ANNEXURE A2
ETHEKWINI ELECTRICITY TRADING SERVICE REFORM BUSINESS AND INVESTMENT PLAN

V1.2

eThekwini Municipality

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Abbreviations

ADMS	Advanced Distribution Management System
AFS	Annual Financial Statement
AMI	Advanced Metering Infrastructure
CAD	Computer Aided Design
CBM	Condition-based Maintenance
CFU	City Fleet Unit
CoGTA	Cooperative Governance and Traditional Affairs
COF	Certificate of Fitness
CTS	Cost to Serve
DOA	Delegation of Authority
DSM	Demand Side Management
EE	eThekwini Electricity

ERP	Enterprise Resource Planning
EUL	Expected Useful Life
EWS	eThekwini Water Services
HC	Human Capital
HCIS	Human Capital Information System
HID	High Intensity Discharge
HV	High Voltage
HRDC	Human Resource Development Committee
ICT	Information Communication Technology
IMU	Information Management Unit
IPPs	Independent Power Producers
ISUPG	Informal Settlements Upgrading Partnership Grant
ITOU	Industrial Time of Use
IVR	Interactive Voice Response
KPI	Key Performance Indicator
kWh	Kilowatt hour
LED	Light-Emitting Diode
LLF	Local Labour Forum
LV	Low Voltage
LDV	Light Duty Vehicle
MFMA	Municipal Finance Management Act
MPV	Multipurpose Vehicle
MTTR	Mean Time to Repair
MV	Medium Voltage
MVA	Megavolt-amperes
MW	Megawatt
NERSA	National Energy Regulator of South Africa
NRS	National Rationalised Specifications
NT	National Treasury
PMO	Project Management Office
PPE	Personal Protective Equipment
PV	Photovoltaic
RE	Renewable Energy
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SCM	Supply Chain Management
SLA	Service Level agreement
SOP	Standard Operating Procedure
SPOMA	Single Point of Management Accountability
SSEG	Small Scale Embedded Generators
SWOT	Strengths, Weaknesses, Opportunities and Threats
TLB	Tractor-Loader-Backhoe
USDG	Urban Settlement Development Grant

Definitions

Asset	A resource owned or controlled by an entity because of past events and from which future economic benefits or service potential is expected to flow to the entity.
Asset Management (LGIAMG)	The process of decision making, planning and control over the acquisition, use, safeguarding and disposal of assets to maximise their service-delivery potential and benefits, and to minimise their related risks and costs over their entire life.
Brownfields Development	Development that is restricted by existing fixed structures, often necessitating some extent of demolishment prior to starting the intended construction.
Capacity (IIMM)	Maximum output that can be produced or delivered using the existing network or infrastructure.
Capital Expenditure (Capex)	Expenditure used to create new assets, increase the capacity of existing assets beyond their original design capacity or service potential, or to return the service potential of the asset or expected useful life of the asset to that which it had originally. CAPEX increases the value of capital asset stock.
Capital Upgrading	Enhances the service potential of the asset or the economic benefits that can be obtained from use of the asset and may also increase the life of the asset beyond that initially expected
Component (IIMM)	A component (Note 1) is a specific part of a complex item (Note 2) that has independent physical or functional identity and specific attributes such as different life expectancy, maintenance and renewal requirements and regimes, risk or criticality. ***Note 1:*** *A component is separately recognised and measured (valued) in the organisation's asset register as a unique asset record, in accordance with the requirements of GRAP 17 to componentise assets.* ***Note 2:*** *A complex item is one that can be disaggregated into significant components. Infrastructure and buildings are considered complex items.*
Facility (IIMM)	A complex comprising many assets (e.g. a hospital, water treatment plant, recreation complex, etc.), which represents a single management unit for financial, operational, maintenance or other purposes.
Financing Costs	Includes annual interest costs and capital repayments (principle amount) for the investment over the period of the loan.
Greenfields Development	Development that is unconstrained by existing fixed structures.
Infrastructure Assets	Stationary systems forming a network and serving whole communities, where the system is intended to be maintained indefinitely at a particular level of service potential by the continuing replacement and refurbishment of its components.
Investment Costs	The initial capital investment plus any intermittent capital expenditure required to achieve the project outcomes.
Life Cycle Cost (IIMM)	The total cost of an asset throughout its life including planning, design, construction, acquisition, operation, maintenance, renewal and disposal costs.
Maintenance	All actions intended to ensure that an asset performs a required function to a specific performance standard(s) over its expected useful life by keeping it in as near as practicable to its original condition, including regular recurring activities to keep the asset operating, but specifically excluding renewal. Refer to **Appendix A** for a hierarchy of maintenance type, approach and actions. ***Note:*** *Maintenance also specifically excludes restoring the condition or performance of an asset following a recognised impairment event, which would be classified as either renewal or upgrading, depending on the circumstances.*
Maintenance Of Capital	Expenditure to ensure that the productive or operating capacity of the asset base is maintained over time. The value vested in capital assets is maintained when the entity has at least as much capital at the end of the period as it had at the beginning thereof.
Major Capital Project	An infrastructure project or a series of interrelated infrastructure projects on a single site having an estimated cost, including those required for new facilities or systems to become fully operational, above a prescribed threshold.
Net Benefits	The sum of annual benefits less annual costs in the year of the project/asset's life.

Net Present Value	The value of an asset to the entity in present money terms. It is the net amount of discounted cash inflows arising from the use and subsequent disposal of the asset, after deducting the value of the discounted total cash outflows.
Operating Expenditure	OPEX is recurrent expenditure to provide services. Examples of OPEX include staff costs, administration costs, consumables, maintenance and repairs and feasibility studies.
Opportunity Cost	The cost of cash flows that could have been earned in the best alternative investment opportunity.
Optimised Decision Making (IIMM)	**Two definitions are:** A formal process to identify and prioritise all potential solutions with consideration of financial viability, social and environmental responsibility and cultural outcomes an optimisation process for considering and prioritising all options to rectify existing or potential performance failure of assets. The process encompasses NPV analysis and risk assessment.
Package	Work which is grouped together for delivery under a single contract or an order.
Portfolio	**To be read in context, as follows:** Asset portfolio: a grouping of assets to deliver a range of services associated with a particular function. Examples of asset portfolios include water and sanitation, roads and stormwater, electricity distribution, solid waste, information and communications technology, social amenities and investment properties. In relation to infrastructure procurement and delivery management: a collection of projects or programmes and other work that are grouped together to facilitate effective management of that work to meet a strategic objective.
Programme	The grouping of a set of related projects to deliver outcomes and benefits related to strategic objectives which would not have been achieved had the projects been managed independently.
Project	A unique set of coordinated and controlled processes and activities; undertaken to achieve a specific objective(s) according to specifications; within a defined timeframe (start and end dates); that consume resources (e.g. funds, labour, materials and equipment); and is confined by a control budget.
Property, Plant And Equipment (PPE) (Grap)	Property, plant and equipment are tangible items that: (a) are held for use in the production or supply of goods or services, for rental to others, or for administrative purposes; and (b) are expected to be used during more than one reporting period.
Public Private Partnership (PPP)	A commercial transaction between an organ of state and a private party in terms of which the private party: Performs an institutional function on behalf of the organ of state or acquires the use of state property for its own commercial purposes; and assumes substantial financial, technical and operational risks in connection with the performance of the institutional function or use of state property; and receives a benefit for performing the institutional function or from utilising the state property, either by way of: consideration to be paid by the organ of state which derives from a revenue fund or, where an organ of state is a national government business enterprise or a provincial government business enterprise, from the revenues of such institution; or charges or fees to be collected by the private party from users or customers of a service provided to them; or a combination of such
Renewal	Expenditure on an existing asset that returns the service potential of the asset or expected useful life of the asset to that which it had originally. ***Note 1:*** *Renewal can include works to replace existing assets or facilities with assets or facilities of equivalent capacity or performance capability.* ***Note 2:*** *Expenditure on renewals is funded through the entity's capital budget, and such expenditure is recognised in the entity's Statement of Financial Position.*
Stage	A collection of logically related activities in the infrastructure delivery cycle that culminates in the completion of a major deliverable.
Upgrading	The replacement of an asset or addition/ replacement of an asset component, which materially improves the original service potential of the asset.
Useful Life (Grap)	The useful life of an asset is the period over which an asset is expected to be available for use by an entity or the number of production or similar units expected to be obtained from the asset by an entity.

Executive summary

This document outlines eThekwini Electricity's Business Plan for the period 2025 to 2030, providing an overview of the initiatives the Electricity Unit intends to undertake to successfully execute its reform strategy. The document is divided into 7 parts.

Part 1 outlines the programme structure and details the projects planned for the short and medium terms. It includes a review of the past financial year to highlight significant variances that need to be addressed in the future. Additionally, an overall financial summary is provided.

Part 2 details the programmes necessary to enhance management and governance, ensuring adequate management resources are available.

Part 3 focuses on programmes aimed at enhancing systems to provide better data for improved decision-making. It is crucial for the Electricity Executive to monitor and control operations effectively, as well as to investigate and analyse issues to develop effective solutions.

Part 4 unpacks programmes related to commercial plans, including customer relations, billing, collection, financials, tariff structuring, and increasing revenue.

Part 5 outlines programmes designed to optimize operations for improved expenditure performance, with a major focus on loss control.

Part 6 details programmes aimed at making investments to ensure the sustainability of the electrical distribution business and other necessary infrastructure for future electricity provision.

Part 7 provides an overall projection and conclusion.

Parts 3, 5, and 6 detail a range of prioritized engineering projects. Each programme's implementation capacity and timelines are also thoroughly examined.

According to National Treasury's Resource Document: Annexure B, titled "Developing and Implementing Municipal Electricity and Energy Business Turnaround Strategies," clause 6.2 discusses the implications of not treating trading services as a business. To significantly improve the operational and financial efficiency of electricity trading services, it is crucial to dedicate considerable and focused management attention to the business. Treating the electricity trading service merely as a technical department can obscure the comprehensive view of the business, which is essential for effective management.

A narrow focus on technical aspects alone often results in overlooking the broader business context, including the intricate interplay of various functions and objectives within the municipality. The implications of not treating trading services as a business typically include:

- No clear picture of the true financial position and performance of the business.
- Inadequate resourcing relative to actual business needs.
- Inability to make appropriate trade-offs between capital and operational spending.
- Failure to recognize specific technical and competence requirements in recruitment.
- Lack of transparency in inter-business costs and performance.
- Decisions based on short-term rather than long-term sustainability.
- Decisions based on corporate rather than trading services' needs.
- Low flexibility in resource deployment.
- A risk-averse organizational culture that penalizes mistakes.
- Absence of clear performance and shareholder agreements.

This business and investment plan has been developed to cover both the technical aspects and the broader business context as a whole

PART 1 - OVERVIEW

1.0 Introduction

This document is eThekwini Electricity's (EE's) Business Plan for the period 2025 to 2030 which provides an overview of the initiatives that the Electricity Unit intends to undertake to successfully execute its reform strategy.

The document has been divided into the following parts:

- Part 1 – Overview
- Part 2 – Institutional Reform
- Part 3 – Information Systems and Business Process Re-engineering
- Part 4 – Customer and Revenue Management
- Part 5 – Optimisation
- Part 6 – Investments for Sustainability

Part 1 outlines the programme structure and details the projects planned for the short and medium terms. It includes a review of the past financial year to highlight significant variances that need to be addressed in the future. Additionally, an overall financial summary is provided.

Part 2 details the programmes necessary to enhance management and governance, ensuring adequate management resources are available.

Part 3 focuses on programmes aimed at enhancing systems to provide better data for improved decision-making. It is crucial for the Electricity Executive to monitor and control operations effectively, as well as to investigate and analyse issues to develop effective solutions.

Part 4 unpacks programmes related to commercial plans (customer relations, billing, collection, financials, tariff structuring, and increasing revenue.

Part 5 outlines programmes designed to optimise operations for improved expenditure performance, with a major focus on loss control.

Part 6 details programmes aimed at making investments to ensure the sustainability of electrical distribution infrastructure and other necessary infrastructure for future electricity provision.

Part 7 finally provides an overall financial summary.

Parts 3, 5, and 6 detail a range of prioritised engineering projects. Each programme's implementation capacity and timelines are also thoroughly examined.

According to National Treasury's (NT's) Resource Document: Annexure B, titled "Developing and Implementing Municipal Electricity and Energy Business Turnaround Strategies," clause 6.2 discusses the implications of not treating trading services as a business:
"To significantly improve the operational and financial efficiency of electricity trading services, it is crucial to dedicate considerable and focused management attention to the business. Treating the electricity trading service merely as a technical department can obscure the comprehensive view of the business, which is essential for effective management."

A narrow focus on technical aspects alone often results in overlooking the broader business context, including the intricate interplay of various functions and objectives within the municipality. The implications of not treating trading services as a business typically include the following:

1. No clear picture of the true financial position (balance sheet) and financial performance (income statement and cash flow) of the business and hence an inability to assess financial performance of the business as a whole. Instead, the key metrics measured are revenue and expenditure against budget.
2. A failure to adequately resource the service in relation to its needs, that is, the capital and operating budgets, which are typically a product of an annual determination of a maximum increment rather than based on actual business needs.
3. An inability to make appropriate trade-offs between capital and operational spending.
4. A failure to recognise the specific technical and other competence requirements of the business in recruitment processes.
5. Lack of transparency in inter-business costs and performance within the municipality, and absence and/or lack of enforceability of inter-business contracts.
6. Decisions based on short-term considerations rather than the long-term sustainability of the business.
7. Decisions based on corporate considerations rather than trading services' needs.

8. Low flexibility in deployment of resources because of strong rules against moving money between budget items within year and a lack of flexibility in how people are deployed. This makes it difficult to respond to unplanned challenges or changes during a financial year.
9. An organizational culture that is risk averse and that penalises mistakes whereas innovative business cultures actively encourage experimentation and expect failures as part of this process.
10. The absence of clear performance and shareholder (financing) agreements between the shareholder and the business entity.

As a result, this business and investment plan has been developed to cover the technical aspects and the broader business as a whole.

2.0 Recap of Reform Strategy Strategic & Tactical Goals

EE's reform strategy aims to improve electricity service delivery by improving management and governance, optimising primary and support operations to increase cash revenue and capital investment, to create a positive reinforcement cycle of growth and sustainability of EE. The strategy is under pinned by the seven-box framework recommended by NT. Five strategic goals have been set to provide direction in achieving a turnaround in delivering electricity services and ensuring financial sustainability of the trading service, namely:

1.Establish a single point of management accountability for the delivery of electricity services.

2.Optimise primary operations to deliver services efficiently to customers.

3.Optimise support operations to deliver services efficiently to primary operations.

4.Turnaround cash revenue to deliver a surplus to sustain operations.

5.Increase investment into electricity operations to increase revenue and ensure efficient and sustainable service delivery.

The Electricity Unit aims to achieve its strategic goals by completing tactical goals, contingent upon institutional reforms that establish a single point of management accountability and a suitable organisational structure.

Table 1 – EE TSRS Tactical Goals

Goal 1: Reform Leadership and Management	Leadership & Management				
Goal 2: Strengthen Governance and Accountability Frameworks		Sound Governance			
Goal 3: Reform support activities within the electricity value chain	Leadership & Management	Sound Governance			
Goal 4: Improve customer satisfaction	Customer Service	Asset Investment			
Goal 5: Increase billing accuracy and efficiency	Customer Service	Asset Investment	Sound Finances		
Goal 6: Optimise outage management	Customer Service	Asset Investment		Asset Operations	People & Systems
Goal 7: Optimise financial stability and efficiency			Sound Finances		
Goal 8: Transform infrastructure management			Sound Finances	Asset Operations	People & Systems
Goal 9: Adapt to market and regulatory changes	Customer Service		Sound Finances		
Goal10: Safeguarding revenue streams	Customer Service		Sound Finances		

Goal 11: Improve loss control	Customer Service	Asset Investment	Sound Finances		
Goal 12: Enhance maintenance efficiency and effectiveness			Sound Finances	Asset Operations	
Goal 13: Strengthen infrastructure resilience and security		Asset Investment		Asset Operations	
Goal 14 Improve data management and decision-making	Leadership & Management		Sound Finances	Asset Operations	
Goal 15: Reform investment management practices		Asset Investment		Asset Operations	People & Systems
Goal 16: Enhance project efficiency and delivery		Asset Investment			People & Systems
Goal 17: Strengthen asset management practices		Asset Investment			People & Systems
Goal 18: Foster innovation and sustainability in infrastructure development		Asset Investment			People & Systems
Goal 19: Enhance employee engagement and motivation					People & Systems
Goal 20: Develop a high-performance workforce					People & Systems
Goal 21: Streamline administrative processes and enhance efficiency		Asset Investment			People & Systems

3.0 Postmortem of 2023-24 Financial Year

This section summarises the postmortem exercise undertaken from a financial perspective to understand variances and reasons for the variances in the 2023-24 financial year.

As can be seen in Table 2, the electricity trading service suffered an approximate R549 million operating losses in 2023-24.

The total deficit was an approximate R1,77 billion, after gains and losses were taken into account.

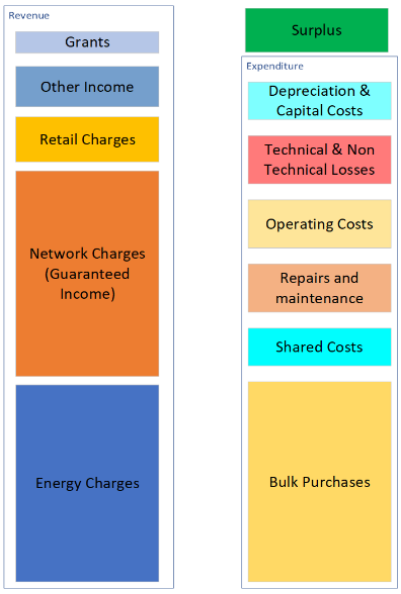

Figure 1 – Revenue & Expenditure

Table 2 – Revenue and Expenditure for 2023-24 FY

Account	Original Budget R'000	Adjusted Budget R'000	YTD Actual R'000	YTD Variance	YTD Variance %
Total Operating Revenue	-21,099,989	-21,344,318	-20,400,637	-943,681	4%
Total operating Expenditure	20,613,193	20,978,854	20,950,457	28,397	0%
Operating profit/losses	**-486,796**	-365,464	**549,820**	-915,284	250%
Gains and losses (Impairment, other Asset related Gains and Losses)	377,102	1,223,413	1,223,309	105	0%
Other Gains and Losses	109,694	231,607	0	231,607	100%
Total Surplus / Deficit	**0**	1,089,556	**1,773,129**	-683,572	-63%

3.1 Review of 2023-24 FY Revenue

The table below highlights variances that occurred. The items highlighted in red and green were selected either based on the amount being over R10 million or percentage variance being greater than 20%. The adjustment on the Grant allocation or non– exchange revenue was driven by perceived grant use of the USDG and ISUPG grants.

A noticeable shortfall is the approximate R1 billion of electricity service charges that never materialised. Key programmes to make corrections going forward have been detailed in PART 4 – Customer & Revenue Management.

Table 3 - Revenue Earned in 2023-24 FY

	Original Budget	Approved Budget	YTD Actuals	Original Budget YTD Variance	Original Budget Variance %	Approved Budget YTD Variance	Approved Budget Variance %
Cost of Free Basic Services	-R353,269,600	-R414,369,600	-R414,371,084	R61,101,484	17.30%	R 1,484	0.00%
Contra Accounts	**-R353,269,600**	**-R414,369,600**	**-R414,371,084**	R61,101,484	17.30%	R 1,484	0.00%
Electricity	-R215,484,000	-R215,484,000	-R314,389,359	R98,905,359	45.90%	R98,905,359	45.90%
Receivables	**-R215,484,000**	**-R215,484,000**	**-R314,389,359**	R98,905,359	45.90%	R98,905,359	45.90%
Service Charges - Electricity	-R18,257,739,680	-R18,257,739,680	-R17,238,230,503	-R1,019,509,177	-5.58%	-R1,019,509,177	-5.58%
Service Charges	**-R18,257,739,680**	**-R18,257,739,680**	**-R17,238,230,503**	-R1,019,509,177	-5.58%	-R1,019,509,177	-5.58%
Operational Revenue	-R2,757,290	-R2,757,290	-R7,294,466	R 4,537,176	164.55%	R4,537,176	164.55%

	Original Budget	Approved Budget	YTD Actuals	Original Budget YTD Variance	Original Budget Variance %	Approved Budget YTD Variance	Approved Budget Variance %
Rental from Fixed Assets	-R509,770	-R509,770	-R915,925	R 406,155	79.67%	R406,155	79.67%
Sales of Goods and Rendering	-R 16,571,020	-R 16,571,020	-R 19,821,665	R 3,250,645	19.62%	R3,250,645	19.62%
Exchange Revenue	**-R 19,838,080**	**-R 19,838,080**	**-R 28,032,056**	R 8,193,976	41.30%	R8,193,976	41.30%
Fines, Penalties and Forfeits	R -	R -	-R522,102	R 522,102		R522,102	
Transfers and Subsidies – Capital	-R295,044,000	-R416,957,365	-R415,845,000	R120,801,000	40.94%	-R 1,112,365	-0.27%
Transfers and Subsidies - Operating	-R353,269,600	-R353,269,600	-R353,269,600	R -	0.00%	R 0	0.00%
Non-exchange Revenue	**-R648,313,600**	**-R770,226,965**	**-R769,636,702**	R121,323,102	18.71%	-R 590,263	-0.08%
Activity Based Recoveries	-R301,732,030	-R301,732,030	-R401,249,912	R99,517,882	32.98%	R99,517,882	32.98%
Departmental Recoveries	-R253,685,680	-R315,001,604	-R115,851,168	-R137,834,512	-54.33%	-R199,150,435	-63.22%
Internal Billing	-R1,049,926,120	-R1,049,926,120	-R1,118,875,986	R68,949,866	6.57%	R68,949,866	6.57%
Recoveries	**-R1,605,343,830**	**-R1,666,659,754**	**-R1,635,977,067**	R30,633,237	1.91%	-R30,682,687	-1.84%
Operating Revenue	**-R21,099,988,790**	**-R21,344,318,079**	**-R20,400,636,771**	-R699,352,019	-3.31%	-R943,681,308	-4.42%

3.1.10 Cost of Free Basic Services

R61 million additional revenue – This revenue source will be investigated further to identify ways to improve in the future. The provision of free basic electricity has a link to non-technical losses relating to affordability issues and illegal connections.

3.1.11 Additional Revenue from Receivables

Additional R98 million - This additional or higher than anticipated revenue is reflective of an increasing quantum of customers in arrears as this is interest income from customers in arrears.

3.1.12 Electricity Sales

R1 Billion variation in sales - The revenue shortfall, although less than 10%, was primarily due to Residential (Home Power) and Prepaid Electricity sales falling short of budget by 13% and 4%, respectively. Industrial (Bulk) Customers' revenue decreased by 5%, but this was partially offset by a 5% increase in Business and General sales.

The amount of revenue lost due to the initial tariff increase requested to NERSA being declined was not available at the time this document was prepared.

Section 22.0 - Tariff Alignment to Cost of Serve, unpacks how the business model will be revised to introduce more cost reflective and structurally reflective tariffs to reduce sales variations in the future and generate guaranteed revenue to maintain the electrical distribution network.

The potential sales lost due to insufficient network capacity has not been quantified. A review of connection applications i.e. those waiting for supply is warranted. This activity involves reconciling data between Customer Services and the MVLV Planning & Construction Branch for customers who have paid for connections/job cards printed vs. jobs not yet completed. Connect application demands, build the business case for HV and MV network expansion, detailed in section 34.1 - HVI Capital Programme and section 33.5 - MV Expansion Programme. Lost sales are particularly noted in the western area due to the network in this region reaching capacity while demand continues to grow.

Sales lost due to load shedding has also not been quantified. Mitigation measures going forward include supporting renewable energy and embedded generation, detailed in section 23.0 - Renewable Energy Programme. It must be noted that the scope of introducing Independent Power Producers is outside the scope of the Electricity Unit. This scope is covered by the Energy Office within eThekwini Municipality and not included in this business plan.

Notably wheeling charges saw a 2570% increase in 2023-2024. Plans to enhance this opportunity is detailed in section 22.3.13 - Development of a Wheeling Policy.

Table 4 - Revenue Earned from Service Charges in 2023-24 FY

	Original Budget	Approved Budget	YTD Actuals	Original Budget YTD Variance	Original Budget Variance %	Approved Budget YTD Variance	Approved Budget Variance %
02740.10 Prepayment Connection	-R 23,254,780	-R 23,254,780	-R 35,487,673	R12,232,893	52.60%	R12,232,893	52.60%
02740.20 Conventional Connection	-R 26,962,120	-R 26,962,120	-R 33,357,927	R 6,395,807	23.72%	R6,395,807	23.72%
02745.10 Disconnect/Reconnect Fe	-R 53,005,030	-R 53,005,030	-R 56,485,860	R 3,480,830	6.57%	R3,480,830	6.57%
02765 Meter Reading Fees	-R39,190	-R39,190	-R51,845	R 12,655	32.29%	R12,655	32.29%
02790.10 Business Cooking	-R 40,695,330	-R 40,695,330	-R 40,379,825	-R315,506	-0.78%	-R 315,506	-0.78%
02790.20 Business & General	-R3,508,193,550	-R3,508,193,550	-R3,709,461,643	R201,268,093	5.74%	R201,268,093	5.74%
02790.30 Private Lights	-R282,150	-R282,150	-R76,028	-R206,122	-73.05%	-R 206,122	-73.05%
02790.40 Two Rate -Scale 2	-R627,651,800	-R627,651,800	-R526,509,465	-R101,142,335	-16.11%	-R101,142,335	-16.11%
02845 Home power 2	-R5,342,343,140	-R5,342,343,140	-R4,627,940,182	-R714,402,958	-13.37%	-R714,402,958	-13.37%
02875 Industrial(11 000 Volts)	-R7,322,302,660	-R7,322,302,660	-R6,952,187,799	-R370,114,861	-5.05%	-R370,114,861	-5.05%
02880.20 Lotus Park - Wheeling	-R10,940	-R10,940	-R292,151	R 281,211	2570%	R281,211	2570%
02880.30 Wheeling Incentive	-R378,750	-R378,750	-R328,527	-R50,223	-13.26%	-R 50,223	-13.26%
02905.10 Industrial Water Heatin	-R7,779,570	-R7,779,570	-R7,000,432	-R779,138	-10.02%	-R 779,138	-10.02%
02935.20 Domestic	-R1,304,840,670	-R1,304,840,670	-R1,248,671,147	-R 56,169,523	-4.30%	-R56,169,523	-4.30%
Service Charges - Electricity	-R18,257,739,680	-R18,257,739,680	-R17,238,230,503	-R1,019,509,177	-5.58%	-R1,019,509,177	-5.58%

3.1.13 Non-Exchange Revenue

R121 million additional revenue from grants – This is due to an increased allocation of capital project funding from grant sources. This variation could also be linked to a change in funding sources from non–grant to grant, and the main contribution of the increase came from the increased use of the ISUPG. This item isn't necessarily linked to corrective action but rather ensuring that the Unit maximises on the grant allocation and improves overall spending on capital projects.

3.1.14 Activity Based Recoveries

R99,5 million over recovery - Recoveries can vary annually based on the allocation of internal staff to maintenance jobs and the timely migration of these costs from Ellipse to JDE EAMS & ERP systems. In the 2023-24 financial year, the processes were enhanced, resulting in improved migration times for these costs.

3.1.15 Departmental Recoveries

The primary factor contributing to the approximately R200 million variation is internal interest. This interest is influenced by the returns on investments, which can fluctuate based on the performance of these investments. A query has been sent to the Investments team on the explanation for 2023-24.

This amount is dependent on the return received on investments and may also be linked to the total value of the city's investments, making it subject to fluctuations. Generally, better market conditions and improved municipal cash flow performance result in higher interest received and allocated to the Unit.

3.1.16 Internal Billing Income

R69 million variation - Internal billing primarily reflects the electricity consumption by internal departments of the city. This consumption-based billing could benefit from collaboration with other internal stakeholders where there are no losses at their sites. This would help verify that the billed consumption accurately represents the actual usage by the Units and is solely for municipal or council purposes, not for private use.

3.2 Review of FY 2023-24 Expenditure

The table below provides a summary of expenditure that took place including variance analysis against the original and adjusted budget. The major expenditure areas are detailed in the sub sections below.

