

## DRAKENSTEIN MUNISIPALITEIT

### BELEID RAKENDE KLEINSKAALSE INGEBOUDE HERNUBARE ENERGIE OPWEKKING

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Drakenstein Munisipaliteit het 'n beleid saamgestel om kleinskaalse ingeboude hernubare energie opwekking aansoeke te akkommodeer vir verbruikers wie belangstel in die opwekking van hul eie hernubare energie. Geïnterreseerde en geïmpakteerde partye word dus hiermee uitgenooi vir deelname aan die **30 dae** kommentaar tydperk.

Die konsep beleid is beskikbaar by die kantore van die Senior Bestuurder: Elektro Tegnieke Dienste, Elektriese Dienste, Jan van Riebeeckweg, Paarl asook al die munisipale kantore van Drakenstein, vanaf 08:00 tot 16:45 (Maandag tot Donderdag) en 08:00 tot 15:30 (Vrydag). Die konsep beleid is ook ter insae op die munisipale webtuiste, [www.drakenstein.gov.za](http://www.drakenstein.gov.za).

Kommentaar kan skriftelik gerig word aan Die Stadsbestuurder, Drakenstein Munisipaliteit, Posbus 1, Paarl, 7622 of per epos, [customercare@drakenstein.gov.za](mailto:customercare@drakenstein.gov.za) teen nie later nie as **Maandag, 09 Desember 2019**. Vir verdere inligting, kontak Telnr: (021) 807 4663.

**07 November 2019**

**DR J H LEIBBRANDT**  
**STADSBESTUURDER**  
**Webtuiste – 07/11/2019**

## **DRAKENSTEIN MUNICIPALITY**

### **POLICY REGARDING SMALL SCALE EMBEDDED RENEWABLE ENERGY GENERATION**

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Drakenstein Municipality has compiled a draft policy to accommodate small scale embedded generation (SSEG) applications from consumers who want to participate in generating their own renewable energy. Interested and affected parties are herewith invited to participate in the **30 day** commenting period.

The draft policy is available at the offices of the Senior Manager: Electro Technical Services, Electrical Services, Jan van Riebeeck Drive, Paarl as well as all the municipal venues of Drakenstein, from 08:00 - 16:45 (Monday to Thursday) and 08:00 - 15:30 (Friday). The draft policy can also be viewed on the municipal website, [www.drakenstein.gov.za](http://www.drakenstein.gov.za).

Comments can be submitted in writing to the City Manager, Drakenstein Municipality, P O Box 1, Paarl, 7622 or email, [customercare@drakenstein.gov.za](mailto:customercare@drakenstein.gov.za) by no later than **Monday, 09 December 2019**. For further information contact Tel: 021 807 4663.

**07 November 2019**

**DR J H LEIBBRANDT**  
**CITY MANAGER**  
**Paarl Post – 07/11/2019**



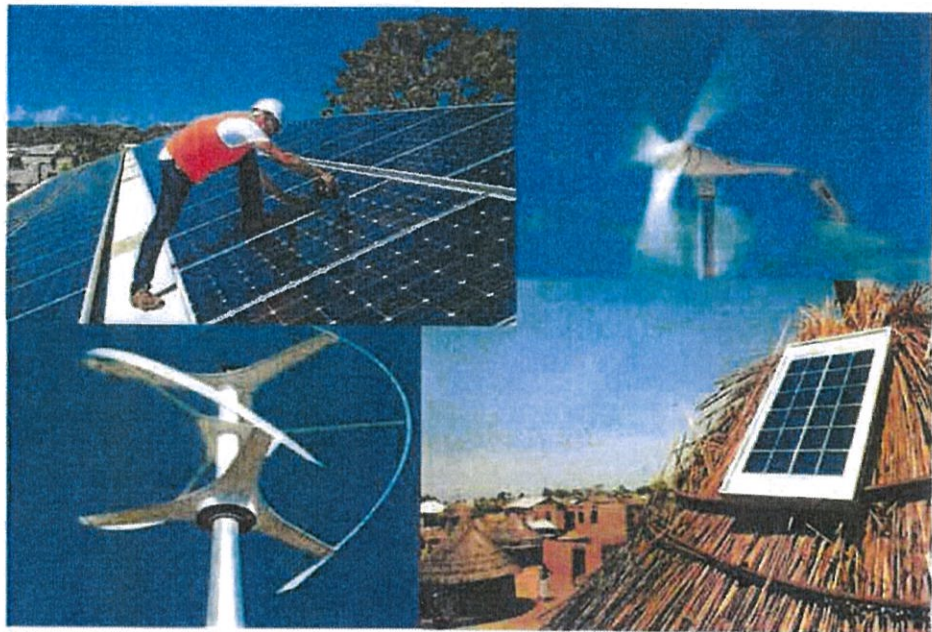
**DRAKENSTEIN**

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**DRAKENSTEIN MUNICIPALITY**

## **POLICY FOR EMBEDDED GENERATION**



**OPERATION PROCESS FOR BECOMING AN EMBEDDED GENERATOR  
ON THE  
DRAKENSTEIN ELECTRICAL NETWORK**

**(REV 0B)**

**JUNE 2019**

**Drakenstein Municipality**

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#### **Disclaimer of Liability**

Anyone using these Guidelines for Small Scale Embedded Generation (SSEG), in part or in full, does so on the basis that they indemnify and hold harmless the authors and their successors or assigns in respect of any claim, action, liability, loss, damage or lawsuit arising from their use of these Guidelines.

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## 1 FOREWORD & ACKNOWLEDGEMENTS

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### 1.1 Foreword

The purpose of this document is to give guidance regarding the Drakenstein Municipality's requirements and application process for connecting all forms of Small-Scale Embedded Generation (SSEG), such as photovoltaic solar systems, wind turbines or biomass reactors to the Municipality's electricity network. This includes both renewable energy and co-generation applications.

The approval process for an SSEG installation in the Municipality varies depending on the size of the system and consumer category. This guideline applies to systems with a generation capacity smaller than 1 MVA (1000 kVA), and all SSEG applicants up to this limit are required to comply with the conditions and process described herein.

In addition, for systems above 17.3 kVA<sub>peak</sub> an initial consultation with the Municipality is mandatory to determine the full set of requirements before proceeding with the impletion of the specific project.

### 1.2 Acknowledgements

This guideline is based on a document known as **"GUIDELINES FOR EMBEDDED GENERATION - Application process to become an embedded generator in the City of Cape Town"**

**(23 Jun 2015)**, which was developed as part of a British High Commission-funded project run by Sustainable Energy Africa (Non-profit Organisation) to facilitate the adoption of small-scale embedded solar PV generation in South Africa.

The abovementioned document was used as basis and modified to suite the specific requirements for the Drakenstein Municipality with regards to their electrical distribution network and tariff structures.

## 2 DEFINITIONS

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The following provides a list of definitions for specific terms commonly used in this document:

<b>Alternating Current:</b>	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 uses of electricity require alternating current.
<b>Anti-Islanding:</b>	The ability of an SSEG installation to instantly and automatically disconnect the generator from the local utility grid whenever there is a power outage in the utility grid, thus preventing the export of electricity to the utility grid from the SSEG. This is done primarily to protect utility workers who may be working on the utility grid and who may be unaware that the grid is still being energized by the SSEG.
<b>Bi-directional meter:</b>	A meter that separately measures electricity flow in both directions (import and export)
<b>Co-generation:</b>	The generation of electricity using waste heat.
<b>Consumer:</b>	In the context of this document, consumers who also generate will be referred to as "consumers", although in effect they are "consumer/generators".
<b>Dedicated LV Feeder:</b>	Section of the utility grid that exclusively supplies a single consumer.
<b>Direct Current:</b>	The flow of electrical energy in one constant direction. Direct current is typically converted to alternating current for practical purposes as most modern uses of electricity require alternating current.
<b>Distribution Grid Code:</b>	A code of practice that sets minimum technical requirements applicable to all participants operating or connected to the Distribution System as approved by NERSA.
<b>Export tariff:</b>	A payment for every kilowatt-hour (kWh) of surplus electricity a customer system exports to the electricity grid.
<b>Generating Capacity:</b>	The maximum amount of electricity, measured in kilovolt-amperes (kVA), which can flow out of the generation equipment into the consumer's alternating current wiring

	system. This is therefore the maximum alternating current power flow which can be generated.
<b>Grid-tied:</b>	An SSEG that is connected to the utility electricity grid either directly or through a consumer's internal wiring is said to be "grid-tied". The export of energy onto the utility grid is possible when generation exceeds consumption at any point in time. Such consumers would rely on the utility grid to supply them with electricity when their instantaneous generation is insufficient to supply their instantaneous consumption.
<b>Inverter:</b>	A power device that converts direct current to alternating current at a voltage and frequency which enables the generator to be connected to the utility grid.
<b>Island</b>	State in which a portion of the utility's or customer's network, containing load and generation, continues to operate isolated from the rest of the grid; the generation and loads may be any combination of customer-owned and utility-owned.
<b>Isolated:</b>	A section of an electrical network which is disconnected from all other possible sources of electrical potential is said to be isolated.
<b>Load Profile:</b>	The variation of the consumers rate of electricity consumption (or demand) over time.
<b>Loss-of-grid</b>	Condition in which supply from the utility network is interrupted for whatever reason.
<b>Low-voltage:</b>	Voltage levels up to and including 1 kV.
<b>Medium-voltage:</b>	Voltage levels greater than 1 kV up to and including 33 kV.
<b>Net Consumer:</b>	A net consumer is someone who purchases (imports) more kWh of electricity than they export (sell) over any 12 month period.
<b>Net Generator:</b>	A net generator is someone who exports (sells) more kWh of electricity than they purchase (import) over any 12 month period.
<b>Net-metering:</b>	Net-metering is a service to an electric consumer under which electric energy generated by that electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities may be used to

	offset electric energy provided by the electric utility to the electric consumer during the applicable billing period.
<b>Network Charges:</b>	The network charge is a tariff charge payable per premise every month. The network charge recovers network costs (including capital, operations, maintenance and refurbishment) associated with the provision of the network capacity required and reserved by the customer. The network charge in the retail tariff or in the Distribution use of system charges may or may not be the same in structure and value.
<b>Parallel Operation</b>	Operation of the embedded generator which is synchronized to the grid and operates in parallel to the network.
<b>Point of Common Coupling:</b>	The nearest point on the electrical network where more than one customer is connected.
<b>Point of Connection:</b>	An electrical node on a distribution system where the customer's electrical assets are physically connected to the utility's grid (In this case the City of Cape Town's grid)
<b>Pr Eng or Pr Tech Eng:</b>	This refers to a professional engineer or professional technologist who is registered with the Engineering Council of South Africa (ECSA).
<b>Rated power (of the RPP)</b>	Highest active power measured at the POC, which the RPP is designed to continuously supply.
<b>Reverse Power Flow:</b>	The flow of energy from the consumer electricity installation onto the utility grid (i.e. export) as a result of the instantaneous generation exceeding the instantaneous consumption at the generation site in question.
<b>Reverse Power Blocking:</b>	A device which prevents power flowing from an embedded generator back onto the utility grid.
<b>Shared LV Feeder:</b>	A section of the utility low voltage grid that supplies more than one consumer on the same network.
<b>Small-scale Embedded Generator:</b>	A small-scale embedded generator for the purposes of these guidelines is an embedded generator with a generation capacity of less than 1000 kVA (1MVA).

<b>Stand-alone Generator:</b>	A generator that is not in any way connected to the utility grid. Export of energy onto the utility grid by the generator is therefore not possible.
<b>Tariff:</b>	A tariff is a combination of charging parameters applied to recover measured quantities such as consumption and capacity costs, as well as unmeasured quantities such as service costs
<b>Time of Use:</b>	The time of day, or season during which electricity is used.
<b>Utility:</b>	The electricity distribution service provider responsible for the electricity grid infrastructure to which the consumer is connected.
<b>Utility Network (or Grid):</b>	The interconnected network of wires, transformers and other equipment, covering all voltage ranges, and belonging to the Drakenstein Municipality which supply consumers in the Drakenstein Municipal distribution area with electricity.
<b>Wheeling:</b>	The deemed transportation of electricity, over a utility's electrical network from an SSEG to a third party electricity consumer.

