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Tel: 011- 787 7566

Fax : 011- 787 7566

Cell: 083 654 8402

E-mail: hbbarnar@mweb.co.za

Address: P O Box 4069, Randburg, 2125

Website: www.expert.co.za

## NDLAMBE ELECTRICITY: RINGFENCING, COST OF SUPPLY AND TARIFF STUDY – 2022/2023 COSTS

### Table of contents:

1.	INTRODUCTION.....	2
2.	INITIAL ASSESMENT.....	2
3.	METHODOLOGY SUMMARY.....	3
4.	ESKOM ANALYSIS.....	5
5.	NETWORK CAPITAL COST ANALYSIS.....	11
6.	CUSTOMER CONSUMPTION PATTERNS.....	13
7.	CUSTOMER / SALES / REVENUE ANALYSIS.....	14
8.	NETWORK LOSSES.....	25
9.	RINGFENCING.....	26
9.1.	Key focus areas.....	26
9.2.	Methodology applied.....	27
9.3.	Overhead cost allocation.....	31
10.	REVENUE REQUIREMENT.....	36
11.	REPRESENTATIVE LOAD PROFILE ANALYSIS.....	37
11.1.	Network profiles.....	39
11.2.	Profile re-conciliation.....	39
11.3.	Representative Profile Quantities.....	42
11.4.	Network Profile Quantities.....	43
12.	COST OF SUPPLY.....	43
12.1.	Cost Classification.....	43
12.2.	Cost allocation: phase 1.....	44
12.3.	Cost allocation: phase 2.....	47
12.4.	Cost allocation: phase 3.....	47
12.5.	Tariff structure analysis.....	60
12.6.	Key findings.....	60
13.	PRICING STUDY.....	60
13.1.	Pricing Policy Drivers.....	60
13.2.	Pricing policy.....	61
13.3.	Cross subsidies to the poor.....	63
14.	PROPOSED TARIFFS.....	65
15.	FINANCIAL IMPACT.....	67
16.	TARIFF IMPACT.....	67
17.	CUSTOMER IMPACT.....	68
18.	BULK TOU TARIFFS.....	70
18.1.	Bulk TOU tariff impact study.....	71
18.2.	TOU tariff recommendations.....	74
19.	AVAILABILITY CHARGES.....	74
20.	BASIC CHARGES.....	75
21.	SMALL SCALE EMBEDDED GENERATION (SSEG).....	75
22.	PHASE IN.....	77
23.	TARIFF SCHEDULE.....	79
24.	CONCLUSIONS.....	82
25.	ANNEXURE.....	83
25.1.	Allocation of network costs to tariff categories.....	83

<b>25.2. Definitions</b> .....	85
<b>25.3. Abbreviations</b> .....	87

## 1. INTRODUCTION.

Ndlambe Municipality (Ndlambe) sanctioned a comprehensive electricity pricing study which contains 3 main components, more than that required by NERSA:

- Ringfencing electricity. The key objective of this part of the study is to establish the true cost and revenue of electricity supply in the municipality.
- The Cost of Supply study. The objective of the cost of supply study is to know the cost of supplying customers on each tariff and to compare this with the revenue from current tariffs and thus the cross-subsidies.
- Tariff study. The final step is to analyse the structure of the tariffs and how it differs from the cost structures and identify the cross subsidies within the tariffs and then to propose new tariffs.

This paper describes the details relating to all three components of the study undertaken for Ndlambe Municipality. It contains the detailed results for the whole area.

## 2. INITIAL ASSESMENT

This section summarises the findings in terms of the existing tariffs and related issues. This was determined through analysis of the existing tariffs and discussions with electricity staff:

### **Domestic tariffs: Normal, indigent; conventional and PP**

- The basic charge is not capacity differentiated and thus is too high for small consumers.
- Energy charges
  - The first block rate is below the Eskom purchase costs.
  - The second block very close to the Eskom costs.
  - The fourth and fifth blocks exceed the Eskom costs.
 This probably means low usage consumers are overcharged.
- In some areas the basic charge is not being levied, RDP, houses.

### **Indigent.**

- The same tariff as for other domestic consumers is applied.
- The basic charge and 50 kWh of FBE is not levied.
- This income foregone is supposed to be covered by the equitable share.
- There are about 900 consumers in poor areas for whom the basic charges have been waived. This does not comply with the rules for any tariff.

### **Commercial Tariffs: Conventional and pre-paid**

- Fixed charge not capacity differentiated.
- High energy charges.

### **TOU for Bulk: LV and MV**

- Slightly high basic charge: Should have difference between MV and LV
- No access charges
- Demand charges at a reasonable level.
- No reactive energy charge
- Voltage differentiation: MV/ LV – exceeding cost difference
- Tariff surcharge: HV / MV - irregular

### **Availability:**

- The standard basic charge is applied.

**SSEG tariff.**

- No provision

**Wheeling charges**

- No provision

**3. METHODOLOGY SUMMARY**

The NERSA cost of supply Framework describes the steps as shown in **Figure 1**. It is considered to be an oversimplification and does not cover all aspects.

Figure 1



NRS058, the National Standard Specification “Cost of Supply Methodology for application in the Electrical Distribution Industry”, which was developed many years ago but never received final approval due to a legal dispute, shows the framework as in the

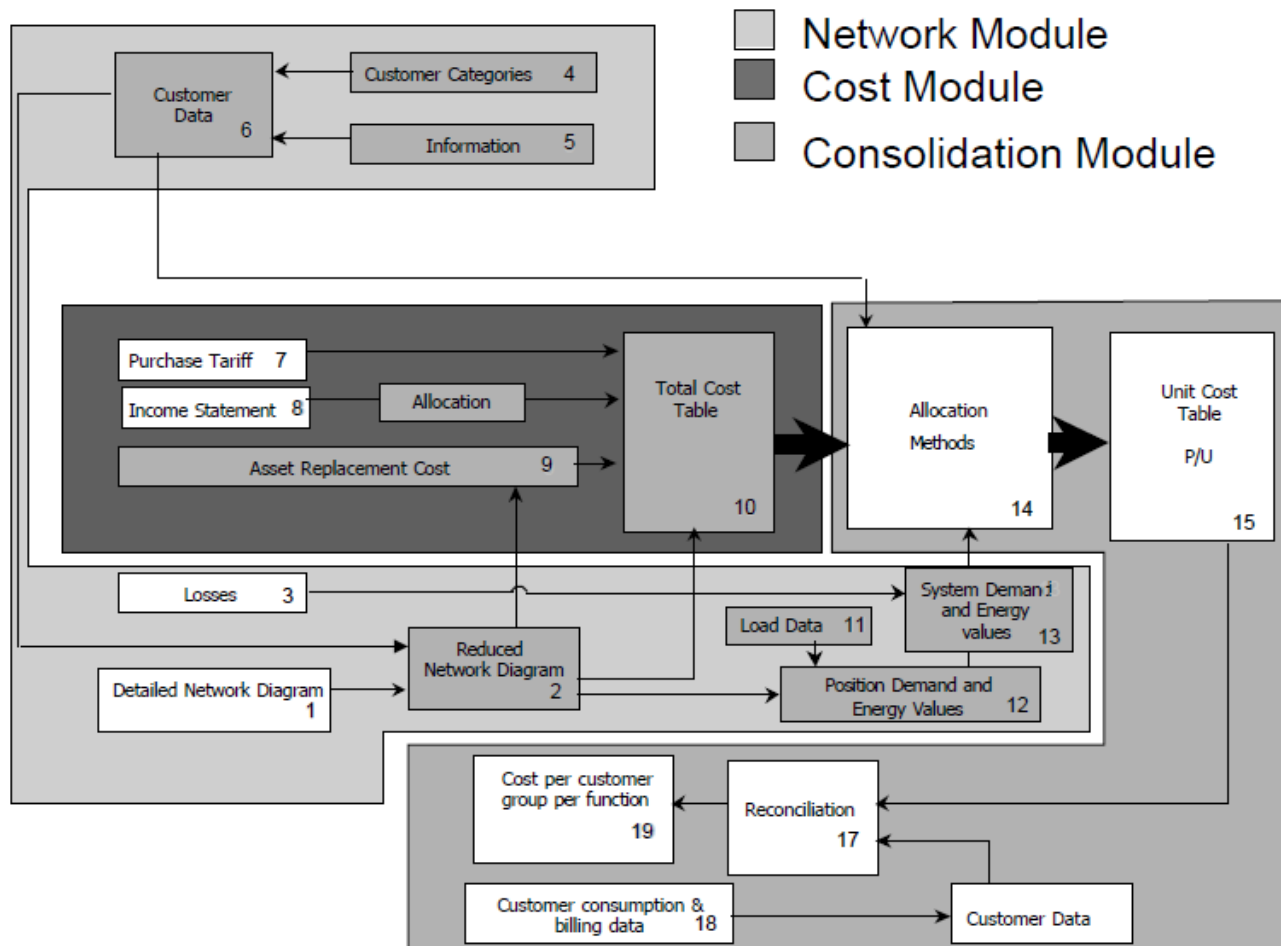
Figure 2.

Figure 2

		Functionalize	Classify	Allocate/Calculate																
		Separate all cost into functions	Calculate total of each function and classify each function according to cost driver	Calculate per Unit value of each cost																
			(Total Rand)	(per Unit )																
Phase 1	Purchase		<table border="1"> <tr> <th>c/kWh</th> <th>R/kVA</th> <th>R/cust</th> <th>%</th> </tr> <tr> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> </table>	c/kWh	R/kVA	R/cust	%	✓	✓			<table border="1"> <tr> <th>c/kWh</th> <th>R/kVA</th> <th>R/cust</th> <th>%</th> </tr> <tr> <td>x</td> <td>x</td> <td></td> <td></td> </tr> </table>	c/kWh	R/kVA	R/cust	%	x	x		
	c/kWh	R/kVA	R/cust	%																
	✓	✓																		
c/kWh	R/kVA	R/cust	%																	
x	x																			
Network Costs		<table border="1"> <tr> <th>c/kWh</th> <th>R/kVA</th> <th>R/cust</th> <th>%</th> </tr> <tr> <td></td> <td>✓</td> <td>✓</td> <td></td> </tr> </table>	c/kWh	R/kVA	R/cust	%		✓	✓		<table border="1"> <tr> <th>c/kWh</th> <th>R/kVA</th> <th>R/cust</th> <th>%</th> </tr> <tr> <td></td> <td>x</td> <td>x</td> <td></td> </tr> </table>	c/kWh	R/kVA	R/cust	%		x	x		
c/kWh	R/kVA	R/cust	%																	
	✓	✓																		
c/kWh	R/kVA	R/cust	%																	
	x	x																		
Support Costs		<table border="1"> <tr> <th>c/kWh</th> <th>R/kVA</th> <th>R/cust</th> <th>%</th> </tr> <tr> <td></td> <td></td> <td>✓</td> <td></td> </tr> </table>	c/kWh	R/kVA	R/cust	%			✓		<table border="1"> <tr> <th>c/kWh</th> <th>R/kVA</th> <th>R/cust</th> <th>%</th> </tr> <tr> <td></td> <td></td> <td>x</td> <td></td> </tr> </table>	c/kWh	R/kVA	R/cust	%			x		
c/kWh	R/kVA	R/cust	%																	
		✓																		
c/kWh	R/kVA	R/cust	%																	
		x																		
Phase 2 Phase 3 Phase 4	Indirect Costs		<table border="1"> <tr> <th>c/kWh</th> <th>R/kVA</th> <th>R/cust</th> <th>%</th> </tr> <tr> <td>✓</td> <td></td> <td>✓</td> <td>✓</td> </tr> </table>	c/kWh	R/kVA	R/cust	%	✓		✓	✓	<table border="1"> <tr> <th>c/kWh</th> <th>R/kVA</th> <th>R/cust</th> <th>%</th> </tr> <tr> <td>x</td> <td></td> <td>x</td> <td>x</td> </tr> </table>	c/kWh	R/kVA	R/cust	%	x		x	x
c/kWh	R/kVA	R/cust	%																	
✓		✓	✓																	
c/kWh	R/kVA	R/cust	%																	
x		x	x																	
				<p>Add similar unit costs for every customer group</p>																
Revenue Requirement		<p>Apply unit costs to customer information and scale to ensure recovery</p>		<p>Unit Cost per Customer Group</p>																

Later in the NRS058 standard, a procedure diagram is provided as is shown in **Figure 3**. The NERSA framework does not feature any of these very important steps.

Figure 3



This report will thus follow the NERSA framework, but it must be realised that it is an over implication of a much more complex process and thus feature many more steps. It must also be remembered that NRS058 was developed largely by an Eskom employee who only undertook cost of supply in Eskom. The issues of ring-fencing of electricity from the rest of the municipality do thus not feature in NRS058. For a proper study, Ringfencing must be done.

It is however proposed that anybody who really wants to appreciate the complexity of this cost of supply study should read the Interim NRS058 before reading this report.

Before starting with the ringfencing study, some background calculations need to be done as detailed in the next few sections.

**4. ESKOM ANALYSIS.**

Ndlambe receives its electricity from Eskom from 2 points of supply. These are shown in

Final

**Table 2** as well as the tariff and the % on TOU.

**Table 1**

TOU PORTION	Rand	R/kWh	Tariff	Type	% TOU
Port Alfred	R 51 158 339	R 1.55	Megaflex	TOU	81%
Alexandria	R 12 237 713	R 2.23	Nightsave Rural	Non-TOU	
Total	R 63 396 052	R 1.64			

These actual kWh and Rand values are summarised to represent the total purchase costs for Ndlambe as shown in **Error! Reference source not found.** During February 2023 a big adjustment was made in the Eskom bills. This involved an increase in maximum demand and decrease in kWh.

**Table 2**

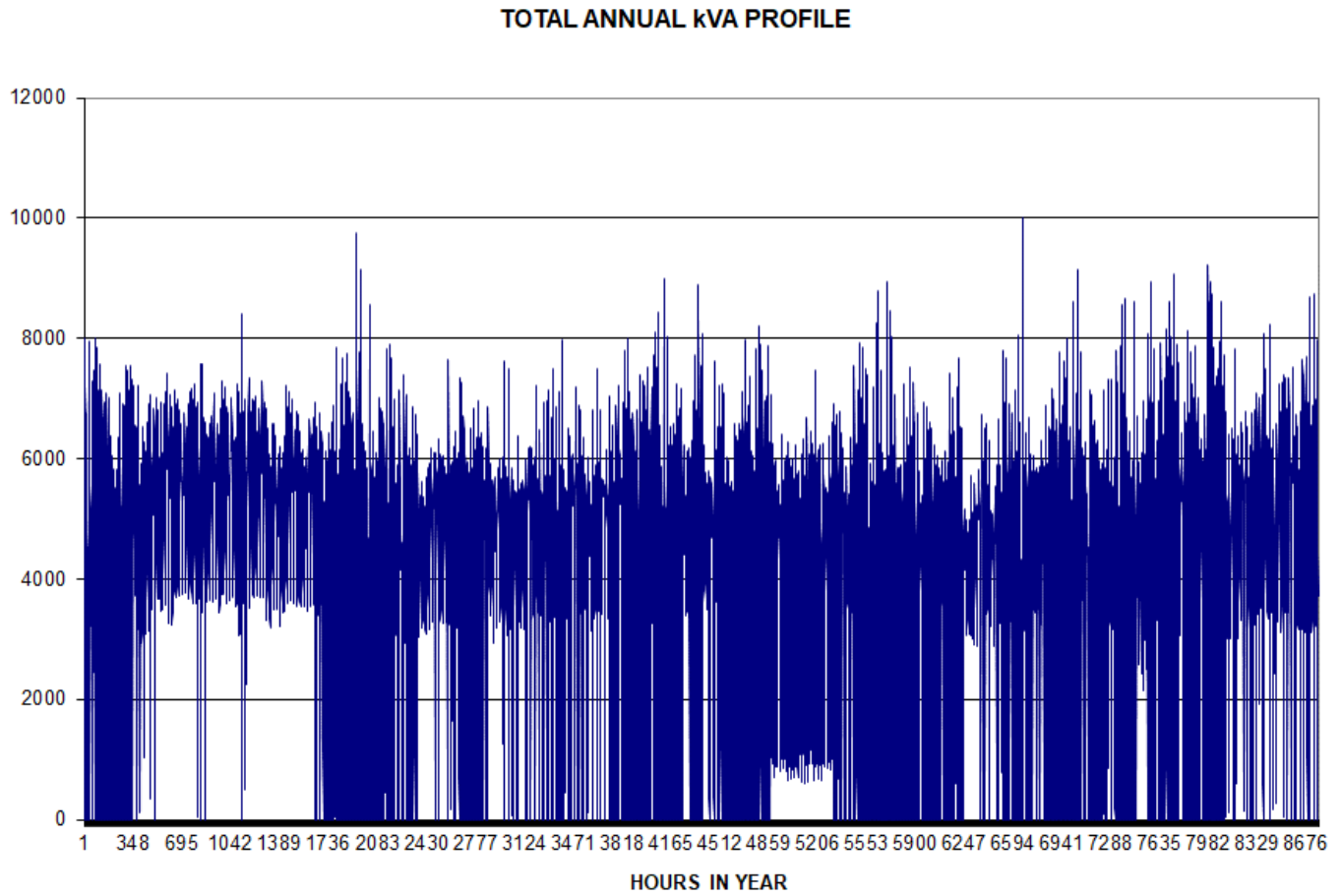
<b>NDLAMBE CONSUMPTION BEFORE ADJUSTMENT</b>		<b>Year</b>	
		<b>Tot</b>	
CONSUMPTION DETAILS (2022-06-17 - 2022-07-16)			
ENERGY CONSUMPTION OFF PEAK kWh 1303731.58		14 235 959	
ENERGY CONSUMPTION STD kWh 1342951.32		13 851 215	
ENERGY CONSUMPTION PEAK kWh 506308.31		5 551 047	<b>Previous</b>
ENERGY CONSUMPTION ALL kWh 3152991.21		33 638 221	33 638 221
DEMAND CONSUMPTION - OFF PEAK 5278.85		74 348	39 124 451
DEMAND CONSUMPTION - STD 6167.17		81 852	39 124 452
DEMAND CONSUMPTION - PEAK 5588.38		82 176	
DEMAND READING - KW/KVA 6167.17		85 102	
REACTIVE ENERGY - OFF PEAK 348306.55		3 299 348	
REACTIVE ENERGY - STD 332555.11		3 047 904	
REACTIVE ENERGY - PEAK 118279.54		1 136 914	
LOAD FACTOR 72.00		692	
	11	132	
PREMISE ID NUMBER 5463299262 TARIFF NAME: Megaflex		33638221.17	
BBS12 PORT ALFRED MUNICIPALITY		33638221.17	39 124 452
		0	
<b>Port Alfred after adjustments</b>		<b>Total</b>	
Administration Charge @ R130.76 per day for 30 days R 3922.80			
TX Network Capacity Charge 10000 kVA @ R11.31 : (for 14 of 30 days) = R5.278/kV R 52780.00		10 000	120 000
TX Network Capacity Charge 10000 kVA @ R12.28 : (for 16 of 30 days) = R6.549333 R 65493.33		833	10 000
Network Capacity Charge 10000 kVA @ R22.26 : (for 14 of 30 days) = R10.388/kVA R 103880.00		10 000	120 000
Network Capacity Charge 10000 kVA @ R24.18 : (for 16 of 30 days) = R12.896/kVA R 128960.00		833	10 000
Network Demand Charge 6167.18 kVA @ R42.21 : (for 14 of 30 days) = R19.698 /kVA R 121481.11		100 548	100 548
Network Demand Charge 6167.18 kVA @ R45.84 : (for 16 of 30 days) = R24.448 /kVA R 150775.22		-	-
Ancillary Service Charge 1471489 kWh @ R0.0055 /kWh R 8093.19		31 685 642	31 685 642
Ancillary Service Charge 1681502 kWh @ R0.006 /kWh R 10089.01		1 385 635	1 385 635
High Season Standard Energy Charge 625989 kWh @ R1.3294 /kWh R 832189.78		10 869 083	10 869 083
High Season Standard Energy Charge 716962 kWh @ R1.4439 /kWh R 1035221.43		2 403 363	2 403 363
High Season Peak Energy Charge 240979 kWh @ R4.3889 /kWh R 1057632.73		4 529 737	4 529 737
High Season Peak Energy Charge 265329 kWh @ R4.7668 /kWh R 1264770.28		1 021 730	1 021 730
High Season Off Peak Energy Charge 604521 kWh @ R0.722 /kWh R 436464.16		11 967 761	11 967 761
High Season Off Peak Energy Charge 699211 kWh @ R0.7842 /kWh R 548321.27		2 279 605	2 279 605
Electrification and Rural Subsidy 1471489 kWh @ R0.1173 /kWh R 158920.81		31 685 643	31 685 643
Electrification and Rural Subsidy 1681502 kWh @ R0.1173 /kWh R 197240.18		1 385 635	1 385 635
High Season Reactive energy Charge 0 kvarh @ R0.1951 /kvarh R 0.00		-	-
High Season Reactive energy Charge 0 kvarh @ R0.2119 /kvarh R 0.00		-	-
REBILLED ADJUSTMENTS			
		33 071 279	33 071 279
			New grand Total
	1		38 557 510
<b>ALEXANDRIA LOADS SPECIFIC</b>		<b>Total</b>	38 557 510
SOUTHERN REGION			
CONSUMPTION DETAILS (2022-06-17 - 2022-07-16)		<b>Total</b>	
ENERGY CONSUMPTION STD kWh 433099.50		5 486 231	
ENERGY CONSUMPTION ALL kWh 433099.50		5 486 231	
DEMAND CONSUMPTION - OFF PEAK 1129.41		14 661	
DEMAND CONSUMPTION - PEAK 1252.72		16 983	
DEMAND READING - KW/KVA 1252.72		17 004	
LOAD FACTOR 49.00		-	
	11	132	
<b>ALEXANDRIA LOADS SPECIFIC</b>		<b>Year</b>	
PREMISE ID NUMBER 5463299831 TARIFF NAME: Nightsave Rural kVa Interval		Tot	
BBS11 ALEXANDRIA MUNICIPALITY			
Administration Charge @ R117.73 per day for 30 days R 3531.90		365	
Network Capacity Charge 1800 kVA @ R17.12 : (for 14 of 30 days) = R7.9893333/kV R 14380.80		1 800	
Network Capacity Charge 1800 kVA @ R18.59 : (for 16 of 30 days) = R9.9146667/kV R 17846.40		1 800	
Network Demand Charge (All Periods) 208140 kWh @ R0.3212 /kWh R 66854.57		5 261 273	5 486 233
Network Demand Charge (All Periods) 224960 kWh @ R0.3489 /kWh R 78488.54		224 960	
Ancillary Service Charge 208140 kWh @ R0.0057 /kWh R 1186.40		5 261 273	
Ancillary Service Charge 224960 kWh @ R0.0062 /kWh R 1394.75		224 960	
High Season Energy Charge 208140 kWh @ R1.1126 /kWh R 231576.56		4 745 607	
High Season Energy Charge 224960 kWh @ R1.2084 /kWh R 271841.66		740 625	
Energy Demand Charge 1252.73 kVA @ R358.61 :(for 14 of 30 days) = R167.3513333 R 209646.04		16 983	
Energy Demand Charge 1252.73 kVA @ R389.49 :(for 16 of 30 days) = R207.728 /kVA R 260227.10		4 043	

<b>NDLAMBE YEAR TOTAL RAND</b>	<b>Year</b>	
ACCOUNT TRANSACTION SUMMARY	<b>Total</b>	SUMMARY
RCC / SCC CONNECTION CHARGE R 2642.00	R 31 704	
ADMINISTRATION CHARGE R 7454.70	R 93 895	
TRANSMISSION NETWORK CAPACITY R 118273.33	R 1 469 073	
DIST. NETWORK CAPACITY CHARGE R 265067.20	R 3 292 949	
NETWORK DEMAND CHARGE R 272256.33	R 3 890 612	
ANCILLARY SERVICE (ALL) R 20763.35	R 235 004	
ENERGY CHARGE (PEAK) 506308.00 R 2322403.01	R 20 196 013	
ENERGY CHARGE (OFF) 1303732.00 R 984785.43	R 12 016 931	
ENERGY CHARGE (STD) 1776051.00 R 2370829.43	R 12 908 810	
ELECTRIFICATION AND RURAL SUBS (ALL) R 356160.99	R 3 932 078	
REACTIVE ENERGY R 0.00	R -	
NETWORK DEMAND CHARGE (C/KWH) (ALL) R 145343.11	R 1 908 381	
DEMAND CHARGE 1252.73 R 469873.14	R 4 208 406	
SERVICE CHARGE R 8702.58	R 109 615	
ADJUSTMENT	-R 897 419	
<b>TOTAL CHARGES FOR BILLING PERIOD R 7344554.60</b>	<b>R 63 396 052</b>	<b>R 63 396 052</b>
ACCOUNT SUMMARY FOR JULY 2022	R -	63 396 052
BALANCE BROUGHT FORWARD (Due Date 2022-07-29) R 7056646.57	R 97 165 191	
PAYMENT(S) RECEIVED Cash - 2022-07-29 R -7056646.57	-R 49 675 801	
	-R 9 516 443	
Check	R 63 396 052	
Diff	R -	
<b>RandPortAlfred</b>		
	Total	
Administration Charge @ R130.76 per day for 30 days R 3922.80	R 49 409	
TX Network Capacity Charge 10000 kVA @ R11.31 : (for 14 of 30 days) = R5.278/kV R 52780.00	R 1 403 580	
TX Network Capacity Charge 10000 kVA @ R12.28 : (for 16 of 30 days) = R6.549333 R 65493.33	R 65 493	
Network Capacity Charge 10000 kVA @ R22.26 : (for 14 of 30 days) = R10.388/kVA R 103880.00	R 2 763 680	
Network Capacity Charge 10000 kVA @ R24.18 : (for 16 of 30 days) = R12.896/kVA R 128960.00	R 128 960	
Network Demand Charge 6167.18 kVA @ R42.21 : (for 14 of 30 days) = R19.698 /kVA R 121481.11	R 3 739 836	
Network Demand Charge 6167.18 kVA @ R45.84 : (for 16 of 30 days) = R24.448 /kVA R 150775.22	R 150 775	
Ancillary Service Charge 1471489 kWh @ R0.0055 /kWh R 8093.19	R 191 005	
Ancillary Service Charge 1681502 kWh @ R0.006 /kWh R 10089.01	R 10 089	
High Season Standard Energy Charge 625989 kWh @ R1.3294 /kWh R 832189.78	R 13 868 339	
High Season Standard Energy Charge 716962 kWh @ R1.4439 /kWh R 1035221.43	R 2 340 981	
High Season Peak Energy Charge 240979 kWh @ R4.3889 /kWh R 1057632.73	R 11 259 493	
High Season Peak Energy Charge 265329 kWh @ R4.7668 /kWh R 1264770.28	R 2 095 056	
High Season Off Peak Energy Charge 604521 kWh @ R0.722 /kWh R 436464.16	R 8 723 985	
High Season Off Peak Energy Charge 699211 kWh @ R0.7842 /kWh R 548321.27	R 1 301 295	
Electrification and Rural Subsidy 1471489 kWh @ R0.108 /kWh R 158920.81	R 3 734 838	
Electrification and Rural Subsidy 1681502 kWh @ R0.1173 /kWh R 197240.18	R 197 240	
High Season Reactive energy Charge 0 kvarh @ R0.1951 /kvarh R 0.00	R -	
High Season Reactive energy Charge 0 kvarh @ R0.2119 /kvarh R 0.00	R -	
REBILLED ADJUSTMENTS	-R 897 419	
Residual Connection Charge @ R2642.00 R 2642.00	R 31 704	
<b>TOTAL CHARGES R 6178877.30</b>	<b>R 51 158 339</b>	
	R 51 158 339	
	R -	
<b>ALEXANDRIA</b>	<b>Total</b>	
PREMISE ID NUMBER 5463299831 TARIFF NAME: Nightsave Rural kVa Interval	<b>Tot</b>	
BBS11 ALEXANDRIA MUNICIPALITY	<b>MUNICIPALITY</b>	
Administration Charge @ R117.73 per day for 30 days R 3531.90	R 44 486	
Network Capacity Charge 1800 kVA @ R17.12 : (for 14 of 30 days) = R7.9893333/kV R 14380.80	R 382 463	
Network Capacity Charge 1800 kVA @ R18.59 : (for 16 of 30 days) = R9.9146667/kV R 17846.40	R 17 846	
Network Demand Charge (All Periods) 208140 kWh @ R0.3212 /kWh R 66854.57	R 1 829 893	
Network Demand Charge (All Periods) 224960 kWh @ R0.3489 /kWh R 78488.54	R 78 489	
Ancillary Service Charge 208140 kWh @ R0.0057 /kWh R 1186.40	R 32 516	
Ancillary Service Charge 224960 kWh @ R0.0062 /kWh R 1394.75	R 1 395	
High Season Energy Charge 208140 kWh @ R1.1126 /kWh R 231576.56	R 4 637 634	
High Season Energy Charge 224960 kWh @ R1.2084 /kWh R 271841.66	R 894 971	
Energy Demand Charge 1252.73 kVA @ R358.61 : (for 14 of 30 days) = R167.3513333 R 209646.04	R 3 662 186	
Energy Demand Charge 1252.73 kVA @ R389.49 : (for 16 of 30 days) = R207.728 /kVA R 260227.10	R 546 220	
SERVICE CHARGE R 8702.58	R 109 615	
<b>TOTAL CHARGES R 1165677.30</b>	<b>R 12 237 713</b>	
	R 12 237 713	

Next is to analyse the load profiles of the supplies from Eskom. The ½ hourly profiles for the last financial year were obtained from Eskom for each of the points of supply.

Figure 4 shows the total ½ hourly KVA purchases (Y-Axis) for Ndlambe over the 12 months (X-Axis).

Figure 4



The following observations can be made from this:

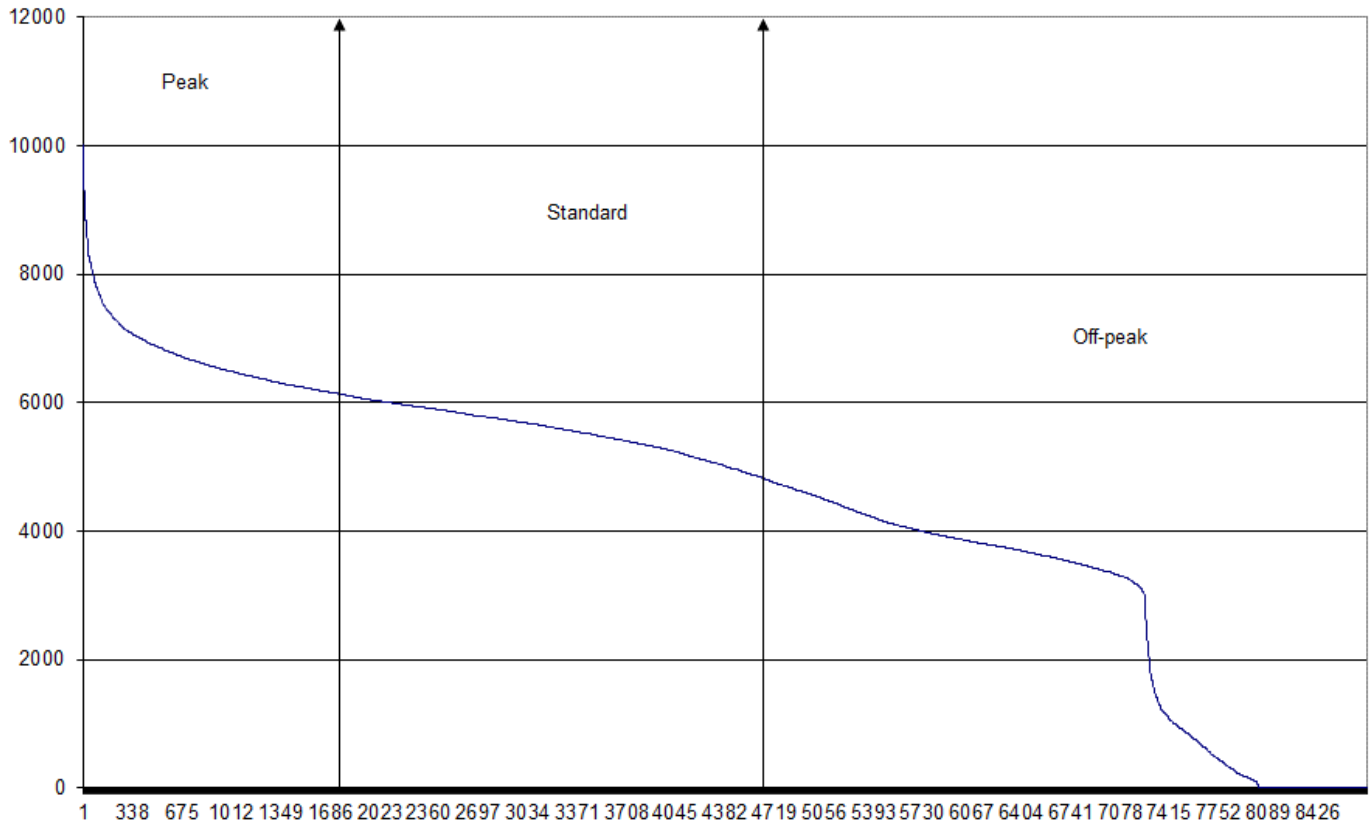
- The municipality has a generally flat load throughout the year.
- It shows very sharp peaks which probably could be accounted to the cold load pickup after load shedding.

