Langeberg Municipality Cost of Supply Study Report

1. Introduction

A critical first step in understanding the operational performance of an electricity distributor is to conduct a Cost of Service (COS) study and sometimes referred to as a Cost to Serve (CTS) study. The objective of this study is to fairly and equitably allocate all costs associated with servicing customers among different customer classes. To support this objective, the National Energy Regulator of South Africa (NERSA) has developed a COS Framework for all licensed electricity distributors ('licensees'), in the country. This framework will serve as a guideline for licensees when conducting their own COS studies.

2. Study Area Overview

Langeberg Municipality is a Category B municipality found in the South African province of Western Cape, and it has a population of 119 962. The total energy sales of the municipality were 298 962 540 kWh in the 2021/22 financial year. In 2021/22, the majority of the electricity sales which accounted for 62% came from industrial customers, while 31% came from domestic customers. The municipality has requested a tariff increase of 12.72% for 2024/25 financial year as informed by the Cost of Supply Study results.

Table 1 Municipal energy sales per customer category

Customer classification	Electricity Sales		No. of customers
	Actual		Actual
	2021/22		2021/22
Free Basic Electricity	292 400	0,10%	5 848
Domestic (pre-paid)	55 511 731	18,59%	16 408
Domestic (conventional)	10 602 083	3,55%	1 529
Agriculture	142 959 848	47,82%	849
Manufacturing / Industrial	55 271 950	18,51%	749
Commercial (pre-paid)	1 338 133	0,45%	179

Customer classification	Electricity Sales		No. of customers
	Actual		Actual
	2021/22		2021/22
Commercial (conventional)	18 777 499	6,29%	637
Other consumers	-20 406	-0,01%	25
Street lighting	2 731 863	0,91%	1
Sold to other municipal departments	11 205 039	3,75%	170
Total	**298 670 140**	**100%**	**20 547**

3. COS Study Methodology

The Langeberg Municipality cost of supply study is a sophisticated study that is inclusive of all requirements of NERSA's current COS framework and also goes beyond it to accommodate electricity distribution businesses transitioning to a more infrastructure availability-based business.

The NERSA Cost Plus methodology has been used for both the wires and retail business revenue requirement determinations. The model has functionality to use the allowable return on the regulated asset base or asset values annuitized at selected discount rates to calculate the revenue requirement of the wires business.

The COS study is a multi-year model spanning across 3 years, namely, the most recent audited financial statement. The years are described as follows:

- Year 0 (FY 21/22) - The data input test year with the recently audited financial statements
- Year 1 (FY 22/23) - The current year in which the study is taking place
- Year 2 (FY 23/24) - The following year for which tariffs are being designed

This multi-year approach introduces several complexities and requires forecasting of costs across years, but it does bring a range of benefits to the analysis.

4. Overview of COS Study Key Results

The following key results were noted from Langeberg Municipality's COS study:

Revenue requirement

- The revenue requirement in FY23/FY24 is estimated as R 659.7 million (excluding the impact of subsidy), increasing from R 606.3 million in FY22/23;
- The wires costs are dominated by network related costs, namely network repairs and maintenance, depreciation, cost of losses and other OPEX costs;
- With regards to the retail business, the dominant cost in this regard is energy purchases from Eskom; and

- Overall, a greater proportion of total electricity costs are incurred by the retail part of the business (around 94%) whilst 6% of the cost is related to the wires business.

Cost functionalisation

- Energy purchases are significant within the cost breakdown and dominate when compared to other costs such as OPEX and Surplus
- CAPEX costs do not contribute significantly to the overall cost breakdown each year as result of the rate of return for the analysis assumed at 2%.

