

# NICC270

## Connection of Medium and Large Embedded Generation Greater Than 30KVA Information Pack

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SA Power Networks

Empowering South Australia

## Revision Notice:

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# 1. Overview

This document contains general information on the connection process of embedded generation (EG) systems (eg. Solar PVs) greater than 30kVA to SA Power Networks' distribution network.

More information on embedded generation including EG ≤30kVA is available on SA Power Networks website Solar and other generators.

# 2. How to use this document

This document is structured in the following way:

- Section 3: useful facts to know before starting an EG project
- Section 4: relevant Technical Standards to which an EG generating system must conform
- Section 5-7: information on the connection processes of different EG sizes
- Section 8: other aspects that may need to be considered
- Section 9: requirements that must be met post generation connection

# 3. Pre-Start Considerations

Please read the following information before commencing an EG project:

- Investment in an Embedded Generation project prior to acceptance of a Connection Offer is at the customer's risk e.g. purchase of plant, contractual commitments, etc.
- The timeframe to connect a generating system may vary significantly depending on the size, which is attributed to the different technical and regulatory requirements
- It is critical to provide as much information as possible upfront and in response to specific requests, to ensure the EG project progresses as promptly as possible
- The customer is obliged to provide notice at time of application for a sub 5MVA generator that they do not want an exemption from Chapter 5 of the NER
- All export is flexible
- Firm capacity is offered on load only

# 4. Technical Standards & Network Information for Contractors & Customers

Our Technical Standards (TS) and our Network Information for Contractors and Customers (NICC) below provide the technical and engineering requirements that you will need to meet to connect your generating systems.

- TS132 Low Voltage Embedded Generation Connection Technical Requirements – Capacity above 30kVA
- TS133 High Voltage Embedded Generation Connection Technical Requirements
- TS134 Communication Systems (inc. SCADA) for Embedded Generation

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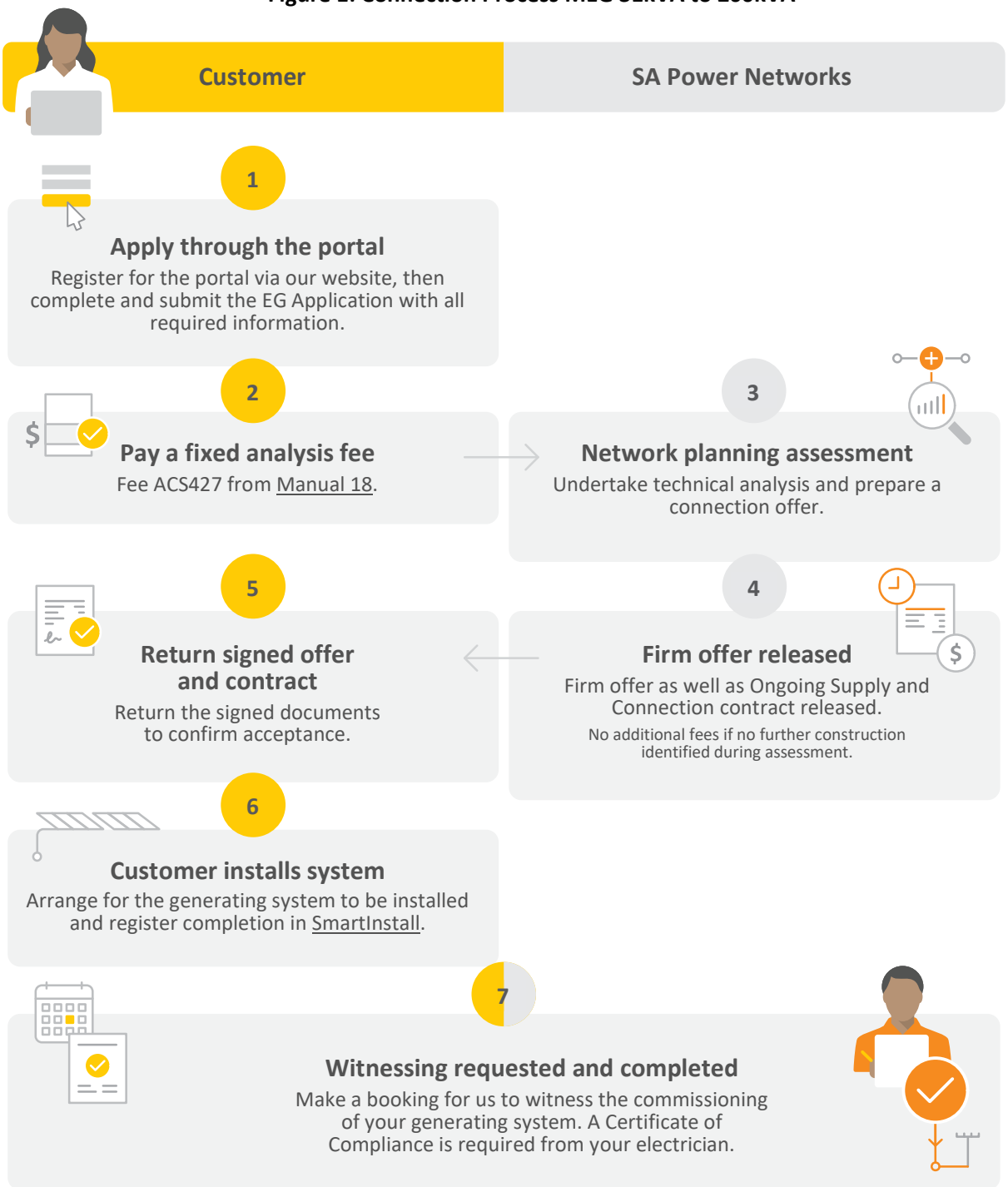

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# 5. Medium Embedded Generation Connection Process

## 5.1 Connections 31kVA to 200kVA

The diagram below describes the process of how a medium embedded generating system (with capacity 31kVA–200kVA) is connected to our network.

