



SMALL-SCALE EMBEDDED GENERATION POLICY

1. OBJECTIVES

This policy facilitates the inclusion of Small-Scale Embedded Generation (SSEG) onto the electricity distribution network of Swellendam Municipality, so that safety, power quality, grid operation and municipal revenue issues are adequately addressed, and that the local renewable energy industry and green economy is promoted at the same time, supporting job creation.

Background

Steep increases in the price of electricity, elevated environmental awareness, rapidly decreasing costs of photovoltaic (PV) panels, and the high risk of national power blackouts have all resulted in electricity distributors around the country receiving numerous requests to allow electricity consumers to connect PV and other Small-Scale Embedded Generators (SSEGs) to the electricity grid. Such SSEGs are intended to be connected to the wiring on the consumer's premises which is in turn connected to, and supplied by, the Municipality's electricity network. Such generators are hence considered to be 'embedded' in the local municipal electricity grid.

The parallel (or embedded) connection of any generator to the electrical grid, however powered, has numerous implications for the local electricity utility. The most significant implications are the safety of the utility staff, the public and the user of the generator. Further implications include the impact on the quality of the local electrical supply, and metering and billing issues. In terms of the Municipal Structures Act, No. 117 of 1998, municipalities are therefore obliged to regulate the installation of SSEGs to uphold responsible management of the distribution network, as well as for the general benefit and protection of citizens.

Although the electricity distribution industry is highly regulated, SSEG's have not yet been adequately covered in national policy or legislation. The AMEU has developed standardized approaches and documentation to support municipalities in this regard, aligned with national policies and regulation, and this Policy is consistent with the AMEU approach and recommendations.

2. SCOPE OF THE POLICY

- 2.1 This policy document provides a framework for the approval and registration of Small Scale Embedded Generators of electricity as well as the regulation thereof relative to



the requirements of the Municipality and all other Policies, By-laws and Legislation applicable thereto.

2.2 The policy is applicable to all customers wishing to install systems categorised as Small Scale Embedded Generators.

2.3 The policy covers:

- The conditions under which SSEG will be accepted onto the Municipal distribution network
- The Application and Commissioning process
- Contractual arrangements between the SSEG customer and the Municipality
- Metering and tariffs for SSEG

2.4 The policy covers all prospective SSEG customers in the municipal distribution area connected to the municipal distribution network.

3. CONSTITUTIONAL, REGULATORY AND POLICY CONTEXT

Section 156 (1) and Schedules 4B and 5B of the Constitution assign municipalities authority and administration over 'Electricity and gas reticulation'. The municipality has legislative and executive authority in this area, and thus must develop a regulatory environment which ensures the safe and proper functioning of their electricity grid in terms of the Municipal Structures Act, No. 117 of 1998. This environment must not contradict the national regulatory framework. Since embedded generators are connected to, and impact on the local distribution grid, municipalities must develop an appropriate regulatory framework for such generators. The electricity reticulation function extends to providing open and non-discriminatory access to the municipal distribution system and to permit the connection of embedded generation systems¹.

Section 74 of the Municipal Systems Act requires the municipality to set appropriate tariffs for municipal services. The use of the municipal distribution grid by embedded generators therefore requires that the municipality sets a suitable tariff for such generators.

The National Energy Regulatory of South Africa issues electricity generation licenses in terms of the Electricity Regulation Act. Schedule 2 of this act specifies that only systems over 1MW capacity require licensing. This also applies to embedded generators.

¹ Paragraph 4 of the Distribution Code sets out the responsibilities of distributors and stipulates in paragraph 4(1) that the distributor shall make capacity available on its networks and provide open and non-discriminatory access for the use of this capacity to all customers including embedded generators.



Technical specifications and standards have been developed to guide the implementation of embedded generation such that safety, power quality, and grid operational parameters are not negatively impacted, centering around the NRS097-2 series of specifications, and the SANS 10142-1-2: *The wiring of premises; Specific requirements for embedded generation installations connected to the low voltage distribution Network in South Africa.*

Local government is given a key role in implementation within the following documents:

- The White Paper on Energy Policy (1998)
- The National Climate Change Response White Paper (2011)
- In addition, the Integrated Resource Plan directing electricity supply in the country increasingly recognizes the role of local government and of embedded generation.

