate in a non-export configuration;
- The location and available capacity of the nearest power system infrastructure capable of facilitating the connection at the requested voltage levels and export levels;
- Whether that infrastructure is owned by Energex or Powerlink (if it is owned by Powerlink, then the response to the enquiry may be that you seek connection via Powerlink);
- Compliance with the relevant Technical Standard;
- The impact of the proposed operation, both short term and into the future, of the EG system on our distribution network (and nearby customers);
- Any new or augmented infrastructure that is likely to be required to facilitate the connection of the EG system and the ownership model under which any construction will occur, including the classification of contestable services provided and their costs;
- The ability to obtain necessary approvals (easements etc.);
- The ability to connect in the requested timeframes; and
- The legal structure and financial stability of the EG system proponent and any entity that proposes to issue any securities under the contracts executed with Energex.

Part A: High Voltage Connection Process – A Detailed View

Enquiry

Should you wish to make a preliminary enquiry regarding your proposed EG system, this can be completed using the Energex portal. Energex will acknowledge receipt of your inquiry within 5 business days.

Pre-Application Services

To ensure that your proposed EG system will not adversely impact on the safety and security of Energex distribution network, an assessment must be performed to confirm that the proposed configuration and operational conditions comply with our relevant Technical Standards. These technical assessments are part of the pre-connection services offered in Energex Alternative Control Services (ACS) price list. The type of pre-connection service applicable to your EG system will depend on the scale, location and complexity of the particular installation.

At a minimum, a valid, basic planning study (known as a technical assessment) will be required to process an Application to Connect. For more complex projects, including those EG systems interconnected with our HV network, or those where a technical assessment has been conducted and further studies are necessary, a more detailed planning study is generally required (typically where network constraints are identified or an augmentation to our distribution network is required). In some cases, a specific and detailed scope and estimate of works for the connection of your proposed EG system will also be required.

This will likely result in further costs - please refer to the Connection Costs and Charges section for further detail on other pre-connection services that we offer to support you in applying to connect to our distribution network.

Your Project Sponsor will advise which services are required and what fee may be charged. The fees for pre-connection services are generally either fee-based or quoted. Your Project Sponsor will provide you with a quote for acceptance before any work commences.

These pre-connection services are designed to ensure that you understand the technical requirements for the connection of your proposed EG system so that you can ensure that this connection will not adversely impact on the safety and security of our distribution network. If you have any questions regarding these services, please contact our team.

Progress from enquiry to Application to Connect

APPLY | CONFIRM | OFFER

Application to Connect

Using the Energex portal you can provide:

- a valid technical assessment or planning report for your proposed EG system
- details of your proposed EG system, including information, product technical specifications, configuration (i.e. non-export, partial-export or full export) and relevant protection devices
- System design information including single line diagrams and protection system details will need to be certified by a Registered Professional Engineer of Queensland (RPEQ).

Upon submission of your application we will advise you within 10 business days if your Application to Connect is considered complete. Once Energex reviews the application we may advise you of details that may be needed to complete your Application. We may require you to provide the outstanding information before your Application can be progressed.

Once we consider that your Application to Connect is complete (from a material perspective), (if you haven't already been invoiced and paid the application fee), you may be charged an Application Fee. This quoted fee covers our services associated with assessing your application and the costs associated with negotiating and preparing a negotiated Connection Offer.

If, at any stage, you decide not to proceed, you must notify us as soon as possible, as you will be charged for the work that has been completed up until the time you notify us to discontinue the process

Connection Offer

In accordance with our obligations under Chapter 5A of the NER, we will use our best endeavours to make a Connection Offer to you within 65 business days.

The Connection Offer will include, among other things, charges for the requested works (see construction and network tariffs below), commercial terms, technical requirements, details of any augmentation/extensions, and a guideline for construction times. Further information, and a sample of the model terms and conditions, can be found on the Energex website:

https://www.energex.com.au/our-services/connections/major-business-connections/large-generation-and-batteries

Our Connection Offer will remain valid for 20 business days from the date of issue. To accept the Connection Offer, you are required to print sign and upload the contracts to the portal or simply click the accept button in the portal. If you fail to upload the contracts within the relevant period, our Connection Offer will lapse. If this occurs and you still wish to proceed, you would be required to recommence the process and submit a new Application to Connect.

BUILD | CONFIRM | OPERATE

Construction to Commissioning

Regardless of the size of your proposed EG system, this stage of the connection process requires the construction and/or installation of the approved electrical infrastructure, or your system, and relevant testing and commissioning (which may be both of the connection point and the EG system).

Once constructed, you, or your chosen consultant, are required to provide confirmation that your EG system is compliant with the technical and operating conditions specified in your planning assessment (either basic or detailed) and your connection contract or consent agreement (as relevant to your EG system).

For EG systems connected to our LV network, this generally involves you engaging a competent person who is approved as a Registered Professional Engineer of Queensland (RPEQ) to complete an RPEQ Compliance Report to confirm that the chosen RPEQ has completed relevant testing and certifies the outcomes of the testing. This report must be submitted to Energex Energy via our email address majorcustomers@energyq.com.au.

To complete the connection process, your Electrical Contractor, will need to submit an Electrical Work Request (EWR) via Energex Energy's online service portal. This will signal that your proposed EG system is ready to interconnect with our distribution network, so that we can carry out a final inspection. If no changes to the meters or the EG system are required, Energex will switch the EG system on.

For those EG systems connected to our HV network, or more complex configurations involving the addition or alteration of connection assets, the use of an RPEQ to endorse your connection may not be sufficient, and additional witness testing may be required. Such additional testing and confirmation may include a HV Audit or additional witness testing by Energex. These requirements will be discussed with you prior to commissioning to ensure that you are aware of all obligations and any associated costs.