Table 5 – Expenditure Incurred in 2023-24 FY

	Original Budget	Approved Budget	YTD Actuals	Original Budget YTD Variance	Original Budget Variance %	Approved Budget YTD Variance	Approved Budget Variance %
Municipal Staff	R1,586,614,110	R1,577,728,757	R1,556,852,316	R29,761,794	-1.88%	R20,876,441	-1.32%
Employee Related Cost	**R1,586,614,110**	**R1,577,728,757**	**R1,556,852,316**	R29,761,794	-1.88%	R20,876,441	-1.32%
Employee Costs Capitalised	-R 46,959,350	-R 46,959,350	-R7,683,979	-R 39,275,371	-83.64%	-R39,275,371	-83.64%
Employee Costs Capitalised	**-R 46,959,350**	**-R 46,959,350**	**-R7,683,979**	-R 39,275,371	-83.64%	-R39,275,371	-83.64%
Interest Paid	R148,960,990	R151,300,269	R151,263,350	-R2,302,360	1.55%	R36,920	-0.02%
Interest, Dividends and Rent	**R148,960,990**	**R151,300,269**	**R151,263,350**	-R2,302,360	1.55%	R36,920	-0.02%
Amortisation	R22,581,410	R22,581,410	R24,313,461	-R1,732,051	7.67%	-R 1,732,051	7.67%
Depreciation	R480,504,070	R480,504,070	R417,527,634	R62,976,436	-13.11%	R62,976,436	-13.11%
Depreciation and Amortisation	**R503,085,480**	**R503,085,480**	**R441,841,094**	R61,244,386	-12.17%	R61,244,386	-12.17%
Bulk Purchases - Electricity	R15,147,654,570	R14,720,208,070	R14,847,181,864	R300,472,706	-1.98%	-R126,973,794	0.86%
Bulk Purchases	**R15,147,654,570**	**R14,720,208,070**	**R14,847,181,864**	R300,472,706	-1.98%	-R126,973,794	0.86%
Materials and Supplies	R370,982,080	R664,815,745	R670,204,747	-R299,222,667	80.66%	-R 5,389,002	0.81%
Consumable Stores	R31,323,360	R46,932,852	R47,050,088	-R 15,726,728	50.21%	-R 117,236	0.25%
Other Materials	**R402,305,440**	**R711,748,597**	**R717,254,835**	-R314,949,395	78.29%	-R 5,506,238	0.77%
Consultants and Professional	R40,016,450	R 5,398,850	R 5,398,490	R34,617,960	-86.51%	R 360	-0.01%
Contractors	R440,680,780	R658,239,340	R660,736,771	-R220,055,991	49.94%	-R 2,497,431	0.38%
Outsourced Services	R216,635,000	R298,167,570	R279,030,436	-R 62,395,436	28.80%	R19,137,134	-6.42%
Contracted Services	**R697,332,230**	**R961,805,760**	**R945,165,697**	-R247,833,467	35.54%	R16,640,063	-1.73%
Operating Leases	R16,039,550	R14,220,680	R14,179,107	R 1,860,443	-11.60%	R41,573	-0.29%
Operational Cost	R222,005,450	R231,597,233	R216,893,077	R 5,112,373	-2.30%	R14,704,156	-6.35%
General Expenses	**R238,045,000**	**R245,817,913**	**R231,072,184**	R 6,972,816	-2.93%	R14,745,729	-6.00%
Other Energy - 50kw per household	R353,269,600	R414,369,600	R414,366,170	-R 61,096,570	17.29%	R 3,430	0.00%
Cost of Free Basic Services Pr	**R353,269,600**	**R414,369,600**	**R414,366,170**	-R 61,096,570	17.29%	R 3,430	0.00%
Bad Debtors Written Off		R154,400,913				R154,400,913	-100.00%
Expenditure		**R154,400,913**				R154,400,913	-100.00%
Activity Based Charges	R327,796,190	R327,796,190	R424,659,456	-R 96,863,266	29.55%	-R96,863,266	29.55%
Departmental Charges	R785,171,240	R787,634,528	R783,414,462	R 1,756,778	-0.22%	R4,220,066	-0.54%
Internal Billing	R469,917,210	R469,917,210	R446,271,886	R23,645,324	-5.03%	R23,645,324	-5.03%
Charges	**R1,582,884,640**	**R1,585,347,928**	**R1,654,345,804**	-R 71,461,164	4.51%	-R68,997,875	4.35%
28001 Transfer from Acc Surplus			-R1,650,342,312	R1,650,342,312		R 1,650,342,312	
Contribution to/from Acc Surplus			-R1,650,342,312	R1,650,342,312		R 1,650,342,312	
Surplus/Deficit			**-R1,650,342,312**	R1,650,342,312		R 1,650,342,312	
Operating Expenditure	**R20,613,192,710**	**R20,978,853,938**	**R19,301,317,023**	R1,311,875,687	-6.36%	R 1,677,536,915	-8.00%

3.2.10 Capitalisation of Employee Costs

R39 million under recovery – The under-recovery is primarily due to the use of internal resources for capital projects, particularly within the MVLV Operations Department. The greater the reliance on internal labour for these projects, the higher the under-recovery amount. A lower ratio of capital expenditure compared to previous years may also contribute to this issue. Additionally, there may have been challenges with materials and tools, which the MVLV Construction management team needs to investigate further.

In the absence of contracts, the efficiency of internal resource usage must be closely monitored. Ensuring the availability of necessary materials and tools for internal resources is also crucial. Section 28.0 - Loss Control Programmes details the required initiatives.

3.2.11 Employee Related Costs

R30 million savings - R20m of the R30m was not due to a saving but a review of the Council pension item which reported a negative spend, which at the Unit level was still being investigated by Business Analysts as at the reporting date. The balance of this variance could have been due to the vacant posts which are still in the process of being filled.

Section 28.0 - Loss Control Programmes elaborates on the initiatives required to increase savings to fund additional critical posts required for the reform and increase value for money by increasing productivity.

3.2.12 Depreciation

R61 million savings – This is not really a saving as it is a non-cash item but rather reflective on the level of capital spending and delays in closing off capital projects timeously. The best way to avoid variances like this is to ensure that projects are closed off as planned and there are no delays in this process.

3.2.13 Materials and Supplies

R314 Million over expenditure - The Unit needs to find a way to better manage the use of materials given any constraints that they may have as this item is based on materials drawn from stores. Management of the Unit needs to find a way to enforce materials reconciliations at the depot level. Further details on how this can be achieved is provided in section 28.0 - Loss Control Programmes.

Of course, the higher the level of breakdowns, the higher the level of material usage. Further details on how this can be reduced is provided in section 28.0 - Loss Control Programmes, along with continuous improvement initiatives covered in section 29.0 - Infrastructure Asset Management Programme. The table below provides a breakdown into departments to determine where over expenditure occurred. The largest contributor is MV/LV Operations Department.

Table 6 - Breakdown of Material Costs per Department in 2023-24 FY

Division	Original Budget	Adjusted Budget	Actuals Budget	Original Budget YTD Variance
Admin IT	27,608,370.00	43,838,751.07	44,213,483.76	- 16,605,113.76
Customer Services	8,174,200.00	58,123,100.00	28,583,071.25	- 20,408,871.25
HV	92,763,550.00	97,829,514.91	92,912,612.44	- 149,062.44
MVLV	271,597,860.00	508,914,421.00	551,363,536.46	- 279,765,676.46
Tech Support	2,161,460.00	3,042,810.00	137,221.67	2,024,238.33
Total	**402,305,440.00**	**711,748,596.98**	**717,209,925.58**	**- 314,904,485.58**

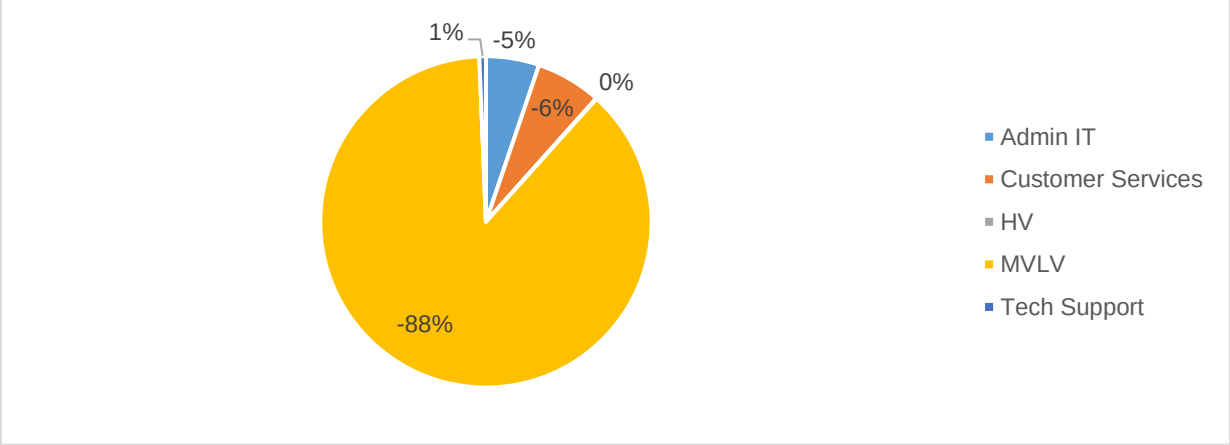

Figure 2 - Variance Percentage of Material Costs

3.2.14 Contracted Services

R247 Million over expenditure - The primary contributor to this expenditure is network maintenance, which accounted for R221 million of the total R247 million. The two largest departments, HV Operations and MVLV Operations, should conduct further investigations. MVLV Operations may have incurred additional costs for security escorts attending to faults and outages. The MV/LV Operations Department needs to investigate the main areas of expenditure, including faults, streetlighting, maintenance costs, and external security.

3.2.15 Bad Debtors Written Off

No write- offs occurred. This was a once-time allocation done by the Budget Office and should not be a recurring item, as it was the first time it was introduced in 2023-24.

3.2.16 Operating Costs

R14 million savings - This savings was due to the delays in the commencement or non-award of software support contracts. This will not impact network maintenance and construction, and the ICT branch can investigate further.

3.2.17 Activity Based Charges

R96 million over expenditure - This charge can fluctuate year to year depending on the allocation of internal staff on maintenance jobs as well as the timeous migration of these costs from Ellipse to JDE EAMS and ERP Systems.

3.2.18 Departmental Charges

R783 million - This area requires a detailed analysis, however for now the majority of the items relate to cross subsidisation, insurance premiums, and the consolidated billing services, seeing that the Electricity Unit is billed along with water, refuse and rates. The items mentioned make up about 83% which means that if all other charges are not levied by other units who do work, there is a total of R130m. Although as indicated there may well be some legitimate charges and perhaps the Unit can review what services are managed by other units such as Legal, Audit etc. The institutional roadmap details plan to systematically review each support service and their associated charges.

Table 7 – Selected Department Charges for 2023-24 FY

Account / Description	Original Budget	Approved Budget	YTD Actuals
27999.5166 IT System App|Info Service	R18,973,870	R 18,973,870	R17,209,860
27999.5202 Cross Subsid|Elec Service	R 332,874,610	R332,874,610	R322,307,165
27999.5208 Cross Subsid|Addl Contr	R 231,019,140	R231,019,140	R240,186,565
27999.5362 HR Recruitment|HR Service	R17,825,380	R 17,825,380	R17,825,389
27999.5381 Insurance Fees|Insurance	R1,177,150	R1,177,150	R1,177,145
27999.5382 Insurance Fees|Insurance	R43,712,120	R 43,712,120	R43,740,541
27999.5541 Mngmt Support|Executive	R8,506,260	R8,506,260	R8,358,152
27999.5722 Procurement|Policy Enfo	R6,268,140	R6,268,140	R6,285,459
27999.5750 Dept Charges|Rates Charge	R -	R-	R8,318,203
27999.5781 Revenue Mngmt|Consolidation	R47,504,280	R 47,504,280	R47,504,280
27999.5782 Revenue Mngmt|Regional	R1,118,470	R1,118,470	R1,118,470

3.2.19 Internal Billing

R23 million savings - The majority of these savings are linked to the consumption of electricity at municipal sites, which reduced the planned recoveries on the income side by at least R18 million. The remaining R6 million is attributed to water consumption at the electricity sites, and depends on usage.

3.2.20 Impairment Losses

R1.2 billion impairment - This is influenced by the socio-economic climate and the affordability of services. As electricity prices rise and customers' economic situations worsen, the provision for impairment increases. However, improvements in recovering long-outstanding debtors should help mitigate this issue.

Table 8 - Impairment Loss in 2023-24 FY

Account / Description	Original Budget	Approved Budget	YTD Actuals	Original Budget YTD Variance	Original Budget Variance %	Approved Budget YTD Variance	Approved Budget Variance %
Impairment Loss	R 377,186,350	R1,223,497,478	1,223,497,478	-R846,311,128	224.37%	R 0	0.00%
Gains and Losses	**R 377,186,350**	**R1,223,497,478**	**1,223,497,478**	-R846,311,128	224.37%	R 0	0.00%

3.3 Electricity Sales and Losses

Electricity Sales statistics are provided in Table 9 below. The issues relating to electricity sales were discussed in section 3.1.12 above, with the exception of losses. An 11.56% deviation can be noted in Table 10 by comparing energy purchases to energy sold. The cost of losses experienced in 2023-24 equated to approximately R1,7 billion (11.56% of R14,847,181,863.57). The losses can be attributed to technical and non-technical losses which are elaborated in the sub sections below.

Table 9 - Sales in 2023-24 FY

Account / Description	Original Budget	Approved Budget	YTD Actuals	Original Budget YTD Variance	Original Budget Variance %	Approved Budget YTD Variance	Approved Budget Variance %
Service Charges - Electricity	-R18,257,739,680	-R18,257,739,680	-R17,238,230,503	-R1,019,509,177	-5.58%	-R1,019,509,177	-5.58%
Bulk Purchases	**R15,147,654,570**	**R14,720,208,070**	**R14,847,181,864**	R300,472,706	-1.98%	-R126,973,794	0.86%

Table 10 – Electricity Purchase and Sales in 2023-24 FY

	ELECTRICITY			
Month	Purchases	Sales	Volumes Lost	% Lost
Jul-23	839,635,248.58	751,156,961.39	**88,478,287.19**	10.54
Aug-23	728,945,943.71	647,741,365.58	**81,204,578.13**	11.14
Sep-23	804,414,127.34	720,996,382.34	**83,417,745.00**	10.37
Oct-23	802,863,190.51	718,336,786.79	**84,526,403.72**	10.53
Nov-23	822,082,547.61	731,773,881.47	**90,308,666.14**	10.99
Dec-23	767,338,713.83	675,258,068.18	**92,080,645.65**	12.00
Jan-24	780,707,484.07	702,636,735.60	**78,070,748.47**	10.00
Feb-24	820,386,443.48	728,347,799.13	**92,038,644.35**	12.64
Mar-24	793,397,801.00	708,504,236.00	**84,893,565.00**	10.70
Apr-24	824,071,092.00	730,543,659.89	**93,527,432.11**	11.35
May-24	805,636,903.00	717,903,044.26	**87,733,858.74**	10.89
Jun-24	906,032,859.12	741,937,145.18	**164,095,713.94**	18.11
TOTAL	**9,695,512,354.25**	**8,575,136,065.81**	**1,120,376,288.44**	**11.56**

3.4 Technical Losses

EThekwini Electricity has historically estimated technical losses at 3%, now revised to 4.5% after completion of a study on the matter. Technical losses equate to R76.5 million. The unit has accepted this position, hence no explicit initiatives have been earmarked to make further improvements.

3.5 Non-Technical Losses

Non-technical losses are estimated by subtracting the technical loss from the total loss. Non-technical losses equate to R1.6 billion. A notable issue related to non-technical losses is the estimation of approximately 170,000 customer connections being bypassed and not having a meter present to calculate actual consumption. Section 25.0 - Revenue Protection Programme, details how this issue will be addressed, essentially through a meter rollout and targeted sweeps.

3.6 Streetlighting

The provision of streetlighting has its own business model which needs to be revised. The table below provides some statistics in terms of revenue and expenditure. The model will need to take the sustainability of infrastructure into account, particularly end of life replacement.

Table 11 - Streetlighting Revenue & Expenditure in 2023-24 FY

	Original Budget	Approved Budget	YTD Actuals	Original Budget YTD Variance	Original Budget Variance %	Approved Budget YTD Variance	Approved Budget Variance %
Co-location revenue							
Advertisement revenue							
Revenue 27990.2060 Int Billing | Elec Street	-R401,437,960	-R401,437,960	-R 401,437,960		0.00%		0.00%
Expenditure 27999.6060 Int Billing |Elec Street	R 401,437,960	R401,437,960	R401,437,960		0.00%		0.00%

4.0 Portfolio, Programme and Project Governance Overview

The figure below illustrate the hierarchy of programmes within the Electricity Portfolio.

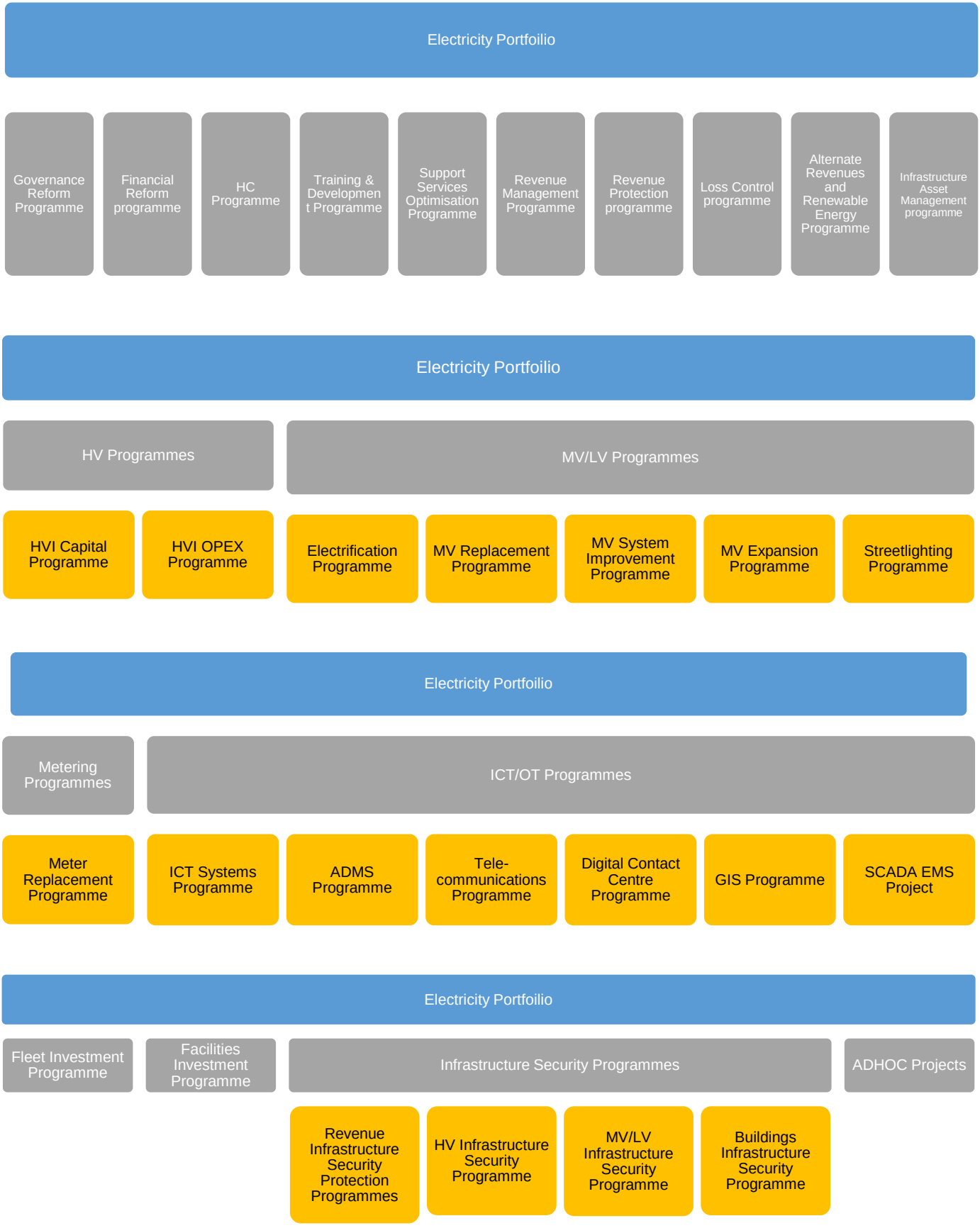

Figure 3 - Electricity Portfolio

5.0 Summary Of Business Plans

This document has been divided into the following parts:

- Part 1 – Overview
- Part 2 – Institutional Reform
- Part 3 – Information Systems and Business Process Re-engineering
- Part 4 – Customer and Revenue Management
- Part 5 – Optimisation
- Part 6 – Investments for sustainability

Figure 4 below shows the grouping of key projects and programmes, each with a theme. The groupings are meant to provide focus areas for implementation of the reform strategy.

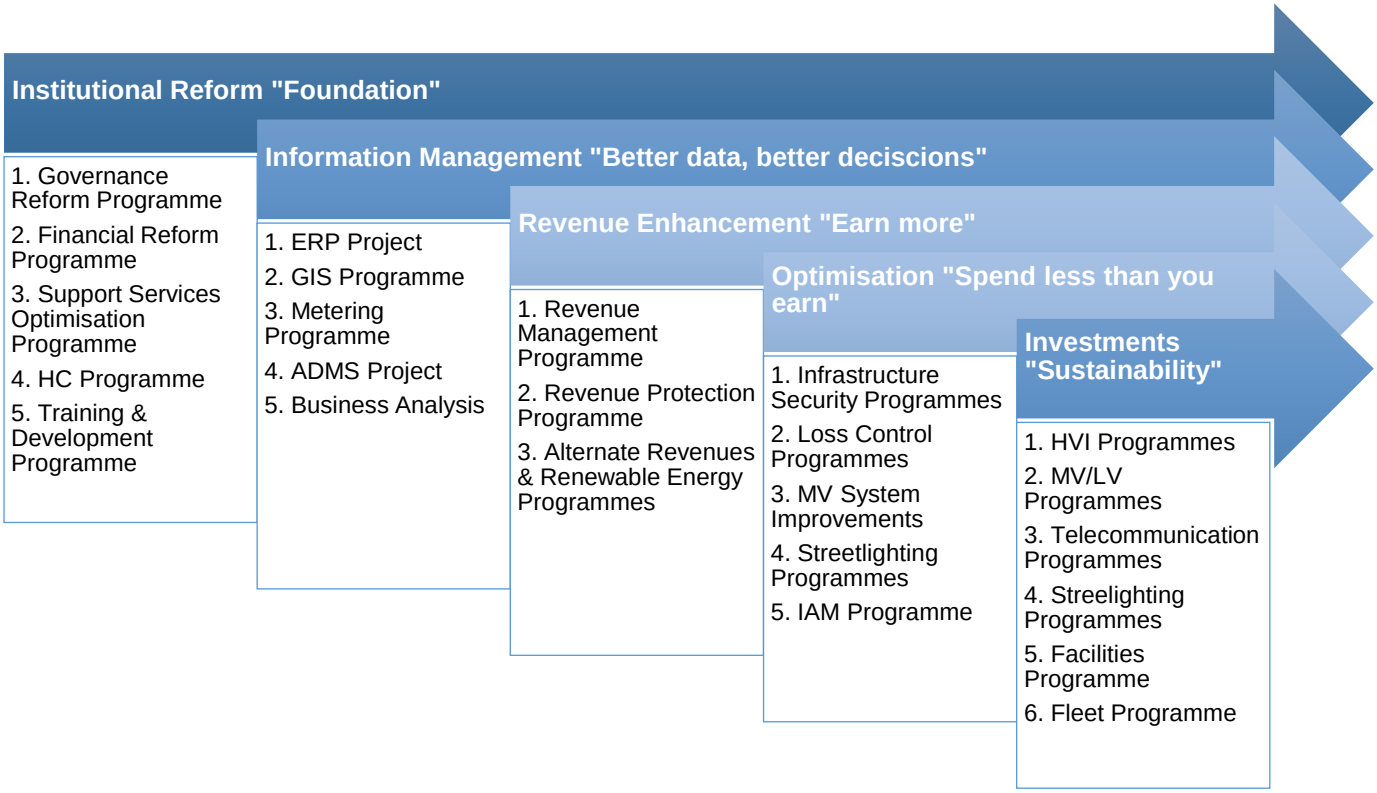

Figure 4 - Key Projects and Programmes

5.1 Commercial Plans (Customer Relations, Billing, Collection, Financials)

The business plan outlines a comprehensive strategy for enhancing revenue, improving meter engineering, optimizing billing and collections, reducing electricity losses, and fostering better customer relations in electricity distribution. This multifaceted approach aims to address existing challenges while capitalising on opportunities for growth and efficiency.

The primary goal of the revenue enhancement strategy is to stabilize and increase the financial sustainability of the organization. By focusing on existing revenue streams, the strategy seeks to improve billing accuracy, streamline collections processes, and implement targeted debt recovery initiatives. This includes enhancing customer engagement to encourage timely payments and reduce outstanding debts.

Improving meter engineering is crucial for accurate billing and minimizing losses. The strategy includes initiatives to upgrade metering infrastructure, ensuring that all consumers are accurately billed for their consumption. This will involve metering previously unmetered areas and implementing bulk meters for large users, thereby increasing the reliability of data used in billing processes. A targeted approach to collections will be implemented, focusing on both residential and commercial debtors. This will include regular audits of accounts to rectify any discrepancies in billing.

Addressing electricity losses is a critical component of the strategy. By identifying and mitigating sources of loss such as technical inefficiencies or unauthorised usage the organisation can significantly enhance its revenue potential. Continuous monitoring and reporting mechanisms will be established to track losses and implement corrective actions promptly.

Fostering positive customer relations is essential for long-term success. The strategy includes enhancing communication channels with consumers to provide timely information regarding services, billing inquiries, and payment options. By improving customer service practices, the organisation aims to build trust and loyalty among its customer base.

In summary, the comprehensive revenue enhancement strategy integrates improvements across multiple facets of electricity distribution operations. By focusing on meter engineering, billing accuracy, collection efficiency, loss reduction, and customer relations, the organization aims to achieve sustainable financial growth while enhancing service delivery standards. Regular monitoring and evaluation will ensure that the strategy remains aligned with organizational goals and adapts to emerging challenges in the sector.

5.2 Tariff Structuring Plans

The Electricity Industry is undergoing an evolution brought on by the shortage of generation capacity, high electricity prices, environmental concerns and a need to make electricity available and affordable to all citizens. This has accelerated the technology development of renewable energy to a point where it is competitively priced to allow for the mass rollout of renewable energy, primarily photovoltaic, in our region.

Further, owing to the national generation crisis, legislation has been reviewed allowing for the dropping of the licence requirements for generators and tax incentives for own generation. This has released an estimated 8000MW of renewable generation nationally, in the last financial year.

As competition from own generation and the Independent Power Producers (IPP's) takes hold, the industry prepares for an open market economy with competitive bidding being the mainstay of the purchase of electricity from generators.

These developments have upset the legacy systems set up to promote the largely single coal-driven generation industry in South Africa to a multiple smaller distributed generation network allowing for bi-directional power flow. This calls for an urgent review of the technical networks and financial systems to accommodate this change.

This makes it imperative to move from an energy business to a network business which will entail separating energy and network/fixed costs which will have to be passed on to the customer.

5.3 Renewable Energy Plans

There is an energy revolution currently underway which municipalities cannot ignore. The revenue model, on which the utility business is based is under a major threat. The fourth industrial revolution, which underpins the energy revolution, is already being witnessed by utilities as decarbonisation, decentralisation and digitalisation are starting to affect municipal traditional strategies. [1]

The electricity sector in South Africa was historically very simple with electricity generation done centrally by Eskom and transmitted by high voltage networks to municipalities/load centres around the country. These municipalities then transmitted, transformed, and distributed the electricity to its residential, commercial and industrial customers. Customers were then metered and given a bill at the end of the month. Using this simple model, municipalities were then able to generate a surplus from the sale of electricity.

However, the introduction of embedded generation sources resulted in partial generation of electricity at the local load centres instead of centrally by Eskom. Customers are no longer only customers but are now called Prosumers. This means that they could be either importing or exporting electricity at any time of the day leading to complexities on the grid that was historically designed for unidirectional power flow as opposed to bi-directional power flow.

This hence necessitate the need to change the existing municipal business models and need for more specialised studies to be conducted to avoid negative impacts to the grid. This will necessitate the need for the training of existing staff and introducing new staff within the utility organogram to be able to manage the growing number of embedded generation applications as well as deal with future applications for electricity wheeling, Independent Power Producers, storage, etc.

6.0 Financial Requirements

This section of the document provides a high-level summary CAPEX and OPEX requirements from the various programmes which comprise the business and investment plan. This data is merely an indicator of the range of financing required by the Electricity Unit. The following exemptions need to be noted:

1. The estimated costs related to revenue protection included a metering rollout is not yet finalised. The issue of procuring meters on OPEX is highlighted in section 25.0. Funding requirements could range for R340million to R935 million.
2. The estimated costs related to the expansion of the MV network work has not been included.
3. OPEX and CAPEX requirements for a range of operational activities not directly mapped to the reform strategy has not been included.

Table 12 - 5 Year Estimated Capital and Operating Budget Requirements

Row Labels	Sum of CAPEX required	Sum of OPEX required
HV infrastructure Capital Programme	R5,340,830,000	
Facilities Investment programme	R1,003,000,000	R336,000,000
Fleet Management Programme	R450,000,000	R240,000,000
MV System Improvement Programme	R344,000,000	R -
MV Cable Replacement Programme	R276,000,000	R -
Telecommunications Programme	R249,500,000	R 5,250,000
Streetlighting Programme	R160,500,000	
Electrification programme	R142,000,000	R -
ICT Systems Programme	R130,000,000	
SCADA EMS Project	R 120,000,000	
ADMS Programme	R 100,000,000	
MV Infrastructure Security programme	R 20,000,000	
GIS Systems Programme	R 6,500,000	R 13,500,000
Meter Replacement Programme	R 5,500,000	R121,250,000
Infrastructure Asset Management programme		
Smart Metering Rollout Programme		
Revenue Protection Infrastructure Security programme		
HC programme		
HV Infrastructure Security programme		
HV infrastructure OPEX Programme		R448,670,000
Financial Reform programme		
Revenue Management programme		
Metering Systems programme		
Revenue Protection programme		
Support Services Optimisation programme		
Digital Contact Centre Programme		
Training & Development programme		
MV Grid Modernisation Programme		
Alternate Revenues and Renewable Energy programme		
Governance Reform Programme		
MV Expansion programme		
Loss Control programme		
Grand Total	**R8,347,830,000**	**R1,164,670,000**

6.1 CAPEX

Figure 5 below is a graph depicting capital requirement for the three largest capital programmes, each over R400 million.

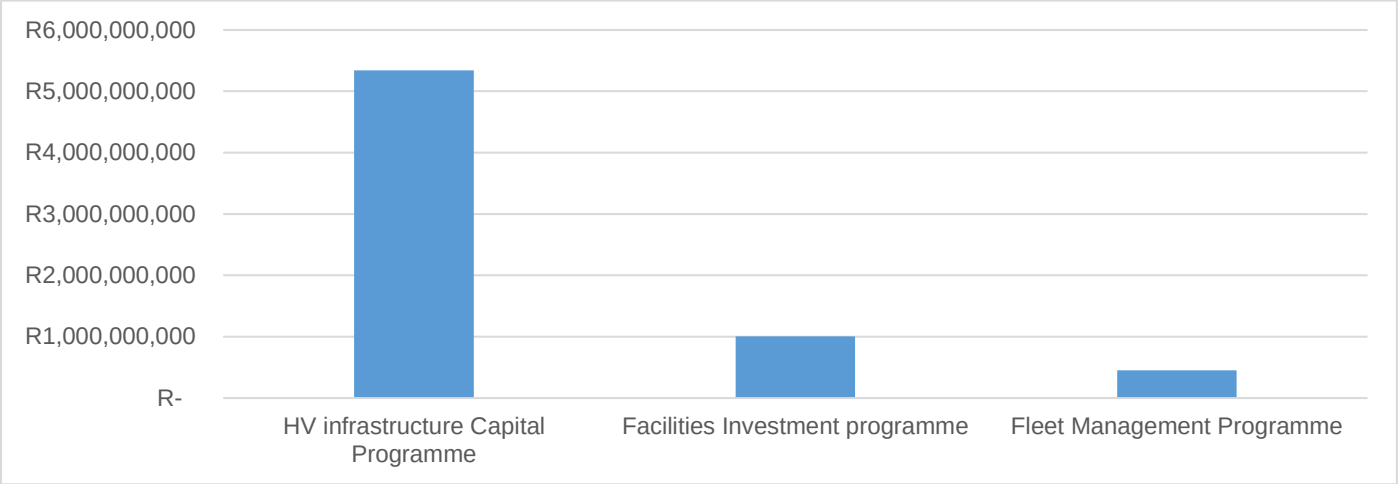

Figure 5 – CAPEX Programmes in Excess of R400 million

Figure 6 below is a graph depicting capital requirement for the remain capital programmes, each under R400 million.