**Figure 5** shows the annual load duration curve. This shows the highest to the lowest  $\frac{1}{2}$  hourly kVA (Y-axis) for all the  $\frac{1}{2}$  hours of the year (x-axis) and gives an indication of the potential to reduce the peak demand.

Final

**Figure 5**

**ANNUAL LOAD DURATION CURVE**



**Table 3**

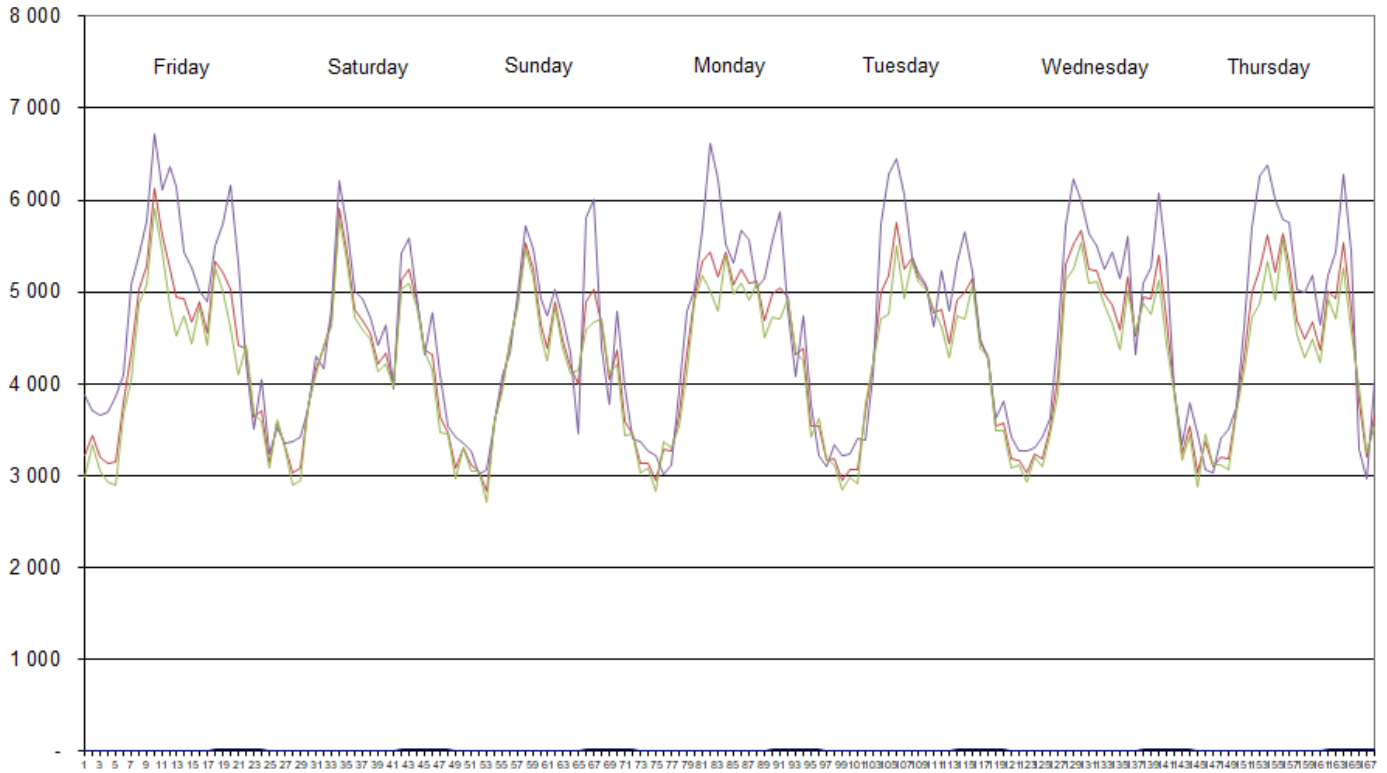
This shows that there is limited opportunity to save on maximum demand charges by only cutting out the peaks for a few hours in the year. Although the potential looks limited for the combined load, it will become clear that there are great opportunities to reduce peaks at each individual Eskom point of supply. Analysis shows that close to 5 MW can be further reduced by managing less than 100 peak hours in the year. This shows the importance of applying demand side management in the pricing signal to customers.

Figure 6 shows the ½ hourly kVA values (Y-axis) for the following average weeks (7 day ½ hours per week = x-axis) of the total Eskom supply in the year:

- Average for whole year.
- Average for high-demand period
- Average for low-demand period.

Figure 6

AVERAGE WEEK



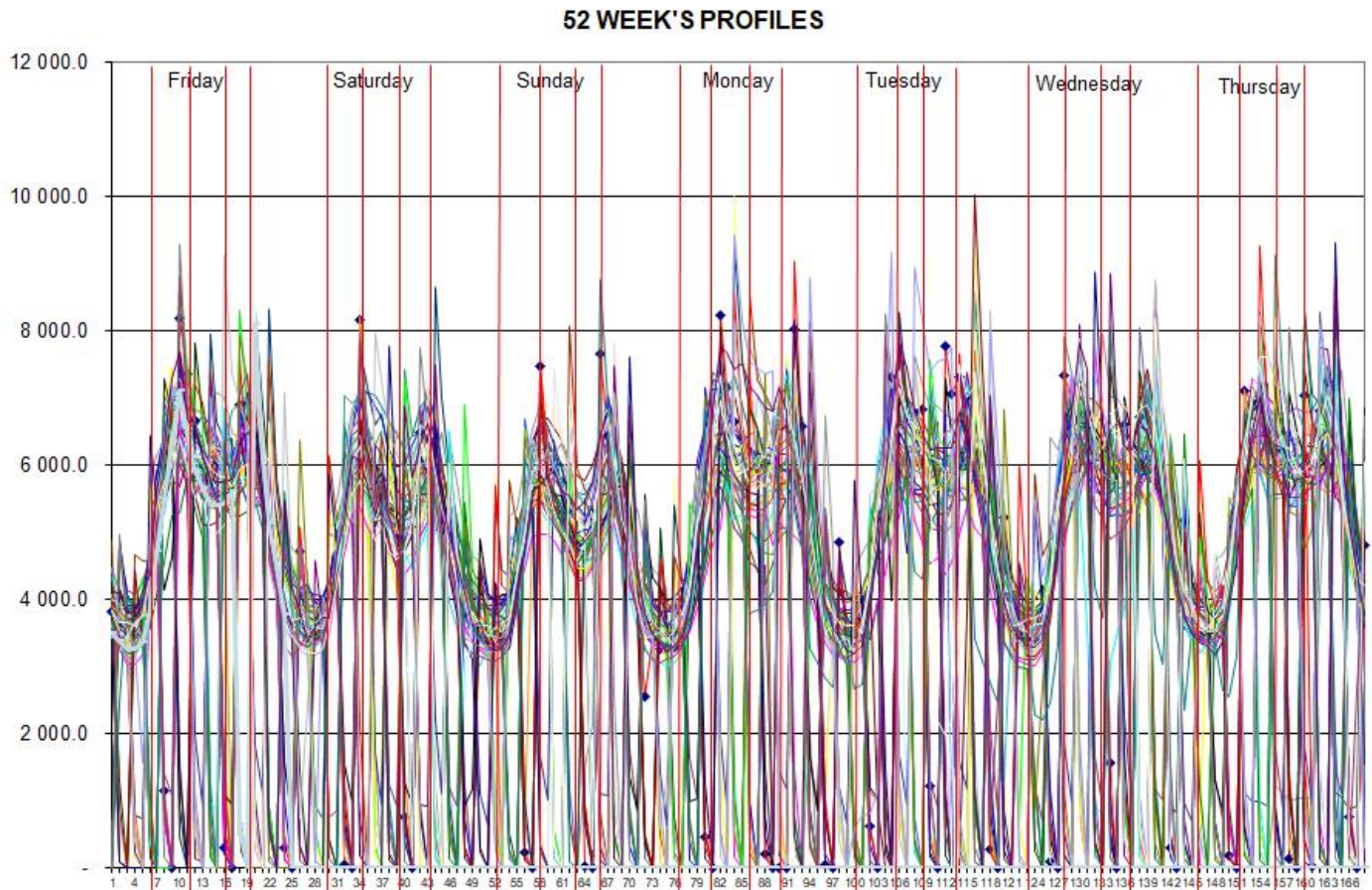
HOURS OF AVERAGE WEEK

The following can be said in this respect:

- This is similar to other town profiles.
- It shows the very high evening peak especially in the High demand period (mainly from domestic customers).
- With the hot summers there is also a lower peak during the late mornings.
- It shows lower consumption on Saturdays and Sundays but late morning peaks on Sundays.
- Very low levels of consumption during the night.

**Figure 7** Error! Reference source not found. shows the ½ hourly kVA values (Y-axis) for every week of the year (7 day ½ hours per week = x-axis). This is a very important graph as the previous average graph easily hides very important information.

**Figure 7**



The following can be seen from this:

- There are high peaks during the mornings and evenings although the highest peak was during the late afternoon.
- It also shows that there are only a few days in the year where the demand actually exceeds 8 MW. That leaves massive opportunity to save more than 2 MW with very limited effort.
- This is a clear message that the key focus for demand reduction must be on domestic evening peaks but the rising morning peaks cannot be ignored.

**5. NETWORK CAPITAL COST ANALYSIS**

The first step in analysing network assets is to develop a Reduced network diagram (RND). **Figure 8** illustrates this for the Ndlambe network. Most rural supplies in the area are provided by Eskom.

**Figure 8**



**REDUCED NETWORK DIAGRAM**

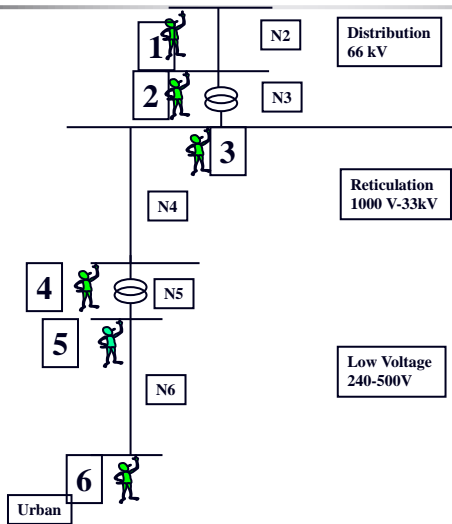


Table 4 shows the RND in table form. All costs and customers will be linked to these networks in the cost of supply study.

**Table 4**  
**NDLAMBE**

NETWORK CONSTRUCTION			
PRIMARY DESCRIPTION	SECONDARY DESCRIPTION	NETWORK CODE	VOLTAGE
Reticulation	Reticulation urban	N4	11 KV
Retic/LV transf	Retic subs urban	N5	11 KV to 400 V
LV	LV urban	N6	400 V

The following comments in this respect:

The summary of electrical assets in the financial assets register was studied and the following found:

- The asset descriptions are not detailed enough: cable and line lengths not shown.
- No replacement values provided.

The technical asset register was then obtained and studied.

The summary of the technical asset register with replacement values are shown in Table 5.

**Table 5**

Row Labels	Network	Count of Barcode	Sum of Purch Price	Sum of New Replacement
<b>MV</b>		<b>401</b>	<b>78986189.51</b>	<b>150513988.1</b>
<b>MV/LV</b>		<b>1880</b>	<b>80890610.96</b>	<b>143975728.3</b>
<b>LV</b>		<b>2397</b>	<b>13009635.83</b>	<b>30825629.32</b>
<b>Consumers</b>		<b>8543</b>	<b>31986805.6</b>	<b>75528796.79</b>
<b>Lights</b>		<b>778</b>	<b>1475717.19</b>	<b>3536642.122</b>
<b>GRAND TOTAL</b>		<b>13 999</b>	<b>206 348 959</b>	<b>404 380 785</b>

The replacement per units values were tested and found to be too low. The CRC values were thus doubled to obtain more reasonable values.

The depreciation and ROA making up the total Capital revenue requirement is shown in Table 6.

**Table 6**

Sum of Quantity	Sum of Quantity	Service connection	Meter Incl Inst	Current Replacement cost	Life expectancy Years	CRC Depreciation	ROA @ 3.5%	Total Capex provision	Current Depreciation	Current Interest	Total current provision	Capital ratios
Energy					15	-	-	-	-	-	-	0.0%
HV					50	-	-	-	-	-	-	0.0%
HV/MV					50	-	-	-	-	-	-	0.0%
MV	401			205 607 671	45	4 569 059	7 196 268	11 765 328	646 871	-	646 871	17.2%
MV to LV	1 880			196 676 167	40	4 916 904	6 883 666	11 800 570	696 118	-	696 118	18.5%
LV	2 397			42 108 949	35	1 203 113	1 473 813	2 676 926	170 333	-	170 333	4.5%
1 PH kWh Pre-paid	14 378	8 000	1 400	135 153 200	10	13 515 320	4 730 362	18 245 682	1 913 452	-	1 913 452	51.0%
3 PH kWh Pre-paid	1	10 000	2 500	12 500	10	1 250	438	1 688	177	-	177	0.0%
1 PH kWh	6 115	6 000	1 000	42 805 000	30	1 426 833	1 498 175	2 925 008	202 006	-	202 006	5.4%
3 Ph kWh	442	10 000	2 000	5 304 000	30	176 800	185 640	362 440	25 031	-	25 031	0.7%
3 TOU	283	20 000	10 000	8 490 000	30	283 000	297 150	580 150	40 066	-	40 066	1.1%
3 PH TOU & ct's	1	12 000	15 000	27 000	30	900	945	1 845	127	-	127	0.0%
TOU RMU & CT/VT's	5	450 000	20 000	2 350 000	30	78 333	82 250	160 583	11 090	-	11 090	0.3%
TOU at HV sub With CB	1	950 000	20 000	970 000	30	32 333	33 950	66 283	4 578	-	4 578	0.1%
Streetlight	778			4 831 184	15	322 079	169 091	491 170	45 599	-	45 599	1.2%
<b>TOTALS</b>	<b>26 682</b>			<b>644 335 671</b>		<b>26 525 925</b>	<b>22 551 748</b>	<b>49 077 674</b>	<b>3 755 448</b>	<b>-</b>	<b>3 755 448</b>	<b>100.0%</b>

The following in this respect:

- CRC depreciation – Calculated using the NERSA prescribed life expectancy.
- ROA - Return on Assets. The 3.5% is a real rate return considered internationally acceptable. This component is to cover the average cost of capital, including interest and return.

The process followed is to calculate the total capital provision as by international standards (depreciation plus ROA also called levelised cost) and then the ratio of these provisions relative to the total provision. Then apportion the current total provision (depreciation and interest) to the various asset categories using these ratios. These values will be used as a basis for the cost of supply analysis.

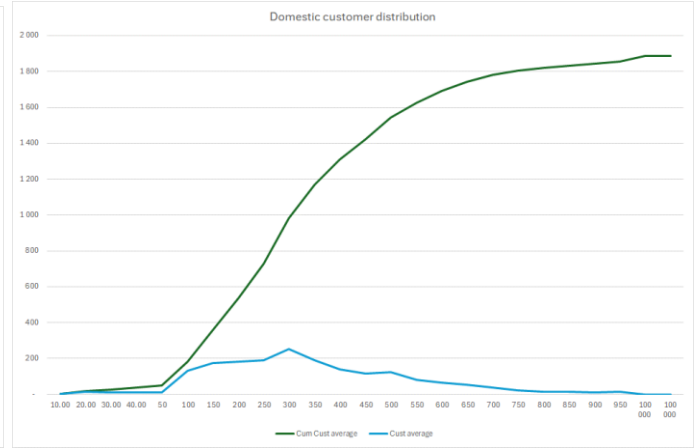
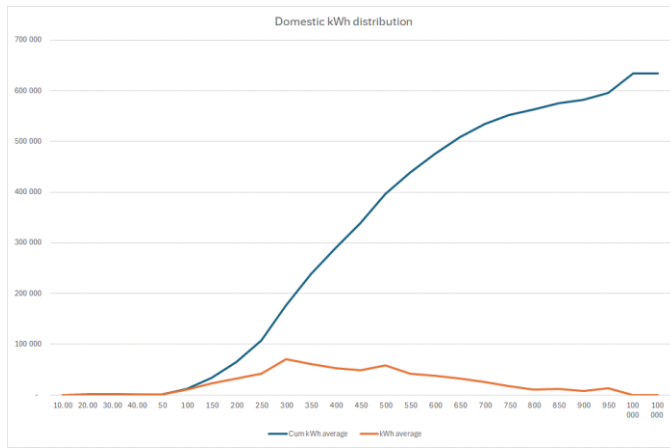
**6. CUSTOMER CONSUMPTION PATTERNS.**

The sales are then analysed even further to determine the number of consumers per consumption block. This is important when deliberating about categorising consumers and developing appropriate tariff structures and consumer impact. The tables and graphs below show a section of the analysis for each of the small consumer tariffs. In case of each tariff the graphs after each table illustrates this graphically:

- The first graphs show:
  - the cumulative kWh vs each kWh block. (vertical axis)
  - the kWh per kWh block (horizontal axis)
- The second graphs show:
  - the cumulative consumers vs each kWh block. (vertical axis)
  - the consumers per kWh block. (horizontal axis)

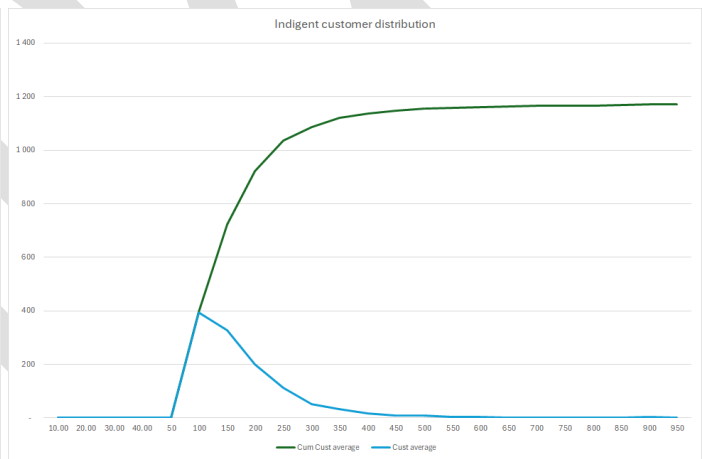
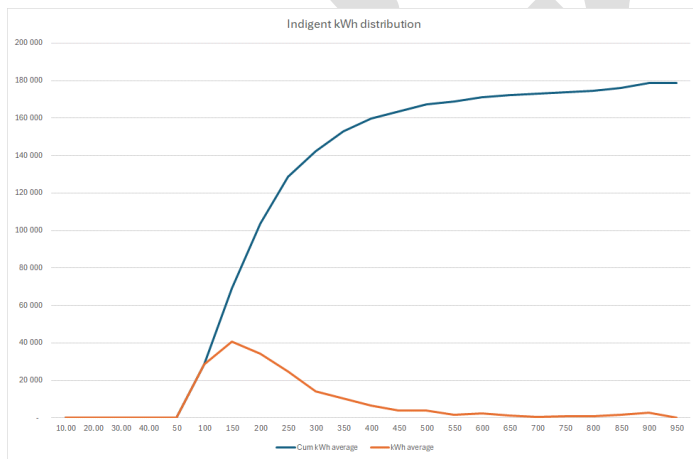
Domestic consumers.

Domestic - Tariff	Average														
	10.00	20.00	30.00	40.00	50	100	150	200	250	300	350	400	450	500	
Cum kWh average	22	266	517	884	1379	11404	33526	65274	107556	177581	238645	290861	339340	396990	
kWh average	22	244	251	367	495	10025	22122	31748	42282	70025	61064	52217	48479	57650	
Cum Cust average	3	18	28	39	50	183	358	539	727	981	1169	1309	1423	1545	
Cust average	3	15	10	11	11	133	175	161	188	254	188	140	114	122	
Block	50	350	600	> 600	Check	Check	BREAKEVEN		Amps	20	30.00	40.00	50.00	60.00	
kWh/y	16549	2847185	3248081	1422342	7534157	7534157			kWh/m	550.00	650.00	800.00	950.00	1050.00	
Customers	50	1119	521	197	1887	1887			Customers	1625	118	76	38	13	



**Indigent consumers**

Indigent - Tariff	Average														
	10.00	20.00	30.00	40.00	50	100	150	200	250	300	350	400	450	500	
Cum kWh average	-	-	-	35	64	28595	69225	103627	128521	142499	153026	159682	163452	167212	
kWh average	-	-	-	35	49	28511	40630	34403	24894	13978	10527	6656	3770	3760	
Cum Cust average	-	-	-	1	2	396	723	923	1035	1087	1120	1138	1147	1155	
Cust average	-	-	-	1	1	394	327	200	112	52	33	18	9	8	
Block	50	350	600	> 600	Check	Check	BREAKEVEN		Amps	20	30.00	40.00	50.00	60.00	
kWh/y	1005	1835305	231090	90336	2157735	2157735			kWh/m	550.00	650.00	800.00	950.00	1050.00	
Customers	2	1118	42	11	1173	1173			Customers	1158	6	3	5	-	



This information is critical for the following:

- The fact that sales is already collected by Amp size makes this very useful.
- Determination of different tariff categories
- Determination of a subsidy tariff for the poor that are not indigent.
- Selecting consumers on appropriate tariffs.

This clearly shows that there are many poor consumers that use very little and probably can't afford more even if they are not indigent.

**7. CUSTOMER / SALES / REVENUE ANALYSIS.**

Before one can start classifying costs, some calculations need to be done which will be used in the classification process. It starts off with the analysis of customers, tariffs and revenue.

Table 7 shows the 2022/2023 and 2023/2024 tariffs. The current tariffs are used to ensure that any restructuring that was done during the last tariff change is incorporated.

Table 7

**2023/2024 NDLAMBE MUNICIPALITY TARIFF LIST**

DESCRIPTION	2022/2023		2023/2024		
	APPROVED		APPROVED		
	VAT EXCL		VAT EXCL	% INCREASE	
	1/7/2022		1/7/2023		
<b>ELECTRICITY NDLAMBE</b>					
<b>1. Scale 1: Domestic Credit</b>					
Applicable to all bona fide domestic Consumers					
Basic Charge:	R	301.40	R	346.91	15.10%
<b>Energy Consumption:</b>					
Block 1 (0 - 50 kWh)	R	1.3523	R	1.5565	15.10%
Block 2 (51 - 350 kWh)	R	1.7386	R	2.0011	15.10%
Block 3 (351 - 600 kWh)	R	2.4470	R	2.8165	15.10%
Block 4 (>600 kWh)	R	2.8694	R	3.3027	15.10%
<b>2. Scale 2: Domestic Pre-payment</b>					
Applicable to all bona fide domestic consumers in areas where vending is available					
Basic Charge	R	301.40	R	346.91	15.10%
<b>Energy Consumption:</b>					
Block 1 (0 - 50 kWh)	R	1.3523	R	1.5565	15.10%
Block 2 (51 - 350 kWh)	R	1.7386	R	2.0011	15.10%
Block 3 (351 - 600 kWh)	R	2.4470	R	2.8165	15.10%
Block 4 (>600 kWh)	R	2.8694	R	3.3027	15.10%
<b>3. Scale 3: Commercial</b>					
Applicable to non-domestic consumers with a demand not exceeding 55kVA.					
Basic Charge	R	540.47	R	622.08	15.10%
Energy Consumption:	R	2.3960	R	2.7578	15.10%

<b>5. Scale 7: Time of Use LV</b>			
<b>Applicable to consumers with a demand normally exceeding 50kVA</b>			
Surcharge on all charges		24%	24%
Basic Monthly charge	R 990,62	R 1 140,21	15,10%
Demand Charges KVA (Peak & Standard only)	R 145,6132	R 167,5984	15,10%
<b>Energy Charges (low season)</b>			
Peak	R 1,9623	R 2,2587	15,10%
Standard	R 1,2105	R 1,3933	15,10%
Off-Peak	R 0,8622	R 0,9922	15,09%
<b>Energy Charges (High season - June to August)</b>			
Peak	R 6,8777	R 7,9162	15,10%
Standard	R 1,8157	R 2,0899	15,10%
Off-Peak	R 1,4489	R 1,6678	15,10%
<b>5. Scale 7: Time of Use MV</b>			
<b>Applicable to consumers with a demand normally exceeding 50kVA</b>			
Surcharge on all charges		12%	12%
Basic Monthly charge	R 990,62	R 1 140,21	15,10%
Demand Charges KVA (Peak & Standard only)	R 131,5216	R 151,3792	15,10%
<b>Energy Charges (low season)</b>			
Peak	R 1,7724	R 2,0401	15,10%
Standard	R 1,0933	R 1,2584	15,10%
Off-Peak	R 0,7787	R 0,8962	15,09%
<b>Energy Charges (High season - June to August)</b>			
Peak	R 6,2121	R 7,1501	15,10%
Standard	R 1,6400	R 1,8876	15,10%
Off-Peak	R 1,3087	R 1,5064	15,10%

**Error!** Reference source not found. shows the 2022/2023 consumptions details.

**Error!** Reference source not found. shows the 2022/2023 consumption statistics.

Table 8 shows the 2023/2024 tariff charges for purpose of calculations and assessment.

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**Error! Reference source not found.** shows the 2022/2023 consumption statistics.

Final



These values all makes sense and will thus be used as such.

Various reports had to be used to determine the sales per tariff. Table 10

Table 11 shows the sales for pre-payment consumers. Table 10

Table 11 shows the consumption per tariff block. This is obtained by calculation of the individual consumer monthly data.

Table 10

Column Labels	Count of Meter Number	Sum of Amount(R)	BST Issue	Count of Meter Number	Sum of Amount(R)	Cancel Prepaid	Count of Meter Number	Sum of Amount(R)	Debt Recovery	Count of Meter Number	Sum of Amount(R)	Free Issue	Count of Meter Number	Sum of Amount(R)	Invalid BST	Sum of Amount(R)
Commercial - Tariff																
Domestic - Tariff	1318	65900	0	12443	622150	2	-111.3	-200				9495.55	41	13220.3	0	
Indigent - Tariff						2	-225.2	-450				1608	5	748.9	0	18
(blank)																
<b>Grand Total</b>	<b>1318</b>	<b>65900</b>	<b>0</b>	<b>12443</b>	<b>622150</b>	<b>4</b>	<b>-336.5</b>	<b>-650</b>				<b>11103.55</b>	<b>55</b>	<b>17134.1</b>	<b>0</b>	<b>18</b>

Table 11

Linked A/C Payment - Arrears Debt Recovery	Sum of Amount(R)	Count of Meter Number	Linked A/C Payment - Installation Cost	Sum of Amount(R)	Count of Meter Number	Prepaid Sale	Count of Meter Number	Sum of Amount(R)	Tran Type of Meter Number	Count of Meter Number	Sum of Amount(R)	Transaction Reversal	Count of Meter Number	Sum of Amount(R)	Total Count of Meter Number	Total Sum of Amount(R)
	113283					100	142262	9730565	22125051	88	0	37	-1965.3	-3520	10362545.1	22112408.72
															10362545.1	22112408.72
															20796009	44357786.9
<b>DOMESTIC ANALYSIS</b>															<b>600 &gt; 600</b>	
Tot <350					1211						448884			1675509	172065	69954
%											19.0%			70.8%	7.3%	3.0%
Tot >350					746						317916			2530503	1318985	1537180
%											5.6%			44.4%	23.1%	26.9%

Table 12 shows the conventional consumer sales data excluding basic charges.

**Table 12**

FROM SALES REPORT						
Row Labels	Count of ACCOUNT	Sum of UNITS	Sum of AMOUNT	kWh/cut/m	R/kWh	
ELEC BASIC DOMESTIC INDIGENT	45.17	542	-	1	-	
ELEC BASIC DOMESTIC INDIGENT	49.83	608	-	1	-	
ELEC USAGE CREDIT 1ST 50KWH - INDIGENT	17.17	17 663	23 412	86	1.33	
ELEC BASIC DOMESTIC	3 828.08	49 565	R 14 828 285	1	R	299.17
ELEC BASIC DOMESTIC	287.25	3 784	R 1 135 696	1	R	300.13
ELEC USAGE DOM.(ALEX)F	208.75	472 774	R 1 066 020	189	R	2.25
ELEC USAGE DOMEST -P.A. F	4 953.67	7 732 865	R 15 155 505	130	R	1.96
ELEC BASIC COMMERCIAL P.A	237.50	5 544	R 2 810 340	2	R	506.92
ELEC BULK BASIC:<55KVA	3.33	44	R 23 781	1	R	540.47
ELEC USAGE BUS. - P.A. F	293.17	4 062 457	R 9 724 123	1 155	R	2.39
ELEC BASIC COMMERCIAL.>55KV	52.75	1 240	R 664 238	2	R	535.68
ELEC USAGE COMMERCIAL (ALEXANDRIA) BL	52.25	643 152	R 1 537 044	1 026	R	2.39
TOU BASIC CHARGE ELEC(ALEX)	1.00	12	R 5 386	1	R	448.85
TOU BASIC CHARGE ELEC(PA)	22.58	216	R 89 670	1	R	415.14
TOU KVA ELEC(ALEX)	1.00	3 258	R 382 364	272	R	117.35
TOU KVA ELEC(PA)	19.92	23 394	R 2 739 936	98	R	117.12
TOU KWH ELEC(ALEX)	1.00	588 064	R 664 762	49 005	R	1.13
TOU KWH ELEC(PA)	21.08	6 283 692	R 8 029 260	24 837	R	1.28
TOU SURCHARGE ELEC(ALEX)	1.00	12	R 125 655	1	R	10 471.26
TOU SURCHARGE ELEC(PA)	19.92	205	R 2 381 450	1	R	11 616.83
ELEC USAGE MUNICIPAL	205.58	508 293	-	206	R	-
ELEC STREETLIGHTS USAGES	0.58	1 982	R 2 650	283	R	1.34
ELEC AVAIL PRIOR PERIOD AJUSTMENT	27.08	194	-R 268 922	1	R	1 386.20
FINALE ELEC READING	5.33		R 21 518	-		#DIV/0!
ELEC USAGE: ADLITES	1.00	12	R 124 599	1	R	10 383.26
ELEC USAGE PRIOR PERIOD AJUSTMENT	1.67	29 126	-R 38 003	1 456	R	1.30
<b>Grand Total</b>	<b>10 357.67</b>	<b>20 370 058</b>	<b>R 61 228 768</b>		<b>R</b>	<b>3.01</b>

The domestic tariffs feature block rate and thus the quantities per block is required. This is not provided in summary form. The sales per block was then calculated from the individual consumer monthly data. A summary of these ratios are shown in Table 13 below.

**Table 13**

PP BLOCK DATA		Cust	50	350	600	> 600
Dom <350	kWh	1 172	538 543	1 715 511	88 681	3 620
	%		23%	73%	4%	0%
Dom >350	kWh	715	374 343	2 159 279	1 051 959	545 929
	%		9%	52%	25%	13%
Ind	kWh	1 173	620 284	1 253 825	77 540	29 950
	%		31%	63%	4%	2%

Table 14 provides details of the non-metered loads including public lighting. The following should be noted in this respect:

- The municipality provides the energy to all the other public lights.
- The municipality provides maintenance to all the public lights.

Final



Table 16 shows a summary of the 2022/2023 actual revenue from the sales reports.

Table 16

NDLAMBE		REVENUES FROM CHARGES APPLICABLE ALL MONTHS OF THE YEAR					
ACTUAL REVENUE	347	Customer service	Basic	Access	Σ MDs all hours	ALL Energy	
TARIFF NAME	TARIFF CODE	R/year	R/year	R/year	R/year	R/year	
Domestic Indigent PP	0		-			2 692 190	
Domestic Indigent Conv	0					23 412	
Domestic 20 Amp PP	0					14 033 017	
Domestic 20 Amp Conv	0		15 963 981			16 221 525	
Domestic > 20 Amp PP	0						
Domestic > 20 Amp Conv	0						
Commercial PP	0					5 430 137	
Commercial Conv	0		3 498 358			11 261 167	
Bulk TOU LV	14418483.54		95 056		3 122 300	11 201 128	
Bulk TOUMV	0						
Streetlight	0						
Availability	0		4 666 652				
Municipal	0						
	88 020 471	88 208 922	-0.2%	24 224 047	-	3 122 300	60 862 575

Table 17



shows the calculated revenue by multiplying the 2022/2023 consumption by the 2023/2024 tariffs.

Table 17

Final



Table 18 shows a summary of the newly calculated revenue compared with the actual revenue.

Table 18

NDLAMBE				
CALCULATED REVENUE		TOTAL	Actual: Reference	
TARIFF NAME	R/year	Total	Difference	% Diff
Domestic Indigent PP	2 732 445	2 692 190	40 255	1.5%
Domestic Indigent Conv	25 192	23 412	1 780	7.6%
Domestic 20 Amp PP	4 532 875	14 033 017	-9 500 142	-67.7%
Domestic 20 Amp Conv	9 808 524	32 185 506	-22 376 983	-69.5%
Domestic > 20 Amp PP	12 615 017	-	12 615 017	
Domestic > 20 Amp Conv	17 455 942	-	17 455 942	
Commercial PP	7 332 395	5 430 137	1 902 258	35.0%
Commercial Conv	15 140 104	14 759 525	380 579	2.6%
Bulk TOU LV	13 967 846	14 418 484	-450 637	-3.1%
Bulk TOUMV	8 620 504	-	8 620 504	
Streetlight	-	-	-	
Availability	4 666 652	4 666 652	-	0.0%
Municipal	-	-	-	
	88 020 471	96 897 497	8 688 575	9.85%

This shows a total increase of 9.85% which is less than the average price increase of 14.59%.