Energisation (for eligible Exporting EG systems)

Before your connection is energised you may, depending on the size of your EG system, also need to ensure you have arrangements in place for the sale and purchase of electricity.

You can choose to negotiate with any authorised electricity retailer.

Part A.1: Low Voltage Connection Process for LV > 30 kVA – A Detailed View

Enquiry – LV > 30kVA

Should you wish to submit an enquiry regarding your proposed EG system, this can be completed using the Energex portal. Energex will acknowledge receipt of your inquiry within 5 business days.

Pre-Application Services

To ensure that your proposed EG system will not adversely impact on the safety and security of Energex's distribution network, an assessment must be performed to confirm that the proposed configuration and operational conditions comply with our relevant Technical Standards. These technical assessments, known as Site Specific Enquiry Responses (SSER) are part of the pre-connection services offered in Energex's Alternative Control Services (ACS) price list.

At a minimum, a valid site-specific enquiry (SSER) response will be required to process an Application to Connect.

These pre-connection services are designed to ensure that you understand the technical requirements for the connection of your proposed EG system so that you can ensure that this connection will not adversely impact on the safety and security of our distribution network.

If you have any questions regarding these services, please contact our team.

energexgeneration@energyq.com.au

Part A.1: Low Voltage Connection Process for LV >30 kVA – A Detailed View

Submit Application to Connect

APPLY | CONFIRM | OFFER

Application to Connect

Using the Energex portal, you must provide:

- A Design Certification Report certifying compliance of the generating system in accordance with the Standard for Low Voltage Embedded Generating Connections (STNW1174 or STNW3511 as applicable)
- The Design Certification Report needs to include a covering letter signed by an RPEQ and the following supporting documentation:
    - Network connection diagram (signed by RPEQ)
    - Protection line diagram including inverter and grid protection device settings and instrument transformer details (signed by RPEQ)
    - DNSP approved Grid Protection Relay (GPR) including name, make and model
    - Voltage Rise Calculations – the EG system has been designed to operate so that there is a maximum 2% voltage rise from the EG system to:
        - A shared Distribution System connection – the Network Connection Point; and
        - A dedicated Distribution System connection – the transformer's low voltage terminals
    - Battery Storage System details (if applicable)

We will advise you **within 10 business days** if your Application to Connect is incomplete in a material respect and advise you of what details are needed to complete your Application. We may require you to provide the outstanding information before your Application can be progressed.

- Once the Application is complete in a material respect, we will carry out a Technical Study and provide an offer within 65 business days.
- A Connection Offer will remain valid for 20 business days (or as otherwise agreed) from the date of issue. To accept this, you will need to sign and return the contracts to us within that timeframe. Unless otherwise agreed, failure to return the accepted Connection Offer within the 20 business days will mean that the Connection Offer will lapse. If this occurs and you still wish to proceed, you would be required to recommence the process
- The system can then be installed and tested for compliance; the system must then be switched off.
- The Compliance Report, certified by an RPEQ must be submitted to us within 180 days of the contract execution date for our final approval.
- Unless otherwise agreed, failure to submit the Compliance Report to us within 180 days of the offer date, the Connection Offer will lapse. If this occurs and you still wish to proceed, you would be required to recommence the process.
- Once our approval has been issued for the Compliance Report, the electrical works request must be submitted, and the installation can be switched on.

Part B Connection Process

EG SYSTEMS ≥ 5 MVA

Energex understands that the connection of an EG system ≥ 5 MVA to our distribution network can be complex, as there is generally more than one network service provider involved in the connection process.

The following information is an overview of the steps involved in the connection process for connecting the following to our distribution network:

- **Registered EG systems (generally ≥ 5 MVA); and**
- **certain Non-Registered EG systems (being those that don't have the benefit of the standing exemption and those that have elected to use the Part B process) .**

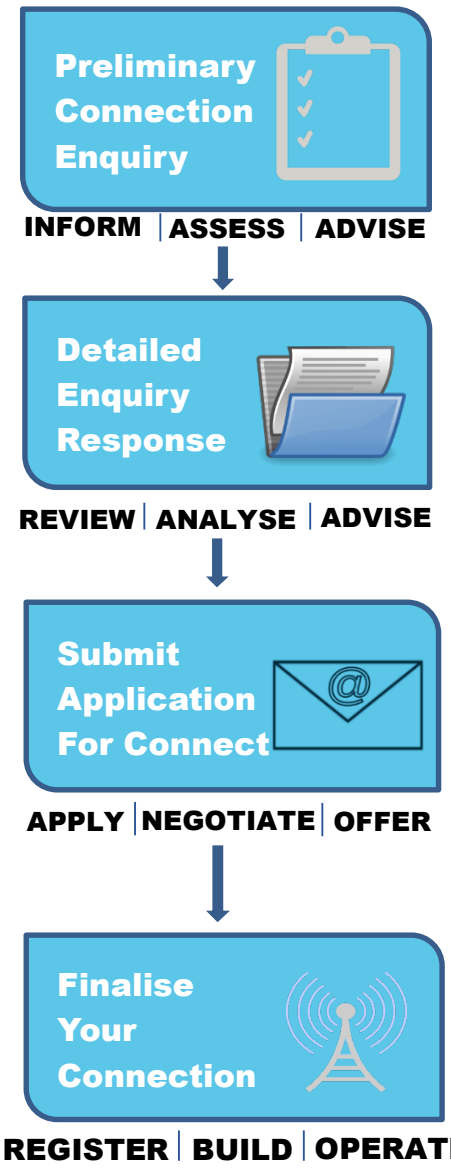
Part B - Connection Process for EG Systems ≥5 MVA

Overview

The below information is an overview of the steps involved in connecting a Registered (or to-be-Registered) EG system, or a Non-Registered EG that either doesn't have the benefit of the standing exemption or which has elected under rule 5A.A.2(c) of the NER to use this Part B process, to connect to the Energex distribution network. As mentioned above, these EG systems are typically larger than 5 MVA, although this varies depending upon the particular EG system.