### 3 ABBREVIATIONS

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The following provides a list of abbreviations commonly used in this document:

ADMD	After Diversity Maximum Demand
AC	Alternating Current
COC	Certificate of Compliance
DC	Direct Current
DB	Distribution Board
DG	Distributed Generation
DoE	Department of Energy
DSD	Distribution System Development (a section within the Electricity Services dept)
ECSA	Engineering Council of South Africa
ED	Electrical Department
EG	Embedded Generation
EIA	Environmental Impact Assessment
EG	Embedded Generation
ESD	Electricity Services Department
FIT	Feed-In Tariff
IPP	Independent Power Producer
kVA	kilo-Volt Ampere (unit of electrical power, often similar in magnitude to kW)
kW	kilo-Watt (unit of electrical power)
kWp	kilo-Watt peak (the rated peak output of solar PV panels)
LV	Low voltage
MV	Medium voltage
MVA	Mega-Volt Amperes (1000 kVA)
NERSA	National Energy Regulator of South Africa
NMD	Notified Maximum Demand
PCC	Point of common coupling
PPA	Power Purchase Agreement
PoC	Point of Connection
PV	Photovoltaic
RPP	Renewable Power Plant
SSEG	Small Scale Embedded Generation/Generator
THD	Total Harmonic Distortion
TSD	Technical Services Department

## 4 INTRODUCTION

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Until recently the transition to renewable energy was viewed as an economic cost. In the last few years, however, it has been increasingly seen as an opportunity to foster a more secure, labour intensive and sustainable economy and society.

The rationale for using renewable energy has generally been dominated by the argument that "it's the right thing to do" because it helps to reduce greenhouse gas emissions and lower the demand for the use of fossil fuels. In recent years the situation has changed. Heightened environmental awareness, dramatic increases in the price of electricity, rapidly decreasing costs of photovoltaic (PV) panels, and the risk of national power blackouts have all resulted in electricity distributors around the country being inundated with requests to allow electricity consumers to connect PV and other SSEGs to the electricity grid.

Currently alternative energy is receiving considerable attention in South Africa due its potential to replace polluting forms of energy. Until now this attention has primarily driven installations of utility scale renewable energy plants, such as large wind farms, and solar photovoltaic farms. There is, however, a large benefit to be realized in using alternative energy in a distributed fashion, for example, incorporated into buildings or small scale free-field installations.

Such SSEGs would be connected to the wiring on the consumer's premises which is in turn connected to, and supplied by, the Municipality's electricity network – thus these generators are considered to be 'embedded' in the local electricity grid. One of the major advantages of such a grid connected system is eliminating the need for backup batteries which stand-alone (off-grid) renewable energy generators usually require.

The parallel connection of any generator to the electrical grid, however powered, has numerous implications for the local electricity utility. The most pressing are the safety of the utility staff, the public and the user of the generator. Further implications include the impact of the physical presence of the generation on neighbours (e.g. visual, noise), the impact on the quality of the local electrical supply, and metering and billing issues. There is therefore a strong need for such practice to be regulated for the general benefit and protection of citizens and manageability of the distribution network.

Consequently the Municipality's Electricity Supply By-law requires that anyone wanting to connect a generator to the Municipality's electricity grid must obtain consent from the Senior manager of

the Electro-technical Services Department. This document outlines the Municipality's requirements in this regard and lays out the associated application processes.

Although the electricity distribution industry is highly regulated, SSEG's have not yet been adequately covered in national policy or legislation. In this void, the Municipality has developed policies and practices which it believes are consistent with broader national policy. In particular, the Municipality does not believe it is allowed to purchase electricity at a greater cost than it would have paid Eskom for the generated electricity.

The Municipality also does not believe consumers are permitted by national legislation to sell electricity to the Municipality in excess of what they purchase from the Municipality over any consecutive 3-month period.

Consumers wishing to install an SSEG and export power back into the utility grid would therefore be required to move onto the SSEG tariff structure, which will include a network charge in order to cover the operating costs of the utility network.

## 5 PURPOSE OF THIS DOCUMENT

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### 5.1 Aim

The parallel connection of any generator to the municipal electrical grid, however powered, has numerous implications for the Drakenstein Municipality. It shall therefore be regulated and managed.

The aim of these guidelines are to:

- ❖ Ensure the safety of the municipal staff, the public and the user of the SSEG installation.
- ❖ Mitigate the impact of the physical presence of the SSEG installation on neighbours (e.g. visual, noise, etc.).
- ❖ Mitigate the negative impact on the quality of the municipal electricity supply, metering and billing process.
- ❖ Mitigate the impact on cross-subsidization of indigent customers and other municipal services.
- ❖ Promote growth in the SSEG industry by creating a conducive environment for growth.

### 5.2 Scope

This document covers the following aspects:

- ❖ Connection of SSEG to the Drakenstein Municipal electrical grid only.
- ❖ Installation of SSEG systems smaller than 1 MW peak.
- ❖ Grid-tied and Off-grid SSEG installations.
- ❖ Installations for "own-consumption" only.

This document does not covers the following aspects:

- ❖ Power wheeling regulations.
- ❖ Connection of SSEG to the Eskom electrical grid.
- ❖ Inverter testing regulations and procedures.

### 5.3 Audience

This Guideline aims to assist consumers who wish to connect an SSEG, with generation capacity up to 1 MVA (1000 kVA), to the Drakenstein Municipality's electricity grid. It is intended to provide guidance to the following role players:

- ❖ SSEG project developers
- ❖ Commercial and Industrial building owners
- ❖ Residential buildings owners
- ❖ SSEG installers
- ❖ Energy consultants commissioned to design SSEG systems
- ❖ Municipal officials involved in SSEG generation
- ❖ Professional Engineers, Technologists and Professional Certified Engineers involved in SSEG commissioning

It is essential that all customers wishing to install an SSEG, regardless of generation capacity, complete the relevant sections of the application process in full, and that written approval is received from the Drakenstein Municipality prior to commencement of system procurement and installation.

The Municipality needs to ensure that, amongst other considerations, the SSEG installation can be accommodated on the electrical network and that the total SSEG generation capacity of the network has not been exceeded. Equipment should therefore not be purchased prior to obtaining written approval from the Drakenstein Municipality as approval is not guaranteed and the Municipality will not be held liable for equipment expenses where approval is denied.

For commercial systems, in particular, an initial consultation with the Municipality's Electro-Technical Department to determine the full set of requirements is highly recommended prior to submission of the application form.

This document does not apply to those who wish to install a system with generation capacity of greater than 1 MVA (1000 kVA). For such systems a meeting should be arranged with the Senior manager of the Electro-technical Services Department in order to establish the necessary requirements and application process. Anyone wanting to connect 1 MVA or greater will not be able to connect under the conditions of these guidelines. In addition a generating licence or exemption letter from NERSA will be required before connection is considered.

## 6 LEGISLATION & CURTAILMENT

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### 6.1 Compliance with Municipal By-Laws

Paragraph 34 of Drakenstein Municipality's Electricity Supply By-Law 2010 states:

- 34 (1) 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 approval of the Municipality. Application for such approval shall be made in writing and shall include a full specification of the equipment and a wiring diagram. The electricity generation equipment shall be so designed and installed that it is impossible for the Municipality's supply mains to be energized by means of a back-feed from such equipment. The consumer shall be responsible for providing and installing all such protection equipment. In the event of a general power failure on the Municipality's network, protection equipment shall be installed by the consumer, subject to the Municipality's approval, so as to ensure that the consumer's installation is isolated from the Municipality's network until normal operating conditions are restored. The cost of any specialized metering equipment will be for the consumer's account.*
- 34 (2) Where, by special agreement with the Municipality, the consumer's electricity generation equipment is permitted to be electrically coupled to, and run in parallel with the Municipality's supply mains, the consumer shall be responsible for providing, installing and maintaining all the necessary synchronizing and protective equipment required for such safe, parallel operation, to the satisfaction of the Municipality.*
- 34(3) Under normal operating conditions, any export of surplus energy from the consumer to the Municipality's network shall be subject to special agreement with the Municipality.*

This entails that failure to obtain this consent for the application of SSEG or co-generation constitutes an offence which could lead to a fine and/or imprisonment. Furthermore, the installation may also be in contravention of the Occupational Health and Safety Act, for which punitive sanctions also apply.

Consumers found to have illegally connected SSEG to the grid (either before or after their electricity meter) will be instructed to have the installation disconnected from the grid. A Certificate of Compliance (COC) issued by an authorised electrical contractor will be required as proof of such disconnection.

Should the consumer fail to have the SSEG disconnected from the grid, the Technical Services Department will disconnect the electricity supply to the property (as provisioned for in the Electricity Supply By-Law).

Consumers wishing to connect SSEG legally to the Municipality's grid will be required to follow the normal application procedure as detailed in these guidelines. NO exemption from ANY of the Municipality's requirements will be granted for "retrospective applications".

In addition, customers wishing to connect SSEG legally to the municipal electrical grid shall be required to ensure that illegal wiring forming part of the electrical installation is disconnected and that the installation is safe.

## **6.2 Generation Curtailment**

The Drakenstein Municipality is following a considered, calculated approach regarding the introduction of embedded generation onto its electricity distribution network. Notwithstanding this it may become necessary – in the event of operating conditions resulting in electricity network parameters not meeting statutory minimum quality-of-supply standards – to impose peak generation limits on embedded generator installations. It is expected that these limitations would be of a temporary nature, applied only during abnormal system conditions or low load periods.

## **6.3 Right to Adapt Rules & Regulations**

The Drakenstein Municipality reserves the right to implement changes to this guideline in the event of provincial or national changes in the energy landscape, relevant rules, regulations, policies, laws and standards.

## **6.4 Right to Deny Access**

It is essential that all customers wishing to install a SSEG system, regardless of generation capacity, complete the relevant sections of the application process in full and that written approval is received from the Drakenstein Municipality before the system installation commences. The Municipality needs to ensure that, amongst other considerations, the SSEG installation can be accommodated on the municipal electrical grid and that the total SSEG capacity of the municipal electrical grid has not been exceeded.

## **7 GENERAL GUIDELINES: SMALL-SCALE EMBEDDED GENERATION**

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### **7.1 General**

Small-scale embedded generation (SSEG) is defined by NRS 097-2 as *"one or more energy generation sources rated at up to 100 kW which includes the energy conversion device/s, the static power converter/s (if applicable) and the control and protection gear within a customer's network that operates in synchronism with the utility's low voltage supply"*.

For the purpose of this document, SSEG will refer to power generation systems rated up to 1 MVA, such as PV systems located on residential, commercial or industrial sites where electricity is also consumed.

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 be exported back into the utility grid.

An SSEG therefore generates electricity that is "embedded" in the local electricity distribution network in that it is connected to the utility network on the consumer's side of the utility's electricity meter.

### **7.2 Generating Licence**

The Drakenstein Municipality will not require SSEG's smaller than 1 MVA to obtain a generating license provided that, they do not feed more electricity into the Municipality's grid than they purchase from the Municipality.

The Municipality will register and authorise grid connection of SSEG's up to 1 MVA without evidence of a generation license. Anyone wanting to connect 1 MVA or greater must produce a generating license or exemption letter from NERSA with their application, failing which the application will not be considered.

Consumers authorized by the Municipality may still be required by NERSA to obtain a generating licence. Consumers are responsible directly to NERSA for obtaining a generating license and the Municipality accepts no liability should NERSA refuse a generating license and the Municipality subsequently withdraws registration and authorisation. The Municipality is obliged to report to

NERSA on a regular basis regarding all grid connected generation. Should NERSA refuse a generating licence the generator must be disconnected from the grid unless the consumer has received an exemption from NERSA in this regard. Any queries requiring clarity in this area must be discussed with NERSA directly.

### **7.3 Professional Sign Off**

Until such time as SANS 10142 - Part 3 (The Wiring of Premises – Embedded Generators) and Part 4 (The Wiring of Premises – Direct Current and Photovoltaic) are published and until such time as an SABS mark is issued for inverters, all embedded generation systems installed on the Drakenstein grid must be signed off during the commissioning stage of the project by an Engineering Council of South Africa (ECSA) registered professional engineer or technologist in order to ensure compliance to the Drakenstein Municipality's requirements.

### **7.4 Testing of Inverters**

Until such time as an SABS mark is issued for inverters, the Municipality will require proof in the form of test certificates, of type tests having been successfully carried out by a third party test facility certifying compliance of the inverters with the requirements of the Municipality and NRS097-2-2. A list of inverters which have been shown to comply with the Municipality's requirements is available on the Drakenstein Municipality's website.

### **7.5 System De-Commissioning**

The Drakenstein Municipality requires notification of any SSEG system which has been decommissioned and therefore disconnected from their utility grid. An SSEG system which has been decommissioned must be disconnected from the grid at the consumer's cost by the removal of wiring / cabling which connects the SSEG system with the utility's grid.

The Decommissioning Report (Form DM/DCOM) must be completed and submitted to the Electro-Technical Services Department at Jan Van Riebeeck Drive, Drakenstein. This form is available from the Drakenstein Municipality's website.