Cost classification

- Energy purchases and the cost of losses make up the energy driven cost, with the highest amount of costs incurred during the Low Season and standard TOU – mostly due to the low season covering a greater proportion of the year
- Demand driven costs are depreciation, network repairs and maintenance along with energy purchase demand related costs. The period of greatest demand driven costs is during the Low Season
- Finally, customer driven costs are dominated by “Other OPEX” which relates to costs incurred in offering the electricity distribution service to the customers

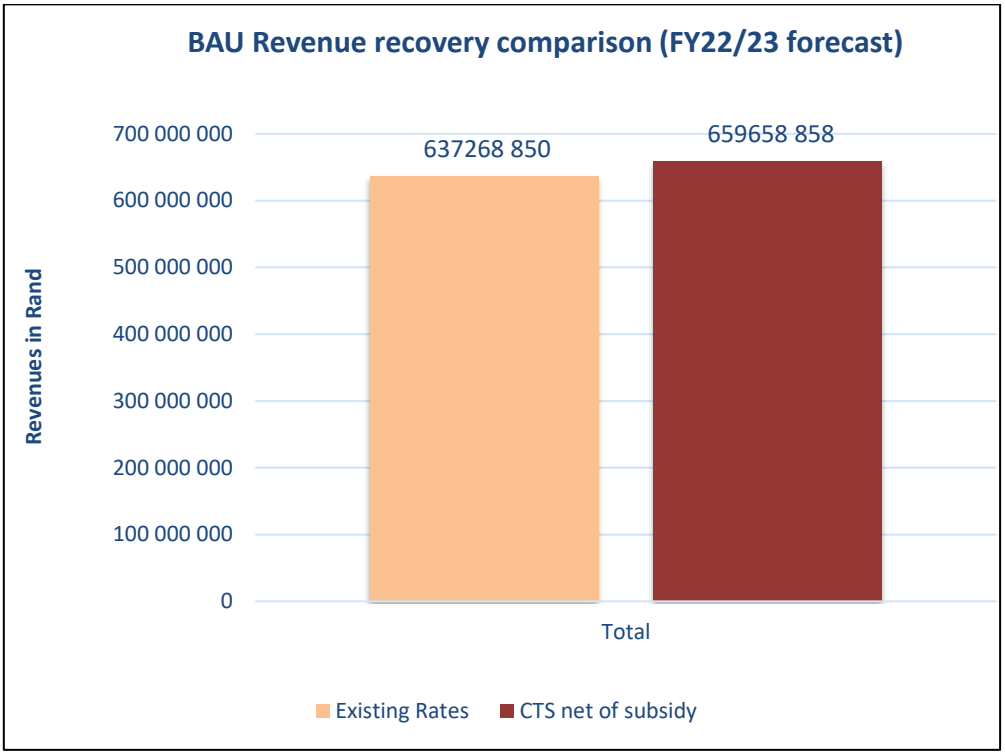
Cost allocation

- The domestic customer category carries the largest proportion of costs, followed by the commercial customers.
- Industrial customers and internal electricity requirements result in the lowest proportion of costs
- Differences in results between customer classes are mainly driven by differences in voltage of connection point, load factors, coincidence factors, and average specific consumption.

COS results

- Under the current rate regime, it is found that 96.6% cost reflectivity is achieved for FY23/24
- There is a mismatch between the structure of the revenue breakdown and cost breakdown
- A 3.5% increase with rate structure improvements and refined TOU - pricing signals would make rates cost-reflective

Table 2 BAU revenue comparison (FY23/24 forecast)



5. COS Study Analysis

Energy purchases analysis

The municipality purchases all their energy from Eskom via six points of delivery (PODs). The COS model captures the tariffs of each POD as well as the volumes purchased at each intake point.

COS models and revenue forecasts are always sensitive to sales forecasts. The Langeberg Municipality COS model assumes sales to be to be flat, with a 1.0 % sales increase per year.