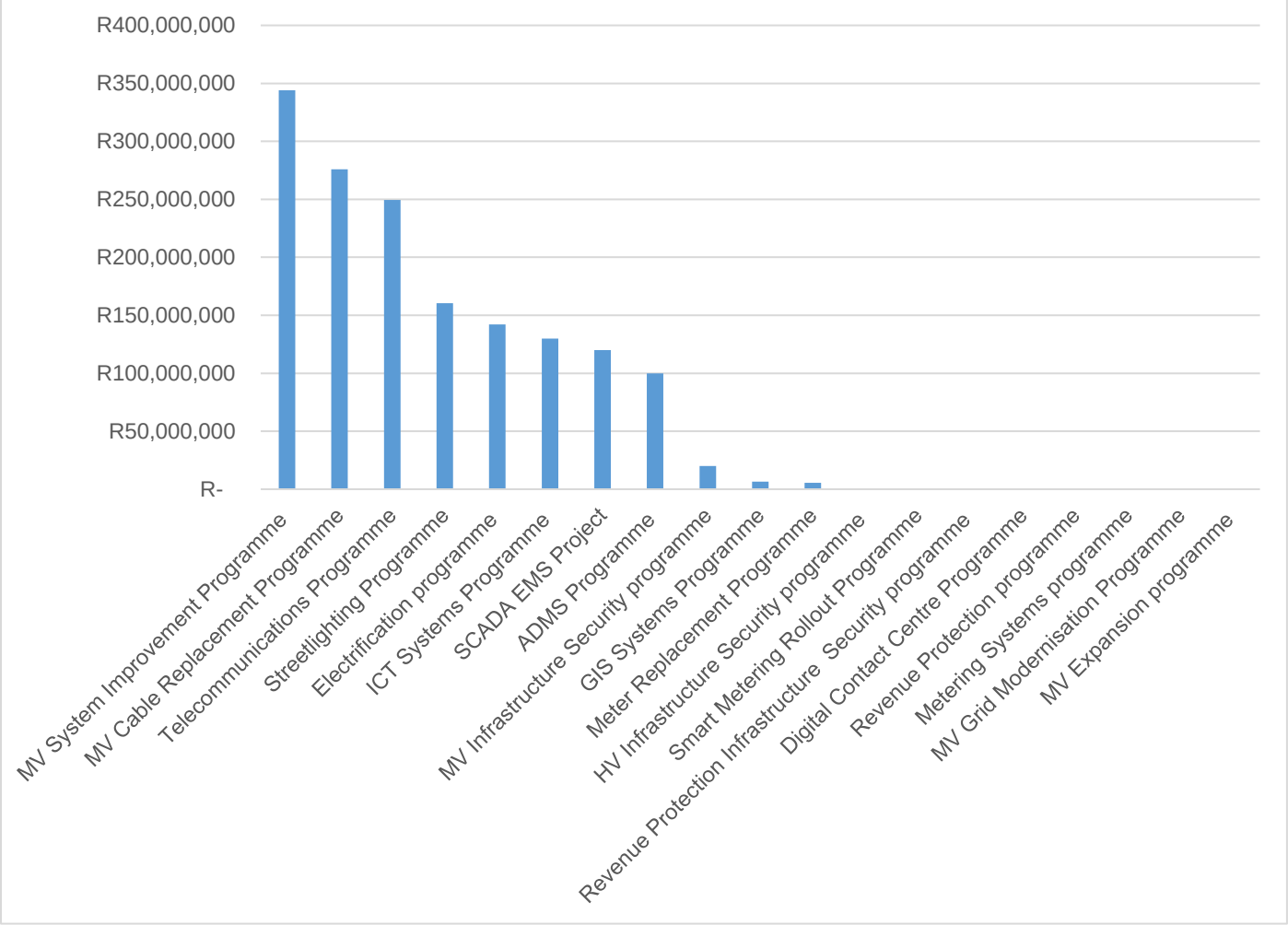

Figure 6 - CAPEX Programmes in Below R400 million

6.2 OPEX

Figure 7 below is a graph depicting operational expenditure requirements for the a range of programmes.

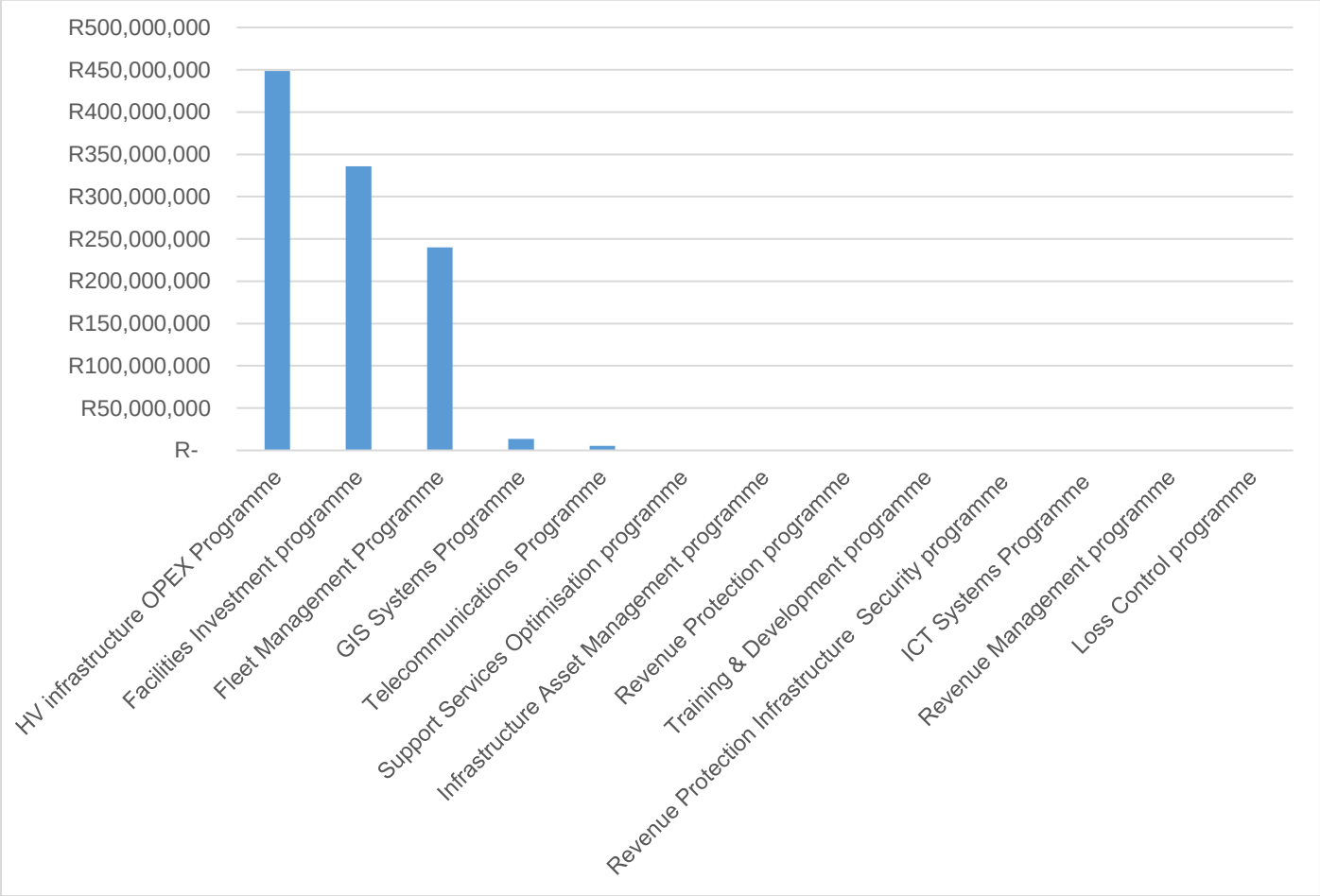

Figure 7 – OPEX Requirements

PART 2 – INSTITUTIONAL REFORM

"*Laying the foundation*"

7.0 Governance Reform Programme

National Treasury has proposed two key activities to enhance the governance of trading services:

1. **Improving governance within municipalities**: This involves strengthening the internal governance frameworks and practices within municipal bodies to ensure better oversight, accountability, and efficiency.
2. **Establishing a governance structure for electricity services**: This aims to create a robust framework for providing electricity services, incorporating rules and norms designed to safeguard against poor or corrupt governance practices, thereby ensuring more reliable and transparent service delivery.

The governance reform programme aligns with the following tactical goals in EE's TSRS:

Goal 2: Strengthen governance and accountability frameworks and

Goal 3: Reform support activities within the electricity value chain.

The figure below illustrates the initiatives that comprise the Governance Reform Programme.

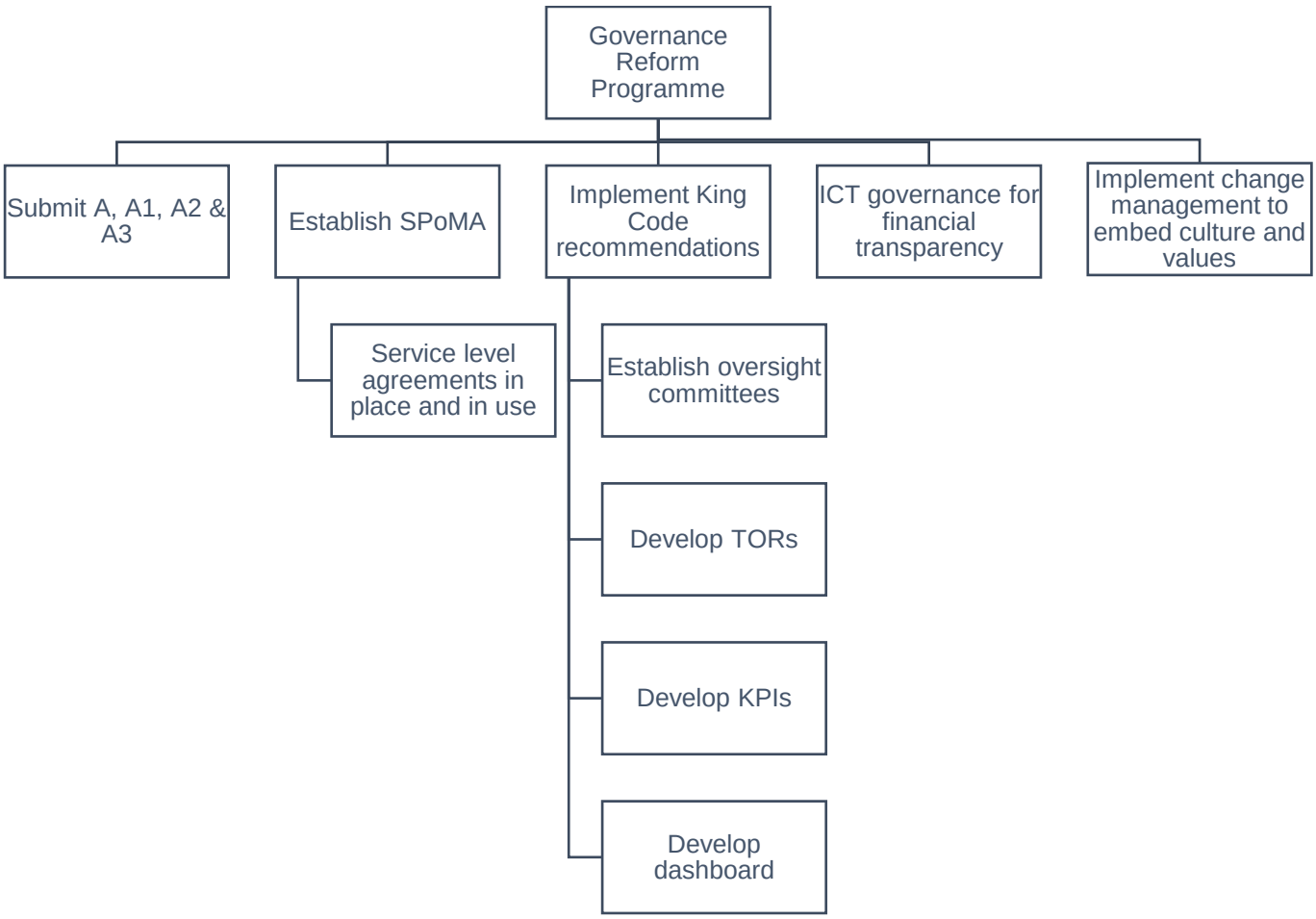

Figure 8 - Governance Reform programme

The primary aim of the governance reform programme is to bolster governance, increase financial transparency, and enhance stakeholder engagement through the following measures:

1. Establishing a single point of management accountability by integrating the following support services: human capital, finance, supply chain management, information communication technology and fleet management

through delegation or change in reporting lines. A Facilities Management and Security Management Branches would also need to be established.
2. Reviewing and implementing the King Code recommendations for more robust governance and ethics. Supported by the establishment of an oversight committee with skilled, experienced, and trained members. Embed a distinct separation between governance roles and daily operations and management.
3. Developing ICT governance and systems for financial transparency.
4. Reforming governance of primary and support activities.
5. Co-locating support services to improve governance and integration.
6. Reviewing and/or establishing optimised services via optimised SLAs.
7. Introducing a change management program to embed the required culture and values.

Strengthening governance and accountability frameworks and implementing an integrated change management programme should foster a culture of responsibility and integrity, where transparent and consistent practices build trust and legitimacy.

Optimising support services and performance structures will eliminate administrative overlaps, creating streamlined processes that enhance efficiency, financial transparency, and employee motivation. Furthermore, by stakeholder engagement EE will ensure that its decisions reflect the needs and concerns of its community while solidifying external confidence in its operations.

Collectively, these initiatives will create a supportive, enabling environment where effective management drives EE to operate successfully as a business, improving service delivery and fostering sustainable growth.

This programme will address the following customer, business and operational KPA and KPI's

Table 13 - Governance Reform Programme KPA's

KPA	KPI
KPA1 Preparation of the Electricity Trading Services Reform Strategy, Institutional Road Map and Business Plans	KPI 1 - Council approved Trading Service Reform Strategy submitted to National Treasury by 31 October 2024, KPI 2 - Annexure A1 Trading Service Reform Road Map submitted to National Treasury by 31 October 2024. KPI 3 – Annexure A2 Trading Service Business and Investment Plan submitted to National Treasury by 31 October.
KPA2 Complete Trading Services Reform Performance Improvement Action Plan (Template will be received from National Treasury in November 2024)	KPI 4 – Receive template and compile Performance Improvement action Plan by February 2025
KPA 3 Establish a single point of management accountability	KPI 5 Delegation of authority for SPoMA to Head: Electricity (11/2024 to 02/2025) KPI 6 – Decentralisation of support services (2025 to 2028) KPI 7 – Finalise SLAs for remaining support services (2025 to 2028)
KPA 4 Establishment of a capable Executive Team	KPI 8 Fast track recruitment critical posts, including vacant deputy head, strategic executive and project executive posts.
KPA 5 KPI dashboard	KPI 9 Develop dashboard requirement specification
	KPI 10 Develop and share dashboard with stakeholders
KPA 6 Establish steering committees to oversee governance	KPI 11 Hold regular steering committee meetings
	KPI 12 Record minutes of all steering committee meetings

The Head of Electricity Trading Services will serve as the programme sponsor, with the relevant Deputy Heads overseeing each of the key projects listed below as project managers. The Head: Electricity, along with the Executive Management team, will ensure that effective governance is ingrained in the Unit's culture, enabling smooth operations, regulatory compliance, and the best service for customers and the community.

The use of a management consultant may be considered to assist with the establishment of the committees and the development of the respective TORs.

Table 14 - Governance Reform Programme summary

Project	KPI 's	Start Year	End Year	Project implementation capacity	Status
Trading service reform strategy	Council approved EE TSRS	04/2024	10/2024	Internal – secondment	In progress
Business and investment plan	Council approved B&IP	08/2024	10/2024	Internal – secondment	In progress
Institutional road map	Council approved IRM	08/2024	10/2024	Internal – secondment	In progress
Performance improvement action plan		11/2024	02/2025	Internal - secondment	Identified
Establish SPoMA		11/ 2024	11/2027		Identified
Develop service level agreements		11/2024	11/2027	Head: Electricity and Heads of Support Services	Identified
Appointment of capable management team with mandate and autonomy to manage	Filling of vacancies in the Executive Team	11/2024	11/2025	City Manager, Head: Electricity and Senior Manager: Human Capital	Identified
Review and implement King Code recommendations for ethics.		11/2024	11/2029		Identified
Public commitment by political leadership to turnaround EE.	Confirmation of the political champion	11/2024	12/2024	NA	Identified
Dashboard on performance published and regularly updated.	Development of KPIs for dashboard	02/2025	05/2025	Head: Electricity, Deputy Heads and Senior Manager ICT	Identified
Develop ICT governance and systems for financial transparency.	Preparation of separate financial statement	12/2024	12/2025	CFO and head: Electricity	Identified
Oversight committee ("Board") suitably skilled, experienced, and trained.	Establish steering committees	02/2025	02/2023	Internal	Identified

7.1 Council Approved Trading Service Reform Strategy, Business and Investment Plan and Institutional Roadmap

Developing a trading service reform strategy for the electricity unit, along with a reform roadmap and business and investment plans, outlines the strategic direction towards creating a financially sustainable, service-oriented business unit. This approach aims to:

- Build customer confidence, thereby enhancing payment culture, financial stability, and attracting investment.
- Improve employee morale and productivity.
- Encourage the adoption of technology and innovation to ultimately deliver high-quality, low-cost services to all citizens.

Furthermore, by complying with the requirements of National Treasury's trading service budget reforms, the unit will become eligible for USDG grants and additional, much needed, incentive grants.

Time frame - April 2024 to October 2024

Status:

1. Trading service reform strategy
   - Prepared.

2. Institutional reform roadmap
   - Prepared.

3. Institutional reform roadmap
   - Prepared.

4. Preparation and submission of Performance Improvement Action Plan
   - Awaiting template from National Treasury in November 2024
   - Submit to National Treasury in February 2025

7.2 Recruitment to fill vacancies in critical posts.

EE's Executive Management team has 10 posts. Only 5 of these posts are currently filled by permanent incumbents. The Executive Management team is responsible for overseeing the operations and activities of EE and their respective Departments. They are also key to setting strategic direction and steering EE towards achieving its long- and short-term goals. The consequences of a high number of vacancies in these key strategic positions include a lack of effective leadership and decision-making, limited organisation accountability which creating negative impacts on financial sustainability and a decline in service delivery outcomes.

It is expected that the posts will be filled by November 2025.

7.3 Review and implement King Code recommendations for ethics

Similar to EWS, the Electricity Unit will endeavour to embed an operational governance framework.

Table 15 – Governance Operational Framework

KPA	YR 1	YR2	YR3	YR4	Y5
Strategy Execution for Resilience & Continuity	1. Review business strategy and strategic objectives every year, to assess whether they are still relevant to the context, situation, and needs of the utility, and update them if necessary. 2. Build adaptive capabilities to execute the strategy 3. Work continuously on optimizing operational and administrative processes, eliminating redundant activities, and reducing operational costs. 4. Formulate Resilience & Business Continuity Plans 5. Develop and implement Disaster Management and Recovery Plans				
Performance monitoring	1. Build capabilities for robust performance management systems to measure business results (KPIs) 2. Index of aggregate performance management targets achieved yearly be above 75% and sustained 3. Monitor processes to analyse progress and make rapid changes when necessary				

KPA	YR 1	YR2	YR3	YR4	Y5
	4. Establish best practice data management to strengthen the improve Unit's data management culture to make data-driven decisions. 5. Take measures to mitigate against poor performance				
Integrity	1. Implement systems to detect and prevent fraud and corruption 2. Enforce Code of Conduct 3. Implement consequence management at all levels of the organisation 4. Report violations to City Integrity & Investigations and SAPS				
Internal Controls & Audit Findings	1. Take steps to identify internal control weaknesses and improve their efficacy 2. Address Internal and External Audit Findings				
Compliance	1. Ensure compliance with all applicable legislative and policy frameworks				
Technology Management	1. Introduce a digital transformation strategy and the use of new technologies that lead to process improvements, time optimization, and cost reduction 2. Develop and implement ICT Governance Frameworks for investment and operational decision-making				
Procurement Management	1. Establish efficient procurement processes, agreements with key suppliers, and sourcing strategies. 2. Develop proper Economic Transformation and Empowerment strategies and protocols 3. Implement sustainable Supplier Development Programme				
Risk Governance	1. Implement a risk governance system that allows the utility to make quick and effective decisions 2. Assess risks and develop and implement plans to mitigate them				
Integrated Reporting	1. Compile quarterly, In-Year and Annual Reports for oversight and accountability to the Trading Services Committee, Council and all stakeholders 2. Develop a performance dashboard and share access with stakeholders				

7.4 Participation in the Executive Management Committee

The Executive Management Committee (EMC) is tasked with ensuring the city's administration is effective and efficient, as per the Municipal Systems Act and the Local Government MFMA. The EMC's key roles include:

- Directing and monitoring the implementation of Council programs and decisions.
- Providing advice and input on submissions to the Executive Committee and other Council Committees.
- Coordinating and communicating strategic decisions made at the Executive Committee level.
- Monitoring service delivery according to the Integrated Development Plan.
- Discussing and resolving strategic issues, including budget implementation.

7.4.10 Role of the Head: Electricity

The Head: Electricity shall be responsible for overseeing and managing the electricity trading service operations and performance in accordance with Council policies and legislative frameworks. He/she will be supported by the direct reports, forming the Electricity Trading Service Executive Management team for daily coordination of activities.

This Executive Management team will provide the Council and its Committees with reliable information, advice, and recommendations on organisational structure, objectives, plans, and policies to facilitate informed decision-making. The Head: Electricity will also be expected to establish sub-committees to assist in these efforts.

The following committees will be established:

- Performance Review
- Customer Services and Service Delivery
- Alternate Revenue
- Revenue Management
- Streetlight
- Loss Control
- Capital Investment
- Acquisition Management
- Business Continuity & Disaster Recovery Committee
- Human Capital Committee
- Digital Committee
- Integrity Committee

8.0 Financial Reform Programme

A financial reform programme is required. Implementation capacity challenges will be addressed once a single point of management accountability is established.

It is proposed that the role of Programme Manager be assigned to the Senior Manager: Finance within the Electricity Unit.

The following initiatives identified in the reform strategy will form part of the programme:

1. Implement an integrated financial dashboard.
2. Enhance variance analysis to align budgets with core business processes.
3. Formalise an agreement on surplus contributions from EE to City Treasury.
4. Formalise an agreement on the cost of capital between EE and City Treasury.
5. Formalise an agreement on the cost of centralised services.
6. Establish an investment framework.
7. Reskill workforce to align to the investment framework.
8. Engage with National Treasury to ensure access to grant funding.
9. Establish a Project Management Office (PMO) to centralise project oversight.
10. Implement standardised project management methodologies and tools.
11. Conduct project performance evaluations and post-implementation reviews to identify areas for improvement and lessons learned.
12. Separate reporting on financial performance for electricity trading service business.
13. Establish Financial transparency for the electricity trading service business.

Further details regarding initiatives 12 and 13 are provided in the institutional roadmap.

9.0 Support Services Optimisation Programme

A support services optimisation programme is required to implement the institutional roadmap. Implementation capacity challenges will be addressed once a single point of management accountability is established.

.

The following initiatives identified in the reform strategy will form part of the programme:

1. ODCM to be engaged to assess the current structure in response to the strategy and in support of the single point of management accountability.
2. Establish a single point of management accountability.
3. Decentralise HR Services.
4. Decentralise Finance Services.
5. Decentralise SCM Services.
6. Decentralise ICT Services.
7. Decentralise Fleet Management Services.
8. Establish Centralised Services SLAs.
9. Co-locate support services to improve governance and integration.
10. Establish a Project Management Office (PMO) to centralise project oversight.
11. Establish a Facilities Management Branch.
12. Establish a Security Management Branch.

Further details regarding the initiatives are provided in the institutional roadmap.

10.0 Human Capital Improvement Programme

A human capital improvement programme is required. Implementation capacity challenges will be addressed once a single point of management accountability is established.

It is proposed that the role of Programme Manager be assigned to the Senior Manager: Human Capital within the Electricity Unit.

The following initiatives identified in the reform strategy will form part of the programme:

1. Accountability for performance with incentives (annual performance review linked to remuneration).
2. Establish a system to acknowledge and reward outstanding performance, contributions, and innovative ideas.
3. Create regular forums, suggestion boxes, or online platforms for employees to voice their concerns, ideas and feedback.
4. Introduce a change management program to address the political overlap.
5. Zero tolerance of corruption and patronage.
6. Foster collaboration between different departments and units by establishing cross-functional teams or task force.
7. Assess existing procedures and streamline workflows.

11.0 Training & Development Programme

A training & development programme is required. Implementation capacity challenges will be addressed once a single point of management accountability is established.

It is proposed that the role of Programme Manager be assigned to the Deputy Head: Technical Support Department.

The following initiatives identified in the reform strategy will form part of the programme:

1. Enhance workforce training and development programs.
2. Provide leadership training to Managers to equip them with the skills necessary to effectively engage and motivate their teams.
3. Identify current skill deficiencies and future skill requirements through comprehensive assessments and surveys.
4. Develop customised training programs based on the identified skill gaps.
5. Pair employees with experienced mentors or coaches to facilitate knowledge transfer.

PART 3 – INFORMATION SYSTEMS & BUSINESS PROCESS RE-ENGINEERING

"*Better data, better decisions*"

12.0 Metering Programmes

The figure below illustrates the initiatives that comprise the metering programmes.

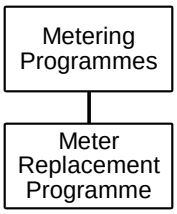

Figure 9 - Metering Programmes

12.1 Meter Replacement Programme

EThekwini Electricity Meter Replacement Programme, enhanced by a detailed metering strategy and test bench strategy, provides a systematic and strategic framework for upgrading utility meters. This approach improves operational efficiency, ensures accurate billing, and supports financial stability. Incorporating these strategies into the programme guarantees that the meter replacement process is organized, effective, and designed for sustainable outcomes.

This programme aligns with Goal 5: Increase billing accuracy and efficiency.

The goal is to ensure accurate meter readings through regular testing and calibration also through maintenance of test bench equipment as per industry standards.

The Meter Replacement Programme contributes significantly to both operational effectiveness and financial solvency by addressing key areas where inefficiencies and revenue losses occur, while also enhancing customer satisfaction and trust.

- Reduces billing errors, minimizing customer disputes and associated costs.
- Prevents revenue loss from inaccurate meters.
- Increases customer trust in billing processes.

The Meter Replacement Programme can significantly benefit from the strategic use of private and development finance, as well as external expertise, to enhance its implementation and ensure long-term success. By leveraging these resources, utilities can accelerate the programme's rollout, incorporate cutting-edge technologies, and improve operational outcomes.

- Partnering with meter manufacturers for advanced testing equipment
- Engaging with industry experts for training and best practices in meter testing

The success of a Meter Replacement Programme depends on clearly defined key performance areas (KPAs) and indicators (KPIs) to measure progress, operational improvements, and financial outcomes. By establishing these metrics, the utility can track performance, identify challenges, and adjust strategies as needed to ensure the programme's long-term success.

This programme will address the following customer, business, and operational KPA and KPIs:

Table 16 - Meter Replacement Programme KPA's

KPA	KPI
KPA 1 Procurement of Meters	KPI 1 Single Phase Specification
	KPI 2 Three Phase Specification
	KPI 3 Meter Cards and Seals
KPA 2 Compile and Make Available all Meter Maintenance Documents	KPI 4 Age Analysis Report
	KPI 5 Maintenance Strategy Report
	KPI 6 Review and Update Maintenance Policy

Overall Programme Manager: Senior Manager: Meter Engineering

To oversee the entire Metering Replacement Plan from Meter Engineering

Sub-Programme Project Managers

Testing of Meter: Test Bench Maintenance Strategy: Chief Engineer

Meter Replacements: Metering Strategy Plan: Chief Technologist

Metering System Compliance & Testing: Chief Technologist

The programme consists of the following related projects:

Key Project 1: Testing of Meters: Test Bench Maintenance Strategy (OPEX)

Key Project 2: Meter Replacements: Metering Strategy Plan

Key Project 3: Metering System Compliance & Testing

Table 17 - Meter Replacement Programme Summary

Meter Replacement Programme							
Project	**KPI 's**	**Start Year**	**End Year**	**CAPEX required**	**OPEX required**	**Project implementation capacity**	**Status**
Test Bench Maintenance	Approval of Plan	2023	Ongoing	0	R250k pa	No	Identified
Metering Strategy Plan	Maintenance Plan	2023	2024	0	R60m pa	Yes	Starting up
Metering System Compliance	E.9623	2019	TBI	R5.5m	0	Yes	Initiated
Total				R 5.5m	R6.25m pa	2 of 3	

12.1.10 Test Bench Maintenance Strategy

High level Description

The metering test bench maintenance strategy aims to ensure the accuracy and reliability of electronic meters used for measuring flow rates. This involves regular calibration, preventive maintenance, and adherence to established testing protocols to minimize errors and enhance operational efficiency.

Intended Benefits

Intended benefits include:

- Accuracy Improvement: Regular calibration and maintenance reduce the likelihood of testing errors, ensuring that meters provide reliable readings.
- Operational Efficiency: A well-maintained test bench minimizes downtime, thereby enhancing the overall productivity of testing operations.
- Cost Reduction: Preventive maintenance helps avoid costly repairs and replacements by addressing issues before they escalate.
- Safety Enhancement: Implementing safety measures, such as emergency shutdown mechanisms, protects both equipment and personnel during testing operations.

Estimated Budget

The estimated budget is approximately R 250 000 per annum

Funding Source

Internal Funding through Operational budget.

Time frame

The implementation timeline for the metering test bench maintenance strategy can be structured as follows:

Initial Assessment and Planning: 1-2 months to evaluate current assets and develop a comprehensive plan.

Implementation Phase: 3-6 months for training personnel, acquiring necessary tools,

Ongoing Maintenance and Review: Continuous, with quarterly reviews to assess performance metrics and make adjustments as needed.

Status

This project is currently in process for formalization the approach is being discussed and documented.

The project is in the development/ initiation stage.

12.1.11 Meter Replacements: Metering Strategy Plan

High level Description

The metering strategy plan for meter replacements involves a comprehensive analysis of existing metering equipment, focusing on age, performance, and technology specifications. This includes an age analysis report to identify meters that are outdated or underperforming. The plan will cover both single-phase and three-phase meter specifications, ensuring that the selected replacements meet current standards and operational needs. Additionally, the strategy will incorporate meter cards for easy tracking and management of meter data, as well as sales strategies to enhance customer engagement and service delivery.

Intended Benefits

- Enhanced Accuracy: Upgrading to modern meters improves measurement precision, reducing billing discrepancies.
- Increased Reliability: New meters have improved durability and reduced failure rates, ensuring consistent service.
- Better Data Management: Advanced metering technologies facilitate real-time data collection and analysis.
- Regulatory Compliance: Updated meters help meet current regulatory standards for energy measurement.

Estimated Budget

The estimated budget for the meter replacement strategy includes:

Meter Costs: Acquisition of new single-phase and three-phase meters.