## 7.6 Transfer/Change of Ownership

When transfer of ownership of a property takes place which has SSEG installed, the new owner will be required to sign a new Supplemental Contract or alternatively the SSEG system must be decommissioned as detailed in Section 7.6 above.

The Certificate of Compliance 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 Consumer ceases to be on the SSEG tariff, any remaining credit are zero out.

## 7.7 Off-Grid Systems

Generators that will never be connected to the Drakenstein Municipality's electricity grid in any way, and are thus 'off-grid' generators, do not need to comply with the standards or requirements as presented in this policy document. However, approvals from other Municipal departments are still necessary, such as from the Planning and Building Development Management Department. It is the responsibility of the prospective stand-alone generator installer or owner to directly obtain these necessary approvals. It is important to note customers with fully "off-grid" systems will still be liable to pay an *Availability Charge (similar to empty stands)*, which will be added to the municipal account on a monthly basis. (Refer to Annual Tariff List for detail).

If the SSEG system shall never be grid-tied via an electrical installation connected to the Drakenstein Municipality's electrical grid, a registered person in terms of the Electrical Installation Regulations (2009) shall install the SSEG system and issue a Certificate of Compliance to the owner of the installation in terms of SANS 10142-1, which confirms that the SSEG system is not grid-tied to the municipality's electrical infrastructure and that it only supplies an off-grid electrical installation.

Customers need to understand that should SSEG systems that were initially designed as 'off-grid' systems be required to in future be connected to the Drakenstein Municipality's electrical grid, such systems will be required to fully comply with the standards and regulations prescribed in this guideline. No sub-standard or non-compliant SSEG systems will be allowed to be connected to the Drakenstein Municipality's electrical network.

## 7.8 Anti-Islanding Installations

The utility's distribution network can become de-energized for several reasons - for example, a substation breaker that opens due to a fault condition or the distribution network might be switched off for maintenance purposes. Should the load and (embedded) generation within an isolated network be closely matched, then the voltage and frequency limits may not be triggered. If the embedded generator control system only made use of passive voltage and frequency out-of-bounds detection, this would result in an unintentional island that could continue beyond the allowed time limits. NRS 097-2 requires that an islanding condition shall cause the embedded generator to cease to energize the utility network within 2 seconds, irrespective of connected loads or other embedded generators. The embedded generator shall comply with the requirements of IEC 62116 (ed. 1). The embedded generator shall physically disconnect from the utility network in accordance with the requirements in NRS 097-2, Clause 4.2.2.2.

Grid-tied inverters are generally not designed to operate in "islanded mode" where the generator supplies power to a portion of the consumer's network during a general grid power outage. Should the inverter have this facility, it must be effectively and instantaneously isolated from the Municipality's grid during operation as is legally required of any back-up or embedded generation system. (Refer to NRS 097-2-1, Clause 4.2.2 "Safety disconnect from utility network"). The generator may not be reconnected to the Municipality's grid unless properly synchronised with the grid. (Refer to NRS 097-2-1, Clause 4.1.8 "Synchronization"). After a voltage or frequency out-of-range condition that has caused the embedded generator to cease energizing the utility network, the generator shall not re-energize the utility network for 60 seconds after the utility service voltage and frequency have recovered to within the specified ranges. (Refer to NRS 097-2-1, Clause 4.2.3 "Response to utility recovery").

If the embedded generator is to be configured as a standby supply, after islanding from the utility supply, the generator will have to be connected to the existing internal wiring of the property, but completely isolated from the utility's grid in order to ensure that the no form of back-energization of the utility's network can occur. Approval by the Municipality's Electricity Services Department is not required for these instances. A registered person in terms of the Electrical Installation Regulations (2009) must install the generator and issue a certificate of compliance to the owner if the generator is to be connected to the existing internal wiring of the property. Requirements of SANS 10142-1 -- Clause 7.12 "Alternative Supplies (including low-voltage generating sets, photovoltaic installations, etc.)" and Annexure S, apply.

## 7.9 Modification of Metering Installation

All customers wishing to participate in the SSEG tariff shall be required to have a Drakenstein Municipality approved bi-directional "smart" meter installed, capable of distinguishing between energy being "imported" from the municipal grid or "exported" from the SSEG into the grid.

The customers will be required to modify their electrical installation in such a way that the required metering is accommodated in a meter kiosk in the road reserve, which will ensure unhindered access to the meter reading and maintenance personnel. This does not apply to instances where an acceptable meter kiosk or room already exists on the street-front property boundary.

For instances where no meter kiosk exists or where there is insufficient room in an existing kiosk, a new meter kiosk shall be installed in the road reserve at the Customer's expense. Such a meter kiosk shall ensure access from the street side and be locked with a standard Drakenstein Municipal lock (to be provided by the TSD).

Refund of Pre-payment Meter (PPM) units when a customer converts to the SSEG tariff and has a bi-directional meter installed:

1. PPM vending units already loaded on the pre-payment meter:
  - a. No refund option available.
  - b. The customer may delay the installation of the bi-directional meter.
  - c. The customer may elect to forfeit the credits on the PPM.
2. PPM vending units not yet loaded on the pre-payment meter:
  - a. The Drakenstein Municipality does not refund. It zeros out credit over a period of a year.

## 7.10 Who Pays for What?

1. The customer is responsible for all the costs involved in the supply and installation of bidirectional meters as required by the SSEG tariff structure.
2. The cost of providing a meter kiosk in the road reserve will be borne by the Customer (if required).
3. The customer will be responsible for the cost of any specialist grid studies (although such studies are unlikely in the case of SSEG installations).

4. The customer will be responsible for any changes required to the utility network upstream of the connection point as a result of the SSEG installation (although the need for such changes is unlikely).
5. The customer will be responsible for all the costs associated with specialist tests that need to be carried out, e.g. inverter testing, as well as for obtaining the required certification of the design and installation.

## 8 SYSTEMS NOT PERMITTED

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### 8.1 Net Generators

SSEGs can either be "Net Consumers" or "Net Generators". "Net Consumers" on average (over a three month period) purchase more electricity from the utility than they feed back into the utility grid, whilst "Net Generators" on average (over a three month period) purchase less electricity from the utility than they feed back into the utility grid.

As mentioned in the introduction, the Drakenstein Municipality does not have a legal mandate to purchase electricity, in excess of what it sells to the consumer in question. For this reason SSEGs which are **Net Generators will not be permitted** by the Drakenstein Municipality, and these guidelines therefore apply only to Net Consumer type customers.

For instances where a customer's SSEG has generated more energy than what has been consumed by the customer on the specific premises, the accrued credits on the bidirectional energy meter will be reset to a zero (0) value at the beginning of the next period without any form of compensation or credits from the Drakenstein Municipality. This means that all surplus energy generated by an SSEG and not locally consumed in total by the same customer in any 3-month period will be considered "wasted" and never to be recovered or compensated for.

### 8.2 Power Wheeling

All electrical energy produced by the SSEG must be utilised on the property on which the generator is located, or fed into the utility network to be credited for by the Municipality. The following are not permissible:

- a. Installation on a different property to where the power is used (e.g. installing solar PV panels on a neighbour's house roof).
- b. Supplying power from an SSEG on one premises to another premises (e.g. selling power to neighbours or to another premises elsewhere in the town).

## 9 NORMATIVE REFERENCES

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The Drakenstein Municipality requires that SSEG installations comply with the necessary standards and regulations in order for the system to be approved and put into commission. This section provides an overview of these legislative requirements as well as a list of the most relevant standards and regulations that the system will need to comply with. A detailed list of national and international standards pertaining to the sub-components of the SSEG systems has been included in Annexure A of this document.

### 9.1 Statutory References

- a. The requirements of the Occupational Health and Safety Act, Act 85 of 1993 (OHS Act) and all subsequent amendments and regulations shall be observed and adhered to except where exemptions has been obtained from the Chief Factories Inspector.
- b. The Electricity Act, No. 40 of 1958.
- c. Electricity Regulation Act, Act 4 of 2006 and Electricity Regulation Amendment Act, 28 of 2007 as amended.
- d. The Code of Practice for the Wiring of Premises SANS 10142-1, with the latest amendments, issued by the South African Bureau of Standards..
- e. NRS 048: Electricity Supply– Quality of Supply
- f. NRS 097-1: Code of Practice for the interconnection of embedded generation to electricity distribution networks: Part 1 MV and HV.
- g. NRS 097-2: Grid Interconnection of embedded generation: Part 2 Small scale embedded generation.
- h. South African Renewable Power Plants Grid Code (SARPPGC)
- i. The Regulations of the Local Fire Department.
- j. The Regulations and Bylaws of the Drakenstein Municipality.

## 9.2 Standards of Importance

Of the compliance standards and regulations stated above, two of these standards are the most important for embedded generation, namely:

- a. NRS 097-2: Grid interconnection of embedded generation: Part 2 and Part 3
- b. South African Renewable Power Plants Grid Code (SARPPGC)

These two set the majority of regulatory requirements in order for compliance to be granted by the Drakenstein Municipality for the installation and operation of an SSEG and therefore should be consulted with care. This section will provide an overview of key aspects of both documents. These overviews should be seen only as summaries, and the standards themselves will need to be referred to for a complete picture. Applicants will require assistance from their installer and professional engineer/technologist to ensure full compliance.

### 9.2.1 NRS 097-2-1 (Part 2: Small Scale Embedded Generation, Section 1)

This document serves as the standard for the interconnection of SSEG's to the utility network and applies to embedded generators smaller than 1000 kVA connected to LV networks of type single, dual or three-phase.

### 9.2.2 NRS 097-2-3 (Part 2: Small Scale Embedded Generation, Section 3)

This document provides simplified utility connection criteria for low-voltage connected generators.

### 9.2.3 South African Renewable Power Plants Grid Code (SARPPGC)

This document sets out the technical and design grid connection requirements for renewable power plants (RPP) to connect to the transmission or distribution network in South Africa. This guideline is of concern to embedded generators of Category A that are connected to a low-voltage (LV) network.

#### Category A: 0 – 1 MVA (Only LV connected RPPs)

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

#### Category A1: 0 - 13.8 kVA

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

Category A2: 13.8 kVA – 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.*

Category A3: 100 kVA – 1 MVA

*This sub-category includes RPPs of Category A with rated power in the range 100 kVA but less than 1 MVA. This category also includes RPPs of Category A1 and A2 with a rated power less than 100 kVA that are directly connected to a MV-LV transformer.*

**Note: RPPs with a rated power greater than 4.6 kVA must be balanced three-phase.**

## **10 OTHER MUNICIPAL DEPARTMENT APPROVALS**

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### **10.1 Planning and Building Development Management**

#### **10.1.1 Roof top installations**

No building plans are required to be submitted provided the panel(s) in its installed position does not project more than 1.5m, measured perpendicularly, above the roof and/or not more than 600mm above the highest point of the roof.

Full building plans, including an engineer's endorsement, are required if the panel(s) in its installed position;

- a. Project more than 1.5 metres in its installed position measured perpendicularly, above the roof and/or;
- b. Projects more than 600mm above the highest point of the roof.

A relaxation in terms of the Zoning Scheme Regulations is also required under either one or both of the above circumstances.

#### **10.1.2 Installations on the Ground**

No building plans are required to be submitted provided the panel(s) in its installed position does not project more than 2.1 metres above the natural/finished ground level.

Full building plans are required where any part of the installation projects more than 2.1 metres above the ground level.

#### **10.1.3 Other Installations**

Clearance required for other embedded generation such as wind.

## **10.2 Environmental Approvals**

Large-scale PV installations would require environmental authorisation (EA) in terms of the NEMA 2010 EIA Regulations if they generate > 10 MW electricity, or <10 MW but cover an area of 1ha or more.

Electrical transmission infrastructure that may be associated with a large scale PV system would require EA if it has a capacity of 275 kV or more within an urban area, or more than 33 kV outside urban areas.

Large scale roll-out of SSEG PV would not require EA. There may however be heritage compliance issues in some areas of Drakenstein.

Household installation of PV would not require an EA unless it exceeds the electricity generation threshold mentioned above, which is highly unlikely.

## 11 DOMESTIC SSEG

### 11.1 General

With reference to NRS 097-2-3:2014, Section 4, the maximum permissible generation size of an individual LV customer is dependent on:

- The type of LV network - this depends on whether the LV network that supplies the customer is shared (supplies other customers) or dedicated (only supplies the customer in question),
- The customer's notified maximum demand (NMD) - the NMD in many cases is determined by the LV service connection circuit-breaker rating.

