energy
Department:
Energy
REPUBLIC OF SOUTH AFRICA

SUITE OF SUPPLY POLICY GUIDELINES

FOR THE INTEGRATED NATIONAL

ELECTRIFICATION PROGRAMME (INEP)

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TABLE OF CONTENTS

CONTENT	PAGE
1. Introduction	2
2. Objective	3
3. Scope of application	3
4. Customer categories	3
5. Guiding principles from the Energy White Paper	4
6. Capital expenditure	4
7. Suite of supply options	6
8. Connection fees and tariffs	8
8.1 Connection fees and tariffs	8
8.2 Supply options and connections fees	9
9. Subsidies	11
9.1 Eskom programme	11
9.2 Municipal programme	12
9.3 Inflation	14
9.4 Recommendations	14
10. Upgrade/downgrade	15
11. Technical motivation for current limited supplies (20A)	15

1. INTRODUCTION

The department has a responsibility to co-ordinate the electrification programme including the setting of realistic electrification targets; determining the allocation criteria and setting priority areas for electrification; ensuring allocation and management of funds; subsidisation of electrification projects as well as determine an appropriate mix between grid and off-grid technologies.

In line with the Energy White Paper and the Electricity Pricing Policy (EPP), cognisance is taken of the fact that many people in South Africa are living below the accepted poverty line and have a limited ability to pay for goods and services. This concept guides the application of subsidies to lower the barriers of entry and reduce the price to low usage customers. All other users of electricity will pay for the subsidies required for low usage residential supplies, typically poor customers.

Supply to residential customers must meet the customers' basic essential electricity needs. This should be done at the lowest possible cost using a combination of suitable appropriate technologies, supply sizes, and customer service options.

In support of the above, a maximum limit on the capital expenditure will be set per type of supply to ensure that the defined economic viability criterion, subject to stated subsidies, is met. Where customers require more than the minimum supply size, the additional costs will be charged to them.

The higher the capacity required, the less the supply will be subsidised due to the higher connection fees charged for higher supply sizes. Higher capacity supplies will pay much higher connection fees than lower capacity supplies.

This document will discuss issues related to capital expenditure; the suite of supply options; connection fees; the subsidies; options for an upgrade or down-grade; and the technical motivation for current limited to supplies.

2. OBJECTIVE

The objective of this document is to develop and provide a suite of supply framework in line with the Energy White Paper, thus providing a uniform set of standardised supply options and connection fees as well as a uniform approach to electrification tariffs for electrification customers for all licensed entities providing electricity.

3. SCOPE OF APPLICATION

The suite of supply policy guidelines are applicable to all licensed implementing entities of the Integrated National Electrification Program (INEP) on behalf of the Department of Energy.

4. CUSTOMER CATEGORIES

Electrification customers include the following categories:

- Domestic households
- Farm dweller houses
- Schools and clinics
- Small, medium and micro-enterprises be considered a normal household supply as defined in this document

Electrification customers exclude the following:

- Street lighting
- Commercial uses of electricity typically requiring 3 phase supply
- Commercial farming
- Community facilities

5. GUIDING PRINCIPLES FROM THE ENERGY WHITE PAPER

The framework for this policy guideline is in line with the following principles from the Energy White Paper which states the following:

- The National Energy Regulator of South Africa (NERSA) will regulate the Electricity Supply Industry (ESI) tariffs' and the connection fee for a basic supply.
- The department should promote energy efficiency and conservation through demand side management (DSM).
- Government will determine a minimum standard for basic energy services.
- The department will prioritize energy provision in previously disadvantaged and rural areas.
- The allocation criteria for subsidies must aim to maximise the economic benefit of electricity subsidies.
- Pricing signals should result in economically optimal investments in electricity infrastructure and consumption of electrical energy.
- Suite of capacity-differentiated connection fees be offered to residential customers.
- Poor households demonstrate low levels of electricity consumption, therefore only requiring low capacity supply, and can only afford low connection fees and subsidised tariffs at low consumption levels.