**Figure 1: Connection Process MEG 31kVA to 200kVA**



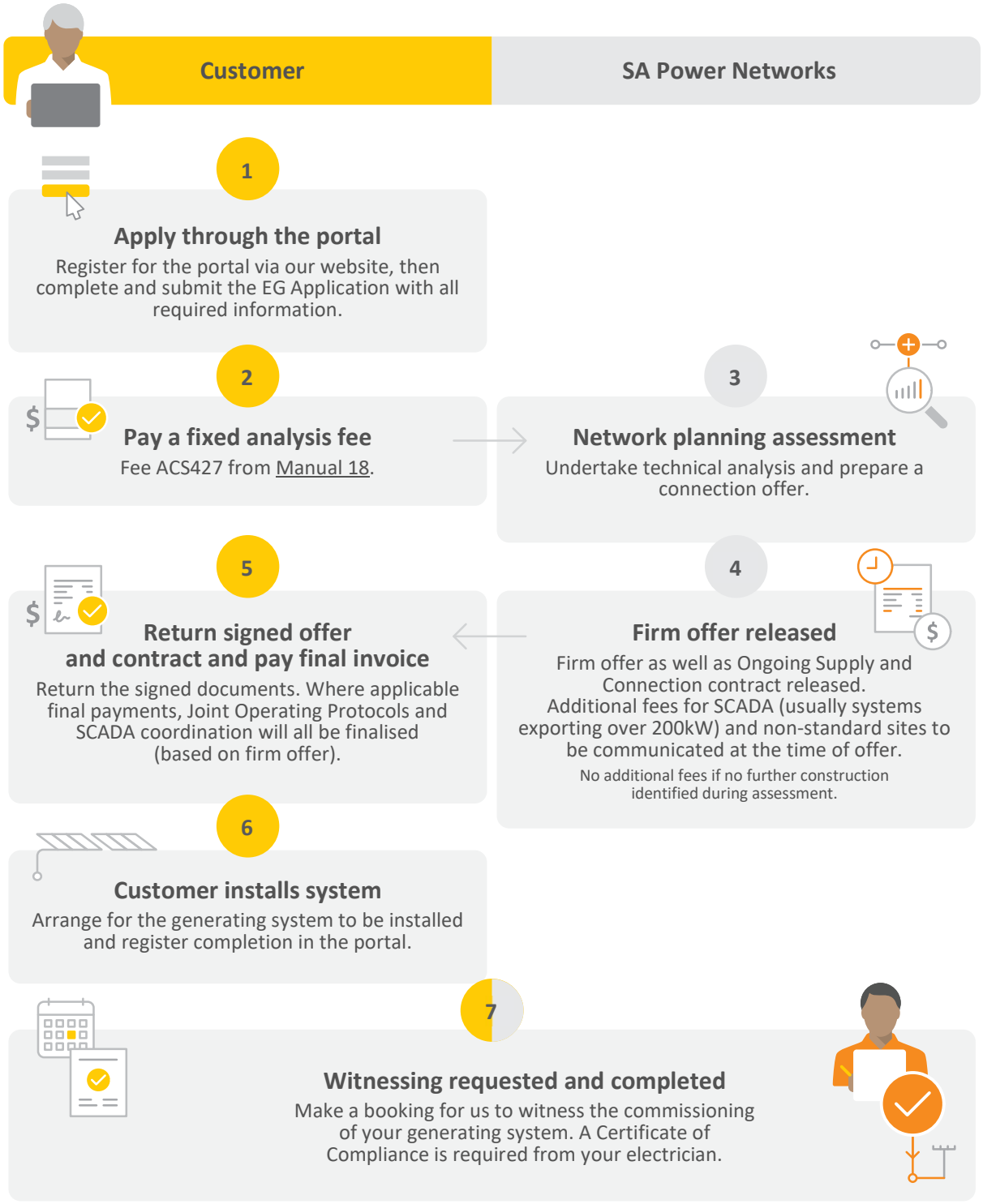

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## 5.2 Connections 201kVA to 500kVA

The diagram below describes the process of how a medium embedded generating system (with capacity 201kVA– 500kVA) is connected to our network.

**Figure 2: Connection Process MEG 201kVA to 500kVA**




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## 5.3 Charges & timeframe

In most cases, for a MEG connection less than or equal to 200kVA only a standard Offer to Connect Fee (ACS427) will be charged to cover our costs in network analysis, offer preparation and witnessing activities. Clustered sites with multiple facilities with a combined capacity exceeding 500kVA may be subject to a LEG process and their associated costs and timeframes.

If the requirement for additional construction work by SA Power Networks to facilitate the EG connection is identified at the analysis stage, there may be additional design and construction fees that apply. This will be advised in the Connection Offer.

In most cases, a Firm Connection Offer will be presented within 65 days of application, assuming all requirements have been met.

Refer to Appendix 1 – EG Request Timeframes and Indicative Charges for further information on all MEGs.