### 11.2 Shared LV Feeders

- The maximum individual generation limit for a shared LV feeder is 25% of the customer's NMD, up to a maximum of 20 kVA (generators greater than 20 kVA should be connected through a dedicated LV feeder).
- The resulting maximum generator sizes for common domestic supply sizes are summarized in Table 1 below.

Phases	MCB Size	NMD (kVA)	Max SSEG Limit <sup>(1)</sup> (kVA) <sup>(2)</sup>
1	20A	4.6	1.2
1	40A	9.2	2.3
1	60A	13.8	3.5
1	80A	18.4	4.6
3	40A	27.7	6.9 (2.3/phase)
3	60A	41.5	10.5 (3.5/phase)
3	80A	55.4	13.8 (4.6/phase)
3	100A	69.2	17.3 (5.8/phase)

Table 1: Maximum Individual SSEG Limit for a Shared LV (400/230V) Feeder as per NRS 097-2-3

<sup>(1)</sup> SSEG Limit refers to the total output capacity of the generator. For PV systems in particular, this refers to the maximum output of the inverter. Due to system losses this is typically 10 to 20% lower than the maximum output of the PV panels, which is specified in DC kilo-Watt-peak (kWp). (The system designer/installer will provide guidance here).

the maximum generator size as a function of the dedicated LV feeder cable size and length for aluminium cables.

1	2	3	4	5	6	7	8	9	10
	Size mm <sup>2</sup>								
	300 Cu PVC	240 Cu PVC	185 Cu PVC	150 Cu PVC	120 Cu PVC	95 Cu PVC	70 Cu PVC	50 Cu PVC	25 Cu PVC
Distance m	Generator sizes kVA								
0	402	351	300	263	230	197	164	132	84
50	402	351	300	241	195	154	111	76	41
100	250	199	151	120	96	76	55	38	20
150	166	132	99	79	64	51	37	25	14
200	125	97	74	59	48	38	27	19	10
250	100	78	59	47	38	31	22	15	8
300	81	65	49	40	32	25	18	13	7
350	70	56	42	34	27	22	16	11	6
400	61	49	37	30	24	19	14	10	5
450	54	43	33	26	21	17	12	8	4,5
500	49	39	30	24	19	15	11	7,5	4

Table 2: Maximum SSEG Limit as a Function of PVC Copper Cable Size & Distance

1	2	3	4	5	6	7	8	9	10
	Sizes mm <sup>2</sup>								
	300 AL	240 AL	185 AL	150 AL	120 AL	95 AL	70 AL	50 AL	25 AL
Distance m	Generator sizes kVA								
0	307	271	234	208	186	164	139	113	59
50	307	271	221	179	143	112	81	58	29
100	184	145	110	89	69	55	41	29	15
150	122	97	74	58	46	37	27	19	10
200	92	73	53	43	35	28	20	15	7
250	73	58	42	35	28	22	16	12	6
300	61	48	35	29	23	18	14	10	5
350	52	39	30	25	20	16	12	8	4
400	46	34	26	22	17	14	10	7	3,5
450	41	30	24	19	15	12	9	6	3
500	34	27	21	17	14	11	8	5,5	3

Table 3: Maximum SSEG Limit as a Function of PVC Aluminium Cable Size & Distance

the maximum generator size as a function of the dedicated LV feeder cable size and length for aluminium cables.

1	2	3	4	5	6	7	8	9	10
	Size mm <sup>2</sup>								
	300 Cu PVC	240 Cu PVC	185 Cu PVC	150 Cu PVC	120 Cu PVC	95 Cu PVC	70 Cu PVC	50 Cu PVC	25 Cu PVC
Distance m	Generator sizes kVA								
0	402	351	300	263	230	197	164	132	84
50	402	351	300	241	195	154	111	76	41
100	250	199	151	120	96	76	55	38	20
150	166	132	99	79	64	51	37	25	14
200	125	97	74	59	48	38	27	19	10
250	100	78	59	47	38	31	22	15	8
300	81	65	49	40	32	25	18	13	7
350	70	56	42	34	27	22	16	11	6
400	61	49	37	30	24	19	14	10	5
450	54	43	33	26	21	17	12	8	4,5
500	49	39	30	24	19	15	11	7,5	4

Table 2: Maximum SSEG Limit as a Function of PVC Copper Cable Size & Distance

1	2	3	4	5	6	7	8	9	10
	Size mm <sup>2</sup>								
	300 AL	240 AL	185 AL	150 AL	120 AL	95 AL	70 AL	50 AL	25 AL
Distance m	Generator sizes kVA								
0	307	271	234	208	186	164	139	113	59
50	307	271	221	179	143	112	81	58	29
100	184	145	110	89	69	55	41	29	15
150	122	97	74	58	46	37	27	19	10
200	92	73	53	43	35	28	20	15	7
250	73	58	42	35	28	22	16	12	6
300	61	48	35	29	23	18	14	10	5
350	52	39	30	25	20	16	12	8	4
400	46	34	26	22	17	14	10	7	3,5
450	41	30	24	19	15	12	9	6	3
500	34	27	21	17	14	11	8	5,5	3

Table 3: Maximum SSEG Limit as a Function of PVC Aluminium Cable Size & Distance

## 11.4 Metering

Domestic consumers may adopt one of two approaches to connecting SSEG to the grid:

- a. Consumers wanting to connect SSEG to the grid without being compensated for reverse power flow will be required to install reverse power flow blocking protection to prevent reverse power flow onto the electricity grid. The consumers may then, subject to the ruling policies for tariffs and metering, keep their existing meter and remain on the relevant electricity consumption tariff. In other words, for this option the conventional credit or prepayment meter is NOT allowed to run backwards.
- b. Domestic consumers installing SSEG who wish to participate in the SSEG tariff must have a bi-directional (four-quadrant) smart meter installed as conventional credit or pre-payment meters are not allowed to run backwards. The Municipality will provide and install the required meters at the customer's cost. The SSEG tariff is only available to consumers who are "net consumers" and it is specifically not available for consumers who are "net generators". In order to qualify for the Residential SSEG tariff consumers must have excess (net) generation to regularly require the facility to feed excess power back onto the municipal grid.

It will be at the Technical Services Department's discretion to decide whether consumers will be allowed on the Domestic SSEG tariff. Consumers may be moved off the tariff if they do not have sufficient regular excess (net) generation. They will be required at their own cost to install reverse power flow blocking protection and a prepayment meter and they will forfeit any expenditure they incurred on having bi-directional metering installed.

## 11.5 Load Profile Management

The SSEG tariff has been structured in such a way that consumers will find it most beneficial, from a financial and practical point of view, to ensure that they utilise as much of the generated electricity as they can and avoid or minimise reverse power flow or "export" back to the Drakenstein Municipality's electrical network.

For example, where a PV system is installed, loads should be shifted to occur during the middle of the day when generation is typically at its highest – when the sun is shining. This means that consumers should arrange that loads such as pool pumps, geysers etc. are switched on during this time – from mid-morning to mid-afternoon (roughly from 10:00 until 15:00) when PV generation is at a maximum, and are off after sunset.

### **11.6 Domestic SSEG Tariff Structure**

Tariffs are determined annually by the Drakenstein Municipality and are subject to approval by NERSA. The current tariffs are published in the Drakenstein Municipality's Tariff List, which is also available from their website: <http://www.Drakenstein.gov.za/documents/>

## 12 COMMERCIAL SSEG

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### 12.1 Generation Size Limitations

This document only covers Small-Scale Embedded Generation Systems with a generating capacity up to 1 MVA (1000 kVA).

- a. All Low Voltage (LV) commercial consumers planning to install SSEG systems smaller than 1 MVA must comply with the sizing limitations specified in NRS 097-2-3 and the South African Renewable Power Plants Grid Code (SARPPGC).
- b. It is important to note that the SARPPGC divides SSEG systems (smaller than 1 MVA) into three (3) sub-categories, namely:

Category A1: 0 - 13.8 kVA

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

Category A2: 13.8 kVA – 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.*

Category A3: 100 kVA – 1 MVA

*This sub-category includes RPPs of Category A with rated power in the range 100 kVA but less than 1 MVA. This category also includes RPPs of Category A1 and A2 with a rated power less than 100 kVA that are directly connected to a MV-LV transformer.*

- c. SSEG systems falling in the Category A3 range have more stringent requirements with regards to dip ride-through capability, injection of reactive current into the network, reactive power capabilities, active power constraints (absolute production and power gradient constraint) and the onus is on the customer to ensure that all the requirements are met in terms of the SSEG installation.
- d. Medium Voltage (MV) commercial and industrial consumers planning to install SSEG systems smaller 1 MVA may require a bespoke engineering study to determine the impact of the proposed SSEG system size on the network.
- e. SSEG Systems with a rated power greater than 4.6 kVA shall be balanced three-phase.

## 12.2 General

With reference to NRS 097-2-3:2014, Section 4, the maximum permissible generation size of an individual LV customer is dependent on:

- The type of LV network - this depends on whether the LV network that supplies the customer is shared (supplies other customers) or dedicated (only supplies the customer in question),
- The customer's notified maximum demand (NMD) - the NMD in many cases is determined by the LV service connection circuit-breaker rating.

## 12.3 Shared LV Feeders

- The maximum individual generation limit for a shared LV feeder is 25% of the customer's NMD, up to a maximum of 20 kVA (generators greater than 20 kVA should be connected through a dedicated LV feeder).
- The resulting maximum generator sizes for common commercial or industrial supply sizes are summarized in Table 6 below.

Phases	MCB Size	NMD (kVA)	Max SSEG Limit <sup>(1)</sup> (kVA) <sup>(2)</sup>
1	40A	9.2	2.3
1	60A	13.8	3.5
1	80A	18.4	4.6
3	40A	27.7	6.9 (2.3/phase)
3	60A	41.5	10.5 (3.5/phase)
3	80A	55.4	13.8 (4.6/phase)
3	100A	69.2	17.3 (5.8/phase)

Table 6: Maximum Individual SSEG Limit for a Shared LV (400/230V) Feeder as per NRS 097-2-3

<sup>(1)</sup> SSEG Limit refers to the total output capacity of the generator. For PV systems in particular, this refers to the maximum output of the inverter. Due to system losses this is typically 10 to 20% lower than the maximum output of the PV panels, which is specified in DC kilo-Watt-peak (kWp). (The system designer/installer will provide guidance here).

<sup>(2)</sup> kVA and kW ratings for SSEG's are similar in most cases and can be used interchangeably for estimation purposes.

- If SSEG generation capacity is 4.6 kVA or less, a single-phase inverter can be installed even if the consumer has a three-phase connection. However, it is the responsibility of the consumer

to ensure that his load is balanced across all three phases. A qualified electrician, engineer or technologist should be consulted in this regard.

- d. For circuit-breaker sizes not included in Table 6, the maximum individual generation limit is 25% of the customer notified maximum demand, i.e. 25% of the circuit-breaker size. The individual limit is only dependent on the service circuit-breaker rating, and not on the feeder After Diversity Maximum Demand (ADMD). For example, a LV customer with a 100 kVA NMD supplied through a shared LV feeder could connect up to  $100 \times 25\% = 25$  kVA of generation. Since 25 kVA is greater than the 20 kVA limit for a shared feeder, the maximum size is 20 kVA and as 20 kVA is greater than the 4.6 kVA single-phase limit, it shall be three-phase connected (6.7 kVA/phase).
- e. If the maximum individual generation limit is exceeded, the customer could potentially be connected through a dedicated LV feeder, such that the generator is supplied through a dedicated LV feeder (and the dedicated LV feeder limits apply). Alternatively the customer can apply for an increased NMD e.g. if a customer with a single-phase 60 A supply wants to install a generator greater than 3.5 kVA, then the customer could apply for an upgraded supply to three phase 60 A whereby the maximum generator limit increases to 13.8 kVA. The customer will be responsible for all additional costs associated with the upgrade of the supply.

## 12.4 Dedicated LV Feeders

For dedicated LV feeders, the maximum individual generation limit is a function of the following:

- a. The notified maximum demand (NMD). The maximum generator size is limited to 75 % of the NMD. SSEG greater than 4.6 kVA should be balanced across the available phases. Customers with dedicated single-phase supplies supplied by a dedicated MV/LV transformer (e.g. 16 kVA MV/LV dedicated supplies in rural areas) will be allowed to connect up to 13.8 kVA on that singlephase but cannot exceed 75% of their NMD.
- b. The dedicated feeder cable size is limited such that the voltage rise between the point of supply and transformer busbar is limited to 1%. Table 7 illustrate the maximum generator size as a function of the dedicated LV feeder cable size and length for copper cables. Table 8 illustrate the maximum generator size as a function of the dedicated LV feeder cable size and length for aluminium cables.

