



CITY OF CAPE TOWN  
ISIXEKO SASEKAPA  
STAD KAAPSTAD

# REQUIREMENTS FOR SMALL-SCALE EMBEDDED GENERATION

Application and approval process for  
small-scale embedded generation in  
the City of Cape Town

September 2023

## Document Control

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## Foreword

**Note:** Please ensure that you have the latest version of these Requirements, relevant application forms and associated documents before proceeding with an application. All relevant application forms and reference documents are available on the City's website ([www.capetown.gov.za/electserviceforms](http://www.capetown.gov.za/electserviceforms)).

## Disclaimer

The City of Cape Town is not liable (and disclaims such liability) for any harm or losses suffered by any person or entity arising out of the use of these Requirements in part or in full for their own small-scale embedded generation program, or for harm or losses suffered by their constituents or clients.

## Scope

The purpose of these Requirements is to define the City of Cape Town's minimum requirements and application and authorisation processes for all forms of small-scale embedded generation, such as solar photovoltaic systems, hybrid solar photovoltaic systems and battery systems in the City's licensed area of supply.

The approval process for small-scale embedded generation varies depending on the system architecture, size and customer category. These requirements apply to systems with a generation capacity less than 1 MVA (1 000 kVA) and all systems up to this limit are required to comply with the conditions and processes described herein.

Importantly, the requirements stipulated in this document do not apply to installations with a generation capacity of 1 MVA or more. For such systems, please refer to the [Technical Standard for Interconnection of Embedded Generation \(EEB 705\) document](#) and [Guide for Municipalities on Processing Embedded Generator Applications 1 MW and Larger](#) (currently a working document), which specifies the minimum technical and statutory requirements.

In an effort to support safe and legal SSEG uptake and streamline the application and approval process, as of 1 October 2023, all embedded generation systems such as solar PV with or without battery storage, that are installed on properties with a City of Cape Town electrical supply point, are treated as grid-tied installations<sup>1</sup>. This aligns with international best practice. In addition, Solar PV geysers (as described in Section 1.4) are permitted as off-grid systems and must be authorised

### **Notable Exceptions: Systems that do not require authorisation:**

The following systems are not considered SSEG and do not require SSEG authorisation:

- Solar water heaters that use the sun's thermal energy to heat water directly (e.g. through flat plate collectors or evacuated tubes), do not require authorisation.

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<sup>1</sup> Prior to 1 October 2023, City of Cape Town permitted the installation of standby or off-grid SSEG systems provided they were configured such that they could never operate in parallel with the grid. In practice, however, most of these systems claiming to be standby or off-grid were incorrectly wired and were operating as grid-tied systems using unsafe equipment and insufficient professional sign off. This poses excessive risks to customers, City staff and the electrical network and causes major delays to the SSEG authorization process.

- Plug-in portable (trolley) inverters that are powered and protected by a plug circuit as an appliance to supply small loads (security systems, lights, computer, TV, life support systems, etc.), these are not wired to the distribution board and may not use fixed mounting solar PV panels.

Note I:

If the plug-in portable (trolley) type inverter is wired to the distribution board, a grid-tied battery only SSEG application to the City is required.

Note II:

If the plug-in portable (trolley) type inverter is wired to the distribution board, and includes fixed mounted PV panels, a grid-tied hybrid SSEG application to the City is required.

- Alternative supplies in terms of SANS 10142-1, Section 7.12 which includes diesel/petrol generators are required to be authorised via the [City's Application for the Connection of a Standby Supply GEN/ELEC 1](#).

Note:

If alternative supply includes solar PV generation for such installation, a grid-tied SSEG application to the City is required.

- Commercial and industrial large UPSs with batteries connected to the electrical supply of buildings, provided for the clean (pure sine wave) and an alternative power supply to sensitive electronic equipment in accordance with IEC/SANS 62040 suite and SANS 10142-1, Section 7.12.

Note:

If solar PV generation is required for this installation, an application to the City is required.

## Abbreviations

<b>ADMD</b>	After Diversity Maximum Demand
<b>AC</b>	Alternating Current
<b>AMI</b>	Advanced Metering Infrastructure
<b>BESF</b>	Battery Energy Storage Facility
<b>CB</b>	Circuit Breaker
<b>CoC</b>	Certificate of Compliance
<b>CCT</b>	City of Cape Town
<b>DC</b>	Direct Current
<b>DMRE</b>	Department of Mineral Resources and Energy
<b>ECSA</b>	Engineering Council of South Africa
<b>EG</b>	Embedded Generation/Generator
<b>EGD</b>	Electricity Generation and Distribution Department of the City of Cape Town
<b>EIR</b>	Electrical Installation Regulations
<b>ERA</b>	Electricity Regulation Act
<b>kVA</b>	kilovolt-ampere (unit of apparent electrical power)
<b>kW</b>	kilowatt (unit of active electrical power)
<b>kWp</b>	kilowatt peak (the rated peak active power output of solar photovoltaic panels)
<b>LV</b>	Low Voltage



<b>MCC</b>	Maximum Charging Current
<b>MEC</b>	Maximum Export Capacity
<b>MV</b>	Medium Voltage
<b>MVA</b>	Megavolt-ampere (1 000 kVA)
<b>NERSA</b>	National Energy Regulator of South Africa
<b>NPR</b>	Nameplate Power Rating
<b>NMD</b>	Notified Maximum Demand
<b>NRS</b>	National Regulatory Services
<b>OHS</b>	Occupational Health and Safety
<b>PCC</b>	Point of Common Coupling
<b>POC</b>	Point of Connection
<b>PGC</b>	Point of Generator Connection
<b>PV</b>	Photovoltaic
<b>RE</b>	Renewable Energy
<b>RPP</b>	Renewable Power Plant
<b>PPM</b>	Prepayment Meter
<b>SABS</b>	South African Bureau of Standards
<b>SAGC</b>	South African Grid Code
<b>SANS</b>	South African National Standards
<b>SCP</b>	Service Connection Planning (a branch within EGD)

<b>SSEG</b>	Small-scale Embedded Generation/Generator
<b>UIC</b>	Utility Installed Capacity
<b>UPS</b>	Uninterruptible Power Supply
<b>VAT</b>	Value-Added Tax

## Glossary

### **Alternating current (AC)**

The flow of electrical energy that follows a sine wave and changes direction at a fixed frequency (i.e. it alternates). Most residential and commercial/industrial uses of electricity require alternating current.

### **Alternative supply**

A power source that serves as an alternative to the main utility supply to the customer loads. Power transfer between the main supply and the alternative supply is done by a break before make switching device

### **Anti-islanding**

The ability of a small-scale embedded generation installation to instantly and automatically disconnect the generator from the distribution network whenever there is a power outage, thus preventing the export of electricity to the distribution network from the SSEG. This is done primarily to protect the distributor's workers who may be working on the distribution network and who may be unaware that the network is still being energised by the generator.

### **Bi-directional meter**

A meter that measures the active energy (Wh) flow in both directions (import and export) and either displays the balance of the imported and exported energy in a single register meter (net metering) or displays both imported and exported energy in separate registers.