Installation Costs: Labor and materials required for the replacement process.

Training Costs: Training personnel on new meter functionalities and management systems.

Funding Source

The estimated budget for meter replacement is conservatively estimated at R60m per annum, this figure will be determined by the Unit's capacity as well as funding and on how aggressive the Unit choose to pursue the project.

Internal Funding through Operational budget.

Time frame

The full-scale project is anticipated to span over 10 years

The initial phase involves an analysis of the installed infrastructure and will provide the condition of meters in field and will take 1 – 2 months to document.

Implementation phase includes alignment of procurement strategy to the meter maintenance strategy. Then deployment of meters to mitigate the highest risks. This is estimated to take between 3 – 10 years.

Monitoring and move to operational maintenance, the project will establish an operationally compliance baseline for continuous maintenance to ensure a high level of operational efficiency, accuracy and reliability.

Status

The strategy is in the development stage with work on developing the meter age analysis underway.

12.1.3 Metering System Compliance & Testing

High level Description

The review and update of the maintenance policy for metering systems focuses on ensuring compliance with industry standards and enhancing testing protocols. This includes an analysis of existing maintenance practices, the incorporation of the latest compliance requirements, and the establishment of rigorous testing procedures for both single-phase and three-phase meters. The updated policy will also include the creation of detailed meter cards for tracking performance and compliance history, as well as strategies for effective sales and customer engagement.

Intended Benefits

- Regulatory Compliance: Ensures that all metering systems meet current legal and industry standards, reducing the risk of penalties.
- Improved Accuracy: Regular compliance testing enhances measurement precision, leading to more reliable billing and operational decisions.
- Enhanced Reliability: A robust maintenance policy minimizes equipment failures, ensuring continuous service delivery.
- Data Integrity: Improved testing protocols ensure that data collected from meters is accurate and trustworthy, facilitating better decision-making.

Estimated Budget

Budget of R5.5m for procurement, training and support for 3 year for portable test equipment.

Funding Source

Internal funding source through Capex budget.

Time frame

Initial Review Phase: 1 year pending funding and aware of contract for equipment.

Development Phase: 3-6 months to develop and pilot internal processes for compliance testing.

Ongoing Review Phase: Continuous, with formal reviews every 6 months to ensure adherence to updated standards.

Status

The contract is currently at BEC stage without an FC, upon confirmation of funding, SCM process will continue until Letter of Award.

13.0 ICT/OT Programmes Overview

The figure below illustrates the initiatives that comprise the ICT/OT programmes.

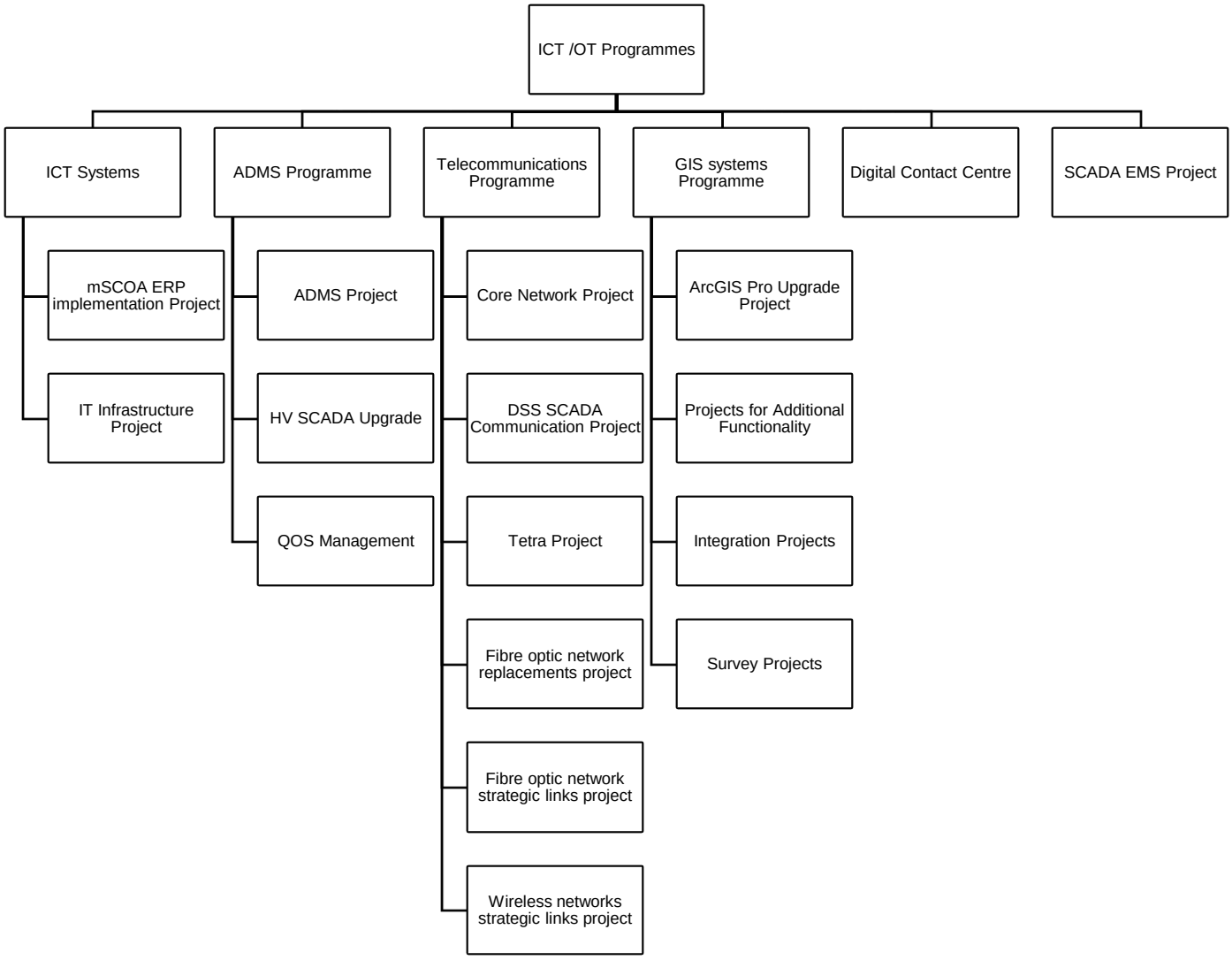

Figure 10 - ICT/OT Programmes

14.0 ICT Systems Programme

This programme aligns with the following tactical goals:

Goal 3: Reform support activities within the electricity value chain

Goal 7: Optimise financial stability and efficiency

Goal 11: Improve loss control

Goal 12: Enhance maintenance efficiency and effectiveness

Goal 14 Improve data management and decision-making

Goal 17: Strengthen asset management practices

Goal 21: Streamline administrative processes and enhance efficiency

Programme goal: To improve operational efficiency and effectiveness of resource management and business processes by providing the relevant ICT support systems

Table 18 - ICT Systems Programme KPA's

KPA	KPI
KPA 1	KPI 1 - ICT/Governance - provide a fully integrated Enterprise Resource Planning (ERP) system to measure and control business processes in compliance with MSCOA tailored for electricity distribution utility.
	KPI 2 - ICT/Governance - increase productivity of staff through providing efficient ICT resources.
KPA 2	KPI 3 - Finance - ability to conduct variance analysis on all work (inclusive of labour, material, and transport costs).

The project implementation capacity for the MSCOA ERP project will primarily be provided by external consultants.

Table 19 - ICT Systems Programme Summary

ICT Systems program							
Project	**KPI 's**	**Start Year**	**End Year**	**CAPEX required**	**OPEX required**	**Project implementation capacity**	**Status**
MSCOA Compliant ERP project		2025-26	2026-27	R130M		Yes	Identified
Total				R130M		1 of 1	

14.1 MSCOA compliant ERP Project

The eThekwini Municipality's Electricity Unit has faced significant operational challenges following the 2016 migration of key functionalities from the Ellipse Enterprise Asset Management (EAM) system to the JD Edwards (JDE) Enterprise One system. The use of two systems i.e. EAM and JDE has resulted in fragmented processes, operational inefficiencies, and significant challenges in the areas of procurement, workforce planning, and financial reporting. The disjointed system architecture has led to delays in project execution, increased material shortages, compliance issues, and persistent audit findings, ultimately reducing the Electricity Unit's ability to deliver reliable services.

To address these issues, a single integrated ERP will have to be implemented in order to integrate all key business processes seamlessly in compliance with MSCOA regulations and MSCOA council approved roadmap.

Intended Benefits

The successful implementation of a single ERP system will provide several significant benefits to the Electricity Unit:

- Operational Efficiency: The integration of Materials, People, and Financial Management will streamline workflows across all business functions, reducing delays in procurement, workforce planning, and financial reporting. This will allow for faster project execution and improved service delivery.
- Improved Asset Utilisation: The ability to manage assets, materials, and work orders in a unified system will enable the Electricity Unit to optimize asset utilization through better planning, monitoring, and preventive maintenance. This will result in cost savings by reducing equipment failures and improving asset performance.
- Enhanced Financial Control and Compliance: Integrating financial management with asset management module will improve financial oversight, ensuring accurate cost tracking and reporting. This will facilitate compliance with GRAP 17 and MSCOA, providing greater transparency in financial transactions and reducing audit risks.
- Cost Savings and Revenue Growth: Implementing a single ERP system will drive down operational costs by improving the efficiency of procurement, workforce utilization, and asset management. In turn, these efficiencies will enable the Electricity Unit to optimize its revenue generation through timely project execution and improved service reliability.

Overall, implementing a single mSCOA compliant ERP system will restore operational efficiency, financial transparency, and regulatory compliance within the Electricity Unit. The successful implementation of a single ERP system for the municipality will result in cost savings, improved revenue opportunities, and enhanced service delivery for the municipality.

Estimated Budget

The budget to be assessed in line with MSCOA road map

.

Funding Source

At present, no funding sources have been identified. The budget requirements to be assessed and considered during the next budget.

Time frame

The project to be executed in line with MSCOA road map and concluded by end of June 2026

15.0 ADMS Programme

This programme aligns with the following tactical goals:

Goal 2: Strengthen Governance and accountability frameworks

Goal 4: Improve customer satisfaction

Goal 6: Optimise outage management

Goal 11: Improve loss control

Goal 14 Improve data management and decision-making

Programme goal: To reduce downtime and improve resolution for power outages by modernising outage management processes.

The ADMS aims at improving the current business processes in managing the planned and unplanned (faults) outages in an effective and efficient manner that enhances the value chain of our business. The ADMS allows to improve the safety and security field operations for planned and unplanned network events through high-quality simulations of switching and restoration activities before operating devices and dispatching field personnel and delivers significant functionality to manage outages and perform automated fault location, isolation, and supply restoration operations. The ADMS contributes to financial solvency through improved restoration times thus reducing unserved energy.

Table 20 - ADMS Programme KPA's

KPA	KPI
KPA 1: Outage Management	KPI 1 Manage Planned and Unplanned outages with improved situational awareness
	KPI 2 Automated Fault location and isolation inclusive of the management of crews and vehicles involved in restoration
KPA 2:SCADA Visibility	KPI 3Improve remote monitoring and control at both Medium Voltage and Low Voltage
	KPI 4 Digitize current Mimic board with a connected electrical network in schematic, geospatial and simplified views, to perform SCADA Commissioning on a live environment
KPA 3: Governance and Compliance	KPI 4 Reporting on electricity reliability indices (e.g. SAIDI,CAIFI etc), as required by the National Energy Regulator of South Africa (NERSA) Address regulatory standards such as NRS047, NRS048, NRS049 Power Quality Directives

The programme consists of the following related projects, ADMS project.

The programme manager is the Senior Manager: MV/LV Network Control, supported by project managers who are Chief Engineers for each of the key projects identified below.

A similar project was initiated in 2008 and continued for a further 10 years. The project was cancelled due to technical and commercial challenges.

Table 21 - ADMS Programme Summary

ADMS programme							
Project	**KPI 's**	**Start Year**	**End Year**	**CAPEX required**	**OPEX required**	**Project implementation capacity**	**Status**
ADMS		2025	2028	100 million		No	Identified

15.1.10 ADMS Project

The ADMS aims at improving the current business processes in managing the planned and unplanned (faults) outages in an effective and efficient manner that enhances the value chain of our business. As such, it is anticipated that the supplied ADMS will assist in providing excellent services to our customers as well as provide the necessary reports for regulatory compliance. The reality of climate change has negatively impacted the electrical network as equipment fail in extreme temperatures. Substations are completely damaged during torrential floods and heavy rains. This eliminates key equipment within an already strained network. There is a need to remotely operate on equipment within a system that has built in safety and overall visibility of the network. The ADMS allows the Control Officers and other technical teams to take effective control of the situation at hand and better manage storm conditions.

EE's Control Centre requires a fast, highly reliable system with access to real time information. This system must validate any changes made to the topology of the electrical network as well as comprise of the following core components, viz.: Outage Management functionality, call taking, reporting, training simulator, situational analysis tools, mobility, power flow analysis and Interactive Voice Response (IVR) as well as Distribution Management facilities.

The solution shall add value to an electrical distribution utility by tying the utility's customer information to a model of the electrical network. Thus, allowing the utility to improve the quality of information given to customers, as well as improving response times by making better use of the outage information provided by customers and other sources. Subsequently, the regulator's Key Performance Indicator reporting shall be improved. The system shall have functions and features to handle distributed energy resources and monitor the gird impacts thereof.

Estimated Budget - R100 million

Funding Source - ISUPG/USDG to be determined

Time frame - 36 months to complete the Project Task/Activity indicated in Table 22 below.

Table 22 – ADMS Project Task & Activity List

Project Task/Activity
Joint project initiation
Joint kick off meeting
Requirements Analysis
Statement of Work
Solution Configuration Documentation
M1: Kick off and acceptance of Project Governance Structures and Technical Specification
Procurement/configuration of hardware
Base system installation and configuration
VM Environment Setup and Test
M2: Hardware procurement and base system installation
Data Migration
Mini Pilot Configuration
Pilot Configuration
M3: Configuration of base system, pilot area and acceptance
Bulk load and schematize
Configure functions and features
M4: Configuration of entire Area of Supply and acceptance
M5: SCADA Configuration, Commissioning and Handover
M6: Development of system interfaces and advanced modules, Commissioning and Handover
Change Management
Administrator Training
User Training
M7: Completion of user and administrator training
Solution Pre- Testing
Business test case development
Pre-FAT

Project Task/Activity
M8: Completion and acceptance of FAT
Pre-SAT
M9: Completion and acceptance of SAT
M10: Go-live of operational system
System Handover
M11: Warranty Complete and Maintenance and Support contract in place for 5 years

Status - On Hold

16.0 SCADA EMS Project

The objective of this project is to implement an advanced SCADA Energy Management System (EMS) that will not only enhance grid control and operational efficiency but also support critical asset management goals, whilst ensuring compliance with regulatory standards set by the National Energy Regulator of South Africa (NERSA), specifically in relation to fault restoration times.

Asset Management:

By integrating advanced analytics and intelligent switching applications, the new EMS will significantly enhance the utility's ability to optimise asset utilisation.

With intelligent switching and optimal power flow tools, the system will help balance loads on an increasingly interconnected and complex network, reducing the stress on specific assets and preventing overloads and premature failures.

Regulatory Compliance and Fault Restoration:

One of the critical requirements from NERSA is to improve fault restoration times to 98% within 24 hours. The new EMS will help achieve this by:

- Intelligent Switching for Restoration:

Intelligent switching applications will automate the rerouting of power during faults, ensuring that unaffected parts of the grid are restored quickly while minimizing disruption to customers. This helps in meeting the 24-hour restoration requirement, as operators will have the tools to react swiftly to emergencies.

- Playback Features for Continuous Improvement:

The playback functionality overlaid on the interconnected map will allow for post-event analysis, enabling operators to learn from previous incidents. This feature will provide actionable insights into how fault restoration can be continuously improved.

Revenue Enhancement:

The implementation of the advanced SCADA EMS will directly contribute to revenue growth by improving grid efficiency and reliability. Enhanced fault detection and restoration capabilities will minimize downtime, reducing the financial losses associated with prolonged outages. Additionally, integrating demand response tools will enable better load management during peak periods, preventing costly overloading and optimizing energy usage. The system's ability to support distributed energy resources (DERs) like solar will also create new revenue streams by enabling the utility to offer energy management services to prosumers and improving grid capacity for selling surplus energy. This combination of reduced operational costs and new service offerings will significantly enhance the utility's revenue potential.

By implementing this EMS, the utility will not only enhance revenue and improve asset management but also align with NERSA's stringent regulatory requirements, positioning itself as a reliable and compliant electricity provider.

Benefits of the Project include:

1. Improved Grid Reliability and Stability: With real-time applications like power flow and state estimation, the system will better monitor the grid, reduce the likelihood of outages, and quickly respond to system failures.
2. Efficient Integration of Renewable Energy and DERs: Implementing DERMS will allow for better integration and management of distributed energy resources, supporting the transition to a more sustainable energy mix.
3. Enhanced Operational Efficiency: Applications such as optimal power flow, contingency analysis, and intelligent switching will optimize grid operations, reducing energy losses and operational costs.

4. Better Decision Making and Incident Management: Tools like contingency analysis and the playback feature will give operators the ability to simulate different scenarios, anticipate potential grid issues, and respond faster to real incidents.
5. Operator Training and Skill Enhancement: An operator training simulator will ensure that staff is well-prepared to handle complex situations, reducing operational risks and improving overall system performance.
6. Increased Customer Engagement and Demand Response Capabilities: Demand response tools will allow customers to participate in balancing the grid, improving energy efficiency, and lowering costs during peak demand periods.
7. Long-Term Cost Savings: While the upfront costs may be significant, the system will lead to lower operational expenses over time through improved grid management and energy savings. This will also position the utility to accommodate future growth and regulatory requirements.

The SCADA EMS project will have touchpoints with the following turnaround strategy priority goals:

Goal 6: Optimise Outage Management:
The SCADA EMS will enable faster fault detection, isolation, and restoration, improving outage management and reducing downtime.

Goal 9: Adapt to Market:
By integrating demand response tools and supporting distributed energy resources (DERs), the EMS helps the utility adapt to evolving market dynamics and customer needs.

Goal 11: Improve Loss Control:
The system's real-time monitoring and intelligent switching capabilities will reduce energy losses by optimizing power flow and preventing inefficiencies.

Goal 13: Strengthen Infrastructure Resilience and Security:
The SCADA EMS will enhance the grid's resilience and security through advanced contingency analysis and automated fault management, minimizing risks to critical infrastructure.

Goal 14: Improve Data Management and Decision Making:
With advanced analytics, state estimation, and playback features, the system will provide better data for informed decision-making and operational optimization.

Goal 18: Foster Innovation and Sustainability in Infrastructure Development:
The EMS promotes innovation by enabling the integration of renewable energy sources and facilitating a smarter, more sustainable energy infrastructure.

Goal 20: Develop a High-Performance Taskforce:
The implementation of the EMS will require ongoing staff training and the development of advanced operational skills, cultivating a highly skilled and performance-driven taskforce.

Estimated Cost is R120 million.

Duration is estimated at 60 months.

17.0 Telecommunications Programme

This programme aligns with the following tactical goals:
Goal 6: Optimise Outage Management.
Goal 11: Improve loss control
Goal 12: Enhance maintenance efficiency and effectiveness
Goal 13: Strengthen infrastructure resilience and security
Goal 14 Improve data management and decision-making
Goal 15: Reform investment management practices

Programme goal: To provide reliable and resilient communication services for business applications which improve operational efficiency and risk management in the provision of electricity, public lighting and other energy services.

The Telecommunications Programme is an organisational enabler that supports the following business applications:

1. HV & MV SCADA Systems to provide operational efficiency in network operation and outage management.
2. HV & MV tele-protection schemes to provide operational efficiency in outage management and risk mitigation.
3. HV substation infrastructure security to provide risk mitigation.
4. HV online asset condition monitoring to provide operational efficiency in infrastructure asset management.
5. HV and MV mobile workforce management to provide operational efficiency in field communication.

The programme contributes to operational effectiveness and financial solvency by enabling loss-reducing investments related to the business applications mentioned above. Co-location and infrastructure sharing of telecommunication infrastructure has the potential to be a surplus generating investment.

The programme has potential use of private finance and expertise particularly in the area of fibre optic infrastructure deployment as well as wide area wireless networks deployment.

This programme will address the following customer, business and operational KPA and KPI's

Table 23 -Telecommunications Programme KPA's

KPA	KPI
KPA 1 – Unplanned interruptions	KPI – restoration of electricity services
	KPI – SAIDI
	KPI - SAIFI
KPA 2 – Communication Services	KPI 1 - Number of services
	KPI 2 - Number of net services added per annum

The programme consists of the following related projects, Core Network Project, SDH Upgrade Project, DSS SCADA communication project.

Table 24 -Telecommunications Programme Summary

Telecommunications program							
Project	**KPI 's**	**Start Year**	**End Year**	**CAPEX required**	**OPEX required**	**Project implementation capacity**	**Status**
Core Network Project		2025	2030	R235M	Nil	Yes	Initiated
DSS SCADA Communication Project		2023	2025	R5M	Nil	Yes	In progress
Tetra Sustainability Project		2025	2030	R0.5M	Nil	Yes	In progress
Fibre optic network replacements project		2025	2030	R5M	Nil	Yes	Identified

Telecommunications program							
Project	**KPI 's**	**Start Year**	**End Year**	**CAPEX required**	**OPEX required**	**Project implementation capacity**	**Status**
Fibre optic network strategic links project		2025	2030	R1M	Nil	Yes	Identified
Wireless networks strategic links Project		2025	2030	R1M	Nil	Yes	Identified
Service policy project		2024	2026	Nil	R250,000	Yes	In progress
Cybersecurity project		2022	2027	R2M	R5M	No	On hold
Total				R 212.5M	R5.25M	7 of 8	

17.1 Core Network Project

The current core telecommunication network infrastructure based on the ABB FOX 515 SDH multiplexer has reached end-of-life in 2017, with end-of-support and hardware repair expected in 2024. Therefore, the primary objective of this project is to establish a new core network to support existing services such as tele protection and SCADA. However, growing demand for IP-based services stemming from IT/OT conversion, smart city initiatives, and new customer expectations and applications, necessitates a redesign of the core network infrastructure to meet requirements such as capacity, quality of service, cost, coverage, scalability, and cybersecurity, which have become considerably more important over the last few years. To cater for these business requirements, the core communication network architecture needs to be carefully designed to meet each one of the current and future requirements for the next 15+ years whilst ensuring that mission-critical tele protection and SCADA services are adequately catered for. Therefore, a complete redesign and replacement of the core telecommunication network to cater for business needs with improved reliability, resiliency, and cybersecurity is needed. Intended Benefits:

1. Improved reliability and resiliency of the HV electrical network through improved tele protection, monitoring and management of the primary plant, resulting in fewer outages, thereby increasing the revenue of the Unit.
2. Optimised/reduced capital and operational expenditure through the consolidation of multiple operational and business services onto a single telecommunication platform, thereby improving the revenue of the Unit.
3. Improved internal customer service through standards-based communication services with quality-of-service offerings.
4. Reduced service addition, fault identification, and fault restoration times.
5. Reduced operations, maintenance, and supervision activities.

Estimated Budget - R 235 000 000

Funding Source – To be determined

Time frame – 36 months

Status – Project initiated. Awaiting funding.

17.2 DSS SCADA Communication Project

A project between the Communication Networks Branch, MV/LV Network Control Branch, and the ICT Branch to renew the cellular VPN communication network used to provide communications links between RTUs located in the medium and low voltage network and the SCADA Master Station located at the Electricity Headquarters.

Intended Benefits

Estimated Budget – R5 million

Funding Source – To be determined

Time frame – 36 months

Status – In progress

17.3 Tetra Sustainability Project

The new digital radio system is a proven robust disaster management tool and with its variable configurations it is suited to the Electricity Unit's communication needs. The Electricity Unit is in support of using the system to improve safety and efficiency in its day-to-day activities.

Estimated Budget R500k

Funding Source

Time frame – 60 months

17.4 Fibre Optic Network Replacements Project

The unit has identified a need to replace underground fibre optic links that have reached their end of useful life.

Intended Benefits – To sustain communication services required by the Electricity Unit.

Estimated Budget - R5 million

Funding Source – To be determined.

Time frame – 60 months

Status – Need identified.

17.5 Fibre Optic Network Strategic Links Project

The unit has identified a need to install new strategic fibre optic links as required by the Electricity Unit. Examples include fibre optics to support differential protection schemes, the establishment of new depots or sites requiring connectivity.

Intended Benefits:

1. To provide high availability fixed line communication services required by the Electricity Unit.
2. Improved electrical network system performance.

Estimated Budget – R1 million

Funding Source – To be determined.

Time frame – 60 months

Status – Need identified.

17.6 Wireless Networks Strategic Links Project

The unit has identified a need to install new strategic wireless links as required by the Electricity Unit. Examples include the establishment of new depots or sites requiring urgent connectivity.

Intended Benefits:

1. To provide high availability wireless communication services required by the Electricity Unit.
2. Provide infrastructure to support Smart Street lighting, distribution automation, or LED upgrade projects.

Estimated Budget – R1 million

Funding Source – To be determined.

Time frame – 60 months

Status – Need identified.

17.7 Communication Networks Service Policy Project

This project aims to introduce and implement a CN Services Policy to be able to measure and improve the performance and range of telecommunication services offered to the Unit. This project aligns with the objective of providing reliable and resilient telecommunication services in line with a measurable standard.

Intended benefits:

1. Improved telecommunication network performance
2. Increase in demand for telecommunication services
3. Improved operational efficiency
   The project will identify current and future service categories and services hosted by the CNB.
4. It will enable CNB understand customers service requirements.
5. Understanding their requirements will enable CNB to design and operate the telecommunication networks to meet the customer requirements thereby increasing customer satisfaction and ultimately providing improved service delivery to citizens of eThekwini Municipality.
6. This project serves and an input to several projects that are part of the branch plan.
7. This project will enable the CNB to motivate for funds related to capital projects and reliability programs that will result from monitoring service performance.

Estimated Budget:

R 250000 OPEX.

Funding source: OPEX

Time frame: 2024 to 2026

Status : In progress

17.8 Communication Networks Cybersecurity Project

This project aims to deliver on the CNB cybersecurity objective of minimising operational technology risks. To this end, a Cyber Security Management System (CSMS) to protect information and communication assets is required. The CSMS aims to provide a mechanism to ensure the availability, integrity and confidentiality of the information vital to achieving eThekwini Electricity's business objectives. This shall be achieved by:

1. Identification of People, Processes and Technology that require cyber security hardening.
2. Protection of information and communication assets to ensure the availability, integrity and confidentiality of telecommunication services.
3. Developing a Cyber Security knowledgeable workforce.

Benefits:

1. Strengthened infrastructure resilience and security
2. Improved availability, integrity and confidentiality of telecommunication services
3. Improved cyber security situational awareness across the business.

Estimated budget:

1. R 5M OPEX over 60 months
2. R 2M CAPEX over 36 months

Funding sources: CAPEX to be determined

Time frame: 60 months

Status: Project on hold due to resource constraints.

18.0 Digital Contact Centre Programme

The adoption of digital communication channels to improve customer communication was the sole positive trend seen in the reform strategy baseline of performance. A digital contact centre programme is required to:

1. Upgrade the customer contact centre systems.
2. Implement real-time customer feedback systems.
3. Improve the customer application and connection processes.

Presently an organisational integrated customer relations management programme is in place to address some of the above initiatives. A fit for purpose programme will be advanced in line with municipal wide approach with a targeted multi-layered approach that support the implementation of single point of management accountability.

19.0 Metering Systems Programme

A metering system programme may be required to procure a meter data management system, multivendor master station, and other support systems. This area is still in development.

20.0 GIS Systems Programme

This programme aligns with the following tactical goals:

Goal 6: Optimise outage management

Goal 11: Improve loss control

Goal 14 Improve data management and decision-making

Programme goal: To improve operational efficiency and effectiveness of core business operations by providing spatial tools and features.

This programme contributes to operational effectiveness by provide a spatial dimension to problem solving and decision making. Many of the proposed projects will improve financial solvency by support loss-reducing applications.

Potential use of private and development finance and expertise is limited.

The programme manager is the Manager of the Network Drawing Office supported by the OEM consultants who are appointed by the city for each of the key projects identified below. The unit has run a similar project in the past.

Table 25 - GIS Systems Programme Summary

Project	KPI 's	Start Year	End Year	CAPEX required	OPEX required	Project implementation capacity	Status
GIS Upgrade		2024	2025		R2M	Yes	In progress
Electricity Faults Capturing Dashboard		2024	2025		R0.5M	Yes	In progress
Feeder Manager solution for MV Network Control		2024	2025		R0.5M	Yes	In progress
MV/LV Planning with Designer		2024			R1M	Yes	On Hold
MV/LV DA Digital Application		2023	2025		R0.5M	Yes	In progress
Lighting Planning Design in GIS		2025			R1M	Yes	Identified
DA Online Application		2024	2024		R0.5M	Yes	In progress
GIS Application to capture and monitor theft of electrical assets		2023	2024		R0.5M	Yes	In progress
GIS/Power GLF Integration		2025	2028		R1M	No	Identified
GIS/SCADA Integration		2025	2028		R2M	No	Identified
GIS/ERP Integration		2025	2028		R2M	No	Identified
Sugar cane scheduled burning viewer.		2025	2028		R1M	Yes	Identified
Management of the internal wayleave process (AFLA)		2025	2028		R1M	Yes	Identified
Scanning Total Station for Survey Division		2025	2027	R1.5M		Yes	Identified

Project	KPI 's	Start Year	End Year	CAPEX required	OPEX required	Project implementation capacity	Status
Replacement of Survey GPS Workstations		2025	2027	R5M		Yes	Identified
Total				R6.5M	R13M	12/15	

The table below provides a summary of each of the projects.