Rule 5.3A under Chapter 5 of the NER sets out the connection process for the connection of such EG systems and details a multistage process which provides for timeframes, actions and information exchanges between parties. This process is designed to assist you by providing a more flexible approach to the proposed connection of your EG system, while providing agreed timeframes, thereby supporting the relationship between you and Energex.

A high-level summary of the connection process is outlined below:



The preliminary enquiry process includes providing general, high level information and any project specific information that we have at hand that may help you understand your connection options and enable you to progress towards a detailed enquiry stage.

A Preliminary Response to Enquiry will be provided by Energex within 15 business days, or as otherwise agreed. Please note that there is no charge for this service.

The purpose of this stage is to build on information provided in the Preliminary Response to Enquiry and provide you with detailed, in-depth analysis and considerations of your proposed project and enable you to move towards submitting an Application to Connect.

A Detailed Response to Enquiry will be provided by Energex within 30 business days, or as otherwise agreed, following the receipt of the enquiry fee relevant to this service.

The purpose of this stage is for you, or your consultant, to submit an Application to Connect your EG system to the Energex distribution network. Energex will acknowledge your Application to Connect and advise of any deficiencies within 10 business days of receiving your Application to Connect.

As part of the Application to Offer stage, your proposed generator performance standards (GPS), including your proposed access standards, will be forwarded to AEMO and any NSP as required for review and approval. Note that this review may result in further changes to your Detailed Response to Enquiry, which may incur an additional fee if rework is required.

As per Energex obligations under Rule 5.3A, Energex will issue you with a Connection Offer within 4 months (or other date as agreed with you or your authorised representative) of receiving your completed Application to Connect.

The purpose of the Construction and Commissioning stage is to build, test and facilitate the energisation of your EG system.

Energex will work with your chosen consultants to audit your construction and provide all required acceptance testing and commissioning requirements for both Energex and AEMO (where required).

Assessing your ≥ 5 MVA EG Connection

When assessing the proposed connection of your EG system, Energex considers the following factors (at both the Connection Enquiry and Application to Connect stage):

- The type and nature of the EG system (e.g. inverter energy system or rotating machine such as a diesel generator), and whether the EG system will export to our distribution network, or will operate in a non-export configuration;
- The details of your intended Registration category (such as whether your EG system will be scheduled, semi-scheduled or non-scheduled) or applicable exemption
- The location and available capacity of the nearest power system infrastructure capable of facilitating the connection at the requested voltage levels and export levels;
- Whether that infrastructure is owned by Energex or Powerlink (if it is owned by Powerlink, then the response to the enquiry may be that you seek connection via Powerlink);
- Compliance with the relevant Technical Standard;
- Compliance with AEMO's System Strength Impact Assessment Guidelines;
- The impact of the proposed operation, both short term and into the future, of the EG system on our distribution network (and nearby customers);
- Any new or augmented infrastructure that is likely to be required to facilitate the connection of the EG system, and the ownership model under which any construction will occur, including the classification of services provided and their costs;
- The ability to obtain necessary approvals (easements etc.);
- The ability to connect in the requested timeframes; and
- The legal structure and financial stability of the EG system proponent and any entity that proposes to issue any securities under the contracts executed with Energex.

Part B: Connection Process – A Detailed View

INFORM | ASSESS | ADVISE

Preliminary Response to Enquiry

To begin the Connection Enquiry process for an EG system ≥ 5 MVA, you will need to complete a Major Customer Embedded Generation Preliminary Enquiry via the Portal https://www.energex.com.au/our-services/our-portals (preferred). Alternatively, you may complete the Major Customer Embedded Generation Preliminary Enquiry Form and email to majorcustomers@energyq.com.au . Note that you can elect to bypass the Preliminary Response to Enquiry stage in certain circumstances and go straight to the Detailed Response to Enquiry.

Provided that your Enquiry is complete, we will acknowledge receipt of your Enquiry within 5 business days. Within 15 business days, or as otherwise agreed, we will (unless you are going directly to a Detailed Response to Enquiry) provide you with a Preliminary Response to Enquiry which will include:

- All items listed in Schedule 5.4A of the NER;
- Information regarding your right to negotiate the terms of a connection contract and the relevant process;
- Any additional information reasonably required by you to progress to a Detailed Response to Enquiry.

REVIEW | ANALYSE | ADVICE

Detailed Response to Enquiry

Following the Preliminary Response to Enquiry, you may request a Detailed Response to Enquiry by submitting the information requested in the Preliminary Response to Enquiry and paying the required Detailed Response to Enquiry fee. This stage builds on the information provided in the Preliminary Response to Enquiry, providing you with more in-depth analysis and the technical considerations you will need to contemplate to ensure the viability of your project, especially for those proponents who are not familiar with the technical and security impacts of proposed connections to distribution networks.

We must respond to you with the information outlined in with Schedule 5.4B of the NER after receiving your request and the nominated connection enquiry fee.