## 5.4 Required information

The following information is required to apply

| No. | Name |
|---|---|
| 1. | Site details including:<br>- site layout diagram<br>- proposed connection point<br>- minimum and maximum demands<br>- existing generating system and/or power factor correction (if applicable) |
| 2. | Customer contact details, including application invoice fee payee details |
| 3. | Current connection details (new – REX number, Existing – NMI and meter number) |
| 4. | Generating system details:<br>- Inverter (including the make, model, nameplate rating and datasheet)<br>- PV/Battery (including datasheet) |
| 5. | Operating philosophy ie. export only, self-consumption |
| 6. | Proposed construction and connection dates |
| 7. | Single Line Diagram(s) with details of protection, metering and control |

## 5.5 Commission, witness, and final connection

There are two aspects to have your generating system operational:

1. The first aspect is the electrical connection (if applicable):
   a) If this is a new connection, work will need to be completed prior to commissioning of the generating system (ie. The Customer must make a request for a new connection in parallel to the EG application and ensure connection works are completed prior to commissioning of the generating system).
   b) If the connection involves HV connection work, up to 8 weeks prior notice will be required to ensure any required switching activities are coordinated prior to commissioning of the generating system (this will be known at the time of offer).
2. The second aspect is the witnessing of your generating system commissioning. This may be required for MEG connections, depending on specific site requirements. Please note a minimum of 20 business days' notice is required to book generating system witness commissioning with SA Power Networks.

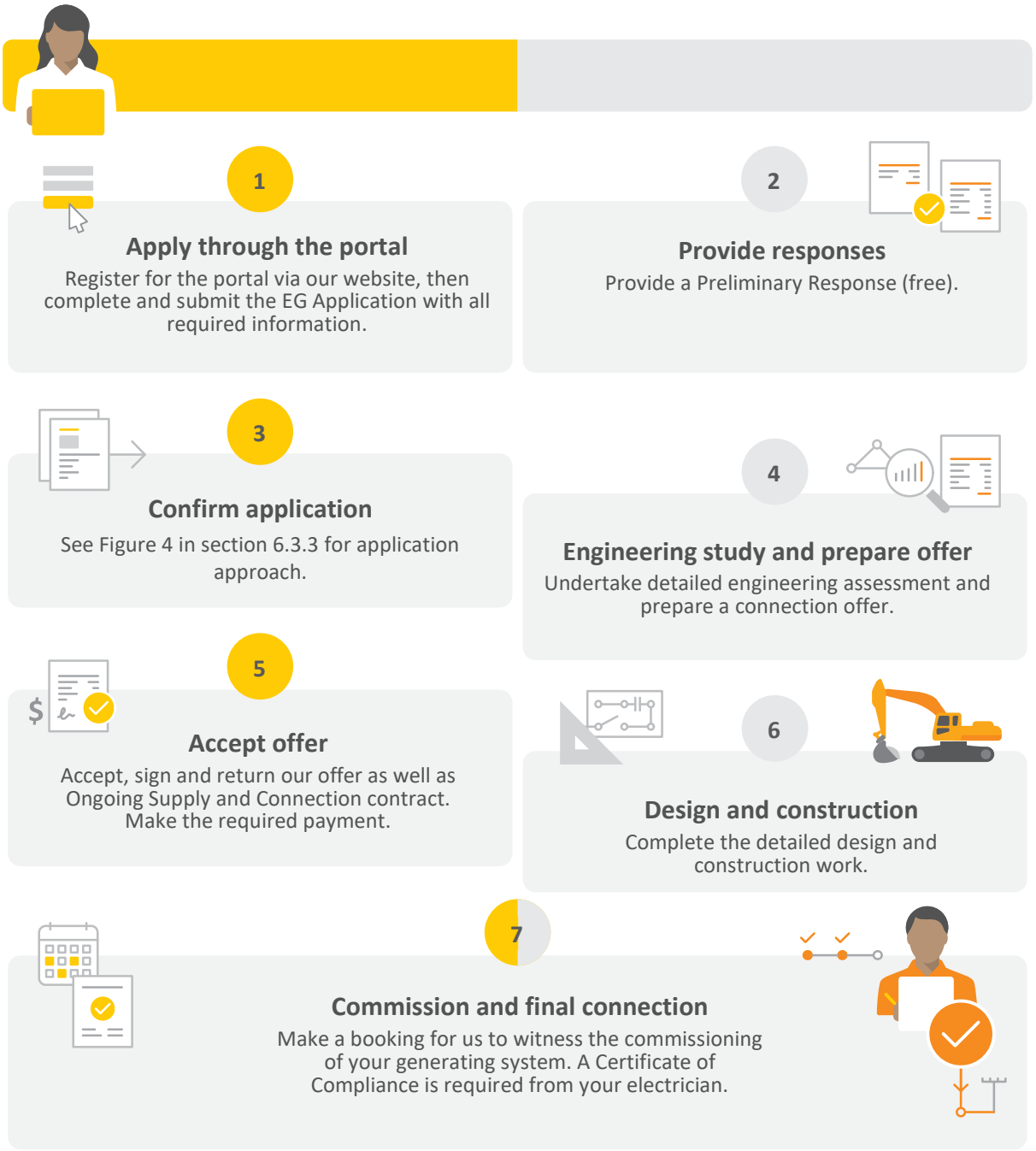
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# 6. Large Embedded Connection Process (EG 501kVA – 4.99MVA)

To connect a generating system of this size will require significant technical modelling and engineering studies in accordance with the requirements set out in TS132 and TS133. We will work closely with your engineering team to provide guidance throughout this complex process. The diagram below provides a high-level illustration on the connection process.