### **City**

The City refers to the City of Cape Town and will be referred to as such throughout this document.

### **Cogeneration**

The simultaneous production of two or more forms of energy from a single fuel source, also known as combined heat and power (CHP).

### **Customer/user**

A person or legal entity that has entered into an agreement with a distributor for the provision of distribution services. An entity may be an embedded generator, another

distributor, an end-use customer (including generators), an international customer, a retailer or a reseller.

### **Dedicated assets/dedicated network**

That portion of the network, which is dedicated to a specific customer. Customer dedicated assets are assets created for the sole use of a customer to meet the customer's technical specifications, and are unlikely to be shared in the distributor's planning horizon by any other end-use customer.

### **Direct current (DC)**

The flow of electrical current in one constant direction. Direct current is typically converted to alternating current for practical purposes, as most modern uses of electricity require alternating current.

### **Distribution network/grid**

The network/grid owned and operated by a Distributor.

### **Distributor**

A legal entity that owns or operates/distributes electricity through a distribution network.

### **Electrical installation**

Any machinery, on or in any premises, used for the distribution of electricity from a point of control to a point of consumption anywhere on the premises, reflecting items included and excluded in the Electrical Installation Regulations.

### **Embedded generation**

A power generation plant using primary renewable energy sources or fuel driven energy sources that is grid-tied.

### **Embedded generator**

A legal entity that operates one or more electricity generation unit(s) that is connected to the distribution network. Alternatively, a legal entity that desires to connect one or more electricity generation unit(s) to the distribution network. Generation and/or bi-directional storage system embedded in the utility distribution network that operates in parallel with the utility supply

**ECSA registered professional**

Person registered with ECSA in the professional category. The professional category includes:

- I. Professional Engineer (Pr. Eng.)
- II. Professional Engineering Technologist (Pr. Tech. Eng.)
- III. Professional Certified Engineer (Pr. Cert. Eng.)
- IV. Professional Engineering Technician (Pr. Techni. Eng.).

**Generation size**

The maximum apparent power capacity of a generator unit or group of generator units that operate in parallel with the grid in an installation in volt-ampere

**Grid-tied or parallel operation**

Both the embedded generator and the utility system supply or absorb power into the same AC system at the same time.

Note. Only NRS 097-2-1 only approved inverters that are listed on the City's list shall be considered under this category.

**Grid-tied SSEG**

Grid-tied SSEG (Generation source only, no batteries) a customer installation consisting of a combination of a load consumption system and a generation system (typically a PV source).

**Grid-tied Hybrid SSEG**

Grid-tied hybrid SSEG (Generation source with batteries) a customer installation consisting of a combination of a load consumption system and generation system (typically a PV source) and storage units.

**Grid-tied Battery Only**

Grid-tied SSEG (Batteries only) a customer installation consisting of a combination of a load consumption system and an energy storage and generation system (batteries only).

**Group development (Sectional title community)**

Site that is supplied by the EGD by means of bulk MV or LV electricity supply and the entity resells the electricity to the private sectional title owners.

**Hybrid Inverter**

An inverter with the capability of switching between a supply following operating mode and a supply forming operating mode (this also applies to battery inverters).

**Hybrid installation**

A hybrid installation consists of generation and energy storage, often used as an embedded generation and a backup power source when the main power supply is interrupted.

**Inverter**

A power electronic device that converts variable DC or AC to grid compatible AC. Note. Only NRS 097-2-1 approved inverters that are listed on the City's list shall be considered.

**Isolated**

A section of the distribution network that is disconnected from all other possible sources of electrical potential is said to be isolated.

**Load Profile**

The variation of the customer's rate of electricity consumption (or demand) over time.

**Low Voltage (LV)**

Nominal voltage levels up to and including 1 kV (1 kV = 1 000 V).

**Maximum Charging Current**

The maximum per phase charging current setting of a system equipped with an energy storage system.

**Maximum Export Capacity**

The maximum aggregative active power the installation is capable to export towards the network at the point of connection.

**Medium Voltage (MV)**

Nominal voltage levels greater than 1 kV up to and including 33 kV.

### **Nameplate Power Rating**

The aggregated maximum nameplate AC apparent power rating of the power conversion equipment, e.g., inverters, synchronous machines, or asynchronous machines.

### **Net-consumer**

A customer who imports (purchases) more electricity than they export (feed-in to the network) over a rolling 12-month period.

### **Plug-in Portable (trolley) inverters**

An appliance used to supply small loads (security systems, lights, computer, TV, life support systems, etc.) from a protected electrical installation socket outlet, not fixed into the electrical supply and without PV, as described in SANS 62040 suite.

### **Point of common coupling (PCC)**

The point in a network where more than one customer is connected or will be connected.

### **Point of connection (POC)**

The electrical node(s) on the distribution network where the customer's assets are physically connected to the Distributor's assets.

### **Point of generator connection (PGC)**

The circuit breaker and associated ancillary equipment (instrument transformers, protection, isolators) that connect a generator to any electrical network. Where more than one such circuit breaker exists, the PGC shall be the circuit breaker closest (electrically) to the generator.

### **Renewable power plant (RPP) categories**

Renewable power plants are grouped into the following three categories as per the Grid Connection Code for RPPs in South Africa (Currently Version 3.1):

a. Category A: 0 – 1 MVA

This category includes RPPs with rated power of less than 1 MVA and connected to the LV network (typically called 'small or micro turbines'). This category shall further be subdivided into 3 sub-categories:

I. Category A1: 0 – 13.8 kVA

This sub-category includes RPPs of Category A with rated power in the range of 0 – 13.8 kVA

II. Category A2: 13.8 – 100 kVA

This sub-category includes RPPs of Category A with rated power in the range greater than 13.8 kVA but less than 100 kVA

III. Category A3: 100 kVA – 1 MVA

This sub-category includes RPPs of Category A with rated power in the range greater than 100 kVA but less than 1 MVA.

Note: For RPPs connected to multi-phase supplies (two- or three-phase connection at the POC), the difference in installed capacity between phases may not exceed 4.6 kVA per phase.

b. Category B: 1 MVA – 20 MVA

This category includes RPPs with rated power in the range equal or greater than 1 MVA but less 20 MVA.

Note that the Battery Energy Storage Facility (BESF) Grid Connection Code (Currently Version 5.3) provides further subdivisions for this category.

c. Category C: 20 MVA or higher

This category includes RPPs with rated power equal to or greater than 20 MVA.

### **Reverse power flow**

The flow of energy from the customer's SSEG onto the distribution grid (i.e. export) as a result of the instantaneous generation exceeding the instantaneous consumption at the customer's site.

### **Reverse power flow blocking**

A device which prevents the flow of energy from an SSEG onto the distribution grid.

### **Shared network**

A section of the distribution grid that supplies more than one customer.

### **Small-Scale Embedded Generator (SSEG)**

For the purposes of these Requirements, a grid-tied small-scale embedded generator is an embedded generator with a generation capacity less than 1 MVA (1 000 kVA).



