

Item A-F (17-2023) CM 26/05/2021	MEDIUM-TERM REVENUE AND EXPENDITURE FRAMEWORK (MTREF) FOR 2023/24 TO 2025/26 AND THE REVISED 2022/2023 TO 2026/27 INTEGRATED DEVELOPMENT PLAN (IDP)
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Resolved:

4. To guide the implementation of the municipality's annual budget, the Council of the City of Ekurhuleni **APPROVES** the amended policies and By-laws as contained in **Annexure E.**

POLICIES

- Annexure E1** Medium-term Budget Statement Policy (Reviewed)
- Annexure E2** Pricing Policy Statement (Reviewed)
- Annexure E3** Property Rates Policy (Reviewed)
- Annexure E4.1** Provision of Free Basic Electricity Policy (Reviewed)
- Annexure E4.2** Provision of free Basic Water supply services (Reviewed)
- Annexure E5** Waste Management Tariff Policy (Reviewed)
- Annexure E6** Consumer Deposit Policy (Reviewed)
- Annexure E7** Indigent Support Policy (Reviewed)
- Annexure E8** Credit Control & Debt Collection Policy (Reviewed)
- Annexure E9** Provision for Doubtful Debtor and Debtor Write-Off Policy (Reviewed)
- Annexure E10** Budget Implementation and Monitoring Policy (Reviewed)
- Annexure E11** Municipal Entity Financial Support Policy (Reviewed)
- Annexure E12** Accounting Policy (Reviewed)
- Annexure E13** Electricity Metering for Residential and business Customers (Reviewed)
- Annexure E14** Policy for the vending of pre-paid electricity (Reviewed)
- Annexure E15** Policy for Estimation and Correction of Energy or Demand Meter Reading and Billing Data (Reviewed)
- Annexure E16** Electricity Tariff policy (Reviewed)
- Annexure E17** Virements Policy (Reviewed)
- Annexure E18** Consumer Agreement (Reviewed)
- Annexure E19** Supply Chain Management Policy (Reviewed)
- Annexure E20** Treasury Policy (Reviewed)
- Annexure E21** Funds Transfer Policy (Reviewed)
- Annexure E22** Assets Management Policy (Reviewed)
- Annexure E23** Cost Containment Policy (Reviewed)
- Annexure E24** Policy for the wheeling of Electricity Ekurhuleni (Reviewed)
- Annexure E25** Policy for Embedded generation (Reviewed)
- Annexure E26** Ekurhuleni Community Enterprise Development Fund Policy (Reviewed)
- Annexure E27** Long Term Financial Strategy 2020/21-2029/30 (Reviewed)
- Annexure E28** Expanded Public Works Programme Policy (Reviewed)

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Record of Significant Revisions to the Guideline

Date of Issue	Reference Pages	Description of Version and Updates
August 2018	All	First release of the Guideline

Foreword

It is important to ensure that you have the latest version of the various application forms and other relevant documents before proceeding with an EG application. These are available on the City of Ekurhuleni's website: <https://www.ekurhuleni.gov.za/forms/> Energy Folder

Indemnity

Anyone (e.g. a municipality), using these Requirements for Embedded Generation (EG), in part or in full, as a basis for their own EG programme does so on the basis that they indemnify and hold harmless the City of Ekurhuleni and its successors or assigns in respect of any claim, action, liability, loss, damage or lawsuit arising from their use of this document.

Approvals

This EG Policy shall be effective upon approval by Council and is intended to complement and be complemented by other policies of the CoE already developed and approved by the Council and those that will be developed in the future.

Information on this document

<p>Purpose of the document</p>	<p>The purpose of this document is to guide stakeholders regarding the policy requirements and application process of the City of Ekurhuleni in connecting all forms of embedded generation to the municipal electricity network, as aligned to national government directives for EG.</p>
<p>The need for this document</p>	<p>The parallel connection of any generator to the municipal electrical grid, however powered, has numerous implications for the city, and requires to be regulated and managed. This document serves to:</p> <ul style="list-style-type: none"> • Ensure the safety of the municipal staff, the public and the users of the EG installations; • Uphold the power quality of the municipal electricity network; • Clarify metering and billing requirements and options; • Balance municipal revenue impact to enable continued operation of all municipal functions. <p>In addition, municipalities are faced with low carbon development imperatives and economic growth challenges. EG can play a role in these areas, and the document therefore also serves to:</p> <ul style="list-style-type: none"> • Promote the development of the EG industry by creating a conducive environment for growth.

<p>Scope</p>	<p>This document covers:</p> <ul style="list-style-type: none"> • The connection of all forms of EG to the municipal electrical grid; • All EG applicants are required to comply with the conditions and process described herein. Note the additional application requirements for installations above 1MW, • Installations connected to low and medium voltage networks (<= 33 kV); • Installations where consumers remain net consumers (purchase more electricity from the grid than they generate and feed back into the utility grid, on a monthly basis). <p>This document does not cover:</p> <ul style="list-style-type: none"> • Applicants who wish to install a system with generation capacity of greater than 1 MW (1000 kW). For such systems a meeting should be arranged with the City to establish the necessary requirements and application process. The Electricity Regulation Act (Act No. 4 of 2006) (ERA), states that no-one may operate any generation, transmission or distribution facility or trade, without a license issued by NERSA. The ERA Amended Schedule 2 Government Gazette, vol. 676 of 5 October 2021, clarifies that generation facilities with an installed capacity of less than 100 MW with a point of connection on the transmission or distribution power system are exempt from the requirement to hold a generation license but are required to be registered with both the distributor and NERSA. • Wheeling regulations are excluded from this policy. • The connection of EG to the Eskom electrical grid i.e. consumers residing within the demarcation boundaries of CoE, but connected to Eskom’s licence distribution grid, need to apply to Eskom for consent to connect EG to the electrical grid. • Systems connecting to HV networks (> 33 kV). It should further be noted that although the NRS 097-1 standards covering MV and HV connections are not complete, such systems may be approved by the municipality if <= 1 MW. These systems are likely to require grid impact studies and should be discussed separately with the municipality • Installations where consumers are net generators (generate more than they consume on average, on a monthly basis);
<p>Defining embedded generation</p>	<p>Embedded generation (EG) refers to power generation installations which are located on residential, commercial or industrial sites where electricity is also consumed.</p> <p>Most of the electricity generated by an EG is consumed on-site, but times may arise when generation exceeds consumption and typically a limited amount of power is allowed to flow in reverse, from the consumer onto the utility grid. An EG consumer therefore generates electricity on the consumer’s side of the municipal electricity meter, where the generation equipment is connected to, and synchronised with, the municipal electricity grid (i.e. ‘embedded’).</p>

Who this document is for	<p>This document will assist all relevant stakeholders involved in the commissioning, installation, management and ownership of an EG system, with generation to the municipal electrical grid. It is intended to provide guidance in this regard to:</p> <ul style="list-style-type: none"> • EG project developers; • Residential and commercial property owners; • EG installers; • Energy consultants commissioned to design EG systems; • Municipal officials involved in the oversight of EG generation; • Registered professional engineers, professional technologists or professional engineering technicians who are involved in EG commissioning.
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Glossary & Definitions

Alternating current	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.
Direct current	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.
Anti-Islanding	The ability of an EG installation to instantly and automatically disconnect the generator from the installation whenever there is a power outage in the utility municipal electrical grid, thus preventing the export of electricity to the municipal electrical grid from the EG. This is done primarily to protect municipal electrical grid workers who may be working on the grid and who may be unaware that the grid is still being energized by the EG.
Bi-directional meter	A meter that separately measures electricity flow in both directions (import and export)
Cogeneration	The sequential or simultaneous generation of multiple forms of useful energy (usually mechanical and thermal) in a single, integrated system.
Consumer	In the context of this document, consumers who also generate must be referred to as "consumers", although in effect they are "consumer/generators".
Generating capacity	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 by the system in its current configuration.
Grid-tied	An EG that is connected to the municipal electrical grid either directly or through a consumer's internal wiring is said to be "grid-tied". The export of energy onto the

