



ANNEXURE A

CONSULTATION PAPER ON ESKOM'S APPLICATION FOR THE AMENDMENT OF THE GENERATOR LOSSES CHARGE

Published on 3 October 2025

Issued by

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ABBREVIATIONS AND ACRONYMS

ERA	Electricity Regulation Act
DUos	Distribution use-of-system
GCAC	Grid Code Advisory Committee
Gen-DUos	Generator distribution use-of-system
NERSA	National Energy Regulator of South Africa
NERA	National Energy Regulator Act
PAJA	Promotion of Administrative Justice Act
PTDF	Power transfer distribution factor
TNSP	Transmission Network Service Provider
TOU	Time-of-use
WEPS	Wholesale Electricity Pricing System

1. EXECUTIVE SUMMARY

- 1.1. Eskom requests the National Energy Regulator of South Africa (NERSA) to approve an amended losses charge calculation methodology for embedded generators. Eskom intends to implement the amended methodology in the 2025/26 Eskom Schedule of Standard Tariffs.
- 1.2. The current methodology on generator losses, which provides a rebate to embedded generators, emanated from a historic assessment that concluded that these generators consistently reduced network losses.
- 1.3. However, the evolving energy landscape, marked by increased distributed generation and factors such as remote generator locations, sizing of embedded generators and off-peak production, has altered this dynamic.
- 1.4. Furthermore, this proposed change aims to modify the existing formula for calculating technical losses incurred by embedded generators connected to the Eskom distribution network, ensuring it better reflects actual costs based on recent technical studies.

2. INTRODUCTION

- 2.1. On 28 July 2025, NERSA received an application for the adjustment of the generation losses formula from Eskom.
- 2.2. According to Eskom, its recent technical studies and power flow simulations indicate that embedded generators now contribute to increased network energy losses in most geographical areas.
- 2.3. Eskom's studies show that the current rebate system, which offers financial advantages to embedded generators, is no longer cost-reflective and results in an unintended subsidy. Consequently, Eskom considers it necessary to amend the losses charge methodology to more accurately represent the costs associated with the use of the distribution network by embedded generators.
- 2.4. Eskom's proposed amendment seeks to address network losses in the following ways:
 - 2.4.1. Recognition of increased losses – embedded generators, which were previously assumed to reduce network losses, now contribute to increased losses in most geographical areas due to factors such as remote locations, oversized generation, and off-peak production.
 - 2.4.2. Elimination of rebates – the rebates currently provided to embedded generators in positive loss factor areas are eliminated. This ensures that generators contributing to increased losses are no longer subsidised.

- 2.4.3. Introduction of positive losses charges – a positive losses charge is introduced for embedded generators in areas where they increase network losses to ensure that the costs of these losses are accurately reflected and recovered.
 - 2.4.4. Cost-reflective tariffs – to ensure that tariffs are more reflective of the actual costs associated with the use of the distribution network, including the increased losses caused by embedded generators.
 - 2.4.5. Geographical differentiation – the methodology uses power transfer distribution factors (PTDFs) to identify areas where embedded generators increase or decrease losses. Generators in areas with positive PTDF values (indicating increased losses) will be charged accordingly.
 - 2.4.6. Incentivising efficient integration – aligning charges with the actual impact of embedded generators on the network, the methodology incentivises more efficient grid integration and discourages practices that exacerbate losses.
- 2.5. The proposed amendment to the energy loss formula is based on the following key principles of the Distribution Tariff Code.
- 2.5.1. Energy efficiency and loss reduction: Tariff structures must include pricing signals that promote energy efficiency, such as reducing electrical technical losses.
 - 2.5.2. Cost-based recovery: The cost of electrical losses must be based on representative technical studies and recovered as a function of appropriate loss factors for the relevant voltage level and the distributor's cost of energy purchases on a time-of-use (TOU) basis.
 - 2.5.3. Distributor responsibility: The distributor is responsible for all distribution and transmission losses flowing through its system and must recover these costs from all load and generator customers connected to its system.
 - 2.5.4. Loss factor differentiation: Loss factors must be differentiated based on the distributor's voltage and geographic categories or, if applicable, the transmission zone determined by the transmission network service provider (TNSP).
- 2.6. Eskom claims that the total bill under the current rebate system is R540 million, while the proposed changes would increase it to R1.808 billion. This would represent a 235% increase in revenue from embedded generators in areas with a positive loss factor.