In addition to the above obligations, local government should align with:

- White Paper on the Promotion of Renewable Energy and Clean Energy Development (2003)
- The transition to a green economy
- National carbon mitigation intentions

3.1 AMEU / SALGA Standard Documentation

The Association of Municipal Electricity Utilities and SALGA has developed a set of Standard documents which provide a sound approach for engaging with SSEG by municipalities. The documents have been reviewed by a municipal SSEG Working Group, and provide a framework to facilitate the establishment of systems to process and integrate SSEG into municipal operations. This Policy is in accord with this SALGA/AMEU framework.

4. DEFINITIONS:

“Bi-directional meter” A meter that separately measures electricity flow in both directions (import and export). Such a meter displays the balance of the imported and exported electrical flow energy in a single register meter (net metering) or displays both imported and exported electrical flow energy in separate registers.

“Consumer” In the context of this document, consumers who also generate will be referred to as “consumers” although in actual fact they are “consumer/generators”.

“Embedded Generator” An entity that operates one or more generation sources that include energy conversion device(s), 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 network.



“Export tariff” A payment for every kilowatt-hour (kWh) of surplus electricity a customer system exports to the electricity grid.

“Import tariff” A payment for every kilowatt-hour (kWh) of electricity imported to a customer from the electricity grid.

“Municipality” Swellendam Municipality

“Reverse power flow” The flow of energy from the consumer electricity installation onto the utility grid as a result of the instantaneous generation exceeding the instantaneous consumption at the generation site in question.

“SSEG” Small Scale Embedded Generation. For the purpose of this policy; an embedded generator with a generation capacity of up to 1000kVA (1MVA) (definition further elaborated below).

“Tariff” A combination of charging parameters applied to recover measured quantities such as consumption and capacity costs as well as service costs.

5. ACRONYMS AND ABBREVIATION

EG: Embedded Generation

ESD: Electrical Services Department

IRP: Integrated Resource Plan

kVA: kilo-Volt Ampere (unit of electrical apparent)

kW: kilo-Watt (unit of electrical real power)

kWp: kilo-Watt peak (the rated peak output of solar PV panels)

MVA: Mega-Volt Amperes (1000kVA)

MW: Mega-Watts (1000kW)

NERSA: National Energy Regulator of South Africa

PV: Photovoltaic

SSEG: Small Scale Embedded Generation/Generator



6. SMALL SCALE EMBEDDED GENERATION DEFINITION

6.1 Small-scale embedded generation (SSEG) refers to power generation up to 1MVA/MW peak output capacity, such as PV systems or small wind turbines which are located on residential, commercial or industrial sites where electricity is also consumed. SSEG is in contrast to large-scale wind farms and solar parks that generate large amounts of power, typically in the multi-MW range. Most of the electricity generated by an SSEG is consumed directly at the site but times arise when generation exceeds consumption and a limited amount of power is allowed to flow in reverse - from the consumer onto the utility grid.

6.2 An SSEG therefore generates electricity that is “embedded” in the local electricity distribution network in that it is connected to the consumers wiring, typically behind the consumers meter, which is in turn connected to the distribution network.

7. POLICY PRINCIPLES

7.1 Consumers are not allowed to connect SSEG to the municipal grid without the written consent of the Municipality. 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. Should the consumer fail to have the SSEG disconnected from the grid, the Electricity department reserves the right to disconnect the electricity supply as stipulated within the Electricity By-laws.

7.2 The document '*REQUIREMENTS FOR SMALL-SCALE EMBEDDED GENERATION: Conditions and application process to become an embedded generator in Swellendam Municipality*' (hereinafter 'REQUIREMENTS document') specifies detailed technical, procedural and other conditions and parameters that must be adhered to. The latest version of this 'REQUIREMENTS' document must be consulted, and adherence to the provisions therein complied with.

7.3 Consumers who wish to connect SSEG to the municipal grid are required to follow the application procedure as detailed in the REQUIREMENTS document.

7.4 Any existing SSEG systems or applications submitted prior to the adoption of this Policy will have to demonstrate compliance with this Policy through following the application procedure specified herein.