Preparing for the Detailed Response

The Preliminary Response to Enquiry outlines the technical options for connection to our distribution network. The Detailed Response to Enquiry will focus on the selected connection option and will outline relevant default technical access standards for your EG system.

If you can't meet these requirements you will need to submit your proposed access standards with your Application to Connect. We'll negotiate these standards with you after receiving a complete Application to Connect. However, if you submit proposed access standards during the Detailed Response to Enquiry stage, we may base our investigations on these proposed access standards.

REVIEW | ANALYSE | ADVICE

Requesting the Detailed Response to Enquiry

To request a Detailed Response to Enquiry, you may submit your request to your Project Sponsor after receiving your Preliminary Response to Enquiry or, if you have our agreement to bypass the Preliminary Response to Enquiry stage, you can choose to go straight to the Detailed Response to Enquiry stage when you lodge the Enquiry. To expedite direct to a detailed enquiry response stage please note this request in the "Additional Request Information" section in the Portal.

Detailed Response to Enquiry Fee

There is a fee payable to Energex for the provision of a Detailed Response to Enquiry.

If you have received a Preliminary Response to Enquiry, an indicative estimate of the Detailed Response to Enquiry Fee, including third party providers' engagement costs, will have been provided for your review. Once your formal request for a Detailed Response to Enquiry is received, we will provide you with a specific quote for your project, and you will be required to accept the quote and pay the required funds before work commences.

Estimates of Costs in the Detailed Response to Enquiry

Estimates provided in the Detailed Response to Enquiry for works associated with your proposed project represent our best estimate of the construction charges and are based on current information available at the time the report is compiled. As a result, the figures provided are estimates only, and actual (final) figures will vary due to a number of factors.

If the proposed project proceeds through to construction, then, upon completion of Energex activities, if we reasonably believe that there is a material discrepancy between the amounts received and the construction charges, we must carry out a reconciliation of these amounts as soon as reasonably practical after such completion and notify you of the outcome of this reconciliation.

Worked examples of connection charges are provided in the Connection Costs and Charges section. These are based on the example connection diagrams and may differ in complexity from your proposed project. As such, they are indicative only.

A Preliminary Impact Assessment of system strength will be provided within 20 business days, prior to the Detailed Response to Enquiry. A Detailed Response to Enquiry will be provided within **30 business days** unless otherwise agreed.

APPLY | NEGOTIATE | OFFER

Lodging the Application to Connect

After receiving your Detailed Response to Enquiry, you may wish to proceed to make an Application to Connect to our distribution network.

To make an Application to Connect, the Energex portal is used.

An Customer Application Checklist and GPS Issues Register - EGs Over 5MW can be downloaded from standards-manuals-and-fact-sheets.

For Embedded Generators ≥ 10 MW, we must consult with the applicable Transmission Network Service Provider (TNSP). Please note that under the NER, it will be a condition of the connection offer that remote monitoring equipment and data costs are paid by you.

To commence the Application Stage, a Completeness check will be made of the Application Package within ten business days, against the Application Checklist. Once accepted, we will assess the connection package, in order to agree on the performance standards, and conduct a *full assessment* under the system strength framework (if required). To do this, we will conduct due diligence on the provided information:

- PSCAD™ SMIB model, and then *full assessment* or *stability assessment* (if required) by using the provided models in a wider area model.
    - This requires many scenarios to be modelled and investigated so that it can be determined there is no stability remediation required, and the generator(s) can meet the proposed Generator Performance Standards (GPS), and do not cause harm to any other connections,
    - Where a *full assessment* or *stability assessment* is not required, *we* will undertake some wider area PSCAD™ modelling. These tests will at minimum include S5.2.5.4, S5.2.5.5 and S5.2.5.13 studies to gauge the suitability and performance of the provided PSCAD™/EMTDC™ model.
- PSS®E modelling on both the SMIB model, and in a wider AEMO snapshot model;
- Benchmarking between PSCAD™ and PSS®E to ensure the suitability of the PSS®E model and lowest short circuit ratio validity;
- Check of validity of models and consistency with provided single line diagrams;
- Review of all provided connections studies reports, protection reports, transformer energisation reports (including collector transformers), voltage control strategy, benchmarking reports, and negotiated access standard report.

APPLY | NEGOTIATE | OFFER

The Application Fee

Once your Application to Connect is considered to be complete, you will be charged an Application Fee. This charge is to cover the expenses directly incurred by us in assessing your Application to Connect and providing you with an Offer to Connect.

As these expenses commence from the time you lodge your Application to Connect, if, at any stage you decide not to proceed, you must notify us as soon as possible, as you will be charged for the work that has been completed up until the time you notify us to stop the process.

Access Standards

Schedule 5.2.5 of the NER outlines the technical requirements for the connection of Generators to a Network Service Provider's (NSP) network. The technical requirements are referred to as access standards, namely, automatic, minimum and negotiated access standards. The access standards define the acceptable level of performance which a Generator must achieve for connection to a NSPs' network. Information about relevant access standards can be found in the Detailed Response to Enquiry and STNW1175.

A negotiated access standard falls between the automatic and minimum access standards. It is an agreed standard of performance for the relevant technical requirement that will be accepted to gain access to the network. This standard should be as close as possible to the automatic standard.

Negotiating Access Standards and Generator Performance Standards

Your Preliminary Response to Enquiry will outline our access standards in relation to each technical requirement. If you are unable to meet the requirements, you may wish to submit, with your request for a Detailed Response to Enquiry, proposed negotiated access standards for consideration.

Your Detailed Response to Enquiry is then based on these proposed negotiated access standards; however final approval cannot be given until the formal Application to Offer stage.