3. LEGAL MANDATE

- 3.1. NERSA is a regulatory authority established as a juristic person in terms of section 3 of the National Energy Regulator Act, 2004 (Act No. 40 of 2004). NERSA's mandate is to regulate the electricity industry in terms of the Electricity Regulation Act, 2006 (Act No. 4 of 2006).
- 3.2. In terms of section 3 of the Electricity Regulation Act, 2006 (Act No. 4 of 2006), as amended ('the ERA'), the Energy Regulator is the custodian and enforcer of the regulatory framework provided for in the ERA and has regulatory authority over all persons undertaking activities that are subject to the ERA. Therefore, the Energy Regulator is entrusted to ensure that the objectives of the ERA are achieved.
- 3.3. The Energy Regulator is obliged, in terms of section 4(a)(ii) of the ERA, to set and approve prices and tariffs in a manner prescribed by a rule and when considering licence applications, to impose licence conditions that relate to the setting or approval of prices, charges, rates and tariffs charged by licensees, as well as, the methodology to be used in the determination of rates and tariffs, in accordance with section 14(1)(d) and (e). The conditions imposed by the Energy Regulator must also ensure that the tariff principles contained in section 15 of the ERA are achieved.
- 3.4. The approval of prices and tariffs, as well as the approval of a methodology to be used to determine the applicable rates and tariffs, is therefore the exclusive mandate of the Energy Regulator.
- 3.5. The Distribution Tariff Code ('the Tariff Code') sets out the objectives and rules for retail tariff structures and connection charges for distribution retail and network services raised by licensed distributors. The Tariff Code, in particular, provides the formula that can be applied to calculate the amount that embedded generators shall pay or be compensated for the losses caused in the Distribution System, based on the amount of energy produced, the voltage and the time at which the energy was produced. Eskom's application proposes changes to the formula, thereby constituting an amendment to section 5.5.1 of the Tariff Code.
- 3.6. In terms of section 5.1 of the Governance Code, NERSA is the approval authority for the Grid Code, and any amendment, derogation or exemptions from the Grid Code shall therefore be approved only by NERSA as guided by the Grid Code Advisory Committee (GCAC). The recommendations and input of the GCAC on Eskom's application will therefore inform the decision of the Energy Regulator.
- 3.7. This public consultation process is undertaken in accordance with the requirement of procedural fairness, which necessitates that the Energy Regulator undertake a public consultation process to ensure that its decisions

comply with section 10 of the National Energy Regulator Act, 2004 (Act No. 40 of 2004) (NERA), read with sections 4 and 5 of the Promotion of Access to Information Act, 2000 (Act No. 2 of 2000) (PAJA).

4. MAIN ASPECTS COVERED IN THIS CONSULTATION PAPER

4.1. The Main Aspects of the Eskom Application Discussed in This Consultation Paper

- 4.1.1. The distribution loss factors for loads and generators connected to the distribution system, as approved by the Energy Regulator.
- 4.1.2. The generator distribution use-of-system (Gen-DUos) urban tariff applicable to distribution embedded generators.
- 4.1.3. Factors that have altered embedded generators' reduction of losses:
 - a) Financial impact analysis
 - b) Technical studies.

4.2. The Distribution Loss Factors for Loads and Generators Connected to the Distribution System, as Approved by the Energy Regulator

- 4.2.1. The evolving energy landscape, driven by the increasing penetration of distributed generation, indicates that this distribution's connected embedded generators are now contributing to increased technical energy losses, specifically in networks not originally designed for bidirectional power flows, as elaborated in Table 1 below.