Because the losses are much higher than the normal expected technical losses, 13.5% compared with 8%, some adjustment is required. If the lower consumption levels are used it would yield R/kWh and R/kVA unit costs that are inflated because the divider is understated. For that reason the following adjustment will be made.

- The number of consumers are not changed as it is assumed that all consumers are on record. There may be some illegal connections but these will be ignored.
- The KVA values are not going to be changed.
- The kWh values are going to be changed on all consumer categories. It may be that t should only be done on residential consumers but experiences elsewhere have shown that losses are incurred on all consumer categories.
- The kwh will thus be increased by the same % to achieve losses of 8%.

The adjusted consumptions figures are shown in Table 19 below.

Table 19

NDLAMBE										
QUANTITIES CHARGEABLE FOR ALL MONTHS OF THE YEAR										
CONSUMPTION		Number of customers	Number of POD's	Highest MD in year	Σ MDs all hours / 12	ALL Energy	Block 1 kWh	Block 2 kWh	Block 3 kWh	Block 4 kWh
TARIFF NAME	Adjustment	Customers	POD's	KVA	KVA	kWh	kWh	kWh	kWh	kWh
Domestic Indigent PP	19.41%		1 150			2 287 641	716 082	1 447 468	89 516	34 576
Domestic Indigent Conv	15.53%		95			20 406	6 387	12 911	798	308
Domestic 20 Amp PP: don't pay basics 900	12.42%		1 172			2 639 161	605 447	1 928 630	99 698	4 069
Domestic 20 Amp Conv	9.94%		1 211			2 601 597	493 496	1 842 029	189 166	76 906
Domestic > 20 Amp PP	7.95%		715			4 445 715	402 812	2 323 494	1 131 961	587 447
Domestic > 20 Amp Conv	6.36%		746			6 067 430	338 137	2 691 458	1 402 881	1 634 954
Commercial PP	5.09%		253			2 074 393	-	-	-	-
Commercial Conv	4.07%		290			4 897 165	-	-	-	-
Bulk TOU LV	3.26%		13	4 450	17 291	4 849 487	-	-	-	-
Bulk TOUMV	2.61%		6	3 300	13 094	3 559 829	-	-	-	-
Streetlight			2 076			1 218 802	-	-	-	-
Availability			1 121			-	-	-	-	-
Municipal			69			719 651	-	-	-	-
	31 319 445	35 381 276	12.97%	8 917	7 750	30 385	2 562 362	10 245 990	2 914 020	2 338 261
	1.00		Losses		Purchase	38 557 510	8.24% Losses			

The adjusted calculation of revenue is shown in Table 20 below. This will also be used as a basis for calculation of the revenue requirement.

Table 20

NDLAMBE	30/06/2022	REVENUES FROM CHARGES APPLICABLE FOR ALL MONTHS OF THE YEAR										HIGH SEASON REVENUES				LOW SEASON REVENUES			
		Customer service	Basic	Access	MD (aLL hours)	ALL Energy	Block 1 kWh	Block 3 kWh	Other charges	Energy Peak	Energy Standard	Energy Off-Peak	Reactive energy	Energy Peak	Energy Standard	Energy Total			
		R/year	R/year	R/year	R/year	R/year	R/year	R/year	R/year	R/season	R/season	R/season	R/season	R/season	R/season	R/season			
TARIFF NAME	Adjustment																		
Domestic Indigent PP	0.194110454	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Domestic Indigent Conv	0.155288363	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Domestic 20 Amp PP. dont pay basics 900	0.124230691	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Domestic 20 Amp Conv	0.099384533	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Domestic > 20 Amp PP	0.079507642	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Domestic > 20 Amp Conv	0.063008114	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Commercial PP	0.050884891	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Commercial Conv	0.040707913	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Bulk TOULV	0.03296653	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Streelight	0.026053064	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Availability	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Municipal	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	101.217.802	101.448.129	20.154.141	5.819.478	19.226.162	2.863.793	20.903.251	8.207.336	7.222.575	3.483.041	2.089.823	2.162.786	2.577.834	3.288.765	3.345.023				

These values will be used to calculate various cost of supply factors.

**8. NETWORK LOSSES.**

The losses in the network are required in various instances. The first step is to determine the amount of energy flowing through each of the networks for each representative load profile. This is done by obtaining the kWh from each customer category from the actual consumption table and allocating it to the relevant point on the network. The result is shown in Table 21.

**Table 21**

NDLAMBE													
kWh CONNECTED BY NETWORK													
Supply position	MV at HV sub P01	MV P01	LV P02	Comm P03	Mun P03	Dom 20 Amp P04	Dom>20 Amp P05	Indigent P06	Lights P06	P07	P08	Total	
S00	0	0	0	0	0	0	0	0	0	0	0	0	
S01	0	0	0	0	0	0	0	0	0	0	0	0	
S02	0	0	0	0	0	0	0	0	0	0	0	0	
S03	0	0	0	0	0	0	0	0	0	0	0	0	
S04	0	3 559 829	0	0	0	0	0	0	0	0	0	3 559 829	
S05	0	0	4 849 487	0	0	0	0	0	0	0	0	4 849 487	
S06	0	0	0	6 971 558	7 19 651	8 669 027	7 084 876	2 308 046	1 218 802	0	0	26 971 961	
S07	0	0	0	0	0	0	0	0	0	0	0	0	
S08	0	0	0	0	0	0	0	0	0	0	0	0	
S09	0	0	0	0	0	0	0	0	0	0	0	0	
	0	3 559 829	4 849 487	6 971 558	7 19 651	8 669 027	7 084 876	2 308 046	1 218 802	0	0	0	35 381 276
											Bulk +SSEG Difference		38 557 510
													8.24%
													35 381 276
													-3 176 233

The next step in the process, to calculate the losses of every network component, is as follows:

- An estimate is made about the loss % for every network component. This is done by considering the impedances of individual network components, the numbers involved and the loads flowing through it.
- The total infeed loads are then added to the relevant losses for every network through which it flows and are then added to the loads through all other networks to yield the total load.
- The loss factors are then modified until the total load, as calculated, is equal to the total load supplied in bulk. This is done by modifying the first pass estimation loss factors by the loss adjustment factor.

The resultant calculations are shown in **Table 22** and

**Table 22**

Final

**Table 22.**

Final



The focus will firstly be on the larger items and thus the 20% of items that have 80% of the impact.

**Services being supplied by Electricity** to the rest of the LG where no charge is levied to cover the cost of supplying such service. The services involved here include the following: Electrical maintenance of LG facilities such as water works, sewerage works, buildings, houses etc.

**Electricity equipment and other resources being used** by the rest of the LG with no charge. This typically includes the following: Heavy vehicles, large machinery, meter readers etc.

**Public lighting** including streetlights, high mast lights, robots, parking lot lights, etc. This service is considered a LG service and not part of electricity supply although the service is provided by Electricity.

**Electricity for own use by LG.** Many municipalities have a different set of tariffs for the supply of electricity for use by its own facilities, such as municipal buildings, stores, sewerage supplies, water pumping and sometimes also for staff. If these tariffs are not cost reflective it has the effect of distorting the true electricity supply cost/revenue and thus surplus. In some cases, an overcharge is made to the LG in the tariff and in other cases an undercharge.

**Services provided to Electricity by the LG.** Typical services include the following: Meter reading and billing, revenue collection, general accounting and administration, telephones, stores, etc. The extent to which this is done, differs significantly between various distributors. The big problem here is the extent of allocation of these costs made to the electricity department:

- Administration and overheads are allocated in terms of turnover instead of more realistic allocation factors, such as the number of staff, the own costs, area of office space etc. The problem with this is that the purchase cost of electricity is close to 70% of the revenue and the tax (surplus) being levied by the LG on electricity makes up a further approximately 20%. This method overstates the true share of the cost by the electricity department by more than 50%.
- Metering and billing costs should typically be allocated according to the share of the cost of the billing system with the number of transactions or actual processing time. Where the revenue is used as a basis, a misallocation is again made.
- A wide range of other methods are being used to allocate the other costs. There are internationally accepted methods that should be used to allocate the costs to ensure a fair burden on the electricity department.

**Funding of capital expenditure.** Assets in municipalities are mainly funded directly from profits / retained income and various grants received by the municipality. Some assets are still funded from external loans. The capital expenditure does not form part of the income statement, except in subsequent years when it appears as depreciation.

**Government Grant funding.** A large portion of LG income is from Government Grants. These are used to subsidise charges to residents but also to fund operating and capital costs. This distorts the normal profitability of departments and complicates the fair allocation of costs and revenues. Proposals will however be made in this respect.

There are a host of practices that affect the accuracy of the cost and revenue of current LG electricity distributors. The focus will firstly be on the larger items and thus the 20% of items that have 80% of the impact. It is one matter to develop a generic methodology to be applied. Things are always different because of the following:

- The way the municipality operates and is structured.
- The availability of data in the required format / level of detail.
- The need to focus on big values that have a significant impact.

## 9.2. Methodology applied

The process starts with an analysis of the Total Municipal Trial Balance for the completed financial year. These are the figures that are used as the basis for the compilation of the Annual Financial statements.

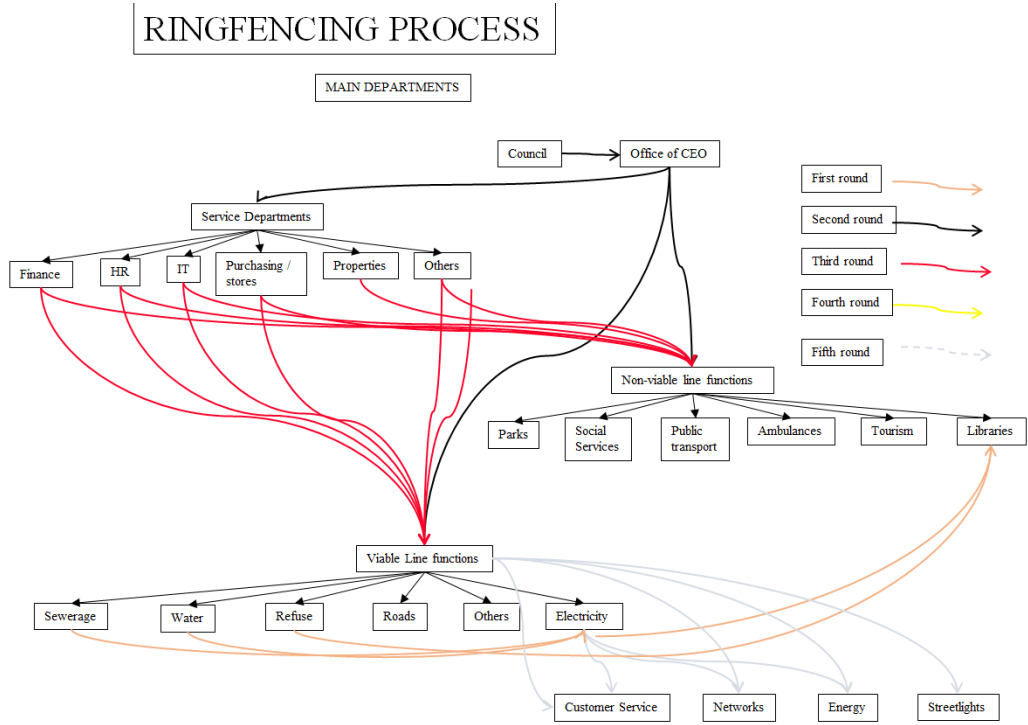
In analysing the Ndlambe data the following key steps were followed to achieve accurate ringfencing:

- The data was ordered as follows:
  - The head office, support and administrative functions. These are not considered primary service delivery but act as support to the various line functions and as such the line departments should cover their costs.
  - Community services, the economic services trading services. These are considered the primary service delivery to the community and need to carry all costs of the overheads and service departments.
- The various sub-departments and cost categories are grouped to make viewing practical.

This process is illustrated graphically in **Figure 9** below.

Final

Figure 9



**Table 24** Error! Reference source not found. shows the trial balance per group before any adjustments.

Final



All the main transactions were analysed and any area where costs / revenues were not transacted correctly were identified. These were checked with the municipality and the required adjustments were made. The trial balance was found to represent the true picture accurately. The positive amounts refer to charges to electricity and negative amounts refer to amounts charged by electricity to the various departments and detailed in the fourth column.

Some adjustments have however been made to represent the data more accurately for tariff making purposes as shown in Table 25.

**Table 25**

<b>COST ADJUSTMENTS</b>	-3 782 541
<b>REVENUE ADJUSTMENTS</b>	1 394 000
Transfers and Subsidies	1 394 000
<b>New Total Cost</b>	<b>102 072 895</b>
<b>New Total Revenue</b>	<b>-84 873 618</b>
<b>New net income</b>	<b>17 199 277</b>

The only adjustment done is to remove the capital grant income as this must cover capital costs not operating costs.

**9.3. Overhead cost allocation**

The next step is to calculate the fair portion of the municipal overheads that should be covered by the electricity department. It was previously stated that no overhead costs have been allocated to Electricity. The next section does a calculation of a fair amount which should be allocated to all the line functions in the municipality by overhead and service departments. The first step is to calculate the ratios of various possible allocation factors using actual data.

Various ratios were analysed. The problem found was that in many cases the data required was inadequate in terms if not reflecting the required departments or in many cases were all grouped together. It is however believed that these ratios provide a fair means of allocating overhead costs.

The table below then shows the following:

**ALLOCATER DATA.**

- This refers to the various allocation bases which are to be used.
- The first line shows the data used
- The second line shows the ratio which will be applied in allocating the service department costs to that line department.
- This is calculated by dividing the line department units by the total units of all line departments.

**ALLOCATION TO LINE DEPARTMENTS**

- This shows the amounts allocated from each service department to the various line departments.
- The first column shows the name of the Service department.
- The second column shows the basis for allocation of the cost. Various basis were considered and inputs from staff was obtained at the workshops. Unfortunately, only those where data was provided could be used.
- The third column shows the percentage of the service department costs to be allocated on the basis.
- The cells in yellow shows the amounts allocated from the service department as a ( ).
- The other cells show the amounts allocated to each line department.
- The last column shows that the net amounts sum to zero.

**NEW NET INCOME**

- This shows the new costs / revenue per department after the cost allocations.
- The subsequent new net income.

The following should also be noted:

- The cost for the Councillors and admin is not allocated to line departments. This will be offset against Account surplus.
- The Municipal and General is a problematic cost centre because:
  - The majority of grant funding is collected under this account. This will not be off-set against line department costs.
  - Various very big costs which belong to line departments are also collected here. The following is proposed in this respect:
    - Only the big cost items minus the small, related incomes will be allocated to the line departments.
    - Bad debt written off. This mainly relates to rates income thus based on total line depart cost.
    - Depreciation. This is only on common assets. Total line depart cost.
    - Inventory and consumables. Total line depart cost.
    - Interest costs relating to retirement benefits. Line department labour cost.
    - Leave pay. Line department labour cost.
    - Various operational costs. Total line depart cost.
- Municipal manager. All costs allocated to Line departments based on total own costs.
- Financial services.
  - Asset and risk based on asset values.
  - Billing finance based on number of bills per service.
  - Debt collection based on outstanding debt per service.
  - Supply chain based on inventory.
  - Remainder based on total cost. Net amount minus property rates income.
- Corporate services. Total net amount.
  - All HR functions according to staff numbers.
  - Remainder based on total cost.
- Strategy and Economic development. Net amount all based on total cost.

The allocation factors and allocations to line departments are shown in Table 26

Table 26.

The actual allocations from the various departments are shown in Table 27.

The next step is to allocate the costs between the various sections within electricity. The allocation factors and the actual allocation of the various cost items to the various departments within electricity are shown in Table 28.

Final

Table 26

Sum of Total/Actual	Housing Total	Other Total	Community and Social Services Total	Public Safety Total	Road Transport Total	Sport and Recreation Total	Waste Management Total	Waste Water Management Total	Water Management Total	Energy Sources Total	Grand Total
<b>ALLOCATER DATA</b>											
<b>Allocation factors to all Line departments</b>											
Total cost (-purchases)	4 178 263	2 785 302	11 648 316	11 530 636	58 359 552	14 672 531	28 712 939	21 859 576	73 558 171	21 492 346	248 797 631
Ratio	1.68%	1.12%	4.68%	4.63%	23.46%	5.90%	11.54%	8.79%	29.57%	8.64%	100.00%
Exchange Revenue	-354	-3 686 609	-576 282	-8 864	-49 600	-257 153	-22 219 340	-18 085 565	-66 335 044	-81 735 917	-192 951 728
Ratio	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
Trade and Other Payable Transactions	109 036	123 872	2 080 041	7 231	453 492	-291 605	148 922	-6 192 246	8 347 484	3 976 535	8 772 762
Ratio	1.24%	1.41%	23.82%	0.08%	5.17%	0.00%	1.70%	0.00%	95.15%	45.33%	100.00%
Number of customers / bills / vending	1	1	1	1	1	1	1	1	1	1	10
Ratio	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	100.00%
Number of meter readings /y	1	1	1	1	1	1	1	1	1	1	10
Ratio	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	100.00%
Employee Related Cost	2 311 913	2 411 726	7 791 857	9 029 844	35 441 417	9 892 762	15 081 059	8 819 498	10 686 338	988 087	102 434 502
Ratio	2.26%	2.35%	7.61%	8.82%	34.60%	9.66%	14.72%	8.61%	10.41%	0.96%	100.00%
Staff numbers	5	10	14	26	122	51	64	29	34	2	357
Ratio	1.40%	2.80%	3.92%	7.28%	34.17%	14.29%	17.93%	8.12%	9.52%	0.56%	100.00%
Property, Plant and Equipment	109 010	19 187	112 193 238	5 954 841	307 424 762	15 433 214	10 120 991	163 156 139	229 469 810	97 968 515	941 849 707
Ratio	0.01%	0.00%	11.91%	0.63%	32.64%	1.64%	1.07%	17.32%	24.36%	10.40%	100.00%
Depreciation and Amortisation	-	-	147 987	8 390	14 254 378	452 828	193 255	5 771 465	14 912 682	3 755 448	39 496 413
Ratio	0.00%	0.00%	0.37%	0.02%	36.09%	1.15%	0.49%	14.61%	37.76%	9.51%	100.00%
Inventory Consumed	19 966	83 288	814 835	662 722	6 089 635	579 690	2 671 709	1 908 610	32 529 410	157 686	45 517 550
Ratio	0.04%	0.18%	1.79%	1.46%	13.38%	1.27%	5.87%	4.19%	71.47%	0.35%	100.00%
Contracted Services	1 436 054	239 915	2 110 843	1 196 321	2 392 270	2 995 831	7 514 056	2 761 400	9 271 119	16 580 162	46 497 970
Ratio	3.09%	0.52%	4.54%	2.57%	5.14%	6.44%	16.16%	5.94%	19.94%	35.66%	100.00%

Table 27

Sum of Total/Actual	Mayoral Council Total	Executive and Council Total	Administrative and Corporate Support Total	Asset Management Total	Finance Total	Fleet Management Total	Human Resources Total	Marketing Customer Relations	Security Services Total	Supply Chain Management Total	Valuation Service Total	Finance and Administration Total	Internal Audit Total	Planning and Development Total	Environmental Protection Total	Health Total
<b>ALLOCATION TO LINE DEPARTMENTS</b>																
Executive and Council Total	-3 979 006	-3 782 570	-1 207 222	-1 207 222	-7 963 802	-20 483 368	-9 523 366	-1 979 229	-1 979 229	-1 979 229	-1 979 229	-8 097 633	-19 323 829	-1 774 172	-3 912 810	
Rest of Exec and Council																
Asset values																
Fleet Management Total																
Human Resources Total																
Human Resources Total																
Security Services Total																
Supply Chain Management Total																
Supply Chain Management Total																
Valuation Service Total																
Rest of Finance and administration																
Internal Audit Total																
Planning and Development Total																
Environmental Protection Total																
Health Total																

Table 28

Sum of Total/Actual	Housing Total	Other Total	Community and Social Services Total	Public Safety Total	Road Transport Total	Sport and Recreation Total	Waste Management Total	Waste Water Management Total	Water Management Total	Energy Sources Total	Grand Total
<b>ALLOCATION TO LINE DEPART</b>											
Executive and Council Total	1 581 500	1 303 889	6 938 834	5 011 294	30 069 844	6 953 523	11 852 018	11 448 323	28 967 400	8 881 390	-0
Rest of Exec and Council	66 823	44 545	186 291	184 409	933 341	234 657	459 204	349 599	1 176 411	343 726	-
Asset Management Total	550 545	367 003	1 534 829	1 519 323	7 689 688	1 933 311	3 783 331	2 880 305	9 692 318	2 831 917	-
Fleet Management Total	140	25	143 804	7 633	394 044	19 782	12 973	209 126	294 124	125 572	-0
Human Resources Total	231 151	241 131	779 051	369 077	1 867 993	469 644	919 054	699 689	2 354 476	687 935	-
Human Resources Total	143 441	286 882	401 634	902 828	3 543 529	989 105	1 507 845	881 797	1 066 449	98 792	0
Security Services Total	159 934	106 615	445 869	745 893	3 499 958	1 463 097	1 836 043	831 957	975 398	57 376	-0
Supply Chain Management Total	868	3 622	35 431	441 365	2 233 861	561 629	1 099 061	836 731	2 815 627	822 674	-
Supply Chain Management Total	61 127	10 212	89 850	28 817	264 794	25 207	116 173	82 992	1 414 469	6 857	0
Valuation Service Total	-	-	-	50 923	101 829	127 520	319 843	117 542	394 634	705 750	-
Rest of Finance and administration	-	-	-	-	-	-	-	-	-	-	-
Internal Audit Total	135 990	90 653	379 119	375 288	1 899 432	477 548	934 522	711 465	2 394 103	699 513	-0
Planning and Development Total	2 237	394	2 307 857	122 175	6 307 401	316 642	207 651	3 347 457	4 708 007	2 010 009	-0
Environmental Protection Total	29 795	19 862	83 064	82 225	416 161	104 630	204 752	155 880	524 542	153 262	-
Health Total	65 711	43 804	183 192	181 341	917 814	230 753	451 565	343 783	1 156 840	338 007	-

The costs and revenues per individual account is shown in **Table 29** below.

**Table 29**

ELECTRICITY	Bulk Purchase (102047)	Electricity Distribution HT (102049)	Electricity Substation (102052)	Electricity Distribution LT (102050)	Electricity Administration (102045)	Street Lighting and Signal Systems	Energy Sources Total
<b>Expenditure</b>	-	-	-	-	-	-	-
Bulk Purchases	67 178 593	-	-	-	-	-	67 178 593
Consultants and Professional Services	-	-	-	-	14 161 302	-	14 161 302
Contractors	-	183 763	91 820	-	46 270	2 048 003	2 369 856
Outsourced Services	-	-	-	-	49 003	-	49 003
Depreciation and Amortisation	-	-	663 420	-	3 092 028	-	3 755 448
Employee Related Cost	-	-	-	-	988 087	-	988 087
Eskom FBE and internal charges	17 184 497	-	-	-	-	-	17 184 497
Inventory Consumed	-	23 000	54 273	-	80 422	-	157 695
Irrecoverable Debts Written Off	-	-	-	-	-	-	-
Operating Leases	-	-	-	-	-	-	-
Transfers and Subsidies	-	-	-	-	-	-	-
Impairment Loss	-	-	-	-	4 154 802	-	4 154 802
<b>COST ADJUSTMENTS</b>	- 3 782 541	-	-	-	-	-	- 3 782 541
<b>ALLOCATION TO LINE DEPARTMENT</b>	-	-	-	-	-	-	8 881 390
<b>Revenue</b>	-	-	-	-	-	-	-
Interest; Dividend and Rental Income	-	-	-	-	1 073 920	-	1 073 920
Service Charges	-	-	-	-	80 661 996	-	80 661 996
Fines; Penalties and Forfeiture	-	-	-	-	7 701	-	7 701
Transfers and Subsidies	-	-	1 394 000	-	3 130 000	-	4 524 000
<b>REVENUE ADJUSTMENTS</b>	-	-	1 394 000	-	-	-	1 394 000
<b>NET INCOME</b>	-	-	-	-	-	-	30 224 515
	-	-	-	-	-	-	-
<b>TOTAL COSTS</b>	80 580 549	206 763	809 513	-	22 571 914	2 048 003	115 098 133
<b>TOTAL REVENUE</b>	-	-	-	-	-	-	84 873 618
<b>NET INCOME - loss</b>	-	-	-	-	-	-	30 224 515

The costs are then allocated to the various functions within electricity. The allocations factors to be used are shown in Table 30.

**Table 30**

RINGFENCING WITHIN ELECTRICITY PARAMETERS	Energy	HV Networks	HV/MV networks	Networks MV	NetworksMV/LV	Networks LV	Customer Services	Streetlights	Electricity Total
<b>Network asset values</b>	-	-	-	150 513 988	143 975 728	30 825 629	195 111 700	3 536 642	523 963 687
Ratio	0%			29%	27%	6%	37%	1%	100%
<b>Network depreciation'</b>	-	-	-	3 344 755	3 599 393	880 732	210 626 669	235 776	218 687 325
Ratio	0%			2%	2%	0%	96%	0%	100%
<b>HR numbers</b>	-	-	-	2.65	2.55	4.45	9.00	3.35	22
Ratio	0%			12%	12%	20%	41%	15%	100%
<b>Sub-total cost</b>	-	-	-	3 247 108	3 034 506	2 063 776	9 649 813	3 328 494	21 323 696
Ratio	0%	0%	0%	15%	14%	10%	45%	16%	100%

The actual allocations are shown in

Table 31

Final

**Table 31**

ELECTRICITY	Allocator	%	Energy	HV Networks	HV/MV networks	Networks MV	NetworksMV/LV	Networks LV	Customer Services	Streetlights	Electricity Total
Bulk Purchases	Energy	100%	67 178 593								67 178 593
Consultants and Professional Services	Network assets	50%				2 033 990	1 945 635	416 566	2 636 667	47 793	7 080 651
Consultants and Professional Services	HR	50%				852 897	820 712	1 432 223	2 896 630	1 078 190	7 080 651
Contractors	Direct	100%				183 763	91 820	-	46 270	2 048 003	2 369 856
Outsourced Services	Direct	100%				-	-	-	49 003	-	49 003
Depreciation and Amortisation	Depreciation	100%				57 438	61 811	15 125	3 617 025	4 049	3 755 448
Employee Related Cost	HR	100%				119 020	114 528	199 863	404 217	150 459	988 087
Eskom FBE and internal charges	Removed	100%									-
Inventory Consumed	Direct	100%				23 000	54 273	-	80 422	-	157 695
Impairment Loss	Cumm cost	100%				632 681	591 256	402 115	1 880 212	648 538	4 154 802
COST ADJUSTMENTS	Direct	100%	-3 782 541			-	-	-	-	-	-3 782 541
ALLOCATION TO LINE DEPARTMENTS	Sub-total cost	100%	-			1 352 431	1 263 882	859 570	4 019 179	1 386 329	8 881 390
Revenue											
Interest; Dividend and Rent on Land											-1 073 920
Service Charges											-80 661 996
Fines; Penalties and Forfeits											-7 701
Transfers and Subsidies											-4 524 000
REVENUE ADJUSTMENTS											1 394 000
TOTAL COSTS			63 396 052	-	-	5 255 220	4 943 918	3 325 461	15 629 625	5 363 361	97 913 636
TOTAL REVENUE											-84 873 618
NET INCOME - loss											13 040 018

## 10. REVENUE REQUIREMENT.

This section calculates the revenue requirement for Ndlambe using the NERSA method. The items are then grouped as per the NERSA method. The calculation of the revenue requirement is shown in Table 32.

**Table 32**

NERSA RR before adjustments	Energy	HV Networks	HV/MV networks	Networks MV	NetworksMV/LV	Networks LV	Customer Services	Streetlights	Electricity Total
Bulk	63 396 052	-	-	-	-	-	-	-	63 396 052
Operating cost	-	-	-	1 514 453	1 467 574	1 024 326	3 057 971	638 221	7 702 545
Shared cost	-	-	-	1 352 431	1 263 882	859 570	4 019 179	1 386 329	8 881 390
Depreciation	-	-	-	57 438	61 811	15 125	3 617 025	4 049	3 755 448
Interest / ROA	-	-	-	-	-	-	-	-	-
Repairs and Maintenance actual	-	-	-	1 698 216	1 559 394	1 024 326	3 055 238	2 686 224	10 023 398
Bad debt written off	-	-	-	632 681	591 256	402 115	1 880 212	648 538	4 154 802
<b>Sub-total cost</b>	<b>63 396 052</b>			<b>5 255 220</b>	<b>4 943 918</b>	<b>3 325 461</b>	<b>15 629 625</b>	<b>5 363 361</b>	<b>97 913 636</b>
Surplus:								7.5%	7 343 523
<b>Total Allowed revenue</b>									<b>105 257 159</b>
<b>Revenue</b>									<b>-84 873 618</b>
<b>Shortfall</b>									<b>20 383 541</b>
<b>% Structure increase</b>	R/kWh	R/kVA	R/kVA	R/kVA	R/kVA	R/kVA	R/cust	R/light	<b>-24.0%</b>

This shows the situation before any adjustments. The buildup of revenue is shown in Table 33 below.

**Table 33**

REVENUE ANALYSIS	
Availability Charges	19 565 647
Connection/Reconnection	7 701
Electricity Sales	61 096 349
Interest	1 073 920
FBE income foregone	6 458 078
Equitable share	3 130 000
Additional equitable share	-
Other income	
COS streetlight revenue	6 051 592
COS internal tariffs	5 582 409
Revenue adjusted for high losses	
<b>TOTAL REVENUE</b>	<b>102 965 697</b>

The proposed adjustments to remove non prudent items are shown in Table 34 below.

**Table 34**

RR Adjustments	Limit	Actual	Tot	Adjust
Eskom Losses exceeding	8%	13.6%	63 396 052	-3 519 805
Eskom interest			17 184 497	-17 184 497
Eskom excess access charges			-	-
Bad debt > 5% of rev	5%	4.9%	4 154 802	-
Shared cost > 30% of own cost	30%	26%	8 881 390	-

After doing these adjustments the revenue requirement is shown in Table 35 below.

**Table 35**

CORRECTED NERSA RR FOR COS	Energy	HV Networks	HV/MV networks	Networks MV	NetworksMV/LV	Networks LV	Customer Services	Streetlights	Electricity Total	With 7.5% surplus and 35% ROA at CRC	NERSA RR
Bulk (full cost as losses are included)	59 876 247	-	-	-	-	-	-	-	59 876 247	59 876 247	Bulk
Operating cost	-	-	-	1 514 453	1 467 574	1 024 326	3 057 971	638 221	7 702 545	7 702 545	Operating cost
Shared cost adjusted to 30% of own cost	-	-	-	1 352 431	1 263 882	859 570	4 019 179	1 386 329	8 881 390	8 881 390	Shared cost adjusted
Depreciation	-	-	-	57 438	61 811	15 125	3 617 025	4 049	3 755 448	23 575 427	Depreciation
Interest (excluding Eskom)	-	-	-	-	-	-	-	-	-	-	Interest
Repairs and Maintenance actual	-	-	-	1 698 216	1 559 394	1 024 326	3 055 238	2 686 224	10 023 398	10 023 398	Repairs and Maintenance actual / @ 6%
Bad debt written off (this is not a cost)	-	-	-	632 681	591 256	402 115	1 880 212	648 538	4 154 802	4 154 802	Bad debt written off
Sub-total cost	59 876 247	-	-	5 255 220	4 943 918	3 325 461	15 629 625	5 363 361	94 393 831	114 213 810	Sub-total cost
Surplus								9.1%	8 571 866	10 371 710	Surplus: 7.5%
Total Allowed revenue									102 965 697	124 585 520	Total Allowed revenue
Revenue: Adjusted									102 965 697	102 965 697	Revenue: Adjusted
Shortfall									-	60 527 988	Shortfall
% Structure increase									0.0%	15.6%	% Structure increase

The problem with adjusting the bulk purchase cost to reflect the losses at an acceptable level is that the actual sales and consumers now have to carry still carry all the network costs.

The Support costs (operations, maintenance and admin) and capital costs (depreciation and interest) are split by function in Table 36 below.

**Table 36**

CORRECTED NERSA RR FOR COS	Energy	Networks MV	NetworksMV/LV	Networks LV	Customer Services	Streetlights	Electricity Total
Total Support costs	-	5 197 781	4 882 106	3 310 337	12 012 600	5 359 312	30 762 136
Total capital provision	-	57 438	61 811	15 125	3 617 025	4 049	3 755 448
Purchases	59 876 247						59 876 247
<b>GRAND TOTAL</b>	<b>59 876 247</b>	<b>5 255 220</b>	<b>4 943 918</b>	<b>3 325 461</b>	<b>15 629 625</b>	<b>5 363 361</b>	<b>94 393 831</b>

The following very important facts need to be noted:

- A surplus of 15% after allocation of overhead costs is considered high as the NERSA benchmarks (10 to 20%) were developed assuming no overhead costs. The actual surplus of 9.1% is thus used..
- The calculated Head Office / Service department allocation (admin charge) to electricity is less than 30% own costs excluding Eskom. This can be considered to be reasonable.
- The current replacement value (CRV) annual depreciation is equal to R26 mill. The surplus must at least cover this amount to ensure long term sustainability. At 9.1% the surplus is equal to R8.5 mill and actual depreciation R3.7 mill. Although these together is less than the CRC depreciation significant financial support is obtain from various grant sources.