## **Solar PV geyser**

Electrical water heating geyser supplied from a PV energy source either:

- a) Directly to a DC geyser heating element or to a dual AC/DC isolated geyser element; or
- b) To a combination of grid AC and PV modulated DC to the existing geyser heating element that is interconnected with the distributor grid supply that requires a suitably interlocked change-over switch.

## **Suitably interlocked change-over switch**

Switch required for grid-tied inverters (GTIs) (essential loads interconnected with the grid) and solar PV water heating geyser to interrupt the grid supply. Switch requirements are listed in [Appendix 4](#).

## **Utility Installed Capacity**

The utility's apparent power installed capacity that is the minimum of the notified maximum demand stated on the billing system, breaker size, or transformer size.

## **Wheeling**

The financial transactions representing the transportation of third-party electrical energy (kWh) over the City's distribution network which allows for the third-party supplier to sell this electrical energy to a City customer at that customer's point of supply.

## Important Notices

### Compliance with the Law

Electricity Regulation Act 4 of 2006 (ERA) and associated Regulations, South African Grid Codes and the Occupational Health and Safety Act 85 of 1993 (OHS) are core legislation.

In terms of the Electrical Installation Regulations (2009), every installation defined under Section 1.4 SSEG Systems shall require an Electrical COC and test report issued by a suitable qualified electrical contractor. Until such time as SANS 10142 – 1 – 2 is published (to allow sign-off by a suitably qualified electrical contractor), grid-tied SSEG systems shall require an ECSA Registered Persons Professional sign-off, as defined below.

Furthermore, the City's Electricity Supply By-law, 2010 and Amended 2017 states that no electricity generation equipment provided by a consumer in terms of any Regulations or for his own operational requirements shall be connected to any installation without the prior written consent of the Director of the EGD.

It is explicitly emphasised that any type of SSEG installation which has been issued only with a Certificate of Compliance (CoC), **is not authorised** to connect to the City's distribution network. Failure to obtain this consent constitutes an offence, which could lead to a service fee and/or disconnection of supply to premises and/or imprisonment in terms of the City's Electricity Supply By-law.

Furthermore, the EIR of the OHS states that it is the property owner who carries the responsibility for the safety of the electrical installation on the property. This includes the SSEG installation on the property. Therefore, the SSEG installation may be in contravention of the OHS, in which case punitive sanctions apply.

Customers who wish to legally install SSEG will be required to follow the application procedure as detailed in these Requirements. No exemptions from these Requirements will be granted for retrospective applications. Retrospective compliance will be required for existing installations whenever the applicable legislation/regulations (e.g. ERA, OHS, South African Grid Codes, etc.), standards (e.g. SANS) and specifications (e.g. NRS) are amended or when quality of supply and/or safety requirements must be improved.

## **Generation Licenses**

SSEG installations are required to comply with Schedule 2 of the ERA which stipulates the requirements for generator licensing and registration or exemption from licensing under certain circumstances. Please refer to the latest Licensing Exemption and Registration Notice published by the Department of Mineral Resources and Energy (DMRE) and if in doubt, seek clarity from the National Energy Regulator of South Africa (NERSA).

## **Approved Inverters**

Until such time as a South African Bureau of Standards (SABS) mark is issued for inverters, the City will require proof of type tests (in the form of test certificates) having been successfully carried out by a third-party test house certifying compliance of the inverters with the City's requirements and the latest NRS 097-2-1 edition. A [list of approved inverters](#) which have been shown to comply with the City's requirements can be found on the [City's website](#) under reference documents. Details of the City's requirements regarding the type testing of inverters, as well as the City's process to add inverters onto the list is provided in [Appendix 3](#).

## **General Energy Related Enquiries**

For general energy related enquiries, please make use of the [Energy Enquiry form](#) or visit the following [website](#). For specific queries related to an SSEG application contact your relevant area office.

## **ECSA Professional Sign-off**

All grid-tied SSEG installed on the City's distribution network must be certified for compliance with the City's requirements as follows:

- An ECSA registered professional engineer, professional engineering technologist, or certified engineer may certify commercial, industrial and residential SSEG installations.
- An ECSA registered professional technician may only certify residential SSEG installations.

The professional registered person is liable and needs to ensure compliance with design, protection, and all relevant standards.

# 1. General Requirements

## 1.1 Introduction

Growing global awareness of climate change coupled with the rapidly falling costs of renewable energy (RE) technologies are two of the major drivers behind the global megatrends of decarbonisation and decentralisation of the energy system. In South Africa, significant increases in the price of grid electricity and the severity of load-shedding due to generation capacity shortfalls in the national energy system have provided further impetus for customers to seek alternative energy generation and storage options. Solar photovoltaics (PV) is the key technology enabling the transition to a more sustainable energy system. Rapid cost reductions of 60-80% since 2010 have increased the economic attractiveness of solar PV, facilitating the adoption of residential and commercial/industrial applications and electricity distributors are increasingly being approached by customers who wish to connect these SSEG systems to the distribution network. Furthermore the decline in cost and improvements in battery technology, particularly Lithium-ion batteries, has facilitated a rapid uptake in behind the meter battery energy storage primarily for loadshedding mitigation at the household or property level.

The grid-tied parallel connection of any generator to the distribution network has numerous implications for the local electricity distributor. The most pressing is the safety of the utility staff, the public and the user of the generator. There is therefore a strong need for such practice to be regulated for the general benefit and protection of citizens as well as the operation and control of the distribution network. Consequently, the City's Electricity Supply By-law requires that no electricity generation equipment shall be connected to any installation without prior written consent from the Director of the EGD. The City has therefore developed this comprehensive Requirements document, which details the application and authorisation process for connecting SSEG to the City's distribution network. The requirements defined in this document **applies to all systems with a generation capacity less than 1 MVA** and all SSEG applicants up to this limit are required to comply with the conditions and process specified herein. It is essential that all customers who wish to install SSEG, complete the relevant sections of the application process in full, and that written approval is received from the City before system installation commences. For Embedded Generation (EG) above 1 MW, see the Scope section above.

Currently, SSEG is not adequately regulated at the national level, despite ongoing attempts by the DMRE and NERSA to develop overarching regulatory rules and frameworks. In the absence of a national regulatory framework, the City has developed its own rules for the registration and authorisation of SSEG in its licensed area of supply. The Constitution of the Republic of South Africa provides that electricity reticulation is a municipal competency. This means that a municipality is responsible for providing electricity reticulation services to the customers within its jurisdiction. The electricity reticulation function extends to the obligation on municipalities as licensed distributors to provide open and non-discriminatory access to the municipal distribution network. Accordingly, its electricity reticulation function includes, inter alia, administering the connection of generation systems to the municipal distribution network.

## 1.2 Defining SSEG

As defined in the Glossary and as per the South African Grid Code (SAGC), an Embedded Generator refers to a legal entity that operates one or more electricity generation unit(s) that is connected to the distribution network. Alternatively, a legal entity that desires to connect one or more electricity generation unit(s) to the distribution network. For the purposes of these Requirements, an SSEG is an embedded generator with a generation capacity less than 1 MVA (1 000 kVA) which is located on residential, commercial or industrial properties where electricity is also consumed. Such SSEG would be connected to the wiring on the customer's premises which is in turn connected to, and supplied by, the City's electricity network – thus these generators are considered to be 'embedded' in the local electricity network. Most of the electricity generated by an SSEG is consumed directly at the site but times arise when generation exceeds consumption and typically a limited amount of power is allowed to flow in reverse i.e. from the SSEG system onto the electricity grid.