1	2	3	4	5	6	7	8	9	10
	Size mm <sup>2</sup>								
	300 Cu PVC	240 Cu PVC	185 Cu PVC	150 Cu PVC	120 Cu PVC	95 Cu PVC	70 Cu PVC	50 Cu PVC	25 Cu PVC
Distance m	Generator sizes KVA								
	0	50	100	150	200	250	300	350	400
0	402	351	300	263	230	197	164	132	84
50	402	351	300	241	195	154	111	76	41
100	250	199	151	120	96	76	55	38	20
150	166	132	99	79	64	51	37	25	14
200	125	97	74	59	48	38	27	19	10
250	100	78	59	47	38	31	22	15	8
300	81	65	49	40	32	25	18	13	7
350	70	56	42	34	27	22	16	11	6
400	61	49	37	30	24	19	14	10	5
450	54	43	33	26	21	17	12	8	4,5
500	49	39	30	24	19	15	11	7,5	4

Table 7: Maximum SSEG Limit as a Function of PVC Copper Cable Size & Distance

1	2	3	4	5	6	7	8	9	10
	Size mm <sup>2</sup>								
	300 AL	240 AL	185 AL	150 AL	120 AL	95 AL	70 AL	50 AL	25 AL
Distance m	Generator sizes KVA								
	0	50	100	150	200	250	300	350	400
0	307	271	234	208	186	164	139	113	59
50	307	271	221	179	143	112	81	58	29
100	184	145	110	89	69	55	41	29	15
150	122	97	74	58	46	37	27	19	10
200	92	73	53	43	35	28	20	15	7
250	73	58	42	35	28	22	16	12	6
300	61	48	35	29	23	18	14	10	5
350	52	39	30	25	20	16	12	8	4
400	46	34	26	22	17	14	10	7	3,5
450	41	30	24	19	15	12	9	6	3
500	34	27	21	17	14	11	8	5,5	3

Table 8: Maximum SSEG Limit as a Function of PVC Aluminum Cable Size & Distance

## 12.5 Metering

Commercial Consumers may adopt one of two approaches to connecting SSEG to the grid:

- a. Consumers wanting to connect SSEG to the grid without being compensated for reverse power flow will be required to install reverse power flow blocking protection to prevent reverse power flow onto the electricity grid. The consumers may then, subject to the ruling policies for tariffs and metering, keep their existing meter and remain on the relevant electricity consumption tariff. In other words, for this option the conventional credit or prepayment meter is NOT allowed to run backwards.
- b. Commercial Consumers installing SSEG who wish to participate in the SSEG tariff must have a bi-directional (four-quadrant) credit meter installed as conventional credit or pre-payment meters are not allowed to run backwards. The Municipality will provide and install the required meters at the customer's cost. The SSEG tariff is only available to consumers who are "net consumers" and it is specifically not available for consumers who are "net generators". In order to qualify for the Commercial SSEG tariff consumers must have excess (net) generation to regularly require the facility to feed excess power back onto the municipal grid.

It will be at the Electricity Services Department's discretion to decide whether consumers will be allowed on the residential SSEG tariff. Consumers may be moved off the tariff if they do not have sufficient regular excess (net) generation. They will be required at their own cost to install reverse power flow blocking protection and a prepayment meter and they will forfeit any expenditure they incurred on having bi-directional metering installed.

## 12.6 Load Profile Management

The SSEG tariff has been structured in such a way that consumers will find it most beneficial, from a financial and practical point of view, to ensure that they utilise as much of the generated electricity as they can and avoid or minimise reverse power flow or "export" back to the Drakenstein Municipality's electrical network.

For example, where a PV system is installed, loads should be shifted to occur during the middle of the day when generation is typically at its highest – when the sun is shining. This means that consumers should arrange that loads such as pool pumps, geysers etc. are switched on during this time – from mid-morning to mid-afternoon (roughly from 10:00 until 15:00) when PV generation is at a maximum, and are off after sunset.

## **12.7 SSEG Commercial Tariff Structure**

Tariffs are determined annually by the Drakenstein Municipality and are subject to approval by NERSA. The current tariffs are published in the Drakenstein Municipality's Tariff List, which is also available from their website: <http://www.drakenstein.gov.za/documents/>

### **12.7.1 Network Cost (R/kVA – based on capacity)**

It shall be ensured that the fixed costs associated with maintaining and operating the municipal electrical infrastructure are recovered through appropriate charges. These costs are calculated by means of a detailed Cost-of-Supply (COS) Analysis done by the Drakenstein Municipality on a regular basis to determine the costs at different voltage levels within the network.

### **12.7.2 Fixed Service Charges**

These are the fixed costs associated with providing a retail service network, including metering, billing, customer call centres, etc. and are recovered by means of a fixed service charge.

### **12.7.3 Energy Charges (c/kWh)**

This is the variable cost of actual energy consumed by the customer. The total cost associated with the volume of energy consumed is recovered through appropriate tariff structures. This is billed on a per kWh basis and is based on a simple flat.

### **12.7.4 Embedded Generation Tariff (c/kWh)**

This is the variable cost of actual excess energy generated by the SSEG and fed back into the utility's electrical grid. The total benefit for the Municipality associated with the volume of energy supplied should be compensated for to the SSEG by means of appropriate tariff structures. This is calculated on a per kWh basis and is based on a simple flat.

### **12.7.5 Billing Period**

The daily network & service charges, along with the charges for energy consumed and credits for energy supplied (in-feed) shall be billed on a monthly basis. Tariffs are determined and adjusted annually by the Municipality and subject to approval by NERSA.

## 13 APPLICATION PROCESS FOR SSEG INSTALLATION

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### 13.1 Application Forms

The SSEG Application Form (DM/SSEG) must be completed for all forms of embedded electricity generation, including renewable energy and co-generation. This form deals with applications for approval to install small-scale embedded generation systems in the Drakenstein Municipal Area. Should tariff or metering changes be required for the SSEG installation, the general application form for new or modified connections must also be completed. The forms are available on the Municipality's website: <http://www.drakenstein.gov.za/documents/>

### 13.2 Important Factors for Consideration

- a. Purchasing your equipment: SSEG equipment that is to connect to the grid must comply with the Municipality's requirements. It is therefore important for consumers to be familiar with these requirements before purchasing the equipment. This is of particular relevance to the inverter. Specific technical information and certificates are required for submission with the initial application form. It is the responsibility of the consumer to ensure that equipment complies with the required standards. A list of Inverters which have been shown to comply with the Municipality's requirements can be found on the Drakenstein Municipality's website.
- b. Where there is no existing electricity service connection: Where an SSEG is to be connected at a location where there is currently no connection to the utility network, an "Application form for new or modified electricity supply service" should be submitted simultaneously as a separate document to the SSEG application form. This application form can be found on the Municipality's website.
- c. Where the SSEG installation requires a tariff or metering change: Should a tariff or metering change be required for the SSEG installation, the "Application form for new or modified electricity supply service" must also be completed.
- d. Future expansion: Consent to connect the SSEG to the electricity grid is only granted for the declared generation capacity. Consumers wishing to increase the capacity of their generation or make changes to their current installation must obtain approval for the expansion or change. Application must again be made through the submission of a completed application form. It is important that the consumer remains a 'net consumer'.
- e. Professional sign off: The final installed SSEG system must be signed off as part of the commissioning process as being compliant with the Municipality's requirements by a

professional engineer or technologist registered with ECSA. For more information regarding professional personnel, visit: <https://www.ecsa.co.za/default.aspx>

### 13.3 Application Process

The following provide a summary for the process to be followed as part of the application for the installation of SSEG systems in the Drakenstein Municipal Area:

1. Obtain the necessary application form/s.
2. Complete the application form/s.
3. Obtain approval from other Municipal Departments.
4. Submit completed form/s and necessary attachments to the Drakenstein Technical Services Department. Await approval from the Drakenstein Technical Services Department.
5. If approved, the SSEG equipment can be procured, installed, tested and commissioned by the Customer.
6. Submit commissioning documentation to Drakenstein Technical Services Department.
7. Electrical Services Department inspects the SSEG installation.
8. Change meter installation to comply with SSEG regulations (if required).
9. If installation is approved by TSD, grid-tie approval will be granted (not applicable to offgrid systems).
10. Process needs to be repeated for any system modifications or expansions.

#### STEP 1: OBTAIN APPLICATION FORM/S

The SSEG Application Form (MBM/SSEG) is obtainable from the Drakenstein Municipality's website or from the Technical Services Department's offices (address listed lower down in Step 4). The application form requires both basic and technical information of the proposed SSEG project to ensure that all SSEG connections are made safely and legally and in compliance with all requirements.

#### STEP 2: COMPLETE APPLICATION FORM/S AND, IF REQUIRED, THE GENERAL APPLICATION FORM FOR NEW OR MODIFIED CONNECTIONS

The Drakenstein Municipality requires that the application form/s (DM/SSEG) be signed by the property owner. Details of the proposed installer must also be provided. The property owner may need support from the proposed installer or a professional in completing the application form (information required includes type of energy conversion, the total generating capacity of the SSEG, electrical parameters, expected consumption, network connection point,

synchronising method, anti-islanding method and generator control method amongst others (not all information is relevant for all generation system types).

### **STEP 3: OBTAIN PERMISSION FROM OTHER MUNICIPAL DEPARTMENTS**

The Electro-Technical Services Department will require prior approval of the proposed SSEG installation from other Municipal departments such as Planning and Building Development Management, before it will consider applications to connect to the grid. All applicable approvals must be reflected in the relevant sections of the application form. (Requirements of these departments are summarised in the Section 10: Other Municipal Department Approvals).

### **STEP 4: SUBMIT COMPLETED APPLICATION FORM/S AND ATTACHMENTS**

Once the form/s have been completed and consent has been obtained from the other relevant Municipal departments the form/s must be submitted to the Drakenstein Electro-Technical Services Department for approval, at the following address:

*Senior manager: Electro-Technical Services*  
*Jan van riebeeck drive*  
*P O Box 1*  
*Paarl, 7622*

### **STEP 5: INSTALLATION COMMENCEMENT UPON APPROVAL**

After due consideration of the application, the applicant will be informed in writing whether the application has been successful. Once notified of a successful application, the applicant may commence the procurement and installation process in accordance with the approved application.

Any deviations from the approved applications will be treated as a new application.

### **STEP 6: COMMISSIONING DOCUMENTATION TO BE SUBMITTED TO TSD**

Once fully installed, the system is ready for testing and commissioning by the SSEG Installer. Note that permanent connection of the SSEG system to the electrical grid is only permitted on receipt of written permission from the Drakenstein Municipality. However the SSEG may connect temporarily to the utility grid for the hot commissioning process only, where after it shall once again be disconnected until written approval is granted by the Municipality.

Commissioning of the system shall be overseen and approved by a Pr. Eng. or Pr. Tech. Eng. who must complete and sign off the SSEG Installation Commissioning Report (Form

DM/COMM), which is obtainable from the Drakenstein Municipality's website or from the Electro-Technical Services Department's offices (address listed in Step 4 above).

In addition to the Commissioning Report, the following documentation shall also be submitted to the Mossel Bay ESD:

- a. Final copy of circuit diagram
- b. Inverter Type Test, the inverter type test certification requirements are specified in the NRS 097-2-1. A list of inverters which have been shown to comply with the Municipality's requirements can be found on the Municipality's website. If the Inverter used for the specific installation is not on the list of approved equipment, type testing is to be undertaken by a 3rd party test house such as Bureau Veritas, KEMA or TÜV Rheinland. Inverter suppliers should be asked to provide the necessary certification before the equipment is purchased. It is strongly recommended that the Drakenstein Municipality be consulted before equipment is purchased to ensure its acceptability by the Municipality.
- c. Factory setting sheet or other documentation showing that the inverter has been set according to NRS 097-2-1 standards.
- d. An electrical installation Certificate of Compliance as per SANS 10142-1 from a qualified Master Electrician.
- e. A signed Supplemental Contract for Embedded Generation. This is a legally required contract that governs the relationship between the Municipality and the consumer. The contract is valid for as long as the project is in existence.
- f. Operation and Maintenance Procedure – installation responsibilities after commissioning.

All completed documentation must be submitted to the Drakenstein TSD offices at the address given in Step 4 above.

#### **STEP 7: INSPECTION OF INSTALLATION (IF NECESSARY)**

The Drakenstein Municipality reserves the right to inspect the installation (if required), although this is unlikely in the case of a residential application for which all the commissioning documentation has been received and approved.

#### **STEP 8: CHANGE ENERGY METER**

If all of the above is satisfactory, the Drakenstein Municipality will install the necessary bidirectional meters and meter kiosks (if applicable).