Negotiating Access Standards and Generator Performance Standards cont.

The factors Energex takes into account when considering your proposed negotiated access standards generally include ensuring that the proposed access standards:

- are no less onerous than the corresponding minimum access standard;
- are set at a level that would not adversely affect the quality of supply of other customers; and
- are able to be approved by AEMO.

As per Rule 5.3A.3(b)(5), Information relating to Access Standards can be found in section 6.2 of the STNW1175 Standard for High Voltage Embedded Generation Connections This information details the automatic, minimum and negotiated access standards. It is suggested that Proponents familiarise themselves with the requirements of the Negotiation Framework prior to developing the connection application package. A factsheet is available from your Project Sponsor. It is also suggested, that in-principle agreement on any 'negotiated' performance is sought prior to submission of the application package, in order to improve efficiency of the assessment process.

AEMO Advisory Matters

AEMO's role in Queensland, for the connection of EG systems, includes negotiating performance standards.

Following your Application to Connect, we must consult with AEMO in relation to AEMO Advisory Matters for each of the proposed negotiated standards and will liaise with AEMO on your behalf to seek AEMO's assessment and approval of the proposed performance standards.

Please note that any cost associated with an AEMO assessment or involvement will be your sole responsibility.

Indicative estimates of AEMO's fees are available in AEMO's Schedule of Fees on their website (www.aemo.com.au) and will also be provided to you in your Detailed Response to Enquiry.

The Connection Offer

Once your Application to Connect has been submitted and accepted as complete we will provide you with a Connection Offer (containing agreements in a form capable of execution to facilitate the works and the ongoing connection).

The Connection Offer will be made within 4 months of the date on which we accept both the Application to Connect unless otherwise agreed (and all subsequent required information) and the payment of the associated application fee (unless another date has been agreed), pending the outcome of the *full assessment* (where required).

APPLY | NEGOTIATE | OFFER

The Connection Offer cont ...

Your Project Sponsor will maintain contact with you throughout the process and provide you with a draft copy of the applicable Connection Contract/s allowing you time to negotiate.

If you seek to negotiate the relevant terms, we will work closely with you to reach an informed understanding of the proposed Connection Offer. The Connection Offer will, among other things, outline charges and rates for the requested works (see construction and network tariffs below), commercial terms, technical specifications and guideline for construction times. When we have prepared your Connection Offer, it will be provided to you for review and acceptance.

Further information, and a sample of the model terms and conditions, can be found on our website: https://www.energex.com.au/our-services/connections/major-business-connections/large-generation-and-batteries

A Connection Offer will remain valid for 20 business days (or as otherwise agreed) from the date of issue. To accept this, you will need to sign and return the contracts to us within that timeframe.

Unless otherwise agreed, failure to return the accepted Connection Offer within the 20 business days will mean that the Connection Offer will lapse. If this occurs and you still wish to proceed, you would be required to recommence the process and submit a new Application to Connect.

As per Rule 5.3A (b)(7), draft copies of the Energex connection agreements applicable to Embedded Generators can be found on our website: https://www.energex.com.au/our-services/connections/major-business-connections/large-generation-and-batteries

Registering with AEMO

AEMO and Market Participants must adhere to the requirements set out in the NER. New applicants must be well informed about the NER, the National Electricity Market (NEM), and their obligations as a Registered Participant.

We encourage you to review all the participant information on the AEMO website regarding registration procedures, exemption and classification guides and what is required for an application to become a registered embedded generator (or if you are applying for an exemption).

Please refer to the AEMO website for more information – www.aemo.com.au

Upon acceptance of the Registration Package (also known as the R1 package), we will assess the package and conduct the required due diligence. An Customer R1 Checklist and Issues Register EGs over 5MW can be downloaded from https://www.energex.com.au/our-services/connections/major-business-connections/standards-manuals-and-fact-sheets. The models for the generator will have undergone some change since the Application phase, as detailed design for the plant is now completed.
The due diligence includes:

- PSS®E and PSCAD™ modelling, both as SMIB studies and as well as wide area studies;
- Benchmarking between PSCAD™ and PSS®E to ensure the suitability of the PSS®E model;
- Verification and negotiation on any GPS changes, including 5.3.9 process if required;
- Development of the Operation Protocol;
- Development, if required, of any curtailment schemes;
- Review of any updated documentation (e.g. protection report, transformer energisation report, voltage control report) that may have changed with the detailed design;
- Finalisation of the Compliance Test Plan;
- Management of Registration process as the key NSP representative, working with AEMO;

Once the due diligence of the registration package in the pre-registration phase is completed, *we* as the NSP will endorse registration to AEMO, and if AEMO are satisfied, the plant will be registered.

Finalise Your Connection

REGISTER | BUILD | OPERATE

Commissioning & Energisation

Before connecting your EG system to our distribution network, we are entitled to inspect and, where necessary, require you to test, those parts of the EG system that have a direct effect on our distribution network.

Additionally, AEMO's role as the National Electricity Market and Systems Operator means that they will also be involved in assessing simulation models of power system plant and associated control systems, and commissioning and post commissioning activities. With any Generator Performance Standard (GPS), a generator commissioning plan is required, which will incorporate a GPS compliance test program agreed between you, us, AEMO and any other relevant Network Service Providers.

Please note that any costs associated with the compliance test program will be your sole responsibility.

Your Project Sponsor will advise your requirements following the technical assessment of your project.

During this phase, we will review hold point reports, facilitate discussions, liaise with the control room and other customers if required. Once commissioning is completed, we will also conduct a review of the final models and report.