Operating expenses analysis

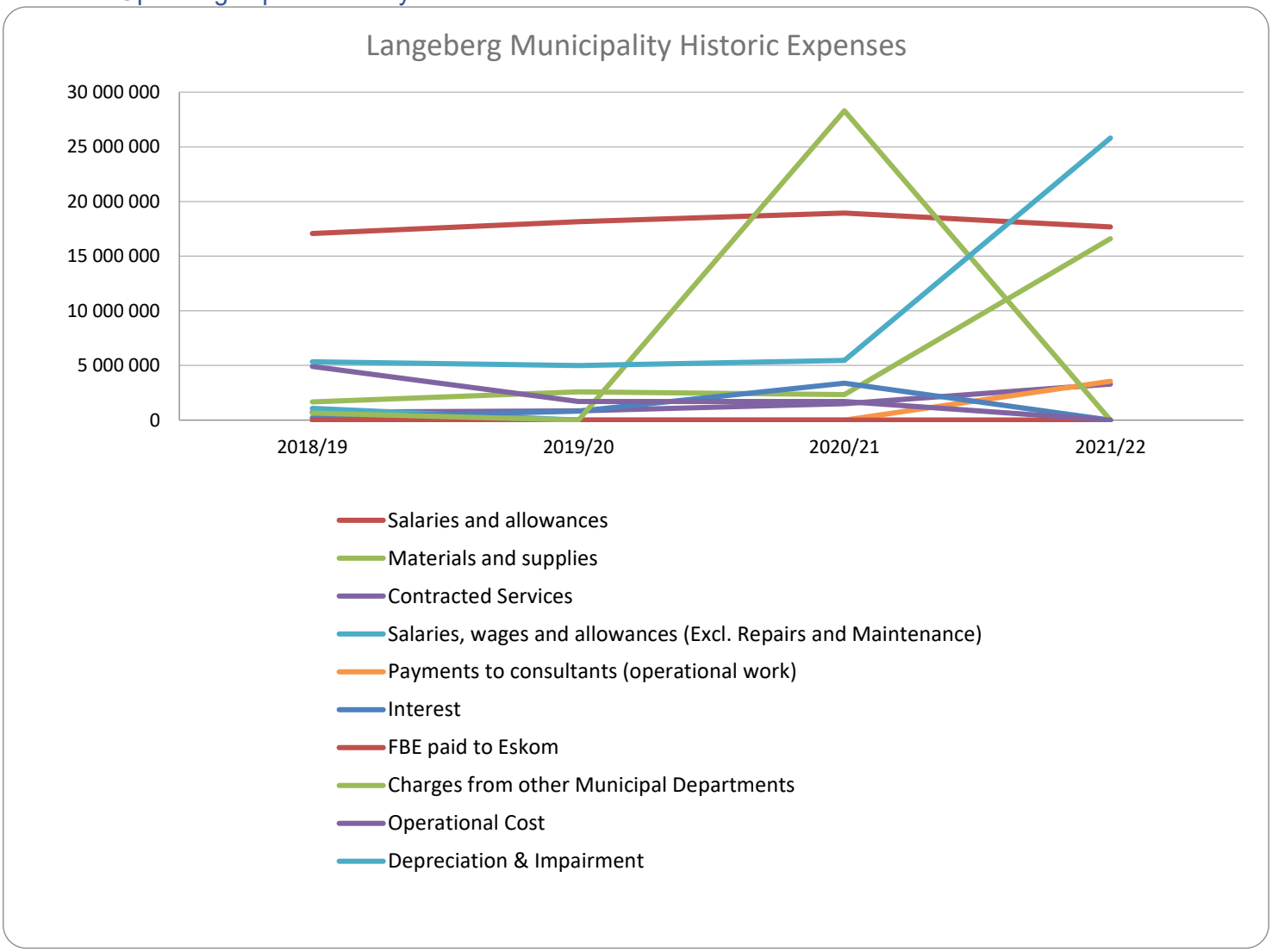


Figure 1 Trend Analysis of D-Form Expenses

When analysing the expenditure over the 4 years, the following observations were made:

- Salaries and allowances have increased over the years (except for a decrease in 2021/22), but at a slower pace compared to electricity purchases.
- Materials and supplies have increased over the years however there was a significant increase in 2021/22.
- Contracted services have increased over the years with a significant increase in 2021/22.
- Payments to consultants were zero from 2019/20 to 2020/21 and increased significantly in 2021/22, possibly indicating a decrease in in-house expertise.
- FBE paid to Eskom has consistently been zero over the years.

- Charges from other Municipal Departments have been inconsistent over the years, with a significant increase in 2020/21.
- Operational costs have remained relatively constant, except for a significant decrease in 2019/20.
- Depreciation and impairment have remained relatively consistent over the years, with a significant increase in 2021/22 indicating the aging of the infrastructure.