**STEP 9: APPROVAL GRANTED TO CONNECT TO THE MUNICIPAL GRID**

If all of the above is satisfactory, the Drakenstein Municipality TSD will provide written approval, together with any operation and decommissioning requirements deemed necessary, to the consumer in order for the SSEG to be connected to the grid.

Once the SSEG is successfully connected to the Drakenstein Municipality's grid, the change to the tariff will be implemented where applicable.

**STEP 10: REPEAT THE PROCESS IN THE CASE OF SSEG CAPACITY EXPANSION**

Should an expansion or a change to the system be required, a new application process must be completed.

## **ANNEXURE A: APPLICABLE STANDARDS & SPECIFICATIONS**

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### **STANDARDS AND SPECIFICATIONS**

All equipment and services supplied shall comply with the standards listed below.

#### **General**

- a. SANS 10142 The wiring of Premises – Part 1: Low voltage installation.
- b. IEC 60364-7-712, Electrical installations of buildings – Part 7-712: Requirements for special installations or locations – Solar photovoltaic (PV) power supply systems.
- c. IEC 61727, Photovoltaic (PV) systems – Characteristics of the utility interface.
- d. IEC 62116:2008 (ed. 1), Test procedure of islanding prevention measures for utility-interconnected photovoltaic inverters.
- e. SANS 60947-2/IEC 60947-2, Low-voltage switchgear and controlgear – Part 2: Circuit-breakers.

#### **PV Modules**

- a. IEC 61215 Ed.2 - Crystalline silicon terrestrial photovoltaic (PV) module - Design qualification and type approval.
- b. IEC 61646 Ed.2 - Thin-film terrestrial photovoltaic (PV) modules - Design qualification and type approval.
- c. IEC 61730-1 Ed.1.2 - Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction.
- d. IEC 61730 -2 Ed.1.0: Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing
- e. IEC 61701 Ed. 2 - Salt mist corrosion testing of photovoltaic (PV) modules.
- f. IEC 62716 Ed. 1 - Photovoltaic (PV) modules - Ammonia corrosion testing
- g. IEC 60891:1987, Procedures for temperature and irradiance corrections to measured I-V characteristics of crystalline silicon photovoltaic devices, Amendment 1 (1992)
- h. IEC 60904-1:1987, Photovoltaic devices – Part 1: Measurements of photovoltaic current voltage characteristics
- i. IEC 60904-2:1989, Photovoltaic devices – Part 2: Requirements for reference solar cells

- j. IEC 60904-3:1989, Photovoltaic devices – Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data
- k. IEC 60904-6:1994, Photovoltaic devices – Part 6: Requirements for reference solar modules.
- l. IEC 60904-7:1998, Photovoltaic devices – Part 7: Computation of spectral mismatch error introduced in the testing of a photovoltaic device
- m. IEC 60904-9:1995, Photovoltaic devices – Part 9: Solar simulator performance requirements.
- n. IEC 60904-10:1998, Photovoltaic devices – Part 10: Methods of linearity measurements.
- o. IEC 61853: Performance testing and energy rating of terrestrial photovoltaic (PV) modules
- p. IEC 60068-2-78:2001, Environmental testing – Part 2-78: Tests – Test Cab: Damp heat steady state
- q. IEC 60068-2-21:1999, Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and Integral mounting devices

#### **Inverters**

- a. IEC 62093 Ed. 1.0: Balance-of-system components for photovoltaic systems - Design qualification natural environments
- b. IEC 62109-1 Ed 1.0: Safety of power converters for use in photovoltaic power systems - Part 1: General requirements
- c. IEC 62109-2 Ed 2.0: Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters
- d. IEC 62116 Ed 2.0: Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures.
- e. IEC 60730-1 Ed.5: Automatic electrical controls - Part 1: General requirements.
- f. NRS 097-2-1 Ed.1: Grid Interconnection of Embedded Generation Part 2: Small-scale embedded generation.
- g. IEC 61683: Photovoltaic systems - Power conditioners - Procedure for measuring efficiency
- h. IEC 61000 - 6 / 3: Electromagnetic compatibility (EMC)
- i. IEC 61727 Ed.2: Photovoltaic (PV) systems - Characteristics of the utility interface

#### **Electrical Cabling**

- a. SANS 1507 Part 1: General - Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1900/3300 V)
- b. SANS 1507 Part 2: Wiring Cables - Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1900/3300 V)

- c. SANS 1507 Part 3: PVC Distribution cables - Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1900/3300 V)
- d. SANS 1507 Part 4: XLPE Distribution cables – Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3300 V)
- e. SANS 1507 Part 5: Halogen-free Distribution Cables - Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1900/3300 V)
- f. SANS 1507 Part 6: Service cables - Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1900/3300 V)
- g. SANS 10198 Parts 1-14:2004 - The selection, handling and installation of electric power cables of rating not exceeding 33 kV Part 1 to 14
- h. SANS 1213 Mechanical Cable Glands
- i. NRS 074-1/2 Low Voltage cables systems

#### **Earthing, Lightning and Surge Protection**

- a. IEC 60364-4-41 Low-voltage plants installation. Part 4-41 - Protection for safety – protection against shock
- b. SANS 10313 – Protection against lightning
- c. SANS 62305 – Earthing and Lightning Protection
- d. SANS 10292:2001 Earthing of low-voltage (LV) distribution systems
- e. SANS 1063:1998 Earth rods and coupling
- f. SANS 10199 - The design and installation of earth electrodes
- g. IEEE 80 - Earthing
- h. IEEE 665:1995 - Guide for Generating Station Grounding
- i. SANS 61312-3:2006/IEC TS 61312-3:2000 - Protection against lightning electromagnetic Impulse Part 3: Requirements of surge protective devices (SPDs)
- j. SANS 62305-1 to 4 /IEC 62305-1 to 4 - Protection against lightning - Parts 1 to 4
- k. SANS 10313:2008 Protection against lightning - Physical damage to structures and life hazard
- l. NRS 039 - Surge arresters for use in distribution systems
- m. IEC 61009 - Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's)
- n. SANS 61024 – Protection of structures against lightning

#### **Metering and Measurements**

- a. IEC 62053 - Electricity metering equipment (A.C.) – particular requirements
- b. IEC 60051-1 - Direct acting indicating analogue electrical measuring instruments and their accessories - definitions and general requirements common to all parts

- c. IEC 61036 - Alternating current static watt-hour meters for active energy
- d. NRS 057/ SANS 474 - Code of practice for electricity metering
- e. NRS 049 - Advanced metering infrastructure ( ) for residential and commercial customers

#### **Switchgear**

- a. IEC 60898 - Electrical accessories - circuit breakers for overcurrent protection for household and similar installations
- b. IEC 61009 - Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's)
- c. IEC 60269 - Low-Voltage fuses
- d. SANS 62271- 100 /IEC 62271 - 100 High-voltage switchgear and control gear – Alternating Current Breakers
- e. SANS 60694:2003/IEC 60694:2002 - Common specifications for high-voltage switchgear and control gear standards
- f. SANS 1973-1 to 4 - Low-voltage switchgear and control gear Assemblies Parts 1 to 4
- g. SANS 1765:2003 - Low-voltage switchgear and control gear assemblies (distribution boards) with a rated short-circuit withstand strength up to and including 10 kA
- h. SANS 60439-1 to 5 /IEC 60439-1 to 5 - Low-voltage switchgear and control gear assemblies parts 1 to 5
- i. SANS 60947 /IEC 60947 - Low-voltage switchgear and control gear
- j. IEC 60529 - Specification for degrees of protection provided by enclosures (IP code)



# ELECTRO-TECHNICAL SERVICES

DM/SSEG

## APPLICATION FOR THE CONNECTION OF EMBEDDED GENERATION

Page 1

This application form for the connection of embedded generation is for small-scale embedded generators to be installed by residential, commercial or industrial customers in the Drakenstein Municipal Area. It is applicable to all forms of embedded electricity generation, including renewable energy and co-generation.

- A separate "Application for a new or modified electricity supply service" form must also be completed, except for installations where reverse power blocking is to be installed.
- If the embedded generator is to be configured as a standby supply after islanding from the utility supply, the generator will have to be connected to the existing internal wiring of the property. In such a case, the property owner must obtain a certificate of compliance from a qualified electrician.

### Submit completed form to:

Customer Support Services		
Electro-Technical Services	Jan Van Riebeeck Drive P O Box 1 Paarl 7622	Tel: (021) 807 4661 Fax: (021) 870 1912

### Property name and location:

Project name:	
Erf number:	
Physical address:	
Suburb / Farm:	

### Name & account number of property owner:

(Only if embedded generation is to be connected to the Drakenstein Municipality's electrical network)

First Name:		Last Name:		Title:	
Municipal account number			Contract account number:		

**APPLICATION FOR THE CONNECTION OF EMBEDDED GENERATION**

Page 2

Meter Number to be connected with the SSEG tariff	
---	--

**Property owner contact details:**

Telephone (Home):	
Telephone (Work):	
Cell no.:	
Fax:	
E-mail:	

**Application type:**

(Tick appropriate box)

Residential	
Commercial / Industrial	
New	
Revised application	
Upgrade existing system	
Change of property owner	
Other (specify)	

**Planned construction schedule:**

Project construction start date:	
Project commissioning date for embedded generation:	

**Mode of embedded generation:**

(Tick appropriate box)

Energy from embedded generation to be used with the consumer's electricity network and no excess energy to be exported to the Drakenstein Municipality's electrical network (reverse power blocking installed).	
---	--

**APPLICATION FOR THE CONNECTION OF EMBEDDED GENERATION**

Page 3

Energy from embedded generation to be used with the consumer's electricity network and excess energy to be exported to the Drakenstein Municipality's electrical network (no reverse power blocking).	
Energy from embedded generation to be used solely for exporting to Drakenstein Municipality's distribution network.	
Energy from embedded generation to be used solely for wheeling to third party through Drakenstein Municipality's distribution network.	

**Small-scale embedded generation type:**

(Tick appropriate box)

Photo-voltaic (PV Solar)	
Concentrated solar	
Small-scale hydro	
Landfill gas	
Biomass	
Biogas	
Wind	
Co-generation	
Other (specify)	

**Type of energy conversion:**

(E.g. synchronous generator, induction generator, inverter, fuel cell, etc.) Include operating characteristic

--

**Battery storage:**

(Tick appropriate box)

Yes		No	
Capacity (Am>-hours)			

**APPLICATION FOR THE CONNECTION OF EMBEDDED GENERATION**

Page 4

**Make & model of key generating equipment:**

<b>Item 1 (description):</b>	
<b>Manufacturer:</b>	
<b>Model:</b>	
<b>Number of units:</b>	
<b>Single / three phase</b>	
<b>Item 2 (description):</b>	
<b>Manufacturer:</b>	
<b>Model:</b>	
<b>Number of units:</b>	
<b>Single / three phase</b>	

**Site location:**

<b>Latitude (dd mm sss)</b>	<b>S</b>			°			'			"
<b>Longitude (dd mm sss)</b>	<b>E</b>			°			'			"
<b>For commercial/industrial only (show location and dimensions of intended installation infrastructure in relation to the existing property point of connection and buildings).</b>										

**Site land-use zoning type:**

--

**Preliminary design <sup>(1)</sup>:**

**(To be attached to this application)**

<b>Circuit diagram and design showing major components, proposed point of common coupling, isolating and interfacing devices with Drakenstein Municipality's electrical network, protection schemes, consumer network, operating characteristics, etc.</b>	
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**System earthing arrangement:**

<b>Earthing arrangements i.e. TN-C-S</b>	
--	--

**APPLICATION FOR THE CONNECTION OF EMBEDDED GENERATION**

Page 5

**Total capacity of embedded generation (kVA and PF):**

(Attach schedule for each unit if more than one generation unit will be installed on the property)

Total installed capacity (kVA or kW peak)	
Power factor (per unit)	

**Property bulk supply circuit breaker rating:**

Current Rating (Ampere)	
Number of Phases (single- or three-phase)	

(1) For guidance in this regard it is recommended that an installer/supplier be consulted.

**Estimated consumption and generation levels:**

(Complete the table below)

Month	Estimated imported energy for the month (kWh) (Electricity bought from utility once SSEG is installed)	Estimated exported energy for the month (kWh) (Electricity generated by SSEG and not utilised for own use)	Estimated maximum instantaneous exported power (kVA)	Day of week that maximum power export occurs	Time of day that maximum power export occurs
January					
February					
March					
April					
May					
June					
July					
August					
September					

**APPLICATION FOR THE CONNECTION OF EMBEDDED GENERATION**

Page 6

October					
November					
December					
Total			N/A	N/A	N/A

Brief explanation of the reasons for the general load profile and electricity export profile as mentioned above

**Electrical parameters for SSEG system:**

Rated system voltage (V)	
Maximum reactive power limit (kVAR)	
Maximum peak short-circuit current (A)	

**Electrical parameters for unit transformer (If applicable):**

Rated voltages (primary/secondary)	
Power rating (kVA)	
Winding configuration	
Method of grounding (solid, NER, NECR)	
Impedance	

**Point of coupling:**

(Only where applicant is not an existing customer)

Attach a single line diagram, indicating the point of connection to the Drakenstein Municipality's electrical network.