**Figure 3: Connection Process LEG 501kVA to 4.99MVA**




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## 6.1 Charges and timeframe

Charges apply to cover our cost in assessing the feasibility of connecting your generating system to our network. Depending on your choice of application approach, you can pay the fees in stages or make a once-off payment. Refer to 6.3.3 for different application approaches.

Refer to Appendix 1 – EG Request Timeframes and Indicative Charges for further information on charges and timeframe.

## 6.2 Required information

The following information is required to submit an application.

| No. | Name |
|---|---|
| 1. | Customer contact details, including application invoice fee payee details |
| 2. | Current connection details (new – REX number, Existing – NMI and meter number, connection voltage) |
| 3. | Installer details (installer, license details and contact details) |
| 4. | Generating system details:<br>- AC (eg. inverter) including the make, model, nameplate rating and datasheet<br>- DC (eg. PV, BESS) including datasheet |
| 5. | Operating philosophy (eg. peak lopping, export to network, self-consumption, FCAS participation, onsite load) |
| 6. | Load Requirements:<br>Firm Load / Flexible Load (expected operational load profile if available) |
| 7. | Site details including:<br>- site layout diagram<br>- connection point<br>- minimum and maximum demands<br>- existing generating system and/or power factor correction (if applicable) |
| 8. | Protection information:<br>- Primary (eg. inverter) anti-islanding protection settings and details<br>- Backup anti-islanding protection details, including relay datasheet and settings |
| 9. | Proposed construction and connection dates |
| 10. | Single Line Diagram(s) with details of protection, metering and control |
| 11. | Additional proposed reactive equipment details if applicable (eg. reactor) |

## 6.3 The process explained

### 6.3.1 Submit online enquiry

Complete the required information through the Portal. For further information on submitting an application refer to Portal User Guides or contact an SA Power Networks Project Manager to assist by contact through emailing LargeGeneration@sapowernetworks.com.au.

### 6.3.2 Provide preliminary response

SA Power Networks' Connections Engineering team reviews your enquiry.

We will provide a Preliminary Response to you free of charge. It contains high level information on feeder, substation capacity, suggested approach to proceed, an indicative cost and the process to complete the application.

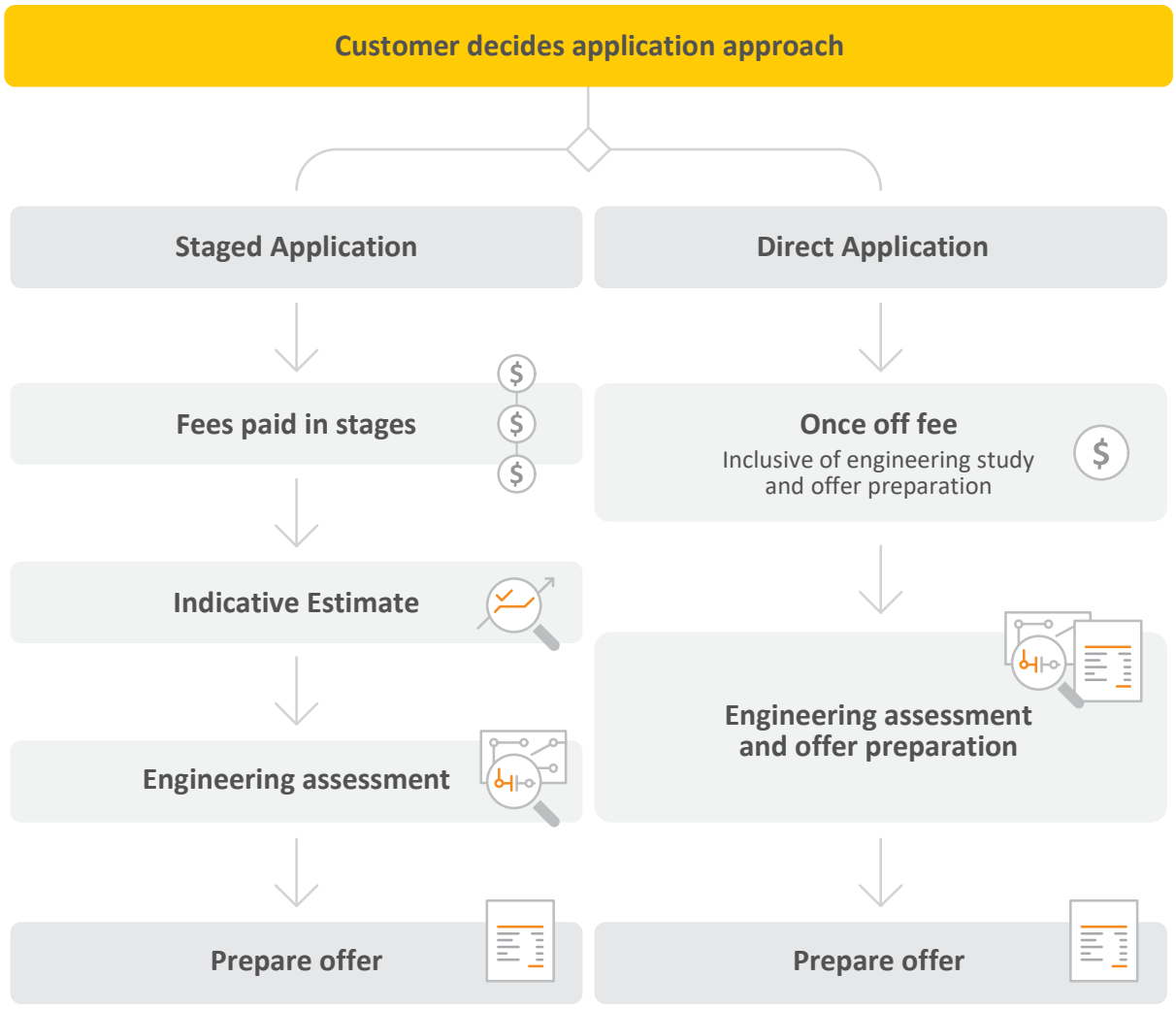
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### 6.3.3 Confirm application

After considering the provided Preliminary Response, you may choose to proceed with a Staged Application approach or a Direct Application approach, see below diagram.