Table 26 – GIS Projects

Project	Description	Benefit
GIS Upgrade	Upgrade of ArcMap to ArcGIS Pro Desktop software.	Will enable the Unit to migrate from the ArcFM geometric network to the ArcGIS Utilities data model.
Electricity Faults Capturing Dashboard	Visual representation of HV/MV and LV Outages in GIS.	To create visibility for all outages in real time.
Feeder Manager solution for MV Network Control	To provide MV/LV Network Control with a digital copy of the MV Network, to be able to simulate network outages in the GIS.	To create visibility for MV outages in real time and to identify areas that are out spatially.
LV Planning with Designer	To implement spatial planning of Distribution Layouts in the GIS.	Since the planned state of the network is already captured in the GIS, this will result in more efficient planning.
MV/LV DA Digital Application	To implement spatial planning of Distribution Applications in the GIS.	Since the planned state of the network is already captured in the GIS. This will result in more efficient planning.
Lighting Planning Design in GIS	To implement spatial planning of Lighting networks in the GIS.	Since the planned state of the network is already captured in the GIS. This will result in more efficient planning.
DA Online Application (Customer Services)	Capturing of DA's using a GIS Form.	It will reduce inconsistent data from being captured in the ERP system.
GIS Application to capture and monitor theft of electrical assets	GIS Application for the capture of theft incidents.	This will create visibility of theft hot-spot areas and to better analyse theft patterns.
GIS/Power GLF Integration	To perform load forecasting and impact assessments based on the calculated results.	Will have the ability to do load forecasting geospatially and contribute data to the data master plan.
GIS/SCADA Integration	Provisioning of an interface (OPC) for uni-directional real-time data flow from the SCADA system into GIS.	Will provide better operations and management of outages.
GIS/ERP Integration	The project requirement is for the ERP data structure to be accounted for, with regards to the data model and field design.	Create the spatial link of all assets in the GIS and ERP Systems.
Sugar cane scheduled burning viewer	To view the sugar cane burning schedules and affected area, along with the electric network in the GIS.	Reduce HV trip outs.
Management of the internal wayleave process (AFLA)	To better coordinate the internal process between Branches for the processing of Wayleaves	This will reduce the turnaround time and make the process more efficient

Project	Description	Benefit
Scanning Total Station for Survey Division	Surveying process that captures all the features of the object without selecting data.	A laser scanning survey is a fast and accurate way of capturing the spatial detail of an existing building or other structure.
Replacement of Survey GPS Workstations	When used by skilled professionals, GPS provides surveying and mapping data of the highest accuracy.	GPS-based data collection is much faster than conventional surveying and mapping techniques, reducing the amount of equipment and labour required.

PART 4 – CUSTOMER & REVENUE MANAGEMENT

"*Better service, increase revenue*"

21.0 Commercial Plans

In today's rapidly evolving urban landscape, municipalities are increasingly turning to digital solutions to enhance service delivery and improve operational efficiency. The implementation of innovative technologies is not just a response to the growing demands of residents but also a strategic move towards sustainable governance. The objective of this business case is to justify the implementation of several strategic initiatives aimed at enhancing municipal service delivery, optimizing revenue collection, and addressing issues related to illegal activities within the municipality. These initiatives include the digitization of customer service platforms, the introduction of digital meter reading, and the establishment of a revenue enhancement strategy, along with forensic investigations to combat illegal reconnections. This business plan outlines several key initiatives aimed at transforming municipal services through digitization and strategic interventions.

•**Digitization of the New DA Online Platform Developed In-House**: This initiative focuses on creating a user-friendly online platform that allows residents to access municipal services seamlessly. By developing this platform in-house, the municipality aims to tailor functionalities to meet specific community needs, ensuring a more responsive and accessible service delivery model.

•**Digital Meter Reading Platform**: The introduction of a digital meter reading platform represents a significant advancement in the accuracy and efficiency of utility management. This system will enable remote collection of meter readings, reducing the reliance on manual processes and minimizing errors in billing. It empowers residents to participate actively in monitoring their energy consumption.

•**Digitization of Automated Electricity Unit Customer Services Queries and Fault Feedback**: By automating customer service queries and fault reporting, the municipality seeks to streamline communication channels between residents and service providers. This digitization will facilitate quicker response times and enhance overall customer satisfaction, ensuring that issues are addressed promptly.

•**Revenue Enhancement Strategy**: A comprehensive revenue enhancement strategy is essential for the financial sustainability of municipal services. This strategy will focus on optimizing billing processes, reducing revenue losses, and exploring new revenue streams, thereby ensuring that the municipality can continue to provide high-quality services to its residents.

•**Forensic Investigation Contract to Deal with Illegal Reconnection Syndicate**: To combat the issue of illegal reconnections, the municipality will engage forensic investigators to identify and dismantle syndicates involved in electricity theft. This initiative aims to protect municipal revenue and ensure fair service delivery to all residents by addressing the root causes of illegal connections.

Together, these initiatives represent a proactive approach to modernizing municipal operations and enhancing service delivery. By leveraging technology and strategic planning, the municipality can better serve its residents, promote transparency, and ensure sustainable growth in the community. To enhance revenue effectively, the organisation will incorporate the following strategies:

•**Customer Segmentation**: Understanding customer needs and behaviours which will allow for tailored billing methods and communication strategies, improving payment rates and customer satisfaction.

•**Automation of Billing Processes**: Implementing automated billing systems will reduce errors and delays, ensuring timely invoicing and collections, which is crucial for maintaining cash flow.

•**Cross-Selling and Upselling**: Cross-selling and upselling in the electricity business can be a powerful strategy for leveraging existing customer relationships to introduce additional services and increase revenue.

The rapid advancement of technology and the increasing demand for efficient service delivery necessitate the adoption of innovative solutions within municipal operations. This business plan outlines the key commercial initiatives aimed at enhancing service delivery, optimising revenue, and addressing issues related to illegal activities within the municipality. The plans include the digitisation of customer service platforms, the implementation of digital meter reading, and strategies for revenue enhancement and forensic investigations.

22.0 Tariff Alignment to Cost of Serve

To reduce revenue risk, it is prudent to collect revenue in the manner the costs or expenses have been experienced. To this end eThekwini has completed a Cost of Supply (CoS) Study to understand cost causation.

Historically, electricity pricing was determined by a “bundled” network, energy and service costs with only the Large Power Users (LPU’s) being on an Industrial Time of Use (ITOU) Tariff that differentiated costs linked to usage patterns with varying costs for use during peak, standard and off-peak times. The network, energy and service costs were well differentiated and costing for electricity via this means reflected the Megaflex Tariff and reduced financial risks for the Municipality. Approximately 40% of the Units revenue from 1200 customers is secured in this manner. This requires complex metering systems to collect and bill for energy.

The situation now warrants a roll-out of similar metering and tariffs for an extended customer base as pricing signals grow stronger owing to generation shortages and higher energy costs. This exercise is deemed costly and resource intensive as a phased approach will have to target 40 000 commercial customers (30% of Revenue) as the next step in introducing greater cost reflectivity in tariffing.

The residential sector constitutes over 740 000 customers and a strategy must be formulated to introduce a fixed cost component and a possible seasonal differentiation for the residential customer base. This will pose a challenge as this has attracted public protests in other Municipalities.

Over and above the above changes, we have introduced Net-Billing Tariffs for the LPU, Commercial and Residential Sectors to encourage the renewable sector in line with national initiatives. These tariffs were designed on a revenue-neutral basis and together with other tariffs will be reviewed on a CoS basis going forward.

22.1 Wheeling of Electricity

Wheeling of electricity is the delivery of electrical energy from a power producer to an end user through a distribution or transmission network as shown in Figure 1. Wheeling allows Independent Power Producers (IPPs) to sell electricity directly to customers, or off-takers, while paying for the use of the electricity grid owned by a third party (e.g. a municipal distributor or Eskom) through the use of system (UOS) charges.

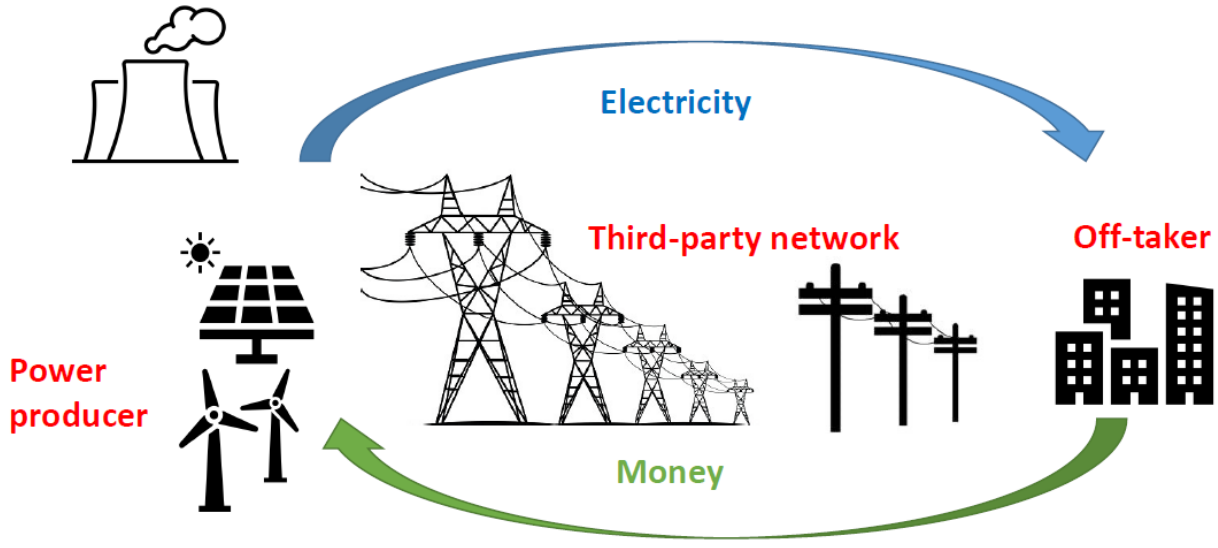

Figure 11 - Typical Wheeling Scenario

Figure **11** shows a typical wheeling scenario.

Policy position 5 of the Electricity Pricing Policy states:

i. Distributors to provide fair and non-discriminatory access to and use of their relevant networks.

ii. The full cost to operate and maintain the networks is reflected in various connection and use of system charges and, therefore, no additional charges for wheeling will be levied unless the wheeling action introduces incremental costs.

iii. Any incremental wheeling cost associated with a specific wheeling transaction and its fair share must be recovered as a connection charge.

iv. Wheeling of electricity can only be permitted if the action complies with all technical, safety and commercial requirements.

The implementation of wheeling differs depending on where the generator is connected. The following three scenarios are most common:

Scenario 1: Generator connected to an Eskom network wheeling to a customer connected to a municipal network as an off taker. In this wheeling scenario depicted in Figure 12, the wheeled energy travels across Eskom's and the municipality's networks, meaning that UOS charges will be paid for Eskom's transmission and/or distribution network and the municipality's distribution network. This scenario requires the generator to comply with Eskom's connection requirements and the generator must apply to Eskom for the grid connection.

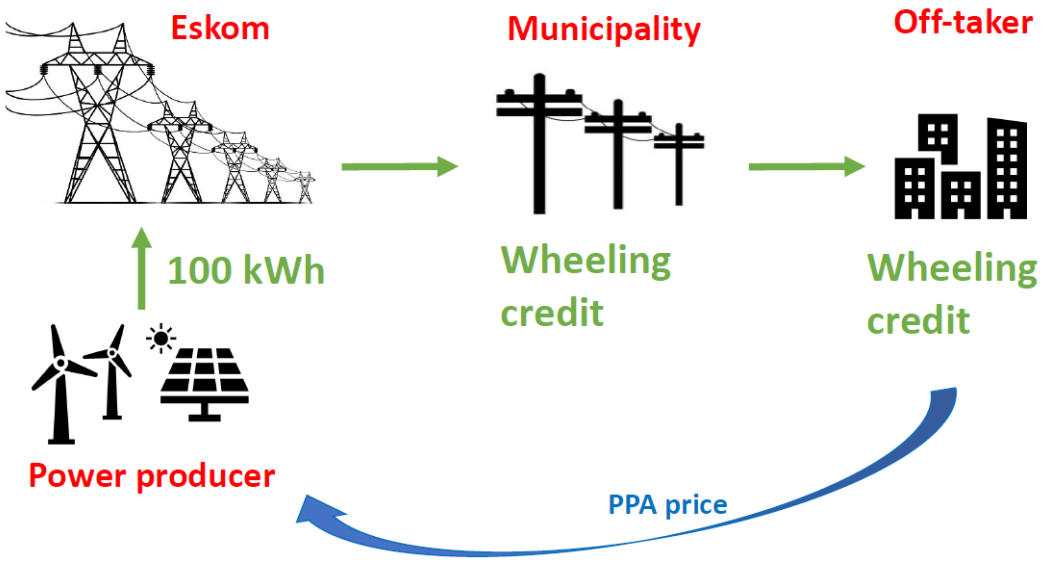

Figure 12 - IPP Installed in An Eskom Network and Off Taker Located in A Municipal Network

Scenario 2: Generator connected to a municipal network wheeling to a customer connected to a municipal network as an off taker. In this wheeling scenario depicted in Figure 13, the wheeled energy does not travel across Eskom's network, meaning that only the municipality's distribution UOS charges must be paid. This scenario requires the municipality to process the generator's connection application, as it will be connected to the municipality's grid.

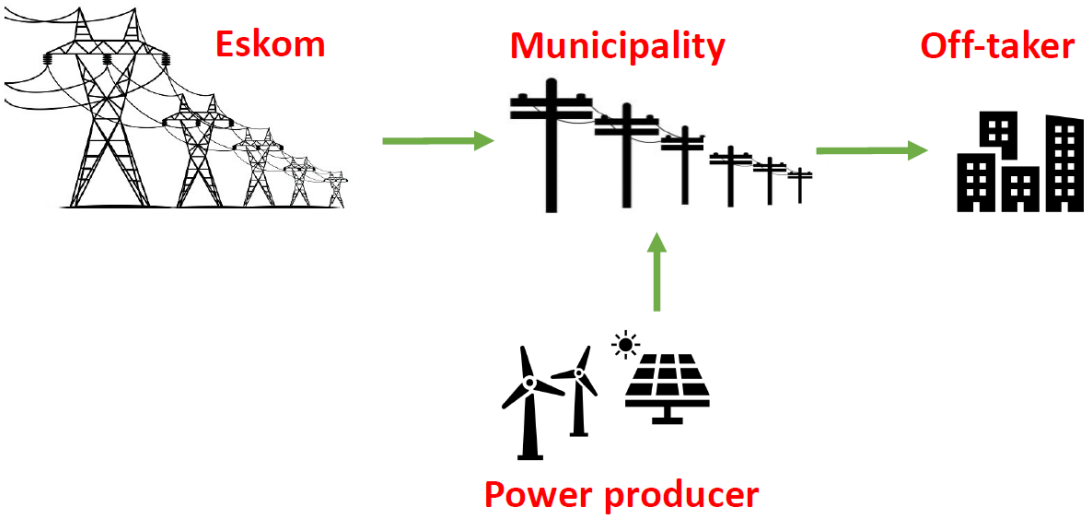

Figure 13 - IPP And Off-Taker Installed in The Same Municipal Network

Scenario 3: Generator connected to a municipal network wheeling to a customer connected to an Eskom network or connected to another municipal network as an off taker. In this wheeling scenario depicted in Figure 14, the wheeled energy travels across the municipality's network and Eskom's network or a network belonging to another municipality. The UOS charges will be paid for the municipality's network and for Eskom's network or another municipality's network. This scenario requires the municipality to process the generator's connection application, as it will be connected to the municipality's grid.

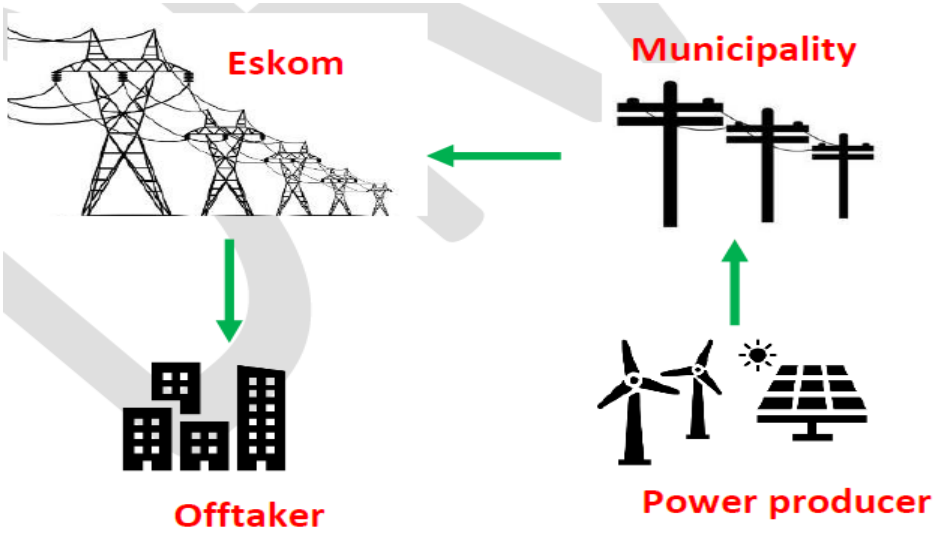

Figure 14 - The IPP Is Located in A Municipal Network and The Off Taker Located in An Eskom Network

With more customers engaging in wheeling options, there is a need to calculate the revenue neutral use of system charges to ensure that all customer (load and wheeling customers) pay their correct and fair contribution for the use of the municipal network. Figure 5 shows that the retail price of electricity can be broken down into two specific costs namely, Eskom purchase price and use of system charge (network charges or costs involved to operate the network). As a start, wheeling will only be offered to customers who are on the eThekwini Industrial Time of Use (ITOU) tariff structure.

When a customer wheels energy, they reduce the amount of electricity that they purchase from the grid which essentially means that the municipality just purchases less electricity from Eskom since this is a pass-through cost to Eskom on the Industrial Time of Use tariff structure. However, in order to wheel the electricity to the customer, the municipality incurs the UOS charge. This then needs to be calculated, and the customers' needs to pay this charge when wheeling electricity via the municipal network. The calculated revenue neutral UOS charges for eThekwini Electricity is shown in Table 27. The wheeling charges are dependent on the voltage level at which the customer purchases electricity on and the time period and season that the electricity is purchased on as shown in Table 27. For a customer wheeling energy, there will be no changes to the customers' existing Notified Maximum Demand (NMD) and Maximum Demand (MD) but only the changes to the Voltage Surcharge Component which is dependent on the sum of all the components on the ITOU tariff structure with the exception of the service charge since the amount of energy purchased from the municipality will reduce. In order to recover the correct revenue neutral UOS charge to compensate for the reduction in the recovery on the voltage surcharge component, the c/kWh figure for every kW wheeled on the network will need to be applied to the customer's bill. There is also a need for an administration charge to cater to the metering/billing/documentation and agreements, etc for customers wanting to wheel energy on the municipal network.

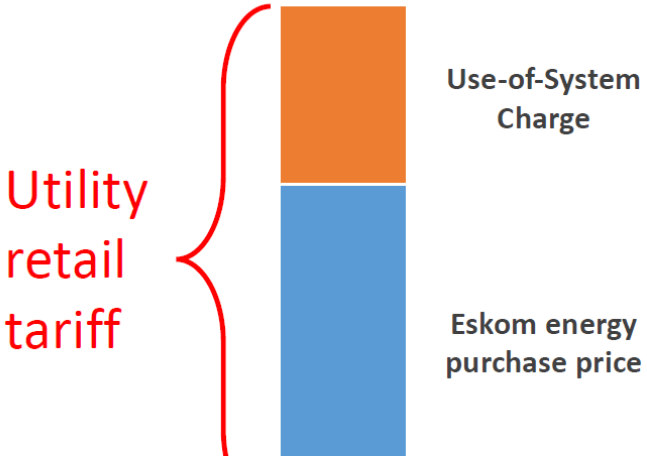

Figure 15 - Breakdown of The Utility Retail Tariff Components

Table 27 - Draft UOS Charges at Different Voltage Levels on The Industrial TOU Tariff

	HIGH DEMAND - ENERGY WHEELED (c/kWh)			LOW DEMAND - WHEELED ENERGY (c/kWh)		
VOLTAGE	**PEAK**	**STANDARD**	**OFF-PEAK**	**PEAK**	**STANDARD**	**OFF-PEAK**
0.4 kV	131.64	42.43	24.70	45.39	32.38	21.86
6.6 kV	75.43	24.31	14.15	26.01	18.56	12.52
11 kV	62.12	20.02	11.66	21.42	15.28	10.31
33 kV	17.75	5.72	3.33	6.12	4.37	2.95
132 kV	13.31	4.29	2.50	4.59	3.27	2.21

Currently the Electricity Unit is awaiting release of the much-anticipated national Wheeling Framework in order to align and release their Municipal Wheeling framework.

22.2 SSEG Amnesty Period

There is currently a large number of unregistered/Illegal SSEG systems that are installed in the eThekwini Electricity distribution network. Some of the reason for this are as follows:

1. Customer/Installers do not understand the SSEG application process and the need to apply.
2. Customers/Installers know about the SSEG requirement process but ignore the application process to prevent delays in application approval.
3. With the current net-billing suite of tariffs not in place, there is no incentive for customers to apply.
4. Customers have installed non approved SSEG equipment that do not comply with NRS 097 requirements and hence prefer to not apply as they know that their application will not be approved due to non-compliance.
5. Customers with zero excess energy for export do want to register in order to prevent paying the SSEG size-based Network Access Charge on the net-billing tariff structure.

It is hence required to firstly have a fully operational end to end SSEG application process before the Municipality can go out on a drive to get all customers with SSEG to apply to the municipality for approval/retrospective approval. Currently the following is outstanding in order to allow for the end-to-end SSEG application process:

1. Completion of the development of the online SSEG application process.
2. The procurement and availability of bi-directional meters.
3. Ability to read these meters monthly to be able to accurately bill customer for import and export energy.

4. Make necessary changes to the Municipal by-laws with regards to SSEG
5. Staff capacity building on the processing/approval and conducting studies for SSEG approvals.

Once item 1 to 5 above is completed, this will allow a smooth operation of the SSEG application process.

Thereafter the municipality will be able to communicate the need and process for all customers to make new/retrospective SSEG applications to the Municipality for approval. Customer will be given a 6-month amnesty period in order to allow customers and staff adequate time to make and process applications. Depending on the effectiveness and volumes of application received, it will need to be deduced on whether the amnesty period will need to be extended by a further 3 – 6 months.

Thereafter if customers are found with illegal/unregistered SSEG systems, they will be fined and given a defined time within which to make an application to legalize their system. Failure to which will result in the customer being disconnected from the Municipal grid.

With regards to detection of these illegal systems, the following methods will be used to detect customers with SSEG systems:

1. Information from the billing systems identifying reduction in customers consumption which will need to be investigate on the GIS and possibly via a site visit. Currently when customers consumptions reduced drastically, they are given historic estimation of their consumption whilst an investigation is carried out to identify the cause. There needs to be a policy created on how to deal with customers that have installed SSEG illegally and only registered them post installation with regards to how to deal with the actual vs estimate readings especially in the case where customers where exporting to the grid and their meters were reversing.
2. The use of Artificial Intelligence (AI) to detect solar panels on the GIS. A project is already on the way to capture all customers that have made SSEG applications on the GIS so the properties identified with the use of AI can be compared to those that are registered in order to identify the remaining which are illegal. Figure 6 shows the pilot projects carried out in the Northern eThekwini networks to identify solar panels on properties. This AI study needs to be conducted once a year when on the latest GIS photo is published.

Figure 16 - Pilot Project Conducted on the eThekwini Electricity Network for Solar Panel Detection

22.3 Tactical Goals, Objectives, And Initiatives

The table below summarises goals related to commercial plans.

Table 28 - Commercial Plan Goals

Goal	Initiative
Goal 1: Improve customer satisfaction	Implement real-time customer feedback systems for post-interaction evaluations and identify key areas for service enhancement.
Goal 2: Improve billing accuracy and efficiency	Roll out smart meters across customer bases to provide accurate readings and minimise estimated bills. Deploy AMI for all the customers to leverage AMI data for more accurate and timely billing, reducing estimation errors and billing disputes to improve revenue by 10%-20% within the next 5 years. Improving billing accuracy in the electricity business is crucial for enhancing customer satisfaction, reducing disputes, and ensuring financial stability. Initiatives to improve billing accuracy include implementation of Smart Metering Technology, enhancing data management systems, improve customer engagement and self-service options like Digital-Meter reading platforms.
Goal 3: Improve revenue enhancement	Improving revenue enhancement in the electricity business involves a strategic approach that focuses on optimizing existing revenue streams, minimizing electricity losses, and enhancing customer relationships.
Goal 4: Reduce electricity losses	Reducing electricity losses in electricity distribution is essential for enhancing efficiency, lowering operational costs, and improving overall service delivery. Initiatives to reduce electricity losses include electrical infrastructure upgrades, systems to enhance metering and billing accuracy, optimize load management, conducting regular audits and addressing non-technical losses through electrification projects and removal of illegal connections.
Goal 5: Forensic Investigation Contract to Deal with Illegal Reconnection Syndicate	The electricity sector faces significant challenges due to illegal reconnections and electricity theft, which result in substantial revenue losses. The primary objectives of the forensic investigation contract are to investigate and gather intelligence on organized groups involved in illegal reconnections and electricity theft. Quantify the financial losses incurred due to these illegal activities, providing a clear picture of the economic impact on the utility and recommend strategies to prevent future occurrences of illegal connections and enhance compliance with electricity regulations.
Goal 6: Enhance Service Delivery	Improve the efficiency and effectiveness of electricity services through digitization and automation. Enhancing service delivery in the electricity business is critical for improving customer satisfaction, operational efficiency, and financial performance.
Goal 7: Optimise Revenue Collection	Optimizing revenue collection in the electricity business is vital for ensuring financial sustainability and operational efficiency. Phasing out conventional meters in favour of smart meters can significantly improve billing accuracy and reduce losses due to underreporting or inaccurate readings. Smart meters provide real-time data, enabling utilities to bill customers based on actual consumption rather than estimates, which can enhance customer trust and prompt payments. Utilizing automated billing systems can reduce administrative errors and ensure timely invoicing. Automation helps maintain consistent cash flow by minimizing delays in billing cycles.
Goal 8: Improve Customer Engagement	Develop detailed customer profiles that go beyond demographics to include preferences, energy usage patterns, and values. This allows for tailored engagement strategies that resonate with different customer segments. Implement online platforms where customers can manage their applications, accounts, view usage data and pay bills. Develop user-friendly mobile applications that allow customers to monitor their energy usage in real-time and receive alerts about unusual consumption patterns or billing issues.

22.3.10 Introduction of Seasonally variated Scale 1 Tariff Mechanism

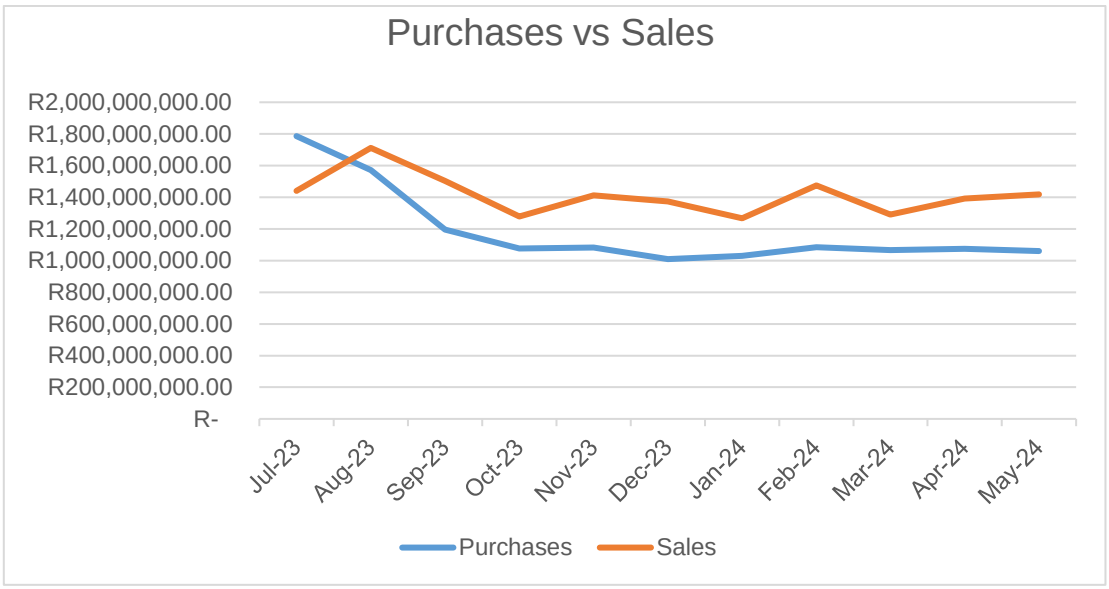

Figure 17 - Purchase Expenditure vs Sales Revenue 23/24 FY

Current configuration of Business and General tariffs is no longer feasible. This is due to contrast between the seasonal variation of the Eskom tariffs levied on the municipality and the non-seasonal nature of the Business and General tariff suite. As can be seen in figure 7, the municipality incurs a definite in High-Season months. This leads to cash-flow restrictions and thus hampers on the Unit's ability to function optimally.

To implement this goal, the tariff engine would need to be modified to enact seasonality. Furthermore, extensive development and testing will have to be carried out by the revenue management team.

The current Business and General tariffs will have to be modelled and recalculated using the Cost of Supply tool to include seasonality.

It is anticipated that this initiative will be implemented 1st July 2026, as a detailed Cost of Supply Study is required to be conducted to ascertain the optimal rates, the potential impact and the necessary modifications, etc.

22.3.11 Discontinue Obsolete Tariffs

The current dispensation of obsolete tariffs can no longer be deemed cost-reflective and is overdue to be discontinued. The continued implementation of these tariffs undermines the Municipality's ability to render services and collect revenue in a cost-reflective manner.

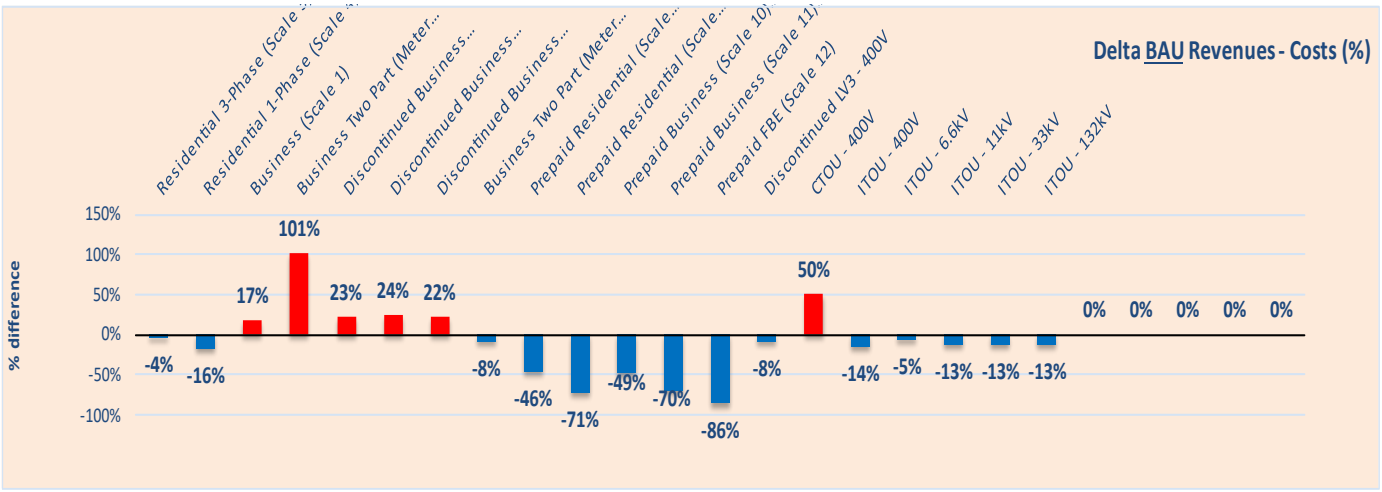

Figure 18 - BAU Cost Reflectivity Levels

To facilitate the phasing out of the obsolete tariffs, the following changes will be implemented:

- Migration of all Scale 5/6&7 customers to Scale 01 on the billing system. This will ensure minimal disruption to the customer experience while ensuring optimal business continuity.
- Consolidate Scale 002/021 consumers onto CTOU. This will ensure that consumers on this tariff continue to enjoy the benefit of time-differentiated tariffs whilst being on a more cost-reflective tariff.
- Migrate LV3-Part consumers on ITOU/Scale 1. This will ensure that Large Power Users (LPU's) are allowed to select the most suitable tariff, based on their consumption pattern.