6. CAPITAL EXPENDITURE

The capital that government will spend on electrification will be limited to an amount that will be reviewed annually. In remote areas, where a grid supply cannot be made available within the set capital expenditure per connection, the viability of non-grid supply option would be investigated. If viable, the non-grid supply option will be used to make basic electrical supply available.

For electrification to achieve the maximum number of connections based on available capital resources there should be a mixture of differentiated supply

capacities, based on customer needs and affordability within the area. If, only high supply capacities are offered without appropriate connection fees, expensive networks would have to be built limiting the success of electrification program in achieving universal access. Lower supply capacities linked to actual customer requirements will allow for the optimal allocation of resources and the maximum number of connections to be achieved with the available funding.

Domestic customers differ in terms of their levels of consumption, supply capacity requirements, ability to pay the capital costs of connection, and the ease with which they can alter their consumption patterns. Generally poor households demonstrate low levels of electricity consumption, therefore only requiring low capacity supplies, and can only afford low connection fees and subsidised tariffs. On the other hand, well off households tend to be high consumption customers, thus requiring expensive high capacity connections, and can afford to pay full connection costs in addition to contributing towards the subsidisation of low consumption (poor) households.

Customers will be offered the choice of supply size based on the value of the connection fee. Lower- end connection fees will be structured to subsidise low levels of consumption but, as the supply size increases, the connection fee will automatically cover full supply costs. These connection fees will provide a strong signal to domestic customers to choose affordable and appropriately rated supply options.

In order to make the costs per connection cheaper, a high number of connections need to be made in one area. If all customers are connected during construction, the distributor will save on revisit and infill costs. To avoid revisit costs, customers that cannot afford to pay a connection fee immediately will be offered a 20A supply which is in line with the EPP and will be a free connection. This will allow an optimal number of connections in an area and would make the costs per connection fall within the set capital limit. Customers who want higher capacity supply can apply for the higher supply size and will be required to pay the required connection fee.

Where all the electrical energy supply options exceed cost targets and where the same services can be provided with alternative energy sources within the set cost targets, alternative energy sources such as the Remote Area Power Supply (RAPS) systems must be considered.

A more effective use of capital will be to ensure that such customers will be offered a supply size that will provide basic electrical needs.

7. SUITE OF SUPPLY OPTIONS

Optimal pricing for electrification customers plays a most important role in linking affordability, customer needs and effective management of scarce capital resources. Where customers are subsidised, the pricing signal should encourage appropriate supply choices.

The rationale behind the suite of supply options:

- To supply the actual needs of customers and not over invest in redundant network capacity.
- To optimise investments in electrification capital infrastructure through the building of appropriate networks based on customer needs.
- To encourage energy efficiency through built-in demand side management pricing signal. Demand side management is where customers manage the demand and consumption from the system and a limited supply in capacity will also lower demand on the system/ supply.
- The need for government to meet the goal of universal access when providing basic electricity services within acceptable cost parameters.
- To lower the cost per connection by increasing the number of households that are electrified at a given area in a given time

Grid electrification customers will have a choice of capacity differentiated supply options that will suit their needs based on their affordability and subject to available capital resources.

To allow customers to pay for only what they need, the supply will be differentiated according to the supply capacities, with lowest capacity being considered a basic supply and at no cost to the customer and the highest capacity being the most expensive. Each supply category has a different connection fee because the cost for making supply available is highly influenced by the supply size. The bigger the supply capacity, the higher the network infrastructure costs to the distributor and the higher the generation costs. This is due to stronger networks that need to be installed and there is an increasing cost impact on generation due to high peak usage associated with a higher capacity supply.

Based on experiences and existing practices in Eskom and municipalities, the following are the applicable practice proven supply options. The table below outlines the supply size and a typical appliance that may be used at any one time for grid supply.