	municipal electrical grid is possible when generation exceeds consumption at any point in time.
Grid-tied hybrid EG	Grid-tied EG that islands after interruption of the utility supply, or when the applicable electrical service conditions are outside stated limits, or out of required tolerances and then supplies the load from the inverter, operating in the stored-energy mode, via a suitably interlocked change-over switch, is said to be a "grid-tied hybrid" SSEG installation.
Inverter	A power device that converts direct current to alternating current at a voltage and frequency which enables the generator to be connected to the municipal electrical grid.
Isolated	A section of a municipal electrical grid which is disconnected from all other possible sources of electrical potential is said to be isolated
Load profile	The profile or curve showing the variation of the consumer's rate of electricity consumption (or demand) over time.
Low-voltage	Voltage levels up to and including 1 kV. (1kV= 1000 Volts) and DC voltage.
Medium-voltage	Voltage levels greater than 1 kV up to and including 33 kV.
Net consumer	A net consumer is someone who purchases (imports) more kWh of electricity than they export (sell), on a monthly basis.
Net generator	A situation where the site generates more electricity than is consumed on site on a monthly basis, and therefore exports more power onto the municipal network than it draws from the network.
Pr Eng or Pr Cert Eng or Pr Tech Eng or Pr Techni Eng	A professional engineer, professional Certificated Engineer, professional technologist or professional engineering technician, who is registered with the Engineering Council of South Africa (ECSA).
Reverse power flow	The flow of energy from the consumer electricity installation onto the municipal electrical grid (i.e. export) as a result of the instantaneous generation exceeding the instantaneous consumption at the generation specific site.
Reverse power flow blocking	A device which prevents power flowing from an embedded generator back onto the municipal electrical grid.
Embedded generator	An embedded generator for the purposes of these guidelines is an embedded generator with a any generation capacity output (AC)
Stand-alone generator/ off-grid generator	A generator that is not in any way connected to the municipal electrical grid. Export of energy onto the municipal electrical grid by the generator is therefore not possible.

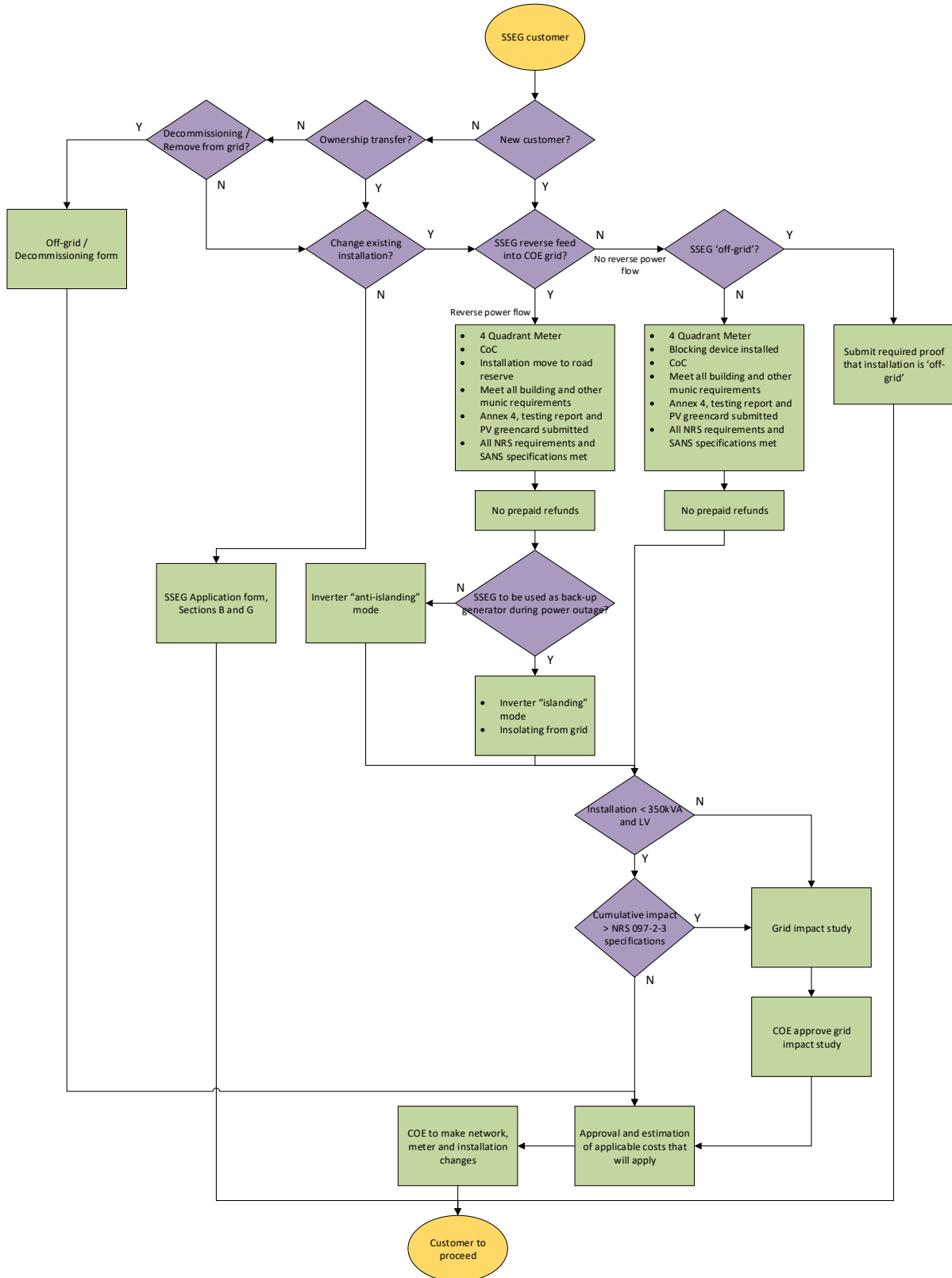
Abbreviations

AC	Alternating current
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AMI	Advanced Metering Infrastructure
DC	Direct current
ECSA	Engineering Council of South Africa
EIR	Electrical installation regulations, 2009,
kVA	kilo-Volt Ampere (unit of apparent 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)
MW	Mega-Watt (1000 kW)
NERSA	National Energy Regulator of South Africa
NMD	Notified Maximum Demand
PV	Photovoltaic
EG	Embedded Generation/Generator
VAT	Value Added Tax

CoE EG Process Quick Guide

- No Generation equipment connected to grid without consent of HOD Energy;
- All EG customers deemed to be grid tied;
- EG Participants to be net consumers.



Introduction

1 INTRODUCTION

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 municipalities around the country being inundated with requests to allow electricity consumers to connect PV and other EGs to the electricity grid. Such EGs would be connected to the wiring on the consumer's premises which is in turn connected to, and supplied by, the City's electricity network. Thus, these generators are considered to be 'embedded' in the municipality's electricity grid. One of the major advantages of such a grid connected system is obviating the need for backup batteries, which stand-alone 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 is 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, standards prescribed and approval procedures developed, for the general benefit and protection of citizens and manageability of the distribution network.

The above needs to be balanced with municipal obligations to embrace low-carbon energy and green economic growth opportunities, so a user-friendly framework for installation application and approval is important to promote the growth of this sector. Such a framework will also minimise systems being installed without going through official channels, thereby potentially not meeting required safety and quality standards.

Municipalities play a vital role in facilitating the necessary regulatory environment to enable the establishment and growth of the EG field. This document outlines the CoE's requirements for prospective EGs and sets out the associated application processes.

Although the electricity distribution industry is highly regulated, EGs are slowly covered in the national policy, legislation and regulation. City has developed policies and practices which it believes are consistent with broader national policy. The City is of the view that it is not allowed to purchase electricity at a greater cost than it would have paid Eskom for the generated electricity.

When the necessary regulatory requirements for EG are gazetted, all customers would need to adhere to these stipulations regarding EG notwithstanding any provision that may be made in this policy.

Consequently, the City's Electricity Supply By-law requires that anyone wanting to connect a generator to the City's electricity grid must obtain written consent from the HOD: Energy

Consumers wishing to install an EG and or feed power back onto the utility grid will be required to move onto the EG tariff, which includes a daily service charge, in order to cover the operating costs of the utility network.

EG export credit tariff is developed and shall be implemented as approved annually.

Indemnity, Legal Requirements & Curtailment

2 INDEMNITY, LEGAL REQUIREMENTS & CURTAILMENT

2.1 LEGAL CONNECTION OF EG TO THE MUNICIPAL ELECTRICAL GRID

The CoE Electricity Supply By-Law states that no generation equipment may be connected to the municipal electrical grid without the express consent of the HOD: Energy. Failure to obtain this consent constitutes an offence which could lead to a fine and/or disconnection of supply.

Furthermore, the installation may also be in contravention of the ERA and/or the Occupational Health and Safety Act, for which punitive sanctions also apply.

Consumers found to have illegally connected EG to the municipal electrical grid (either before or after their electricity meter) will be instructed to make it legal through following the application process and complying with the safety and metering requirements. In the event of failure to comply, the installation must be disconnected from the municipal electrical grid. A Certificate of Compliance issued by a registered electrical contractor is required as proof of such disconnection. Should the consumer fail to have the EG disconnected from the municipal electrical grid, the Municipal Electricity Services Department will disconnect the electricity supply to the property, as prescribed in the CoE Electricity Supply by- Law and EIR.