Connection Costs & Charges

Delivering value, delivering choice

Connection Costs & Charges

Australian Energy Regulator (AER) Pricing Information

We charge customers for regulated distribution services. The AER classifies the services we provide as either:

Standard Control Services, which reflect core distribution services associated with the access and supply of electricity to customers, including network services (e.g. construction, maintenance and repair of the network), some connection services (e.g. small customer connections) and Type 7 metering services. Energex recovers our costs in providing *Standard Control Services* through network tariffs which are billed to retailers.

Alternative Control Services are activities undertaken by Energex which relate to a specific request from an identifiable customer, retailer or appropriate third party which are in addition to Energex Standard Control Services. The charges for *Alternative Control Services* can be directly attributed to the customer requesting the service.

Price lists for both *Standard Control Services* and *Alternative Control Services* are approved by the AER every year. For more information on our distribution pricing principles and methodologies, please go to our website.https://www.energex.com.au/contractors/electrical-contractors/price-list-for-alternative-control-services

Services available

A full list of services is available on our website https://www.energex.com.au/contractors/electrical-contractors/price-list-for-alternative-control-services A selection of those services typically applying to EG system connections (large customer connections) is outlined overleaf.

These services can be tailored to meet your individual project needs, and your Project Sponsor will be able to assist you with any enquiries you have.

Contestability of Services

Some services are contestable, meaning you have the option of engaging Energex or a suitably qualified and experienced consultant to perform the service.

If we are providing a chargeable service, we will provide you with a quote tailored to your needs. Upon acceptance of this quote, we will issue you with an invoice which will be payable prior to the commencement of work

Example Services & Indicative Charges

Your proposed project may require several pre-connection services to enable us to determine the impact of the EG system connection on the safety and security of our distribution network prior to an Application to Connect.

The services required to be performed in relation to your connection can vary, and, as the cost of those services are tailored to your project's specific requirements, it is difficult to provide indicative costs outside of an itemised quote.

Additional Costs

There may also be ongoing charges associated with your proposed EG system, including, but not limited to:

- additional network tariffs associated with EG systems
- security (contract or construction) costs (where applicable)
- costs regarding third party involvement (e.g. AEMO), where required, such as registration of generator performance standards (GPS)

Your Project Sponsor will advise if any of these costs are applicable to your proposed project.

As your connection arrangements may differ significantly, you must understand that your connection costs will be determined in line with your connection agreements and the applicable regulatory arrangements. However, worked examples of connection costs associated with the connection of EG systems, based on preferred and possible connection arrangements, are noted belo

Energex worked examples of pre connection and connection costs

Low Voltage (LV)

>30kVA Site Specific Enquiry Response Quoted Fees 2024-2025				
	Inverter Energy System	**Inverter kVA/Rotating Machine Operation**	**GST Ex**	**GST Inc**
	Site Specific Enquiry Response	30kVA -200kVA	$1,074.55	$1,182.00
		201kVA - 1,500kVA		
		Bumpless transfer		
		Standby (for testing only)		
		Continuous Parallel		

> 30kVA Application Quoted Fees 2024-2025				
	Application and Compliance Fee	**Inverter kVA/Rotating Machine Operation**	**Gst Ex**	**Gst Inc**
BASIC	Basic Connection 100kVA with up to 15kW export 200kVA with up to 30kW export	30kVA -200kVA	$585.45	$644.00
Option 1	Negotiated Connection Solar	30kVA -200kVA	$1,638.18	$1,802.00
Option 2	Negotiated Connection Solar	201kVA - 500kVA	$3,599.09	$3,959.00
Option 3	Negotiated Connection Solar	501kVA - 1,500kVA	$4,648.18	$5,113.00
Option 4	Rotating Machine Based EG System	Bumpless transfer	$3,599.09	$3,959.00
Option 5	Rotating Machine Based EG System	Standby (for testing only)	$6,120.00	$6,732.00
Option 6	Rotating Machine Based EG System	Continuous Parallel	AS QUOTED	
Option 7	Other	Complex Applications; Greater than 1,500kVA applications, Multiple Connection Points, Embedded Network, Multiple Customers on one site	AS QUOTED	

>30kVA Site Specific Advice Quoted Fees 2024-2025		
Site Specific Advice	EMBEDDED NETWORK INVESTIGATIONS	AS QUOTED
Site Specific Advice	TECHNICAL ADVICE - HOURLY RATE SERVICE	AS QUOTED
Site Specific Advice	CONSULTATION - HOURLY RATE SERVICE	AS QUOTED

High Voltage (HV)

High Voltage (HV) - Class A1 - 2024/25 rates

Ergon - High Voltage (HV)	Class A1 >30 kVA to 1.5 MVA (HV Network) Export and Nil Export (in accordance with NER chapter 5A)				
Indicative Service Required	Inverter/Rotating Machine/BESS	Indicative Cost Simple (Inc. GST)	Indicative Cost Standard (Inc. GST)	Indicative Cost Complex (Inc. GST)	Connection Diagram
EG Enquiry - connection review and preliminary response	>30 kVA to 1.5 MVA (HV Network) Export or Non-Export	Nil cost *	Nil cost *	Nil cost *	Connection SLD Reference B or Reference C Connection of a Generator through a HV transformer see page 33
A1 Technical Assessment or Application	>30 kVA to 1.5 MVA (HV Network) Export or Non-Export	$5,500	$12,200	$35,500	

* Please note : Multi Site EG Enquires from the same applicant may require quoted fees to be applied for the Preliminary response.