Table 1: Grid Current Supplies

Supply Size	Typical appliances
20A	Radio + lights + television + fridge and one of the following at any one time: (iron + double hotplate) or (kettle + single bar heater) or (iron + two bar heater) or small geyser.
40A	Radio + lights + television + fridge + iron + toaster + heater + stove +geyser + washing machine +microwave at any one time.
60A	Radio + lights + television + fridge + iron + toaster + heater + stove +geyser + washing machine +microwave at any one time. (Basic handyman's tools including welding machine, a small business such as a 'Spaza' shop)

The 20 Amp limited supply is considered to be the basic service for the poorest sector where grid extension is feasible. Its availability allows settlements of sufficient density to be electrified by maximising the number of

connections, thereby bringing the average cost per connection within the accepted norms.

The table below outlines a supply size with typical appliances that can be used with each supply for non-grid supply.

Table 2: Non- grid Current supplies

Supply Size	Typical appliances
50Wp	4 lights for 4 hours per day + small monochrome TV for 2 hours per day + small radio 10 hours per day (Dc Loads) – suitable for small house
>50Wp	Same as above but for a colour TV and/or small refrigerator (Ac Loads) system designs are modular allowing easy upgrading

8. CONNECTION FEES AND TARIFFS

8.1 Connection fees

Connection fees are an important part of the tariff as a contribution to the capital costs to make supply available. This is the only influence on supply choice by giving a pricing signal that encourages customers to make the right economical decision when choosing the supply capacity. Because the cost to make supply available is influenced by the supply size, the connection fees have to differ based on the supply capacity. Table 3 below outlines the principles applied to the different sizes of supply.

Table 3: Guiding principles for the different supply sizes

Size	Principles applied
20A	Nil connection fee is applied based on affordability thus catering for the target market, which is the poor. As the entry-level tariff, this tariff option will address the current backlog in response to Universal Access and quickly assist blanket connections without the delay of collecting connection fees.
40A	Affordability is considered to be less of an issue. The connection fee or contribution to be paid by the customer to the capital costs covers a portion of the difference between the total cost of providing electricity and the subsidy provided the department
60A	Affordability is not an issue. This supply size needs the biggest pricing signal due to potential impact on the network. Therefore the connection fee must cover the cost of full service connection.

8.2 Supply options and connection fees

The following table outlines the connection fees and the tariff rate per supply option for electrification.

Table 4: Connection fees & tariff rates for the different types of supply

Supply type	Connection fee (incl. VAT)	Tariff rate
NON GRID		
Non-grid 50Wp (*intention is to have the majority of the CAPEX subsidised)*	RNIL	Monthly fixed service fee as based on the Business Plan of the approved service provider and approved by NERSA.
Non-grid higher service capacity	RNIL	Monthly fixed service fee as based on the Business Plan of the approved service provider and approved by NERSA

GRID (lower level)		
Grid 1ϕ system 20A (typical consumption 60kWh - 120kWh)	R Nil	kWh Tariffs as approved by NERSA
GRID (higher level)		
Grid 1ϕ system 40A (typical consumption 120kWh - 800kWh)	R600	kWh Tariffs as approved by NERSA
Grid 1ϕ system 60A (typical consumption >800kWh)	At full cost	kWh Tariffs as approved by NERSA
Larger systems	Full commercial cost	kWh Tariffs and MD charges as approved by NERSA

The principle applied to connection fees is to make the most basic supply the cheapest and the highest supply the most expensive. The basic supply size will have a nil connection fee with the subsequent supply sizes having increasing connection fees. The maximum fee charged at 60 Amp supply will be based on the cost of a service connection. Furthermore, only the 20 A & the 40A supply will be subsidized. There will be no subsidy for the 60A supply.

No customer will be forced to take a specific supply option as customers will always be given a choice. This, however, will be limited to what the local licensed entity or utility provides. Once a choice has been made, it is upgradable on application and payment of the relevant connection fee. Where grid supply is not available, non-grid supply options will be offered.

9. SUBSIDIES

9.1 Eskom Programme

Eskom electrification programme is mainly in the rural areas. Eskom has recorded its yearly average cost per connection, see table 1 below. The actual average cost per connection in the Eskom programme was R 3,106.00 during 2002/3. During 2008/9 actual cost per connection in the Eskom programme was R10, 352.00.