**Protection & control scheme details <sup>(2)</sup>:**

**APPLICATION FOR THE CONNECTION OF EMBEDDED GENERATION**

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Method of synchronization (auto/manual, make and type of relays, etc.)	
Method of anti-islanding (detail of scheme, type of relays, etc.)	
Method of generator control (AVR, excitation, type of relays, etc.)	
Other main protection to be applied: (O/C, E/F, over/under voltage, over/under frequency, reverse power, back-up impedance, generator transformer back-up earth fault, etc.)	

(2) For guidance in this regard it is recommended that an installer/supplier be consulted.

**Clearance from other Drakenstein Municipal Departments:**

FUNCTION	DEPARTMENT	COMMENTS	NAME	SIGNATURE	DATE
Zoning/subdivision/building plans	Planning and Building Development				
Noise impact assessment and ventilation	Health				
Air pollution and air quality (fuel burning)	Health				

**Note:**

- Electricity Services will require prior approval from these departments. Applications to connect to the grid will not be considered until all relevant approvals have been obtained.

**APPLICATION FOR THE CONNECTION OF EMBEDDED GENERATION**

Page 8

2. Photovoltaic (PV) SSEG applications will require approval from only Planning and Building Development Management if:

- a. Rooftop installations: PV panel(s) in its installed position projects more than 1.5m, measured perpendicularly, above the roof and/or projects more than 600mm above the highest point of the roof;
- b. Installations on the ground: PV panel(s) in its installed position projects more than 2.1 metres above the natural/finished ground level.

**Installer details:**

Name of installer:			
Accreditation / qualification:			
Professional registration:		Reg.no	
Physical Address:			
Contact person:			
Telephone no:	Office:	Cell:	
Email address:			

I request Drakenstein Municipality's Electricity Services Department to proceed with the review of this embedded generation interconnection application. I understand that:

- I will have to pay for both in-house and outsourced engineering studies conducted as part of this review, should these be required; and
- A quotation for such work will be provided beforehand, giving me the opportunity to cancel or modify the application should I wish to do so.

I further consent to Drakenstein Municipality providing this information to the National Transmission Company and other Distributors as required.

**Application completed by:**

Name:	
Surname:	

**APPLICATION FOR THE CONNECTION OF EMBEDDED GENERATION**

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<b>Title:</b>			
<b>Physical Address:</b>			
<b>Telephone no:</b>	<b>Office:</b>	<b>Cell:</b>	
<b>Email address:</b>			

**ECSA registered professional:**

<b>Name:</b>			
<b>Professional registration:</b>		<b>Reg.no</b>	
<b>Contact person:</b>			
<b>Telephone no:</b>	<b>Office:</b>	<b>Cell:</b>	
<b>Email address:</b>			

(Note: Sign-off by an ECSA registered professional is optional at application stage, however it is recommended that an ECSA registered professional engineer or professional technologist that is familiar with the technical details of the intended generation technology, complete this application form)

**Signed (Applicant):**

**Signed (Property owner):**

\_\_\_\_\_

\_\_\_\_\_

**Date:** \_\_\_\_\_

**Date:** \_\_\_\_\_



**Date application received:**

--

**Application notification no:**

--

**Further information required:**

(e.g. Competent person detail required in terms of OHSA, General Machinery Regulations, etc.)

YES		NO	
-----	--	----	--

**Date received:**

--

**More detailed studies required:**

(e.g. fault level, voltage rise, harmonics, protection, voltage stability, etc.)

YES		NO	
-----	--	----	--

**Date completed:**

--

**Approved in Principle: Date**

YES		NO	
-----	--	----	--

**applicant informed:**

--

**Copy to Planning Section: Date**

YES		NO	
-----	--	----	--

**completed:**

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The following SSEG Commissioning Report must be submitted for each installation, confirming compliance with the Municipality's requirements.

Site Details	
Property address (incl. post code)	
Contract account number	
Contact Details	
SSEG property owner	
Contact person	
Contact telephone number	
SSEG Details	
Manufacturer	
Type	
Model	
Serial number/s of inverter/s and independent disconnection switching unit/s (if not integrated into one of the components of the embedded generator)	
Serial number / version numbers of software (where appropriate)	
SSEG rating (kVA) and power factor (under normal running conditions)	
Single or three phase	
Meter Number to be connected with the SSEG tariff	

**SSEG INSTALLATION COMMISSIONING REPORT**

Page 2

Maximum peak AC short circuit current (A)	
Type of prime mover (e.g. Inverter or rotating machine) and fuel source (e.g. sun, biomass, wind)	
Location of SSEG within the installation	

Installer Details	
Installer	
Accreditation/qualification	
Address (Incl. post code)	
Contact person	
Telephone number	
Fax number	
E-mail address	

Information to be enclosed	
Final copy of circuit diagram	
Inverter type test Certificate of Compliance and Test Report according to NRS 097-2-1, issued by accredited 3rd party test house (not necessary if already provided).	

**SSEG INSTALLATION COMMISSIONING REPORT**

Page 3

Factory setting sheet or other documentation showing that the inverter has been set according to NRS 097-2-1	
An electrical installation Certificate of Compliance.	
Signed contract for SSEG	
Operation and maintenance procedure	

<b>Compulsory declaration – to be completed by ECSA registered Pr. Eng. or Pr. Tech Eng.</b>	
The SSEG installation complies with the relevant sections of NRS 097-2-1.	
The loss of mains protection has been proved by a functional test carried out as part of the on-site commissioning, e.g. a momentary disconnection of the supply to the SSEG in order to prove that the loss of mains protection operates as expected.	
Protection settings have been set to comply with NRS 097-2-1	
Safety labels have been fitted in accordance with NRS 097-2-1	
The SSEG installation complies with the relevant sections of SANS 10142-1 and an installation certificate of compliance is attached.	
Reverse power blocking protection system installed and commissioned to prevent reverse power flow onto the distribution electricity network (where applicable)	

Comments (continue on separate sheet if necessary)

<b>Name:</b>		<b>Signature:</b>		<b>Date:</b>	
<b>ECSA Prof. Category:</b>		<b>Reg. No.:</b>			

The following SSEG De-commissioning Report must be submitted for each system be disconnected from the utility grid, confirming compliance with the Municipality's requirements.

<b>Site Details</b>	
Property address (incl. post code)	
Contract account number	
<b>Contact Details</b>	
SSEG property owner	
Contact person	
Contact telephone number	
<b>SSEG Details</b>	
Manufacturer	
Type	
Model	
Serial number/s of inverter/s and independent disconnection switching unit/s (if not integrated into one of the components of the embedded generator)	
SSEG rating (kVA) and power factor (under normal running conditions)	
Single or three phase	
Meter Number to be connected with the SSEG tariff	
Type of prime mover (e.g. inverter or rotating machine) and fuel source (e.g. sun, biomass, wind)	
Location of SSEG within the installation	

De-Commissioning Agent Details					
Name					
Accreditation/qualification					
Address (incl. post code)					
Contact person					
Telephone number					
Fax number					
E-mail address					
Certificate of Compliance number (provide certified copy of the CoC which confirms that the SSEG has been disconnected effectively from the Municipality's electricity distribution network).					
Comments (continue on separate sheet if necessary)					
Name:		Signature:		Date:	
Qualification:		Reg. No.:			

**SUPPLEMENTAL CONTRACT FOR SMALL-SCALE EMBEDDED GENERATION**

(Supplemental to the contract for the supply of electricity)

Made and entered into between –



**THE DAKENSTEIN MUNICIPALITY**

(hereinafter referred to as the “Municipality”)

and

---

(hereinafter referred to as the “Consumer”)

WHEREAS the consumer has applied to the Municipality for the connection of a small-scale embedded generator and the Municipality is prepared to approve the connection in accordance with the terms and conditions of this contract;

AND WHEREAS the Municipality and the consumers are desirous of entering into a written contract recording and regulating the terms and conditions relating to the connection of the small-scale embedded generator;

NOW THEREFORE THE PARTIES HERETO HAVE AGREED EACH WITH THE OTHER:

## 1 DEFINITIONS

In this contract the following words and expressions shall have the meanings hereby assigned to them except where the context otherwise requires:

- 1.1 "Anti-Islanding" shall mean the ability of an embedded generation system to instantly automatically disconnect the generator from connection to the utility grid whenever the local utility grid has lost the supply of power from the national electricity grid, thus preventing the export of electricity to the utility grid from the embedded generator. This is done primarily to protect utility workers who may be working on the utility grid and who may be unaware that the grid is still being energized by the embedded generator.
- 1.2 "MUNICIPALITY" shall mean the Drakenstein Municipality, established in terms of the Local Government: Municipal Structures Act, 1998 read with the Western Cape Provincial Notice No. 479/2000 published in Province of the Western Cape: Provincial Gazette 5588 dated 22 September 2000.
- 1.3 "Consumer" shall mean: (individual/company name)
- \_\_\_\_\_
- Company/close corporation registration number (if applicable) \_\_\_\_\_
- 1.4 "Contract" shall mean this contract together with the Schedules and Annexures hereto.
- 1.5 "Effective date" shall mean the first business day following the date of signature by the consumer, provided that connection to the electrical grid shall only be permitted as provided in terms of this contract.
- 1.6 "Electrical installation" shall mean any machinery, in or on any premises, used for the transmission of electricity from a point of control to a point of consumption anywhere on the premises, including any article forming part of such an electrical installation irrespective of whether or not it is part of the electrical circuit.

- 1.7 "Embedded generator" shall mean an electricity generating device, such as a photovoltaic panel or wind turbine that is connected to the consumer's electrical installation beyond the point of control.
- 1.8 "Energy import" shall mean the energy flowing from the Municipality's network into the consumer's electrical installation.
- 1.9 "Energy export" shall mean the energy flowing from the consumer's electrical installation back into the Municipality's network.
- 1.10 "Kilowatt hour" shall mean the consumption or generation of electrical energy equivalent to one kilowatt of power sustained for one hour.
- 1.11 "Law" shall mean the provisions of the Local Government: Municipal Systems Act (Act No. 32 of 2000), the Electricity Regulation Act, (Act No. 4 of 2006), the Drakenstein Municipality's Electricity By-law, as well as any applicable law, proclamation, ordinance, act of parliament or other enactment having force of law.
- 1.12 "Main supply contract" shall mean the existing contract in place between the Municipality and the consumer for the supply of electrical power at the premises, as contained in the documentation signed at the time of applying for an electrical connection, read together with the Drakenstein Municipality's Electricity By-law.
- 1.13 "Month" shall mean the period between successive monthly meter readings made in terms of this contract, irrespective of whether such readings are taken on the last day of the calendar month; provided that if, in terms of this contract, meter readings may be estimated should the actual reading of the meter not be possible in any particular month.
- 1.14 "Net consumer" shall mean a consumer who over a period of a year imports (purchases) more energy than he/she exports (puts back into the network).
- 1.15 "Point of control" shall mean the point at which an electrical installation on or in any premises can be switched off by a user or lessor from the electricity supplied from the point of supply.
- 1.16 "Parties" shall mean the Municipality and the Consumer.
- 1.17 "Point of supply" shall mean the actual supply point on the network as described in Schedule 1.

1.18 "Prescribed tariff" shall mean the approved Municipality's tariff of charges for electricity and services, as amended from time to time.

1.19 "Rated generator capacity" shall mean the maximum output of the embedded generator as advised by the Consumer to the Municipality, being the sum of the outputs, in kVA, of all invertors connected to embedded generators and the Consumer's installation.

## **2 INTERPRETATION**

2.1 Unless inconsistent with the context, an expression which denotes:

2.1.1 any gender includes the other genders;

2.1.2 a natural person includes a juristic person and vice versa;

2.1.3 the singular includes the plural and vice versa.

2.2 The headings of the clauses of this contract shall not be deemed part of or affect the interpretation or construction thereof.

2.3 If any provision in a definition is a substantive provision conferring rights or imposing obligations on any party, notwithstanding that it only appears in a definitions clause, effect shall be given to it as if it were a substantive provision in the body of this contract.