**11. REPRESENTATIVE LOAD PROFILE ANALYSIS.**

Extensive work is required in respect of load profiles. This refers to the way electricity is used by different customer categories and through different networks. The data used is 12 months of ½ hourly data.

The representative load profiles refer to the typical load profile of customers in a tariff category. The typical profiles that have been accepted nationwide and for which data is separately available include the following:

- Commercial
- Municipal
- Domestic
- Res Poor
- Streetlights.

The municipality provided 30 customer load profiles. These were provided by Cigicell. The profiles were for a whole year and of good quality.

Details of the customers and the type of profile of each type is indicated in Table 37.

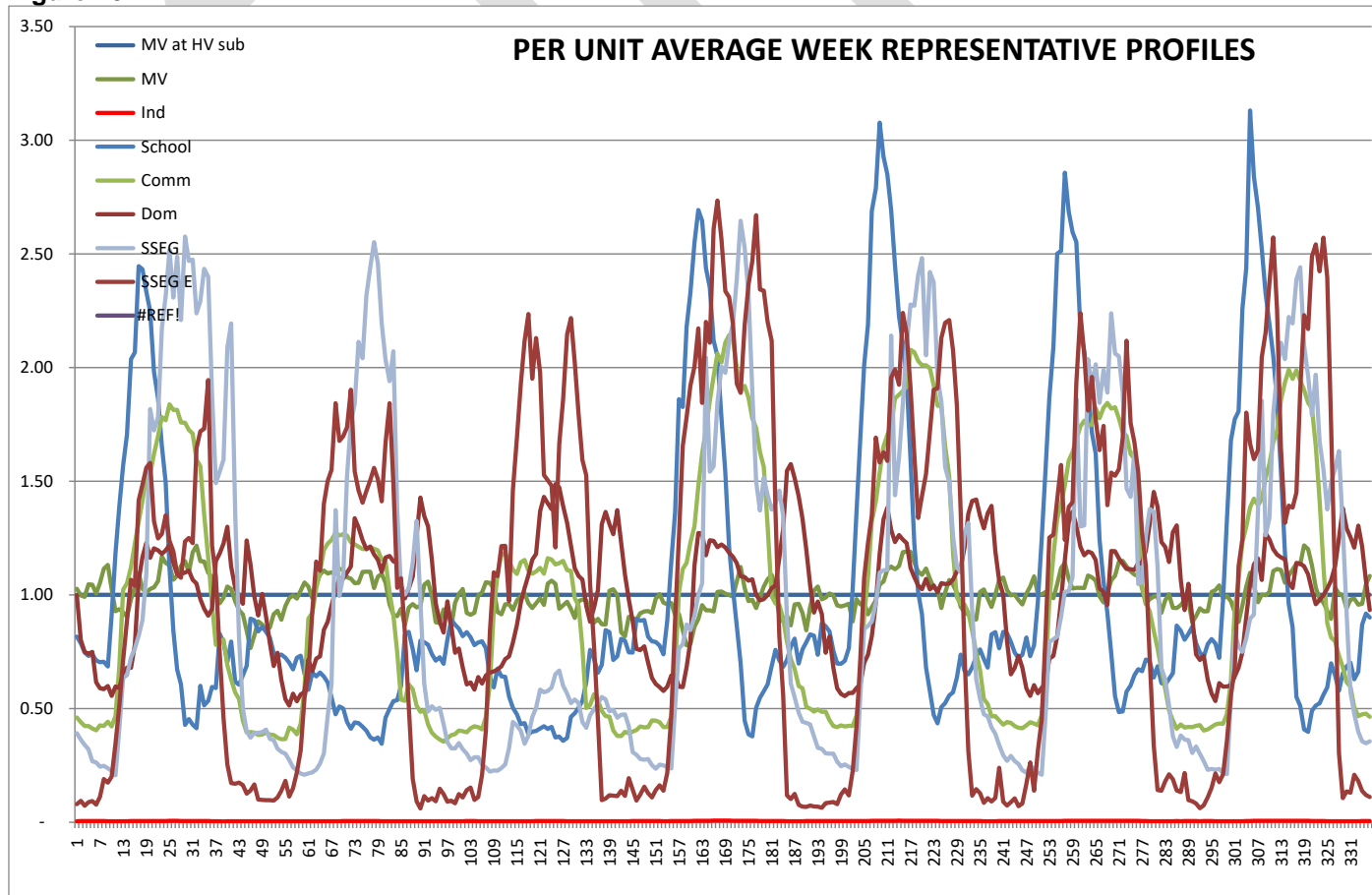
Table 37

PROFILE TYPE	NETWORK	KWH	NAME
Comm	LV	496.20	01 Heritage Mall LGZ94388520
Comm	LV	155.71	05 Hospital LGZ94388521
Comm	MV	291.90	06 Chicory Alex LGZ98449087
Comm	LV	179.46	07 Spar LGZ50310064
Comm	LV	178.78	09 St. Andrews Hotel LGZ96893433
Comm	LV	67.29	11 R72 Motors Fresh Stop LGZ50773144
Comm	MV	49.76	12 InyamaRama LGZ54064489
Comm	LV	82.13	13 Stenden LGZ38808244
Comm	LV	51.40	14 Wimpy LGZ50310065
Comm	LV	56.08	15 Damant Lodge LGZ40743406
Comm	MV	27.15	16 SAPS LGZ58388954
Comm	LV	10.85	17 Thornhill Hall LGZ50773143
Dom	LV	388.27	04 Settlers Park New LGZ95790118
Dom	LV	266.17	08 Settlers Park Old LGZ95879111
Mun	LV	160.00	02 R.O.Main Plant LGZ38808245

These profiles were then analysed and the resultant representatives profiles calculated.

Figure 10 shows the ½ hourly kVA values (Y-axis) for the average week (7 day ½ hours per week = x-axis) for each of the representative load profiles.

Figure 10



These profiles are then used to simulate the load profiles at each of the representative networks.

**11.1. Network profiles.**

To be able to calculate the load on a particular network one firstly has to calculate the profile at every infeed point on the network. This is calculated by:

- Multiplying the total load for every representative load profile being fed in at that point with the representative load profile ratio to establish the total load of every profile.
- The values for every representative profile are then added together.

The next step is to calculate the loads going through every network component.

- Calculate the load being taken at the infeed point of every network by adding the losses to the load being taken from the outgoing side of that network.
- Calculate the load through each individual network by adding the load infeed at the outgoing side of that network to the load going through the next network.
- This is an integrated process starting with the last points on the networks from where loads are taken and working upwards towards the main supply point to the distributor.
- This should be done for every half hour of the year, yielding an annual half hourly profile going through every network.

The result is an annual profile at N2 (the Eskom supply point).

**11.2. Profile re-conciliation.**

It is essential that an assessment be made of the accuracy of the representative load profiles used. This is done by

- calculating the annual load profile from the LV network up to HV network:
- multiplying consumption at each point on the network times the per unit representative load profile at that point.
- adding up from the LV network up to the highest voltage network including losses at each point up calculations
- and comparing that with the annual purchase load profile.

Table 38 below shows the maximum demand with date and time for the actual purchase profile and the N2 profile. The maximum demand occurs at a very different time of the year.

**Table 38**

N2 Max	N2 Max date	N2 Max
9 388.35	2023/04/04 19:30	9 388.35
Σ kVA at Peak	Σ Own Max	Max
8 971.78	10 703.34	
		1
Purchase Max	Max date	
10 336.55	2023/06/13 16:30	10 336.55
Σ kVA at Peak	Σ Own Max	
1 734.39	13 056.53	

Figure 11 shows the Eskom and N2 profile for the Eskom peak day. One of the challenges with this analysis relate to the Eskom load shedding which disports all the profiles. This is clear from this graph.

Final

Figure 11

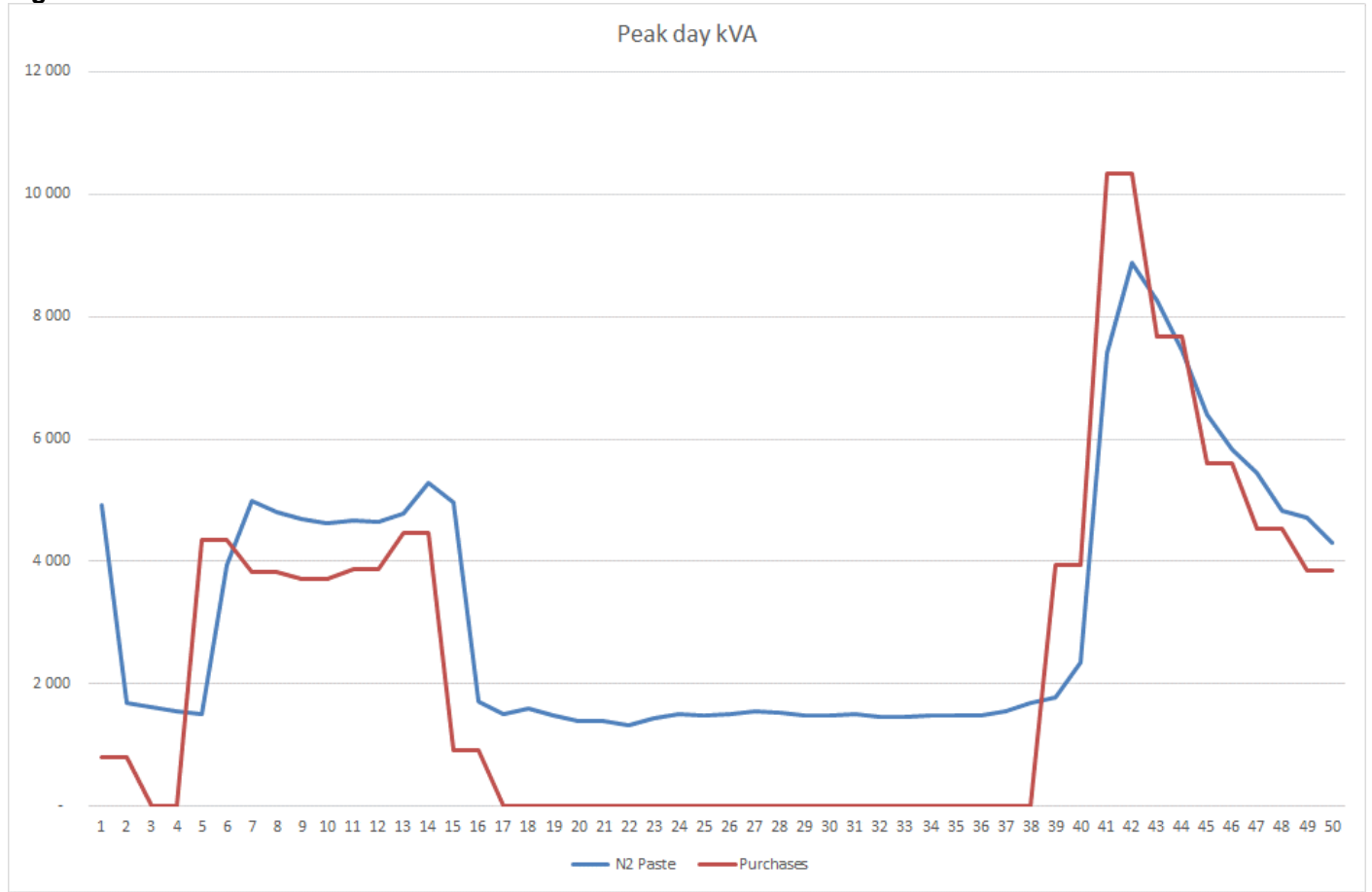


Figure 12 below shows the Eskom and N2 profile for the Eskom peak week. The same problem as for the peak day is apparent here as well.

Figure 12

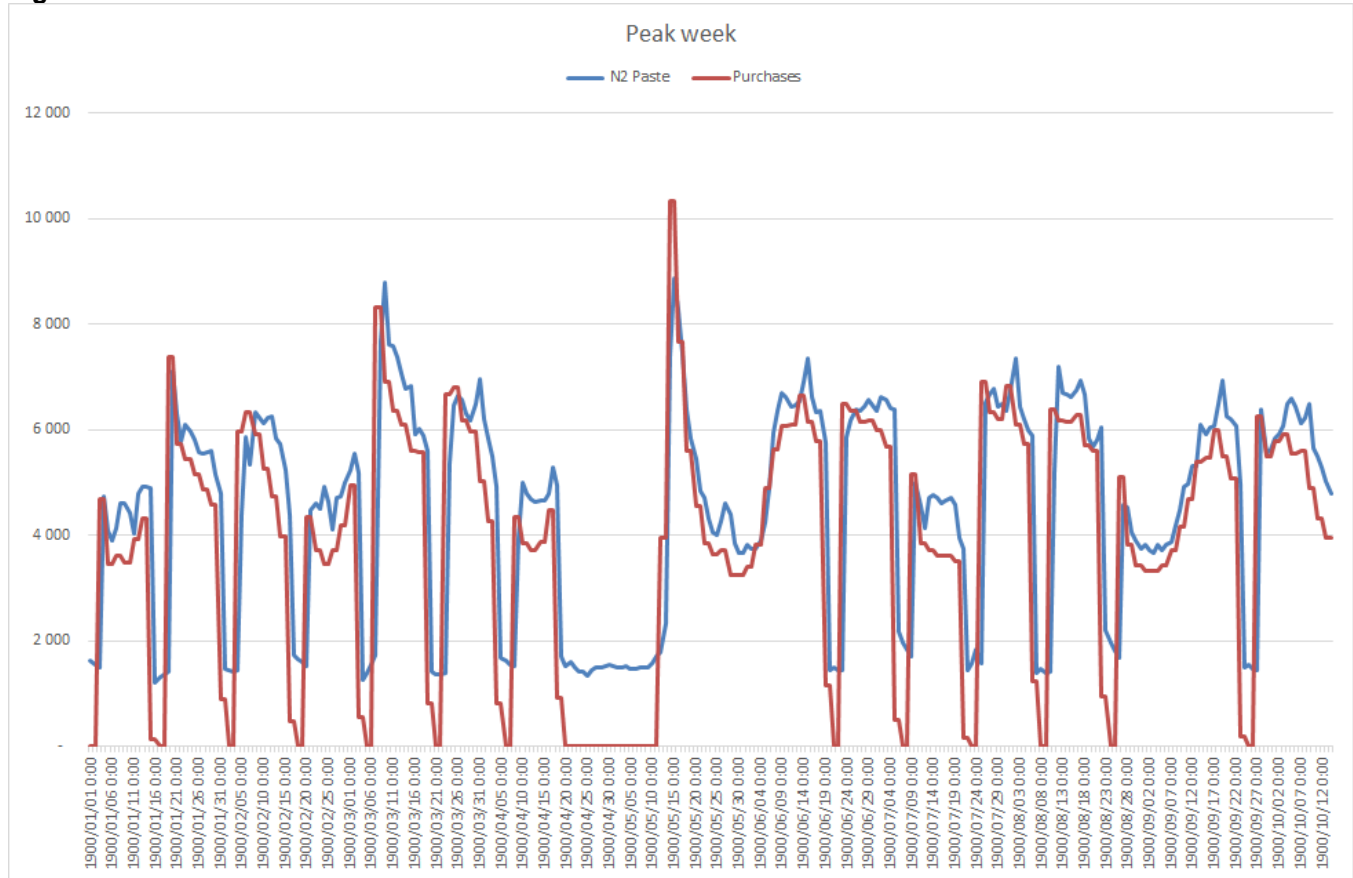
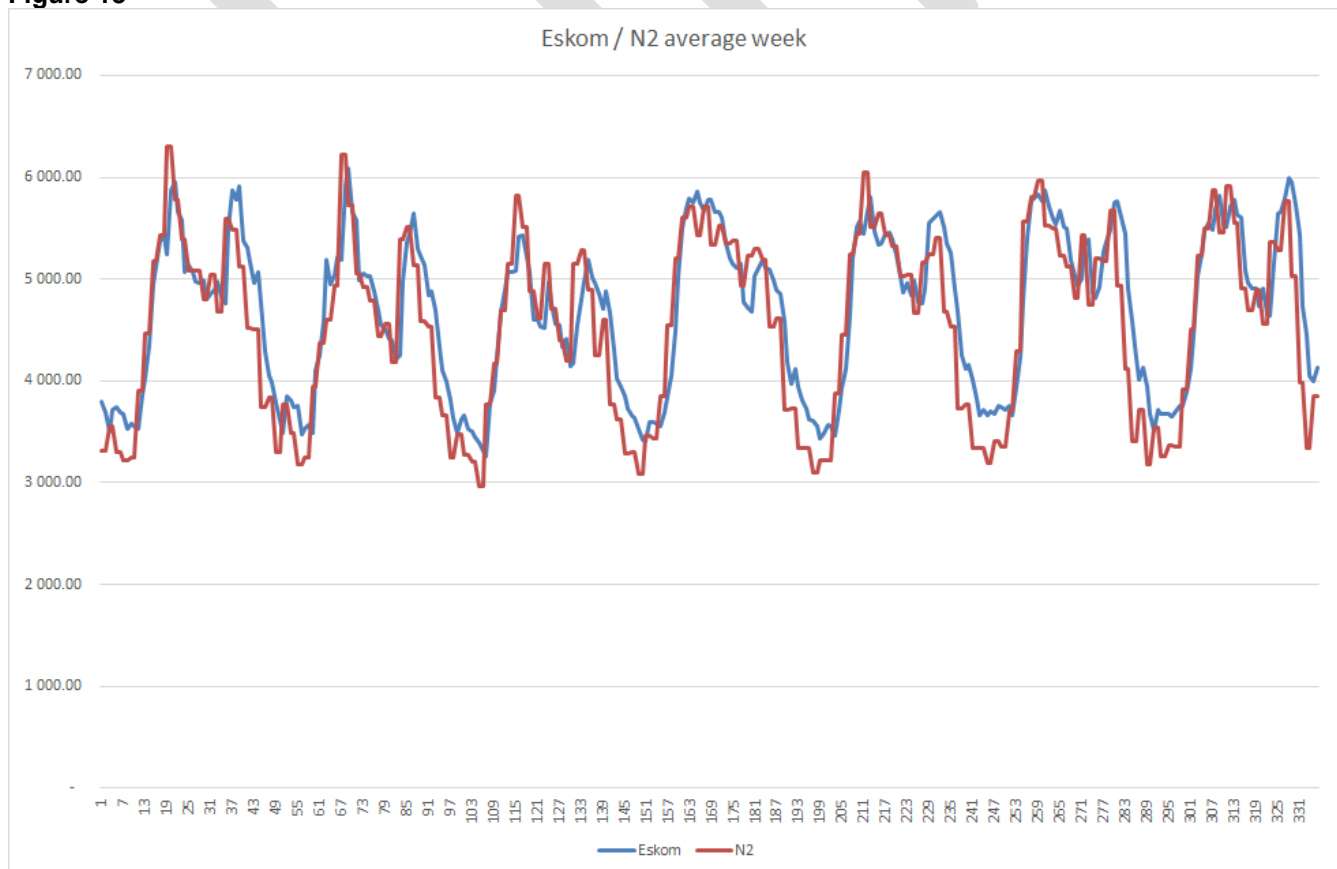


Figure 13 below shows the average week for Eskom and N2. Here it is clear that there is a very good correlation.

Figure 13



This concludes the analysis of load profiles. These results will be used later on specifically as basis for the kVA units per network.

**11.3. Representative Profile Quantities.**

The TOU quantities for each of the representative load profiles were then calculated. The per unit representative load profile quantities for the year are then multiplied by the total kWh for each representative load profile. The results are shown in Table 39:

The process followed in the model can be described briefly as follows:

- The ½ hourly kWh and kvarh per unit figures as calculated for each annual profile from above is used as starting point. The per unit value means that each actual half hourly value is divided by the total number of half hours in a year (365 days x 24 hours = 8760).
- In other words, if the total number of kWh used by this profile of customers are multiplied by the per unit values and then again divided by 8760, the full picture for this profile is obtained.
- For each profile the kVA values are then calculated. This is done by calculating the square root of the 1/2 hourly kWh and kvarh and multiplying by 2.
- For each half hour the excess kvarh are then calculated by obtaining the amount of kvarh exceeding the kvarh associated with the kW peak for than ½ hour with a power factor of 0.85.
- The ½ hourly kWh, kvarh and kVA figures are then sorted and summed by:
  - For each month.
  - Season: High and Low.
  - TOU period: Peak, Standard and Off-peak.
  - Excess kvarh during peak and standard periods only.
- The sum of the maximum demands incurred during each month is then calculated as well as the highest maximum demand during the whole year.
- From these the Annual Load Factor (LF) and Excess kvarh % of total kWh are calculated.
- These values are then calculated for each profile.

**Table 39**

REP PROFILE QUANTITIES	TOTAL				HIGH SEASON			LOW SEASON				Annual	
YEAR	ENERGY	MAX DEMAND	MAX DEMAND	MAX DEMAND P&S	Monthly KVA LOAD FACTOR	P	S	O	P	S	O	Max	kVA Load factor
PROFILE	kWh (FOR)	kW	kVA	kVA	%	kWh (FOR)	kWh (FOR)	kWh (FOR)	kWh (FOR)	kWh (FOR)	kWh (FOR)	kVA	LF
1Total Purchases	38 557 510	106 948.28	109 483.71	109 273.54	57.12%	4.9%	12.0%	11.7%	12.3%	28.7%	30.4%	10 337	42.58%
2Bulk	3 673 203	10 048.71	11 131.97	11 131.97	51.53%	4.5%	11.7%	11.4%	12.2%	29.4%	30.7%	1 066	39.34%
3MV(kWh)	0	0.00	0.00	0.00	41.73%	3.3%	9.5%	8.5%	12.5%	31.9%	34.4%	0	19.76%
4LV(kWh)	5 116 128	14 026.70	15 109.19	15 109.19	51.96%	4.7%	12.0%	11.9%	12.2%	29.0%	30.2%	1 412	41.35%
5Indigent	2 661 561	7 406.41	7 611.95	7 611.95	47.72%	4.1%	11.7%	9.9%	12.7%	30.6%	31.0%	717	42.37%
6Comm(kWh)	7 683 400	20 455.27	21 905.58	21 905.58	58.30%	4.3%	11.0%	10.8%	12.3%	30.0%	31.6%	2 138	41.02%
7Mun(kWh)	557 886	2 270.49	6 884.61	6 843.45	11.18%	5.3%	14.6%	18.5%	8.6%	23.4%	29.6%	950	6.70%
8Dom(kWh)	7 857 545	21 865.43	22 472.25	22 472.25	47.72%	4.1%	11.7%	9.9%	12.7%	30.6%	31.0%	2 117	42.37%
9Res Poor	7 857 545	21 865.43	22 472.25	22 472.25	47.72%	4.1%	11.7%	9.9%	12.7%	30.6%	31.0%	2 117	42.37%
10													
11Lights	1 337 717	3 995	4 876	4 876	40.42%	1.2%	5.2%	20.5%	3.0%	11.3%	58.8%	406	37.58%

The following should be noted in this respect:

- The average Load factor refers to the total kWh per year divided by the sum of the monthly maximum demand in the year times the total hours in the year. (Total kWh for year) ÷ (Sum 12 kVA maximum demands x hours in year).
- The Annual LF refers to the total kWh per year divided by the highest maximum demand in the year times 12 times the total hours in the year. (Total kWh for year) ÷ (Highest maximum demand in year x 12 x hours in year).
- The % values in each of the TOU periods refer to the % of consumption relative to the total consumption.
- The reactive energy refers to the kvarh as calculated in the Eskom Megaflex tariff. (Sum of: kvarh – 30% of kWh for each ½ hour in peak and standard periods).

This data will be used to calculate the load demands of each profile and the kWh's used in the different time periods.

**11.4. Network Profile Quantities.**

The network profiles calculated above are now further processed. The maximum demand and TOU ratios are required for further analyses and the results obtained are shown in Table 40. Once again it is clear that there is a good correlation.

**Table 40**

NETWORK QUANTITIES	YEAR TOTAL					Monthly KVA LOAD FACTOR	HIGH SEASON			LOW SEASON			YEAR TOTAL	
	P&S	ENERGY	MAX DEMAND	MAX DEMAND	MAX DEMAND P&S		P	S	O	P	S	O	Max	kVA Load factor
	Year	kvarh	kWh (FOR)	kW	kVA		kVA	%	kWh (FOR)	kWh (FOR)	kWh (FOR)	kWh (FOR)	kWh (FOR)	kWh (FOR)
1Purchases	168 399	38 557 510	106 948.28	109 483.71	109 273.54	57.12%	4.9%	12.0%	11.7%	12.3%	28.7%	30.4%	10 337	42.58%
2N2	938 759	38 467 092	98 850.49	101 717.15	101 717.15	57.91%	4.4%	11.9%	11.5%	12.2%	28.9%	31.2%	9 388	46.77%
3Total N3	836 108	34 467 813	93 114.19	95 679.17	95 679.17	56.94%	4.5%	12.2%	11.2%	12.5%	29.5%	30.1%	9 047	43.49%
4Total N4	827 092	34 096 125	92 110.08	94 647.40	94 647.40	56.94%	4.5%	12.2%	11.2%	12.5%	29.5%	30.1%	8 949	43.49%
5Total N5	623 981	29 918 945	81 566.04	83 451.48	83 451.48	56.30%	4.5%	12.2%	11.2%	12.5%	29.5%	30.0%	7 781	43.89%
6Total N6	524 412	28 218 622	73 960.44	75 630.10	75 630.10	56.26%	4.3%	11.9%	11.4%	12.2%	28.8%	31.4%	7 092	45.42%

These values will be used to calculate the peak demands at every point on the network and thus to calculate the per unit R/kVA for each network.

**12. COST OF SUPPLY**

The next step is to allocate the electricity costs between the various cost functions. The table below firstly shows the cost adjustments and then the method used and the actual allocation of cost per function. The next step is to functionalise the various costs between the various cost drivers. The 4 types of functions in electricity namely:

- Purchases
- Networks and
- Customer services.
- Streetlights.

The steps to be followed to do this are as follows:

- The costs, as per the trial balance, are firstly allocated directly to the relevant function as prescribed by the particular activity.
- The common costs are then allocated based on various relevant ratio's such as number of staff or asset values.

These calculations were already done in the Ringfencing part of the study.

**12.1. Cost Classification**

The next step is to classify these costs into the different cost types / drivers. The electricity costs, from a tariff point of view are classified as one of the types below:

- R/kWh in terms of the different TOU periods namely, peak, standard and off-Peak.
- R/kVA costs also separated by dedicated and shared per network.
- R/customer as per customer category.
- Rand / light in the case of streetlight maintenance costs.

The way in which these costs are functionalised / classified is shown in Table 41.

**Table 41**

COST FUNCTIONALISATION				
		R/kWh	R/kVA	R/Customer
<b>Purchase</b>		All Energy charges levied to munic	All demand and access charges levied to munic	None
<b>Network costs</b>	Capital provision	None	All	None
	Operating and maintenacne	None	All	None
<b>Customer Services</b>		None	None	All

The actual functionalisation/ classification of costs is shown in Table 42Table 42.

**Table 42**

CORRECTED NERSA RR FOR CO	Energy	Networks MV	NetworksMV/LV	Networks LV	Customer Services	Streetlights	Electricity Total
Bulk (full cost as losses are included)	59 876 247	-	-	-	-	-	59 876 247
Operating cost	-	1 514 453	1 467 574	1 024 326	3 057 971	638 221	7 702 545
Shared cost adjusted to 30% of own	-	1 352 431	1 263 882	859 570	4 019 179	1 386 329	8 881 390
Depreciation	-	57 438	61 811	15 125	3 617 025	4 049	3 755 448
Interest (excluding Eskom)							
Repairs and Maintance actual		1 698 216	1 559 394	1 024 326	3 055 238	2 686 224	10 023 398
Bad debt written off (this is not a cost)	-	632 681	591 256	402 115	1 880 212	648 538	4 154 802
<b>Sub-total cost</b>	<b>59 876 247</b>	<b>5 255 220</b>	<b>4 943 918</b>	<b>3 325 461</b>	<b>15 629 625</b>	<b>5 363 361</b>	<b>94 393 831</b>
Surplus:						9.1%	8 571 866
Total Allowed revenue							102 965 697
Revenue: Adjusted							<b>102 965 697</b>
Shortfall							-
% Structure increase							<b>0.0%</b>

The following points are of note:

- There is a small portion of customer services costs which can be classified in R/kWh. The problem is that the true cost really depends on the number of customers and not the amount of kWh purchased. All customer services costs are therefore classified as R/Customer.
- A portion of the Eskom costs relate to the demand or maximum capacity taken from the network. This will be classified as such later on in the process of detailed cost calculations.

These costs will now be used as a basis for the detailed cost calculations to follow.

**12.2. Cost allocation: phase 1**

The next step is to allocate the various costs per the different cost categories. This is shown in Table 43 in respect of the capital portion of the network and customer connections. It also allows for adjustment to reflect the pricing policy of the municipality. In other words, where customers pay outside of the tariff (by way of connection fees, capital contributions, subdivision fees or developer contributions), the full capital provision must not come from the tariff. In this respect staff indicated that all capital costs for new customers / capacity are covered outside of the tariff and thus no adjustment is made.

Table 43

<b>NDLAMBE</b>									
<b>TOTAL NETWORK CAPITAL CAPITAL REVENUE REQUIREMENT</b>									
Total Network Levelised costs			Adjustment to reflect cash payments		Adjustment: difference: revenue requirement - capital provision in budget			Reconciled	
		R/year	%	%					R/year
Energy	Energy	0	0%	0	LEVELISATION ADJUSTMENT				0
N2	HV	0	0%	0					0
N3	HV/MV	0	0%	0	Total levelised costs		23 902 600		0
N4	MV	646 871	0%	646 871	Current capital provisio		3 755 448		101 633
N5	MV to LV	696 118	0%	696 118	Difference		(20 147 153)		109 370
N6	LV	170 333	0%	170 333	% Adjustment		15.71%		26 762
N7			0%	0					0
N8			0%	0					0
Streetworks		45 599	0%	45 599					7 164
<b>Totals</b>		<b>1 558 921</b>		<b>1 558 921</b>					<b>244 929</b>
<b>METERING</b>									
1 PH kWh Pre-paid		18 245 682	0%	18 245 682					2 866 663
3 PH kWh Pre-paid		1 688	0%	1 688					265
1 PH kWh		2 925 008	0%	2 925 008					459 562
3 Ph kWh		362 440	0%	362 440					56 945
3 TOU		580 150	0%	580 150					91 150
3 PH TOU & ct's		1 845	0%	1 845					290
TOU RMU & CT/VT's		160 583	0%	160 583					25 230
TOU at HV sub With CB		66 283	0%	66 283					10 414
			0%	-					0
									0
									0
<b>SUB-TOTAL</b>		<b>22 343 680</b>		<b>22 343 680</b>					<b>3 510 518</b>
<b>GRAND TOTAL</b>		<b>23 902 600</b>		<b>23 902 600</b>					<b>3 755 448</b>

The next step is to allocate the support costs (operations, maintenance and administration) relating to the networks and technical customer services. The operating costs per different cost type, network and customer category are shown in Table 44.

Table 44

<b>NDLAMBE</b>								
<b>OPERATING COST SEPARATION</b>								
		Total Support costs						
Energy	N0	-						
Customer services	N1	12 012 600						
HV	N2	-						
HV/MV	N3	-						
MV	N4	5 197 781						
MV to LV	N5	4 882 106						
LV	N6	3 310 337						
SL	N7	5 359 312						
		<b>30 762 136</b>						
	<b>Network operating</b>	<b>Adjust Factor</b>	<b>Initial ratio</b>	<b>Act Share</b>	<b>ALLOCATED SUPPORT</b>			
N0				0.00%		-		
N1		100%		0.00%		-		
N2		100%	0.00%	0.00%		-		
N3		100%	0.00%	0.00%		-		
N4	5197781	100%	38.82%	38.82%		4 952 890		
N5	4882106	100%	36.46%	36.46%		4 652 088		
N6	3310337	120%	24.72%	29.67%		3 785 246		
						-		
	<b>13 390 224</b>		<b>100.00%</b>	<b>104.94%</b>		<b>13 390 224</b>		
<b>Customer service direct</b>			<b>12 012 600</b>					
				<b>Total</b>				
	Service connection / Metering share		50.0%	<b>6 006 300</b>				
	Billing share		25.0%	<b>3 003 150</b>				
	Customer service share		25.0%	<b>3 003 150</b>				
			<b>100.00%</b>	<b>12 012 600</b>				
<b>Service connection / Metering Revenue requirement</b>				<b>6 006 300</b>				
<b>Metering</b>	Meter capex RR	Customers	Equivalent meter cost weight	Equivalent single phase meters	Portion of metering opex	Opex R/y	Metering: Capex and Opex	<b>Total R/cust/m</b>
1 PH kWh Pre-paid	2 866 663	14 378	1.50	21 567	61.94%	3 720 535	6 587 198	<b>38.2</b>
3 PH kWh Pre-paid	265	1	2.50	3	0.01%	431	696	<b>58.0</b>
1 PH kWh	459 562	6 115	1.50	9 173	26.34%	1 582 353	2 041 915	<b>27.8</b>
3 Ph kWh	56 945	442	2.50	1 105	3.17%	190 624	247 569	<b>46.7</b>
3 TOU	91 150	283	10.00	2 830	8.13%	488 205	579 355	<b>170.6</b>
3 PH TOU & ct's	290	1	15.00	15	0.04%	2 588	2 878	<b>239.8</b>
TOU RMU & CT/VT's	25 230	5	20.00	100	0.29%	17 251	42 481	<b>708.0</b>
TOU at HV sub With CB	10 414	1	25.00	25	0.07%	4 313	14 727	<b>1 227.2</b>
	-							
<b>SUB-TOTAL</b>	<b>3 510 518</b>	<b>21 226</b>	<b>78</b>	<b>34 817</b>	<b>100.00%</b>	<b>6 006 300</b>	<b>9 516 819</b>	
<b>Billing/ cust.service</b>		Number of customers	Equivalent < 50 kW customers	Billing/cust.serv. cost R/y	<b>R/cust/m</b>			
Small <50 kVa	1	20936	20 936	5 612 242	<b>22.34</b>			
Medium <500 kVa	5	284	1 420	380 655	<b>111.69</b>			
Large <2000 kVa	10	5	50	13 403	<b>223.39</b>			
Very large >2000kVa	20	0	-	-	<b>#DIV/0!</b>			
	<b>Total</b>	<b>21225</b>	<b>22 406</b>	<b>6 006 300</b>				
<b>Sub-Total</b>							<b>12 012 600</b>	
<b>GRAND TOTAL</b>								<b>30 762 136</b>

The following should be noted in this respect:

- The operating costs are as per the ringfenced trial balance.
- The network costs are then allocated as follows:
  - According to the Network capital revenue requirement at first pass.
  - These figures are then adjusted based on inputs from staff to reflect the real case of support costs per network.
- The customer services costs are then split between:
  - Metering according to different connections and metering.
    - This is done by giving a weighting to each of the types of connections. The following in this respect:
      - This is a difficult number to determine because records are not kept of difference in these costs.
      - This has been done based on experiences elsewhere and inputs from staff.
      - An example is the amount of come backs that have been experienced with pre-payment meters compared with conventional 1 phase meters.

