

1 Executive Summary

This document's aim is to provide guidance to Distributors how to develop net-billing tariffs and sets out the principles under which net-billing tariffs can be developed on a standardised approach.

Net-billing is a mechanism used to compensate customers when the customer's generation is synchronised with the grid (grid-tied) and some energy is exported. This compensation is based on an export tariff. The customer still gets charged a full tariff for energy consumed and capacity provided.

The utility or another party does not purchase this energy; the energy still belongs to the customer using the Distribution grid as a bank. Net-billing can be easily implemented, provided bi-directional metering is installed, tariffs are properly unbundled, and the export tariff is set at a rate that is equal to the avoided energy purchase cost.

The following figure explains how net-billing works:

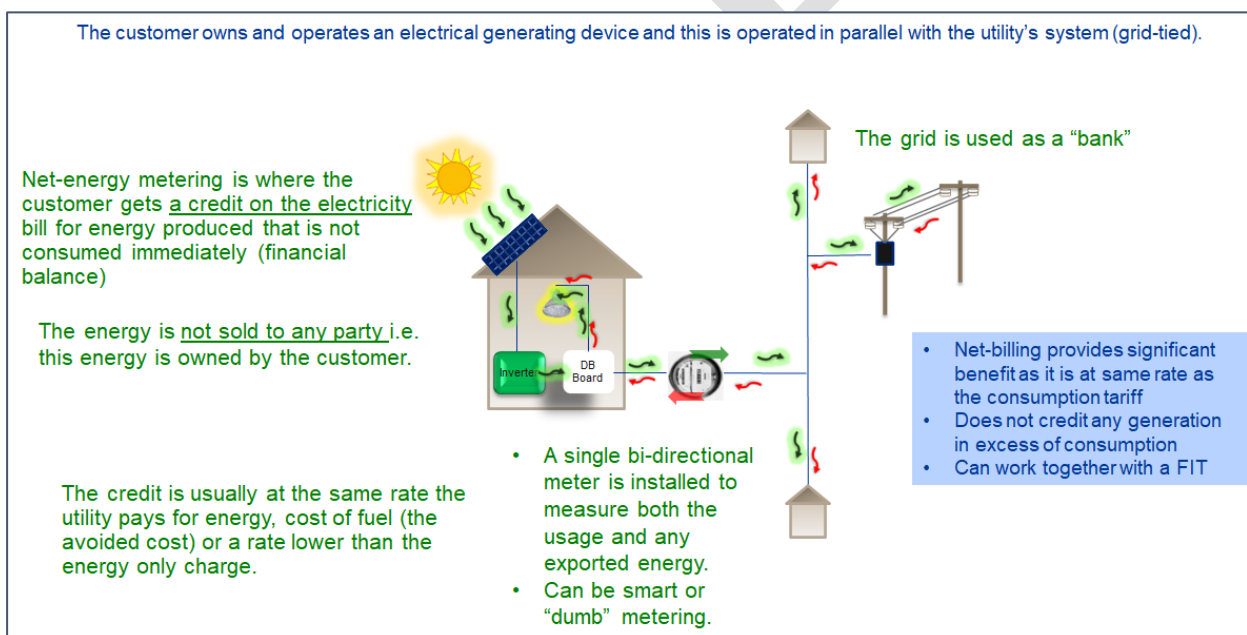


Figure 1 – net-billing

A number of Distributors and Eskom have net-billing tariffs in place using various terms such as SSEG tariffs or offset tariffs. These tariffs provide both the charges for the energy consumed, the demand and the compensation rate (the "export rate") for any energy exported.

Not all Distributors have such tariffs and there is no standardised methodology or framework for the industry providing guidance on how these tariffs should be structured and how the net-billing export rate should be determined.

2 Accountable party for the guideline

A decision needs to be made on whether a national net-billing tariff guideline is required using a standardised approach or to allow each Distributor to develop their own tariffs. Recently NERSA decided that it is outside of their mandate to approve SSEG tariffs. If this is the correct approach, then the accountability for a net-billing framework needs to be established, whether in law, regulation or government policy.