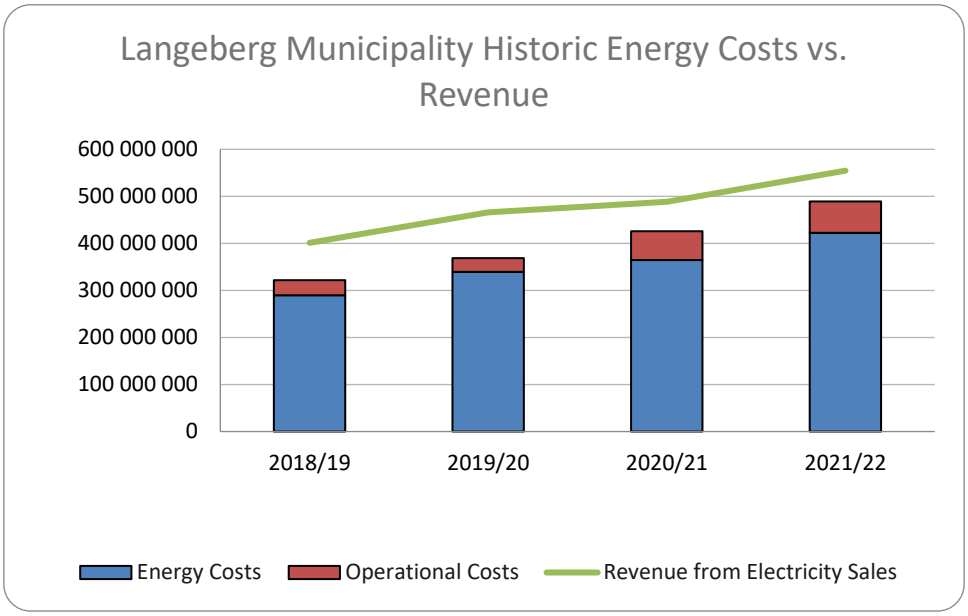


Figure 2 Historic energy costs and revenue comparison

The revenue on the other hand showed the following trend:

- The revenue from electricity sales has steadily increased over the years, reaching a high of R554 650 910 in 2021/22. This suggests an increase in the number of customers or an increase in the rate of electricity consumption.
- The revenue growth rate has not shown a great increase over the years from 2019 to 2022.
- The revenue from electricity sales has exceeded the expenses, indicating a profit in the electricity sales business.

Overall, the analysis suggests that the cost of electricity purchases has been the main driver of the increase in expenses, while revenue from electricity sales has been steadily increasing, resulting in a profit in the electricity sales of the municipality. However, there are also some areas of concern, such as the significant increase in bad debts in 2020/21 and the

aging infrastructure, which may require attention to ensure the sustainability of the municipality.