## 1.3 Applicability

These requirements are applicable to all customers who wish to install SSEG systems, with a generation capacity less than 1 MVA, in the City's licensed area of supply. Applications for authorisation of SSEG are required for:

- New Systems
- Modification to existing systems (refer to section 2.2)

- Change of property ownership (as detailed in section 1.12)

It specifies the minimum requirements to:

- SSEG project developers and installers/electrical contractors
- Commercial, industrial and residential property owners
- Engineering consultants commissioned to design SSEG systems
- ECSA registered professionals involved in the commissioning of SSEG systems
- City officials involved in the registration and authorisation process for SSEG systems.

It is essential that all customers who wish to install any type of SSEG (such as for example solar PV and/or batteries), regardless of generation capacity, complete the relevant sections of the application process in full, and that written approval is received from the City prior to commencing with the system installation. The City needs to ensure that, amongst other considerations, the SSEG installation can be accommodated on the distribution network, is compliant with the relevant regulations/standards/specifications and that the total SSEG generation capacity of the network has not been exceeded. Therefore, **equipment should not be purchased prior to obtaining written approval** from the City, as **approval is not guaranteed** and the City will not be held liable for equipment expenses where approval is denied.

### **Eskom Customers**

Customers residing within the metropolitan boundary of the City but are located in Eskom's licensed area of supply will need to apply to Eskom for approval/authorisation of their SSEG system. To view the City's electricity distribution licence and area boundaries see the following [link](#), or visit the [City's website](#) and search under reference documents.

## 1.4 SSEG Systems

This section defines the types of SSEG configurations that are permitted by the City as part of the SSEG authorisation process. For additional definitions on the systems listed below, refer to the [Glossary section](#).

Notes:

- I) Fossil Fuel (Petrol and Diesel) generators are not covered under the SSEG systems here and will require authorisation via the [Application for the Connection of a Standby Supply GEN/ELEC 1 process](#).
- II) For Residential generation size limitations refer to Section 3.1.
- III) For Commercial and Industrial generation size limitations refer to Section 4.1
- IV) Refer to [Embedded Generation Schematic Drawings](#)

### 1.4.1 Grid-tied

As defined, and with two modes of operation:

- a) Grid-tied with export

Customer is allowed to export excess electricity generated by the system onto the grid.

- b) Grid-tied with no export:

Customer may not export electricity onto the grid and must install reverse power flow blocking protection in order to ensure that no excess electricity is exported to the grid.

Notes:

An SSEG installation connected to the City's grid through a reverse power flow blocking relay is still considered grid-tied and must comply with the requirements for grid-tied SSEG.

### 1.4.2 Grid-tied Hybrid

As defined, and with two modes of operation:

- a) Grid-tied with export

Customer is allowed to export excess electricity generated by the system onto the grid.

b) Grid-tied with no export:

Customer may not export electricity onto the grid and must install reverse power flow blocking protection in order to ensure that no excess electricity is exported to the grid.

Notes:

An SSEG installation connected to the City's grid through a reverse power flow blocking relay is still considered grid-tied and must comply with the requirements for grid-tied SSEG.

### 1.4.3 Grid-tied Battery Only

As defined in [Glossary](#).

Notes:

Grid-tied Battery Only system refers to an inverter and battery system **only** i.e. solar PV is not included. In order to include solar PV panels to the installation, submit a new Grid-tied Hybrid SSEG application.

### 1.4.4 Solar PV Geyser

As defined, and for two types:

- a) Solar PV directly connected to a DC geyser heating element or to a dual AC/DC isolated geyser element; or
- b) Existing geyser electrical heating element supplied by both modulated DC solar PV and the utility supply with an interlocked change-over switch.

Notes:

Customer External Change-over switch must comply with requirements detailed in [Appendix 4](#). Therefore these systems do not require ECSA professional sign off.



## 1.5 Applicable Technical Standards

Most of the technical requirements for SSEG installations are covered in the following standards/specifications (see [Appendix 1](#) for list of applicable regulations, standards and specifications):

- I. NRS 097-2 Grid Interconnection of Embedded Generation – Part 2: Small-scale Embedded Generation
- II. Grid Connection Code for Renewable Power Plants (RPPs) in South Africa (latest version)
- III. Technical Standard for Interconnection of Embedded Generation (EEB 705).
- IV. Guide for Municipalities on Processing Embedded Generator Applications 1MW and larger

The above standards/specifications cover aspects such as voltage range, flicker, DC injection, frequency operating range, harmonics and waveform distortion, power factor, synchronisation, safe disconnection, over- and under-voltage, sudden voltage dips and peaks, over- and under-frequency, anti-islanding, network faults, response to utility recovery, isolation, earthing, protection and labelling.

The design and installation of SSEG equipment must comply with these requirements. Consult your supplier/installer to ensure that all the required conditions are satisfied.

## 1.6 On-site Consumption of Electricity

The electricity produced by the SSEG system must be consumed on the property on which the SSEG is located or exported to the City's network for purchase by the City. Transfer of electricity to a different property i.e. wheeling, will only be permitted if both the generator and consumer satisfy the relevant local/national regulatory and technical requirements. Refer to the following [website](#) for more details on wheeling in the City of Cape Town.

## 1.7 Metering and Meter Accommodation

The latest budgetary estimates for metering changes can be obtained on the [City's website](#) by viewing the tariffs under the reference documents section.

Grid-tied SSEG customers must select one of two options for their systems i.e. export or

non-export, and this selection will determine the metering solution as described below:

**a) Metering Requirements for Export customers**

Grid-tied SSEG customers who wish to export and participate in the SSEG Feed-in Tariff must have a bi-directional AMI meter installed. The City will supply and install the requisite meter, at the customer's cost.

The City will only add Value-Added Tax (VAT) to the SSEG Feed-in Tariff if the customer is a registered VAT vendor with the South African Revenue Services (SARS). These customers will not be required to submit invoices to the City, as per Interpretation Note No. 56 (31 March 2010) of the Value-Added Tax Act, 1991.

**b) Metering Requirements for Non-Export Customers**

Grid-tied SSEG customers who do not wish to export and not partake in the SSEG Feed-in Tariff must install reverse power flow blocking protection to prevent the flow of excess electricity onto the distribution network. Any SSEG customer with a credit meter that draws less than 100 A will be required to have their credit meter replaced with a split PPM, at the City's cost. Grid-tied SSEG customers that draw more than 100 A will be required to reduce their capacity to below 100 A or alternatively, have a bi-directional AMI meter installed, at the customer's cost. This is done to avoid credit meters and PPMs from running in reverse.

When a customer changes from a PPM to an AMI meter, unused PPM units will be refunded (fully or partially) according to the ruling policy.