The draft EPP included net-billing as a policy position and placed the obligation on NERSA to approve such rates and develop a framework. It is not known, however, the wording in final EPP, but it is important that net-billing to ensure a standardised approach. The draft EPP stated that there are benefits in using the grid, which can especially be leveraged with net-billing tariffs such as:

- The grid is a virtual battery, that is, it can temporarily store excess energy and can accommodate more storage than a battery.
- The customer can benefit from a net-billing tariff, which is a debit and credit process for energy consumed and produced at the same point of supply and not a netting of import consumption kWh and export production kWh.
- If net billing is combined with storage, the customer can benefit by reducing higher peak power charges. Storage could include hot water and batteries (including electric cars).
- The grid provides ancillary services that the customer would otherwise have to provide such as supplemental and back-up power and a fault level.
- The customer can also provide ancillary services to the grid provider and the System Operator, that is, remote control over the generation and/or storage, for which the customer can be compensated.

3 Objectives

The following are the objectives of a net-billing tariff:

- To provide customer with the option to get credited for exported energy through a simple process of crediting on the electricity bill
- Low administrative overheads for customers and the utility.
- Export tariff to be low enough to not create an additional burden to overall electricity costs and but high enough to provide an incentive for timely generation of electricity
- High security of investments into SSEG as its linked to retail tariffs.
- Fair coverage of costs of grid usage through properly structured tariffs for consumption and demand.

4 Framework for net-billing tariffs

With net-billing tariffs, it is important that appropriate charges are raised for the back-up, the use of the grid, the services being provided and that these charges are not raised as volumetric c/kWh charges as far as possible. If tariffs do not reflect cost causation, this means that customers with own generation could be subsidised by customers without by reducing their contribution to covering network and retail costs, while shifting those costs onto utility customers who do not have own generation.

From an energy usage perspective, the ideal would be to raise these charges on a TOU basis and also that the export rate is linked to the same TOU periods. This would ensure alignment with the wholesale purchase tariffs and fair payment and compensation in the various time-of-use periods. Tariffs that reflect costs in different time periods, including net billing, will encourage storage, the reduction of peak demand and result in a reduction of costs for the utility and the customer. The wholesale purchase structure for Distribution would be the amount payable for energy. For Distributors that do not purchase on a TOU basis, they may or may not decide to use the Eskom TOU structure or

4.1 Proposed tariff framework

4.2 General guideline for net-billing tariffs

The following is the design guideline for net-billing tariffs:

1. The tariffs to be applied must be non-discriminatory and cost-reflective and not be prejudicial to customers that have SSEG installations or those that don't. The tariffs should be correctly structured and unbundled to reflect the different services being provided and this should apply equally to those that have SSEG installations and those that don't.
2. Net-billing will be allowed, subject to any licensing or registration required by law and in compliance with any NERSA rules;
3. The net-billing customer should be preferably on a standard time-of-use tariff aligned to the purchase structure and energy charges;
4. The net-billing customer should pay the relevant use-of-system charges for the use of the grid associated with consumption;
5. The net-billing customer will be required to pay where applicable the relevant use-of-system charges for the use of the grid associated with export of energy;
6. A export rate for energy exported onto the grid should not be higher than the avoided purchase cost for the utility so as to not increase tariffs for all users;
7. Use-of-system and retail charges will always be payable and will not be credited against the value of energy exported into the Distribution grid, that is there should be no netting of consumption and export;
8. The export rates should ideally reflect the time of the export and therefore aligned with a TOU structure; and
9. A retail charges may be raised to cover the incremental cost associated with the additional billing transaction.

4.3 Export rate

With net-billing the export tariff should never rise above the average energy retail price and provided the net-billing credit rate is set at a value equal to avoided cost to a distributor (that is their energy purchase cost), this rate will provide an incentive for own consumption first and only excess is then credited.

The export rate should be one that is aligned to the consumption energy tariff, but does not have to be the same value.

The avoided cost of energy means the marginal costs a utility would avoid in any given hour if a distributed energy resource provided power instead of the utility. For Distributors at the retail level, this would be their energy purchase costs plus potentially losses in high load areas.

Proposed net-billing guidelines

Distributors that do not purchase on a TOU basis, they may or pay not decide to use the Eskom TOU structure or design their own version of TOU rates.