In cases where unauthorised reverse feed-in takes place which results in the meter reversing to the benefit of the consumer, the city will institute action in accordance with By Laws and policies, to recover lost revenue, and relevant punitive fines will be applicable.

No exemption from any of the Municipality's tariffs, requirements and processes will be granted for retrospective applications.

2.2 GENERATION CURTAILMENT

In the event of operating conditions resulting in municipal electrical grid parameters not meeting statutory minimum quality-of-supply standards, it may become necessary 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.

2.3 RIGHT TO ADAPT RULES & REGULATIONS

In the event of provincial or national changes to the regulatory environment, it may become necessary to implement changes to the municipal requirements with which EGs are to comply. All EGs, new and existing, will be obliged to comply with these changes, and will do so at their own cost.

2.4 RIGHT TO DENY ACCESS

It is essential that all consumers wishing to install an EG system, regardless of generation capacity, complete the relevant sections of the application process in full, and comply with the specified regulations and standards; and that written approval to commence is received from the City before system installation commences. The City needs to ensure that, amongst other considerations, the EG installation can be accommodated on the electrical network and that the total allowable EG capacity of the municipal electrical grid has not been exceeded, considering parameters in the NRS097-2-3 and other applicable SANS standards. Equipment should not be purchased prior to obtaining written approval from the CoE to commence, as approval is not guaranteed, and the City will not be held liable for any equipment expenses incurred where approval is denied.

In the event of a consumer being dissatisfied with the CoE denying access, and having exhausted all internal dispute resolution mechanisms, the consumer may lodge an appeal with NERSA, in terms of the Electricity Regulation Act, which stipulates NERSA's role in the investigation and resolution of disputes and complaints.

General Guidelines Embedded Generators

3 GENERAL GUIDELINES - EMBEDDED GENERATORS

This section covers important considerations in terms of the CoE's EG rules and regulations that apply to all consumers, including residential, commercial and industrial consumers who wish to connect a EG system, to the municipal electrical grid.

Anyone wanting to connect systems over 1 MW will not be able to connect under the conditions reflected in this document, and should approach the CoE directly to discuss the way forward. It is likely that grid impact studies will be necessary in these circumstances, amongst other work.

The CoE guidelines are subject to compliance with all current legislation, regulation and national policy, and applicants are required to ensure their compliance in this fluid policy environment

3.1 REGISTERED PROFESSIONAL SIGN OFF

The following is required in terms of professional sign off for all EG installations:

Annexure 4 as per Electrical Installation Regulations of the OHS Act 85 of 1993 must be completed, with the application form, by a Department of Labour (DoL) Registered Electrical contractor.

A copy of the Certificate of Compliance (CoC) {for Low Voltage installations} and or a Safety Report {for Medium Voltage Installations} and supporting test reports must be provided to the municipality upon commissioning and testing of the installation. A copy of the PV Greencard, where available, can also be submitted supplementary to the CoC/Safety and Test reports.

Until SANS 10142-Part 1-2 covering EG installation requirements and DC wiring are published, all SSEG designs and projects above 18kVA must be signed off on commissioning by a registered professional engineer (Pr. Eng) or professional certificated engineer (Pr Cert Eng) or professional technologist (Pr. Tech.Eng) or professional Engineering Technician (Pr Techni Eng)

3.2 TESTING OF INVERTERS

Until such time as a 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 testing authority certifying compliance of the inverters with NRS097-2-1 (and NRS097-2-2 when published). The use of inverters without such certification is not permitted, both in new and existing installations.

The certification body must be SANAS accredited or be recognised by the International Laboratory Accreditation Co-operation (ILAC) or the International Accreditation Forum (IAF) in terms of ISO/IEC 17025:2005 for photovoltaic systems. For any other embedded generation source an applicable certificate from a recognised body will be required and will be approved by the municipality. The accreditation bodies must provide accreditation documentation for the specific test location.

The EG applicant should require the inverter suppliers to provide the necessary certification before the equipment is purchased.

3.3 EG PARTICIPANTS MUST BE NET CONSUMERS

EGs can either be "net consumers" or "net generators". "Net consumers" purchase more electricity from the utility than they feed back onto the utility grid on a monthly basis. "Net generators" purchase less electricity from the utility than they feed back onto the utility grid on a monthly basis. EG's connected to the City's grid shall be net-consumers.

3.4 GENERATING LICENCE

The applicant has the responsibility to comply with all legal and regulatory requirements, as related to EG. Current legislation stipulates those generators of 100 MW or smaller do not require a license from NERSA. Should the existing threshold change all existing and new EGs will need to comply with the new requirements, at their own cost.

If a NERSA generation licence is required, then it is the consumer's responsibility to interact with NERSA to obtain such. The CoE is required to report to NERSA on a regular basis regarding all municipal electrical grid connected generation and is compelled to disconnect generators that do not adhere to regulations.

3.5 ESKOM GRID CONNECTION

Consumers residing within the municipal boundaries, but connected to the Eskom distribution grid, need to apply to Eskom for consent to connect EG to the Eskom electrical grid. The CoE will not be involved in this process as these consumers are legally supplied by Eskom.

3.6 DECOMMISSIONING OF AN EG SYSTEM

The City requires notice of any EG system which has been decommissioned, irrespective of the reason for decommissioning. An EG system which has been decommissioned must be disconnected from the grid at the consumer's cost by the removal of wiring which connects the inverter/s with the grid; and the submission of a decommissioning report on the prescribed form. If the EG customer was on an export credit tariff, the tariff will revert back to an import only tariff.

3.7 TRANSFER OF POWER TO A DIFFERENT LOCATION

The power produced by the EG must be utilised on the property on which the generator is located, or fed into the utility network for purchase by the City through an export credit tariff. The following are not permissible:

- Installation on a different property to where the power is used (e.g. installing solar PV panels on a neighbour's house roof);
- Supplying power from an EG on the premises of the applicant to another premises (e.g. selling power to adjacent properties or to another premises elsewhere in the city).

3.8 TRANSFER/CHANGE OF OWNERSHIP/CONSOLIDATIONS/SUB DIVISIONS/SEMI HOUSES

If a transfer of the property and/or change of ownership of the electricity account holder takes place (or in the case of consolidation, sub division or semi houses), a new EG application form should be lodged in terms of the municipal EG process, or alternatively the EG system must be decommissioned. After decommissioning, if the EG customer was on an export credit tariff, the tariff will revert back to an import only tariff.

A new CoC is required if the current one is more than two years old, or if any changes have been made to the electrical installation within the two-year period.

For a change of ownership, a new test report of the EG installation by a registered person (a professional engineer, professional technologist or) will be required.

3.9 ISLANDING / ANTI-ISLANDING INSTALLATIONS

Grid-tied inverters are required to have an anti-islanding function (immediate disconnection when there is a general power outage), as stipulated in the NRS 097-2-1. Certification to this effect is required (see Testing of Inverters). Should the inverter or EG installation have the facility to both comply with these anti-islanding requirements AND operate in "islanded mode" where the EG installation supplies power to

a portion of the consumer's electrical grid during a general power outage, it shall be effectively isolated from the municipal electrical grid during operation, (as is legally required of any standby generator).

If the EG installation is to be configured as a standby supply after islanding from the municipal electrical grid, (and it shall be isolated from the grid during such operation), a registered person in terms of the Electrical Installation Regulations (2009) shall 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 (Section on 'Alternative supplies including low voltage generating sets, installations, etc') apply. This connection would further require a break-before-make switch with an appropriate change-over switch interlock.

3.10 FIRE SAFETY AND EMERGENCY SHUT-OFF SWITCH

Emergency disconnection switching must be in accordance with NRS 097-2-1.

The approval of the fireman's switch is subject to relevant SABS standards, in addition to what is specified in NRS 097, and is subject to the City's DEMS requirements.

3.11 OFF-GRID SYSTEM

Stand-alone generators (not connected to the municipal electrical grid in anyway), do not need permission from the energy department. However, consumers with EG installations that they deem to be off-grid, will be required to submit the following to substantiate that the EG installation is off-grid, as defined, and that the Electricity Supply By-law therefore does not apply to it:

1. A completed "Declaration for Off-grid Embedded Generation form" with details of the consumer and the installation, declaring that the EG installation is deemed to be off-grid and thus does not have to be approved;
2. A certificate of compliance (CoC) and test report for electrical installations certifying that the EG installation is physically separated from the City's grid and the part of the installation on the property that is being supplied from the City's network. If a suitably interlocked change-over switch is required for a passive standby UPS utilised as off-grid hybrid EG, the certificate of compliance and the test report must certify that the change-over switch complies with the requirements.
3. A schematic diagram showing details of the EG installation in relation to the rest of the installation and the City's grid.
4. A certificate by a registered person (a professional engineer, professional technologist) certifying that the installation is off- grid.