The aforementioned will require input from Meter Engineering, Customer Services and Revenue management branches. This is to ensure that consumers are made aware of the implications of changing tariffs and are migrated to the most economically feasible tariff option, whilst ensuring cost-reflectivity.

It is anticipated that this initiative will be implemented 1st July 2025, as a detailed Cost of Supply Study is required to be conducted to ascertain the optimal rates, the potential impact and the necessary modifications, etc.

22.3.12 Implementation of Embedded Generation Tariffs

To realise the full potential of embedded generation installations within the municipal network, the current bouquet of embedded generation tariffs will be aggressively rolled out. The rollout will be focused on current installations, with the intent on registering and regularising existing installations.

This initiative will provide an incentive via an amnesty for SSEG to legalize their systems while maintaining revenue security, as discussed above.

To facilitate and implement this initiative, the appropriate metering infrastructure is required. The current billing system would have to be modified and integrated with the advanced metering infrastructure system, to allow a seamless customer experience.

The current suite of tariffs will be expanded to cater for the varied requirements of each customer segments. Customers in the Residential, Business & General as well as industrial users will have a choice of embedded generation tariffs to choose from, based on their tailored needs.

It is anticipated that this initiative will be implemented 1st July 2026, as a detailed Cost of Supply Study is required to be conducted to ascertain the optimal rates, the potential impact and the necessary modifications, etc.

22.3.13 Development of a Wheeling Policy

As previously discussed above**,** the wheeling of energy from Independent Power Producers (IPPs) to sell electricity directly to customers, or off-takers, requires the formulation and implementation of an extensive policy. The Energy Wheeling policy is intended to govern the implementation of wheeling practises within the Municipality and govern the formulation of the use of system (UoS) charges. And outline the roles and responsibilities of the individual stakeholders anticipated to partake in wheeling activities.

The National Wheeling framework will form the basis of the Municipal framework and policy; however, the latter will be tailored to cater for the specific customer composition of eThekwini Municipality.

It is anticipated that this initiative will be implemented 1st July 2026, as a detailed Cost of Supply Study is required to be conducted to ascertain the optimal rates, the potential impact and the necessary modifications, etc.

22.3.14 Green Energy Tariff

To better cater for the requirements of the changing energy landscape, it is imperative to investigate the possibility of reselling Green Energy and accreditation thereof. The aim would be to source renewable energy at competitive prices and resell the same energy at market-related prices to green-affiliated consumers who wish to lower emissions but are not large enough for Wheeling.

It is anticipated that this initiative will be implemented 1st July 2026, as a detailed Cost of Supply Study is required to be conducted to ascertain the optimal rates, the potential impact and the necessary modifications, etc.

22.3.15 Battery Storage Mitigation

As technology becomes more affordable, battery technology is expected to be adopted at a high rate. This poses a threat to municipal revenues, as current tariff offerings do not cater for the potential to be negatively affected by the technology. Peak-shaving and Energy Arbitrage are phenomena that can be achieved through strategic implementation of battery technology.

The above necessitates the development of a suite of tariffs aimed at combating possible revenue leakages as a result of the proliferation of battery storage.

It is anticipated that this initiative will be implemented 1st July 2026, as a detailed Cost of Supply Study is required to be conducted to ascertain the optimal rates, the potential impact and the necessary modifications, etc.

23.0 Renewable Energy Programme

Embedded generation installations are becoming a common sight in Durban and across South Africa. This has been driven by a number of factors namely: [2]

1. Rising costs of electricity from the grid.
2. Reducing cost of embedded generation in South Africa leading to very lucrative payback periods.
3. The need to reduce Carbon emissions, impending Carbon Taxes, Carbon Border Adjustment Mechanism, etc.
4. Changes in the licensing requirements for generation in South Africa.
5. Implementation of feed in tariffs by Municipalities.
6. Energy shortage and rotational loadshedding.
7. Various funding mechanisms available from the leadings banks in South Africa to finance renewable energy generation projects.
8. Various tax incentives available to customers that install embedded generation e.g. Section 12B of the Income Tax Act (Act 58 of 1996).
9. Various lease options available to customers who can't afford to purchase embedded generation systems.
10. Numerous Power Purchase Agreement (PPA) schemes available where the customer incur zero upfront capital costs but saves on their purchase price of electricity from day one.

23.1 Technology of Choice

The most common technology of choice from eThekwini Electricity customers has been rooftop solar PV and the main driving factors for this technology can be summarised follows: [2]

1. They are simple in design with no moving parts. Once installed they require very little maintenance as opposed to most other renewable technologies with moving parts.
2. Solar PV systems have a very short lead time to install in comparison to most other renewable technologies.
3. Solar PV technology is modular, and capacity can be expanded very easily over time by adding more panels, inverters and associated hardware.
4. There are no environmental concerns and hence no Environmental Impact Assessment requirement for rooftop solar PV, as opposed to most other renewable energy technologies.
5. They have a long lifespan with panel manufactures offering production warranties between 12 – 30 years whilst inverter manufacturers offer warranties between 5 and 10 years with the option to extend the warranty further.
6. PV panel manufactures offer production performance warranties for their PV panels which is guaranteed over the life of the panel. An example of this is Amerisolar, who currently offer an 80.6% production warranty after 30 years on their solar panels.
7. The fuel source (sun) is effectively infinite, renewable and free.
8. The pricing of solar PV has drastically reduced over time.
9. Solar PV technology has drastically advanced with large amounts of money being dedicated to research and development of new and improved Solar PV products that is constantly being introduced to the market.
10. Historically solar PV technology was installed on building rooftops and later onto carport structures but with the new development in Building Integrated Photovoltaic Systems (BIPV) and flexible light weight PV systems, the application now becomes endless. It also solves problems of limited roof space and roof structural integrity using BIPV and new light weight flexible solar PV which could even be draped on the sides of buildings, installed on roads or sidewalks.
11. There have been numerous developments in solar PV technology such as bi-facial solar panels, passivated emitter and rear contact cells, half cut cells with potential for tri cut cells in the future, multi junction concentrator solar cells, etc.
12. The efficiency of solar panels currently on the markets have increased with currently panels offering efficiencies of up to 24.3% such as panels from Aiko Solar (Neostar 3N54), whilst labs such as the National Renewable Energy Lab has obtained higher efficiencies up to 47.1% using multi junction concentrator solar cells in the lab.
13. Solar PV panels sizes have increased from the 250 W – 300W panels which were common a few years ago to newer panels that are becoming commercially available, sized at 700W from Jollywood/Akcome and 800W from JA Solar.
14. Whist the size of string inverters has also increased from 50kW - 100 kW up to 350 kW (Kehua's SPi) string inverter.
15. There has also been a shift from the previous generation of inverters which offered a 1000V DC input to the new inverters which offer a 1500V DC input voltage and output voltages from 400V AC to now 800V AC.

The key focus on the development of these new panels and inverters are aimed at reducing the levelized cost of electricity to the customer.

23.2 Uses of Embedded Generation

There are three uses of customer installed embedded generation, namely own use/load reduction, own use supplemental with excess for export and generation for pure export. Figure 1 shows a typical residential customers load profile depicted by the increased electricity demand in the morning and evening whilst the solar PV generation has a midday peak resulting in load reduction with excess energy generation for export to the grid. Whilst the commercial/industrial profile shown in Figure 19 on the right shows the perfect match of the solar PV generation vs the customers load profile resulting in own use/load reduction.

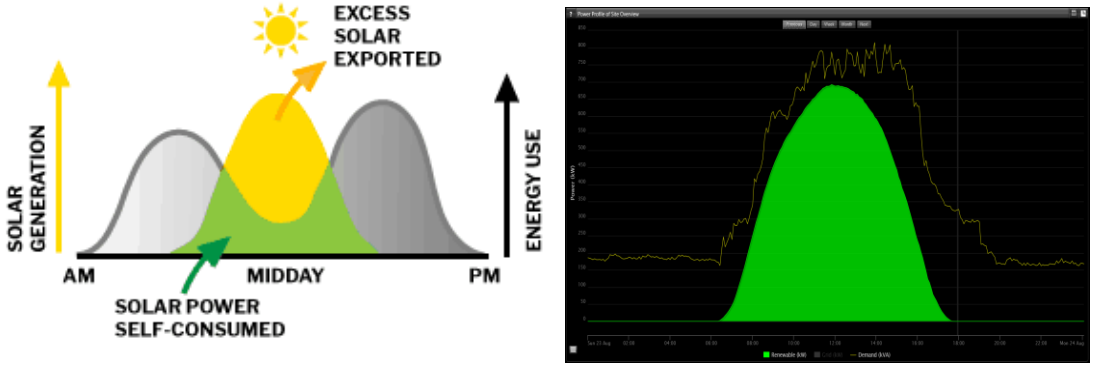

Figure 19 - Residential Profile Use Vs PV Generation and Commercial /Industrial Profile Vs PV Generation

However, the commercial/industrial customer load profile can be broken down in two further categories which is shown in Figure 20 for a company that operates 5 days a week and a company that operates 7 days a week. In the case of the company that operates 5 days a week, there will be excess energy for export on the weekends/public holidays whilst own use/load reduction during weekdays.

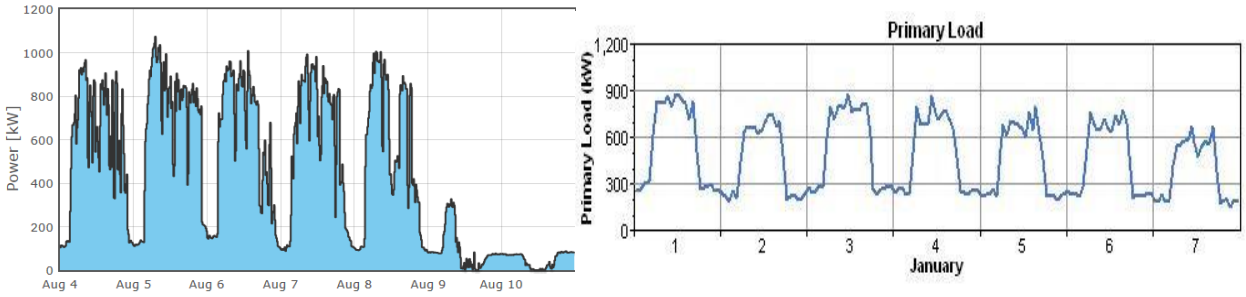

Figure 20 - 5-Day Operation Load Profile Vs 7-Day Operation Load Profile

The three customer categories that define customer installed embedded generation usage are as follows:

a. Own Use/Load Reduction: Customer primarily uses all the electricity generated from the solar system to reduce their own onsite load whilst the balance of the load is fed from the municipal grid. An example is shown in Figure 21. The green represents the energy supplied from the solar PV system whilst the red represents the energy fed from the municipal grid.

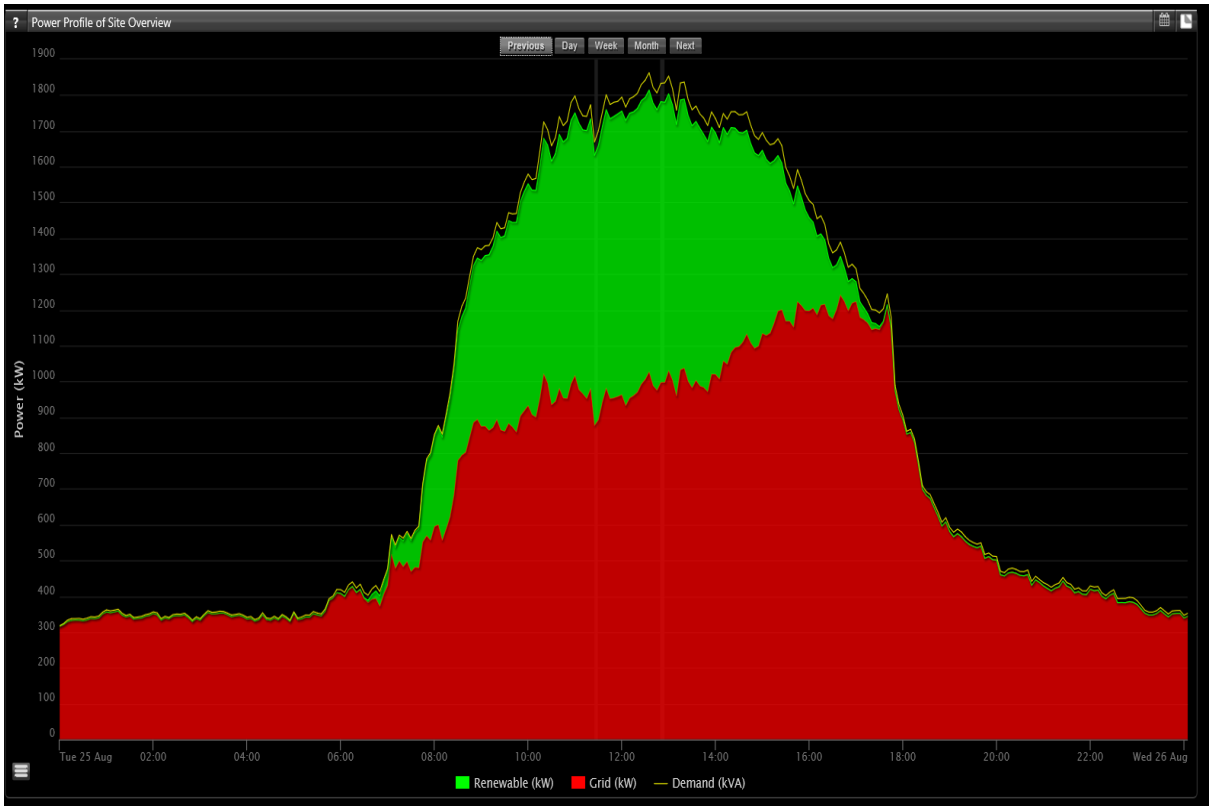

Figure 21 - Resultant Customers Load Profile Shown in Red with Embedded Generation Offset in Green

b. Own Use Supplemental/Excess Export**:** The customer utilizes the solar PV generation to feed their own load requirements but may have excess to export to the grid as and when not required. This typically occurs more for commercial/industrial customers who are closed on weekends which results in lower on-site energy consumption and hence excess generation for export to the grid. This also applies to residential customers who may have excess energy for export during the week. An example of this is shown is Figure 22.

Figure 22 - Excess Energy Export During Times of Low Demand Such as Weekends for An Industrial Customer

c. Independent Power Producers: There is also a third category where the generator is an Independent Power Producer that generates purely to export to the grid or to wheel to an off taker on the grid. All of the electricity that is generated by the Generator is exported into the municipal grid and either purchased by the municipality via a Power Purchase Agreement (PPA) or wheeled to an off taker within the municipal or Eskom network. An example of pure export is shown in Figure 23 which shows all of the generation from the Bisasar Road Landfill gas to electricity is exported to the municipal grid.

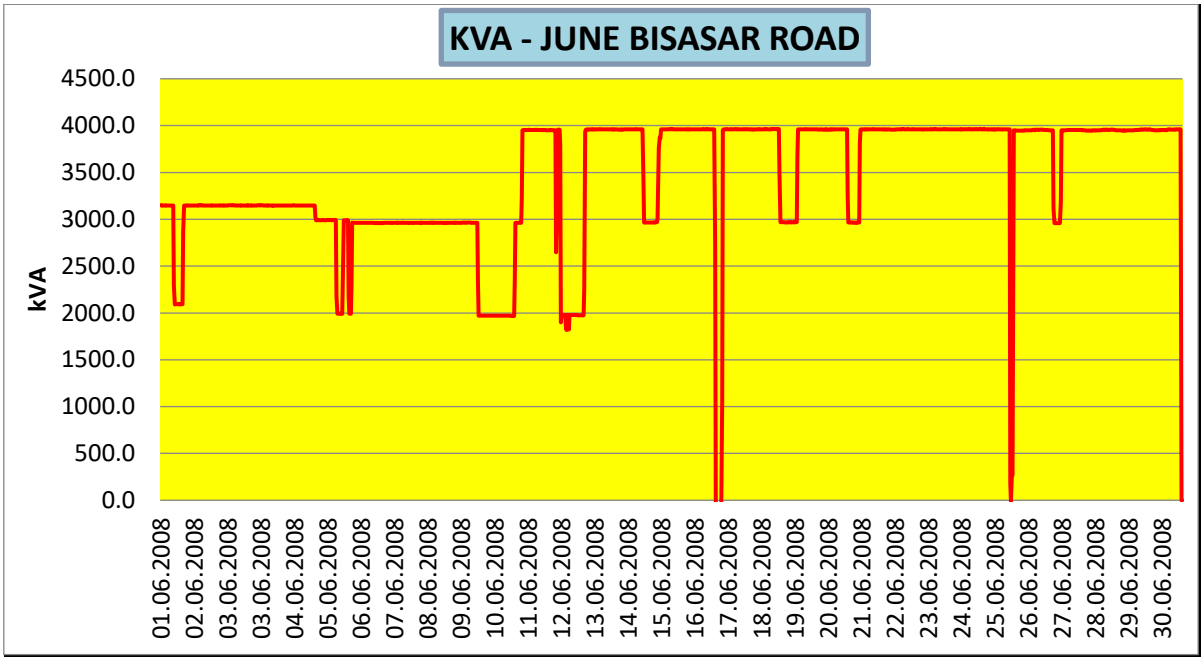

Figure 23 - Generation for Pure Export Purpose from The Bisasar Road Landfill Site Gas to Electricity Plant

23.3 Current Trends Observed at eThekwini Electricity

There has been an exponential increase in the capacity of embedded generation installed on the eThekwini Electricity grid. Figure 24 shows the exponential increase in embedded generation installations in Durban which currently exceeds 100 MW of installed, commissioned, and approved capacity. The most common technology of choice is solar PV but other technologies of embedded generation such as landfill gas to electricity, pipeline hydro, natural gas generation, co-generation, use of bagasse for generation in the sugar cane industry, coal and steam generation projects have also been constructed and connected to the eThekwini Electricity grid.

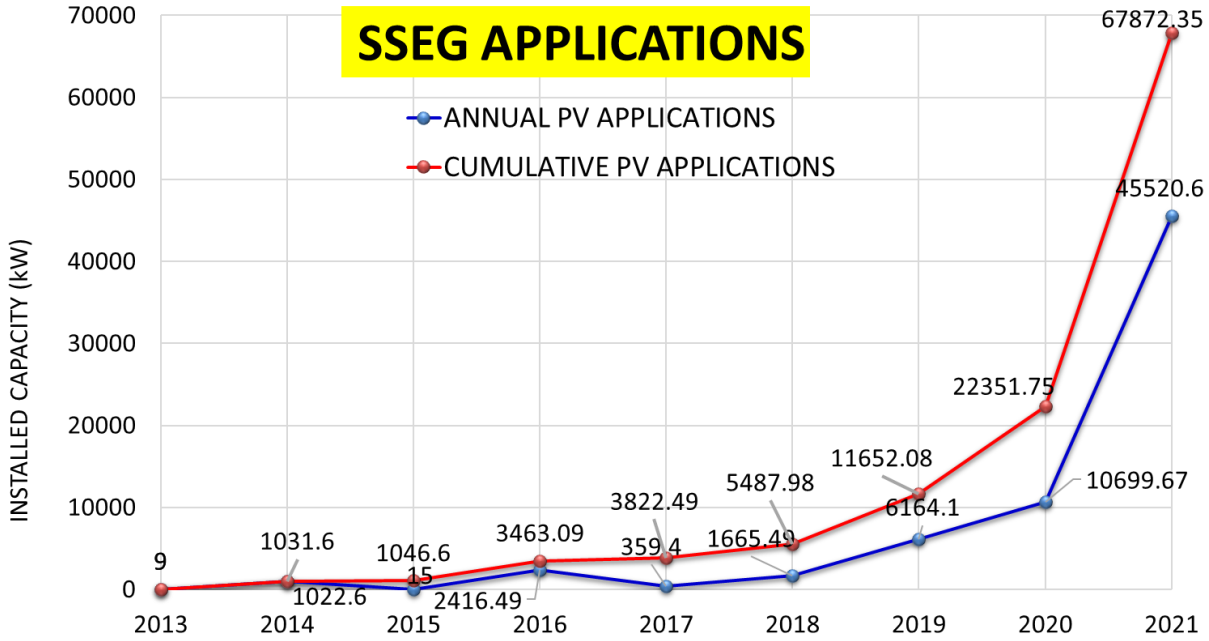

Figure 24 - Growing Installation of Embedded Generation Within eThekwini Municipality

23.4 Commercial Consequences of Embedded Generation Installations

Customer installing embedded generation on the eThekwini Electricity grid has a number of consequences with the main consequence being the decline in electricity sales. This can be clearly seen in Figure 25 that there has been a steady decline in the purchase and sale of electricity at eThekwini Electricity resulting in an overall loss of revenue leading to a deficit. One of the causes of this decline is due to customers installing embedded generation technology such as rooftop solar PV resulting in reduced consumption from the grid.

A typical example is the Arbour Crossing Mall that installed a 1 MW (1.43 MWp) rooftop solar PV system, which simulation results indicate will generate 1 658 358 kWh a year which will all be self-consumed by the mall. This means that with the installation of this PV system, municipal electricity sales will reduce by 1 658 358 kWh from the mall.

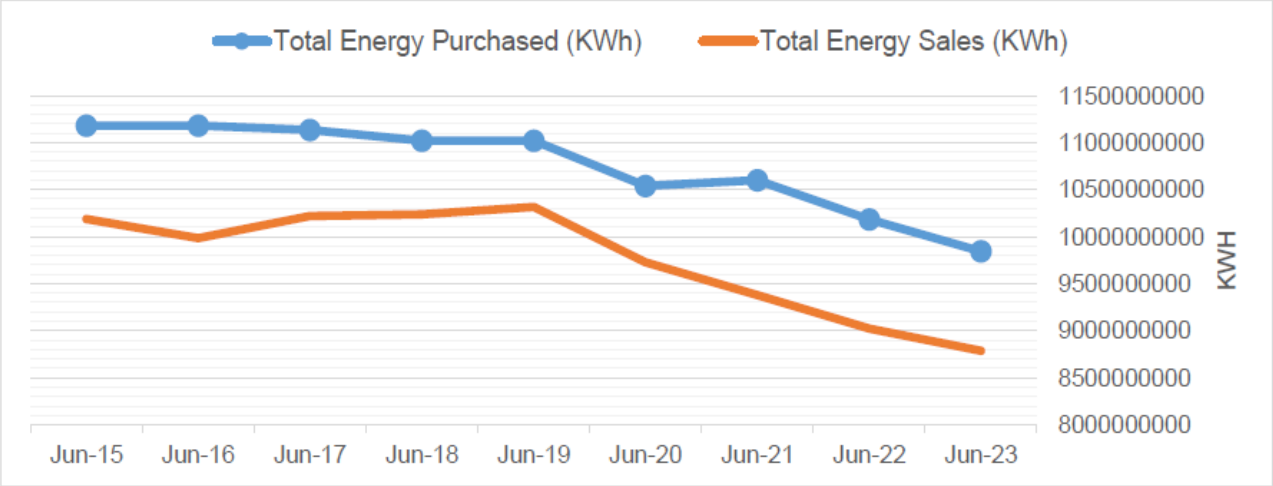

Figure 25 - Electricity Purchases and Sales Data

The main issues for a utility related to the connection of embedded generation installations are: [3]

a) Embedded generation causes a reduction in sales and where tariffs are not structured to recover all fixed costs through fixed charges, there will be a negative revenue impact due to loss of sales.
b) Customers may be net zero consumption customers, but still need the grid as a backup to variable energy generation resources.
c) Even though consumption might be lower or even zero, customers may still require the infrastructure to draw the same demand affecting the grid and generation capacity as customers that do not have own generation – typically those installing PV.
d) There remains a cost to connect and use the grid as a backup and to consume when needed.
e) This cost is not recovered if fixed charges are not cost-reflective and there is a net-metering/billing or net-feed in tariff scheme.
f) Most tariffs for residential and small business customers do not have cost reflective network charges such as the residential tariffs and business Scale 1 tariff structures.
g) Customers that do not have embedded generation could subsidise the tariffs of customers with embedded generation unless the tariffs are made cost reflective.
h) The customer should be aware that they will not be getting a credit based on current tariffs, that credit should be related to the total utilities avoided cost.
i) The customer's avoided cost could therefore only be related to costs that are avoided by embedded generation and this needs to be factored in by the customer when investing in such equipment.

23.5 Need for Unbundled Tariff Structures

The South African energy generation sector is evolving from a vertically integrated structure to a more liberalised one via local embedded generation sources. Customers are now reducing their energy dependency from the municipal grid due to self-consumed generated electricity from embedded generation sources such as rooftop solar PV. This self-consumption of energy creates an imbalance in the recovery of network- related charges for the municipality i.e. creating a revenue loss due to electricity sales reduction. The solution derived was to restructure electricity tariffs with better cost and structural reflectivity. This includes the separation of the electricity trading services into the retail business and "wires" business as shown in Figure 26.

Figure 26 - Separation of The Electricity Trading Service Business

With customers installing embedded generation technology largely solar PV, their usage profiles change with them importing and exporting energy at different times of the day, different days of the week and different months (seasons) of the year. The new customer usage model is shown in Figure 27. It hence required a shift from single rate tariff structures to a new net-billing tariff structure which will consist of 3 components. This is a shift away from bundled tariff structures to a more unbundled tariff structure. The new net billing tariff structure is shown in Figure 28 and now contains two additional components which were added namely, a network access charge component and an export energy compensation component to renumerate the customer for excess energy that they export to the municipal grid in addition to the existing import energy rate that the customer purchase electricity from the municipality grid. Recovering all the network-related costs in a network access charge offers the utility the lowest risk in cost recovery whilst promoting the highest level of cost reflectivity. The network access charge is further based on the size of the customers inverter/generator to allow fair contribution to the usage of the grid based on the fact that a larger inverter/generator will generate more electricity and hence reduce electricity purchases from the grid even more.

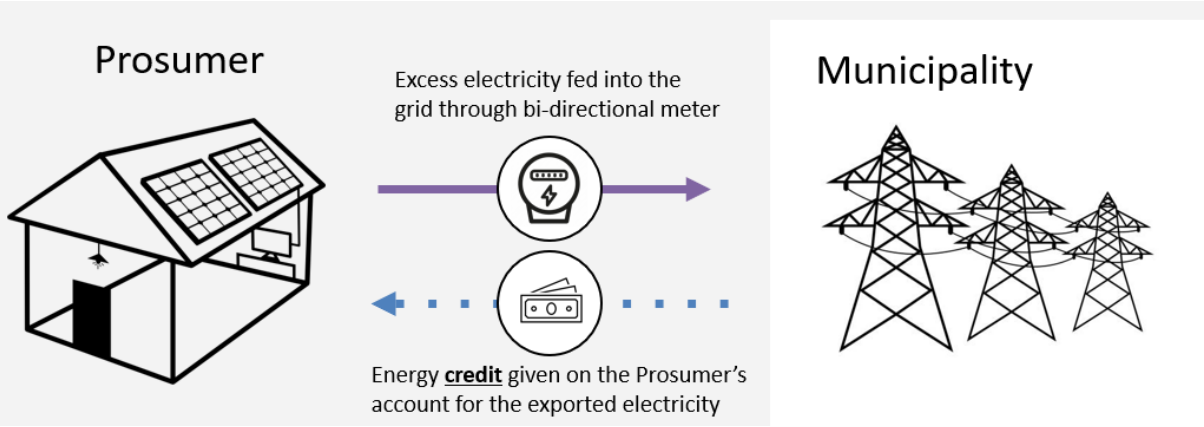

Figure 27 - New customer generation/consumption model

Figure 28 - Net Billing Unbundled Tariff Structure

23.6 Net-Billing Tariff Structures

23.6.10 Residential Net-Billing Tariff Structures

Historically the residential electricity tariff was a single rate tariff structure shown in Table 29 with the service and network charge built into the single rate. However, with customer installing embedded generation such as solar PV and reducing their overall consumption from the grid, there was a need to move towards a more unbundled cost reflective tariff. Hence the residential net-billing tariff structure was introduced.

Table 29 - Existing eThekwini Electricity Singe Rate Residential Tariff Structure

Energy Charge		Service Charge
c/kWh	VAT Incl	
290.94	334.58	Not Applicable

The residential net billing tariff structure is made up of an import energy rate, feed-in-tariff rate (export energy credit) and a network access charged based on the customers inverter/generators size as shown in Table 30.

Table 30 - Residential Net-Billing Tariff Structure

Energy Charge		Feed-in-Energy Rate		Network Access Charge	
c/kWh	VAT Incl	(c/kWh)	VAT Incl	R/kVA	VAT Incl
290.94	334.58	140.71	N/A	62.17	71.50

Studying a sample of 201 of the most recently received residential embedded generation applications as shown in Figure 29, it can be seen that a 5-kW system makes up more than half of the installations whilst 8 kW systems make up almost a third of the installations. Other systems sizes such as 12 kW on the three phases systems and 16 kW on single phases systems have also been installed but at a much lower percentage.