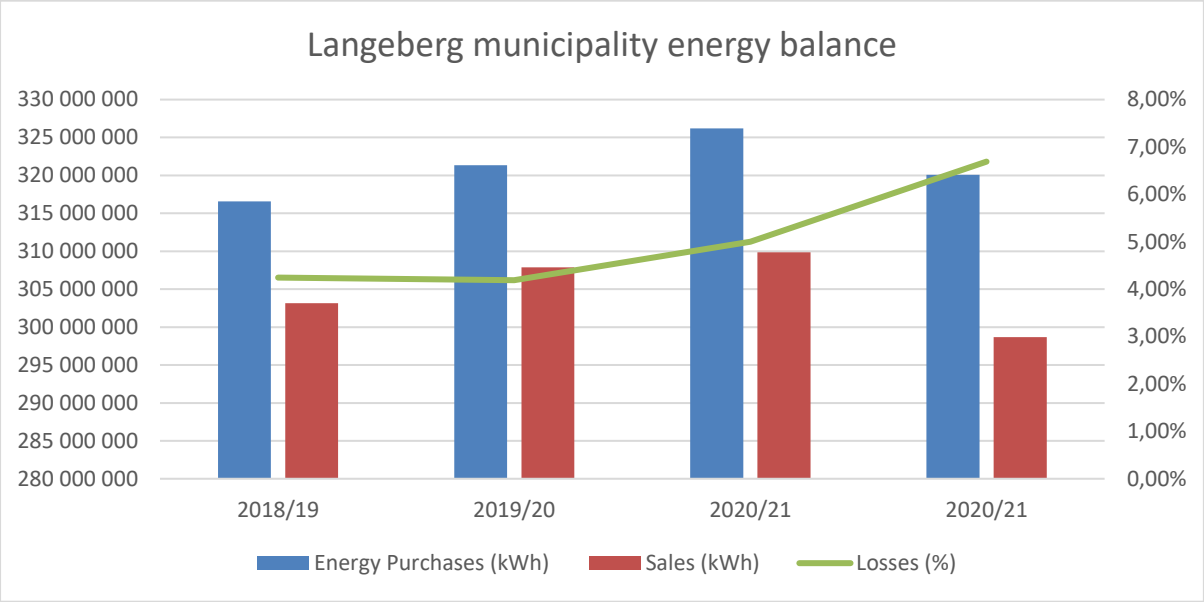


Figure 3 Energy balance and losses

Total energy purchased and total energy sales have fluctuated over the years, indicating potential instability in the organization's operations. Energy losses have increased from 2018/19 to 2021/22. This could suggest potential issues with energy management or technical inefficiencies.

Revenue requirement analysis

Section 3.2.1.1 of the NERSA COS framework deals with the revenue requirement and states that NERSA adopted the Cost-Plus Methodology 'as an interim methodology for implementation by licensees, including small licensees with limited capacity and database challenges. This is because other regulatory methodologies such as the rate of return, price cap, revenue cap, yard stick regulation, will be difficult to implement for a number of reasons, including the fact that licensees might struggle to keep proper accounting and property records, among other reasons. Even though these are historical costs (since the test year for the study was FY21/FY22), it is important to adjust these costs for prudency and efficiency so that when they are allocated to different customers, the allocation results reflect the proper costs. The framework covers the key elements of the revenue requirement including purchases, operating costs, repairs and maintenance, and depreciation and return on assets or interest on loans.

The Figure 4 below offers a breakdown of the revenue requirement based on the various functions which have been established and split between the wires and retail/trading parts of

the electricity value chain. The data below is determined based on a forecast for the financial year 2023/24 (FY22/FY23), or Year 2.

Various aspects can be ascertained from the figure. These include:

- The revenue requirement in FY22/FY23 is estimated as R659 658 858 (excluding the impact of subsidy);
- The wires costs are dominated by network related costs, namely network repairs and maintenance, depreciation, cost of losses and other OPEX costs;
- With regards to the retail business, the dominant cost in this regard is energy purchases from Eskom; and
- Overall, a greater proportion of total electricity costs are incurred by the retail part of the business R 667 592 270 (89%) whilst the costs related to the wires business is R 77 741 941 (11%).

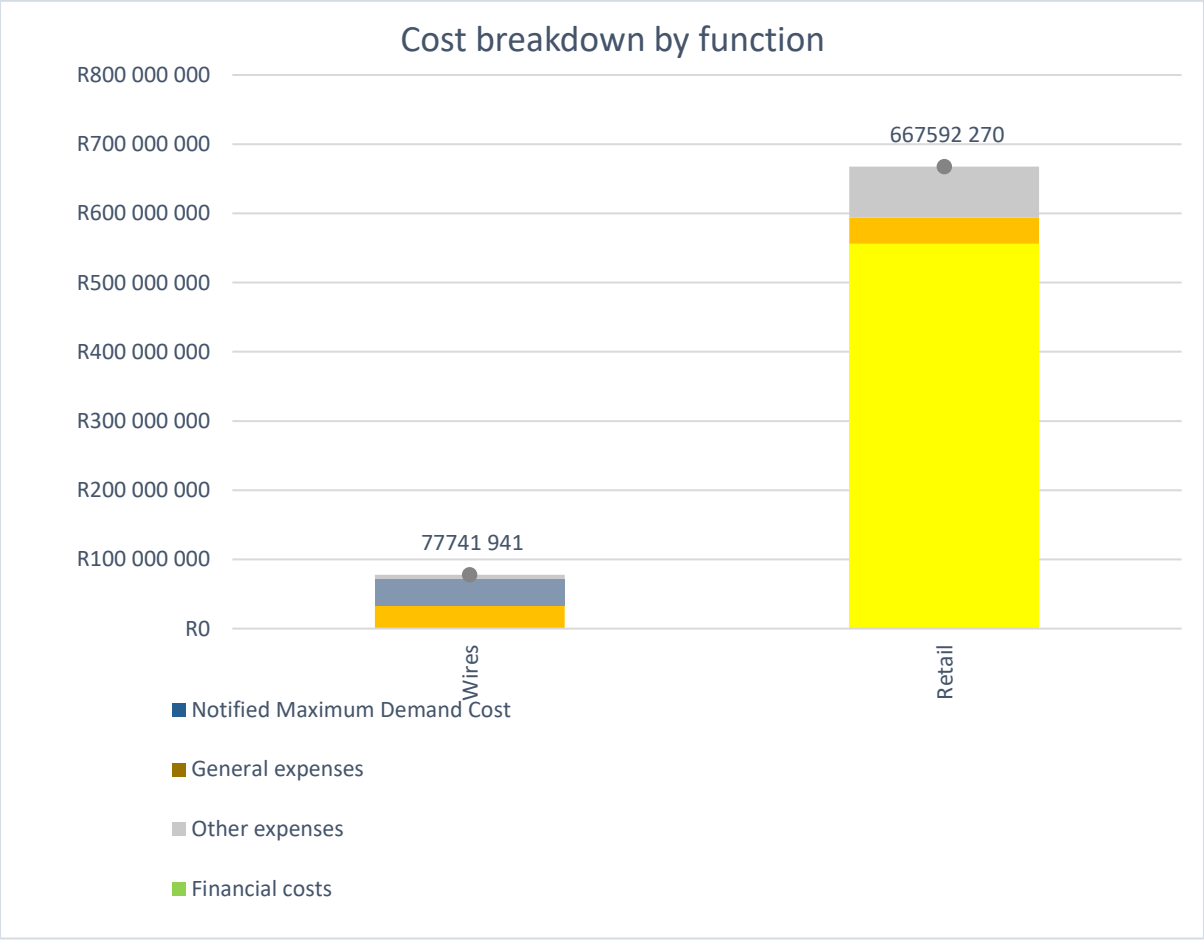


Figure 4 Cost breakdown by function

Energy Purchases

Langeberg Municipality has six incoming electricity supplies from Eskom that it uses for distribution namely Bonnievale Remote, Robertson Remote, Munisipaliteit Ashton Remote, McGregor, Noree Substation, and Munisipaliteit Montague Remote.

The municipal energy purchases have been adjusted for losses since the COS framework only allows for only 12% of losses as per the benchmark. The municipality's projected losses for the FY23/F24 are 6,60%. The municipality buys electricity from Eskom and the total energy purchases were projected to be R326 188 668 in FY23/FY24.

The licensee used the purchases for the test period to forecast sales for the financial year that it is applying for. The forecasted purchases include street lighting electricity, own use electricity and the allowable loss factor.

Cost functionalisation, classification, and allocation

The model follows the NERSA COS framework methodology for these methodological steps. Costs are first split into their function, and then classified according to their cost drivers, and finally allocated to the customer categories according to usage. These methodological steps are sound and the key results have been summarised in the previous section.

COS results

The key finding is that the municipality needs to increase its tariffs by 14.4% to achieve full cost-reflectivity.

The municipality's COS results are shown per tariff category in the figure below. The prepaid customers are most costly to service.

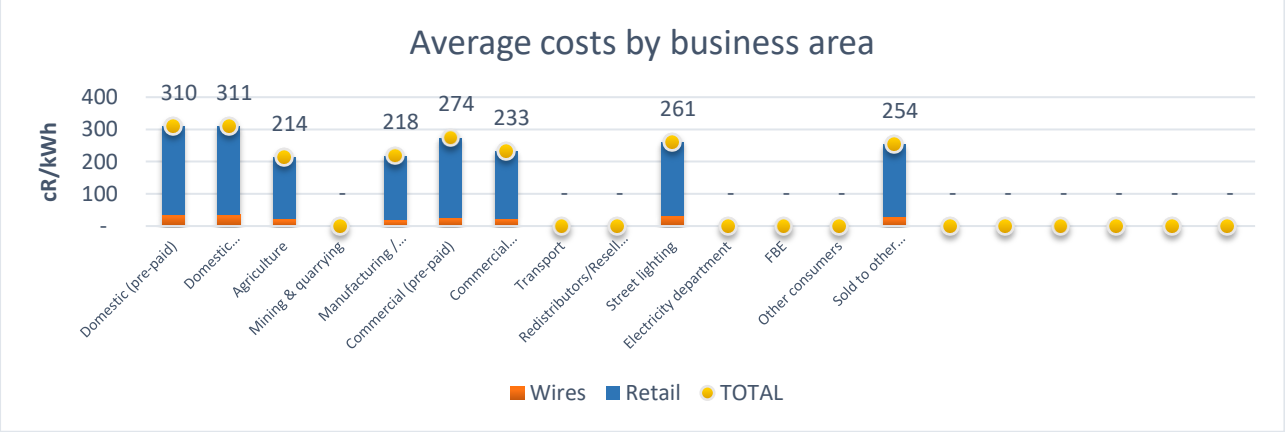


Figure 5 average costs by business area

Comparing these costs to the income per tariff category reveals the over or under recovery per tariff category, as shown in the figure below. When reading this graph, it is important to note that it is presented in % terms and not absolute Rand terms.

Figure 6 % Over/under recovery of customers

The key insight is that domestic customers are currently receiving electricity services at a price below cost (i.e., being cross-subsidized) while commercial, manufacturing/industrial, and agriculture customers are paying above cost for electricity.

The business as usual (BAU) rates as shown in graph below indicate that existing tariff structures are not cost reflective. More than 80% of costs are recovered through a variable energy charge and this makes the municipality susceptible to volumetric risk. The cost of supply (CTS) results indicates that to achieve cost reflectivity, the municipality must recover slightly more than 80% of their costs through variable energy charges, the remainder of costs through stable or fixed demand and customer charges. As the uptake of distributed generation increases in electricity distribution networks, a more cost reflective approach to setting tariffs is proposed.