In addition, approvals from other City departments such as the Planning and Building Development Management Department may still be necessary, depending on the type of generator proposed and its characteristics. It is the responsibility of the prospective off-grid generator owner to obtain the necessary approvals from these departments direct.

Note that an EG installation connected to the City's electricity grid through a reverse power flow blocking relay is not considered to be operating as an off-grid device. It is grid-connected and must comply with all the requirements detailed in these requirements.

Customers wishing to go complete off grid, shall be charged all necessary connection fee should they opt to re-connect to the grid.

3.12 APPLICABLE TECHNICAL STANDARDS

Most of the technical requirements that EGs are required to comply with are covered in the following standards (note that these do not necessarily cover all requirements for EG systems - see Appendix 1 for the complete list):

- NRS 097-2: Grid interconnection of embedded generation: Part 2 Small Scale Embedded Generators (Sections 1 to 4)
- South African Renewable Power Plant Grid Code (although the NRS 097-2 series cover most issues relevant to EG)

The above standards cover aspects such as voltage range; flicker; DC injection; frequency operating range; harmonics and waveform distortion; power factor; synchronization; safe disconnection from the network; overvoltage and undervoltage; sudden voltage dips and peaks; voltage change; over frequency and under frequency; anti-islanding; DC current injection; network faults; response to utility recovery; isolation; earthing; short-circuit protection; labelling.

The design and installation of all EG equipment will need to comply with these requirements¹.

In addition, EG installations are to comply with the following standards, legislation and regulations:

- South African Distribution Code
- NRS 048: Electricity Supply – Quality of Supply
- NRS 049: Smart metering
- SANS 10142- Parts 1 and 2: The wiring of premises (as amended and published)
- SANS 474 / NRS 057: Code of Practice for Electricity Metering
- Electrical Installation regulations (EIR),2009
- Electrical Regulations Act 4 of 2006 (ERA)
- City of Ekurhuleni Electricity Supply by-law.
- City of Ekurhuleni AMR metering standard.

¹ The CoE will not check whether all these requirements are met, but will require the necessary certificates to demonstrate proof of compliance. Neither will the City provide advice- prospective EG's need to consult with their suppliers.



Metering

4 METERING

4.1 MUNICIPAL ELECTRICAL GRID CONNECTION

4.1.1 REVERSE POWER FLOW/ FEED-IN TO THE MUNICIPAL ELECTRICAL GRID

The CoE allows for reverse flow, compensation, through an export credit will be provided once the export credit tariffs are approved. The CoE has developed an EG export credit tariff, which will compensate EG consumers for feed-in once implemented. Consumers installing EG, who wish to participate in reverse power flow (and the EG tariff when implemented), shall have a 4-quadrant bi-directional Automated Meter Reading (AMR) meter installed. The CoE will provide and install the requisite meters at the consumer's cost. Manual read conventional credit or prepayment meters are not allowed to run backwards, due to technical deficiencies and manual reading requirement.

All consumers changing to quadrant 4-quadrant bi-directional AMR meter must adapt their electrical installations in such a way that metering is accommodated in a meter kiosk in the road reserve. This does not apply where an acceptable meter box or meter room already exists on the street-front property boundary. If no kiosk exists or there is no room for the meter in an existing kiosk, a meter kiosk must be installed in the road reserve at the applicant's cost. Only in cases where there are extremely narrow or no footways, thereby precluding the installation of a meter kiosk, consumers will be required to provide metering accommodation on the street-front property boundary. Such a meter box must face outwards and be locked with a standard CoE Energy Department lock.

4.1.2 REVERSE POWER FLOW RESTRICTED.

Consumers wanting to connect EG to the grid without feeding back into the grid need to install reverse power flow blocking protection to prevent reverse power flow onto the electricity grid. Prepayment customer installing EG, who do not wish to participate in reverse power flow have the option to remain on prepayment meter or , install a 4-quadrant bi-directional Automated Meter Reading (AMR) meter. The CoE will provide and install the requisite meters at the consumer's cost. Consumer who do not wish to participate in reverse power flow will be on an import tariff structure. A deposit will be payable when changing to a 4-quadrant bi-directional Automated Meter Reading (AMR) meter.

4.2 REFUNDS OF ELECTRICITY ALREADY PRE-PURCHASED

Where applicants currently have prepayment meters, and want to feed into the municipal system, these meters will need to be replaced with 4 quadrant bi-directional AMR meters appropriate for EG systems and tariffs. The refund of Pre-paid meter units when a consumer changes to the EG tariff and has a 4-quadrant bi-directional AMR meter installed will be undertaken as follows:

- Pre-paid meter vending unit tokens already loaded on the Pre-paid meter: The consumer may delay the installation of an EG - appropriate meter
- Alternatively, the consumer may elect to forfeit the units on the Pre-paid meter, as defined in the By Laws.

EG Connection Criteria

5 EG CONNECTION CRITERIA

Simplified EG connection criteria are specified in the NRS 097-2-3, and applications for systems that fall within these parameters are likely to be easily processed by the municipality, and only in rare cases will require grid impact studies in their assessment. Such parameters include:

- Systems not larger than 1000kW (1MW)
- Connecting to a LV network

Applications for systems which exceed the parameters of the NRS097-2-3 but do not exceed 1 MW will also be accepted by the municipality, but may require specialist grid-impact studies in their assessment. The municipality will advise the consumer of such needs after the application form is received.

The criteria for simplified connection in shared and dedicated LV feeders are described below (for details see the relevant sections of the NRS097-2-3):

5.1 SHARED LV FEEDERS

The NRS 097-2-3 specifies that the maximum individual generation limit in a shared LV feeder (which applies to most small commercial and residential situations) must not exceed 25% of the consumer's NMD, and be up to a maximum of 20 kW. The following EG size limitations are derived from NRS 097-2-3 for Shared LV connections.

Table 1: EG size limitations - NRS 097-2-3 for Shared LV connections

Service connection		
No. of Phases	Service Circuit Breaker Size (A)	Maximum Total Generation Capacity of SSEG (kW)
1	40	2.3 (10A)
1	60	3.5 (15A)
1	80	4.6 (20A)
3	40	6.9 (30A)
3	60	10.4 (45A)
3	80	13.9 (60A)
3	100	17.3 (75A)

Notes to table:

- To determine if you have a single-phase or three-phase connection, check the main circuit-breaker on the distribution board. A single-phase supply will generally have a single main circuit-breaker, and a three-phase a triple main circuit-breaker. If in doubt consult an electrician.
- 'Maximum total generation capacity' refers to the total output capacity of the generator. For PV systems, 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.
- kVA and kW ratings for EGs are similar in most cases and can be used interchangeably for estimation purposes
- If EG generation capacity is 4.6 kW 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 their load is balanced across all three phases. A registered electrician, engineer or technologist should be consulted to ensure compliance.
- Any changes to NRS 097-2-3 adopted and implemented shall be used as the basis of table 1 above or any other conditions.

5.2 CUMULATIVE EG CAPACITY AND IMPACT ON LV AND MV NETWORKS

Should the cumulative installed capacity of EG systems be such that it may impact negatively on local LV or MV network functioning, as per the stipulations of NRS097-2-3, the CoE will not allow further EG connections until they can be undertaken without such negative impact. Specialist grid impact studies may be requested of the new EG applicant to demonstrate this, even if the system size falls within the NRS097-2-3 parameters.

5.3 SECTIONAL TITLE GROUP DEVELOPMENTS AND BLOCKS OF FLATS

EG installations in sectional title group developments or blocks of flats need to meet unique requirements. In the event of Sectional Title Developments wanting to install EG, the application should be made in the name of the body corporate - no individual applications will be allowed.

Proposals must be discussed with the HOD: Energy before applications are submitted. The basic approach will be the same as for full title consumers but the isolating point in the event of an outage, or for own generation, will be at the point of municipal connection with the sectional title group development or block of flats. The applicable import and export credit (once approved) tariffs for such developments will be published annually.

EG Tariffs

6 EG TARIFFS

EG export credit tariffs are developed, and will be implemented ~~in future~~ once as approved annually. The following guidelines are in line with best practice, and form the basis for the SSEG tariff development.