- Another example is that the Bulk meters are not read by normal meter readers but by the Distribution staff.
  - The effective cost per meter is thus calculated.
- Billing and customer services according to size of customer.
  - This is again done by giving a weighting to each size of customer. The following should be noted in this respect:
    - This is one of the most difficult assumptions because records are not kept of customer service costs per size of customer.
    - This has been done based on experiences elsewhere and inputs from staff.
    - An example is that a customer > 50 kVA is a 3 phase customer which means there is a more sophisticated meter or 3 single phase meters that need to read and thus 3 readings to be entered into the billing system compared with only one for a customer < 50 kVA which are mostly 1 phase customers.
    - Staff also indicated that bigger customers have more queries on their electricity bills and they thus spend more time on them.
    - These assumptions are subjective but the best available considering the staff inputs.
  - The effective cost per size of customer is then calculated.

### 12.3. Cost allocation: phase 2

Ndlambe purchases all its energy from Eskom on TOU at Megaflex.

For these reasons the Megaflex tariff will be used as a basis to calculate the cost of supply and specifically the energy costs and unit rates.

The summary of Megaflex LG rates is shown in Table 45.

Table 45

Megaflex			2023/2024
> 900km			0.00%
≥ 500V & < 66kV	Transmission network access	R/kVA/m	R 14.72
	Network access charge:	R/kVA/m	R 28.65
	Network demand High:	R/kVA/m	R 54.31
	Network demand Low:	R/kVA/m	R 54.31
<b>TOU: High Demand Season</b> (June -Aug)	Peak	c/kWh	570.45
	Standard	c/kWh	172.79
	Off-peak	c/kWh	93.85
<b>TOU: Low Demand Season</b> (Sept-May)	Peak	c/kWh	186.06
	Standard	c/kWh	128.06
	Off-peak	c/kWh	81.21
<b>Electrification and rural</b>		c/kWh	13.90
<b>Affordability</b>		c/kWh	-
<b>Urban low voltage subsidy charge [R/kVA/m]</b>		R/kVA/m	-
<b>Reliability service</b>		c/kWh	0.71
<b>REACTIVE ENERGY (c)</b>	High Demand	c/kvarh	25.11
	Low demand	c/kvarh	-

These values will be used as the initial per unit energy and Demand / Access charges.

### 12.4. Cost allocation: phase 3

The next step is to add the capital cost to the operating costs and then allocating it to the various cost drivers as is shown in Table 46. The cost of the actual streetlights plus overheads is allocated on a per light basis.

Table 46

NDLAMBE														
CATEGORISED TOTAL COST														
ENERGY														
											59 876 247			
Eskom											59 876 247.17			
Capex											-			
Opex											-			
TOTAL NETWORK COSTS														
(System peak week demand)														
		TOTAL		ALLOCATION RATIOS				SUPPORT				TOTAL COST		
		CAPEX	SUPPORT	Cost	CAPEX									
				Type	Acc	MD	PODs	Demand	Units	PODs	Acc	MD	PODs	
Energy	Energy	N0	0	0	R/y	50%	50%	0%	100%	0%	0%	0	0	
		N1	0	0	R/y	50%	50%	0%	0%	100%	0%	0	0	
HV	HV	N2	0	0	R/y	50%	50%	0%	100%	0%	0%	0	0	
HV/MV	HV/MV	N3	0	0	R/y	50%	50%	0%	100%	0%	0%	0	0	
MV	MV	N4	646 871	4 952 890	R/y	50%	50%	0%	100%	0%	0%	2 799 881	2 799 881	
MV to LV	MV to LV	N5	696 118	4 652 088	R/y	50%	50%	0%	100%	0%	0%	2 674 103	2 674 103	
LV	LV	N6	170 333	3 785 246	R/y	50%	50%	0%	100%	0%	0%	1 977 789	1 977 789	
Lights	Lights	N7	45 599	5 359 312	R/y	0%	0%	100%	0%	0%	100%	0	0	
					R/y	100%	0%	0%	100%	0%	0%	0	0	
					R/y	100%	0%	0%	100%	0%	0%	0	0	
			1 558 921	18 749 536								7 451 773	7 451 773	
													5 404 910	
<b>Service connection / Metering Revenue requirement</b>														
<b>Metering</b>														
			Meter capex RR	Opex R/y									Total cost R/Y	
1 PH kWh Pre-paid			1 913 452	3 720 535									5 633 987	
3 PH kWh Pre-paid			177	431									608	
1 PH kWh			202 006	1 582 353									1 784 359	
3 Ph kWh			25 031	190 624									215 655	
3 TOU			40 066	488 205									528 271	
3 PH TOU & ct's			127	2 588									2 715	
TOU RMU & CT/VT's			11 090	17 251									28 341	
TOU at HV sub With CB			4 578	4 313									8 890	
			-	-									0	
			-	-									0	
SUB-TOTAL			2 196 527	6 006 300									8 202 827	
<b>Billing/ cust.service</b>														
													R/y	
Small <50 kVa				5 612 242									5 612 242	
Medium <500 kVa				380 655									380 655	
Large <2000 kVa				13 403									13 403	
Very large >2000kVa				-									0	
Total				6 006 300									6 006 300	
			3 755 448	30 762 136									94 393 831	

The following should be noted in this respect:

- The streetlight maintenance costs are allocated per streetlight.
- All network costs are allocated on the R/kVA basis.
- All customer costs are allocated on the R/customer/month basis.

Based on experience the non-co-incidental peak demand method was used as basis to allocate all network costs to customer categories.

The total costs have to be divided by the total number of units applicable to that cost. The units required for this purpose should be derived from the network load and customer details.

To be able to allocate the network costs as a per unit cost (R/kVA), the kVA for each network is required. This was calculated by building up the total load profile of each network starting at LV and working up to the high voltages. It must be noted that the Purchase values differ from the billing data as it is calculated from the load profile data.

The allocation units to be used are shown in Table 47Table 48. The network kVA and kWh quantities were obtained from the Quantities tables. The sales data was obtained from the sales data.

Table 47

<b>NDLAMBE</b>						
<b>TOTAL ALLOCATION UNITS</b>						
<b>NETWORK</b>						
(System peak week			Max kVA	ΣkVA y	kWh	PODs
			kVA	kVA	kWh	PODs
		N0	10337	101 717	38 467 092	
Energy	Energy	N1	10337	101 717	38 467 092	
HV	HV	N2	9388	101 717	38 467 092	
HV/MV	HV/MV	N3	9047	95 679	34 467 813	
MV	MV	N4	8949	94 647	34 096 125	
MV to LV	MV to LV	N5	7781	83 451	29 918 945	
LV	LV	N6	7092	75 630	28 218 622	
Lights	LV	N6				2 076
		N5/6				
<b>GRAND TOTAL</b>						2 076
<b>Metering</b>						
<b>Metering</b>						
1 PH kWh Pre-paid			14 378			
3 PH kWh Pre-paid			1			
1 PH kWh			6 115			
3 Ph kWh			442			
3 TOU			283			
3 PH TOU & ct's			1			
TOU RMU & CT/VT's			5			
TOU at HV sub With CB			1			
			0			
<b>SUB-TOTAL</b>			21 226			
<b>Billing/ cust.service</b>			0			
Small <50 kVa			20 936			
Medium <500 kVa			284			
Large <2000 kVa			5			
Very large >2000kVa			0			
<b>Total</b>			21 225			

The next step is to calculate the unit costs. This is done by dividing the total cost per category by the relevant units. The results are shown in Table 48.

Table 48

<b>NDLAMBE</b>						
<b>COST PER UNIT</b>						
<b>NETWORK</b>						
(System peak week demand)				Max kVA	ΣkVA y	PODs
				All	All	R/PODs
		N0		0.00	0.00	0.00
Energy	Energy	N1		0.00	0.00	0.00
HV	HV	N2		0.00	0.00	0.00
HV/MV	HV/MV	N3		0.00	0.00	0.00
MV	MV	N4		26.07	29.58	0.00
MV to LV	MV to LV	N5		28.64	32.04	0.00
LV	LV	N6		23.24	26.15	0.00
Lights	LV	N6		23.24	26.15	216.96
<b>GRAND TOTAL</b>						
<b>Metering</b>		<b>R/C/m</b>				
1 PH kWh Pre-paid		33				
3 PH kWh Pre-paid		51				
1 PH kWh		24				
3 Ph kWh		41				
3 TOU		156				
3 PH TOU & ct's		226				
TOU RMU & CT/VT's		472				
TOU at HV sub With CB		741				
NA		0				
<b>AVERAGE</b>		32				
<b>Billing/ cust.service</b>		<b>R/C/m</b>				
Small <50 kVa		22				
Medium <500 kVa		112				
Large <2000 kVa		223				
Very large >2000kVa		0				
NA		0				
<b>AVERAGE</b>		24				

The costs obtained up to now reflect the cost of every separate network segment. To have a more practical set of charges these must be set for every network supply position stating the total charges at each point. This involves the network cost closest to the supply position plus all the networks up to that point plus the losses incurred in the networks up to that point. The values stated therefore reflect the total per unit cost of supply at that network supply point. The resultant costs are shown in Table 49.

Table 49

<b>NDLAMBE</b>		<b>2023/2024</b>		<b>Eskom adjust</b>			<b>0.00%</b>
<b>COSTS PER TARIFF COST CATEGORY</b>				<b>Cost increase</b>			<b>5.0%</b>
				<b>+ Surplus</b>			<b>9.1%</b>
<b>FOR ALL LOAD FACTORS</b>							
			Access	Demand	Peak	Standard	Off-peak
HIGH SEASON	Access / Demand	R/kVA/m	47.31	59.24			
	Energy	c/kWh			6.2225	1.8848	1.0237
LOW SEASON	Access / Demand	R/kVA/m	47.31	59.24			
	Energy	c/kWh			2.0296	1.3969	0.8858
	Super Peak	c/kvarh			-	-	
Fixed charges (R/m)		R/m					
Reactive energy - Hi	Total excess for year	c/kvarh	0.2739				
Transmission network		R/m					
National levies		c/kWh	0.1594				
<b>TOTAL COSTS PER SUPPLY POSITION</b>			<b>Acc %</b>	<b>Acc</b>	<b>DM</b>		
Total Network Charges (including losses)				R/KVA/m	R/KVA/m	c/kWh	R/pod/m
			Total losses	All	All	All	
S0			0.00%			0	0.00
S1	Non-Tech		0.00%	0.00	0.00	0	0.00
S2			0.00%	0.00	0.00	0	0.00
S3			1.12%	0.00	0.00	0	0.00
S4			3.02%	30.08	34.13	0	0.00
S5			5.33%	63.36	71.37	0	0.00
S6			10.06%	90.47	101.87	0	0.00
S7 Lights			10.1%	90.47	101.87	0	216.96
<b>Metering</b>							
	<b>R/C/m</b>						
1;1 PH kWh Pre-paid		37.25					
2;3 PH kWh Pre-paid		57.82					
3;1 PH kWh		27.74					
4;3 Ph kWh		46.38					
5;3 TOU		177.46					
6;3 PH TOU & ct's		258.12					
7;TOU RMU & CT/VT's		538.87					
8;TOU at HV sub With CB		845.19					
9;NA		0.00					
10;0		0.00					
AVERAGE		36.74					
<b>Billing/ cust.service</b>							
	<b>R/C/m</b>						
1;Small <50 kVa		25					
2;Medium <500 kVa		127					
3;Large <2000 kVa		255					
4;Very large >2000kVa		0					
5;NA							
NA		27					

The following should be noted in this respect:

- Own costs increase by CPI.
- The surplus is the actual surplus.
- The surplus reflects the current surplus which NERSA would allow under normal circumstances.
- The R/kVA costs are split here between the dedicated and shared portion as follows:
  - Dedicated refers to networks which cannot really be shared with other customers. For example, if a development is done based on a particular after diversity maximum demand (ADMD) and supplies to various small and large customers are installed, if customers change their loads the costs do not change, and these networks cannot be used to supply other customers and thus are considered dedicated.

- Assumptions about this is subjective but also reflects the realities in each municipality. Where there is ongoing growth and customers continue to use the power installed this is not a problem.
- In areas where economic growth is bad and customers reduce their demands, the risk of revenue loss is higher to municipalities as there are less customers to share the unused capacity with.
- These values show the total network costs at each position on the network including the costs and losses of all higher voltage networks up to that point. In other words when a demand of say 10 kVA is incurred at a LV point of supply, the demand at the point of purchase which is increased by the total losses up to that point. Losses thus effect the network and energy costs.
- It is important to note that these are per unit values. For example, the energy costs for each profile will be calculated by using the Eskom energy rates, plus the losses up to each relevant network multiplied by the % of kWh in each TOU period multiplied by the total number of kWh for that profile.
- The Eskom and own network costs are calculated by:
  - Multiplying the sum of the monthly maximum demands by that profile by the Eskom maximum demand and own maximum demand per unit costs.
  - Multiplying the highest annual maximum demand by the Eskom access charge plus losses and the own Access costs.

Before one can go from the costs per tariff cost category to costs per tariff, we need to know the statistics of the loads associated with the various tariffs. Representative load profiles were calculated from available data. These were then analysed and the necessary details calculated under the load profile section.

The following comments in this respect:

- The quantities shown represents the quantities associated with each representative load profile at the relevant network where it is supplied from.
- For example, the kWh represents the kWh used by streetlights supplied from the LV network. The Sum of maximum demands represents the sum of the sum of the 12 highest maximum demands incurred on the network, the Annual maximum demands is the highest maximum demand that Streetlight supplies placed on the network in the year.
- Because the individual maximum demand method is used, the maximum demand values of each profile are used irrespective of when it was incurred.
- These quantities will be used to calculate the per unit charges.

The next step is to now calculate the various per unit charges which should apply in respect of the different customer, network and energy charges relevant to the various periods. This makes use of:

- The position at which the customer is supplied to determine:
  - the R/kVA network costs plus R/kVA Eskom costs.
  - the losses % to be added to Energy and Eskom Demand/Access.
- The type of metering and size of supply to determine the metering and billing / customer service costs.

This is shown in Table 50.

Table 50

NDLAMBE						
year						57600
TARIF	347	2022/2023				
F	TARIFF CODE		Netw ork	Profile	Meter	Size
1	Domestic Indigent PP		S6	5Indigent	1;1 PH kWh Pre-paid	1;Small <50 kVa
1	Domestic Indigent Conv		S6	5Indigent	3;1 PH kWh	1;Small <50 kVa
1	Domestic 20 Amp PP: don't pay basi		S6	9Res Poor	1;1 PH kWh Pre-paid	1;Small <50 kVa
1	Domestic 20 Amp Conv		S6	9Res Poor	3;1 PH kWh	1;Small <50 kVa
1	Domestic > 20 Amp PP		S6	8Dom(kWh)	1;1 PH kWh Pre-paid	1;Small <50 kVa
1	Domestic > 20 Amp Conv		S6	8Dom(kWh)	3;1 PH kWh	1;Small <50 kVa
1	Commercial PP		S6	6Comm(kWh)	1;1 PH kWh Pre-paid	1;Small <50 kVa
1	Commercial Conv		S6	6Comm(kWh)	4;3 Ph kWh	1;Small <50 kVa
1	Bulk TOU LV		S5	4LV(kWh)	6;3 PH TOU & ct's	2;Medium <500 kVa
1	Bulk TOUMV		S4	3MV(kWh)	7;TOU RMU & CT/VT's	3;Large <2000 kVa
1	Streetlight		S6	11Lights	NA	1;Small <50 kVa
1	Availability		S6	8Dom(kWh)	NA	1;Small <50 kVa
1	Municipal		S6	7Mun(kWh)	4;3 Ph kWh	1;Small <50 kVa

The resultant costs per tariff broken up in all the different components are shown in Table 51

Table 52Table 51.

The consumption values of the various customer categories were previously calculated. These quantities are broken up into the detailed cost categories and not billing quantities. This is done by using the representative load profile, load factor and consumption per TOU period.

- The ratio of consumption Peak, Standard, Off-peak
- and the load factors of the different representative load profiles
- are obtained from the representative load profile quantities.

The consumption quantities per TOU period are shown in  
**Reference source not found..**

Table

522Error!

Table 51

Year	CHARGES APPLICABLE FOR ALL MONTHS OF THE YEAR										HIGH SEASON CHARGES				LOW SEASON CHARGES				Basic adjust	
	2023/2024 details										Months in year.				Months in year.					COST
	Customer service	Basic	Access	MD (aLL hours)	ALL Energy	Energy Peak	Energy Standard	Energy Off-Peak	Reactive energy	Energy Peak	Energy Standard	Energy Off-Peak	Reactive energy	Energy Peak	Energy Standard	Energy Off-Peak	Reactive energy			
R/cust/m	R/POS/m	R/KVA/m	R/KVA/m	R/kWh	c/kWh	c/kWh	c/kWh	c/kvarh	c/kWh	c/kWh	c/kWh	c/kvarh	c/kWh	c/kWh	c/kWh	c/kvarh	c/kWh			
1	Domestic Indigent PP	62.320	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	323.85							
1	Domestic Indigent Conv	52.872	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	581.63							
1	Domestic 20 Amp PP- don't pay basics	62.320	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	319.46							
1	Domestic 20 Amp Conv	52.872	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	315.78							
1	Domestic > 20 Amp PP	62.320	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	296.28							
1	Domestic > 20 Amp Conv	52.872	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	294.05							
1	Commercial PP	62.320	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	287.57							
1	Commercial Conv	71.391	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	283.52							
1	Bulk TOU LV	382.976	115.794	136.657	0.168	6.554	1.985	1.078	0.2739	2.138	1.471	0.933	354.17							
1	Bulk TOU MV	788.437	79.191	95.546	0.164	6.410	1.942	1.055	0.2739	2.091	1.439	0.913	298.89							
1	Streetlight	216.960	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	731.34							
1	Availability	150.635	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	734.05							
1	Municipal	71.391	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	734.05							

Table 52

Year	QUANTITIES CHARGEABLE FOR ALL MONTHS OF THE YEAR										HIGH SEASON QUANTITIES				LOW SEASON QUANTITIES			
	2023/2024 details										Months in year.				Months in year.			
	Customer service	Basic	Access	MD (aLL hours)	ALL Energy	Energy Peak	Energy Standard	Energy Off-Peak	Reactive energy	Energy Peak	Energy Standard	Energy Off-Peak	Reactive energy	Energy Peak	Energy Standard	Energy Off-Peak	Reactive energy	
R/cust/m	R/POS/m	R/KVA/m	R/KVA/m	R/kWh	c/kWh	c/kWh	c/kWh	c/kvarh	c/kWh	c/kWh	c/kWh	c/kvarh	c/kWh	c/kWh	c/kWh	c/kvarh	c/kWh	
1	Domestic Indigent PP	62.320	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	323.85					
1	Domestic Indigent Conv	52.872	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	581.63					
1	Domestic 20 Amp PP- don't pay basics	62.320	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	319.46					
1	Domestic 20 Amp Conv	52.872	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	315.78					
1	Domestic > 20 Amp PP	62.320	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	296.28					
1	Domestic > 20 Amp Conv	52.872	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	294.05					
1	Commercial PP	62.320	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	287.57					
1	Commercial Conv	71.391	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	283.52					
1	Bulk TOU LV	382.976	115.794	136.657	0.168	6.554	1.985	1.078	0.2739	2.138	1.471	0.933	354.17					
1	Bulk TOU MV	788.437	79.191	95.546	0.164	6.410	1.942	1.055	0.2739	2.091	1.439	0.913	298.89					
1	Streetlight	216.960	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	731.34					
1	Availability	150.635	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	734.05					
1	Municipal	71.391	150.635	176.148	0.175	6.849	2.074	1.127	0.2739	2.234	1.537	0.975	734.05					

**NDLAMBE**

QUANTITIES CHARGEABLE FOR ALL MONTHS OF THE YEAR

Number of customers: 8,917  
 Number of POD's: 110,679  
 Highest MD in year: 18,826  
 Σ MDs all hours / 12: 35,381,276  
 ALL Energy: 1,533,622 kWh  
 Energy Peak: 4,001,287 kWh  
 Energy Standard: 3,981,464 kWh  
 Energy Off-Peak: 726,612 kWh  
 Reactive energy: 11,332,055 kvarh  
 Energy Peak: 4,348,586 kWh  
 Energy Standard: 10,184,262 kWh  
 Energy Off-Peak: 2,518,050 kWh  
 Reactive energy: 423,618 kvarh

**CONSUMPTION**

Number of customers: 8,917  
 Number of POD's: 110,679  
 Highest MD in year: 18,826  
 Σ MDs all hours / 12: 35,381,276  
 ALL Energy: 1,533,622 kWh  
 Energy Peak: 4,001,287 kWh  
 Energy Standard: 3,981,464 kWh  
 Energy Off-Peak: 726,612 kWh  
 Reactive energy: 11,332,055 kvarh  
 Energy Peak: 4,348,586 kWh  
 Energy Standard: 10,184,262 kWh  
 Energy Off-Peak: 2,518,050 kWh  
 Reactive energy: 423,618 kvarh

The following should be noted in this respect:

- The kVA for small customers represents the total maximum kVA placed on the network and not the actual installed capacity of customers. The peak values are calculated from the representative load profile quantities. This corresponds to using the individual maximum demand method for allocating network costs. If the average and access method was used, these values would be slightly different.
- The subsidised quantities: Basic and Free Basic Electricity (FBE) quantities are removed as we calculate costs.
- These quantities have been adjusted so that the same revenue as before is generated.

Table 53 shows the calculation of the total cost per tariff. It multiplies the per unit costs by the number of units to obtain total revenue.

Table 53

NDLAMBE	FROM CHARGES APPLICABLE		REVENUES FROM CHARGES APPLICABLE FOR ALL MONTHS OF THE YEAR						HIGH SEASON REVENUES				LOW SEASON REVENUES			
	Customer service	R/year	Basic	Access	MD (aLL hours)	ALL Energy	Energy Peak	Energy Standard	Energy Off-Peak	Reactive energy	Energy Peak	Energy Standard	Energy Off-Peak	Reactive energy		
															R/year	R/year
1 Domestic Indigent PP	-	860 011	1 114 052	1 156 835	401 264	650 135	552 947	256 102	1 374	649 359	1 075 792	690 743	-			
1 Domestic Indigent Conv	-	60 274	9 937	10 319	3 579	5 799	4 932	2 284	11	5 792	9 596	6 161	-			
1 Domestic 20 Amp PP: don't	-	876 463	1 285 238	1 334 595	462 922	750 035	637 913	295 455	1 362	749 140	1 241 098	796 882	-			
1 Domestic 20 Amp Conv	-	768 329	1 266 944	1 315 599	456 333	739 360	628 834	291 250	1 343	738 477	1 223 433	785 540	-			
1 Domestic > 20 Amp PP	-	534 702	2 165 006	2 248 149	779 801	1 263 448	1 074 577	497 700	2 294	1 261 940	2 090 653	1 342 363	-			
1 Domestic > 20 Amp Conv	-	473 306	2 954 761	3 068 232	1 064 258	1 724 331	1 466 563	679 251	3 131	1 722 272	2 853 285	1 832 033	-			
1 Commercial PP	-	189 202	1 043 391	858 518	363 859	617 638	471 433	252 996	3 565	569 307	956 081	639 309	-			
1 Commercial Conv	-	248 227	2 463 205	2 026 764	858 968	1 458 100	1 112 944	597 265	8 417	1 344 002	2 257 088	1 509 260	-			
1 Bulk TOU LV	-	59 744	6 183 421	2 362 942	814 048	1 363 999	944 842	582 700	28 683	1 348 453	1 893 752	1 592 941	-			
1 Bulk TOU MV	-	56 767	3 135 961	1 251 088	584 433	1 152 857	795 784	653 342	48 255	742 361	1 087 523	1 131 423	-			
1 Streetlight	-	5 404 910	639 287	570 732	213 784	375 345	295 558	156 931	7 477	333 346	550 801	365 393	-			
1 Availability	-	-	4 863 235	-	-	-	-	-	-	-	-	-	-			
1 Municipal	-	59 112	2 215 662	1 553 843	126 230	262 154	217 399	149 950	93 111	138 071	259 373	207 657	-			
10	-	-	-	-	-	-	-	-	-	-	-	-	-			
1 Total	-	9 591 048	29 340 119	17 757 615	6 129 501	10 363 202	8 203 727	4 415 227	199 021	9 602 519	15 498 475	10 899 706	-			

The following very important point must be noted:

- In the sales analysis it was shown that the calculated revenue using the sales data and tariff data does not exactly achieve the revenue as indicated in the trial balance.
  - This is because of inaccurate data provided because of various reasons including journals made in Rand values but not in sales volumes.
  - The target sales revenue will thus not be that in the trial balance but that calculated from current tariffs plus adjustments.
  - The adjustments are to add back the income foregone from FBE if not included in “n-1” calculations.
- The target revenue from the new cost reflective tariffs is shown in Table 54

**Table 56**

• .

**Table 54**

<b>TARGET REVENUE</b>		2023/2024
Previously calculated revenue		101 448 129
Plus Income foregone 2022/2023		6 307 379
Plus add internal sales		5 319 439
Plus additional streetlight revenue		8 925 213
<b>Total</b>		<b>122 000 160</b>

The adjustments that were made to the per unit costs are shown in Table 55

**Table 55**

<b>Basic adjust</b>	<b>Cap/MD djust</b>	<b>kWh adjust</b>
-0.66%	-0.66%	0.00%

The expanded summary data is shown in Table 56.

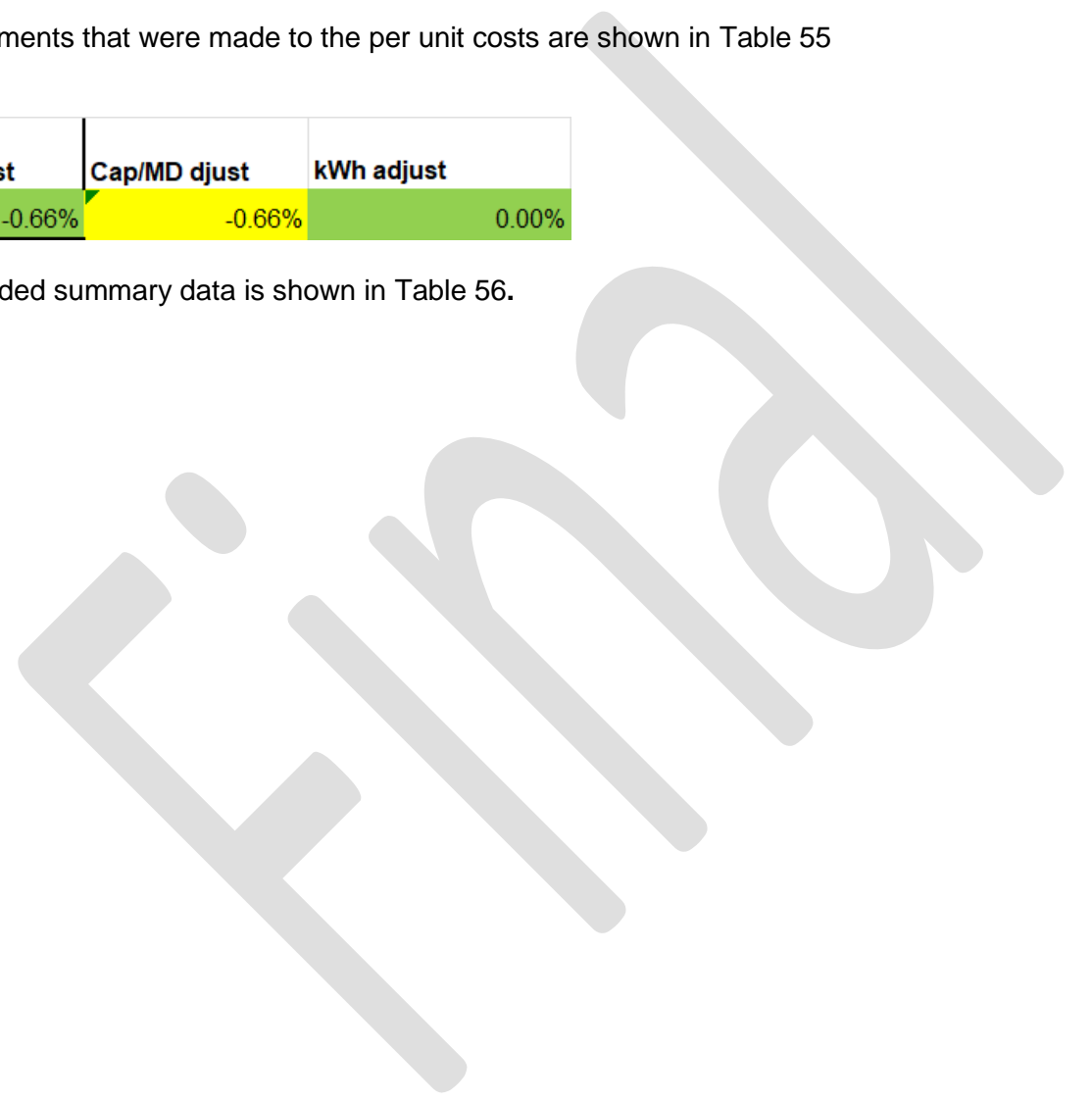


Table 56

<b>NDLAMBE</b>					
<b>TOTAL COSTS</b>		<b>TOTAL</b>	<b>REFERENCE</b>	<b>OVERCHARGE</b>	<b>% Overcharge</b>
<b>TARIFF NAME</b>	<b>TARIFF CODE</b>	<b>COST</b>	<b>TARIFF REVENUE</b>	<b>RAND</b>	<b>+% of Tariff</b>
1	Domestic Indigent PP	7 408 612	3 262 842	-4 145 770	-127.1%
1	Domestic Indigent Conv	118 685	29 104	-89 581	-307.8%
1	Domestic 20 Amp PP: don't	8 431 104	5 095 997	-3 335 107	-65.4%
1	Domestic 20 Amp Conv	8 215 442	10 282 310	2 066 868	20.1%
1	Domestic > 20 Amp PP	13 260 634	13 381 353	120 719	0.9%
1	Domestic > 20 Amp Conv	17 841 423	18 368 715	527 292	2.9%
1	Commercial PP	5 965 299	7 609 400	1 644 101	21.6%
1	Commercial Conv	13 884 260	15 668 376	1 784 116	11.4%
1	Bulk TOU LV	17 175 525	14 298 519	-2 877 006	-20.1%
1	Bulk TOUMV	10 639 795	8 784 860	-1 854 935	-21.1%
1	Streetlight	8 913 564	-	-8 913 564	#DIV/0!
1	Availability	4 863 235	4 666 652	-196 583	-4.2%
1	Municipal	5 282 581	-	-5 282 581	#DIV/0!
1	0	-	-	-	0.0%
1	<b>Total.</b>	<b>122 000 160</b>	<b>101 448 129</b>	<b>-20 552 031</b>	

The results are illustrated below in **Figure 14** in % of cost and in **Figure 15** in Rand difference between cost and current revenue. The vertical axis refers to % over or under recovery and the horizontal axis refer to the tariff.