**Figure 4: Application Approach**




### 6.3.4 Undertake engineering study and prepare Offer

If you choose the Staged Application approach, we will first provide you with an Indicative Estimate which contains high level analysis of the proposed work, an indicative cost and the process to complete the work. If you decide to proceed, we will provide you with an Engineering Report which provides a summary of the impact of connection of the proposed generating system, required operating conditions and scope of augmentation and connection works required by SA Power Networks to facilitate the connection of your generating system. If you then decide to proceed further, we will provide you with a Connection Offer with firm costs and an Ongoing Connection & Supply Contract.

If you choose the Direct Application approach, you will be charged a once-off fee to cover our cost for engineering assessment and offer preparation. We will provide you with a Connection Offer and an Ongoing Connection & Supply Contract.

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### 6.3.5 Accept offer

You will need to accept our Offer and sign and return the signed Offer and Ongoing Connection & Supply Contract to us within the required timeframe (45 business days). You also need to make the required payment set out in the Connection Offer to formalise acceptance and so that we can start the design and construction work.

### 6.3.6 Design and construction

Once you accept the Offer and pay the Offer Fee, we will proceed to complete our work outlined in the Offer. This work includes the detailed design and construction of the SA Power Networks assets to connect your generating system:

- **Augmentation work** – Works to enlarge the capability, such as (but not limited to) the capacity and/or function, of a distribution network to distribute electricity and as to meet a customer's requested electricity demand and/or export requirements.
- **Connection work** - Works required, such as an establishment of, or an alteration of a connection asset (such as a Connection Point, SCADA and telecommunications, and etc) between a distribution network and a customer's premises to allow the flow of energy and provision of connection services.

In the meantime, you can commence your own design, procurement and construction works to install the generating system. Your system must be connected within 12 months from when you accept the Offer.

### 6.3.7 Commission and final connection

There are two aspects to have your generating system operational:

1. The first aspect is the electrical connection (if applicable):
   (a) If this is a new connection, work will need to be completed prior to commissioning of the generating system (ie. The Customer must make a request for a new connection in parallel to the EG application and ensure connection works are completed prior to commissioning of the generating system)
   (b) If the connection involves HV connection work, up to 8 weeks prior notice will be required to ensure any required switching activities are coordinated prior to commissioning of the generating system (this will be known at the time of offer).
2. The second aspect is the witnessing of your generating system commissioning, which will require a minimum of 20 business days' notice:
   (a) You will need to make a booking with your assigned SA Power Networks Project Manager for the witnessing.
   (b) Before commissioning your generating system, you will need to agree on a Joint Operating Protocol (JOP) with us for a coordinated management of the generating system operation.

For detailed requirements on commissioning, refer to Technical Standards listed in Section 4.

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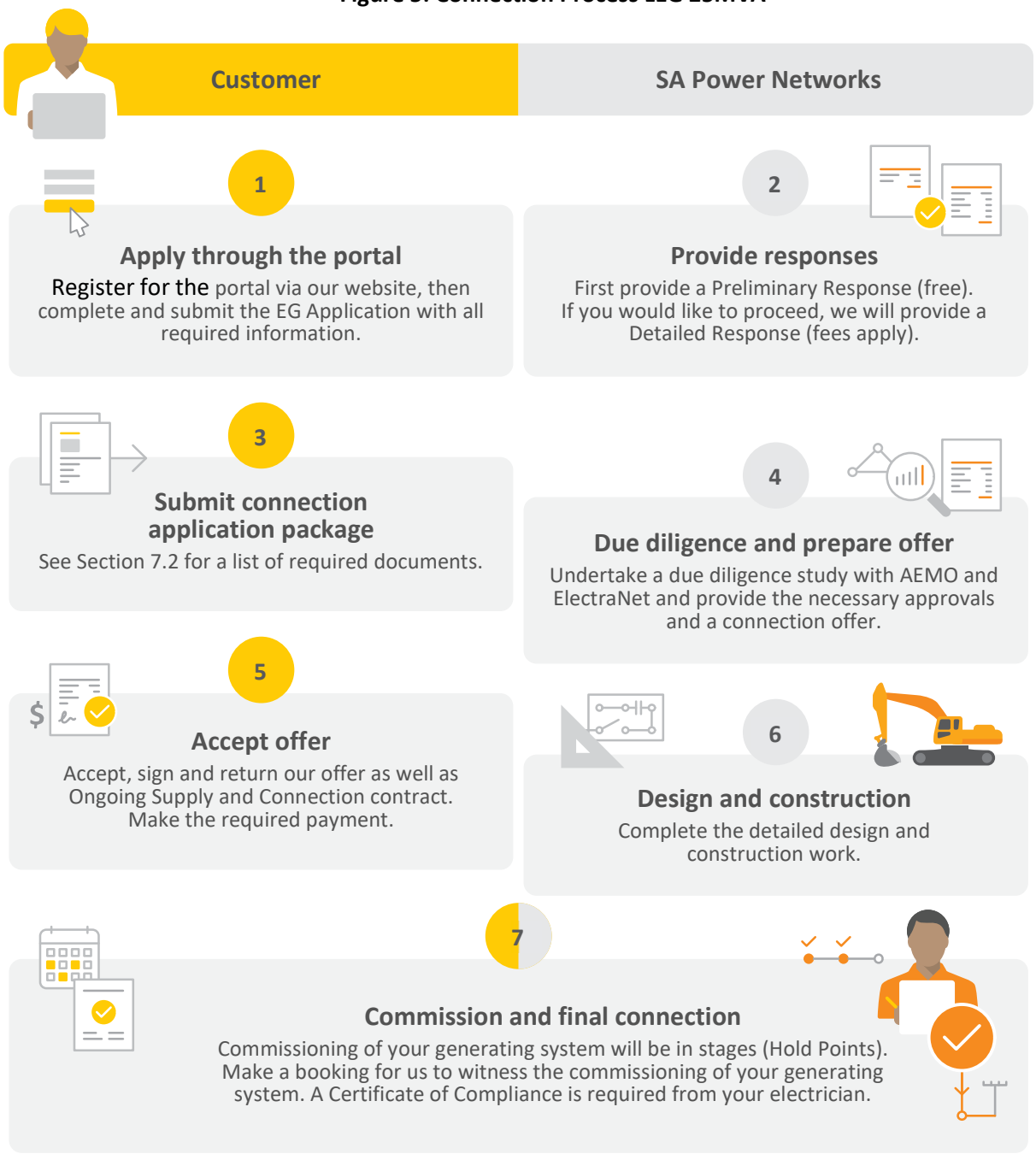