Although the recommended cost per connection during 2010/11 was capped at **R 6600 and R 7200** in urban and rural areas respectively, Eskom had always been fully subsidized because it is a DoRA schedule 7 allocation in terms of company.

Table 1: Average cost per connection by Eskom since 2002 - 2009

Province	Cost per connection	Cost per connection	Cost per connection	Cost per connection	Cost per connection	Cost per connection	Cost per connection
	2002-3	2003-4	2004-5	2005-6	2006-7	2007-8	2008-9
Eastern Cape	4,034	5,812	5,805	5,812	15,682	8,515	8,882.31
Free State	2,162	2,185	2,389	4,505	4,496	3,996	5,755.60
Gauteng	2,372	3,689	2,530	7,658	5,044	4,444	9,602.87
KwaZulu Natal	3,967	5,628	7,962	6,413	8,472	9,412	8,487.56
Mpumalanga	3,267	2,256	1,972	5,569	13,742	8,887	10,432.65
Limpopo	2,795	3,060	3,735	4,816	4,247	5,939	12,704.27
North West	3,237	4,462	4,024	6,496	17,881	9,721	11,348.18
Northern Cape	1,995	6,454	5,280	3,871	9,501	4,113	15,333.27
Western Cape	1,758	3,397	2,310	5,311	4,368	12,215	10,623.62
Total averages	**3,106**	**4,430**	**4,468**	**5,579**	**8,995**	**7,702**	**10,352**

Table 2: Eskom's projected cost per connection for 2011/12

Province	Capex	Connections	Cost per connection
North West	R 110,041,858.99	8,816	**R 12,482.06**
Eastern Cape	R 368,066,871.45	24,890	**R 14,787.74**
Northern Cape	R 55,754,561.45	5,817	**R 9,584.76**
Free State	R 16,685,340.04	2,377	**R 7,019.50**
Gauteng	R 137,397,401.29	13,454	**R 10,212.38**
Western Cape	R 53,783,137.87	6,304	**R 8,531.59**
KZN	R 280,083,587.93	15,725	**R 17,811.36**
Limpopo	R 155,287,051.78	14,634	**R 10,611.39**
Mpumalanga	R 91,201,524.35	6,891	**R 13,234.88**
Total	**R 1,268,301,335.15**	**98,908**	**R 12,823.04**

Above is table 2 indicating the 2011/12 cost per connection projections on the Eskom programme. These figures do not include infrastructure and pre-engineering costs. According to Eskom, these figures have taken into consideration the actual cost incurred in the past years, CPI information. Labour costs have increased sharply above the CPI figures in the recent years.

9.2 Municipal programme

For 2011/12 financial year, the total amount requested or applied for by municipalities is approximately R5.1 billion. Projects applied for varied from pure electrification related projects as well as maintenance, refurbishments and infrastructure expansion projects.

Table 3 below indicates the average cost per connection per province as well as the national average. These figures are averages consolidated from application forms received from various municipalities. Municipalities applied for subsidies ranging from R 6,000 to R32, 161 costs per connection for households electrification programme.

Table 3: Average municipal cost per connection by Province

Province	Average cost per connection
Eastern Cape	R 13,863.00
Free State	R 8,393.00
Gauteng	R 6,600.00
Kwazulu Natal	R 11,798.00
Limpopo	R 9,664.00
Mpumalanga	R 7,376.00
North West	R 8,510.00
Northern Cape	R 8,432.00
Western Cape	R 6,923.00
TOTAL	**R 9,062.00**

According to the municipal applications for 2011/12 financial year, the national average cost per connection is R9, 062.00. These figures are based on the actual applications for 2011/12 and not the actual cost per connection.

Table 4 below indicates the actual costs per connection incurred on the municipal programme during the 2009/10 financial year. This information was sourced from the municipalities on completed projects.

Table 4: Actual cost per connection from selected municipal projects by Province in 2009/10

Province	Actual averages incurred per connection
Eastern Cape	R 10,698.00
Free State	R 7,053.00
Gauteng	R 5,649.00
Kwazulu Natal	R 19,234.53
Limpopo	R 5,762.15
Mpumalanga	R 7,946.00
North West	R 5,413.63
Northern Cape	R 7,200.00
Western Cape	R 7,306.00
Total averages	**R 8,473.59**

9.3 Inflation

Below is a table highlighting the CPI rates as published at the Statistical release (P0141): Consumer Price index – published in November 2010.