All grid connected consumers on the EG export credit tariff will need to pay a network access charge. The network access charge tariff will be published annually for all EG consumer classes. For consumers feeding into the network, an export tariff is under consideration, and when implemented, will be published.

6.1 RESIDENTIAL EG TARIFF

The Residential EG tariff comprises of:

- Network access charge – a fixed daily charge to ensure that fixed costs associated with maintaining and operating the municipal electrical grid, and providing a retail service, are recovered through appropriate charges.
- Energy charge (c/kWh) - electricity consumption charges for kWh consumed and purchased from the municipal grid.
- Export (Feed-in) rate (c/kWh) - a fixed rate per kWh at which the Municipality will purchase residential generation exported to the grid, when implemented.

6.1.1 BILLING PERIOD

A net billing methodology will be applied. The daily service charge, along with charges for consumption and credits for generated electricity fed onto the utility network, will be billed monthly (as is done for other Municipal services e.g. water and rates). Tariffs are determined annually by the CoE and are subject to approval by NERSA. EG applicants should check the Municipality's website www.ekurhuleni.gov.za for the latest tariffs.

6.1.2 INCREASED COSTS

The CoE bears no responsibility should the consumer's electricity bill increase due to a consumer moving to an EG tariff. It is up to the consumer to ensure that they understand the financial implications of having an EG system installed and the applicable tariffs.

Residential consumers should note that it is possible that they could be migrated to another residential tariff class to accommodate the implementation of the EG tariff structure. Consumers should thus discuss the possible impact of tariff changes with the City during the application process.

6.2 COMMERCIAL AND INDUSTRIAL EG TARIFF

Commercial and industrial consumers that are on tariffs which already have a fixed service charge and network demand (capacity) charge will remain on this tariff. An export (feed-in) generation tariff component is added, to compensate consumers for energy exported onto the municipal electrical grid, at a fixed rate per kWh. Consumers on a tariff that does not include fixed network access charge and demand charge will be moved to an appropriate tariff.

Tariffs are determined annually by the CoE and are subject to approval by NERSA. EG applicants should check the Municipality's website www.ekurhuleni.gov.za for the latest tariffs.



Commercial & Contracting

7 COMMERCIAL AND CONTRACTING

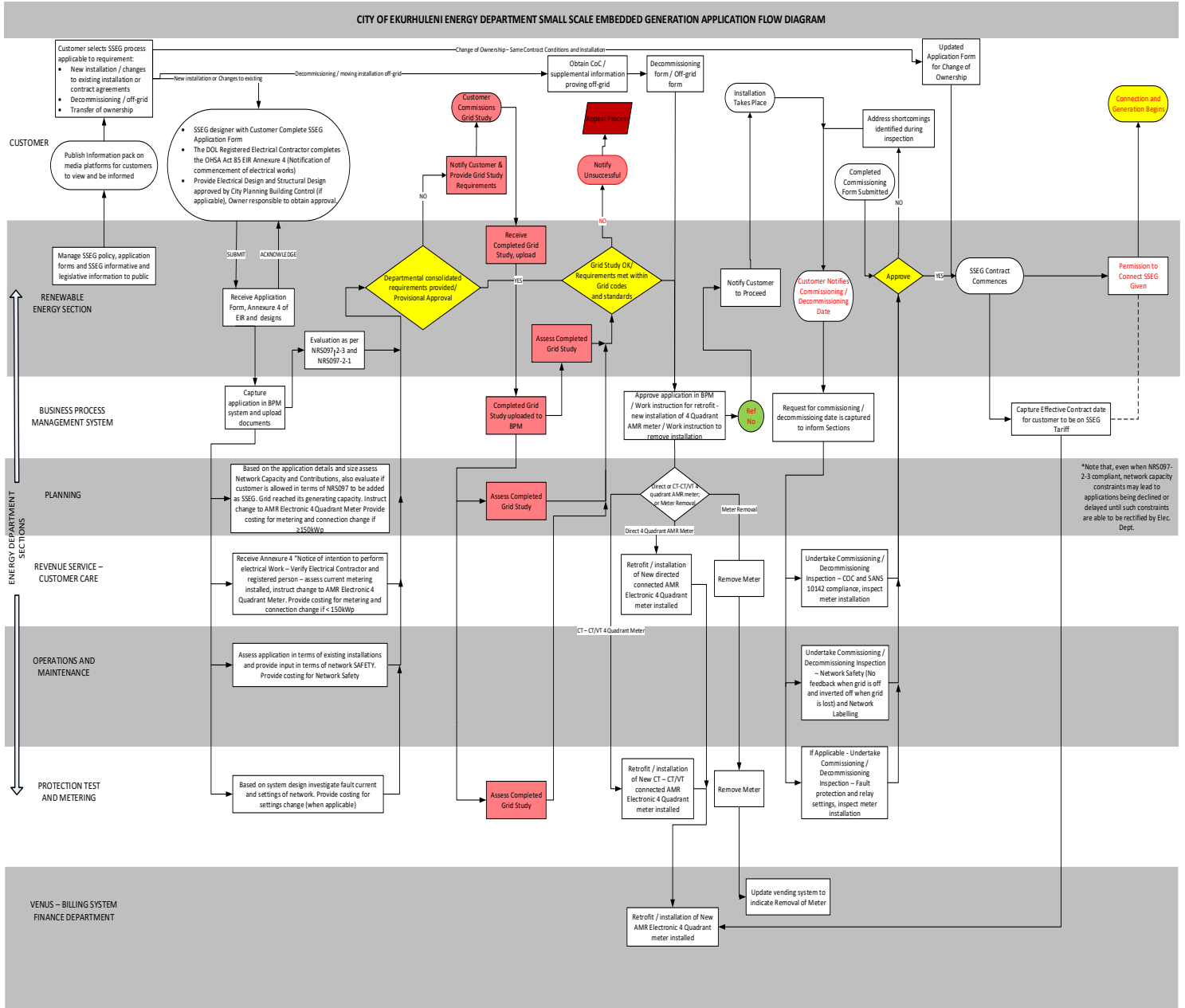
- The consumer is responsible for all the costs involved in the supply and installation of meters. Budgetary cost for any of the applicable metering changes for EG will form part of the connection cost of the city as annually recalculated, approved and published by the City.
- The consumer will be responsible for any rearrangement of the installation or meter accommodation including the moving of the metering point to the property boundary. The cost of providing a meter kiosk in the road reserve will be borne by the customer, unless this may form part of the metering upgrading program of the city. In the event that the kiosk cannot be accommodated due to the pavement being too narrow, in which case the consumer will be required to provide a metering kiosk to the City's specifications inside the property on the road boundary. If applicable, the customer will also be required to provide a servitude, or way leave, to accommodate the infrastructure as necessary;
- The consumer will be responsible for the cost of any specialist grid studies (if required);
- The consumer will be responsible for any changes required to the utility network upstream of the connection point as a result of the EG installation (although the need for such changes is unlikely);
- The consumer will be responsible for all the costs associated with specialist tests that need to be carried out as set out in Section 8 Step 6 of this document, e.g. Inverter testing, PV Greencard, CoC issued by a registered person (Electrical); as well as for obtaining the required certification of the design and installation.
- Any other costs associated with obtaining approval for the EG connection to the municipal grid.



Residential, Commercial & Industrial EG

8 RESIDENTIAL, COMMERCIAL AND INDUSTRIAL EG APPLICATION PROCESS

An overview of the EG application process is shown below. The application forms for EG is presented in Annexure 5: Application for the Connection Embedded Generation.



The Application for the Connection of Embedded Generation form must be completed for all embedded generation. Should metering changes be required for the EG installation, the general application form for new or modified connections must also be completed. The forms are available on the Municipality's website.

Step 1: Visit the Municipality website

Visit the Municipality's website (www.ekurhuleni.gov.za) and download the relevant application form/s as noted above.

Alternative – visit your Consumer Care Centre, Energy Department, Consumer Care Section.

Step 2: Complete application for the connection of small scale embedded generation form and, if required, the general application form for new or modified connections

The Municipality requires that the application form/s be signed by the current electricity account holder.

Details of the proposed Registered person must also be provided in the form of Annexure 4 of EIR (part of application form)

The applicant may need support from the proposed installer or a registered professional in completing the application form.

The completion and full approval of the application form, and the signoff after commissioning, will constitute the formal EG agreement between the customer and COE.

Step 3: Obtain permission from other Municipal departments

The Energy Department requires prior approval of the proposed EG installation from City Planning Department, Fire Department and Building Control Management divisions.

Step 4: Submit completed application form/s and attachments

Form/s must be submitted to the relevant contacts at the Energy Department.