Table 1: FY2024/25 and FY2025/26 loss factors comparison

Distribution Loss Factors								
Voltage	2024/25		2025/26		Difference		% Difference	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
< 500V	1.1111	1.1527	1.1862	1.1973	0.0751	0.0446	6.8%	3.9%
≥ 500V & < 66kV	1.0957	1.1412	1.1556	1.1761	0.0599	0.0349	5.5%	3.1%
≥ 66kV & ≤ 132kV	1.0611		1.0724		0.0113		1.1%	
> 132kV / Tx connected	1		1		0		0.0%	

- 4.2.2. NERSA has already approved distribution loss factors for loads. Table 1 above highlights the generators connected to the distribution system.

4.3. The Gen-DUos Urban Tariff Applicable to Distribution Embedded Generators

- 4.3.1. The application for the amendment of generator distribution use-of-system (DUoS) charges seeks to update the formula Eskom uses to bill embedded generators for network losses. The aim is to make the charges more accurately reflect the actual cost of using the distribution network, based on recent technical studies.
- 4.3.2. The existing methodology for calculating losses for embedded generators currently provides a rebate. The rebate stems from a

historical technical assessment that found generators can decrease distribution network losses when remote generator locations and off-peak operations are not considered within the distribution grid.

- 4.3.3. The losses charge is only applicable to the Gen-DUos urban tariff, and rural embedded generators do not get rebates.
- 4.3.4. The Gen-DUos urban tariff charges associated with losses are as follows:
 - a) Network capacity charge based on supply voltage and maximum export capacity.
 - b) The losses charge is based on loss factors applied to export volumes.
 - c) The applicable TOU and wholesale electricity pricing system (WEPS) rates, excluding losses, are applied to the resulting losses volumes to determine the rebate value.
 - d) The rebate value is subtracted from the network capacity charge revenue (the rebate). This reduction is capped at zero, i.e. no reductions/rebates beyond zero.

4.4. Calculation of the Losses Charge

- 4.4.1. The losses charge is calculated based on the energy volumes produced, as well as the applicable transmission and distribution loss factors.

Distribution losses charge = *energy in each TOU period x WEPS rate excluding losses in each TOU period x (Distribution loss factor x Transmission loss factor (for loads) - 1)*

- 4.4.2. The distribution losses charge formula above is used to calculate losses charges applicable to the Gen-DUos urban tariff.

Question 1:

What are the stakeholders' views on the changed distribution loss factors?

4.5. Factors that Have Altered Embedded Generators' Reduction of Losses

- 4.5.1. In its application, Eskom identified the following factors that have altered embedded generators' reduction of losses.
 - a) **Location of variable renewable embedded generators:** The increasing deployment of renewable generators, situated far from demand centres, contributes to increased network losses. This geographical mismatch between generation and demand exacerbates the losses experienced in the grid.

- b) **Sizing of variable renewable embedded generators:** The generation capacity of some renewable generators is too large for the local load, resulting in excess power being injected back into the local network. This increased current flow in the lines results in higher losses.
- c) **Production outside of peak hours:** Solar generators typically produce at maximum capacity during times when system demand is low, such as outside of peak demand hours. This production pattern creates a significant mismatch between generation and consumption, further contributing to the rise in technical losses.
- d) **Increased losses from embedded generators:** The new tariffs will be more cost-reflective of the costs associated with using the system, including the increased losses and potential congestion caused by embedded generators.

Question 2:

Eskom has identified four factors that contributed to the reduction in losses of embedded generators. Does the stakeholder see these factors as contributors to the reduction in losses as a result of embedded generators? Are there any additional factors that stakeholders could provide?