Figure 14

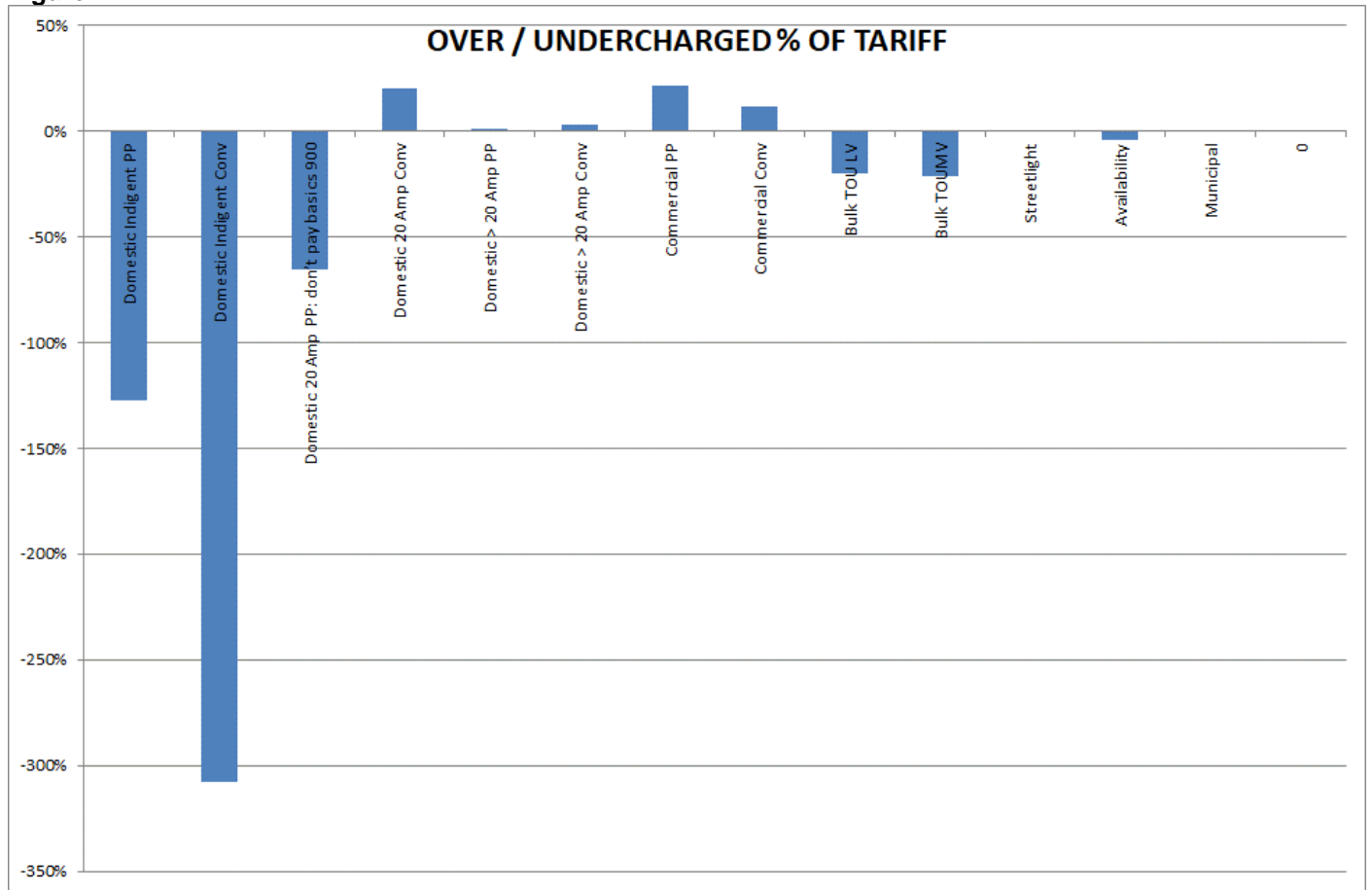
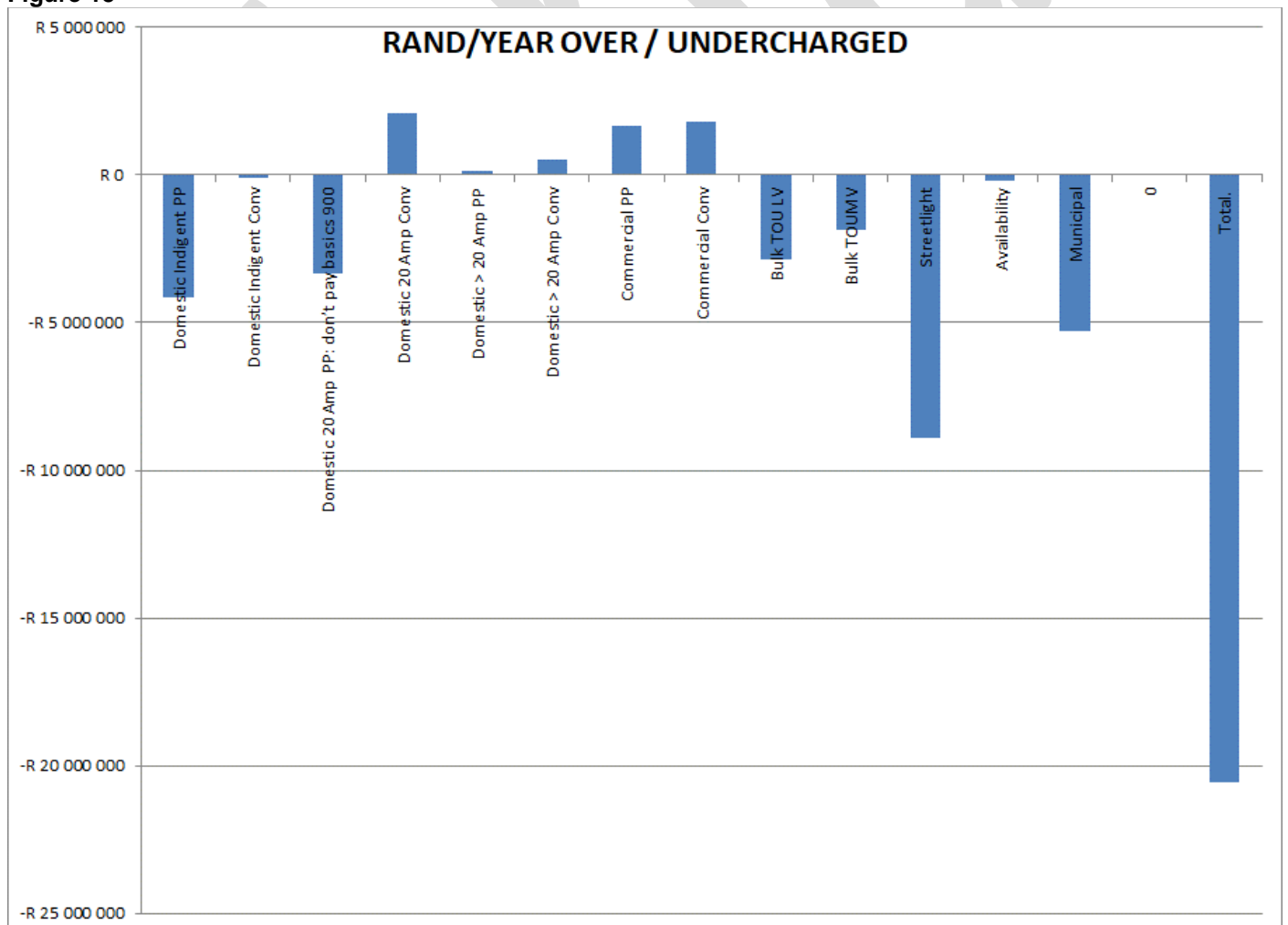


Figure 15



**12.5. Tariff structure analysis**

The cost of supply analysis shows the total cost vs revenue impact of the various tariffs. This section compares the current tariff components with the costs for the same tariff components. This is illustrated in Table 57.

**Table 57**

NDLAMBE													
TARIFF SIMPLIFICATION	2023/2024 TARIFFS								SIMPLIFIED COSTS 2023/2024			0.0%	
TARIFF CHARGES	Basic	Access	MD (aLL hours)	ALL Energy	Block 1 kWh	Block 2 kWh	Block 3 kWh	Block 4 kWh	Basic	Access	Demand	kWh All	
Nr	TARIFF NAME	R/POS/m	R/kVA/m	R/kVA/m	R/ kWh	50.00	350.00	600.00	>600	R/month	R/kVA	R/kVA	R/kWh
1	Domestic Indigent PP	-	-	-	-	-	2.00	2.82	3.30				3.239
1	Domestic Indigent Conv	-	-	-	-	-	2.00	2.82	3.30				5.816
1	Domestic 20 Amp PP: don't	-	-	-	-	1.56	2.00	2.82	3.30				3.195
1	Domestic 20 Amp Conv	346.91	-	-	-	1.56	2.00	2.82	3.30	231			1.870
1	Domestic > 20 Amp PP	346.91	-	-	-	1.56	2.00	2.82	3.30				1.870
1	Domestic > 20 Amp Conv	346.91	-	-	-	1.56	2.00	2.82	3.30	726			1.870
1	Commercial PP	622.08	-	-	2.76	-	-	-	-	689			2.876
1	Commercial Conv	622.08	-	-	2.76	-	-	-	-	1 363			2.835
1	Bulk TOU LV	1 413.86	-	207.82	-	-	-	-	-	383		494.267	3.542
1	Bulk TOUMV	1 277.04	-	169.54	-	-	-	-	-	788		335.041	2.989
1	Streetlight	-	-	-	-	-	-	-	-	217			7.313
1	Availability	346.91	-	-	-	-	-	-	-	361.525			
1	Municipal	-	-	-	-	-	-	-	-	4 624			7.340

**12.6. Key findings**

The following key findings can be made in terms of the tariff levels and structures:

- Indigent customers are seriously. This is due the lack of fixed charges, the low first 2 blocks energy rates and FBE.
- Households alternative are also seriously subsidised due to the same issues as for Indigent consumers.
- Other domestic consumers are close to cost or slightly overcharged.
- Commercial customers without basic charges are overcharged when average consumption is high and undercharged when low.
- All other commercial tariffs are extensively overcharged.
- Bulk consumers at LV and LV undercharged but municipal supplies overcharged due to bad load factors.
- TOU at MV and LV customers are slightly overcharged.
- Streetlight tariffs are too low and do not cover the fixed maintenance costs.

**13. PRICING STUDY**

Now that the costs are known and how it differs from revenue, new tariffs can be developed. The first step in this process is to develop a new pricing policy.

**13.1. Pricing Policy Drivers**

It is now clear that the tariffs fall short in being cost reflective tariffs. The challenge is to determine what must guide the changes to be made to become more cost reflective. This section proposes the pricing principles and policies to be followed in making tariff changes.

The key sources used for purpose of formulating these policies are:

- The South African Constitution.
- The South African Electricity Pricing Policy (EPP).
- Municipal Finance Management Act (MFMA).
- Municipal Systems Act (MSA).

NERSA regulates the electricity tariffs in South Africa. The NERSA policies and guidelines thus have to be followed. There are however various NERSA guidelines in conflict with some of the legislation and regulations. The results of the cost of supply study must thus be used to move NERSA in accepting the municipal proposals.

## 2.1 General Tariff Principles

Section 16 of the Electricity Regulation Act of 2006 states that the setting of prices, charges, tariffs and the regulation of revenues:

- a. must enable an efficient licensee to recover the full cost of its licensed activities, including a reasonable margin or return;
- b. must provide for or prescribe incentives for continued improvement of the technical and economic efficiency with which services are to be provided;
- c. must give end users proper information regarding the costs that their consumption imposes on the licensee's business;
- d. must avoid undue discrimination between customer categories; and
- e. may permit the cross-subsidy of tariffs to certain categories of customers.

Principles obtained from the Municipal Systems Act are as follows:

- a. Users of municipal services should be treated equitably in the application of tariffs.
- b. The amount individual users pay for services should generally be in proportion to their use of that service.
- c. Low income households must have access to at least basic services through:
  - tariffs that cover only operating and maintenance costs;
  - special tariffs or life line tariffs for low levels of use or consumption of services or for basic levels of service; or
  - any other direct or indirect method of subsidisation of tariffs for low income households.
- d. Tariffs must reasonable reflect the costs associated with rendering the service, including capital, operating, maintenance, administration and replacement costs, and interest charges.
- e. Tariffs must be set at levels that facilitate the financial sustainability of the service, taking into account subsidisation from sources other than the service concerned.
- f. Provision may be made for the promotion of local economic development through special tariffs for categories of commercial and industrial users.
- g. The economical, efficient and effective use of resources, the recycling of waste and other appropriate environmental objectives must be encouraged.
- h. The extent of subsidisation of tariffs for low income households and other categories of users should be fully disclosed.
- i. A tariff policy may differentiate between different categories of users, debtors, service providers, services, service standards, geographical areas and other matters as long as such differentiation does not amount to unfair discrimination.

## 13.2. Pricing policy.

In view of the findings to date, the summarised pricing policy is provided below:

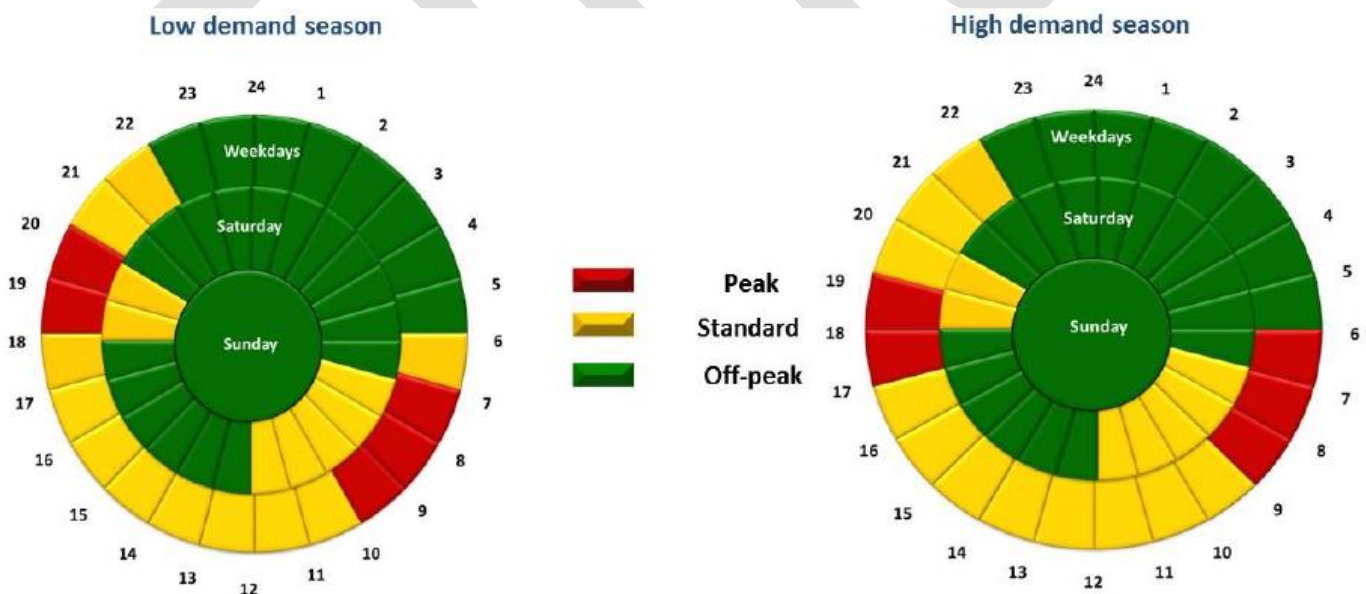
- It should be in line with the National Electricity Pricing Policy.
- All tariffs should be set as close as possible to the cost of supply.
- Indigent customers as registered in terms of indigent policy.
  - These customers limited to 20 Amps with no fixed charges.
  - The current IBT energy rates be retained.
  - Free Basic Electricity (FBE) of 50 kWh/m off-set by equitable share.
  - The cost of FBE be based on the second block price, thus first block removed????
- Cross subsidisation of low usage domestic customers (poor but not indigent) customers should be done as follows:

- Customers limited to 20 Amps with no fixed charges.
- The current IBT energy rates be retained but first block price be set equal to the second block???
- No FBE is granted.
- All small customers (domestic / business) > 20 Amp should have a fully cost reflective tariff:
  - A basic charge to reflect the fixed metering, billing, revenue collection and customer services costs.
  - A capacity charge based on the installed / limited capacity of the customer. In other words, the total network costs as calculated for that tariff before (using the relevant demand allocation method), is now divided by the customers' actual capacity.
  - An energy charge that covers the full energy cost, losses and surplus mark-up.
- All large customers should be charged on a TOU tariff with structure and TOU slots as per the Eskom Megaflex tariff applicable to Ndlambe including changes over time:
  - Basic charge.
  - Capacity charge based on the highest of the following:
    - Notified demand or highest **annual** maximum demand to cover Eskom Access charge plus dedicated municipal network costs.
  - Maximum demand charge based on **monthly** highest maximum during Peak and Standard Periods only.
  - Energy charges for:
    - High Demand (June, July and August) and Low demand (all other months)
    - Peak, Standard and Off-peak (See diagram below)
  - Reactive energy charge based on kvarh in excess of 30% of kWh during all peak and Standard period for both seasons.
  - Public holidays treated as the day they fall on.
  - The tariffs should be different small consumers (<100 kVA), LV and MV.

This means that each customer will pay an average price depending on its own TOU ratio's and load factor. This is the same as applied by Eskom on its TOU tariffs.

TOU periods are as shown in Figure 16.

Figure 16



- Co-generation charges. (SSEG-tariff)
  - The standard Access / Capacity charges remain.
  - Energy purchased by the customer be charged at the relevant standard tariff charges.
  - An additional basic charge be levied to cover the additional metering / billing costs.
  - The energy purchased from the customer be credited on TOU period based on 90% of Eskom TOU energy rates (excluding non-TOU energy charges such as levies). The municipality proposes to reduce this to 50% despite the fact that the current rate is very close to 80%)

### 13.3. Cross subsidies to the poor.

In view of the proposed pricing policy, it is further proposed that the tariffs for Indigents and 20 Amp customers are not increased structurally. The extent of the cross subsidy in this case is then calculated.

The results of these calculations are shown in Table 58 existing and Table 58 proposed.

**Table 58**

<b>SUBSIDY ANALYSIS</b>							
Tariffs to be subsidised	Customers	Tot Cost	Current revenue	Shortfall	Equitable share	Subsidy	% subsidy
Domestic Indigent PP	1 150	7 408 612	3 262 842	4 145 770	3 137 701	1 008 069	14%
Domestic Indigent Conv	95	118 685	29 104	89 581		89 581	75%
Domestic 20 Amp PP: don't pay basics 900	1 172	8 431 104	5 095 997	3 335 107		3 335 107	40%
<b>TOTAL</b>		<b>15 958 401</b>	<b>8 387 943</b>	<b>7 570 458</b>	<b>3 137 701</b>	<b>4 432 757</b>	<b>28%</b>
Total revenue excluding subsidy customers		93 060 186					
Total subsidy as % of Base revenue						<b>4.76%</b>	

This subsidy % is of non-subsidised revenue. The question thus is what the charge for the indigent customers should be.

**Table 59**

<b>SUBSIDY ANALYSIS: NEW</b>							
Tariffs to be subsidised	Customers	Tot Cost	New revenue	Shortfall	Equitable share	Subsidy	
Domestic Indigent PP	1 150	7 408 612	2 732 445	4 676 167	4 769 659	-93 493	-1%
Domestic Indigent Conv	95	118 685	25 192	93 493		93 493	79%
Domestic 20 Amp PP: don't pay basics	1 172	8 431 104	4 772 311	3 658 793		3 658 793	43%
<b>TOTAL</b>	<b>0</b>	<b>15 958 401</b>	<b>7 529 949</b>	<b>8 428 453</b>	<b>4 769 659</b>	<b>3 658 793</b>	<b>23%</b>
	0	0	0	0	0		
Total revenue excluding subsidy custom	0	88 393 534	-	-	0		
Total subsidy as % of Base revenue						<b>3.93%</b>	

**Table 60** shows the calculation of the marginal Eskom purchase costs. The marginal costs do not refer to the average Eskom purchase price but the price of the domestic customers on its own. In other words, the impact that domestic customers have on increasing the access charge, maximum demand charge, energy charges during the various periods and the reactive energy charges.

**Table 60**

DOMESTIC ENERGY /MARGINAL ESKOM COST ANALYSIS													
Eskom			2023/2024										
'Transmission network charges [R/kVA/m]			R/kVA/m			14.72							
Distribution network charges													
'Network capacity charge			R/kVA/m			28.65							
'Network demand charge			R/kVA/m			54.31							
'Urban low voltage subsidy charge [R/kVA]			R/kVA/m			-							
Energy charges													
				Ancillary service charge [c/kWh]		Electrification and rural network subsidy charge [c/kWh]		Total					
'High demand season [Jun		Peak		R/kWh		570.45		0.71		13.90		585.06	
		Standard		R/kWh		172.79		0.71		13.90		187.40	
		Off Peak		R/kWh		93.85		0.71		13.90		108.46	
'Low demand season [Sep - May]													
		Peak		R/kWh		186.06		0.71		13.90		200.67	
		Standard		R/kWh		128.06		0.71		13.90		142.67	
		Off Peak		R/kWh		81.21		0.71		13.90		95.82	
Domestic characteristics													
DATA PER													
BILLING CYCLE													
MONTH													
Domestic													
Dom Poor													
Vending c/kWh													
EFFECTIVE R/KWH													
c/KWH													
Eskom charges													
Domestic													
Dom Poor													
		HIGH SEASON		LOW SEASON		Monthly LF		Annual LF		Reactive Energy		Losses	
		P		S		O		P		S		O	
		kWh (FOR)		kWh (FOR)		kWh (FOR)		kWh (FOR)		kWh (FOR)		kWh (FOR)	
		5%		15%		18%		9%		23%		30%	
		11%		7%		%		%		%		%	
		5%		15%		18%		9%		23%		30%	
		11%		7%		%		%		%		%	
		Transmission network charges [R/kVA/m]		Distribution network charges		Network capacity charge		Network demand charge		Urban low voltage subsidy charge [R/kVA/m]		Energy charges	
		Peak		Standard		Off Peak		Peak		Standard		Off Peak	
		R/kVA/m		R/kVA/m		R/kVA/m		R/kVA/m		R/kVA/m		R/kVA/m	
		14.72		28.65		54.31		0		585.06		187.40	
		33.022		38.545		73.067		-		34.16		29.95	
		33.022		38.545		73.067		-		34.16		29.95	
		108.46		200.67		142.67		95.82		25.11			
		18.92		36.71		31.13		-		172.87		317.50	
		22.01		18.92		36.71		31.13		-		172.87	
		22.01		18.92		36.71		31.13		-		172.87	

The following in this respect:

- The Megaflex charges are those applicable to Ndlambe municipality.
- The TOU consumption ratios and load factors were calculated from the representative load profiles.
- The monthly vending costs is the total vending cost divided by the number of customers divided by 12. This is then converted to a c/kWh for each domestic tariff category.
- This shows that the marginal cost of Eskom purchases for Indigent customers is 166 c/kWh in 2023/2024 values.
- In time this can be reviewed depending on the subsidy on non-subsidised customers.

The equitable share is calculated as shown in

**Table 61** and compared with the actual amount applied. It shows that the current equitable share covers more than the revenue foregone. It is thus proposed that the equitable share for FBE be calculated at the second block price not the first block.

Final

**Table 61**

EQUITABLE SHARE VALUE CALCULATION							
TARIFF	CUSTOMERS	FBE KWH	BASIC CHARGE SUBSIDY	ENERGY CHARGE	TOTAL BASIC SUBSIY	TOTAL UNITS SUBSIDY	TOTAL FBE SUBSIDY
Domestic Indigent PP	1 150.00	716 081.69	346.91	1.56	4 787 377.32	1 114 581.14	5 901 958.46
Domestic Indigent Conv	95.00	6 387.42	346.91	1.56	395 479.00	9 942.02	405 421.02
<b>GRAND TOTAL</b>	<b>1 245.00</b>	<b>722 469.11</b>	<b>693.82</b>	<b>3.11</b>	<b>5 182 856.32</b>	<b>1 124 523.17</b>	<b>6 307 379.48</b>
<b>PROPOSED</b>							
Domestic 20 Amp PP: don't pay basics 900	1 150.00	716 081.69	391.65	2.00	5 404 729.76	1 432 951.06	6 837 680.82
Domestic 20 Amp Conv	95.00	6 387.42	391.65	2.00	446 477.68	12 781.87	459 259.55
<b>GRAND TOTAL</b>	<b>3 735.00</b>	<b>2 167 407.33</b>			<b>16 216 920.06</b>	<b>3 694 779.27</b>	<b>7 296 940.36</b>
						<b>Trail Balance</b>	<b>3 137 701.36</b>

**14. PROPOSED TARIFFS**

In view of the proposed pricing policy the following tariffs are proposed for Ndlambe as shown below:

**Table 62**

Table 632. It shows the following:

- The current tariffs,
- The current costs escalated to 2023/2024.

**Table 633.** It shows the following:

- The current tariff
- The proposed rates before annual price increase and phase in.



A slight adjustment is made to achieve the revenue target as shown in green in **Table 64**.

**Table 64**

Basic adjust.	Access /Demand adjust.	Energy adjust.	Subsidy adjust.
-3.25%	-3.25%	0.00%	3.93%

The following should be noted:

- The basic. Capacity and energy charges will be the same for all domestic consumers as proposed by the municipality. Although the cost of supply study indicates differences between indigent, low usage and high consumers.
- The basic charges for single and three phase consumers will not differ.

**15. FINANCIAL IMPACT**

The tariffs have been developed in a way that will ensure revenue neutrality from a tariff structure point of view:

- Provision has been made for customers to reduce their circuit breaker capacity thereby building in a small safety margin.
- With the application of cost reflective basic and amp charges, the net revenue loss when customers install renewable energy will be minimised.
- Some savings opportunity is opened by buying surplus renewable energy from customers at a price below that of Eskom power.
- With the more aggressive capacity charges, customers will be more inclined to reduce their peak capacity rather than energy thereby reducing Ndlambe’s Eskom and own network costs without sacrificing much municipal revenue thereby increasing profitability.

The proposed tariffs thus hold very little risk but real opportunities.

**16. TARIFF IMPACT**

Table 655 below show the overall impact on customers on each tariff on average. This is for the tariffs before phase in (in other words the whole impact). The impact of each would be about a third of this if phased in over 3 years.

- All Indigents get Basic and capacity charge and 50 kWh/m for free.
- All other poor consumers willing to accept 20 Amps get the Basic for free.
- These discounts are to be recovered via the equitable share. The impact is similar to the current equitable share amount.

**Table 65**

NDLAMBE						
CALCULATED REVENUE		2022/2023 Proposed	2022/2023 Reference	Difference	Structure change	Initial cost reflectiveness
Nr	TARIFF NAME	R/year	0.00%	Rand	%	
1	Domestic Indigent PP	2 732 445	3 262 842	-530 396	-16.26%	-127.1%
1	Domestic Indigent Conv	25 192	29 104	-3 912	-13.44%	-307.8%
1	Domestic 20 Amp PP: don't pay basics 900	4 772 311	5 095 997	-323 686	-6.35%	-65.4%
1	Domestic 20 Amp Conv	9 288 092	10 282 310	-994 218	-9.67%	20.1%
1	Domestic > 20 Amp PP	11 908 209	13 381 353	-1 473 145	-11.01%	0.9%
1	Domestic > 20 Amp Conv	16 345 786	18 368 715	-2 022 929	-11.01%	2.9%
1	Commercial PP	6 401 334	7 609 400	-1 208 065	-15.88%	21.6%
1	Commercial Conv	13 431 042	15 668 376	-2 237 334	-14.28%	11.4%
1	Bulk TOU LV	17 278 784	14 298 519	2 980 265	20.84%	-20.1%
1	Bulk TOUMV	10 818 886	8 784 860	2 034 026	23.15%	-21.1%
1	Streetlight	9 081 345	-	9 081 345	#DIV/0!	#DIV/0!
1	Availability	4 890 078	4 666 652	223 426	4.79%	-4.2%
1	Municipal	2 420 202	-	2 420 202	#DIV/0!	#DIV/0!
<b>1</b>	<b>Total.</b>	<b>109 393 706</b>	<b>101 448 129</b>	<b>7 945 577</b>	<b>7.83%</b>	

The income foregone is deducted as the full cost calculations include such amount as shown in **Table 666** below.

**Table 66**

TARGET REVENUE	2023/2024
Previously calculated revenue: not adjusted	102 501 303
FBE	(7 303 742)
Additional internal	5 282 581
Additional Streetlight	8 913 564
<b>Total</b>	<b>109 393 706</b>

The following impacts will be experienced over the phase in period using the second option.

- Indigent customers will be limited to 20 Amp only.
- Domestic 20 Amp lifeline consumers will pay more for the first block.
- The general trend for other tariffs is as follows:
  - The category will move closer to cost reflective but still retaining the cross subsidy.

The impact for each customer will however be different. It will depend on the utilisation of the capacity provided to customers and the extent to which electricity is used in the peak times:

- The following customers will generally see increased bills:
  - Those that are not utilising their capacity and are not willing to reduce / manage their capacity, due to the Capacity/Access charges.
  - Customers who need large capacity only for a few months in the year.
  - TOU customers who use a lot of electricity during the expensive Winter Peak times and are not willing / able to shift load out of these periods.

If these tariffs are phased in over 3 years, customers will have time to adapt to the new rates and thus manage their bills. The impacts shown in the table above will thus be 1/3 for each of the 3 years.

**17. CUSTOMER IMPACT**

The detailed impact on domestic customers have been further analysed and is illustrated. **Table 677** shows the revenue on existing and proposed tariffs, then the Rand impact of the % change. It also shows the number of consumers on each tariff and the average consumption and selected capacity of these.

Table 67

DOMESTIC TARIFF IMPACT:													
RESTRUCTURED WITHOUT PRICE INCREASE AND PHASE IN													
Existing Tariff 2023/2024	Capacity Amps	Basic	Capacity	Energy		Block 1	Block 2	Block 3	Block 4	Block 4	Rest rate	Lost revenue	
		Per month R/m	Per A (installed) R/A/m	Block 1 rate c/kWh	Block 1 size kWh/m	Block 2 rate c/kWh	Block 2 size kWh/m	Block 3 rate c/kWh	Block 3 size kWh/m	Block 4 rate c/kWh			Block 4 size kWh/m
Domestic Indigent	20	0.000	0.000	0.000	50.00	2.001	350.00	2.817	600	3.303	100000		
Domestic 20 Amp PP: don	20	0.000	0.000	1.557	50.00	2.001	350.00	2.817	600	3.303	100000		
Domestic > 20 Amp	20	346.911	0.000	1.557	50.00	2.001	350.00	2.817	600	3.303	100000		
<b>Proposed</b>													
Domestic Indigent	20			0.000	50.00	2.001	350.00	2.817	600	3.303	100000		
Res 1 ph = 20 Amps	20			2.001	50.00	2.001	350.00	2.817	600	3.303	100000		
Res 1 ph > 20 Amps	30	57.83	13.24	1.943	100000.00								
Res 1 ph > 20 Amps	40	57.83	13.24	1.943	100000.00								
Res 1 ph > 20 Amps	50	57.83	13.24	1.943	100000.00								
Res 1 ph > 20 Amps	60	57.83	13.24	1.943	100000.00								
Res 1 ph > 20 Amps	120	57.83	13.24	1.943	100000.00								
												new	new
<b>IMPACT: TOTAL IMPACT EXCLUDING PRICE INCREASE</b>		kWh/m		100									
Amps	<b>Exis</b>	0	50	100	200	300	400	500	600	700	800	900	1000
	Exis-Domestic Indigent	0	0	100	300	500	741	1 023	1 304	1 635	1 965	2 295	2 626
	Exis-Domestic 20 Amp PP: don't pay basics 900	0	78	178	378	578	819	1 101	1 382	1 713	2 043	2 373	2 703
	Exis-Domestic > 20 Amp	347	425	525	725	925	1 166	1 448	1 729	2 059	2 390	2 720	3 050
	to												
Amps	<b>Prop</b>	0	50	100	200	300	400	500	600	700	800	900	1 000
	Prop-Domestic Indigent20	0	0	100	300	500	741	1 023	1 304	1 635	1 965	2 295	2 626
	Prop-Res 1 ph = 20 Amps20	0	100	200	400	600	841	1 123	1 405	1 735	2 065	2 395	2 726
	Prop-Res 1 ph > 20 Amps30	455	552	649	844	1 038	1 232	1 427	1 621	1 815	2 010	2 204	2 398
	Prop-Res 1 ph > 20 Amps40	588	685	782	976	1 171	1 365	1 559	1 754	1 948	2 142	2 337	2 531
	Prop-Res 1 ph > 20 Amps50	720	817	914	1 109	1 303	1 497	1 692	1 886	2 080	2 275	2 469	2 663
	Prop-Res 1 ph > 20 Amps60	852	950	1 047	1 241	1 435	1 630	1 824	2 018	2 213	2 407	2 601	2 796
	Prop-Res 1 ph > 20 Amps120	1 647	1 744	1 841	2 036	2 230	2 424	2 619	2 813	3 007	3 202	3 396	3 590
Amps	<b>CHANGE IN REVENUE</b>												
20.00	Prop-Domestic Indigent20 to Prop-Domestic Indigen	0	0	0	0	0	0	0	0	0	0	0	0
20.00	Domestic 20 Amp PP: don't pay basics 900 to Prop-	0	22	22	22	22	22	22	22	22	22	22	22
30.00	Domestic 20 Amp PP: don't pay basics 900 to Prop-	455	474	472	466	460	413	326	239	103	-33	-169	-305
40.00	Domestic 20 Amp PP: don't pay basics 900 to Prop-	588	607	604	598	592	546	459	371	235	99	-37	-172
50.00	Domestic 20 Amp PP: don't pay basics 900 to Prop-	720	739	736	731	725	678	591	504	368	232	96	-40
20.00	Domestic > 20 Amp to Prop-Res 1 ph > 20 Amps30	108	128	125	119	113	67	-21	-108	-244	-380	-516	-652
30.00	Domestic > 20 Amp to Prop-Res 1 ph > 20 Amps40	241	260	257	251	246	199	112	24	-112	-247	-383	-519
40.00	Domestic > 20 Amp to Prop-Res 1 ph > 20 Amps50	373	392	390	384	378	331	244	157	21	-115	-251	-387
50.00	Domestic > 20 Amp to Prop-Res 1 ph > 20 Amps60	506	525	522	516	510	464	377	289	153	17	-119	-255
120.00	Domestic > 20 Amp to Prop-Res 1 ph > 20 Amps120	1 300	1 319	1 317	1 311	1 305	1 258	1 171	1 084	948	812	676	540
Amps	<b>CHANGE %</b>	0	50	100	200	300	400	500	600	700	800	900	1 000
20.00	Prop-Domestic Indigent20 to Prop-Domestic Indigen	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
20.00	Domestic 20 Amp PP: don't pay basics 900 to Prop-	0.0%	28.6%	12.5%	5.9%	3.8%	2.7%	2.0%	1.6%	1.3%	1.1%	0.9%	0.8%
30.00	Domestic 20 Amp PP: don't pay basics 900 to Prop-	0.0%	609.7%	265.1%	123.2%	79.6%	50.5%	29.6%	17.3%	6.0%	-1.6%	-7.1%	-11.3%
40.00	Domestic 20 Amp PP: don't pay basics 900 to Prop-	0.0%	779.8%	339.6%	158.3%	102.5%	66.7%	41.7%	26.9%	13.7%	4.9%	-1.5%	-6.4%
50.00	Domestic 20 Amp PP: don't pay basics 900 to Prop-	0.0%	950.0%	414.0%	193.3%	125.4%	82.8%	53.7%	36.4%	21.5%	11.3%	4.0%	-1.5%
20.00	Domestic > 20 Amp to Prop-Res 1 ph > 20 Amps30	31.2%	30.0%	23.8%	16.4%	12.2%	5.7%	-1.4%	-6.2%	-11.8%	-15.9%	-19.0%	-21.4%
30.00	Domestic > 20 Amp to Prop-Res 1 ph > 20 Amps40	69.4%	61.2%	49.0%	34.7%	26.5%	17.1%	7.7%	1.4%	-5.4%	-10.4%	-14.1%	-17.0%
40.00	Domestic > 20 Amp to Prop-Res 1 ph > 20 Amps50	107.5%	92.4%	74.2%	52.9%	40.9%	28.4%	16.9%	9.1%	1.0%	-4.8%	-9.2%	-12.7%
50.00	Domestic > 20 Amp to Prop-Res 1 ph > 20 Amps60	145.7%	123.6%	99.5%	71.2%	55.2%	39.8%	26.0%	16.7%	7.4%	0.7%	-4.4%	-8.3%
120.00	Domestic > 20 Amp to Prop-Res 1 ph > 20 Amps120	374.8%	310.6%	250.9%	180.8%	141.1%	107.9%	80.9%	62.7%	46.0%	34.0%	24.9%	17.7%

The average percentages only represent the average. The case will be different for each customer. It will depend largely on how effective customers utilise their capacity. In other words, customers with large capacity and low consumption will see higher increases and those with low capacity and high consumption will see lower increases. This clearly shows that only customers that are not willing to reduce / manage their capacity or have irregular usage over the months in the year will pay significantly more. If these tariffs are phased in over 3 years customers will have time to adapt to the new rates and thus manage their bills.