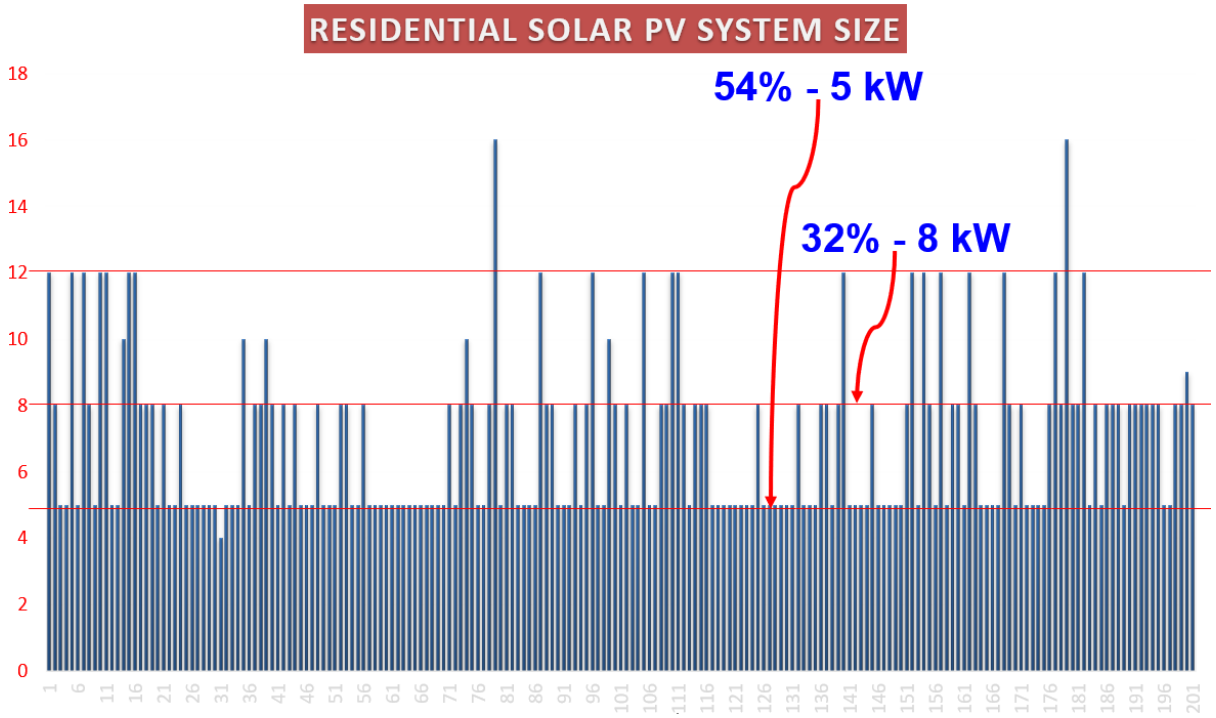

Figure 29 - Sample of The Size of Residential Embedded Generation Applications Received

Applying the residential net billing tariff network access charge to the various sizes of embedded generation systems sizes, Table 31 shows the network access charge recovery from the customer based on the system size they install. Currently the eThekwini Electricity Cost of Supply Model indicates that the Rand/kVA for cost for the network access charge should be double the current value but following a public consultation workshop feedback and various financial models conducted, it was decided to halve the network access charge component and subsequently increase it to the full value over the next 5 years whilst keeping the import energy rate as is to compensate for this.

Table 31 - Cost Recovery from The Network Access Charge Component for Different Inverter/Generator Sizes

RESIDENTIAL NETBILLING TARIFF			
INVERTER SIZE (kVA)	NAC COST/kVA	TOTAL NAC COST	ANNUAL NAC COSTS
5	62.14	310.7	3728.4
8	62.14	497.12	5965.44
12	62.14	745.68	8948.16
16	62.14	994.24	11930.88

23.6.11 Business Net-billing Tariff

The Business and General tariff structure is a single rate tariff structure which includes the network charge and has a separate service charge component as shown in Table 32. With Business and General tariff structure, customers installing embedded generation will reduce their consumption from the municipal grid leading the municipality not being able to recover the full network access charge required.

Table 32 - Existing Business and General Tariff Structure

Energy Charge		Service Charge	
c/kWh	VAT Incl	R	VAT Incl
328.53	377.81	429.87	494.35

Table 6. Existing Business and General tariff structure

Hence there was a need to introduce a business net-billing tariff structure which now includes two additional tariff components, an export energy rate and a network access charge component. The import energy rate is the rate at which the customer purchases electricity from the municipality, the export energy rate is the rate at which the customer is compensated for the electricity that they export to the grid and the network access charge is the rate that the customer needs to pay the municipality based on the size of their inverter/generator as shown in Table 33.

Table 33 - Business Net Billing Tariff Structure

Import Energy Rate		Service Charge		Export Energy Rate		Network Access Charge	
c/kWh	VAT Incl	R	VAT Incl	c/kWh	VAT Incl	R/kVA	VAT Incl
328.53	377.81	429.87	494.35	107.46	123.58	138.66	159.46

Table 7. Business net billing tariff structure

Applying the business net billing tariff, network access charge to the various common sizes of embedded generation systems, Table 34 shows the network access charge recovery from the customer based on the system sizes they install. Financial Modelling conducted indicates that the introduction of the network access charge component on this tariff structure will have minimal impact to the customers already lucrative payback period hence the required full network access charge component will be recovered via this tariff mechanism.

Table 34 - Cost Recovery from The Network Access Charge Component for Different Generator Sizes

BUSINESS NETBILLING TARIFF			
INVERTER SIZE (kVA)	NAC COST (R/kVA)	MONTHLY NAC COST (R)	ANNUAL NAC COSTS (R)
50	159.46	7973	95676
100	159.46	15946	191352
200	159.46	31892	382704
300	159.46	47838	574056
400	159.46	63784	765408
500	159.46	79730	956760

Table 8. Cost recovery from the network access charge component for different generator sizes

23.6.12 Industrial Net-Billing Tariff Structure

The industrial net-billing tariff structure is an multi tariff component tariff structure that is time of day, day of week, month of year dependent. It is an unbundled tariff structure where the network charges have been separated from the energy charges. The current industrial time of use tariff structure is shown in Table X. However, the voltage surcharge component is based on a percentage levied on the sum of all costs with the exception of the service charge. When an industrial time of use customer installs embedded generation, they reduce their energy usage from the grid and hence the recovery of the total network access charge via the voltage surcharge component. There was hence a need to introduce a new industrial net-billing tariff structure as shown in Table X which introduces an ancillary network access charge component to compensate for the reduction in the voltage surcharge component whilst the export energy rates are equal to the important energy rates which is a direct pass-through cost to Eskom. Table X depicts the ancillary network access charge recovery for different generator sizes installed by an industrial time of use customer.

Table 35 - Existing Industrial Time of Use Tariff Structure

Active Energy Rate (c/kWh) – Import Energy Rates											
High Demand Season (Jun - Aug)						Low Demand Season (Sep - May)					
PEAK		STANDARD		OFF-PEAK		PEAK		STANDARD		OFF-PEAK	
c/kWh	VAT incl	c/kWh	VAT incl	c/kWh	VAT incl	c/kWh	VAT incl	c/kWh	VAT incl	c/kWh	VAT incl
591.63	680.37	190.68	219.28	110.00	127.65	203.99	234.59	145.55	167.38	98.28	113.02

									Voltage Surcharge	
Network Demand Charge			Network Access Charge			Service Charge			Voltage	% Surcharge
[R/kVA) All Seasons			[R/kVA] All Seasons			Rands All Seasons			132 kV	2.25
Excl VAT		VAT incl	Excl VAT		VAT incl	Excl VAT		VAT incl	33 kV	3.00
140.32		161.36	46.09		53.00	6533.21		7513.29	11 kV	10.50
									6.6 kV	12.75
									0.4 kV	22.50

Table 36 - Industrial Net-Billing Tariff

Active Energy Rate (c/kWh) – Export Energy Rates											
High Demand Season (Jun - Aug)						Low Demand Season (Sep - May)					
PEAK		STANDARD		OFF-PEAK		PEAK		STANDARD		OFF-PEAK	
c/kWh	VAT incl	c/kWh	VAT incl	c/kWh	VAT incl	c/kWh	VAT incl	c/kWh	VAT incl	c/kWh	VAT incl
591.63	680.37	190.68	219.28	110.00	127.65	203.99	234.59	145.55	167.38	98.28	113.02

Ancillary Network Charge		
Voltage	R/kVA per month Based on Generator Size	
132 kV	4.33	4.98
33 kV	5.65	6.49
11 kV	19.96	22.96
6.6 kV	24.8	28.52
0.4 kV	42.41	48.77

Table 37 - Monthly Ancillary Network Access Charge for Different Inverter/Generator Sizes

VOLTAGE LEVEL	COST/kW incl VAT	250 kW	500 kW	750 kW	1000 kW	2000 kW	5000 kW
132 kV	4.98	1245	2490	3735	4980	9960	24900
33 kV	6.49	1622.5	3245	4867.5	6490	12980	32450
11 kV	22.96	5740	11480	17220	22960	45920	114800
6.6 kV	28.52	7130	14260	21390	28520	-	-
400 V	48.77	12192.5	24385	36577.5	48770	-	-

23.7 Bi-directional Meters

In order to implement the various net-billing tariff structures, there is a need for the customers' existing meter to be replaced with a bi-directional meter. The cost of the bi-directional meter will be borne by the customer. With the installation of the bi-directional meter, the import and export energy from the prosumer is accurately measured to which the net-billing tariff structure can be then applied to. Figure 30 shows a typical bi-directional meter installation where the single bi-directional meter can measure import and export energy values accurately in different registers in the meter. Bi-directional meters are currently still to be procured and hence the net-billing tariff structures has not been implemented to date even though the tariff structures have been approved for implementation.

The lack of bi-directional meters is not only hindering the implementation of the new net-billing tariff structures, but also resulting in numerous errors on customers' bills when embedded generation customers especially residential customers and commercial customers who are exporting energy illegally on to the grid with existing analogue meters on site. When energy is exported through these analogue meters, the meter reverses resulting in the customers receiving an unofficial 1:1 offset on their electricity bill resulting in further loss of revenue to the municipality.

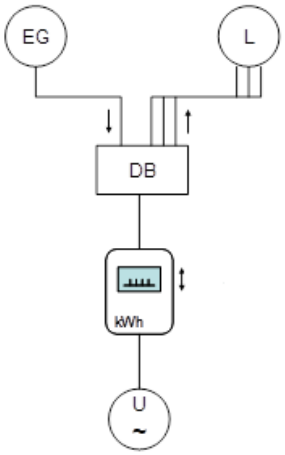

Figure 30 - Typical Bi-Directional Meter Installation at The Customers Property

Figure 31 shows the typical metering data that is downloaded from the 4-quadrant smart bi-directional meter. The metering file contains numerous other measured parameters such as import and export kVAr and kVA values but for the purpose of net-billing only the import and export values of real power is required as shown below. The kW register on the left-hand side in Figure 13 is the electricity exported to the grid whilst the kW value on the right-hand side is the electricity imported from the grid. Based on the fact that you cannot be importing and exporting at the same time, only one register will have a recorded value at any time.

Load Profile 1 - LGZ50708422

Protocol: Dlms
ID: LGZ50708422
FromDate: 2023-05-01 00:01:00.00
ToDate: 2023-05-15 00:00:00.00

0-0:1.0.0	0-0:96.240.12 [hex]	1-1:1.5.0 [kW]	1-1:2.5.0 [kW]
Clock (tm=30 min)	EDIS status	Last average demand +A (QI+QIV)	Last average demand -A (QII+QIII)
2023-05-01 00:30:00	81800004	0.0428	0.0000
2023-05-01 01:00:00	81800004	0.0428	0.0000
2023-05-01 01:30:00	81800004	0.0427	0.0000
2023-05-01 02:00:00	81800004	0.0428	0.0000
2023-05-01 02:30:00	81800004	0.0428	0.0000
2023-05-01 03:00:00	81800004	0.0428	0.0000
2023-05-01 03:30:00	81800004	0.0428	0.0000
2023-05-01 04:00:00	81800004	0.0427	0.0000
2023-05-01 04:30:00	81800004	0.0428	0.0000
2023-05-01 05:00:00	81800004	0.0427	0.0000
2023-05-01 05:30:00	81800004	0.0428	0.0000
2023-05-01 06:00:00	81800004	0.0428	0.0000
2023-05-01 06:30:00	81800004	0.0427	0.0000
2023-05-01 07:00:00	81800004	0.0428	0.0000
2023-05-01 07:30:00	81800004	0.0427	0.0000
2023-05-01 08:00:00	81800004	0.0428	0.0000
2023-05-01 08:30:00	81800004	0.0428	0.0000

Figure 31 - Typical Metering Data Acquisition from A Bi-Directional Meter at A Generation Site

23.8 Customer Billing

Figure 32 shows what a sample residential net billing customers bill will look like. It will contain an import kWh value and export kWh value and the size of the customer inverter where the respective tariffs are applied. The customers business net billing tariff bill will look similar and contain the same three components with an existing separate service charge component.

Business And Residential Electricity

Reference - E6794222 45 SYRINGA AVENUE, DAWNCLIFFE(P), WESTVILLE(P)
Res 1 Ph Sc 4 Net Billing

CT Ratio	1.00000	VT Ratio	1.00000	Installed Capacity		Inverter Size	5.00

Meter No.	Register	Previous Meter Reading		Current Meter Reading		Reading	Usage
		Date	Reading	Date	Reading	Constant	
45079425075	Energy Std	2024/07/11	6456.00000	2024/08/08	7225.00000	1.00	769.00 kWh
45079425075	Energy - Export	2024/07/11	1142.00000	2024/08/08	1349.00000	1.00	207.00 kWh

Figure 32 - Sample of A Residential Customers Net Billing Bill

Description	Units	Rate (R)	Amount (R)
Energy (Export)	207.00000 kWh	1.4929 /kWh	309.03Cr*
Energy charge	769.00000 kWh	2.9095 /kWh	2,237.41*
Ancillary Network Charge	5.00000 kVA	51.0100 /kVA	238.05*

Figure 33 - Sample of A Residential Customers Net Billing Bill

Whilst Figure 34 shows what a typical industrial net billing tariff customers bill will look like with three (peak, standard and off-peak) import energy rate and three (peak, standard and off-peak) export energy rates and an ancillary network access charge over and above the other components of the industrial net billing tariff.

Meter No.	Register	Previous Meter Reading		Current Meter Reading		Reading	Usage
		Date	Reading	Date	Reading	Constant	
44305314	Energy Std	2024/05/31	0.00000	2024/06/30	11.31100	16000.00	180976.00 kWh
44305314	Energy Peak	2024/05/31	0.00000	2024/06/30	5.14900	16000.00	82384.00 kWh
44305314	Max Demand	2024/05/31	0.00000	2024/06/30	0.35920	16000.00	5747.20 kVA
44305314	Energy OffPk	2024/05/31	0.00000	2024/06/30	6.82800	16000.00	109248.00 kWh
44305314	Energy Peak (Export)	2024/05/31	0.00000	2024/06/30	9.82400	16000.00	157184.00 kWh
44305314	Energy Std (Export)	2024/05/31	0.00000	2024/06/30	29.31700	16000.00	469072.00 kWh
44305314	Energy Off-Peak (Export)	2024/05/31	0.00000	2024/06/30	43.96500	16000.00	703440.00 kWh

Meter reading period from 2024/05/31 to 2024/06/30

Description	Units	Rate (R)	Amount (R)
Active energy - peak	82384.00000 kWh	5.2486 /kWh	432,400.66*
Active energy - standard	180976.00000 kWh	1.6916 /kWh	306,139.00*
Active energy - off-peak	109248.00000 kWh	0.9847 /kWh	107,576.51*
Network Demand charge	5747.20000 kVA	124.4800 /kVA	715,411.46*
Network Access charge	6000.00000 kVA	40.8900 /kVA	245,340.00*
Voltage Surcharge	R 1806867.63	10.50%	189,721.10*
Service charge	-	5795.9600 p.m	5,795.96*
Energy - Peak (Export)	157184.00000 kWh	5.2486 /kWh	824,995.94Cr*
Energy - Standard (Export)	469072.00000 kWh	1.6916 /kWh	793,482.20Cr*
Energy - Off-Peak (Export)	703440.00000 kWh	0.9847 /kWh	692,677.37Cr*
Ancillary Network Access Charge (ANAC)	500.00000 kVA	0.9847 /kVA	8,855.00*
508700000 Sub-total			299,915.82Cr
508700000 VAT raised on items marked with an asterisk (*)			44,987.37Cr
508700000 Total			**344,903.19Cr**

Figure 34 - Example of An Industrial Net Billing Tariff Customers Bill

23.9 Embedded Generation Application Process

Currently the customer follows a manual application process when applying for embedded generation. Customers need to obtain approval from the municipality prior to any SSEG installation. The current manual embedded generation application process requires the customer to submit the following documents as shown below:

1. Completed application form (residential or commercial/industrial form)
2. NRS 097 inverter certificate
3. Operating Philosophy if the customer has batteries/supercapacitors to be installed
4. Equipment data sheets
5. Detailed Single Line Diagram
6. PV/generation production simulation report (for commercial and industrial systems)

Based on the generation size and customers connection voltage level, the application is assessed using the NRS 097-2-3 simplified connection criteria or if it doesn't meet the requirements of the simplified connection criteria then there could be additional requirements such as a Grid Impact Study/Grid Code Compliance Studies/Network Impact study required.

Currently customers are not costed for the bi-directional meter due to the unavailability of meters and hence not moved onto the appropriate net-billing tariff structure. This step will be carried out in the future once bi-directional meters become available.

Once the application is assessed and approval is given, the customer may commence with construction of the generation plant. On completion of construction and commissioning, the following is required:

1. Certificate of Compliance (COC).
2. Completed commissioning report.
3. Professional Engineer/Professional Technologist sign off letter for the installation.
4. As built drawing if any changes were made to Single Line Diagram submitted.
5. View access to the PV generation portal.

Once the above is received, a site inspection is set up and carried out and if all is in order then an approval letter is issued.

Going forward to streamline and simplify the embedded generation application process, an online application process has been developed as shown in Figure 35. With the online application process that's been developed but still to be implemented, the customer can make the application online and upload all of the required supporting documents and is then given an application number should everything be in order. Thereafter the application will be approved should everything be in order and the process will continue from the above post commissioning process.

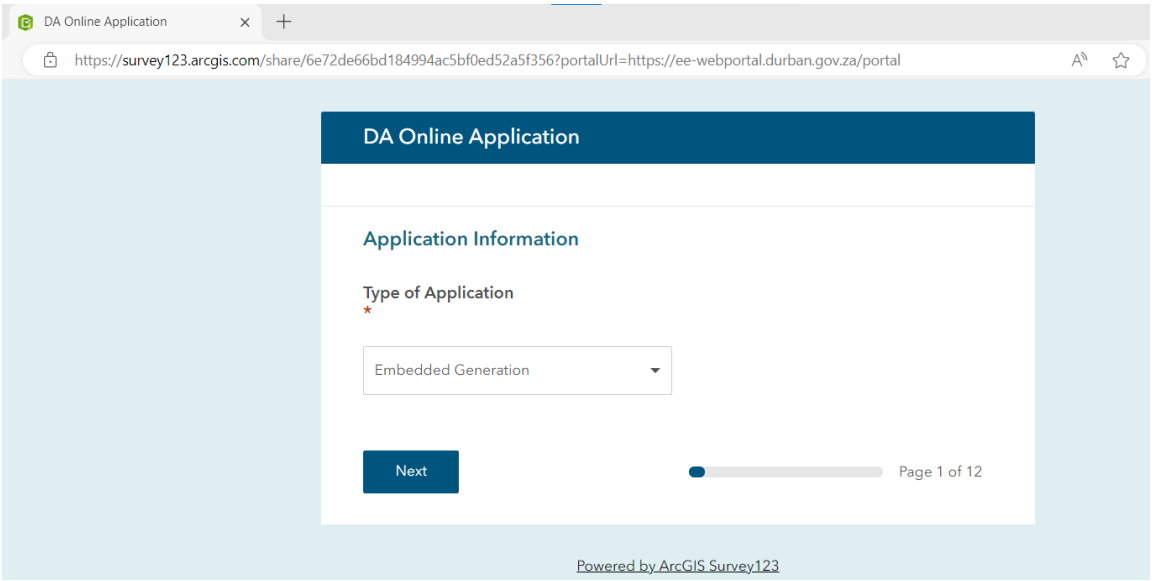

Figure 35 - Online Embedded Generation Application Process

23.10 Specialised Studies Required

Installation of embedded generation systems can have a number of technical impacts on the municipal grid. Some of the main impacts of embedded generation on the grid are as follows:

a. Rapid Voltage Change
b. Increase in network fault levels
c. Potential to introduce power quality problems (Harmonics, DC injection, voltage rise) on the grid
d. Excess energy export to the grid which can result in overloading of distribution network assets such as cables/transformers, etc.
e. Potential to impact distribution network losses
f. Potential to overload networks following return of electricity supply following a load shedding event or network outage with battery charging if not properly managed.
g. Affect existing network protection co-ordination
h. Hosting capacity studies to determine available hosting capacity on networks with multiple generation sources
i. Possible system strengthening required to accommodate embedded generation

Due to the large number of embedded generation applications received by municipalities, an “Embedded Generator Grid Impact Study Guideline” was drawn up to divide the responsibility of who should conduct which studies when connecting different size embedded generation at different voltage levels on the distribution network. The studies to be conducted and the responsibility of whom should carry out the study is shown in Figure 36. This can be broken down as follows:

1. LV Prosumers (<1000 kVA): These customers have a LV connection to the distribution (municipal) network and typically install embedded generation for own use. Evaluation should be done as prescribed in the NRS097-2-3 (Simplified Connection Criteria). This evaluation typically does not involve any network studies.
2. LV Prosumers (>1000 kVA) or MV Prosumer: Such customers install embedded generation primarily for own use. Grid impact studies will be applicable to these types of customers. Studies can be done by either the distributor or the client. This evaluation falls within the scope of this guideline and is conducted to check the impact of the embedded generation at the Point of Connection (POC).
3. Independent Power Producer (IPP): These customers install embedded generation primarily for supply of energy to the distribution network. Such customers must be evaluated against the South African renewable energy grid code and the full grid code compliance process must be evaluated i.e.,
    a) Grid code compliance studies (includes steady state and dynamic Low Voltage Ride Through (LVRT), High Voltage Ride Through (HVRT), phase jump studies etc).
    b) Testing of the plant’s capability and controllability.
    c) Submission of all supporting documents.
    Grid code compliance should be conducted in collaboration with the Renewable Energy Technical Evaluation Committee.

As a guide, Section 4 (9) of the Distribution Network code stipulates the studies that distributors need to complete and is extracted below.
The Distributor shall conduct Distribution System Impact Assessment studies to evaluate the impact of additional loads or embedded generator or major modification to the Distribution System. The assessment conducted shall include the following where relevant:

(a) Voltage impact studies
(b) Impact on network loading
(c) Fault currents
(d) Coordination of protection systems
(e) Impact on the system’s quality of supply
(f) Strengthening of the system

Further to the studies above, it is also recommended that the distributors also conduct hosting capacity studies. Such studies will enable the distributor to assess the total amount of EG that can be connected to the network, without the need to upgrade the network.

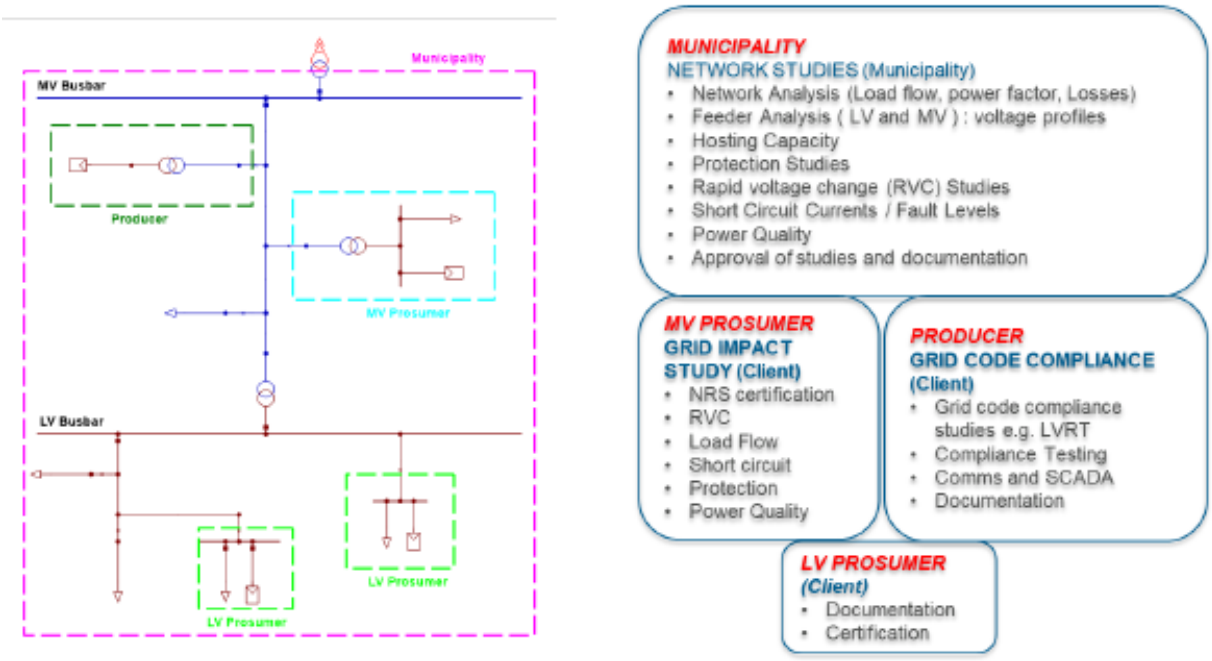

Figure 36 - Various Studies That Need to Be Conducted to Mitigate Adverse Network Impacts

For Network Studies to be conducted to comply with the Distribution Network Code, the following is required to be in place:

1. There is a need to capture all embedded generation application onto the GIS/Ellipse and link them to their respective source substations to spatially understand which customers have embedded generation installed in a specific network, embedded generation size, source substations, etc.

   This task is currently being undertaken by Customer Services and the Network Drawing Office. Once completed this will also serve other purposes such as allowing the Municipality in obtaining reports for reporting to the regulator, understand trends and customer behaviour to provide feed in to tariff development, use of Artificial Intelligence (AI) to identify non-registered systems, etc.

2. There is also a requirement to ensure that all customers have legally registered and approved systems with the municipality.

   Once the end-to-end embedded generation process is operational, the Pricing and Marketing branch will go out on an amnesty drive, where existing non-registered customers will be given a defined period of time to apply to the municipality for approval of their systems after which harsh penalties will apply. Completion of item 1 above will allow for non-registered system detection with the use of Artificial Intelligent (AI). An example of the use of AI to detect solar panels on the GIS is shown below.

Figure 37 - Using AI To Detect Solar Panels on The GIS [4]

3. Further to this, there is a need to have an updated Medium Voltage (MV) electrical model on which the embedded generation will need to be modelled, and the various studies conducted.

   The model is currently updated by HV Planning and is accurately modelled up to the 11 kV Major Substation bus bars. MV Planning will then need the model the network down in phases first down to Distributor Substation level and thereafter down to the 11 kV substation level. This model can then be used to conduct the network studies for embedded generation. Currently the Planning branch is investigating the option comparing the existing 2012 model with the latest network schematic in order to identify the changes require to update the model. Thereafter staff will be trained to update and keep the model up to date.

4. Staff need to be trained in order to be able to carry out these specialised studies.

   All staff that will be responsible for the modelling and updating of the model and conducting specialised studies will need to be trained on and how to use the software in order to conduct these specialised studies.

23.11 Require Embedded Generation Resources

Based on the customer trends and increase in embedded generation application, there is a need to have more dedicated resources available to be able to assess/process and create policy and procedures on embedded generation. A structure has been created that consists of a Strategic Executive: Sustainable Energy, a Specialist Engineer: Grid Integration and a Specialist Engineer: Energy Generation and Trading. These posts are yet to be graded and filled. This structure when filled will provide strategic policy and guidelines regarding to embedded generation within the unit.

Currently the MV/LV Planning branch staff (Chief Engineer from Engineer Support and each Technologist from each Planning Section) are currently involved in the processing of all embedded generation applications however with the increasing volumes of applications and new and emerging technologies such as energy storage, energy wheeling, independent power producers connecting onto the municipal grid, training is required to equip more staff in order to allow them to assess these new types of applications. A review of the current process and structure is needed and defining roles and responsibilities of tasks to be carried out by the new “Sustainable Energy” structure and the Planning branch.

23.12 Tactical Goals, Objectives, And Initiatives

Table 38 – Tactical Goals Related to Renewable Energy

Goal	Initiative
Goal 4: Improve customer satisfaction	Proposed introduction of an online Embedded Generation application process to streamline and make the application process simpler for customers and easier to track the application.
Goal 4: Improve customer satisfaction	Introducing net-billing tariff structures so that customers can be paid for any excess energy that they export to the municipal grid.
Goal 5: Increase billing accuracy and efficiency	Implementation of the net-billing system reconfiguration for the introduction of net-billing tariffs have been completed and tested.
Goal 5: Increase billing accuracy and efficiency	Roll out of bi-directional meters will prevent meters reversing and allows us to accurately record the customers import and export energy.
Goal 5: Increase billing accuracy and efficiency	Roll out of bi-directional meters will prevent meters reversing and allows us to accurately record the customers import and export energy.
Goal 9: Adapt to market and regulatory changes	Introduction of a renewable energy branch and training of more planning staff to be able to assess and process embedded generation applications.
Goal 14 Improve data management and decision-making	Capturing of all embedded generation customer applications on the GIS for simpler statistics analysis, identifying illegal systems and for the purpose of carrying out network studies.

24.0 Revenue Management Programme

Presently revenue management activities are managed centrally. A tailored revenue management programme will need to be developed subject to a single point of management accountability being established. The following initiatives identified in the reform strategy will form part of the programme:

1. Run educational campaigns to inform customers about changes.
2. Establish regular audits and cross-checks to identify and rectify billing discrepancies promptly.
3. Streamline tariff approval processes.
4. Align operational policies with national regulations.
5. Design and progressively align the business to the true cost of supply model.
6. Improve the customer application and connection processes.
7. Establish an SLA with the Revenue Management Unit.
8. Review of credit control processes and debt collection processes which are currently driven centrally by the Revenue Management Unit.

25.0 Revenue Protection Programme

A revenue protection programme is under development. The following initiatives identified in the reform strategy will form part of the programme:

1. Implement an aggressive meter sweep program; namely
2. Investigate meters showing significant consumption reductions
3. Enforce revenue protection by managing illegal connections.
4. Establish infrastructure security branch (solution need to manage organised crime via syndicates).
5. Energy balancing.
6. Targeted revenue protection by analysing data.
7. Rollout of meters to address the “bypassed meters” issue.

Presently, it is estimated that there are over 170 000 customer connections without meters. A meter rollout is required to address this issue. The impact of this issue is softened by the fact that most of these customer connections are assumed to be low consumption on a prepaid arrangement.

Below are two broad estimates to provide an indication of the range of funding that may be required.

Scenario 1 – Conventional Meter. Using an estimated cost of R2000 would result in R340 million being required to procure meters for 170 000 customer connections.

Scenario 2 – Smart Meter - Using an estimated cost of R5,500 would result in R935 million being required to procure meters for 170 000 customer connections.

Currently meters are procured using operational expenditure. A review of this practice is required to consider the meter as an asset procured via capital expenditure.

26.0 Billing & Collections Programme

A programme is required to address the functions of billing and collection. The need to launch such a programme will be reviewed once a single point of management accountability has been established. Activities related to revenue management need to be restructured between the Expenditure Unit, Revenue Management Unit, and Electricity Unit.

27.0 Alternate Revenues Programme

A programme is required to explore the introduction of alternate revenues. The need to launch such a programme will be reviewed once a single point of management accountability has been established. Activities related to revenue management need to be restructured between the Expenditure Unit, Revenue Management Unit, and Electricity Unit.