## **3 CONNECTION OF EMBEDDED GENERATOR**

The Municipality undertakes to approve the connection of an embedded generator, as described in Schedule 1 to this agreement, by the consumer at the premises, subject to the terms and conditions of this contract. The consumer may only, other than for the purposes of carrying out tests and commissioning), connect his/her/its SSEG installation to the electricity grid upon receipt of a written letter from the Director: Technical Services giving consent for such connection.

## **4 PERIOD OF CONTRACT**

This contract shall commence on the effective date and shall continue indefinitely unless terminated by either party, in terms of Clause 22 of this contract.

## **5 CESSION**

The consumer shall not cede or assign this contract or any part thereof or any benefit, obligation or interest herein or hereunder without the prior written consent of the Municipality.

## **6 CURTAILMENT OF GENERATION**

The consumer shall, if and when required and on instruction by the Municipality, reduce peak generation during abnormal system conditions or low load periods.

## **7 DISCONTINUENCE OF GRID CONNECTION GENERATION**

- 7.1 An embedded generator which has been de-commissioned must be physically disconnected from the grid by the removal of all wiring which connects the inverter/s with the grid.
- 7.2 Grid connected generation will only be considered by the Municipality as being disconnected from the electricity grid once the consumer has notified the Municipality in writing on the prescribed form and provided the Municipality with a copy of the Certificate of Compliance covering the removal of the wiring.

## **8 NOTIFIED MAXIMUM EMBEDDED GENERATOR OUTPUT**

- 8.1 The notified maximum output of the embedded generator is as specified in Schedule 1.
- 8.2 If the consumer proposes increasing the maximum output of the embedded generator, he/she/it shall not implement such increase without the consent of the Municipality, which shall not be granted to the consumer until: -
  - 8.2.1 the consumer has submitted an additional embedded generator application for an upgrade of an existing system to the Municipality; and
  - 8.2.2 the parties enter into a new contract; and
  - 8.2.3 any work required on the parties' electricity networks have been completed, to the satisfaction of the Municipality.

## **9 NET CONSUMER**

9.1 Consent to the connection of an embedded generator is given subject to:

9.1.1 the condition that the consumer remain a net consumer of electricity over a rolling period of twelve months:

9.1.2 the condition that the embedded generator shall not exceed the maximum generator output figure stipulated in Schedule 1.

9.2 Should the consumer not remain a net consumer he/she/it shall be deemed to be in breach of this Contract in terms of section 21.

## **10 RESIDENTIAL CONSUMERS**

10.1 A residential consumer shall only be entitled to the benefit of being charged the small scale embedded generation tariff if he/she/it has a bona fide need to feed power back into the electricity grid each month. Should this not be the case the Senior manager, electro-technical Services may require that the consumer either withdraw the embedded generator from service or alternatively have a prepayment meter and reverse power flow blocking protection installed, so as to place the consumer on the appropriate domestic consumption tariff.

10.2 All costs for metering changes will be for the consumer's account.

## **11 PRICES FOR ELECTRICITY**

11.1 The consumer's municipal account shall be credited for energy generated by the embedded generator and exported to the network in the amount/s reflected in the Municipality's annual tariff relating to the import and export of electrical energy for embedded generation.

11.2 At the time that the consumer ceases to be on the small scale embedded generation tariff, any remaining credit balance will be credited to the consumer on written request provided that the consumer has no other outstanding municipal debt.

11.3 The aforesaid tariffs are amended annually on 1 July of each calendar year, as regards quantum and structure, and are applicable to all existing and new embedded generators. The Municipality reserves the right to make amendments to the tariff as stated and does not warrant the financial viability of the consumer's embedded generation installation.

11.4 A schedule of the tariffs set by the Municipality shall be furnished to the consumer upon written request to the Municipality.

11.5 The Municipality shall not be obliged to grant credit to the consumer for power not received onto the electrical grid due to unavailability of the grid or for any other reason.

## **12 SUPPLY TO THIRD PARTY PROHIBITED**

The consumer shall not supply any electricity generated on the premises under this contract to any third party on any other premises in any way.

## **13 TRANSFER OF SUPPLY TO ANOTHER SUPPLY AUTHORITY**

The parties agree that, if the premises of the consumer in the future become located within the area of jurisdiction of another supply authority, this Supplemental Contract will be terminated and the consumer may negotiate with the new supply authority a new Contract for embedded generation.

## **14 COMPLIANCE WITH THE CITY'S TECHNICAL REQUIREMENTS**

14.1 It is an express condition of this contract that the consumer ensure that the SSEG equipment remains compliant with the Municipality's technical requirements and if it does not do so the consumer will be in breach of this contract.

14.2 The Municipality reserves the right to (not unreasonably) alter its requirements for whatsoever reason and the consumer will be obliged to ensure at the consumer's cost that the SSEG equipment complies with the additional requirements.

## **15 QUALITY OF SUPPLY**

15.1 In accordance with the Electricity Regulation Act, as amended, the consumer shall be responsible for maintaining the quality of supply from the embedded generator within the limits set out in the NRS 048 Quality of Supply and NRS 097 Grid Interconnection of Embedded Generation specification, with which the consumer acknowledges himself/herself/itself to be acquainted.

- 15.2 The Municipality shall not be liable for any loss or damage, direct or consequential, suffered or sustained by a consumer as a result of or arising from the cessation, interruption or any other abnormality of the supply of electricity, unless caused by negligence on the part of the Municipality.

## **16 NETWORK STABILITY**

The consumer shall ensure that the anti-islanding functionality of the generation equipment is in good operational order to ensure the safety of the Municipality's personnel.

## **17 MEASUREMENT OF IMPORT AND EXPORT OF ENERGY**

Measurement of imported and exported energy shall be carried out monthly.

## **18 BILLING AND PAYMENT OF CHARGES**

- 18.1 The consumer shall be liable for all charges as per the Municipality's Electricity Tariff as amended from time to time.
- 18.2 Consumers who have had a bidirectional credit meter installed and are on a small scale embedded generation tariff will be billed as follows:
- 18.2.1 The monthly fixed demand and network charges and all energy and maximum demand charges, as applicable, will be billed on the monthly electricity account.
  - 18.2.2 Compensation for export of energy will be carried out monthly against the normal monthly electricity account.
  - 18.2.3 Customers will not be paid out if the monthly bill goes into credit - the credit balance will be carried forward to the following month.
  - 18.2.4 VAT will only be payable by the Municipality on exported energy where the consumer is registered with the South African Revenue Service (SARS) as a VAT vendor.

## **19 GENERATION LICENCE**

The Electricity Regulation Act stipulates that grid connected generators shall obtain a generating licence. "Generating for own use" is excluded from this requirement. It is recorded that clarification is still required from the National Energy Regulator of South Africa whether generators who are net consumers are considered to be "generating for own use". The consumer bears all the risk regarding any liability which might arise from any change or clarification made by NERSA in this regard, and specifically indemnifies the Municipality with regard to any such risk or liability.

## **20 THE PARTIES' OBSERVANCE OF APPLICABLE LEGISLATION**

The parties shall in addition to complying with the terms and conditions of this contract also comply with the provision of any law which may have application to this contract.

## **21 BREACH**

- 21.1 Should either party hereto breach or fail to comply with any term or condition of this contract then the party aggrieved thereby shall give the defaulting party written notice to rectify such a breach.
- 21.2 In the event of the defaulting party failing to rectify such a breach within fourteen (14) days of the receipt of such notice, the aggrieved party shall be entitled to give written notice of termination of this contract to the other party. Such termination shall take effect upon receipt of such notice by the defaulting party.
- 21.3 Should either party repeatedly breach any of the terms and conditions of this contract in such a manner as to justify the aggrieved party in holding that the defaulting party's conduct is inconsistent with the defaulting party's intention to carry out the terms and conditions of this contract, then and in such event the aggrieved party shall without prejudice to its legal rights and remedies, be entitled to terminate this contract.
- 21.4 Termination of this contract shall be without prejudice to any other rights or remedies of the aggrieved party under this contract or at law and will not affect any accrued rights or liabilities of the aggrieved party at the date of termination.

## **22 TERMINATION**

22.1 This contract shall terminate with immediate effect upon the happening of any of the following events:

22.1.1 If either party fails to rectify a breach of this contract as provided for in terms of Clause 21.

22.1.2 If the consumer gives two working days' notice in writing of him/her de-commissioning and disconnecting the embedded generator.

22.1.3 If the main supply contract is terminated.

22.1.4 If the parties mutually agree to terminate this contract.

## **23 GENERAL CONDITIONS**

23.1 No alteration, cancellation, variation of or addition to this contract shall be of any force or effect unless reduced to writing and signed by the Municipality and the consumer or their duly authorised representatives.

23.2 The schedules to this contract may be amended by an exchange of letters between the parties.

23.3 This Contract constitutes the entire supplemental contract between the parties hereto in relation to the grid connected embedded generator and neither of the parties shall be bound by any undertakings, representations, warranties, promises or the like not recorded herein.

23.4 No extension of time or other indulgence granted by either party to the other in respect of either of the parties' obligations will constitute a waiver of either of the parties' right to enforce compliance with the terms of this contract; neither shall it constitute a novation of this contract.

23.5 The customer acknowledges that he/she/it is entering into this contract voluntarily and at his/her/its risk. Accordingly he/she/it grants a full and sufficient indemnity in favour of the Municipality against all risk or liability which may arise from the contract. This shall include any losses suffered by the customer arising from negligence relating to the design, construction, installation, commissioning, operation and maintenance of the embedded generator.

## 24 DOMICILIUM CITANDI ET EXECUTANDI

24.1 Each of the parties chooses domicilium citandi et executandi for the purposes of the giving of any notice, the serving of any legal process and for any purposes arising from this Contract at their respective addresses set forth hereunder:

**The Municipality:**

The Drakenstein Municipality  
Civic Centre  
Berg River Boulevard  
Paarl  
7646

**The Consumer:**

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24.2 Any notice to any party shall be addressed to it at its domicilium aforesaid and be sent either by prepaid registered post or be delivered by hand. In the case of any notice:

24.2.1 Sent by pre-paid registered post, it shall be deemed to have been received, unless the contrary is proved, on the seventh day after posting; and

24.2.2 Delivered by hand, it shall be deemed to have been received, unless the contrary is proved, on the date of delivery, provided such date is a business day or otherwise on the next following business day;

24.2.3 Any party shall be entitled by notice in writing to the other, to change its domicilium to any other address within the Republic of South Africa, provided that the change shall become effective only fourteen (14) days after the service of the notice in question;

24.2.4 Any notice addressed to the Municipality shall be required to be addressed to the Municipal Manager (for the Attention of the Director: Technical Services) to be deemed to have been effectively delivered or served.

## 25 JURISDICTION

The parties hereby consent in terms of Section 45 of the Magistrate's Court Act No 32 of 1944 as amended to the jurisdiction of the Magistrate's Court of any district having jurisdiction in terms of Section 28 of the said Act, to adjudicate any dispute arising from this contract, provided that such consent shall not derogate from the right of either party to institute proceedings in the High Court.

## 26 COSTS

Each party shall bear his/her/its own costs incurred in the negotiation, preparation and settling of the terms of this contract.

## 27 WARRANTY OF AUTHORITY

Each party warrants to the other party that it has the power, authority and legal right to enter into, sign and perform in terms of this contract, and that this contract has been duly authorised by all necessary actions of its directors or person/s on whose behalf the signatory acts herein.

SIGNED AT \_\_\_\_\_ THIS \_\_\_\_\_ DAY OF \_\_\_\_\_ 20\_\_\_\_

The Consumer: \_\_\_\_\_

As Witnesses: 1: \_\_\_\_\_

2: \_\_\_\_\_

SIGNED AT \_\_\_\_\_ THIS \_\_\_\_\_ DAY OF \_\_\_\_\_ 20\_\_\_\_

The Municipality: \_\_\_\_\_

As Witnesses: 1: \_\_\_\_\_

2: \_\_\_\_\_

## SUPPLEMENTAL CONTRACT FOR EMBEDDED GENERATION

### SCHEDULE 1

1. Details of premises:

a. Erf no. .... Suburb .....

b. Address .....

c. Name of building .....

d. Meter position .....

2. Customer category: Residential / Commercial / Industrial \*

3. Supply voltage .....V( $\pm 10\%$ ) Single / Three phase \*

4. Type of meter .....

5. Rated generator capacity (AC side ) .....kVA

6. Notified maximum demand of the property ..... kVA

7. Authorized capacity of the property ..... kVA

8. The tariff rate applicable to this supply as per the schedule of tariffs of the Municipality is:

Tariff description/s.....

9. Allow export of excess power onto grid - Yes / No\*

10. Special power quality requirements:

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*\* Delete what is not applicable*

Contract Version date: 2019-06-26