Attachments to the application include an initial design circuit diagram (for >100 kW systems) and the inverter certification of compliance with NRS 097-2-1.

Step 5: Installation commencement upon approval from the municipality

After due consideration of the application, the applicant will be informed in writing whether the application has been successful or not.

If further information or grid studies are required by the municipality, the applicant will be notified thereof.

Once notified of a successful application, the applicant may commence installation (it is advised that the applicant does not pay for any equipment until municipal approval to install is granted in writing, as such approval is not guaranteed).

Step 6: Commissioning and documentation to be submitted to the Energy Department.

Commissioning of the system must be undertaken by a registered professional, who must complete and sign off the *EG Installation Commissioning Report*.

In addition to the Commissioning Report, the following documentation must also be completed:

- Final as-built circuit diagram
- Inverter type test certificate according to NRS 097-2-1.
- A copy of an electrical installation Certificate of Compliance as per SANS 10142-1 (and SANS 10142-1-2 when published), together with a copy of PV Greencard Report.
- Pictures of NRS safety labelling indicating dual supply, placed on the customer's distribution side as well as on the Municipal distribution point (e.g, Meter box, Miniature substation, distribution kiosk, brick substation etc)

All completed documentation must be submitted to the Energy Department – Alternative and Renewable Division's office.

Step 7: Inspection of installation

The Municipality has the right to inspect all residential, commercial and industrial installations, at their sole discretion, for compliance and grid safety.

Step 8: Approval granted to connect to the municipal electrical grid and generation commences

If all of the above is satisfactory, and a change of metering is required, a metering quotation will be issued (which will include all associated costs). Upon acceptance of the quotation and payment of all costs, the Municipality will install the necessary meter.

Approval to connect EG to the municipal electrical grid must be provided by the Energy Department to the consumer, in writing, together with any operation and other requirements deemed necessary.

The Energy Department must conduct a safety loss of power test to ensure that no power feedback exist.

Once completed, the consumer will be placed on the appropriate tariff, which will be applied from the date the AMR meter was commissioned, or, if no change was required, from the date of issue of the Commissioning Approval Letter.

Step 9: Repeat the process in the case of EG capacity expansion

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

APPENDIX 1: RELEVANT STANDARDS AND REGULATIONS

Relevant Standards and Regulations

The CoE requires that EG 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. The design and installation of all EG equipment will need to comply with these requirements. The Professional Engineer / Technologist will highlight aspects most applicable to the EG system in question to ensure that these conditions are met.

List of Standards and Regulations

There are a number of standards and regulations that the project developer and EG user/lesser have to be aware of. The most relevant standards and regulations that must be complied with are:

- Electricity Regulation Act, Act 4 of 2006 and Electricity Regulation Amendment Act, 28 of 2007 as amended
- South African Distribution Code (all parts)
- South African Renewable Power Plants Grid Code
- Occupational Health and Safety Act 1993 as amended
- SANS 10142- Parts 1 and 2: The Wiring of Premises
- SANS 474/ NRS 057 Code of Practice for Electricity Metering
- NRS 048: Electricity Supply– Quality of Supply
- NRS 097-1: Code of Practice for the interconnection of embedded generation to electricity distribution networks: Part 1 MV and HV (Eskom 240-61268576 / DST 34-1765: Standard for the interconnection of embedded generation, is applicable until published)
- NRS 097-2: Grid interconnection of embedded generation: Part 2 Small scale embedded generation

Guidance on their applicability and coverage is given below:

Standards of Importance

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

1. NRS 097-2: Grid interconnection of embedded generation: Part 2 Small-scale embedded generation
2. South African Renewable Power Plants Grid Code

NRS 097-2-1 (Part 2: Small-scale Embedded Generation, Section 1)

NRS 097-2-3 (Part 2: Small-scale Embedded Generation, Section 3)

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

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.

i) Category A: 0 – 1MVA (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:

i.1) Category A1: 0 – 13,8kVA

This sub-category includes RPPs of Category A with rated power in the range of 0 to 13,8 kVA.

i.2) Category A2: 13,8kVA – 100kVA

This sub-category includes RPPs of Category A with rated power in the range greater than 13,8 kVA but less than 100kVA.

i.3) Category A3: 100kVA – 1MVA

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 4,6kVA must be balanced three-phase.

Other Standards and Legislation

Electricity Regulation Act, Act 4 of 2006 (ERA)

All applicants should familiarize themselves with the ERA. The act states that no person may, without a licence issued by the regulator (NERSA), operate any generation facility. The ERA holds that exemption is held for non-grid-tied projects. Note that NERSA has issued a communication giving licence exemption to EG installations in municipal areas under 100kW.

South African Distribution Code

The South African Distribution Code applies to all entities connected to the distribution network, including EGs. It sets the basic rules for connecting to the distribution network, ensures non-discrimination to all users connected to the distribution network and specifies the technical requirements to ensure the safety and reliability of the distribution network. A more detailed guideline pertaining to the connection of EGs to the utility network and the specific requirements involved is found in the NRS 097-2-1.

Occupational Health and Safety Act, 1993

The Occupational Health and Safety Act provides for the health and safety of the people by ensuring that all undertakings are conducted in such a manner so that those who are, or who may be, directly affected by such an activity are not negatively harmed as far as possible and are not exposed to dangers to their health and safety.

City of Ekurhuleni Electricity Supply By-Law

This document provides the general conditions of supply of electricity, outlines the responsibility of the consumers, systems of supply, measurement of electricity and the electrical contractors' responsibilities.

SANS 10142-1 The Wiring of Premises - Low-voltage installations

This document serves as the South African national standard for the wiring of premises in low- voltage networks. The aim of the document is to ensure that people, animals and property are protected from dangers that arise during normal as well as fault conditions,

due to the operation of an electrical installation. Compliance to the standards and regulations as laid out SANS 10142-1 is required and proof should be provided via an electrical installation certificate of compliance. The implication is that a qualified electrician is required to sign off on your system.

SANS 10142-2 The Wiring of Premises - Medium-Voltage installations above 1 kV A.C. not exceeding 22 kV A.C. and up to and including 3 000kW installed capacity

This document serves as the South African national standard for the wiring of premises in medium-voltage networks. The aim of the document is to ensure that people, animals and property are protected from dangers that arise during normal as well as fault conditions, due to the operation of an electrical installation. Compliance to the standards and regulations as laid out SANS 10142-2 is required and proof should be provided via an electrical installation certificate of compliance. The implication is that a qualified electrician is required to sign off on your system.

SANS 474 / NRS 057 Code of Practice for Electricity Metering

SANS 474 specifies the metering procedures, standards and other such requirements that must be adhered to, by electricity licensees and their agents. It refers specifically to new and existing metering installations for the purpose of billing. It further specifies the initial calibration and certification requirements as well as compliance testing of metering installations and the subsequent procedures to ensure continued compliance. It specifies the procedures for the manipulation and storage of metering data and sets a standard format for the numbering of electricity meters.

For more specific details with regard to the metering for EG purposes, NRS 097-2-1 should be consulted and the requirements as defined by the City must be adhered to.

NRS 048

The NRS 048 series covers the quality of supply parameters, specifications and practices that must be undertaken to ensure correct and safe operation. The NRS 048-2 and NRS 048-4 have the most relevance to the operation and connection of EG's to the utility network:

NRS 048-2: 'Voltage characteristics, compatibility levels, limits and assessment methods' sets the standards and compatibility levels for the quality of supply for utility connections as well as for stand-alone systems. It is intended that generation licensees ensure compliance with the compatibility levels set in this document under normal operating conditions.

NRS 048-4: 'Application Requirements for utilities' sets the technical standards and Requirements for the connection of new consumers. It also sets the technical procedures for the evaluation of existing consumers with regards to harmonics, voltage unbalance and voltage flicker.