High Voltage (HV) - Class A2 - 2024/25 rates

Ergon - High Voltage (HV) Class A2	5MVA> Aggregated Generation Capacity ≥1.5MVA ; Inverter, Rotating Machine or BESS; Export, Partial Export or Nil Export (in accordance with NER chapter 5A)			
Service Required	Deliverables	Indicative Cost Standard/Simple (Inc. GST)	Indicative Cost Complex (Inc. GST)	Connection Diagram
EG Enquiry	Connection review and provision of preliminary information.	Nil cost *	Nil cost *	Connection SLD Reference B or Reference C Connection of a Generator through a HV transformer see page 33
Technical Assessment	Planning Report High-level Scope and Estimate of cost for the upgrade works required to the existing network	$53,000	$102,452	
Application Phase	Detailed Scope and Estimate of cost for the upgrade works required to the existing network Offer	$71,000	Quoted	
Application process generator modelling and generator performance standard GPS review.	Application process generator modelling and generator performance standard GPS review.	Quoted	Quoted	

* Please note : Multi Site EG Enquires from the same applicant may require quoted fees to be applied for the Preliminary response.

High Voltage (HV) - Class B - 2024/25 rates

Ergon- High Voltage (HV) Class B	Aggregated Generation Capacity > 5 MVA EG (HV Network); Export, Nil Export (in accordance with NER chapter 5)			
Service Required	Deliverables	Indicative Cost Standard (Inc. GST)	Indicative Cost Complex (Inc. GST)	Connection Diagram
Site Specific Connection Advice - cost will be dependent on the services provided/requested	A scope document along with the estimate of cost for one component of augmentation/extension required	Quoted	Quoted	Connection SLD Reference B or Reference C Connection of a Generator through a HV transformer see page 33
Detailed Response to Enquiry	Planning Report Scope and Estimate of cost for the upgrade works required to the existing network	$115,600	$157,600	
Application Fee Negotiated – Major Customer Connection (Exclusive of AEMO and other NSP's)	> 5 MVA EG	$214,400	$508,000	

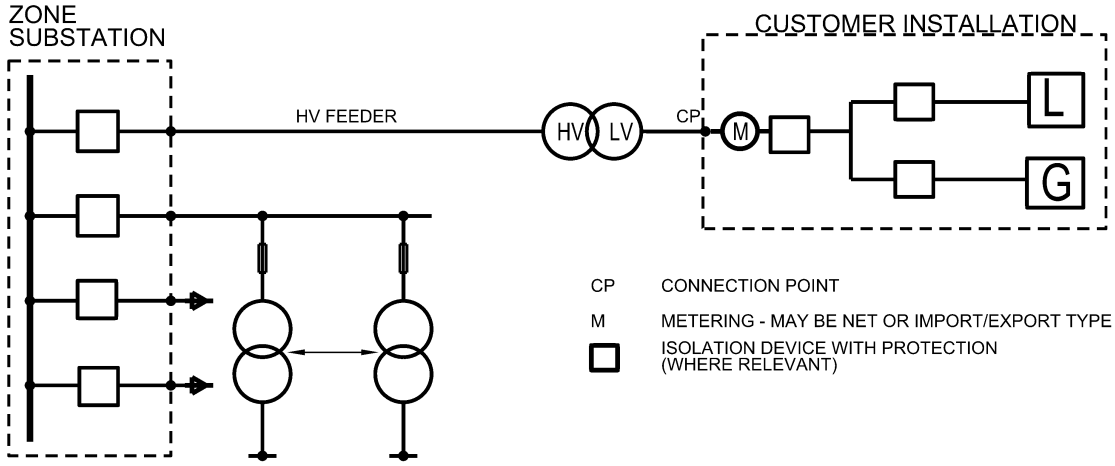
Sample Connection Diagrams

As per the requirement under Rule 5.3A.3(b)(2) of the NER, please find the following single line diagrams of our preferred connection arrangements and other possible connection arrangements for integrating an EG system, showing the connection point, the point of common coupling, the embedded generating unit(s), load(s), meter(s), circuit breaker(s) and isolator(s).

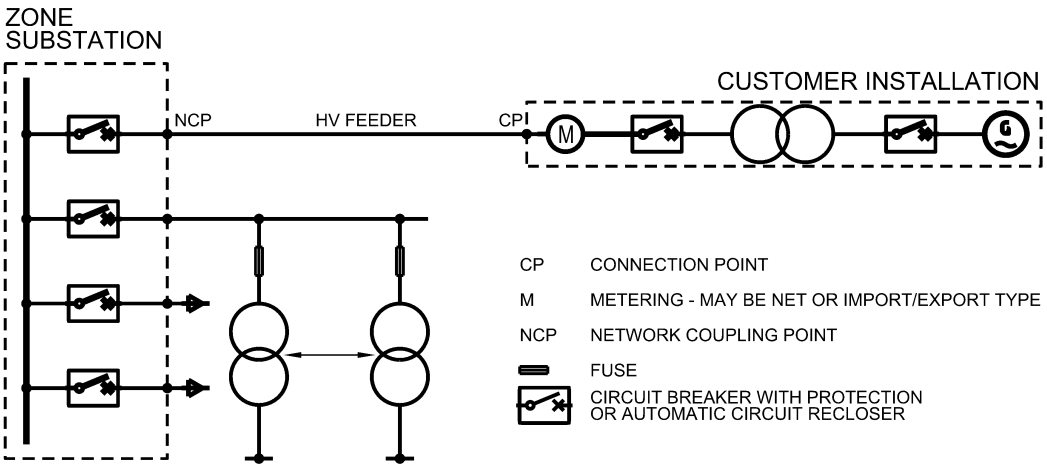
Additional information can be found in the Energex Connection Policy 2020-2025

Sample schematic diagrams outlining protection and control system requirements can be found in the relevant Technical Standard for your particular EG system. Please refer to our Relevant Technical Standards Section for more information on this.