4.6. Financial Impact Analysis

- 4.6.1. Eskom conducted the financial impact analysis of the proposed amendment to rebating of embedded generators and the introduction of a losses charge for generators in positive loss factor areas.
- 4.6.2. Table 2 below presents a scenario analysis on how changes in the rate structure and the application of energy losses rebates affect the overall bill under the Gen-DUos urban tariff.
 - 4.6.2.1 The 2025/26 rates (inclusive of the losses rebate): The total bill, set at R540 million with a rebate, serves as the baseline for comparison when the rebates are removed.
 - 4.6.2.2 The 2025/26 rates (losses rebate eliminated and losses charged introduced for generators in positive loss factor areas): A losses charge raised for generators in positive loss factor areas leads to a total bill of R1.088 million, which is a 235% increase.

Table 2: FY2025/26 tariff revenues with losses charge applied

	Scenario	Use of system Charges	Energy Losses Rebate/Charge	Total Bill	Revenue Change
	2025/26 rates (Inclusive of the losses rebate)	R1,217m	-R677m	R540m	-
Positive losses charge raised for the 60 generator PODs in positive loss factor areas	2025/26 rates + losses charge (Eliminate the losses rebate and introduce a losses charge)	R1,116m	R634m	R1,750m	-
Negative losses charge raised for the 8 generator PODs in negative loss factor areas	2025/26 rates + negative losses charge	R100m	-R43m	R58m	-
Total		R1,217m	R591m	R1,808m	+R1,268m (+235%)

Question 3:

Stakeholders are requested to comment on the financial impact analysis conducted by Eskom, as shared in Table 2.

4.7. Technical Studies

4.7.1. Eskom provided technical studies in support of its application with power flow simulations and power transfer distribution factor (PTDF) calculations using the FY2024/25 network model.

4.7.2. The major aspects of technical studies cover the following aspects:

- a) Loss factors in electricity pricing
- b) Methodology:
 - Load flow sensitivities and PTDFs
 - PTDF calculations in power world simulator
 - Simulation and analysis network mode
 - Analysis inputs
 - Analysis outputs
 - Iterations and automations in Python
 - Analysis and graphical representation in Python and Rand
 - Areas and zones in the Eskom network
 - Solar and wind generation models.
- c) Results:
 - Simulation output data
 - Data processing and analysis
 - Outcomes.

4.7.3. Annexure A provides all the technical studies provided by Eskom in support of its application.

4.7.4. Table 3 below provides a snapshot of most geographical areas that exhibit positive loss factors (PTDF values), indicating increased network energy losses due to embedded generation.

Table 3: Geographical areas with PTDF values

Area	%change	Area	%change
East Rand		Phalaborwa	
Johannesburg	-0.91	Polokwane	-1.88
Vaal Triangle		Rustenburg	-2.48
West Rand		Bloemfontein	1.15
Empangeni		East London	8.51
Ladysmith		Port Elizabeth	7.63
New Castle	0.43	Sasolburg	
Pinetown		Welkom	1.66
Highveld South		Karoo	2.83
Lowveld		Kimberley	2.15
Middelburg		Namaqualand	1.71
Witbank		Oudeniqua	2.53
Carletonville	-2.08	Peninsula	3.68
Lephalale	0.72	West Coast	3.31

Question 4:

Stakeholders are requested to comment on technical study conducted by Eskom to support its application.

5. THE CONSULTATION PROCESS

- 5.1. This consultation process is undertaken in accordance with the requirement of procedural fairness, which necessitates that the Energy Regulator undertake a public consultation process to ensure that its decisions comply with section 10 of NERA, read with sections 4 and 5 of PAJA.
- 5.2. Stakeholders are requested to comment on this consultation paper in writing and submit written comments using the following details:

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- 5.3. NERSA will collate all comments received, which will be taken into consideration when the decision is made.
- 5.4. The closing date for the submission of comments is 14 November 2025 at 16:00.

End.

ATTACHMENTS

Annexure A: Eskom's Application for the Amendment of Generator Losses Charge

Annexure B: Loss Factor Technical Analysis