APPENDIX 2: INVERTER TYPE TESTING REQUIREMENTS

A list of approved inverters is updated when necessary and published on CoE website. The list can also be obtained from Alternative and Renewable Energy Division. The CoE's requirements for grid tied inverter (GTIs) and ancillary equipment type test certification are as follows:

1. A 3rd party accredited body must perform the inverter type test certification in terms of NRS 097-2-1. The accredited body must be SANAS accredited or be a member of the recognition arrangements of the International Laboratory Accreditation Co-operation (ILAC) or the International Accreditation Forum (IAF) in terms of ISO/IEC 17025:2005 for photovoltaic systems. The accreditation bodies must provide accreditation documentation for the specific test location.
2. The accredited body must:
 - a) Issue a Certificate of Conformity for all GTIs and ancillary equipment (e.g. network and system grid protection voltage and frequency relays for the centralised disconnect switch) in terms of the requirements of current NRS 097-2-1 document.
 - b) Provide summary Test Report [excluding sensitive information test results] comprising of:
 - i. Report reference number, test laboratory name, client/applicant's name and reference, test specification and report form, test item description/name/model/types, ratings, lab and testing location, name and signature of test person and approval authority, manufacturer name and dress, test report documentation version control;
 - ii. Test item particulars, test case verdicts [N/A, pass and fail], test and issue dates, general remarks;
 - iii. Copy of GTIs and ancillary equipment name plate data;
 - iv. General product information, preferably with the inclusion of the GTIs and ancillary equipment electrical block diagram;
 - v. Summary of NRS 097-2-1 indicating all clauses, clause description/requirement/test, result/remark and verdict [N/A, pass or fail];
 - vi. Test overview summary.
3. NRS 097-2-1: 2017 was published on 8 March 2017 and replaces NRS 097-2-1: 2010. Inverter requirements are as follows:
 - a) Retrospective compliance of installed NRS 097-2-1: 2010 type tested inverters to the new NRS 097-2-1: 2017 version: Retrospective compliance of the installed EG base with the new version is not required.
 - b) New installations with existing certified NRS 097-2-1: 2010 type tested inverters:
 - i. EG installations and applications in process (inclusive of EG system modification or expansion) will be accepted until 31 December 2018 only.
 - ii. Commissioned inverter settings shall be in accordance with the new NRS 097-2-1: 2017 version.
 - c) New inverter type test certification:
 - i. All the existing NRS097-2-1: 2010 type tested inverters must be SANAS re-certified in accordance with new NRS097-2-1: 2017 with effect from 1

January 2019 if the inverter is being considered for a new embedded generation application.

- ii. New inverter type test certifications must be in accordance with the new NRS 097-2-1: 2017 version and the embedded generation installation using such inverters shall be compliant with new version.

APPENDIX 3: SUITABLY INTERLOCKED CHANGE-OVER SWITCH FOR GRID-TIED HYBRID EG AND A PASSIVE STANDBY UPS UTILISED AS OFF-GRID HYBRID EG

1. This includes interrupters, transfer switches, bypass switches, isolation switches and tie switches.
2. The switch shall provide feedback of its position to the inverter/charger so that if the contacts fail to operate or malfunction [e.g. fused-closed contacts, inadvertent energising of the change-over switch coil, etc.], use of the inverter mode will be impossible.
3. The requirements of SANS 10142-1 Section 7.12.2.5 are applicable.
4. It shall be a separate, controllable switch, compatible with the applicable electrical service conditions and to the performance requirements of the passive standby UPS, in accordance with SANS / IEC 60947-6-1 and the following product specifications:
 - a) Static transfer systems (STS): SANS / IEC 62310-3.
 - b) Automatic transfer systems (ATS): SANS / IEC 60947-6-1.
 - c) Manual isolation, tie and transfer switches (MTS): SANS / IEC 60947-3.
5. The switch shall have a rated lightning impulse withstand voltage (BIL) of 4 kV at 1,2/50 μ s in accordance with SANS / IEC 60947-1 (Tables H.1 and 12).
6. Characteristics of the transfer shall be break-before-make (open transition) – no transient cross-conduction during transfer. The transfer time of the switch shall be \geq 20 ms.
7. The contactor gap of the switch shall exceed 4 mm in accordance with SANS 60950-1, S 2.10.3.3 and Table 2K for a fixed installation with overvoltage category 2.

Note: The Certificate of Compliance with the accompanied test report must provide detail of the suitably interlocked change-over switch as above in Sections 3 and 4 of the SANS 10142-1 Test report.

APPENDIX 4: APPROVALS REQUIRED FROM OTHER MUNICIPAL DEPARTMENTS

1. Planning and Building Development Management

No building plans are required to be submitted provided the SSEG installation does not project more than 1.5 m, measured perpendicularly, above the roof and/or not more than 600mm above the highest point of the roof. If the above parameters are exceeded then full building plans, including an engineer's endorsement, are required. A relaxation in terms of the Zoning Scheme Regulations might also be required under either one or both above circumstances. The EG applicant will be required to apply to Building Control to verify that the proposed rooftop PV installation will not require additional civil / structural requirements.

2. Ground-mounted PV systems

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 (i.e. carport conversion etc.).

3. Environmental Approvals

Solar PV EG installations covered by this document do not require Environmental Approval².

4. Health and Air Quality Approvals

Air Quality and Mechanical Engineering (Noise) Units do not need to be consulted with EG applications where diesel fuelled mechanical engine generator are not part of the installation. Should a mechanical engine which burns fuel or generates noise be incorporated in the installation, such applications should be referred to the Municipal Health Department.

² Large-scale embedded generation installations would require environmental authorisation (EA) in terms of the NEMA 2010 EIA Regulations if they generate > 10 MW electricity. In addition, the electrical transmission infrastructure that may be associated with a large scale embedded generation system would also require EA if it has a capacity of 275 kV or more within an urban area, or more than 33kV outside urban areas.

APPENDIX 5: APPLICATION FOR THE CONNECTION OF EMBEDDED GENERATION



APPLICATION FOR THE CONNECTION OF EMBEDDED GENERATION

This application form is for the connection of any type of grid-tied small-scale embedded generation to the electrical installation of residential, commercial or industrial customers, connected to the electrical grid of City of Ekurhuleni.

PLEASE NOTE: FAILURE TO PROVIDE ALL RELEVANT INFORMATION AS REQUIRED BELOW MAY LEAD TO DELAYS IN THE APPLICATION PROCESS

SECTION A: Application Type

Please select the type of EG application and approval sought.

1. New Grid-tied EG Installation (Complete Sections B, C, D, E, G)
2. Changes to Existing Grid-tied EG Installation (Complete Sections B, C, D, E, G)
3. Transfer of Ownership (Complete Sections B, G)
4. Decommissioning / Moving EG Off-grid (Complete Sections B, F, G)

SECTION B: Applicant and Property Information

B1. Municipal Account Holder Details*

Name:			
Municipal Account Number:		Existing Tariff Category:	
Telephone Number:	Land:	Mobile:	
Email Address:			

* - if the applicant does not yet have an electricity connection, this should be stated above and an application for a new connection will need to be submitted together with this application form.

B2. Property Details

Property Erf number:	
Property use (tick):	Residential <input type="checkbox"/> Other (Business, Commercial, Industrial) <input type="checkbox"/>
Physical address:	
Stand number (as per municipal account):	

Township / Suburb / Farm:						Post code:					
Site GPS coordinates:	Latitude (dd mm ss)	S	2	°	'	''	'	''	'	''	
	Longitude (dd mm ss)	E	2	8	°	'	''	'	''		

SECTION C: Installer Information

Installer information to be provided as part of the completed **Annexure 4: Regulation 8(1) of the Electrical Installation Regulations (EIR), 2009 Notice of Commencement of Installation Work**. The completed Annexure 4 should be attached to this application form.

The Annexure 4 form can be collected from the City of Ekurhuleni, or downloaded from <https://www.ekurhuleni.gov.za/>

Anticipated Construction Schedule:

Start Date:		Commissioning Date:	
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SECTION D: Embedded Generator Technical Information

D1. NERSA license³

Does the system require a license from NERSA? (tick)	No
	Yes

D2. EG system overview

Project name:		Nominal AC capacity (kVA):	
Generation technology*(tick):	Solar PV <input type="checkbox"/>	Wind <input type="checkbox"/>	Diesel generator <input type="checkbox"/>
Other generation type (specify) _____			
Does the EG include storage capabilities (tick appropriate):	Yes		No
	Storage capacity:	kW	
		kWh	
System type (tick):	Rooftop <input type="checkbox"/>	Ground mounted <input type="checkbox"/>	Building integrated <input type="checkbox"/>
Other system type (specify) _____			
Existing main switch:	Voltage (V):	Current (A):	
Total inverter AC capacity (kVA):		Total (nameplate) capacity (kWp):	
Grid Connection mode (tick appropriate):	Energy from system to be used solely within the consumer's electricity network and no excess power to be exported to CoE's Electricity Distribution network at any time (i.e. reverse power blocking to be installed)		
	Energy from system to be used within consumer's electricity network and excess power to be exported to CoE's Electricity Distribution network		
	Energy from system to be used solely for exporting to CoE's Electricity Distribution Network (e.g. Wheeling)		

³ Licence requirements and exemptions are subject to NERSA guidelines, as published in the ERA.