**Metering Accommodation**

In all cases where grid-tied SSEG customers are going to export and participate in the SSEG Feed-in Tariff, they will be required to provide metering accommodation, in the form of a meter box, at their own cost (according to the City's specifications) on the street-front property boundary. Such a meter box must face outwards and be locked with a standard City (EGD) lock.

For existing street front overhead supplies to the property, the overhead connection must be replaced with an underground cable from the street-front boundary at customers cost.

Where there is an existing mid-block overhead connection to the main dwelling, the overhead connection must be replaced with an underground cable from the street-

front boundary at the customers cost.

For more details on metering accommodations refer to the [Guideline for Electrical Contractors](#) here or on the [City's website](#) under reference documents.

## 1.8 Tariff Updates

Tariffs are determined annually by the City and subject to approval by both Council and NERSA. The latest tariff book for all customer categories is available on the [City's website](#) under reference documents, this includes the annual consumptive electricity tariff as well as the annual miscellaneous electricity tariff. For additional information on the City's tariff policies visit the City's [Cost of Electricity website](#).

## 1.9 Payment of Credits for Export: 'Cash for Power'

Customers choosing to export surplus energy are credited at the feed-in tariff. The City is allowing all customers with systems authorised to export, to offset the credit earned from their energy surpluses against their consumption and other municipal charges. In addition, it is allowing commercial customers to sell surplus SSEG energy to the City for a cash amount should there be a credit after all offsets have been applied. This programme is known as 'Cash for Power'. In order to qualify to sell surplus energy to the City for cash, participants shall meet the following criteria:

- a) Must have an approved SSEG system
- b) Required to be a registered service provider on the City of Cape Town Supplier database.
- c) Required to submit all supply chain declarations and forms (e.g. tax clearance) required in terms of procurement law and process.
- d) Participate in Request for Expression of Interest
- e) Authorisation from the Bid Adjudication Committee to participate in the program

Surplus Energy will be bought at the approved City SSEG feed-in Tariffs as per the approved annual consumptive tariff schedule available on the [City's Website](#) under reference documents.

### **1.9.1 Residential Customer Requirements**

#### a) Municipal Account Offsets

Residential customers are allowed to offset their full municipal account i.e. (electricity, rates, water and solid waste). For more details on SSEG Export payments refer to section 3.3 Residential SSEG Tariffs below.

#### b) Additional Credit Offset (Cash for Power) Requirements

Residential customers currently do not qualify for an additional credit offset. Visit the [Going Solar webpage](#) for updates on if this becomes applicable to residential customers.

### **1.9.2 Commercial and Industrial Requirements**

#### a) Municipal Account Offsets

Commercial and Industrial Customers are allowed to offset their full municipal account.

#### b) Additional Credit Offset (Cash for Power) Requirements

If some credit remains after the municipal account offset, Commercial and Industrial customers (who complied with criteria indicated above)) may obtain an additional credit offset (cash for power initiative). In order to register complete the SSEG Supplier Registration Form at the following [website](#).

## **1.10 Grid Studies**

Grid engineering studies will be done by the City for the proposed SSEG installation, should these be required. The latest fees based on capacity sizes can be found in Miscellaneous Tariffs on the [City's website](#) under reference documents.

## **1.11 Generation Curtailment**

The City is following a considered and calculated approach regarding the introduction of embedded generation in the distribution network. In the event of operating conditions resulting in electricity network parameters not meeting the statutory minimum quality of supply standards, peak generation limits may be imposed on embedded generator installations. It is expected that these limitations would be of a temporary nature, applied only during abnormal system conditions.

## 1.12 Change of Property Ownership

When transfer of ownership of a property takes place that has an authorised SSEG system installed, the new owner will be required to sign a new Supplemental Contract. If the system is not authorised as part of the City's SSEG registration process, the new owner will be responsible for obtaining authorisation or alternatively the SSEG system must be decommissioned as detailed in section 1.13. The CoC which is required to be issued as a condition of transfer of ownership of the property must include a statement regarding the state of connection or disconnection. At the time that the customer ceases to be on the SSEG tariff, any remaining credit balance will be refunded to the customer on written request provided that the customer has no other outstanding municipal debt.

## 1.13 SSEG Decommissioning and Illegal Installations

The City requires notice of any SSEG system which has been decommissioned. An SSEG system which has been decommissioned must be disconnected from the distribution network (at the customer's cost) by the removal of wiring which connects the inverter/s to the network and all the PV panels. Customers who intend on decommissioning their SSEG systems have the following options:

### **a) Customer removes generation source i.e. solar PV panels**

- I. Customer must provide a CoC which indicates that the system has been disconnected and removed.
- II. Compulsory installation of a split prepayment meter (PPM) at the City's cost and the customer to be placed on the appropriate tariff.
- III. The customer may opt for the installation of an advanced metering infrastructure (AMI) meter (at the customer's cost) and customer to be placed on the appropriate tariff.

### **b) Customer keeps generation source i.e. solar PV panels, on the roof**

- I. Customer must provide a CoC which indicates that the system has been disconnected.
- II. Customer relinquishes the option for a PPM by not removing the panels.
- III. Customer is charged for a compulsory AMI meter and placed on the appropriate tariff.

The declaration section of the Decommissioning Report (EG/DECOM) must be completed by a registered person and submitted to the relevant Customer Support Services (CSS) office or via email to [electricitycustomer.support@capetown.gov.za](mailto:electricitycustomer.support@capetown.gov.za).

## 1.14 Amounts Payable

- II. The customer will be responsible for all the costs involved in the supply and installation of meters where required, refer to section 1.7 for details.
- III. The customer will be responsible for any rearrangement of the electrical installation or meter accommodation, including the moving of the metering point to the property boundary, refer to section 1.7 above for details.
- IV. The customer will be responsible for the cost of any grid studies, should these be required.
- V. The customer will be responsible for any changes required to the distribution network upstream of the Point of Connection (POC) as a result of the SSEG installation.
- VI. The customer will be responsible for all the costs associated with any specialist tests that need to be carried out e.g. inverter testing, as well as for obtaining the required certification of the design and the installation as detailed below.

## 1.15 Accessing Historical Consumption and Excess Generation Graphs

Upon successful registration of a user profile on the City's e-Services website and activation of Municipal Account services, customers with AMI metering will be able to access graphs depicting their property's historical electricity consumption and excess generation (details on the e-Services registration process can be found [here](#)).

## 2 Application and Approval Process

### 2.1 Relevant Application Forms for SSEG Authorisation

The following forms need to be completed in full when submitting an SSEG application.

#### a) SSEG Application Form

The customer must complete and submit an [Application for the Connection of Embedded Generation](#) (GEN/EMB form) to the City for approval, (together with all of the requisite supporting documentation). This is required for all types of SSEG, including grid-tied, grid-tied hybrid, grid-tied storage and solar PV geysers systems and includes renewable energy and co-generation.

#### b) Metering or Tariff Change as a result of SSEG Application

Should a metering or tariff change be required as a result of the approved SSEG installation, the customer will be required to complete and submit an [Application for a New or Modified Electricity Supply Service](#).

#### c) Online Application Platform Notice

Take note, the City is developing an SSEG Online Application platform. Details about the system will be made available via the [City's website](#) soon. The City recommends that potential future applicants (such as SSEG installers / property owners) register user accounts on e-Services in preparation.