The avoided costs formula should be based on the following:

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4.4 Proposed tariff structures that may be used

Charge type	Charge structure	Comments	Source of the charge
Consumption tariff			
Use-of-system network charges	R/kVA or R/point of supply based on circuit breaker size	Can be fixed or variable. The more variable the charge is, the more revenue is lost to the utility on own consumption. If variable avoided by own consumption Can be unbundled into Transmission and Distribution use of system charges	Based on allocated network costs.
Energy charge	c/kWh TOU energy	The energy charges may be unbundled into energy and generation capacity charges (subject to NERSA) Energy charges avoided with own consumption	Pass through cost, based on purchase rate for energy only rates plus losses.
Service and administration charges	Based on supply size and recovered as a R/point of supply charge	Can be fixed or variable. If variable avoided by own consumption	Allocated retail costs (billing, meter reading, customer services)
Ancillary service charge	c/kWh	Charged on consumption, but avoided with own consumption	Pass through cost
Subsidies/surcharges	c/kWh or R/kVA or R/point of supply	Should ideally be fixed. If variable avoided by own consumption	Socio economic subsidies
Export tariff			
Export energy rate	c/kWh TOU energy rates	May be set lower than purchase costs to cover admin and ancillary service costs	Aligned to the wholesale purchase structure plus losses. Losses may be avoided or not
Service and administration charges	Based on export capacity	Can be fixed or variable or if export energy rate reduced by admin and ancillary service	Allocated retail costs (billing, meter reading, customer services)

Proposed net-billing guidelines

Charge type	Charge structure	Comments	Source of the charge
		costs, this charge does not need to be raised	
Ancillary service charge	Based on export energy	Charged on exported energy or if export energy rate reduced by admin and ancillary service this charge does not need to be raised	Pass through cost
Use of system charges	R/kVA on maximum export capacity	Where such charges are applicable to generators	Allocated costs

A point to note, it that it is recommended that the above structure should be used for all consumption tariffs, that is, not to treat non-SSEG customers differently, except for potentially lifeline tariffs and for smaller supply size customers where TOU is not suitable or available.

4.5 Banking

Typical net-billing schemes caps the export kWh to the consumed kWh either in the month or over a period of a year. Net-billing cycle of 1 year, with compensation capped to annual consumption, meaning that the customer will receive compensation only after a period of 1 year and customer will not be compensated for any energy produced that is in excess of consumption at the end of the year.

5 Metering

Net-billing would require, that bidirectional smart meters are installed, that the funding for such meters would have to be in place (either by the utility or the customer) and that the tariffs provide the correct pricing signals for consumption and for the credit rate. NERSA must require the distributors to 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 Distributors to ensure that the metering arrangement and the meters installed are fit for purpose.

6 Revenue impact

If tariffs are not correctly structured, any own consumption will reduce revenue that is not equal to the reduction in costs. This is not a net-billing issue but a general concern with the changing energy environment and will result in tariffs charges increasing. In addition, the export rate needs to be set at value that does not also cause tariff charges increasing, that is not more than the avoided costs.

The revenue impact would be calculated taking into account the following ...[This section would need more analysis]

7 Tax implications

It is to be noted that under a net-billing scheme there will be a loss of tax revenue as the customer will pay VAT on a reduced bill (due to own-use generation and credit for exported energy).

8 Contracting

Standard agreements for net-billing customers shall contain:

- Tariff specification
- Guarantee that exported energy will be taken under normal operating conditions
- Customer and utility obligations for the legal, technical, safety and financial aspects

9 Conditions

The conditions proposed are as follows:

- To be applicable to all generation
- Grid tied compliant
- Tariffs to be approved by NERSA and not be discriminatory
- The fixed components shall cover grid usage and administrative costs of distribution utility and must be worked out in a transparent way, which is reproducibly to the public.
- Metering one bi-directional meter.

10 Summary

The essential aspects of this framework are:

- Net-metering with separate net-export and net-import measurement - no netting of consumption or reversal of meters
- Fair recovery of costs of grid usage and consumption through cost-reflective tariff structures
- Different export and import tariffs and fixed charges based on the connection capacity (kVA) for covering use of system costs.
- Export tariff that provides sufficient incentive to avoid illegal connection of SSEG.
- Export tariff that is sufficiently low for not creating an additional burden to overall electricity costs and based on avoided costs.
- Tariff that provides an incentive for timely generation of electricity.
- Low overhead costs for additional equipment, such as meters etc.

The proposed framework will still leave a number of parameters open (e.g. actual tariffs rates and structures for consumption and export) and the appropriate definition of these parameters

will be within the responsibility of the municipalities and Eskom and may be subject to NERSA approval.

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