7.3 Existing legislation requires that systems up to 1MVA do not need a NERSA license. The Municipality will process applications for SSEG systems up to 1MVA without evidence of a generating license. Anyone wanting to connect greater than 1MVA



must produce a generating license or exemption letter from NERSA with their application. Should the licensing regulations change, SSEG customers will be required to comply with the new regulations at their own cost.

- 7.6 All embedded generation systems installed within the Municipality's grid must be signed off on commissioning by appropriate personnel as defined in the REQUIREMENTS document.

8. MUNICIPAL MANAGER AS RESPONSIBLE AND ACCOUNTABLE OFFICER

- 8.1 The Municipal Manager is responsible and accountable for the implementation and enforcement of the provisions of this Policy and must take the necessary steps to do so.
- 8.2 The Municipal Manager shall from time to time report to the Executive Mayor on matters relating to this Policy, the efficacy of the tariffs set by the Council in terms hereof, the administrative mechanisms, resources, processes and procedures related to its implementation and the extent to which the Policy is achieving the objectives of the Council.
- 8.3 All the necessary power and authority is hereby delegated to the Municipal Manager to enable him/her to fulfil his/her functions, responsibilities and obligations in terms hereof, including appropriate revisions of the REQUIREMENTS document to keep up to date with this fast-changing field, with full authority to further delegate any specific responsibility.

9. IMPLEMENTATION

9.1 Application process

The Municipality requires that all prospective SSEG customers fill in the Municipality's SSEG application form and submit it to the relevant office for assessment. The Municipality will evaluate the application according to criteria in the NRS097-2-3 and other criteria as noted in the REQUIREMENTS document, and inform the applicant of the success or otherwise of the application. Should the application not be successful, the Municipality will advise the applicant regarding necessary measures to enable compliance with the criteria and SSEG connection. Further information or technical studies may be requested by the Municipality before a conclusion can be reached.

9.2 Commissioning

Approved SSEG systems, once installed, must be commissioned and signed off by suitable personnel as specified in the REQUIREMENTS document. A Commissioning Report must be provided to the Municipality on the prescribed form.



9.3 Metering

All SSEG systems must have approved bi-directional meters installed, as clarified in the REQUIREMENTS document.

9.4 Contractual agreements

All new SSEG customers must agree to the Municipality's GENERAL TERMS AND CONDITIONS: CONTRACT FOR CONNECTION OF AN EMBEDDED GENERATOR before generation may commence. This contract clarifies the legal responsibilities of both the customer and the Municipality.

9.5 SSEG Tariffs

The Municipality aims to implement SSEG tariffs which both cover municipal costs (fixed and variable) in different tariff categories, and will also be cognizant of a reasonable return-on-investment for the SSEG customer. The tariff will be implemented only once NERSA has approved such a tariff. Prior to such tariff implementation, reverse feed-in to the Municipal grid will be permitted, but no financial compensation will be given.

9.6 Standards

All SSEGs are to comply with the following standards:

1. NRS 097-2-1: *Grid interconnection of embedded generation: Part 2 Small Scale Embedded Generation, Section 1: Utility interface*
2. NRS 097-2-3: *Grid interconnection of embedded generation: Part 2 Small Scale Embedded Generation, Section 3: Simplified utility connection criteria for low voltage connected generators*

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

1. *South African Renewable Power Plant Grid Code (although the NRS 097-2 series cover most issues relevant to SSEG)*
2. *NRS 048: Electricity Supply – Quality of Supply*
3. *SANS 10142-1, including SANS 10142-1-2: The wiring of premises (as amended and published)*
4. *SANS 474 / NRS 057 : Code of Practice for Electricity Metering*
5. *Municipality Electricity Supply by-law*

The REQUIREMENTS document has specific information regarding compliance with the above standards or specifications.



10. EFFECTIVE DATE OF POLICY

This Policy will become effective from the date of approval by the Municipal Council.

Tariffs contemplated within this Policy will be formulated as part of the annual budget approval process, and will become effective pursuant to the dates stipulated therein. Tariffs are subject to NERSA approval.

ANNEX:

REQUIREMENTS FOR SMALL-SCALE EMBEDDED GENERATION: Conditions and application process to become an embedded generator in Swellendam Municipality