### 2.2 Important Application Scenarios

In the following scenarios customers are required to complete the process defined below.

#### a) No Existing Electricity Service Connection

Should a customer wish to connect an SSEG system at a location where there is no existing electricity service connection, the customer must complete and submit an [Application for the Connection of Embedded Generation](#), together with an [Application for a New or Modified Electricity Supply Service](#).

#### b) Future Expansion of an Authorised SSEG installation

Authorisation to connect the SSEG to the distribution network is only granted for the declared generation capacity. Customers who wish to increase/decrease their

generation capacity or make any changes to their installation must obtain authorisation from the City before doing so. To request a modification to an existing SSEG application, the customer must complete and submit an [Application for the Connection of Embedded Generation](#), with application type "SYSTEM MODIFICATION OR EXPANSION" selected.

### 2.3 SSEG Application Process Steps

The SSEG application and approval process is now defined. Note the distinction between City actions as defined as "EGD Actions in green" as well as the Customer / Property Owner / Installer Proxy / Applicant actions as defined as "Customer Actions in blue" in Figure 1 below.



Figure 1: SSEG Application and Approval Process



### Step 1: Visit the City's Website

Visit the [City's website](#) and download the latest electronic [application form/s](#). Alternatively, if a physical form is required, this can be collected from the CS offices listed below. Both forms require both basic and technical information of the proposed SSEG installation to ensure that all SSEG connections are done in a safe and legal manner and in compliance with all relevant requirements. For grid-tied systems, the information required includes type of energy conversion, total generating capacity, electrical parameters, expected consumption, network connection point, synchronising method, anti-islanding method and generator control method amongst others.

### Step 2: Complete the latest published [Application for Connection of Embedded Generation \(GEN/EMB\) Form](#) and, if required, the latest published [Application for a New or Modified Electricity Supply Service Form](#)

The City requires that the application form/s be signed by the property owner. If applying on behalf of the property owner an approved letter of proxy must be attached to the application. Details in the [SSEG Application Form](#) that will need particular consideration are highlighted below:

<b>Technical Information</b> Type of energy source/system, total capacity, battery storage, export.
<b>Preliminary Design</b> Circuit diagram showing major system components and POC must be provided.
<b>Earthing Arrangement</b> This must be in accordance to SANS 10142-1. Earthing requirements for common earthing systems are described in NRS 097-2-1. Refer also to NRS 097-2-1: 2023 Ed 3 [publishing imminent] for neutral/earth bonding requirements.
<b>Electrical Parameters of the System</b> Various electrical parameters of the system must be provided. Different sections are applicable for the different system types.
<b>System Protection Detail</b> This includes information about the synchronizing method, anti-islanding, power quality, change-over switch, etc.

### **Peak Power Generation Output**

The expected peak power generation output of the system. Note that this must be in line with the limits described in these Requirements.

### **Step 3: Obtain Permission from other City Departments**

Some SSEG installations may require prior approval from other City departments (Planning and Building Development Management, City Health). Please note that for Solar PV SSEG installations, approval from the Planning and Building Development Management department will only be required if the installation falls outside defined parameters. Applications will only be considered when all relevant approvals are obtained and this must be reflected in the relevant sections of the application forms. The requirements of the other City departments are summarised in [Appendix 2](#).

### **Step 4: Submit Completed Form/s and Supporting Documentation**

Once the relevant application form/s have been completed and approval has been obtained from other City departments (if required), the form/s must be submitted to the relevant CS office for the area in which the project is located. A map of the City's Electricity Distribution License and Area Boundaries can be found [here](#), or under reference documents on the [City's website](#).

The details of the different area offices are provided below:

<b>CUSTOMER SUPPORT SERVICES: AREA NORTH</b>		
Electricity House City Cnr Buitengracht & Hout Street CBD Cape Town	Electricity House City 51 Buitengracht Street CBD Cape Town 8000	Tel: 021 444 1394/6 Email: <a href="mailto:electricityapplications.north@capetown.gov.za">electricityapplications.north@capetown.gov.za</a>
<b>CUSTOMER SUPPORT SERVICES: AREA EAST</b>		
EGD Head Office Bloemhof Complex Bloemhof Street Bellville	Private Bag X44 Bellville 7535	Tel: 021 444 8511/2 Email: <a href="mailto:electricityapplications.east@capetown.gov.za">electricityapplications.east@capetown.gov.za</a>
<b>CUSTOMER SUPPORT SERVICES: AREA SOUTH</b>		
Wynberg Electricity Depot Rosmead Avenue Wynberg	Wynberg Electricity Depot Rosmead Avenue Wynberg 7800	Tel: 021 400 4750/1/2/3 Email: <a href="mailto:electricityapplications.south@capetown.gov.za">electricityapplications.south@capetown.gov.za</a>

**The Service Connection Planning (SCP) branch within the EGD is responsible for the processing of applications.**

### **Step 5: “Permission to Install” Letter Issued**

After due consideration of the application, the applicant will be informed in writing (via email) regarding the outcome of the application. Successful applications will be issued with a “Permission to Install” Letter and only thereafter can system installation commence. Please note that the registration for authorisation process needs to be concluded within three months from the date of this letter. Failure to submit all outstanding information will result in your application being cancelled.

### **Step 6: Installation Commencement Upon Approval**

The successful applicant may now commence with installation and commissioning of the SSEG system. Once the installation is complete, the system is ready for testing and commissioning by the installer. Note that the permanent connection of the SSEG system to the distribution network is only permitted on receipt of written permission from the City i.e. “Permission to Install” Letter. However, the SSEG system may temporarily connect to the distribution network only for the purpose of commissioning. Once the commissioning process is completed, the system must be disconnected until the “Commissioning Approval” Letter is issued by the City. The applicant must pay for changes to metering and relocate the metering position, if required. The Supplemental Contract must be completed for grid-tied SSEG with the assistance of SCP. This contract is a legal requirement that governs the relationship between the City and the customer and is valid for as long as the system is in existence. Should it be found that the SSEG installation is generating without the commissioning approval being in place, a contravention notice will be issued and a service fee will be debited to your account.

### **Step 7: Submission of Commissioning Documentation**

As detailed above, commissioning of the SSEG system must be done by an ECSA registered professional who must complete and sign off the GRID-TIED SSEG INSTALLATION COMMISSIONING REPORT (Appendix 1 of the GEN/EMB Form). In addition to the GRID-TIED SSEG INSTALLATION COMMISSIONING REPORT, the following documentation must also be submitted:

- I. Copy of final circuit diagram
- II. Electrical installation CoC as per SANS 10142-1
- III. Signed Supplemental Contract.

The City reserves the right to inspect the installation if required.

**Step 8: “Metering Quotation” Letter Issued (if applicable)**

As described above, should a metering change be required as a result of the installation, a “Metering Quotation” Letter will be issued by the City.

**Step 9: Customer Pays for Metering Changes (if applicable)**

Payment should be made as per the instructions in the “Metering Quotation” Letter. Once the payment is received and the customer has relocated the metering position (if required), the EGD will install and commission the new meter.