Table 5. This table indicates the month to month inflation for the year 2010

Month	Rate
January	6.2
February	5.7
March	5.1
April	4.8
May	4.6
June	4.2
July	3.7
August	3.5
September	3.2
October	3.4
November	3.6
December	Not yet published
Average total	4.6

The average national inflation for 2010 is 4.6 %

9.4 Recommendations

The recommended and approved subsidy levels for 2011/12 financial year are as follows:

Urban areas: R 6 600.00 + 10% = R 7 260.00
Rural areas: R 7 200 .00 + 10% = R 7 920.00

These figures are now rounded as follows:
R 7300 for urban and R 8000 for rural

This is a 10% increase from the previous subsidy levels. These subsidy levels apply for a basic level of service. The inflation on electrification connections can be higher than the published inflation due to the high cost of materials

and labour, hence the 10% increase is warranted to cater for this higher than published inflation figures.

Municipalities are expected to top-up if the actual cost per connection is above the applicable subsidy. However, municipalities that are not able to top up will be allowed to make a motivation to be funded at a higher than recommended cost per connection.

10. UPGRADE/DOWNGRADE

As customers are offered a choice of the available supply options, a customer can choose one supply option and might later realise that the option does not meet his/her needs. These customers will be allowed to upgrade the supply, subject to the payment of an upgrade fee. The upgrade fee will be equal to the difference between the present supply size and the upgraded supply size. Upgrade to a higher supply (40A and 60A) could require meter and cable changes. The higher connection fee would contribute towards the costs of these upgrades.

In order to forego unwarranted network upgrading, incentives should be offered to customers to downgrade their supplies, or to manage consumption within their existing supply limits.

A connection fee paid prior to the downgrade will however not be refunded, but will be used to cover the cost to the distributor. The distributor will benefit from the reduced load demand.

11. TECHNICAL MOTIVATION FOR CURRENT LIMITED SUPPLIES (20A)

There is a direct link between supply size and cost of networks. This is true particularly in less dense rural areas where long lines need to be built to bring supply to customers. Customers in rural areas typically consume very little electricity and also do not place a large load onto the system. In order to

match customer needs and the requirement to save on capital expenditure, networks can be built to an optimum capacity. This optimum capacity has been found to be in the region of 10A. In order to ensure that these networks are not overloaded, the design of the network needs to be such that it caters for a mix of limited supplies, 10A, 20A, 40A and 60A supplies. This means that the limited supplies must be set below 10A (0, 8 to 1 kVA). Networks are therefore protected from potential voltage problems due to the presence of current limited customers. This enables the designers to fully implement the 0, 8 to 1 kVA with lower risk.

The issue is that the expected demand and capital expenditure must be balanced. Based on current experience 0.8 to1 kVA ADMD (after diversity maximum demand) will suffice in newly electrified rural areas. In order to achieve this ADMD of 0.8 to 1 kVA, the minimum supply size must be 20A. If this limit is not offered as a choice, there is a potential risk of voltage drops below the legal limit when demand increases. The prepayment meter and service connection cable that were previously installed on 10A supplies were essentially the same as that of 20A supplies. Therefore, making the 20A the entry supply size for all new electrification customers should be manageable using a phased-in approach.

The upgrading of a system / network in an area can be done cost effectively by:

- Initially employing boosters and strengthening the network and
- Installing larger transformers.

For 60A supplies - the house has to be wired by the customer who will obtain a Certificate of Clearance (COC). An Electricity Dispenser prepayment meter that does not contain an earth leakage relay replaces the Electricity Control Unit prepayment meter. The service cable may also need to be increased in size. The connection fee that is considerably higher than the 20A supply covers the cost of this upgrade. It is preferable to identify the 60A supplies prior to electrification though this is not always possible.