The impact on Business consumers is illustrated here. Table 688 below show the existing and proposed tariffs.

Table 68

Commercial															
RESTRUCTURED WITHOUT PRICE INCREASE AND															
Existing Tariff	Capacity	Basic	Capacity	Energy											
2023/2024	Amps	Per month	Per A	R/kWh	Block 1 size										
		R/m	(installed)	c/kWh	kWh/m										
			R/A/m												
Commercial		622.081	0.000	2.758	100000.00										
<b>Proposed</b>															
Commercial 20	20	67.53	19.47	1.94	100000.00										
Commercial 30	30	67.53	19.47	1.94	100000.00										
Commercial 40	40	67.53	19.47	1.94	100000.00										
Commercial 50	50	67.53	19.47	1.94	100000.00										
Commercial 80	80	67.53	19.47	1.94	100000.00										
Commercial 90	90	67.53	19.47	1.94	100000.00										
Commercial 120	120	67.53	19.47	1.94	100000.00										
Commercial 150	150	67.53	19.47	1.94	100000.00										
Commercial 180	180	67.53	19.47	1.94	100000.00										
Commercial 210	210	67.53	19.47	1.94	100000.00										
Commercial 240	240	67.53	19.47	1.94	100000.00										
<b>IMPACT: TOTAL IMPACT EXCLUDING PRICE INCRE</b>															
<b>Amperage</b>															
		<b>EXISTING REVENUE</b>			<b>0</b>	<b>200</b>	<b>400</b>	<b>600</b>	<b>800</b>	<b>1000</b>	<b>1200</b>	<b>1400</b>	<b>1600</b>	<b>1800</b>	<b>2000</b>
60	Commercial	622	1 174	1 725	2 277	2 828	3 380	3 931	4 483	5 035	5 586	6 138			
to															
		<b>PROPOSED REVENUE</b>													
20	Commercial 20	457	845	1 233	1 622	2 010	2 398	2 786	3 174	3 563	3 951	4 339			
30	Commercial 30	652	1 040	1 428	1 816	2 205	2 593	2 981	3 369	3 757	4 146	4 534			
40	Commercial 40	846	1 235	1 623	2 011	2 399	2 787	3 176	3 564	3 952	4 340	4 729			
60	Commercial 50	1 236	1 624	2 012	2 401	2 789	3 177	3 565	3 953	4 342	4 730	5 118			
80	Commercial 80	1 625	2 014	2 402	2 790	3 178	3 566	3 955	4 343	4 731	5 119	5 507			
90	Commercial 90	1 820	2 208	2 596	2 985	3 373	3 761	4 149	4 538	4 926	5 314	5 702			
120	Commercial 120	2 404	2 792	3 181	3 569	3 957	4 345	4 734	5 122	5 510	5 898	6 286			
150	Commercial 150	2 988	3 377	3 765	4 153	4 541	4 929	5 318	5 706	6 094	6 482	6 871			
180	Commercial 180	3 573	3 961	4 349	4 737	5 125	5 514	5 902	6 290	6 678	7 067	7 455			
210	Commercial 210	4 157	4 545	4 933	5 321	5 710	6 098	6 486	6 874	7 262	7 651	8 039			
240	Commercial 240	4 741	5 129	5 517	5 906	6 294	6 682	7 070	7 458	7 847	8 235	8 623			
//															
		<b>CHANGE IN REVENUE</b>													
20.00	Commercial to Commercial 20	-165	-328	-492	-655	-818	-982	-1 145	-1 309	-1 472	-1 635	-1 799			
30.00	Commercial to Commercial 30	30	-134	-297	-460	-624	-787	-950	-1 114	-1 277	-1 441	-1 604			
40.00	Commercial to Commercial 40	224	61	-102	-266	-429	-592	-756	-919	-1 082	-1 246	-1 409			
60.00	Commercial to Commercial 50	614	450	287	124	-40	-203	-366	-530	-693	-856	-1 020			
80.00	Commercial to Commercial 80	1 003	840	677	513	350	187	23	-140	-304	-467	-630			
90.00	Commercial to Commercial 90	1 198	1 035	871	708	545	381	218	55	-109	-272	-435			
120.00	Commercial to Commercial 120	1 782	1 619	1 455	1 292	1 129	965	802	639	475	312	149			
150.00	Commercial to Commercial 150	2 366	2 203	2 040	1 876	1 713	1 550	1 386	1 223	1 060	896	733			
180.00	Commercial to Commercial 180	2 951	2 787	2 624	2 460	2 297	2 134	1 970	1 807	1 644	1 480	1 317			
210.00	Commercial to Commercial 210	3 535	3 371	3 208	3 045	2 881	2 718	2 555	2 391	2 228	2 065	1 901			
240.00	Commercial to Commercial 240	4 119	3 956	3 792	3 629	3 466	3 302	3 139	2 975	2 812	2 649	2 485			
		<b>CHANGE %</b>			<b>0</b>	<b>200</b>	<b>400</b>	<b>600</b>	<b>800</b>	<b>1 000</b>	<b>1 200</b>	<b>1 400</b>	<b>1 600</b>	<b>1 800</b>	<b>2 000</b>
20.00	Commercial to Commercial 20	-26.5%	-28.0%	-28.5%	-28.8%	-28.9%	-29.0%	-29.1%	-29.2%	-29.2%	-29.3%	-29.3%			
30.00	Commercial to Commercial 30	4.8%	-11.4%	-17.2%	-20.2%	-22.1%	-23.3%	-24.2%	-24.8%	-25.4%	-25.8%	-26.1%			
40.00	Commercial to Commercial 40	36.1%	5.2%	-5.9%	-11.7%	-15.2%	-17.5%	-19.2%	-20.5%	-21.5%	-22.3%	-23.0%			
60.00	Commercial to Commercial 50	98.7%	38.4%	16.6%	5.4%	-1.4%	-6.0%	-9.3%	-11.8%	-13.8%	-15.3%	-16.6%			
80.00	Commercial to Commercial 80	161.3%	71.6%	39.2%	22.5%	12.4%	5.5%	0.6%	-3.1%	-6.0%	-8.4%	-10.3%			
90.00	Commercial to Commercial 90	192.6%	88.2%	50.5%	31.1%	19.3%	11.3%	5.5%	1.2%	-2.2%	-4.9%	-7.1%			
120.00	Commercial to Commercial 120	286.5%	137.9%	84.4%	56.8%	39.9%	28.6%	20.4%	14.2%	9.4%	5.6%	2.4%			
150.00	Commercial to Commercial 150	380.4%	187.7%	118.2%	82.4%	60.6%	45.8%	35.3%	27.3%	21.0%	16.0%	11.9%			
180.00	Commercial to Commercial 180	474.3%	237.5%	152.1%	108.1%	81.2%	63.1%	50.1%	40.3%	32.6%	26.5%	21.5%			
210.00	Commercial to Commercial 210	568.2%	287.3%	186.0%	133.7%	101.9%	80.4%	65.0%	53.3%	44.3%	37.0%	31.0%			
240.00	Commercial to Commercial 240	662.1%	337.0%	219.8%	159.4%	122.5%	97.7%	79.8%	66.4%	55.9%	47.4%	40.5%			

It is believed that if phased in over 3 years this impact should be acceptable and the results should be very good for the municipality.

**18. BULK TOU TARIFFS**

TOU tariffs must continue to be applied to Bulk consumers and even be applied to small customers. This is because:

- It offers opportunities for customers to shift load thereby reducing their own costs without any detrimental financial impact on the municipality.

- It offers savings to the municipality when the system peaks are reduced due to customer load shifting.
- Municipal own purchase costs can be reduced when the tariff is applied to internal consumption points such as sewerage works.
- This is a requirement in terms of the EPP.

The Cost of Supply study follows an approach of applying % surcharges to achieve the required revenue. When this is applied to the TOU energy rates, the tariffs are seriously distorted. This is because the same % surcharge on the more expensive Peak energy charges cause a very high c/kWh mark-up compared with that on the cheaper off-peak period. This means that when customers shift load from the Peak to Standard or Off-peak, the loss in revenue far exceeds the savings in Eskom purchase costs.

The tariffs are then redesigned by applying the same c/kWh on all energy rates but to still achieve the same revenue as shown in Table 699. It also shows the load shifting impact of the initial tariffs. Under the proposed tariffs the load shift impact is zero as the mark-up in the different periods are the same and thus no net revenue (change in revenue minus charge in purchase cost) is lost.

**Table 69**

TOU TARIFF REDESIGN				HIGH SEASON CHARGES			LOW SEASON CHARGES			Reactive energy kvarh	Total
	Access R/kVA	MD (all hours) R/kVA	Energy Peak kWh	Energy Standard kWh	Energy Off-Peak kWh	Energy Peak kWh	Energy Standard kWh	Energy Off-Peak kWh			
<b>ESKOM MEGAFLEX</b>											
Megaflex at MV	2023/2024	43.37	82.96	5.851	1.874	1.085	2.007	1.427	0.958	0.2511	
With escalation	2023/2024	43.37	82.96	5.851	1.874	1.085	2.007	1.427	0.958	0.251	
<b>Customer service Customers</b>											
	Access kVA	MD (all hours) kVA	Energy Peak kWh	Energy Standard kWh	Energy Off-Peak kWh	Energy Peak kWh	Energy Standard kWh	Energy Off-Peak kWh	Reactive energy kvarh	Total Rand	
<b>Bulk TOU at LV</b>	Markup	0.2981									
Consumption	13	1.483	17 291	208 110	475 923	540 389	630 781	1 287 079	1 707 206	104 719	
Initial tariff	385	116	137	6.9864	2.2378	1.2952	2.3963	1.7037	1.1442	0.2739	
R/kWh markup				1.1358	0.3638	0.2106	0.3896	0.2770	0.1860	0.0228	
% Markup				19.4%	19.4%	19.4%	19.4%	19.4%	19.4%	9.1%	
Revenue: Initial Tariff	60 074	2 072 517	2 375 984	1 453 934	1 065 021	699 887	1 511 517	2 192 754	1 953 413	28 683	13 413 784
New tariff	385.09	116.43	137.41	6.149	2.172	1.383	2.305	1.725	1.256	0.251	-
Revenue: New tariff	60 074	2 072 517	2 375 984	1 279 597	1 033 734	747 175	1 453 801	2 219 907	2 144 700	26 295	13 413 784
R/kWh markup				0.298	0.298	0.298	0.298	0.298	0.298		
% Markup				5.09%	15.91%	27.48%	14.85%	20.89%	31.11%		
<b>Load shift impact initial tariff:</b>											
				Savings in Eskom cost	Lost revenue	Net impact	Savings in Eskom cost	Lost revenue	Net impact		
				Peak to Standard	3.98	4.75	0.77	0.58	0.69	0.11	
				Peak to Off-Peak	4.77	5.69	0.93	1.05	1.25	0.20	
				Standard to Off-peak	0.79	0.94	0.15	0.47	0.56	0.09	
<b>Bulk TOU at MV</b>											
Consumption	6	0.2808	13 094	179 847	409 847	619 514	355 064	755 735	1 239 824	3 559 829	129.6890872
Initial tariff	788.44	79.19	95.55	6.8329	2.1886	1.2667	2.3436	1.6662	1.1191	0.2739	
R/kWh markup				0.9823	0.3146	0.1821	0.3369	0.2395	0.1609	0.0228	
% Markup				16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	9.1%	
Revenue: Initial Tariff	56 767	1 045 320	1 251 088	1 228 871	897 004	784 736	832 132	1 259 231	1 387 456	975 045	9 717 651
New tariff	788.44	79.19	95.55	6.131	2.155	1.365	2.288	1.708	1.239	0.251	-
Revenue: New Tariff	56 767	1 045 320	1 251 088	1 102 717	883 149	845 902	812 219	1 290 439	1 536 177	893 873	9 717 651
R/kWh markup				0.281	0.281	0.281	0.281	0.281	0.281	-	
% Markup				4.80%	14.99%	25.89%	13.99%	19.68%	29.31%	0.00%	
<b>Load shift impact initial tariff:</b>											
				Savings in Eskom cost	Lost revenue	Net impact	Savings in Eskom cost	Lost revenue	Net impact		
				Peak to Standard	3.98	4.64	0.67	0.58	0.68	0.10	
				Peak to Off-Peak	4.77	5.57	0.80	1.05	1.22	0.18	
				Standard to Off-peak	0.79	0.92	0.13	0.47	0.55	0.08	

The following is important to note from this change to TOU tariffs:

- The basic, capacity and demand charges remain the same.
- The energy charges are set with the same c/kWh markup on each Eskom TOU energy charge.
- The revenue from each TOU tariff remains the same (difference in yellow)
- This is done by adjusting the c/kWh markup (in green).

**18.1. Bulk TOU tariff impact study**

Although the cost of supply study proposes tariffs that are cost reflective with subsidies for the poor it is important to get an idea of the impact on individual customers. Normally individual impact studies are done for all Bulk customers. Not all load profile data available to the municipality was made available for analysis. There was also an argument that the load profile data may not be displayed with any customer names. The data that was made available was analysed to illustrate the individual customer impact.

The tariffs used for the analysis is shown in Table 7070. The existing maximum demand charges that are different for each TOU period has been recalculated to reflect one demand charge by using the relative demands of consumers in the different periods times the rate for each period.

Table 70

TOU TARIFFS FROM COS		Actual 2023/2024				Proposed 2023/2024			
All rates include surcharges.		BASIC	ACCESS	MAXIMUM	ENERGY	BASIC	ACCESS	MAXIMUM	ENERGY
SEGMENT		CHARGE	DEMAND	DEMAND	CHARGE	CHARGE	DEMAND	DEMAND	CHARGE
Tariff Name	Code	R/C/m	R/kVA/m	R/A/m	R/kWh	R/C/m	R/kVA/m	R/A/m	R/kWh
3.A. Low voltage consumers (Tariff cod:LLV)									
<b>TOU TARIFFS</b>		Basic	Access	Demand		Basic	Access	Demand	
		-							
LLV									
LV		1 413.86	-	207.82		369.54	111.73	131.86	
		9.8160	2.5915	2.0681		6.1374	2.1608	1.3714	0.2511
		2.8007	1.7276	1.2304	-	2.2935	1.7135	1.2450	
		1 277.04	-	169.54		788.44	79.19	95.55	
MV		8.0081	2.1142	1.6872		6.1204	2.1438	1.3544	0.2511
		2.2849	1.4094	1.0038		2.2765	1.6965	1.2280	

The ½ hourly load profile of all the profiles that were sent were analysed. The result of this analysis is illustrated in Table 71Table 71 for one customer.

Table 71

Grand Total		ENERGY			DEMAND					TOTAL	TOTAL				
		P	S	O	MD - KVA ALL	MD - KW ALL	MD P&S	MD highest	MD highest	ENERGY	P&S	KVA LOAD FACTOR	P	S	O
MONTH	Days	kWh (for)	kWh (for)	kWh (for)	kVA	kW	kVA	kVA	kW	kWh (for)	kvarh	%	kWh (for)	kWh (for)	kWh (for)
2022/07/31	31	100 550	229 378	297 674	2 547.37	2 547.37	2 547.37	3 069	2 124	627 601	172 224	28.01%	16.02%	36.55%	47.43%
2022/08/31	31	154 318	348 855	389 694	2 244.47	2 244.47	2 244.47	3 069	2 124	892 867	166 587	39.86%	17.28%	39.07%	43.65%
2022/09/30	30	100 508	209 423	277 087	2 858.50	2 858.50	2 858.50	3 069	2 124	587 018	161 967	26.20%	17.12%	35.68%	47.20%
2022/10/31	31	142 763	293 772	400 567	2 924.71	2 924.71	2 924.71	3 069	2 124	837 102	195 462	37.37%	17.05%	35.09%	47.85%
2022/11/30	30	140 237	264 308	347 419	2 589.10	2 589.10	2 589.10	3 069	2 124	751 963	197 138	33.57%	18.65%	35.15%	46.20%
2022/12/31	31	127 937	240 003	375 271	3 068.86	3 068.86	3 068.86	3 069	2 124	743 211	197 909	33.18%	17.21%	32.29%	50.49%
2023/01/31	31	107 209	224 746	324 065	2 635.62	2 635.62	2 635.62	3 069	2 124	656 021	202 717	29.28%	16.34%	34.26%	49.40%
2023/02/28	28	119 809	257 789	344 772	2 724.98	2 724.98	2 724.98	3 069	2 124	722 371	202 105	32.24%	16.59%	35.69%	47.73%
2023/03/31	31	97 451	197 115	284 431	2 405.62	2 405.62	2 405.62	3 069	2 124	578 997	173 713	25.84%	16.83%	34.04%	49.12%
2023/04/30	30	102 304	217 198	323 435	2 790.41	2 790.41	2 790.41	3 069	2 124	642 937	181 334	28.70%	15.91%	33.78%	50.31%
2023/05/31	31	105 721	214 883	335 694	2 891.18	2 891.18	2 891.18	3 069	2 124	656 298	157 746	29.30%	16.11%	32.74%	51.15%
2023/06/30	30	124 724	311 280	369 884	2 993.50	2 993.50	2 993.50	3 069	2 124	805 889	180 757	35.97%	15.48%	38.63%	45.90%
<b>TOTALS</b>		1 423 531	3 008 750	4 069 993	32 674.32	32 674.32	32 674.32	3 069	25 488	8 502 274	2 189 659	379.52%	16.74%	35.39%	47.87%

The calculation of the revenue for each of the tariff components for each month is shown in Table 722. This is done for each of the tariff options.

Table 72

Exm	New TOU	Admin Charge	Network access charge:	Network demand charge:	Peak c/kWh	Standard c/kWh	Off-peak c/kWh	Reactive energy (c/kvarh)	Total	c/kWh
31-Jul-22		369.54	23 188	8 372	20 613	20 051	15 962	2 145	90 701	374
31-Aug-22		369.54	23 188	8 460	27 879	26 409	17 689	2 559	106 554	359
30-Sep-22		369.54	23 188	8 724	9 443	15 956	15 715	2 316	75 711	291
31-Oct-22		369.54	23 188	9 209	9 738	15 774	16 578	2 293	77 150	288
30-Nov-22		369.54	23 188	9 638	11 301	16 829	17 223	2 621	81 170	284
31-Dec-22		369.54	23 188	9 705	9 372	13 699	14 927	2 054	73 315	305
31-Jan-23		369.54	23 188	9 540	8 509	14 785	16 442	2 120	74 954	293
28-Feb-23		369.54	23 188	9 730	8 762	14 640	14 474	2 060	73 225	305
31-Mar-23		369.54	23 188	9 696	8 422	13 473	15 931	2 129	73 209	301
30-Apr-23		369.54	23 188	9 580	8 002	13 449	16 113	2 062	72 763	300
31-May-23		369.54	23 188	8 601	7 737	12 337	15 831	1 990	70 055	301
30-Jun-23		369.54	23 188	8 208	22 938	22 015	17 181	2 158	96 059	363
<b>Total</b>		4 434	278 260	109 465	152 717	199 416	194 066	26 508	964 867	314

This is then done for all customers. The results are shown in Table 733. It shows the following impact for each customer. The table shows the impact for the consumers who's load profiles were provided. This represents about 25% of the total bulk sales. The names have been hidden for privacy.

- Old to New TOU

Negative (-) amounts shown reduction in bill and positive (+) amounts show increases.

Table 73

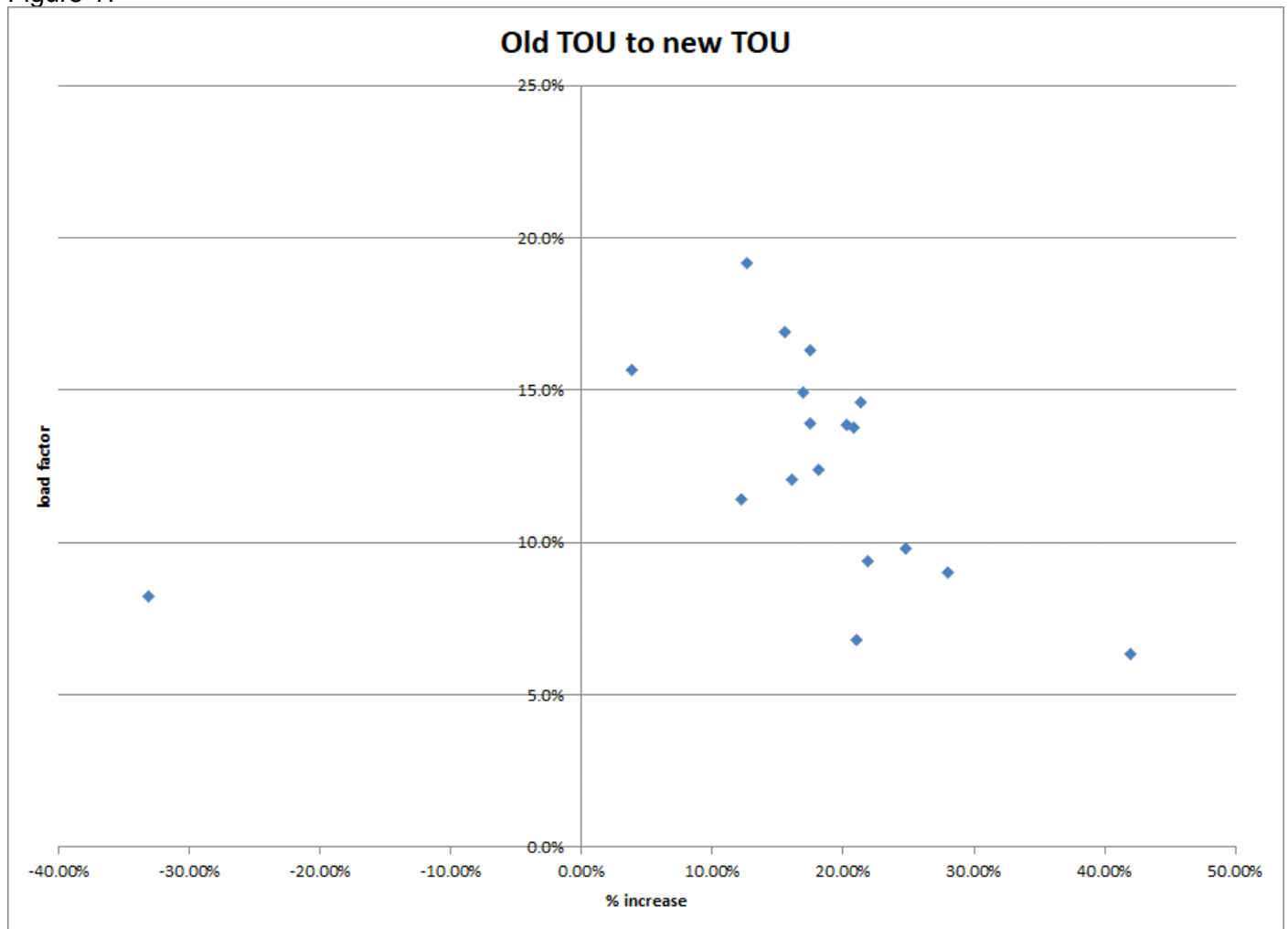
IMPACT SUMMARY								
Voltage	Old to New TOU		Annual	Monthly				
Voltage	Old to New TOU	Diff %	LF	LF	Energy cost	kWH	c/kWh	Highest M
LV	129 532	15.51%	16.9%	50.7%	546 199	307 292	177.75	208
MV	(507 460)	-33.16%	8.2%	24.7%	1 013 296	588 065	172.31	814
LV	78 174	16.03%	12.1%	36.2%	288 451	150 050	192.24	142
LV	16 458	21.04%	6.8%	20.4%	32 147	18 069	177.91	30
LV	906 580	20.84%	13.8%	41.3%	2 761 707	1 517 793	181.96	1 258
LV	236 509	16.98%	14.9%	44.7%	882 019	486 777	181.20	373
LV	124 758	21.35%	14.6%	43.8%	368 929	204 344	180.54	160
LV	428 672	17.45%	16.3%	49.0%	1 601 670	932 113	171.83	652
MV	695 767	41.96%	6.4%	19.1%	974 568	545 263	178.73	980
LV	101 323	12.62%	19.2%	57.6%	537 754	306 838	175.26	183
LV	25 516	12.18%	11.4%	34.3%	116 023	61 402	188.96	61
LV	629 653	28.03%	9.0%	27.0%	1 259 727	671 182	187.69	851
LV	689 003	18.09%	12.4%	37.2%	2 340 131	1 237 957	189.03	1 141
LV	347 196	20.25%	13.8%	41.5%	1 090 375	588 161	185.39	485
LV	279 445	17.46%	13.9%	41.8%	1 008 064	550 665	183.06	451
LV	151 020	24.74%	9.8%	29.4%	346 115	186 051	186.03	217
LV	4 637	3.83%	15.7%	47.0%	68 104	39 159	173.92	29
LV	87 911	21.90%	9.4%	28.1%	223 937	111 094	201.57	135
-	4 424 696	17.78%						

This shows a total decrease in revenue higher than on the main study. This is because this is only a part of the total consumer base.

The impacts are illustrated graphically in

Figure 17.

Figure 17



The main reason for the big savings for many of these consumers is because the current demand charges are too high and the energy rates are too low. Those customers with low load factors were thus heavily overcharged in the past.

**18.2. TOU tariff recommendations**

The following is thus proposed in this respect:

- The tariffs thus be developed based on the cost of supply results.
- The differentiation will be set as per cost differences.
- The markup on energy will be in R/kWh and not in %.
- The surcharges be removed and be replaced with new tariff rates to achieve the desired revenue.
- A TOU tariff also needs to be created for small consumers.

**19. AVAILABILITY CHARGES**

The municipality uses the incorrect terminology by referring to availability charges when they mean Basic charges. The terms availability charges is generally refer to in the industry as stands where the supply is available but not taken by the owner. Basic charges refer to the charge levied to consumers to covered the following costs:

- Meter kiosk with circuit breakers, supply cable / line and meter.

- Meter reading, billing, revenue collection, vending, customer services.
- Meter repairs, replacement, maintenance, auditing, fault replies, etc.

The calculation of availability charges is done in the following way:

- No contribution is made to the costs covered by the basic charge.
- No contribution is made to the Maximum demand charge which include:
  - The Eskom maximum demand charge
  - 50% of the municipal network costs
- The full contribution is made to the Access charge which include:
  - 50% of the municipal network costs (the more dedicated portion)
  - The Eskom Access charge as capacity has to be reserved to Eskom.
- The demand on the network to calculate the access charge is based on the following:
  - The design capacity of the network. This refer to the so called ADMD (After Diversity maximum Demand) which is usually about 1 to 5 kVA depending on the type of area.
  - This can be expressed by the installed capacity before diversity. For these calculations a 30 Amp single phase supply with a 30% co-incident factor is used which comes to:
    - $30 \text{ Amps} \times 240 \text{ Volts} = 7.2 \text{ kVA} \div 3 = 2.4 \text{ kVA (ADMD)}$ .

This represents the minimum that should be charged as the whole network still needs to be maintained and be paid for whether consumers use electricity or not.

## 20. BASIC CHARGES

There is an issue in Ndlambe that consumers are complaining that they have to pay a basic charge per meter in cases where multiple points of supply is provided on single properties. The following should be noted in this respect:

- The law in fact stipulated that only one point of supply is allowed per erf.
- In other words it is a concession by the municipality to allow multiple supplies on one stand.
- These multiple supplies needs itself to electricity theft as multiple wires enter the property which are not metered thus exposing the municipality to risk.
- The current basic charge covers the normal basic customer services costs but also makes a contribution to the network.
- The new tariffs will split these costs and thus each meter will only pay:
  - The basic consumer services associated with a meter.
  - The capacity of each supply (meter).
- With the new meter the system would thus be more fair as the capacity that can be associated with the different meters will each make its fair contribution to the network costs.

If consumers feel unhappy with this arrangement they can take a single supply from the municipality and distribute and supply meters and vend (sell) their own units to the various different supplies on the property themselves.

## 21. SMALL SCALE EMBEDDED GENERATION (SSEG)

The important issue in respect of SSEG customers is that they must be on a cost reflective tariff with fixed and capacity / demand charges close to cost.

**Ideally** all SSEG consumers should be on a TOU tariff with 4 quadrant meters:

- A new TOU tariff for small consumers, <100 kVA, has been developed.
- Any consumer can select this tariff, but all SSEG consumers must be on this tariff.
- It is subject to an application and payment for the supply and installation of a 4 wire, 4 quadrant TOU meter.
- The tariff has been designed as follows:
  - The basic charge equal to the average of a 1 and 3 phase TOU meter supply.

- The capacity charge is set at the average of the Domestic and Commercial tariff capacity charge.
- The energy rates are set equal to the Bulk LV plus the additional losses on the LV network.
- No reactive any charge is levied.

The SSEG Feed-in tariff, which caters for consumers who want to feed-in to the network, is as follows:

- An additional basic charge to cater for the additional metering & administration costs to administer the feed-in.
- The energy credit rates are set at 80% of Eskom Megaflex energy charges applicable to Ndlambe.
- This tariff applies to any customer wanting to feed-in irrespective of whether they have a LV or MV connection.
- Various other conditions apply.

The proposed TOU to be applied to SSEG consumers smaller than 50 kVA and the SSEG additional basic charge and feedin rates which apply to all SSEG consumers are shown in Table 744 below.