**Step 10: “Commissioning Approval” Letter Issued**

If all of the above steps are concluded to the City’s satisfaction and all of the relevant supporting documents are received, a “Commissioning Approval” Letter will be issued.

**Step 11: Customer Placed on Appropriate Tariff and Generation Commences**

The customer will be placed on the appropriate tariff which will be applied from the date the AMI meter was commissioned or, if no metering change was required, from the date of issue of the “Commissioning Approval” Letter.

**Step 12: Repeat the Process for Modification or Expansion of the SSEG System**

Should the customer wish to modify or expand the SSEG system, a new application must be submitted.

## 3 Residential SSEG

### 3.1 Generation Size Limitations

The generation size limitations for SSEG are provided in the Table 1 below.

1	2	3	4	5
No. of Phases	Service CB [A]*	MEC = 0.25 UIC [kVA]	NPR = UIC [kVA]	MCC @ 0.25 UIC (per phase) [A]
1	40	2.3	9.2	10
1	60	3.45	13.8	15
1	80	4.6	18.4	20
3	40	6.9	27.7	10
3	60	10.4	41.6	15
3	80	13.9	55.4	20
3	100	17.3	69.3	25

Table 1: Maximum individual installation limits in a shared LV (400 V/230 V) feeder as derived from NRS 097-2-3

**1** Check the main circuit breaker on your distribution board to determine whether you have a single - or three-phase connection. A single-phase connection will generally have a single main circuit breaker and a three-phase connection a triple main circuit breaker. If in doubt, consult an electrician.

**2** The individual Maximum Export Capacity (MEC) limit in a shared LV feeder is limited to 25% of the customer's Utility Installed Capacity (UIC).

**3** kVA and kW ratings for Solar PV SSEG are similar and shall be used interchangeably for estimation purposes.

**4** The Nameplate Power Rating (NPR) of the installed power conversion equipment (inverter in this case) is limited to 100% of the customer's UIC.

**5** Maximum battery storage capacity is not defined but Maximum Charging Current (MCC) defines the maximum battery charging current limits according to these values.

Notes:

- i. The generation size limits in Table 1 apply to standard connections on a shared LV network.
- ii. If SSEG generation capacity is 4.6 kVA or less, a single-phase inverter can be installed even if the customer has a three-phase connection at the POC. However, it is the responsibility of the customer to ensure that their load is

balanced across all three phases and the difference in installed capacity between phases may not exceed 4.6 kVA per phase. A qualified electrician, engineer or technologist should be consulted in this regard.

## 3.2 Generation Capacity Categories

The residential generation capacity categories are detailed below:

### 3.2.1 Grid-tied SSEG

- a) Inverter Maximum Export Capacity to the grid is in accordance with Table 1.
- b) Nameplate Power Rating (Maximum Inverter Capacity) is limited to the circuit breaker size of the customer's service connection, as per Table 1.
- c) If a customer Change-over switch for bypass use of the grid during emergency is installed, it must comply with requirements detailed in [Appendix 4](#).

### 3.2.2 Grid-tied Hybrid SSEG

- a) Inverter Maximum Export Capacity to the grid is in accordance with Table 1.
- b) Nameplate Power Rating (Maximum Inverter Capacity) is limited to the circuit breaker size of the customer's service connection, as per Table 1.
- c) Maximum Battery Storage capacity is not defined.
- d) Maximum Battery Charging Current Limit is 25% of the circuit breaker size of the customer's service connection, as per Table 1.
- e) If a customer Change-over switch for bypass use of the grid during emergency is installed, it must comply with requirements detailed in [Appendix 4](#).

### 3.2.3 Grid-tied Battery Only

- a) Nameplate Power Rating (Maximum Inverter Capacity) is limited to the circuit breaker size of the customer's service connection, as per Table 1.
- b) Maximum Battery Storage capacity is not defined.
- c) Maximum (Battery) Charging Current Limit is 25% of the circuit breaker size of the customer's service connection, as per Table 1.
- d) If a customer Change-over switch for bypass use of the grid during emergency is installed, it must comply with requirements detailed in [Appendix 4](#).

Notes:

Grid-tied Battery Only system refers to an inverter and battery system **only** i.e. Solar PV is not included. In order to include solar PV panels to the installation submit a new Grid-tied Hybrid SSEG application.

### 3.2.4 Solar PV Geyser

- a) Solar PV array and maximum power point tracker (MPPT) for modulated DC shall not exceed the geyser heating element capacity.

## 3.3 SSEG Tariffs

SSEG customers who elect to export, will be moved to the SSEG Home User Tariff which works as follows:

- I. A monthly network access and administration charge
- II. A monthly AMI meter administration fee
- III. Block 1 (0 – 600 kWh) and Block 2 (600.1+ kWh) electricity consumption charges for kWh consumed.
- IV. A rate per kWh at which the City will purchase exported excess generation i.e. SSEG Feed-in Tariff.
- V. A rate per kWh at which the City will purchase exported excess generation i.e. SSEG Feed-in Incentive (valid until 31 June 2025).
- VI. Exported excess generation purchased in IV and V will be offset against total monthly municipal account (electricity, rates, water and solid waste) and all accounts linked to the same owner (upon written request).
- VII. Should the City decide to implement cash-for-power payments to residential customers in the future: If some credit remains after the municipal bill offset, the City will pay this to the customer once a year. Payments will only be made on amounts over R1000. Amounts of less than R1000 will be held back until the total exceeds R1000 and will then be paid.

The monthly network access and administration charge, AMI meter administration fee along with the charges for consumption and credits for exported excess generation; will be billed monthly.

### 3.4 Group Developments and Blocks of Flats

SSEG installations in group developments or for blocks of flats need to meet unique requirements and will be assessed on a case by case basis. The proposed installations must be discussed with the EGD before applications are submitted. Please refer to suite of [Embedded Generation schematic drawings](#). Technical requirements are detailed in the [Technical Standard for Interconnection of Embedded Generation](#) (EEB 705) document which can be found on the [City's Website](#) under reference documents.



## 4 Commercial and Industrial SSEG

### 4.1 Generation Size Limitations

All LV commercial and industrial (C&I) customers who wish to install SSEG systems with a generation capacity less than 1 MVA, must comply with the size limitations specified in NRS 097-2-3. For LV C&I shared feeder customers, limits as per Table 1 is applicable up to 100 A three phase only. For customers above 100 A three phase, refer to NRS 097-2-3 for generation size limits.

For LV and MV customers it is likely that specialist engineering studies will be required for C&I SSEG installations, especially if the Nameplate Power Rating is above 350 kVA. The purpose of the study is to determine the impact of the proposed SSEG system on the distribution grid.

### 4.2 SSEG Tariffs

Commercial and Industrial (C&I) SSEG customers will remain on the relevant tariff with the addition of the following components:

- I. A monthly AMI administration fee
- II. A rate per kWh at which the City will purchase exported excess generation. There are three feed-in tariffs available to C&I SSEG customer's viz. SSEG Feed-in Tariff 1, SSEG Feed-in Tariff 2 and SSEG Feed-in TOU.
- III. Exported excess generation purchased in (II) will be offset against full municipal account.
- IV. *For customers having completed vendor registration and other supply chain processes:* If some credit remains after the offset, the City will pay this to the customer on a monthly basis. Payments will only be made on amounts over R5000. Amounts of less than R5000 will be held back until the total exceeds R5000 and will then be paid.