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# 7. Large Embedded Generation Connection Process (EG ≥ 5MVA)

To connect a generating system of this size will require significant technical modelling and engineering studies with AEMO and ElectraNet in accordance with the requirements set out in NER Chapter 5. We will work closely with your engineering team to provide guidance throughout this complex process.

The below diagram provides a very high-level illustration on the connection process.

**Figure 5: Connection Process LEG ≥5MVA**




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## 7.1 Charges & timeframe

Below are the charges for connecting a generating system ≥ 5MVA:

- NER Detailed Response Fee covers the cost for us to undertake detailed technical analysis.
- Engineering Assessment Fee, consisting of the following:
  - SA Power Networks' System Studies Fee (RFI and Assumption Report)
  - SA Power Networks' Assessment of the Connection Application Package
  - SA Power Networks' Project Management Fee
  - ElectraNet Due Diligence Assessment Fee
  - AEMO Due Diligence Assessment Fee
- Offer to Connect Fee – this covers our cost to prepare the Connection Offer.
- Design and Construction Fee will be advised in the Connection Offer.
- Any Long Lead-Time Equipment Fee (if required).

Refer to Appendix 1 – EG Request Timeframes and Indicative Charges for further information on charges and timeframe.

## 7.2 Required information

For the full application to connect, please refer to the checklist on AEMO website: AEMO | Stage 3 - Application

## 7.3 The process explained

### 7.3.1 Submit online enquiry

Complete the required information through the Portal. For further information on submitting an application refer to Portal User Guides or contact an SA Power Networks Project Manager to assist by contact through emailing LargeGeneration@sapowernetworks.com.au.

### 7.3.2 Provide responses

An SA Power Networks Connections Planning Engineer assesses your enquiry.

We will first provide a NER Preliminary Response to you free of charge. It contains a high-level analysis of the proposed work, a high-level indicative cost and the process to complete the work.

If you decide to proceed, we will provide you with a Detailed Response which provides detailed information on the above-mentioned aspects. You will need to confirm your intention to proceed.

### 7.3.3 Submit Connection Application Package

During this stage, your engineering team will need to provide the required documentation package to us to enable the modelling and studies in accordance with the relevant NER rules. A critical part of your submitted package is the GPS (Generator Performance Standards).

To prepare the Package, you may need to submit a Request for Information (RFI) to obtain our asset and network information. You will also need to submit an Assumptions Report prior to commencing your studies, which must be agreed to by both parties.

### 7.3.4 Undertake Due Diligence Study and prepare offer

Upon receiving the complete Application Package, we will undertake the DNSP Due Diligence Study according to the regulatory requirements. This includes a significant amount of engineering modelling and may require a Full Impact Assessment (FIA) to evaluate the impact on the electrical network.

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ElectraNet and AEMO will in turn undertake their own studies as part of their Due Diligence. Please note that they may request further information or additional modelling to be undertaken which might have an impact on the project timeframe.

Once AEMO is satisfied with the outcome of the NSP Due Diligences and their own Due Diligence, it will provide necessary approval for the project to progress.

We will then provide you with the Engineering Report, a Connection Offer and an Ongoing Connection and Supply Contract.

### 7.3.5 Accept offer

You will need to accept our Offer and sign and return the signed offer and Ongoing Connection & Supply Contract to us within the required timeframe (45 business days). You will then need to make the required payment set out in the Connection Offer.

### 7.3.6 Design and construction

Once you accept the Offer and on receipt of applicable payments, we will proceed to complete our work outlined in the Offer. This work includes the detailed design and construction of the assets to connect your generating system to the distribution network.