	Energy from system to be used only within customer's electricity network, with no physical connection between the customer's network (or phase on which the EG is connected) and the CoE Electricity Distribution network (i.e. off-grid).	
Earthing arrangements i.e. TN-C-S:		

* Provide product description details and specifications of generation technology as a separate appendix to this application

D3. EG system details

Make and Model of key generation Equipment	Manufacturer:		
	Model:		
	Serial No:		
	Phase: (Tick)	Single <input type="checkbox"/>	Three <input type="checkbox"/>
Electrical parameters of EG: (All units in parallel, to be used for fault-level studies. Not all of these parameters apply to all modes of SSEG. Insert N/A if not applicable).	Rated Voltage:		
	Maximum MVAR limit		
	Inertia constant		
	Maximum peak short-circuit current (A)		
	Neutral to earth resistance (ohms)		
	Xd – Synchronous reactance (p.u.)		
	X'd – Direct axis transient reactance (p.u.)		

D4. Estimated Consumption and Generation Levels

Current electricity consumption/month (kWh)	Range from:	to:
Estimated average output of solar PV/month (kWh)	Summer:	Winter:
Monthly reverse feed (export) estimation (kWh)	Summer:	Winter:
Maximum (peak) expected export power onto Municipal grid (kVA)		

D5. Preliminary design details (for systems >18kVA only):

A preliminary circuit diagram and design showing major components, proposed point of common coupling, isolating and interfacing devices with the municipal electrical network, protection schemes, customer electrical installation, earthing arrangements, etc. should be attached as an appendix to this application form.

D6. Inverter Details

Manufacturer:			
Model:			
Number of Inverters:			
Inverter AC rating (kVA):	Each:	Total (if multiple):	
Other information:			
Number of Phases*:	Single Phase (✓)		Three Phase (✓)
Is the inverter/s certified according to NRS 097-2-1? (test certificate must be attached to this application):			
Please tick applicable below:			(✓)
Islanding			
Anti-islanding			
Reverse blocking			

* - see NRS097-2-3 for phase balancing requirements

E1. Project Name

Project name:	
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E2. Account Holder Details

Name:		
Municipal Account Number:		
ERF No:		
Telephone Number:	Landline:	Mobile:
Email Address:		
Physical address:		

E3. Installer Details

Company name:		
Contact Person Name:		
Telephone:	Landline:	Mobile:
Email address:		
DoL Reg Number:		

E4. EG Details

Inverter manufacturer and model:	
Inverter AC rating (kVA) (total if more than one inverter):	
Single of three phase:	
Serial number/s of inverter/s:	
Reverse power blocking method (or N/A):	

E5. Attachments Checklist*:

✓

Final as-built circuit diagram:	
Inverter type test Certificate of Compliance according to NRS 097-2-1, issued by accredited 3 rd party test house:	
Electrical installation Certificate of Compliance according to SANS 10142-1 (and SANS 10142-3 when published):	

* Note: The signed application form, together with final approval from CoE, will service the contract.

E6. Compulsory Declaration (to be completed by ECSA registered Pr Eng or Pr Cert Eng or Pr Tech Eng)

The EG installation complies with the relevant sections of NRS 097-2-1 and NRS 097-2-3:	
The loss of mains protection (anti-islanding) has been checked to be functional in test carried out as part of the on-site commissioning – i.e. a momentary disconnection of the mains supply to the site:	
Safety labels have been fitted in accordance with NRS 097-2-1:	
The EG installation complies with the relevant sections of SANS 10142-1 and SANS 10142-3 'Low voltage embedded generators' standard (as published), and an installation certificate of compliance is attached:	
The EG installation complies with licensing requirements of NERSA	
Reverse power blocking protection system installed and commissioned to prevent reverse power flow onto the municipal distribution electricity network (or N/A):	
Comments:	
Date: _____ Signature: _____	
ECSA registered Pr Eng or Pr Cert Eng or Pr Tech Eng Details	
Full Name:	
Company Name:	
Telephone:	Landline: _____ Mobile: _____
Email address:	
ECSA Reg no.	

F1. Account Holder Details

Name:		
Electricity Account Number:		
ERF No:		
Telephone Number:	Landline:	Mobile:
Email Address:		
Physical address:		

F2. Inverter Details

Inverter manufacturer and model:		
Inverter AC rating (kVA) (total if more than one inverter):		
Serial number/s of inverter/s:		

F3. Decommissioning Agent Details

Name:		
Accreditation/qualification:		
Address (incl. post code):		
Certificate of Compliance number (provide certified copy of the CoC which confirms that the EG has been disconnected effectively from the municipal electrical distribution grid):		
Telephone number:	Landline:	Mobile:
E-mail address		
Name:	Signature:	Date:

SECTION G: Declaration

I request the City of Ekurhuleni to proceed with a preliminary review of this embedded generation interconnection application / decommissioning / transfer of ownership (delete non-applicable) and I agree to pay the cost associated with completing this review and obtaining written consent of the Municipality, though such costs are unlikely except if grid studies are required. Should such grid studies be required, 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 the CoE providing this information to the National Electricity Regulator of SA (NERSA).

I declare that this installation has been designed such that it complies with the requirements laid out in the latest version of the Municipality’s *Requirements for Embedded Generation* document. I agree not to interconnect and operate this proposed EG system without written approval from the Municipality to do this.

Account Holder/Property Owner Signoff:

_____	_____	_____
Name	Date	Signature

DOL registered Electrician / PV Installer / Technician Signoff:

Organisation name:		
Person:		
_____	_____	_____
Name	Date	Signature

Return completed form to the relevant office, or email address:

Office: Room 422, 4 TH Floor, Boksburg Civic Centre, Trichardtts Road, Boksburg.
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Attachments to this application checklist (tick)	<input checked="" type="checkbox"/>
Preliminary circuit diagram (if >18kVA)	
Annex 4: Regulation 8(1) of the Electrical Installation Regulations (EIR), 2009 Notice of Commencement of Installation Work	
Inverter type test Certificate of Compliance and Test Report according to NRS 097-2-1, issued by accredited 3 rd party test house	
Supplemental power generation technology product description and specifications	
City Planning Department Approval	
Department of Environmental Resource Management Approval	
Disaster & Emergency Management Services Approval	

FOR OFFICE USE

1. Other municipal department approvals: Clearance by other Municipal departments

SECTION	COMMENTS	NAME	SIGNATURE	DATE
City Planning Department				
Disaster & Emergency Management Services				
Department of Environmental Resource Management				

Notes:

1. Energy Department will require **prior** approval from this department if necessary. Applications to connect to the municipal electrical grid will not be considered until relevant approval has been obtained by the applicant.
2. SSEG applications will require approval from Planning and Building Development Management if:
 - a) Roof top installations: PV panel(s), turbines etc. 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), turbines etc. in its installed position projects more than 2.1 metres above the natural/finished ground level.
3. EG applications will require approval from Environmental Resource Management if emitting generators, such as diesel fuel generators, are utilised.

2. Alternative and Renewable Energy Division

Date Application Received:		Application Reference No.	
Further Information Required	YES / NO	Date Received:	
Inspection Required	YES / NO	Date Undertaken:	
More detailed studies Required	YES / NO	Date Complete:	
Approved in Principle:	YES / NO	Date Applicant Advised:	

3. Revenue Services

Direct driven Meter change required:	YES / NO	Date Applicant Advised:	
Remain on prepayment meter (reverse blocking installed)	YES / NO	Date Applicant Advised:	
Tariff Change approved:	YES / NO	Date Applicant Advised:	
Instruction given for the installation of Direct driven Meter	YES / NO	Date Applicant Advised:	

4. Operations and Maintenance

Existing Safety Labels on network:	YES / NO	Date Applicant Advised:	
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Noting for Safety labels required:	YES / NO	Date Applicant Advised:	
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4.1 Protection Test and Metering

Existing protection and fault settings adequate:	YES / NO	Date Applicant Advised:	
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Protection and fault settings adjusted:	YES / NO	Date Applicant Advised:	
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Installation of AMR CT- CT/ VT	YES / NO		
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4.2 Planning and Construction

Import Network Capacity	YES / NO	Date Applicant Advised:	
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Export Network Capacity:	YES / NO	Date Applicant Advised:	
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Sufficient loading	YES / NO	Date Applicant Advised:	
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5. Commissioning

Commissioning Report received:	YES / NO	Date received:	
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Further information required:	YES / NO	Date Received:	
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Installation inspection: Copy of COC received	YES / NO	Date inspected:	
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AMR meter installed	YES / NO	Date installed:	
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Tariff change effected	YES / NO	Date changed:	
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Comments:

6. Final CoE Approval

Name and designation	Date	Signature / Stamp

7. Decommissioning

Decommissioning Report received:

Date received:

Decommissioning CoC received:

Date received:

