

Comments from the SALGA/AMEU/ESKOM reference group on NERSA's Standard Conditions for Small Scale Embedded Generators

Purpose: We propose that NERSA provides for a framework which allows for the legal connection and operation of rooftop PV in South Africa. This is necessary since PV roof top are already being installed and illegal connections will endanger safety and security of staff. To achieve this we propose a net metering scheme as described in Annexure A. Simultaneously, it is also recommended that the relevant national departments investigate and establish a sustainable financing mechanism to compensate SA municipalities for the loss of revenue resulting from the operation of rooftop PV.

1 Executive Summary

1.1 Background

In September 2011, NERSA presented a Draft Decision Paper relating to Small Scale Embedded Generation within Municipal Boundaries (less than 100kW). This decision paper is mainly focusing on rules and requirements for registration and reporting to NERSA, safety of operating personnel and power quality requirements according to applicable technical standards such as NRS097-2-1.

Aspects relating to the remuneration of energy produced by Small Scale Embedded Generators can be found in the Discussion-section of this paper. In 2011, NERSA proposed:

- Classical Net-Metering (remuneration based on net-energy exchanged with the Distribution Utility)
- Tariff consisting of a fixed monthly charge (for network services and administration) and an energy rate for energy purchase.
- Requirement to install Smart-Metering

During two meetings (25.07.2013 and 07.11.2013) in the offices of SALGA an AMEU/ESKOM reference group discussed options for conditions for Small Scale Embedded Generation within Municipal Boundaries, which finally resulted in the proposal and comments presented in this paper.

During these discussions, it turned out that the following main aspects have to be considered by those standard conditions:

- Safety of operating personnel.
- Low impact on power quality in local distribution networks.
- Tariff structures for customers with small scale embedded generation
- Export tariff that provides sufficient incentive to avoid illegal connection of Small Scale Embedded Generation.
- Low administrative overhead cost so that also residential customers can participate in it.
- Export tariff that is sufficiently low so as not to add unnecessarily to overall electricity costs.

- High security of investments into Small Scale Embedded Generation.
- Tariff that provides an incentive for timely generation of electricity.
- Low overhead costs for additional equipment, such as meters etc.
- Fair coverage of costs of grid usage.
- The conditions to include generation connected to Eskom networks.

1.2 Proposed Conditions

The conditions proposed by the SALGA/AMEU/ESKOM working group can be summarized as follows:

- Registration rules and requirements as proposed by the NERSA paper from September 2011, but at the same time taking into account the comments below.
- To be applicable to all small scale embedded generation and not just municipal connected generation i.e. inclusion of Eskom.
- Reference to NRS-097-2-1 or alternatively to a technical document, which has to be prepared specifically and which shall be based on these NRS-standards but reflects the decided Standard Conditions for Small Scale Embedded Generators in SA.
- Applicability to installations $\leq 100\text{kVA}$ and having a LV connection point. However, it is strongly recommended to extend the scheme to installations up to 1MVA.
- Compensation of exported energy based on a modified net-metering scheme applying individual tariffs for net-power export and net-power import (sometimes also referred as “net-billing”).
- Tariff scheme will contain:
 - A fixed monthly rate based on installed kVA of customer
 - A set tariff for net-import of electricity or optionally a Time of Use (TOU) tariff.
 - A set tariff for net-export of electricity
- The fixed monthly rate shall cover grid usage and administrative costs of distribution utility (DU) and must be worked out in a transparent, reproducible way.
- Metering using two single-directional meters or one bi-directional meter. No obligation for the installation of Smart-Meters.
- The application of suitable Time-of-Use-Tariffs (including the installation of the required metering equipment) shall be possible but must not be mandatory to Net-Metering-customers. Incentive for timely use of electricity can be achieved by setting the export tariff to a lower value than the import tariff.
- Net-billing cycle of 1 year, meaning that over a period of 1 year, the accrued value of exported electricity is capped to the accrued value of imported electricity.¹

¹ The actual definition of “year” is open to each DU. “Year” can be a calendar year or a “rolling year”. It’s important that the net-billing cycle covers all seasons.

- Obligation of the DU to take the exported energy produced by Small Scale Embedded Generators under normal operating conditions.
- No obligation to the DU to give consent to any application for the connection of Small Scale Embedded Generators with immediate effect. However, applications shall not be rejected or withheld unreasonably and shall be subject to the capability of the DU's network and resources (technical and financial). Reference to NRS 097-2-3 or any other appropriate technical standard shall be included.
- No licenses required for net-metering customers as they will be considered net-consumers and not net-generators (no incentive to be a net-generator as there is no compensation).

2 Comments Relating to the NERSA Decision Paper of 22.09.2011

Paragraph 2c)

The stated requirement for Time of Use Tariffs to encourage households to consume their electricity produced during the peak demand is not supported. The wording “in each Time of Use Tariff metered time period” would thus have to be removed.

Instead, we propose to install a bi-directional meter with two registers as shown in Figure 1.

However, in a Net-Metering Scheme, gross generation is not metered, hence cannot be reported. If NERSA intends to evaluate the electrical energy generated by Small Scale Embedded Generators, the following options are possible:

- Estimate the total gross generation per technology, based on the total installed capacity of each technology multiplied by a factor for each technology per municipality e.g. for PV in Nelson Mandela Bay Metro - 5.6kWh/day/square meter installed.
- Installation of an additional meter directly connected to the generator. Because this meter would only be required for statistics, not for billing, it should not be at the customers expenses, if required.

Paragraph 4)

Use NRS 097-2-1 or a specific document (which would still have to be developed), e.g. named “Interconnection Rules for Small Scale Embedded Generators in South Africa”. The advantage of a specific document would be:

- It would directly relate to the conditions of the NERSA decisions (and, for example, not explain various metering arrangements that are used world-wide).
- It could also integrate other aspects, like a formalized application process or compliance requirements.
- It would take relevant technical clauses of the SA Grid Code for RPPs into consideration.

Paragraph 5)

This directive applies to small scale generation of a size less than 100kVA and a connection point at LV.

Paragraph 6)

That these conditions are mandatory and will be included in the License Conditions of DUs when they will be reviewed.

Paragraph 7)

- remove “municipal”
- of a size less than 100kVA and connected to a LV grid.

Add:

Customers having a Small Scale Embedded Generator installed are named Net-Metering-Customers.

Paragraph 11)

NRS 097-2-1 or specific Interconnection Rules (see comment relating to paragraph 4).

Paragraph 13)

There should still be a formalised application process in place for assessing technical feasibility of Small Scale Generation installations. The assessment of technical feasibility should follow a nation-wide standardized procedure (such as proposed NRS 097-2-3: Simplified utility connection criteria for LV connected generators). Applications should generally be processed at DU level and customers will have to wait formal approval from the distributor before commissioning their installations (ideally, a first level of approval should take place based on the submission of planning documents).

Paragraph 15)

The existing wording in the first paragraph should be amended to read:

“... Invoicing is for the value of energy (export-tariff times kWh exported) that Net-Metering customers produce during times of net export (generated power larger than consumed power) minus the value of energy (import-tariff times kWh imported) that Net-Metering customers consume during times of net consumption (generated power lower than consumed power) (see also Figure 1).

Over a period of 1 year (billing cycle) the value of generated energy is limited to the value of consumed energy.”

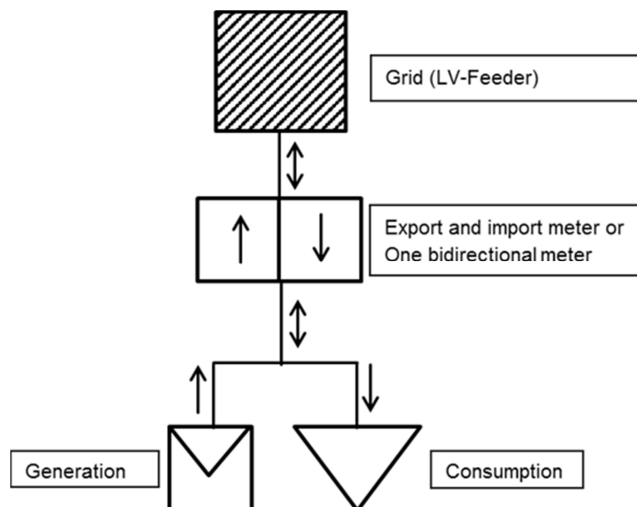


Figure 1: Proposed Metering Arrangement

Paragraph 17)

Replace with:

DUs are entitled to introduce new tariffs for Net-Metering-Customers. These tariffs can generally contain the following components:

- Fixed charges for network services and administration
- Variable charge for energy imported from the DU (fixed charge per kWh imported or TOU if smart metering is installed)

- Variable charge for energy exported to the DU (fixed charge per kWh exported)

The **fixed charges components** must be worked out on basis of a cost calculation considering costs of administration and network services. This fixed component shall be as low as possible and ideally just cover expenses².

The **variable charges for energy imported** must comply with the following constraint:

- A Net-Metering-customer with a kWh-consumption that is equal to the average of his tariff class must not pay more than a regular customer with the same kWh-consumption (which means that his variable import charge must be below the consumption tariff of a regular consumer).

The **variable charges for energy exported** must be defined in a fair and transparent manner ensuring that it provides sufficient incentive to connect Small Scale Embedded Generators legally to the grid and that it supports South African's ambitious goals with regard to carbon footprint reductions.
³

The DU has to ensure that the splitting of tariffs for Net-Metering-customers into fixed and variable charges and the resulting lower variable cost of electricity don't provide an unintentional incentive for increased electricity consumption.

The distributors must install either:

- One bi-directional meter that allows evaluating exported and imported energy using two different registers (this meter could be a simple or a smart bi-directional meter) or
- Two single-directional meters, which count in one direction only (no reverse flow).

It is within the responsibility of the DU to ensure that the metering arrangement and the meters installed are fit for purpose.

Paragraph 20):

DUs are required to submit a copy of the standard agreement and applicable tariffs together with relevant information explaining the design of the individual charges of a Net-Metering tariff and their cost break-down.

Standard agreements for Net-Metering-customers shall contain:

- Tariff specification
- At least a three-years guarantee period for the export tariff.⁴
- Guarantee that exported energy will be taken by the DU under normal operating conditions
- Customer and utility obligations
- Technical and safety aspects (reference to applicable interconnection rules)

² Higher fixed charges imply lower variable chargers (per kWh) and hence create an incentive for high consumption, which should be avoided.

³ Alternatively the export rate could be regulated by NERSA

⁴ It is questionable that it is possible to secure tariffs over such a long period. This definitely requires legal verification. The recommendation is to fix export tariffs over a long period.

3 Summary

This document describes comments relating to the NERSA Draft Decision Paper relating to Small Scale Embedded Generation within Municipal Boundaries from September 2011.

The presented comments represent the results of two meetings of an AMEU/ESKOM working group that took place in July and November 2013 at SALGA's offices.

The essential aspects of the AMEU/ESKOM/SALGA proposal are:

- Net-metering with separate net-export and net-import metering (also called “net-billing”).
- Individual export and import tariffs and a monthly fixed charge based on the connection capacity (kVA) for covering expenses relating to network management and administration.
- Billing cycle of 1 year, meaning that the value of exported energy will be capped to the value of imported energy after a period of one year.
- Guaranteed export tariff (duration as long as it is possible within the legal context of SA) for providing the required investment security.
- Guarantee that the generated power will be taken by DU under normal operating conditions.
- Definition of interconnection rules for Small Scale Embedded Generators for ensuring safety of operation personnel and quality of supply. These rules shall be based on NRS 097-2-1.
- No licenses required for net-metering customers as they will be considered net-consumers and not net-generators (no incentive to be a net-generator as there is no compensation).

The proposed Standard Conditions for SSEG shall ensure that the following objectives will be met:

- Safety of operating personnel.
- Low impact on power quality in local distribution networks.
- Low administrative overhead so that private customers can also participate.
- Export tariff that provides sufficient incentive to avoid illegal connection of Small Scale Embedded Generation.
- Export tariff that is sufficiently low so as not to add unnecessarily to overall electricity costs.
- High security of investments into Small Scale Embedded Generation.
- Tariff that provides an incentive for timely generation of electricity.
- Low overhead costs for additional equipment, such as meters etc.
- Fair coverage of costs of grid usage.

The proposed standard conditions will still leave a number of parameters open (e.g. actual tariffs etc.) and the appropriate definition of these parameters will be the responsibility of the municipalities and Eskom.

Besides the Standard Conditions for SSEG, the appropriate definition of these parameters will be of very high importance for the successful integration of Small Scale Embedded Generation in South Africa.