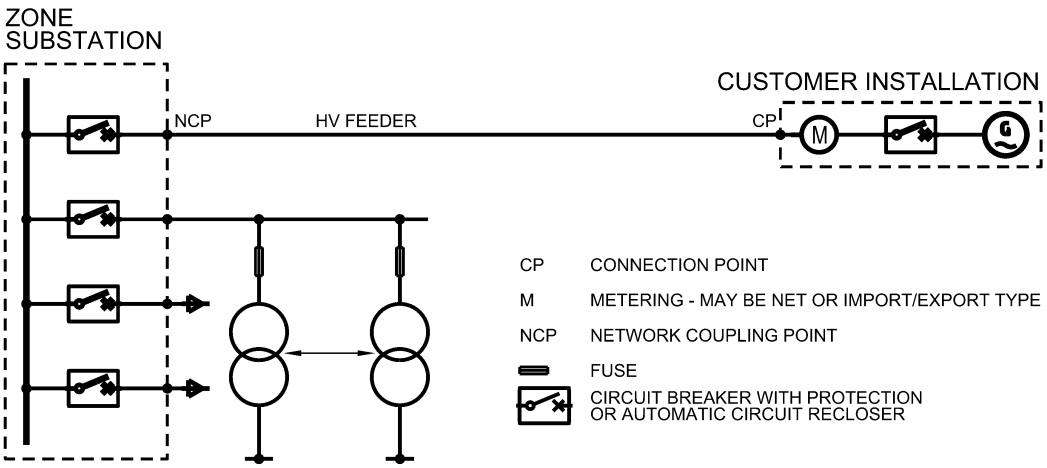
A - Connection of a Generator through a transformer (LV)



B - Connection of a Generator through a transformer (HV)



C- Direct Connection of a High Voltage Generator



List Of Services Relevant To The Connection Of EG Systems

From the Energex Energy Price List for Alternative Control Services

Service	Description	Performed by	Fee
Energex Pre Connection Services			
Provision of general Information	Provision of standard information and general information during a connection enquiry. Includes but not limited to: • Provision of advice on Supply Availability • Provision of advice on process related issues • Initial Assessment of Enquiry and response / acknowledgement	Energex	No - service provided at no cost
Pre-Connection Site Inspection	Site inspection in order to determine nature of the connection being sought	Energex	Yes - fee to be quoted
Provision of site-specific connection advice for Major Customers	Provision of site-specific advice, data and/or information on request for small or major customer connections (during the connection enquiry and/or connection application stage only). For example: • advice on project feasibility • advice on whether augmentation would likely be required • capacity information, including specific network capacity • load profiles for load flow studies • requests to review reports and designs prepared by external consultants, prior to lodgement of connection application • additional or more detailed specification and design options. Excludes information provided in planning reports/studies and project scopes	Energex	Yes - fee to be quoted
Assessment for Non-Exporting embedded generator applications	Services associated with assessing a generator on a customer's installation which will not be exporting into the distribution system.	Energex	Yes - fee to be quoted
Provision of a Planning Report	• General evaluation and advice on asset options - Build-own-operate ~ build-own-transfer ~ Energex build • Design of up to three connection options that Energex would see as feasible. These can be standard connection options – tailored to individual circumstances. e.g. load, distances, network conditions • The advantages, disadvantages, likely costs and timing of each option • A clear recommendation from Energex on the most suitable option	Energex	Yes - fee to be quoted

Service	Description	Performed by	Fee
Energex Pre Connection Services			
	(These are indicative and non-binding estimates, and subject to formal design & pricing via the Application Stage)		
Provision of a Project Scope	Design and advice on one (1) connection configuration option from the Planning Report; including information as follows • Prepare indicative estimates for this connection configuration option • Technical connection configuration design • Secondary Systems Assessment and Design including Communications, Protection • Property Aspects Advice - including guidance on land owner agreements, the consultation process and easement requirements or land acquisitions that remain outstanding. • Environment and Cultural Heritage Advice - includes guidance on all documents required to support the application for such approvals (Whilst more refined than the Connection Planning report, - these remain indicative and non-binding estimates, and are subject to formal design & pricing via the Application Stage) (Equivalent to external consultant estimates - to be formalised in Application to Connect).	Energex or a suitably qualified and experienced external consultant (Energex can provide, on request, a list of recommended consultants)	Yes - fee to be quoted
Energex Connection Services			
Removal of a network constraint for embedded generator	Augmenting the network to remove a constraint faced by an embedded generator	Energex	Yes - fee to be quoted
Witness Testing	Witnessing of testing carried out at the customers' installation where reasonably required or requested.	Energex	Yes - fee to be quoted
Energex Post Connection Services			
Re-arrange connection assets at the request of the customer	Removal, relocation or rearrangement of connection assets at customer's request.	Energex	Yes - fee to be quoted

Additional References

Speak to your Project Sponsor about the additional information available to you, which may help you with your project.

- Modelling Information for Registered Generators and Modelling Information for Non-Registered Generators,
- Understanding the Generator Performance Standards,
- Negotiating Framework in EQL and example Template,
- Voltage Fluctuation,
- Benchmarking Guideline,
- Hardware in the Loop guideline,
- Example Voltage Control Strategy,
- STNW1179 Standard for Plant Energisation,
- Commissioning Factsheet, Generator Performance Standard (GPS) Compliance Test Program template and Hold Point Report template.