Note Customer to meet the requirements as described in section 1.9 above.

## Appendix 1: Relevant Regulations, Standards and Specifications

The City requires that all SSEG installations are fully compliant with the relevant regulations, standards and specifications in order for the installation to be approved. Below is a (non-exhaustive) list of the most relevant regulations, standards and specifications:

- Electricity Regulation Act 4 of 2006 and Electricity Regulation Amendment Act 28 of 2007
- South African Grid Codes (Distribution, Transmission and Renewable Power Plants)
- Occupational Health and Safety Act 85 of 1993
- City of Cape Town Electricity Supply By-law, 2010
- SANS 10142: All Parts
- SANS 474/NRS 057: Code of practice for electricity metering
- NRS 097 Series
- City of Cape Town Technical Standard for Interconnection of Embedded Generation (EEB 705).
- Guide for Municipalities on Processing Embedded Generator Applications 1 MW and Larger
- Embedded Generation Schematic Drawings

## Appendix 2: Approvals from other City Departments

In the cases below, the Energy Directorate will require **prior** approvals from other City departments.

### **Planning and Building Development Management Department**

- Rooftop Solar PV Installations:
  - No building plans will be required provided that the solar PV panels (in their installed position) do not project more than 1.5 meters (measured perpendicularly) above the roof and/or not more than 600 mm above the highest point of the roof.
  - If the solar PV panels (in their installed position) exceed the above limits, building plans (incl. an engineer's endorsement) will be required. A relaxation in terms of the Zoning Scheme Regulations will also be required.
- Ground-mounted Solar PV Installations:
  - No building plans will be required provided that the solar PV panels (in their installed position) do not project more than 2.1 meters (measured perpendicularly) above the natural / finished ground level.
- Wind Turbine Generators and other:
  - Clearance will be required for other SSEG technologies such as wind turbine generators.

### **City Health Department**

- Air quality and mechanical engineering (noise) units are not required for SSEG installations that do not include generators powered by fossil-fuels i.e. diesel.
- Should a generator which burns fossil-fuels or generates noise be incorporated in the installation, approval by the City Health Department will be required.

## Appendix 3: Inverter Type Testing Requirements and Listing Procedure

### Requirements for Inverter Type Testing

The City of Cape Town maintains a list of NRS 097-2-1 type test approved inverters in an attempt to protect our customers and citizens from purchasing and installing equipment that does not meet the requirements for grid interconnection.

The City's requirements for listing grid-tied inverters (GTIs) and ancillary equipment (e.g. network and system grid protection voltage and frequency relay) are as follows:

- I. An accredited (3<sup>rd</sup> party) body must perform the inverter type test certification in terms of NRS 097-2-1. The accredited body must according to the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006, be SANAS accredited or by a member of the recognition arrangements of the International Laboratory Accreditation Co-operation (ILAC) or the International Accreditation Forum (IAF) in terms of ISO/IEC 17025:2005 for photovoltaic systems. The accreditation body accreditation certification and the equipment testing scope for the specific test location are required.
- II. The accredited body must:
  - a) Issue a Certificate of Conformity for all GTIs and ancillary equipment in terms of the requirements of latest NRS097-2- 1 edition, currently 2017, Edition 2.1.
  - b) Provide summary NRS 097-2-1 Test Report [excluding sensitive information test results] comprising of:
    - Report reference number, test laboratory name, client/applicant's name and reference, test specification and report form, test item description/name/model/types, ratings, lab and testing location, name and signature of test person and approval authority, manufacturer name and address, test report documentation version control;
    - Test item particulars, test case verdicts [N/A, pass and fail], test and issue dates, general remarks;
    - GTIs and ancillary equipment name plate data;
    - General product information, preferably with the inclusion of the GTIs and ancillary equipment electrical block diagram;

- Summary of NRS 097-2-1 indicating all clauses, clause description/requirement/test, result/remark and verdict [N/A, pass or fail];
  - Test overview summary.
- c) Where necessary, interpret the results of other, relevant test reports to allocate a 'pass' test result on NRS 097-2-1 clauses pertaining to, inter alia:
- Electromagnetic compatibility (EMC) for both under and above 150 kHz;
  - IEC/SANS 62109-1 and 2;

Note: Provide the test reports above

### **Listing Procedure and Rules**

The City verifies the Certificate of Conformity and Test Report documentation for tests performed by a 3rd party accredited body, in accordance with the requirements detailed above. In order to get type tested inverters, these documents must be supplied to the City for verification. Inverter compliance verification requests, to get inverters approved and added to the [CCT Approved Inverter List](#) should be emailed to [inverter.approval@capetown.gov.za](mailto:inverter.approval@capetown.gov.za).

Apply due diligence to ensure that all the required documents supplied contain all sections outlined above. The following rules apply to the listing of inverters:

- Listed GTIs and ancillary equipment will be removed from the City's list on the expiry date of the Accredited Body Certificate of Conformity.
- Manufacturer declarations will not be accepted.
- Until a new NRS 097-2-1 Edition 20XX is published, all the current type tested inverters and equipment remain on the City of Cape Town type tested inverters/equipment list and must be re-type tested within two years after the publishing of a new NRS 097-2-1: Edition 20XX.
- In addition to NRS 097-2-1, inverters are required to adhere to IEC/SANS 62109-1 and 2, as well as EMC requirements stated above.
- The inverter list is updated on a monthly basis with changes.

## Appendix 4: External Change-over Switch for Grid-tied Inverter (GTIs) and Solar PV geyser and other appliances with alternative supplies

- I. This includes interrupters, transfer switches, bypass switches, isolation switches and tie switches.
- II. The interlock requirements of SANS 10142-1 Section 7.12.2.5 are applicable.
- III. The change-over switch shall be SANS/IEC 60947-6-1: Low-voltage switchgear and control gear – Part 6-1: Multiple function equipment – Transfer switching equipment, compliant and preferably automatic to meet customer needs.
- IV. The change-over switch shall be installed external to the GTIs.
- V. Solar PV water heating geyser interlocked with the utility grid supply must also comply with the requirements of this appendix.

### Notes:

- i. The EIR CoC with the accompanying test report must provide detail of the suitably interlocked change-over switch.
- ii. For solar PV water heating geyser a Letter of Authority (LoA) from the National Regulator for Compulsory Specifications (NRCS) is required for the change-over switch and controller combination.

## Appendix 5: South African Grid Code Signal and Control Requirements

All SSEG with a capacity of above 100 kVA, require signal and control with the City's distribution network in terms of the Grid Connection Code for Renewable Power Plants and the Battery Energy Storage Facility Grid Connection Code.

For technical requirements, consult [the Energy Directorate Technical Standard for the Interconnection of Embedded Generation: EEB 705](#), also available on the [City's website](#) under reference documents, for technical requirements.