Alternately under an agreement between both parties, Augmentation works and in some instances Connection works may be undertaken prior to studies and Due Diligence being completed. Any changes brought about by the result of the studies and/or Due Diligence will be at the customers risk and any associated costs will be borne by the customer to facilitate the additional changes.

- **Augmentation work** – Works to enlarge the capability, such as (but not limited to) the capacity and/or function, of a distribution network to distribute electricity and as to meet a customer's requested electricity demand and/or export requirements.
- **Connection work** - Works required, such as an establishment of or an alteration of a connection asset (such as a Connection Point, SCADA and telecommunications, and etc) between a distribution network and a customer's premises to allow the flow of energy and provision of connection services.

In the meantime, you can commence your own work to install the generating system.

### 7.3.7 Commission and final connection

There are two aspects to have your generating system operational:

1. The first aspect is the electrical connection (if applicable):
   (a) If this is a new connection, work will need to be completed prior to commissioning of the generating system (ie. The Customer must make a request for a new connection in parallel to the EG application and ensure connection works are completed prior to commissioning of the generating system)
   (b) If the connection involves HV connection work, up to 8 weeks prior notice will be required to ensure any required switching activities are coordinated prior to commissioning of the generating system (this will be known at the time of offer)
2. The second aspect is the witnessing of your generating system commissioning, which will require a minimum of 20 business days' notice:
   (a) You will need to make a booking with your assigned SA Power Networks Project Manager for the witnessing.
   (b) Before commissioning your generating system, you will need to agree on a Joint Operating Protocol (JOP) with us for a coordinated management of the generating system operation.

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(c) The commissioning of the generating system will be in stages (Hold Points). For each Hold Point test, AEMO and we will need to review the Test Report. After the test result is found satisfactory, the commissioning can then progress to the next hold point test.

For detailed requirements on testing and commissioning, refer to Technical Standards listed in Section 4.

# 8. Other Considerations for the Customer

## 8.1 Essential Services Commission of South Australia (ESCOSA) Licensing

It is the responsibility of the Customer to liaise with ESCOSA to apply for a generation license as required. The license, or exemption (if required), must be in place at the time of connection.

Please visit ESCOSA website for detailed licensing requirements.

## 8.2 Australian Energy Market Operator (AEMO) Registration

Where registration with (or exemption from) AEMO is required, written evidence of either is required to be provided to SA Power Networks prior to connection to the network. Further details of the AEMO registration requirements are available on the AEMO website.

## 8.3 Battery Energy Storage Systems

Any battery energy storage system installed on site will be considered as part of the overall generating systems' capacity of the site. The system will be treated as an Inverter Energy System (IES) generating unit during export and as a load during charging (or import). Where the Customer chooses to recharge the battery system from the network applicable charges will be required. Information on tariffs is available at Tariffs we charge to distribute your electricity - SA Power Networks.

## 8.4 Frequency Control Ancillary Services (FCAS)

Customers intending to participate in the Contingency Frequency Control Ancillary Service (FCAS) market as an Ancillary Service Provider (ASP) must register or enter into an appropriate arrangement with an existing Market Participant or a Demand Response Service Provider (DRSP) to classify the relevant plant as an Ancillary Service Unit (ASU).

Confirmation of eligibility and classification should be sought directly from AEMO to ensure the proposed market or financial arrangement as well as the proposed communication design qualifies for this arrangement.

Note that Customers intending to register as a Generator or an Integrated Resource Provider (IRP) for FCAS market participation will require a separate assessment under Chapter 5 of the NER.

## 8.5 Flexible Connections

Flexible capacity is offered for load and export connections. Flexible connections are managed through Dynamic Operating Envelopes (DOEs). DOEs are adjusted at regular intervals based on the measured limits of the network capacity. DOE limits will vary due to conditions such as, but not limited to weather, active customer connections, generation limits, load limits, planned and unplanned outages, loss of system control and directions from electricity authorities. Operating envelopes may be reduced to zero under certain network operating conditions.

Connections with load greater than 500kVA may be considered for flexible loads.

To be eligible for a flexible connection, the customer must have remote monitoring and controls that can receive and respond to DOE limits from SA Power Networks' energy management platforms. Any flexible import or export from the customer's site, including wholesale market and ancillary services operations, must remain within the DOE.

For further information, please refer to our website.

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# 9. Post-Connection requirements

Following a successful witnessing of commissioning, the generating system is permitted to generate power and export it to the electrical network. However, the customer has the obligation to ensure the generating system is in full compliance to its approved generating conditions. This includes:

1. **Conduct Ongoing Compliance Monitoring and Maintenance**

   The customer must conduct ongoing monitoring and maintenance in accordance with its Compliance Monitoring Program.

2. **Notice of Alteration to Approved Design**

   The generating system must not be altered, nor its protection settings, from the approved design without the prior written consent of SA Power Networks.

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# A. Abbreviations

| | |
|---|---|
| **AEMO** | Australian Energy Market Operator Limited (ACN 072 010 327) |
| **ASGU** | Ancillary Service Generating Unit |
| **ASL** | Ancillary Service Load |
| **BESS** | Battery Energy Storage System |
| **DNSP** | Distribution Network Service Provider |
| **DRSP** | Demand Response Service Provider |
| **EG** | Embedded Generation or Embedded Generating |
| **ESCOSA** | Essential Services Commission of South Australia |
| **FCAS** | Frequency Control Ancillary Services |
| **HV** | High Voltage |
| **IES** | Inverter Energy System |
| **NER** | National Electricity Rules |
| **PV** | Photovoltaic |
| **RFI** | Request for Information |
| **SCADA** | Supervisory Control and Data Acquisition |

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# B. Appendix 1 – EG Request Timeframes and Indicative Charges

The tables below are approximate timeframes and indicative quote-based charges when assessing a medium or large embedded generation enquiry. Please note that these timeframes and costs are dependent on the complexity and scope of the customer's application, and provision of all requested information in a timely manner. Please note that the charges below do not include the cost of design or construction of network alterations or connections (these costs will be confirmed at the time the offer letter is presented/analysis is completed).