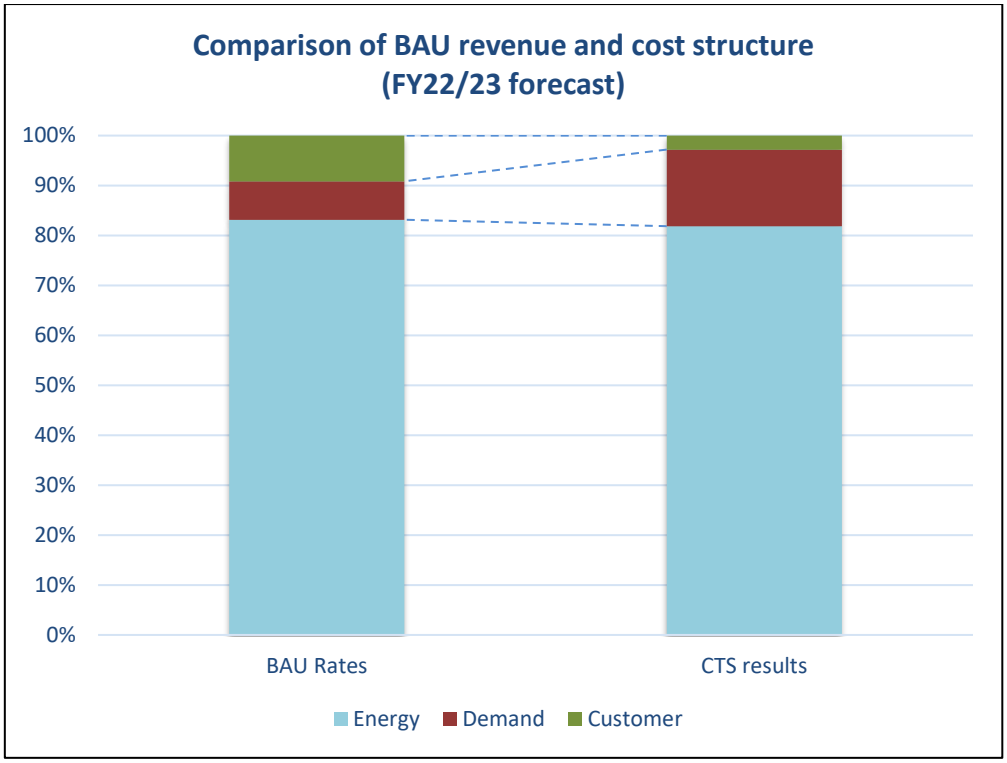


Figure 7 Comparison of revenue and cost structure

The cost reflective charges are shown in table below. These are results of the cost of supply study and indicate what the municipality should be charging customers to recover 100% of their revenue. However, due South Africa's socio-economic conditions and the municipality's revenue recovery strategy, the municipality may deviate from these cost reflective tariffs in the tariff design stage of the cost of supply study. Rate design is discussed in the next section and may deviate from these results based on the municipality's maximum tolerable tariff increase, subsidy policy, price signals, tariff design choices etc.

Table 3 Cost reflective results by business area, class, season, TOU

Business area:	**Total**	**Total**	**Total**
Cost class:	**Energy**	**Demand**	**Customer**
Season:	All	All	All
TOU:	All	All	All
Unit:	*cR/kWh*	*R/kVA/month*	*R/POD/month*
Customer Categories			
Domestic (pre-paid)	199	116	50
Domestic (conventional)	199	116	66
Agriculture	169	83	314
Mining & quarrying	-	-	-
Manufacturing / Industrial	169	87	314
Commercial (pre-paid)	176	93	83
Commercial (conventional)	176	93	99
Transport	-	-	-
Redistributors/Resellers	-	-	-
Street lighting	199	116	116
Electricity department	-	-	-
FBE	-	116	50
Other consumers	-	-	-
Sold to other municipal departments	199	113	99

5. Rate design

Municipal tariff setting is guided by Municipal Tariff Policy which is developed with reference to various pieces of legislation, but in particular Sections 4 and 74 of the Municipal Systems Act (32 of 2000) and the National Electricity Pricing Policy (2008), which also outlines the General Tariff Principles as set out in S16 of the Electricity Regulation Act of 2006. The regulatory framework on tariffs seeks to balance the often competing or contradictory tariff principles of revenue sufficiency, economic efficiency, equity, fairness and simplicity.

The COS is an important, but not deterministic, input to tariff design. It enables a municipality (and the Regulator) to assess:

a. Revenue sufficiency of proposed tariffs and the financial sustainability of the utility.
b. That tariffs reflect the costs associated with rendering the services and those customers are treated equitably and pay in general proportion to use of services.
c. The reasonableness of the low-income tariff determination in line with guiding policy: including access to a free basic service plus lifeline tariff based on operation and maintenance only.
d. Whether environmental objectives are being encouraged; and
e. The transparency of subsidies and surcharges.

6. Key Assumptions

This section of the report outlines key assumptions that were made in the development of this Cost of Supply study. These assumptions were essential due to granular data unavailability and lack of clear planning approaches in the municipality. These assumptions are as follows:

- The energy forecasts will increase year on year by 1.0%
- The D-Form expenses will decrease by 20% for FY2022/23 then remain constant.
- The total maximum demand of the municipality is 75 MVA and with an assumed coincidence factor of 0.2
- The Eskom bulk purchase energy price was assumed to increase year on year by 12%
- For customers with an inclining block tariff, the block 2 tariff was used as the test year input. The model is unable to cater for inclining block tariff inputs.
- For manufacturing/industrial customer, Industrial - Large power user <11kV Connection tariff was used as an input into the model.
- For commercial (pre-paid), Commercial prepaid three phase <=80 Amp tariff was used as an input into the model
- For commercial, Commercial conventional 3phase <=50kVA tariff was used as an input into the model
- The actual municipal energy losses for FY2021/22 were 6.70% however, energy losses were capped at 12% as per the COS framework.

RECOMMENDED	✓
NOT RECOMMENDED	

M SHUDE
DIRECTOR: FINANCIAL SERVICES

APPROVAL	✓
DISAPPROVAL	

D P LUBBE
MUNICIPAL MANAGER