**Table 74**

DESCRIPTION	2022/2023	2023/2024	2023/2024	2024/2025	2024/2025	2024/2025	2024/2025	New description
	APPROVED	APPROVED	Restructured	Year 1 phase in	Increase	Year 1 phase in	Year 1 phase in	
	VAT EXCL	VAT EXCL	VAT EXCL	VAT EXCL	VAT EXCL	VAT EXCL	VAT EXCL	
	1/7/2022	1/7/2023	1/7/2023	Increase		Increase	Increase	
<b>6. Scale 8: Time of Use Small: &lt; 50 kVA</b>								<b>6. Scale 8: Time of Use Small: &lt; 50 kVA</b>
Applicable to consumers with a demand normally exceeding 50kVA								Applicable to consumers with a demand not exceeding 50kVA. Compulsary for SSEG consumers <50 kVA.
Surcharge on all charges			Zero					Surcharge on all charges
Basic Monthly charge		R 397.95	R 460.51	New	R 460.51	R 460.51	R 460.51	Basic Monthly charge
Capacity charge: R.Amp/phase		R 6.31	R 7.30	New	R 7.30	R 7.30	R 7.30	Capacity charge: R.Amp/phase
<b>Energy Charges (low season)</b>			R -					<b>Energy Charges (low season)</b>
Peak		R 2.3189	R 2.6834	New	R 2.6834	R 2.6834	R 2.6834	Peak
Standard		R 1.7389	R 2.0122	New	R 2.0122	R 2.0122	R 2.0122	Standard
Off-Peak		R 1.2704	R 1.4701	New	R 1.4701	R 1.4701	R 1.4701	Off-Peak
<b>Energy Charges (High season - June to August)</b>			R -					<b>Energy Charges (High season - June to August)</b>
Peak		R 6.1628	R 7.1316	New	R 7.1316	R 7.1316	R 7.1316	Peak
Standard		R 2.1862	R 2.5298	New	R 2.5298	R 2.5298	R 2.5298	Standard
Off-Peak		R 1.3968	R 1.6163	New	R 1.6163	R 1.6163	R 1.6163	Off-Peak
<b>7. Scale 9: SSEG FEEDIN</b>								<b>7. Scale 9: SSEG FEEDIN</b>
Applicable to all SSEG consumers consumers irerespective of size.								Applicable to all SSEG consumers consumers irerespective of size.
Additional Basic Monthly charge		R 100.00	R 115.7200	New	R 115.72	R 115.72	R 115.72	Additional Basic Monthly charge
<b>Energy Credits (low season)</b>								<b>Energy Credits (low season)</b>
Peak		-R 1.6054	-R 1.6054	New	-R 1.7017	-R 1.8038	-R 1.8038	Peak
Standard		-R 1.1414	-R 1.1414	New	-R 1.2098	-R 1.2824	-R 1.2824	Standard
Off-Peak		-R 0.7666	-R 0.7666	New	-R 0.8126	-R 0.8613	-R 0.8613	Off-Peak
<b>Energy Credist (High season - June to August)</b>								<b>Energy Credist (High season - June to August)</b>
Peak		-R 4.6805	-R 4.6805	New	-R 4.9613	-R 5.2590	-R 5.2590	Peak
Standard		-R 1.4992	-R 1.4992	New	-R 1.5892	-R 1.6845	-R 1.6845	Standard
Off-Peak		-R 0.8677	-R 0.8677	New	-R 0.9197	-R 0.9749	-R 0.9749	Off-Peak

**Realistically** the municipality does not currently have the resources to manage many electronic meters.

An alternative option is as follows:

- SSEGS consumers pay the standard domestic tariff plus the additional SSEG basic charge.
- The energy charge for consumption remains the same.
- The export tariff be set as a single energy rate.
- The standard Ferraris disc meters cannot be used as these meters turn backwards when any energy is exported. The consumer will thus at least have to pay for any electronic meter that will block / not record any export energy.
- These consumers must at least take a 30/40 Amp supply.

It is realised that many SSEG consumers use very little energy. In terms of the current industry accepted norm consumers can only export so much energy as the value of their energy consumed. This seriously limits any exports. Cape Town has obtained approval from NERSA to buy more than the value of what the consumer buys from National Treasury.

The potential to buy massive amounts of energy from SSEG consumers is very real. It is therefore proposed that the TOU option with 4 quadrant meters be the preferred way to address these consumers. In terms of managing the electronic meters with remote access it is strongly proposed that an external contractor be appointed to do this management. The additional cost can be the basis for the additional SSEG basic charge and thus it would not have a negative financial impact on the municipality.

**22. PHASE IN**

It is accepted that the proposed tariff structure changes will have a marked impact on customers. Some customers will pay much less and others much more. For this reason, the possibility to phase the changes in evenly over 3 years could be considered. This can be done as follows:

- Calculate the difference between the current charge and the proposed charge. (basic, Amp, R/kVA, energy).
- Divide the difference by 3 and add to the current charge.
- Then add annual price increase %.
- In year two add 1/3 of the difference and year three the full difference.
- Continue this trend to the end of the 3 year phase in.
- In some cases, combine different tariffs to reduce the total number.

This phase in plan has many difficulties:

**Domestic.**

- Indigents and 20 Amp will see no change.
- Those with supplies > 20 Amp single phase with see basic charges reducing and capacity charges increasing and the higher energy block prices reducing.

**Commercial**

- They will see basic charges reducing and capacity charges increasing and the energy charges reducing.

**Bulk.**

- Two Bulk tariffs will exist during the phase in period:
  - TOU either LV or MV

All of this will create careful administration.

The following is proposed for implementation with no phase in:

- All SSEG consumer go to the full cost reflective tariffs.
- Streetlight tariff.
- Internal supplies. (own use)

The schedule containing the proposed phase in rates for year one including the annual price increase is shown in Table 755.

**Table 75**

NDLAMBE		2022/23/2024 Proposed after increase										
1	Phase in year 1	1	Increase	15.72%	Phase in years			3	Eskom Increase	0.00%		
1					Energy Peak	Energy Standard	Energy Off-Peak	Energy Peak	Energy Standard	Energy Off-Peak	Reactive energy	
PROPOSED TARIFFS		Basic charge	Capacity	MD / kVA	ALL Energy	Block 1 energy	Block 2 energy	Block 3 energy	Block 4 energy	Block 5 energy		
Nr	TARIFF NAME	Rand/month	R/kVA/A/m	R/kVA/A/m	R/kWh	R/kWh	R/kWh	R/kWh	R/kWh	R/kWh	R/kWh	
1	Domestic Indigent PP	-	-	-	-	2.3157	2.3157	3.2593	3.8219	-	-	
1	Domestic Indigent Conv	-	-	-	-	2.3157	2.3157	3.2593	3.8219	-	-	
1	Domestic 20 Amp PP- don't pay basics	-	-	-	-	2.3157	2.3157	3.2593	3.8219	-	-	
1	Domestic 20 Amp Conv	289.94	5.11	-	-	1.950	2.293	2.922	3.298	-	-	
1	Domestic > 20 Amp PP	289.94	5.11	-	-	1.950	2.293	2.922	3.298	-	-	
1	Domestic > 20 Amp Conv	289.94	5.11	-	-	1.950	2.293	2.922	3.298	-	-	
1	Commercial PP	505.96	7.51	-	2.876	-	-	-	-	-	-	
1	Commercial Conv	505.96	7.51	-	2.876	-	-	-	-	-	-	
1	Bulk TOU LV	1 239.29	44.91	213.33	-	9.944	2.837	2.129	3.050	1.998	1.434	0.097
1	Bulk TOUMV	1 291.00	30.72	167.86	-	8.543	2.462	1.828	2.645	1.746	1.252	0.097
1	Streetlight	252.45	-	-	3.46	-	-	-	-	-	-	-
1	Availability	407.85	-	-	-	-	-	-	-	-	-	-
1	Municipal	78.15	22.53	-	2.25	-	-	-	-	-	-	-

The calculated revenue using the phase I rates with annual price increase is shown in Table 76



Table 776 and the summary in Table 777.

**Table 76**

Final



Table 77

Ndlambe						
CALCULATED REVENUE		2022/2023 Proposed	2022/2023 Reference	Difference	Structure change	Initial cost reflectiveness
Nr	TARIFF NAME	R/year	0.00%	Rand	%	
1	Domestic Indigent PP	3 161 986	3 262 842	-100 856	-3.09%	-127.1%
1	Domestic Indigent Conv	29 153	29 104	48	0.17%	-307.8%
1	Domestic 20 Amp PP: don't pay basics 900	5 522 518	5 095 997	426 521	8.37%	-65.4%
1	Domestic 20 Amp Conv	11 149 676	10 282 310	867 365	8.44%	20.1%
1	Domestic > 20 Amp PP	14 325 458	13 381 353	944 105	7.06%	0.9%
1	Domestic > 20 Amp Conv	19 771 792	18 368 715	1 403 077	7.64%	2.9%
1	Commercial PP	8 125 906	7 609 400	516 506	6.79%	21.6%
1	Commercial Conv	16 860 886	15 668 376	1 192 510	7.61%	11.4%
1	Bulk TOU LV	17 440 731	14 298 519	3 142 211	21.98%	-20.1%
1	Bulk TOUMV	10 823 636	8 784 860	2 038 776	23.21%	-21.1%
1	Streetlight	10 508 932	-	10 508 932	#DIV/0!	#DIV/0!
1	Availability	5 486 433	4 666 652	819 780	17.57%	-4.2%
1	Municipal	2 800 658	-	2 800 658	#DIV/0!	#DIV/0!
1	<b>Total.</b>	<b>126 007 765</b>	<b>101 448 129</b>	<b>24 559 636</b>	<b>24.21%</b>	

This shown an increase of 15% on the reference value.

**23. TARIFF SCHEDULE**

The proposed tariff schedule is shown in Table 78 It shows the following rates:

- The fully cost reflective rates for 2023/2024 without phase in or annual price increase for 2024/2025.

Table 78

### 2024/2025 NDLAMBE MUNICIPALITY TARIFF LIST

DESCRIPTION	2022/2023	2023/2024	2023/2024	2024/2025	2024/2025	New description
	Actual	Actual	Full cost reflective	Year 1 phase in with increase.	Increase	
	VAT EXCL	VAT EXCL	VAT EXCL	VAT EXCL	VAT EXCL	
	1/7/2022	1/7/2023	1/7/2023	Increase		
				15.72%	%	
<b>ELECTRICITY NDLAMBE</b>						<b>ELECTRICITY NDLAMBE</b>
<b>1. Scale 1: Domestic Credit</b>						<b>1. Scale 1: Domestic Credit</b>
Applicable to all bona fide domestic Consumers			Indigents get 50 kWh/m for free'			Applicable to all bona fide domestic Consumers with capacity smaller or equal to 20 Amps single phase.
Basic Charge: R/m per point of supply (meter)	R 301.40	R 346.91	R -	R -	-100.0%	Basic Charge: R/m per point of supply (meter)
<b>Energy Charge: R/kWh</b>						<b>Energy Charge: R/kWh</b>
Block 1 (0 - 50 kWh)	R 1.3523	R 1.5565	R 1.5565	R 2.3157	48.8%	Block 1 (0 - 50 kWh)
Block 2 (51 - 350 kWh)	R 1.7386	R 2.0011	R 2.0011	R 2.3157	15.7%	Block 2 (51 - 350 kWh)
Block 3 (351 - 600 kWh)	R 2.4470	R 2.8165	R 2.8165	R 3.2593	15.7%	Block 3 (351 - 600 kWh)
Block 4 (>600 kWh)	R 2.8694	R 3.3027	R 3.3027	R 3.8219	15.7%	Block 4 (>600 kWh)
<b>2. Scale 2: Domestic Pre-payment</b>						<b>2. Scale 2: Domestic Pre-payment</b>
Applicable to all bona fide domestic consumers in areas where vending is available						Applicable to all bona fide domestic consumers with capacity exceeding 20 Amps single phase Prepaid and credit.
Basic Charge: R/m per point of supply (meter)	R 301.40	R 346.91	R 57.83	R 289.94	-16.4%	Basic Charge: R/m per point of supply (meter)
			R 13.24	R 5.11	New	Capacity charge: R/Amp/phase/month
<b>Energy Charge: R/kWh</b>						<b>Energy Charge: R/kWh</b>
Block 1 (0 - 50 kWh)	R 1.3523	R 1.5565	R 1.9434	R 1.9504	25.3%	Block 1 (0 - 50 kWh)
Block 2 (51 - 350 kWh)	R 1.7386	R 2.0011	R 1.9434	R 2.2934	14.6%	Block 2 (51 - 350 kWh)
Block 3 (351 - 600 kWh)	R 2.4470	R 2.8165	R 1.9434	R 2.9225	3.8%	Block 3 (351 - 600 kWh)
Block 4 (>600 kWh)	R 2.8694	R 3.3027	R 1.9434	R 3.2975	-0.2%	Block 4 (>600 kWh)
<b>3. Scale 3: Commercial</b>						<b>3. Scale 3: Commercial: Credit or Prepaid'</b>
Applicable to non-domestic consumers with a demand not exceeding 55kVA.						Applicable to non-domestic consumers with a demand not exceeding 55kVA. Including municipal supplies
Basic Charge: R/m per point of supply (meter)	R 540.47	R 622.08	R 67.53	R 505.96	-18.7%	Basic Charge: R/m per point of supply (meter)
			R 19.47	R 7.51	New	Capacity charge: R/Amp/phase/month
Energy Charge: R/kWh	R 2.3960	R 2.7578	R 1.9411	R 2.8763	4.3%	Energy Charge: R/kWh
<b>4. Scale 7: Time of Use LV</b>						<b>4. Scale 7: Time of Use LV</b>
Applicable to consumers with a demand normally exceeding 50kVA						Applicable to consumers with a demand normally exceeding 50kVA supplied at LV, including municipal supplies.
Surcharge on all charges	24%	24%	Zero			Surcharge on all charges
Basic Charge: R/m per point of supply (meter)	R 990.62	R 1 140.21	R 385.09	R 1 239.29	8.7%	Basic Charge: R/m per point of supply (meter)
			R 116.43	R 44.91	New	Access charge: Highest of notified or actual MD
Demand Charges KVA (Peak & Standard only)	R145.6132	R167.5984	R 137.41	R 213.33	27.3%	Demand Charges KVA (Peak & Standard only)
<b>Energy Charge: R/kWh (low season)</b>						<b>Energy Charge: R/kWh (low season)</b>
Peak	R 1.9623	R 2.2587	R 2.3048	R 3.0497	35.0%	Peak
Standard	R 1.2105	R 1.3933	R 1.7248	R 1.9981	43.4%	Standard
Off-Peak	R 0.8622	R 0.9922	R 1.2563	R 1.4338	44.5%	Off-Peak
<b>Energy Charge: R/kWh (High season - June to August)</b>						<b>Energy Charge: R/kWh (High season - June to August)</b>
Peak	R 6.8777	R 7.9162	R 6.1487	R 9.9445	25.6%	Peak
Standard	R 1.8157	R 2.0899	R 2.1721	R 2.8371	35.8%	Standard
Off-Peak	R 1.4489	R 1.6678	R 1.3827	R 2.1288	27.6%	Off-Peak
			R 0.2511	R 0.0969	New	Reactive Energy Charge: R/kvarh (>85% PF per hour (Peak & Standard)
<b>5. Scale 7: Time of Use MV</b>						<b>5. Scale 7: Time of Use MV</b>
Applicable to consumers with a demand normally exceeding 50kVA						Applicable to consumers with a demand normally exceeding 50kVA, supplied at MV, including municipal supplies.
Surcharge on all charges	12%	12%	Zero	Zero		Surcharge on all charges
Basic Charge: R/m per point of supply (meter)	R 990.62	R 1 140.21	R 792.79	R 1 291.00	13.2%	Basic Charge: R/m per point of supply (meter)
			R 79.6280	R 30.7152	New	Access charge: Highest of notified or actual MD
Demand Charges KVA (Peak & Standard only)	R131.52	R151.38	R96.07	R167.86	10.9%	Demand Charges KVA (Peak & Standard only)
<b>Energy Charge: R/kWh (low season)</b>						<b>Energy Charge: R/kWh (low season)</b>
Peak	R 1.7724	R 2.0401	R 2.2875	R 2.6451	29.7%	Peak
Standard	R 1.0933	R 1.2584	R 1.7075	R 1.7460	38.7%	Standard
Off-Peak	R 0.7787	R 0.8962	R 1.2390	R 1.2523	39.7%	Off-Peak
<b>Energy Charge: R/kWh (High season - June to August)</b>						<b>Energy Charge: R/kWh (High season - June to August)</b>
Peak	R 6.2121	R 7.1501	R 6.1314	R 8.5431	19.5%	Peak
Standard	R 1.6400	R 1.8876	R 2.1548	R 2.4622	30.4%	Standard
Off-Peak	R 1.3087	R 1.5064	R 1.3654	R 1.8283	21.4%	Off-Peak
			R 0.2511	R 0.0969	New	Reactive Energy Charge: R/kWh: R/kvarh (>85% PF per hour (Peak & Standard)

2024/2025 NDLAMBE MUNICIPALITY TARIFF LIST						
DESCRIPTION	2022/2023	2023/2024	2023/2024	2024/2025	2024/2025	New description
	Actual	Actual	Full cost reflective	Year 1 phase in with increase.	Increase	
	VAT EXCL	VAT EXCL	VAT EXCL	VAT EXCL	VAT EXCL	
	1/7/2022	1/7/2023	1/7/2023	Increase		
<b>6. Scale 8: Time of Use Small: &lt; 50 kVA</b>						<b>6. Scale 8: Time of Use Small: &lt; 50 kVA</b>
Applicable to consumers with a demand normally exceeding 50kVA						Applicable to consumers with a demand not exceeding 50kVA. Compulsary for SSEG consumers <50 kVA.
Surcharge on all charges			Zero			Surcharge on all charges
Basic Charge: R/m per point of supply (meter)			R 397.95	R 460.51	New	Basic Charge: R/m per point of supply (meter)
Capacity charge: R.Amp/phase			R 6.31	R 7.30	New	Capacity charge: R.Amp/phase
<b>Energy Charge: R/kWh (low season)</b>				R -		<b>Energy Charge: R/kWh (low season)</b>
Peak			R 2.3189	R 2.6834	New	Peak
Standard			R 1.7389	R 2.0122	New	Standard
Off-Peak			R 1.2704	R 1.4701	New	Off-Peak
<b>Energy Charge: R/kWh (High season - June to August)</b>				R -		<b>Energy Charge: R/kWh (High season - June to August)</b>
Peak			R 6.1628	R 7.1316	New	Peak
Standard			R 2.1862	R 2.5298	New	Standard
Off-Peak			R 1.3968	R 1.6163	New	Off-Peak
<b>7. Scale 9: SSEG FEEDIN</b>						<b>7. Scale 9: SSEG FEEDIN</b>
Applicable to all SSEG consumers consumers irresepective of size.						Applicable to all SSEG consumers consumers irresepective of size.
Additional Basic Charge: R/m per point of supply (meter)			R 100.00	R 115.7200	New	Additional Basic Charge: R/m per point of supply (meter)
<b>Energy Credits (low season)</b>						<b>Energy Credits (low season)</b>
Peak			-R 1.6054	-R 1.6054	New	Peak
Standard			-R 1.1414	-R 1.1414	New	Standard
Off-Peak			-R 0.7666	-R 0.7666	New	Off-Peak
<b>Energy Credist (High season - June to August)</b>						<b>Energy Credist (High season - June to August)</b>
Peak			-R 4.6805	-R 4.6805	New	Peak
Standard			-R 1.4992	-R 1.4992	New	Standard
Off-Peak			-R 0.8677	-R 0.8677	New	Off-Peak
<b>8. Scale 10: Public lighting</b>						<b>8. Scale 10: Public lighting</b>
Applicable to non-domestic consumers with a demand not exceeding 55kVA.						Applicable to non-domestic consumers with a demand not exceeding 55kVA.
Maintenance charge:R/luminaire/month			R 218.16	R 252.45	New	Maintenance charge:R/luminaire/month
Energy Charge: R/kWh			R 2.9920	R 3.4623	New	Energy Charge: R/kWh
<b>9. Scale 11: Municipal usage</b>						<b>9. Scale 11: Municipal usage</b>
All municipal supplies< 50 kVA						All municipal supplies< 50 kVA
Basic Charge: R/m per point of supply (meter)			R 78.15	R 90.43		Basic Charge: R/m per point of supply (meter)
Capacity charge: R/Amp/phase/month/month			R 22.53	R 26.08		Capacity charge: R/Amp/phase/month/month
Energy Charge: R/kWh			R 2.2462	R 2.5993		Energy Charge: R/kWh
<b>10. Scale 12: Availability.</b>						<b>10. Scale 12: Availability.</b>
Applicable to serviced stands that is not connected. This includes SSEG consumers who have gone off the Grid.						Applicable to serviced stands that is not connected. This includes SSEG consumers who have gone off the Grid.
Fixed charge per month.		R346.9114	R 363.5205	R 407.8526	17.6%	Fixed charge per month.

## 24. CONCLUSIONS

This detailed Ringfencing, Cost of supply and Pricing study presented many different challenges. All these have been addressed and the results obtained are considered 95% accurate. The current tariffs were found needing major changes. These will send a clear signal about the value of capacity which in time will assist the municipality in controlling its costs which are largely dictated by capacity.

The COS study must now be workshopped internally and be approved by Council and then be submitted to NERSA. Once the budget process starts the proposed tariffs need to be submitted to proper public participation. Only once NERSA approval and public participation process is completed can implementation begin.

**25. ANNEXURE****25.1. Allocation of network costs to tariff categories.**

Before proceeding to calculation of unit costs the issues of how to allocate network costs to different tariff categories need to be explored. NRS058 explores various methods. It is the consultant's expert view that the method that best allocates costs to the category of customers who cause the high demand and thus high costs should be based on each category of customer's contribution to the system peak. Various approaches could be followed in this respect such as not just using one single peak demand but maybe the average of the highest week or average of the 12 highest demands etc. The problem is that this requires very accurate data. The work in previous sections have already illustrated the problems with the data obtained reflected mainly in the fact the peak in the Eskom profile data and that from the simulated profile differ such that one is in the morning and the next in the evening. This caused the requirement to analyse the impact using the different methods. The results for the allocation of network costs at the highest voltage level network are reflected in Table 799.

**Table 79**

DEMAND ALLOCATER METHODS COMPARED								
AVERAGE AND ACCESS METHOD								
Customer group demand responsibility ratio								
N2	D	L	A	B	C	E		
		An LF	P kWh/y	Tot kWh/y	P Ex MD	Σ Ex MD	Ex MD%	ENERGY RATIO
1Total Purchases								
2Bulk	10,0%	42,58%	3 673 203	35 407 269	599,952	6 123,517	128,8%	10,4%
3MV(kWh)	0,0%	42,58%	0	35 407 269	0,000	6 123,517	355,5%	0,0%
4LV(kWh)	13,3%	42,58%	5 116 128	35 407 269	763,454	6 123,517	117,6%	14,4%
5Indigent	6,9%	42,58%	2 661 561	35 407 269	397,221	6 123,517	124,2%	7,5%
6Comm(kWh)	20,9%	42,58%	7 683 400	35 407 269	1 242,966	6 123,517	138,9%	21,7%
7Mun(kWh)	8,9%	42,58%	557 886	35 407 269	879,454	6 123,517	1242,8%	1,6%
8Dom(kWh)	20,0%	42,58%	7 857 545	35 407 269	1 120,234	6 123,517	112,4%	22,2%
9Res Poor	20,0%	42,58%	7 857 545	35 407 269	1 120,234	6 123,517	112,4%	22,2%
<b>TOTAL</b>			<b>35 407 269</b>					
Customer group excess demand								
N2	C - excess demand	Ave MD	Group energy	Hours in year	PF	Non-co-incident MD	Group energy	Annual LF
	kVA	kVA	kWh/y	8760	%	kVA	kWh/y	%
1Total Purchases								
2Bulk	599,95	465,91	3 673 203	8 760,0	90%	1 065,9	3 673 203	39,34%
3MV(kWh)	0,00	0,00	0	8 760,0	90%	0,0	0	19,76%
4LV(kWh)	763,45	648,93	5 116 128	8 760,0	90%	1 412,4	5 116 128	41,35%
5Indigent	397,22	319,82	2 661 561	8 760,0	95%	717,0	2 661 561	42,37%
6Comm(kWh)	1 242,97	895,00	7 683 400	8 760,0	98%	2 138,0	7 683 400	41,02%
7Mun(kWh)	879,45	70,76	557 886	8 760,0	90%	950,2	557 886	6,70%
8Dom(kWh)	1 120,23	996,64	7 857 545	8 760,0	90%	2 116,9	7 857 545	42,37%
9Res Poor	1 120,23	996,64	7 857 545	8 760,0	90%	2 116,9	7 857 545	42,37%
<b>Total</b>	<b>6 123,52</b>	<b>4 393,71</b>	<b>38 557 510</b>	<b>70 080,0</b>		<b>10 517,2</b>	<b>35 407 269</b>	
NON CO-INCIDENTAL MD								
DEMAND ALLOCATER METHODS COMPARED								
N2		NON CO-INCIDENTAL MD	AVERAGE AND ACCESS METHOD	ENERGY RATIO	CO-INCIDENTAL PEAK DEMAND METHOD	Monthly LF	Ave & Access Adustment factor	
1Total Purchases								
2Bulk		10,1%	10,0%	10,4%	0,0%	51,5%	96,8%	
3MV(kWh)		0,0%	0,0%	0,0%	0,0%	41,7%	192,3%	
4LV(kWh)		13,4%	13,3%	14,4%	0,0%	52,0%	92,1%	
5Indigent		6,8%	6,9%	7,5%	0,0%	47,7%	92,1%	
6Comm(kWh)		20,3%	20,9%	21,7%	0,0%	58,3%	96,3%	
7Mun(kWh)		9,0%	8,9%	1,6%	0,0%	11,2%	565,9%	
8Dom(kWh)		20,1%	20,0%	22,2%	0,0%	47,7%	89,9%	
9Res Poor		20,1%	20,0%	22,2%	0,0%	47,7%	89,9%	

This shows the following:

The following in this respect:

- All methods yield similar results.
- The energy ratio method seems out of line with the other methods, as is to be expected.
- The average and access method and Non-co-incident methods are almost identical.
- From the profiles it is clear that the annual peak demands are mainly caused by residential customers.
- The co-incident peak demand methods best reflect this reality which will show domestic costs even higher.

For simplicity's sake and close results with the Average and access method the non-co-incident peak demand method was used as basis to allocate all network costs.

## 25.2. Definitions.

**Ampere (A):** The unit in which electric current is measured being the rate of flow of electric current through a conductor and which is comparable to the rate of volume of water flow through a pipe.

**Capacity utilisation.** – This refers to the extent to which the capacity that has been installed for a customer has been utilised by the customer.

**Charges.** – This refers to different charges that a customer has to pay such as a charge for energy or charge for installed capacity.

**Clients.** – This refers to other contacts of the utility such as contractors, consultants, etc.

**Connection fee:** The minimum, once-off, up-front payment for new or additional capacity

**Consumers.** – This refers to any user of electricity whether it be an illegal connected supply, unpaid supply or third-party person.

**Cross subsidy.** – This refers to cases where one set of customers are subsidised by another set of customers because their tariff does not cover their cost of supply.

**Customer.** – This refers to a consumer that is legally connected to the electricity network, is contracted with the supply utility and is paying their dues.

**Demand charge:** A R/kVA or R/kW charge which is time and/or seasonally differentiated and is applied to the chargeable demand registered during the month.

**Demand tariffs.** – This refers to tariffs that charge for the maximum demand taken by the customer every month.

**Diversity Factor:** This is defined as the ratio of the sum of individual consumers' non-coincident maximum demands to the total maximum demand of a group, which is an indication of the extent to which the same capacity can be used for different consumers

**Electrical Energy** – This refers to the amounts of units of electricity consumed. This is normally measured for a month.

**Gigawatt (GW):** Equal to one thousand MW or one million kW.

**Inter tariff cross subsidies.** – This is where one category of customers is cross-subsidising another category of customers.

**Intra tariff cross subsidies.** – This is where there is cross subsidisation between the different customers within a particular customer category such as high usage customers cross-subsidising low usage customers.

**kWh** (kilo Watt hour) – This is the unit of measure for energy. It means 1000 of Watt hours. In other words, if a 100 Watt globe was burning for 10 hours.

**Kilovolt-Ampere (kVA):** The product of volts and amperes times 1 000, i.e.  $V \times A \times 1\,000$ . This is a measure of "apparent" electrical power.

**Kilowatt (kW):** The product of kVA and power factor which is a measure of "true" electrical power. The expression for kW is  $V \times A \times \text{power factor} \times 1\,000$ .

**Kilowatt-hour (kWh):** The total amount of energy used in one hour by a device that requires one kilowatt of power for continuous operation, i.e. the product of kilowatts and hours.

**kVA (kilo Volt Ampere)** – This is the unit of measure for maximum demand. It includes the real and reactive components of power.

**kW (kilo Watt)** – This is also a unit of measure for maximum demand but only the real component. Here the calculation is done over a 1-hour period. The maximum demand taken by ten 100-Watt globes equals to 1 kW.

**Load factor.** – This refers to the amount of electricity consumed by a customer in a billing period relative to the amount of energy that could have been consumed had the appliances been kept on all the time. This indicates how effective the capacity had been used.

**Load factor (LF) annual:** Total kWh/y divided by the highest maximum demand in the year times 12 times the total hours in the year.  $(\text{Total kWh for year}) \div (\text{Highest maximum demand in year} \times 12 \times \text{hours in year})$ .

**Load factor (LF) average monthly:** Total kWh/y divided by the sum of the maximum demands of all months in the year times 12 times the total hours in the year.  $(\text{Total kWh for year}) \div (\text{Sum of 12 maximum demands in year} \times \text{hours in year})$ .

**Life line.** – This refers to a tariff that provides support, subsidy, discount to customers. This is usually not available to all customers and provide more support at low consumption levels and become more expensive at high consumption levels.

**Maximum demand.** – This refers to the maximum demand that the customer places on the network normally averaged over a half hour period.

**Megawatt (MW):** Equal to one million Watts or 1 000 kW.

**Network voltage.** – This refers to the voltage at which the network operates. This voltage is usually higher to transfer large amounts of power.

**Network capacity.** – This refers to the maximum rating of the network equipment that has been installed to supply a customer. This is expressed as kVA or A (Amperes).

**Point of delivery (POD):** A physical point on the electrical network, where electricity is delivered to a customer, usually the metering point.

**Point of supply:** It could be a single point of delivery to a customer or a specific group of points of delivery on the System from where electricity is supplied to the customer.

**Power Factor (PF):** The ratio kW / kVA indicates the ratio of “true” electrical power to “apparent” electrical power, i.e. the ratio of useful work to the total quantity of volts and amperes supplied.

**Reactive energy charge:** In case of Megaflex, it is levied on every kvarh which is registered in excess of 30% of the kWh supplied during the specified periods of the month.

**Supply voltage.** – This refers to the voltage at which customers are supplied. The supply voltage for households is usually 240 V (volt).

**Single energy rate tariff.** – This refers to a tariff that only has one charge and that is a simple energy charge eg. 25 c/kWh.

**Seasonal tariffs.** - This refers to tariffs where the price for electricity consumed during different seasons of the year is different. This is because there is a much higher demand for electricity typically in Winter making it more expensive to provide.

**Tariff.** – A tariff is the combination of various charges as mentioned above to make up a tariff applicable for a specific customer category.

**Tariff structure.** – This refers to the type of charges in the tariff as well as the relative sizes of the different charges.

**Tariff restructuring.** – This refers to the process of changing the charges in a tariff but also the relationship with other tariffs.

**Two part tariff.** - This refers to a tariff that has a single energy rate plus a fixed charge, sometimes called a basic charge. For example, the tariff has a basic charge of R100/month and an energy rate of 105 c/kWh.

**TOU (Time of Use) tariffs.** - This refers to tariffs where the electricity consumed at different times of the day is measured separately and are charged for differently.

**Time-of-use (TOU) tariff:** A tariff that has different energy rates for different time periods and seasons in order to reflect different cost of supply at different times more accurately.

**Voltage discount.** – This refers to a discount applied to customers supplied at higher voltages because it is cheaper to supply, and the customer incurs more costs to transfer the energy for their own applications.

**Voltage (V):** Measure of electric pressure that drives electric current through a conductor.

**Watt (W):** The unit of electrical power or energy transfer equivalent to one ampere flowing due to an electrical pressure of one volt at unity power factor,  $W = V \times A$

### 25.3. Abbreviations

<	less than	CRC	Current replacement cost.
≤	less than or equal to	ROA	Return on Assets
>	greater than	HV	High Voltage ≥ 40 kV
≥	greater than or equal to	MV	Medium Voltage ≥ 1000 V < 40 kV
A	ampere	LV	Low Voltage < 1000 V
c	cents	COS	Cost Of Supply
c/kvarh	cents / reactive kilovolt-ampere-hour	POD	Point of delivery
c/kWh	cents per kilowatt-hour	POS	Point of Supply
CPI	consumer price index	EPP	South African Electricity Pricing Policy
GWh	gigawatt-hour	MFMA.	Municipal Finance Management Act
km	kilometre	MSA	Municipal Systems Act
kVA	kilovolt-ampere	IBT	Inclining Block Rate Tariff
kvarh	reactive kilovolt-ampere-hour	CRC	Current replacement cost.
kV	kilovolt	LF	Load factor
kW	kilowatt	FBE.	Free Basic Electricity
kWh	kilowatt-hour		
MVA	megavolt-ampere		
N/A	Not applicable		
NERSA	National Electricity Regulator of South Africa		
NMD	Notified Maximum Demand		
PF	Power factor		
R	Rand		
R/kVA	Rand per kilovolt-ampere		
R/kW	Rand per kilowatt		
TOU	Time-of-Use		
V	volt		
VAT	value added tax		
W	watt		

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