## Medium Embedded Generation (31-500kVA)

Following the receipt of the Portal application, SA Power Networks will provide an initial response within 5 business days.

Upon receipt of a fully completed customer application, the majority of MEG offers will be presented within 65 days.

The table of fees below are effective as of 1 July 2026. All figures are inclusive of GST. Please note that changes to ACS fees occur every 12 months.

| Category [1] | Heading | Details | Minimum | Maximum | Calculation Method/Considerations |
|---|---|---|---|---|---|
| **ACS427** [2] | Analysis Type | The standard fee charged for all (31 - 500kVA) Network Assessments | $5,498.90 | NA | Refer to Manual 18 for the most recent charge. This fee will be charged for all applications prior to processing |
| **A** | SCADA | Any systems that is exporting greater than 200kW will incur this charge | $23,628 | NA | Materials and Labour required to |
| **B** | HV Connection | If the system connects to High Voltage, the NPO will need to determine the additional resources required for Witnessing. FS Witnessing can confirm this. | $2,482 | $6,522 | Number of hours required for HV Connect Officer (Tech Specialist) + Number of TSW hours/line truck (Field Worker) |
| **C** | >200km from CBD | If the system is installed greater than 200km from the CBD, the NPO will need to determine the additional travel costs for FS and SCADA. | $1,362 | $7,734 | Additional attendee hours (allowance is for 1 only) - Field Worker per hour |
| | | | | | Additional travel hours - use Field Worker per hour |
| | | | | | Accommodation and LAFHA - $600 maximum per trip |
| | | | | | Both FS and SCADA |
| | | | | | SCADA can provide a detailed breakdown use Tech Specialist hourly rate to convert |

1. ACS463 is the applicable ACS code for Categories A,B,and C,. Exact values will be communicated at time of firm offer.
2. ACS = Alternate Control Services
3. There may be some exceptions where SCADA will also be required.

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## Large Embedded Generation (Greater than 500kVA)

The list below contains QUOTED services, and as such, prices are indicative only and should be used as a guide from 1 July 2026. We reserve the right to vary the below prices depending on the effort required to complete the service.. All figures are inclusive of GST.

| **Large Embedded Generation<br>Indicative timeframes and Indicative quote-based charges^** | | | | |
|---|---|---|---|---|
| | | **501kVA to 1.5MVA** (Typically, LV connections)** | **1.51MVA to ≤4.99MVA** (Typically, HV Connections)** | **5MVA and above** |
| **Connection Enquiry Response** | | No Charge<br>Within 5 business days | | |
| **Indicative Estimate Response** (PV Only) | | $4,312<br>Within 20 Business Days | | N/A |
| **Indicative Estimate Response** (with material load - eg BESS / PV+BESS / PV+BESS+Load) | | $5,665<br>Within 30 Business Days | | N/A |
| **NER Preliminary Response** | | N/A | | No Charge<br>Within 15 business days |
| **NER Detailed Response** (PV Only) | | N/A | | $27,599<br>Within 30 Business Days |
| **NER Detailed Response** (with material load - eg BESS / PV+BESS / PV+BESS+Load) | | N/A | | $35,101<br>Within 30 Business Days |
| **Engineering Report** (PV Only) | | $10,725<br>Within 40 Business Days | $12,441<br>Within 40 Business Days | $250,000 to $1,000,000 (indicative only)<br>Lead times will vary, allow 12 months |
| **Engineering Report** (with material load - eg BESS / PV+BESS / PV+BESS+Load) | | $13,563<br>Within 40 Business Days | $14,674<br>Within 40 Business Days | $250,000 to $1,000,000 (indicative only)<br>Lead times will vary, allow 12 months |
| **Engineering Studies** | **AEMO** | NA | | $200,000 to $350,000 (Indicative only)<br>Timeframe to be advised |
| | **ElectraNet** | NA | | $150,000 to $450,000 (Indicative only)<br>Timeframe to be advised |
| **Connection Offer** | | $4,664<br>Within 65 Business Days | | $50,000 to $250,000 (Indicative only)<br>Timeframe to be advised |
| **Design and Construction** | | Timeframes and Costs to be advised in Connection Offer | | |
| **5MVA and above process may be applied in some instances to ≤4.99MVA applications, if the site will be Registered in NEM | | | | |

^Manual No. 18 SA Power Networks Connections & Ancillary Network Services is published on our website with charges for embedded generation connections ≤ 500kVA. In the manual, the services under Large Embedded Generation are deemed by the Market to be "Quoted Services". The actual chargeable customer price is determined by using labour rates in Manual 18 published on our website and the effort (hours) to complete the service. Rates are provided in Appendix D.

Please note that the above indicative costs may vary (or may incur variations) for any of the stages above, if:

- you choose multiple options or multiple locations for your enquiry;
- your proposal is complex in nature;

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- require additional efforts by SA Power Networks (eg. studies, analyses, modelling, investigations and/or level of services); and/or
- subject to additional costs incurred or imposed by others (eg. AEMO, ElectraNet, others).

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