PART 5 – OPTIMISATION

"*Spend less than you earn*"

28.0 Loss Control Programmes

Loss Control programmes need to be put in place for better expenditure management. The governance reform programme and ICT systems programme are prerequisites to regain control of operations, and then apply loss control. The table below summarises expenditure areas and proposed initiatives to reduce losses.

Table 39 - Expenditure Areas and Proposed Initiatives to Reduce Losses

Expenditure	Initiative	Proposed Scope
Salaries	**Implement an internal restructuring project**	**Objective - Resource Optimisation** Demand forecasting and planning need to be undertaken to forecast future business process outputs. Resources need to be optimised in line with the forecast. Business process re-engineering is required to improve operational efficiency Savings need to be found to fund additional positions required to support the reform strategy. Transfers to be recommended and implemented.
	Implement a productivity management project	**Objective - Process Efficiency** Business process re-engineering is required to improve operational efficiency Assessment of productivity is required to establish a baseline.
Contracted Services	**Restructure outsourcing contracts**	**Objective -Effective insourcing/outsourcing** Assessment of productivity is required to establish a baseline can compare internal staff efficiency vs contracted staff efficiency. Costs associated to activities need to be benchmarked to determine an efficient insourcing/outsourcing policy.
Materials	**Improve materials managements**	**Objective – Reduce pilferage** Implement systems for effective planning and control of work. Undertake variance analysis of materials planned to be used vs materials withdrawn.
Operational & Capital Costs	**Optimise the use of insurance**	**Objective 1 – Reduce incorrect allocations to OPEX and CAPEX Budget.** Implement systems for effective planning and control of work to ensure items that are covered under insurance are not booked to or capital costs operational costs. In addition, the scope will need to include the recovery of funds from insurance so ensure the same objective. **Objective 2 – Reduce insurance claims and costs** Analyse insurance claims to identify high frequency claim. Address the root cause to minimise occurrences. Analyse insurance costs to identify escalating insurance premiums. Address the root cause to minimise claims and reduce premium cost.

Note that the scope related to metering, consumption, collection, and non-technical loss control are covered in programmes detailed in Part 4 of the document.

29.0 Infrastructure Asset Management Programme

The figure below illustrates the initiatives that comprise the Infrastructure Asset Management programme.

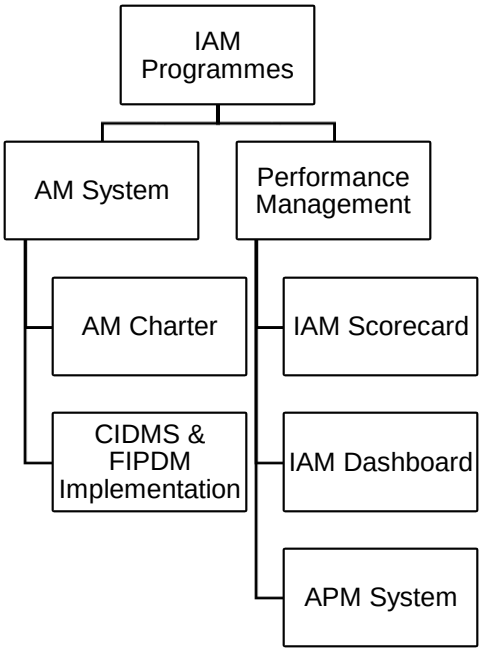

Figure 38 - Infrastructure Asset Management Programme

Initiative 1: Implementation of the AM System

The Asset Management System is the management system for managing the organisation's assets. It is used by an organisation to plan, coordinate, control, execute, monitor and improve the activities associated with managing assets. Electricity's Asset Management Plan is guided by the overall municipal Strategic Asset Management Plan (SAMP) as adopted by Council. This is guided by National Treasury guidelines on City Infrastructure Delivery and Management System(CIDMS).

It is estimated that the current replacement cost (CRC) of all infrastructure assets within the EE is approximately R 48 billion. The existing asset base is aging, and significant failures occur frequently. Without implementing strategic, structured, and coordinated approaches to the Infrastructure Asset Management across the entire Unit, the eThekwini Municipality's service delivery mandate is negatively impacted. Any organisation reform in terms of resources, processes and systems undertaken to improve the asset management lifecycle process will have a direct improvement to all other supporting and consequential activities of the entire Municipality. The proper implementation of asset management system will provide assurance that the City's and EE objectives can be achieved consistently and sustainability over time. Organisations that demonstrate asset management maturity should be able to foresee and respond to both the changing business environment and changing stakeholder needs in a manner that retains alignment of the various activities within the organisation. The implementation of a well-structured asset management system will enhance the EE's asset management maturity.

Figure 39 - Plans in The Asset Management System

29.1 Asset Management Charter:

As illustrated in Figure 39 above, the core documents in an asset management system are the Asset Management Policy, Strategic Asset Management Plan (SAMP) and Asset Management Plans Asset Management Policy. Collectively, these will be referred to as the asset management charter.

29.1.10 Asset Management Policy

The Infrastructure Asset Management Policy will assist in managing, integrating and standardising decision making and reporting on infrastructure assets. The purpose of the Asset Management Policy is to;

a) Guide the provision of infrastructure assets to deliver municipal services in accordance with legal requirements;
b) Endure life cycle management methods are applied to improve the sustainability of service delivery using infrastructure assets; and
c) Institutionalise an infrastructure asset management system that demonstrates management accountability by supporting the achievement of triple line goals described in the Report on Corporate Governance of South Africa ("King Report").

In implementing the asset management system, EE will adopt the City's Infrastructure Asset Management Policy. The official City's Asset Management Policy was approved by Council in 2019 and is currently being revised by the Corporate Infrastructure Asset Management Branch with EE being one of the Units providing support in this revision process.

29.1.11 Strategic Asset Management Plan

The Strategic Asset Management Plan (SAMP) is a documented information that specifies how organisational objectives are to be converted into asset management objectives, the approach for developing asset management plans, and the role of the asset management system in supporting achievement of the asset management objectives.

This initiative will involve the review of the EE's SAMP (previously called Asset Management Strategy), to align with the reviewed City's Asset Management Policy and the EE MTSRS.

29.1.12 Asset Management Plan

An Asset Management Plan (AMP) is a documented information that specifies the activities, resources and timescales required for an individual asset, or a grouping of assets, to achieve the organisation's asset management objectives.

This initiative will involve annual review and updates of the EE's AMP, with strong emphasis in ensuring it is aligned to the City's Infrastructure Asset Management Planning Framework.

29.2 CIDMS & FIDPM Implementation

On the 8th of August 2020, EThekwini Municipality adopted the Cities Infrastructure Delivery and Management System (CIDMS) Edition 1, 2018. The CIDMS Edition 1 toolkit was developed by National Treasury City Support Programme in partnership with the eThekwini Municipality, the City of Johannesburg, and the City of Cape Town in 2018, following demand from Metropolitan Cities for a system to accelerate the delivery of infrastructure and to manage infrastructure portfolios more sustainably. It is fully aligned to ISO55000, which is the best practice global standard on Asset Management, and enables a whole of organization approach to asset management.

In 2023, National Treasury published a revised version of CIDMS, that is Cities Infrastructure Delivery and Management System (CIDMS) Toolkit Edition 2, 2023 and this was subsequently adopted by eThekwini Municipality on 26 March 2024. The CIDMS toolkit Edition 2 of 2023, provides a holistic system for the management of infrastructure based on the requirements of SANS 55001: Asset Management Systems requirements, tailored for application in the South African metropolitan cities and specifically in support of the Country's spatial transformation agenda. The CIDMS system also incorporates an infrastructure delivery system based on the National Treasury's Framework for Infrastructure Delivery and Procurement Management (FIDPM) system.

As part of the AMS implementation, EE will embark on implantation of CIDMS and FIDPM.

Initiative 2: Performance Management and Benefits and Value Realisations

29.3 IAM Scorecard

The purpose of the infrastructure asset management (IAM) scorecard is to define the key performance indicators (KPIs) and measures that will be used to measure the results of implementing the infrastructure asset management system. The improvement targets to be achieved for each KPI are also defined and, as such, the AM KPIs are to be the formal "infrastructure asset management scorecard" for EE.

Clause 9.1 of ISO 55001 requires that: The organisation shall determine:
a) what needs to be monitored and measured;
b) the methods for monitoring, measurement, analysis and evaluation, as applicable, to ensure valid results;
c) when the monitoring and measuring shall be performed;
d) when the results from monitoring and measurement shall be analysed and evaluated

This initiative will involve reviewing the previous version of the IAM scorecard that was approved in 2019, aligning it with the performance outcomes of the EE MTSRS. The IAM scorecard will be reviewed with due consideration of relevant legislations, regulations and EE strategic and tactical goals and initiatives outlined in the MTSRS. The measures are intended to indicate to management (at all levels) to what extent the infrastructure asset management objectives are being achieved.

29.4 IAM Dashboard

This initiative will involve the development of a live dashboard for reporting on KPIs developed as discussed in 2.1 above. This will be used for monitoring, measuring and analysing data in key performance areas.

29.5 APM System

This initiative will involve the implementation of Asset Performance Management (APM) system within EE. The APM system transforms real-time and/or historical asset data into strategic insights on the condition of mission critical assets.

EE has many critical assets, e.g. power transformers and circuit breakers mentioned above, and the failure of any critical asset could result in large sections of the network grid being affected. APM allows business users to see, graphically, the risk of failure of any asset being monitored. By knowing the health of an asset, it enables business to make corrective actions to mitigate the risks. APM provides information as to short term maintenance actions that are recommended and allows business users to see, and plan, for long term when asset refurbishment or replacement is needed.

The typical life cycle of the APM asset management process is:

- Connect or collect data from all data sources (sensors, historians, databases, asset management systems, etc.).
- Analyse/Predict using the expert models within APM and the data collected.
- Inform business, and potentially prescribe actions, based on the output from the expert models in business intelligent format.
- Asset management teams act upon the information received.
- Asset management teams track results of changes due to actions performed.
- And repeat, as data continues to be collected and should show changes based on actions performed or not performed.

In the case of EE's current implementation, the assets are currently limited to identified high voltage (HV) power transformers and HV circuit breakers and through this initiative the scope will be extended to other asset classes over a medium-term to long-term period.

30.0 Infrastructure Security Programmes

The figure below illustrates the initiatives that comprise the Infrastructure Security programmes.

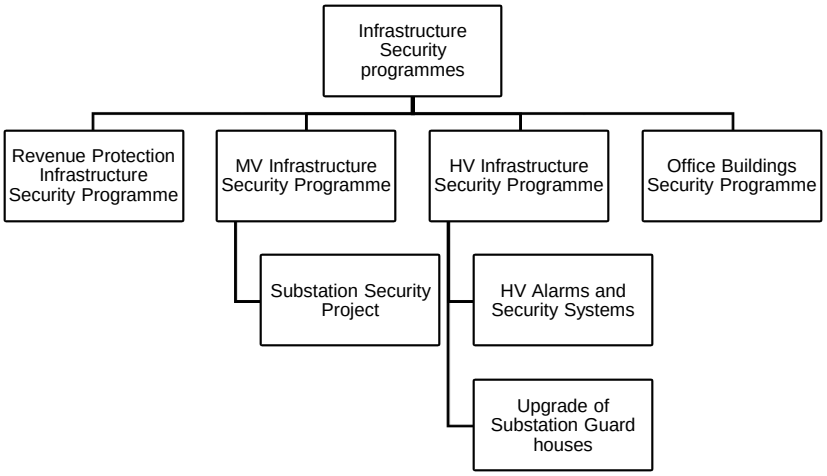

Figure 40 - Infrastructure Security Programmes

30.1 Revenue Protection Infrastructure Security Programme

This programme is under development. Historic projects included the rollout of protective enclosures for metering infrastructure.

30.2 MV Infrastructure Security Programme

This programme aligns with the following tactical goals:

Goal 13: Strengthen infrastructure resilience and security

Programme goal: To enhance infrastructure protection measures to mitigate risks of damage, theft, and vandalism by designing and implementing effective solutions.

The programme aims to improve safety and reduced risk of injury to working personnel and further improve operational efficiency by reducing power outages caused by vandalism and theft. Reduced replacement costs and insurance claims contributes positively to attain financial solvency.

Table 40 - MV Infrastructure Security Programme KPA's

KPA	KPI
KPA 1 - Impact	KPI 1 – No of sites affected by theft
	KPI 2 – No of insurance claims
KPA 2 - Finances	KPI 3 – Cost of theft and vandalism
	KPI 4 –Revenue lost
KPA 3 - Operations	KPI 3 – Cost of theft and vandalism
	KPI 4 – SAIDI / SAIFI

The programme manager is Senior Manager: MV/LV Network Control, supported by project managers who Engineers for each of the key projects identified below.

MV/LV Network Control have employed 6 shift workers that shall be utilized to assist in the Monitoring Control Room (MCR) catering for each of the 6 regions within EE. These resources shall monitor and control access to the distributor substations using the Access Control and Intruder Alert system.

Historically the Pepper Spray system was implemented at strategic distributor substations that were deemed high risk. The business has not been able to secure funding to continue the project. The last contract expired in 2019.

Table 41 - MV Infrastructure Security Programme Summary

MV Infrastructure Security program							
Project	**KPI 's**	**Start Year**	**End Year**	**CAPEX required**	**OPEX required**	**Project implementation capacity**	**Status**
Substation Security Project		2025	2028	20 million	Nil	Yes	On hold
Total				20 million	Nil	1 of 1	

30.2.10 Substation Security Project

In recent years, eThekwini Electricity has experienced a concerning rise in substation theft and vandalism. Currently, our medium voltage substations lack adequate security measures, leaving it vulnerable to potential threats. Recent incidents have highlighted significant gaps, including limited surveillance and no real-time response capability. These vulnerabilities pose serious risks to both our property and the safety of our staff.

Vandalism at substations can have a profound and far-reaching impact on both the infrastructure and the broader community. The current impact of the uncontrolled theft and vandalism are detailed in the figure below:

Figure 41 - Impact of The Uncontrolled Theft and Vandalism

To address this escalating issue and protect our assets, we propose installing a comprehensive access control and intruder alert security system at distributor substations.

The ACIA system shall incorporate the following features:

a) Access control;	b) Intruder alert;	c) Tamper protection	d) Pepper spray system.	e) Armed Response

The intension of the substation security system is to provide an early detection facility for theft and vandalism. For this, the substation shall be equipped with various sensors to detect forced entry, cutting of power cable and malicious entry. In addition, EE aims to install a pepper spray system to ward off intruders.

Benefits of Implementing Access Control and Intruder Alert system

•Reduce damage to infrastructure

•Improved safety and reduced risk of injury to field staff

•Improve operational efficiency, reducing power outages caused by vandalism and theft

•Reallocation of resources to address alternate business needs

•Reduced repair and replacement costs and insurance claims

•Enhanced control and monitoring of field staff accessing substations

Estimated Budget -20 million over a period of 3 years to target 100 sites

Funding Source- To be determined

Time frame - 3 years

Status - On hold

30.3 HV Infrastructure Security Programme

This programme is in development. Solution design is subject to a single point of management accountability being established. Historic projects included the rollout of access control, CCTV, and electric fencing. A comprehensive security solution was designed in the past, however it could not be implemented due to split responsibility challenges.

31.0 Streetlighting Programme

Improvement and optimisation of the Public Lighting System The lighting and illumination industry is evolving rapidly in terms of technological advancements and development, some with many added technical and financial benefits. The intention is to align the business with the latest industry standards, thereby overcoming or minimising some of the various challenges faced in a municipal environment.

This programme aligns with the following tactical goals: Goal to optimise the public lighting system

Programme goal: EThekwini Electricity is committed to the effective and proactive maintenance of the street and public lighting network. The overall goal is to improve efficiency and functionality whilst reducing theft with the implementation of new technology.

Theft and vandalism of lighting infrastructure remains one of the unit's major challenges, resulting in unlit areas and prolonged outages which is the environment very conducive to crime and other unsavoury activities.

The lighting systems are being modernised to promote the rollout of the more efficient and controllable LED technology. This new technology allows for more monitoring and controllability features, thereby assisting in the battle against theft and vandalism thus reducing the cost associated with frequent maintenance and improvement of quality of the public lighting system.

The provision of effective and efficient public lighting systems would result in a generally safer environment for motorists, pedestrians and the public at large.

Four possible initiatives being considered are:

1. The use of tele-management systems to monitor the lighting network.
2. The use of solar technology for streetlight applications.
3. Implementation and roll out of LED luminaires.
4. Implementation of High mast lighting.

This programme will address the following customer, business and operational KPA and KPI's:

Table 42 - Streetlighting Programme KPA's

KPA	KPI
KPA 1 **Smart Street Lighting**	KPI 1 Monitoring and Control of lighting systems
	KPI 2 Reduced Maintenance costs
KPA 2 **Solar street Lighting**	KPI 3 Reduced Maintenance
	KPI 4 Requires no supply from the grid
KPA 3 **LED Luminaires**	KPI 5 Energy savings
	KPI 6 Efficiency
KPA 4	KPI 7 Reduced maintenance
High Mast Lighting	KPI 8 Increased efficiency

Table 43 - Streetlighting Programme Summary

Streetlighting Programme							
Project	**KPI 's**	**Start Year**	**End Year**	**CAPEX required**	**OPEX required**	**Project Implementation Capacity**	**Status**
Smart Street Lighting	Monitoring and Control	2024		R 250,000		No	Initiated
Solar street Lighting	Reduced Maintenance	2024		R 250,000		No	Initiated

Streetlighting Programme							
Project	**KPI 's**	**Start Year**	**End Year**	**CAPEX required**	**OPEX required**	**Project Implementation Capacity**	**Status**
LED Luminaires	Energy Efficiency	ongoing		R 100,000,000		Yes	In progress
High Mast Lighting	Reduced maintenance	2024		R60,000,000			
Total				R 160,500,000			

31.1.10 Smart Street Lighting Project

LED luminaires are equipped with built-in intelligence, but appropriate communication and monitoring systems are required to get the relevant information back to the respective data centres. This could be achieved either by engaging with external communication service providers via a medium to long term agreement or by using appropriate systems along with the available internal communication options.

The main benefits of an effective lighting smart street lighting system is that the lighting network could easily be remotely monitored, and necessary steps taken to send out maintenance teams as well as to take the necessary steps to attend to theft and vandalism issues.

Estimated Budget - R 250 000

Funding Source -

Time frame- 2024

Status - In progress

31.1.11 Solar Street Lighting Project

The use of solar technology for streetlight applications is still very much in its infancy stages and cost vs benefit ratios need to be considered carefully.

The use of solar technology will assist during periods of electricity outages and with the provision of basic illumination in areas where it is not feasible to electrify with the conventional components of the supply system such as cables and overhead lines.

Estimated Budget - R250 000

Funding Source

Time frame - 2024

Status - In progress

31.1.12 LED Luminaires project

A strategic decision was taken to replace HID (High Intensity Discharge) lamps and luminaires with LED (Light Emitting Diode) luminaires for street lighting. LED luminaires result in more effective lighting compared to the old HID technology whilst reducing the power consumption.

The implementation of LED luminaires started in 2009 and has progressed significantly over the years. In 2019, an executive decision was taken to replace HID lamps and luminaires with the more efficient LED luminaires due to the reasons listed below:

- Good lumen maintenance: the amount of light produced from a luminaire when it is brand new to the amount of light output at a specific time in the future.
- Excellent uniformity (due to a variety of optic choices)
- Superior, comfortable white light: improved colour rendering compared to HPS
- Higher light output compared with conventional lighting technologies
- Greater than 50% energy saving
- Lower maintenance requirements

Estimated Budget - 100 000 000.00

Funding Source]

Time frame - immediate

Status- Ongoing

31.1.13 High Mast Lighting Project

High mast lights are used for illuminating a large area as they are mounted at a considerable height to distribute the light uniformly. They are primarily designed to provide an extended lighting coverage and to minimize shadows that may occur when shorter poles are used. High mast poles cannot be easily cut down as compared to the standard street light pole and can therefore be implemented in areas when theft and or vandalism is of major concern.

- Energy Efficiency
- Long Lifespan when used in conjunction with LED luminaires
- Durability and Reliability
- Low Maintenance

Estimated Budget - R60 000 000.00

Funding Source -

Time frame -2024

Status - Waiting for funding

32.0 Fleet Management Programme

The figure below illustrates the initiatives that comprise the Fleet Investment programme.

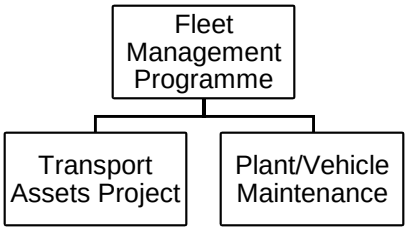

Figure 42 - Fleet Management Programme

The Fleet Management Programme, consist of two components, namely the Transport Asset Project and Plant/Vehicle Maintenance Project.

This programme will address the following customer, business and operational KPA and KPI's :

Table 44 - Fleet Management Programme KPA's

KPA	KPI
KPA 1	KPI 1 – Operational availability

The programme consists of a project to procure transport assets and maintenance of the fleet. The programme manager is Manager: Administration.

The unit has a history of under and delayed expenditure relating to the procurement of vehicles. Issues have been experienced in the past due to suppliers receiving orders but failing to deliver them on time due to stock shortages. There has also been instances whereby the vehicles procured were not available for use due to specifications (for modifications) not been completed or vehicle specifications not being complied with.

Table 45 - Fleet Management Programme Summary

Fleet Management Programme							
Project	**KPI 's**	**Start Year**	**End Year**	**CAPEX required**	**OPEX required**	**Project implementation capacity**	**Status**
Transport Assets				R450M			
Vehicle Maintenance					R240M		
Total				R450M	R240M	TBC	

32.1 Transport Asset Project

Goal 1: The overall goal of the Transport Asset Project is to replace assets, on a planned basis, using factors, such as, age, downtime, kilometres travelled, repairs/maintenance cost to date and general appearance.

Goal 2: To acquire new assets, based on factors, including price, reliably. Safety, availability of spares, service intervals, warranties, and risk to Staff.

Goal 3: Standardise vehicle specifications, to best suit operational requirements, of user Sections/ Depots. This would facilitate, faster turnaround times, of onsite work activities.

Key Project — Transport Assets

High Level Description — Purchase of new and replacement Vehicles and Plant.

Intended Benefit — Staff have reliable fleet, to under repairs /maintenance of Electrical Network. Reduction in loss revenue, due to faster restoration, of power, during power outrage

Estimate Budget — R450 000 000 .00

Funding Source: Internal

Time Frame: 3 years

Status: Identified

32.2 Plant /Vehicle Maintenance Project

Program goal 1: The overall goal of the Plant/Maintenance Project, is to reduce downtime, by operator training, regular inspections, and servicing.

The Fleet Management Program aligns with the following tactical goals:

- Goal 12: enhance maintenance efficiency and effectiveness
- Goal 17: strengthen asset management

And achieves the following benefits, namely:

- Reducing maintenance costs.
- Reducing downtime of vehicle breakdown, thus increasing, vehicle availability and faster response/turnaround times, in repairs/maintenance of Electricity Network. This mitigates, loss of revenue when Customer are off.
- Providing a safer working environment, for Staff, by avoiding purchase, of "high Risk vehicles"
- Vehicle modifications /standardisation , reduce restorations times ,thus reducing, loss of revenue , due to outrages.
-
- Key Project Plant /Vehicle Maintenance
- High Level Description To undertake repairs/ maintenance of the Plant and Vehicles.
- Intended Benefit Timely repairs/maintenance of Fleet. Comply with Traffic Regulations. Fewer vehicles' breakdowns and disruptions to Electricity Services. Reduction in loss revenue, due to faster restoration, of power, during power outrage
- Estimate Budget R240 000 000 .00
- Funding Source: Internal
- Time Frame: 3 years
- Status: Identified

PART 6 – INVESTMENTS FOR SUSTAINABILITY

"*Investing for sustainability*"

33.0 MV/LV Operations Programmes

The figure below illustrates the initiatives that comprise the MV/LV Operations programmes.

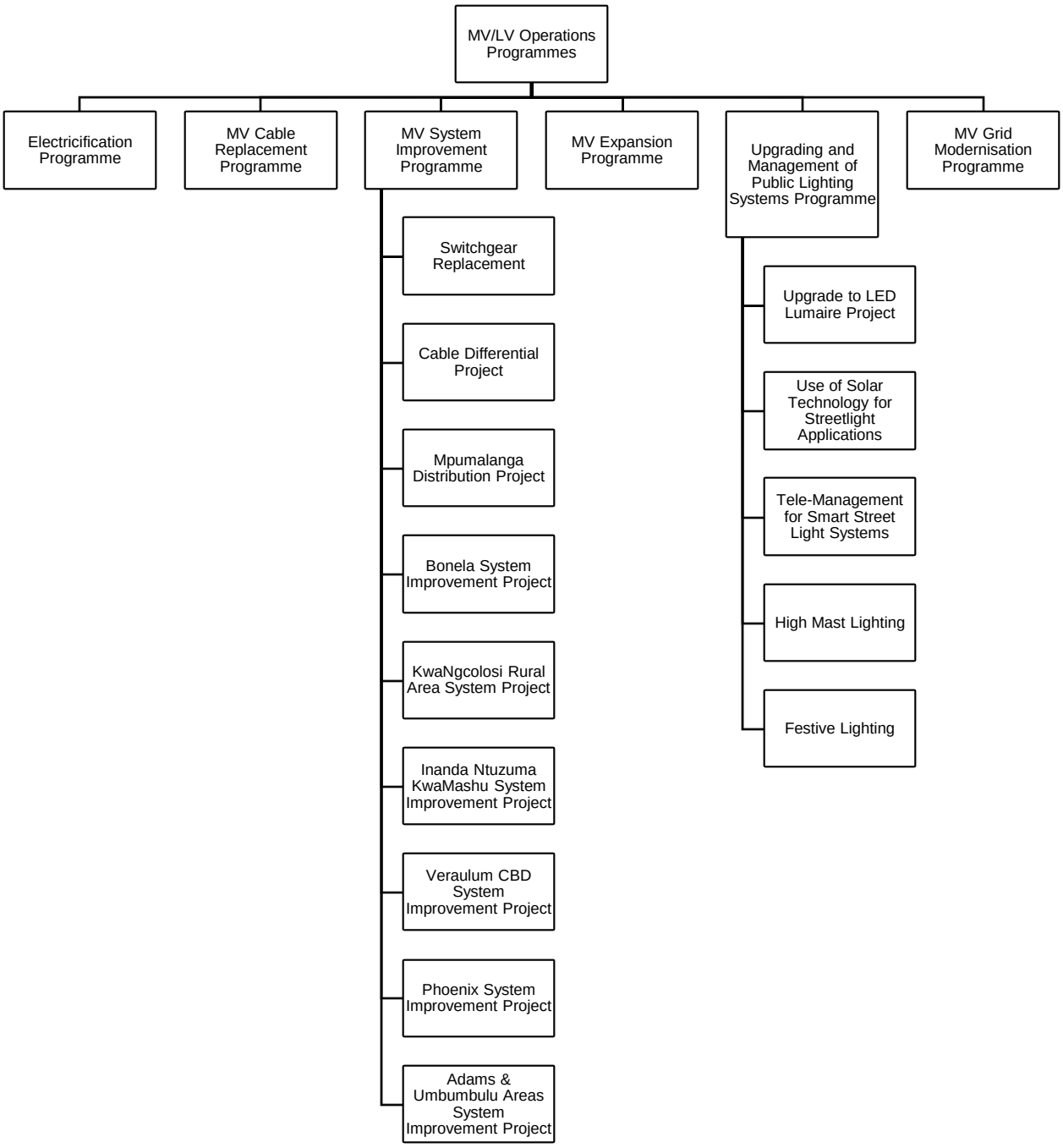

Figure 43 - MV/LV Operations Programmes

33.1 Electrification Programme

The purpose of the Electrification programme is to eradicate the service delivery backlog currently experienced within the eThekwini Electricity area of supply boundary. The programme is aimed at providing electrical service connections to customers that have applied for electricity in both the formal and informal sector. The electrification programme is aimed at improving the quality of life of both individual customers and communities through sound application of network design and service delivery principles to ensure that a safe and efficient quality of service is provided to customers.

Benefits associated to the programme are those of aligning to the City's IDP whilst increasing the sales of electricity via increasing the customer base. The reduction of illegal connections associated with the provision of services as well as the possibility of reduction of infrastructure theft.

This programme aligns with the following tactical goals:

Goal 10 – Safeguarding revenue streams - Increasing the current customer base in order to provide for increased revenue generated as a result of the sales of electricity. Currently illegal connections contribute to non-technical losses which has a direct impact on the cash revenue of the Unit. Increasing the customer base to customers that may be contributing to the non-technical losses assists two-fold by adding to energy sales and well as decreasing the non-technical losses.

Goal 15 – Reform Investment Management practices - The development of investment programmes provides insight into the credibility of the proposed projects and their alignment to the Unit's strategic objectives.
The programme if viewed in isolation has a direct impact on cash revenue for the business, however, also indirectly impacts the following:

Goal 6 – Optimise Outage management - Decreasing the potential outage requests as a result of network theft, vandalism and overloading requests thereby allowing for a lighter workload for staff to allow for more efficient response times.

The overall goal for the Electrification Programme is the eradication of the service delivery backlog and thus improving the quality-of-life communities within the eThekwini Electricity area of supply boundary.

Programme goal: To improve access to electricity services by providing individual service connections to dwellings.

The programme contributes the Units operational effectiveness by minimising the number of illegal connections thereby allowing of effective deployment of staff resources. This assists the financial solvency of the business two-fold in minimising the possibility of potential overtime as well as increasing the sales of electricity.

The programme addresses the key performance area of Basic Service delivery. This programme will address the following customer, business and operational KPA and KPI's

Table 46 - Electrification Programme KPA's

KPA	KPI
Basic Service Delivery	Meet infrastructure and household service needs and backlogs - 3A.14.1 Number of dwellings provided with connections to the mains electricity supply by the municipality (EE1.11)

The Electrification Programme consists of individual electrification projects as per the schedule below. The projects are dependent on internal staff resources for the project designs as well as construction to a certain extent. External contractors are also utilised to align to the proposed project timeframes.

The programme manager is Senior Manager: MV/LV Planning & Construction, supported by Chief Engineers and Construction depot managers for each of the key projects identified below.

The programme has a good ability to implement and spend as per previous financial years' expenditure. In certain instances, projects are affected by unforeseen delays such as community issues that may delay the ability to implement, the programme however has the flexibility to substitute alternative projects that are ready to proceed to attain the KPI target set for the financial year.

Table 47 - Electrification Programme Summary

Electrification programme							
Project	**KPI 's**	**Start Year**	**End Year**	**CAPEX required**	**OPEX required**	**Project implementation capacity**	**Status**
Informal Settlements	"The number of connections	2024	2027	R142 million	TBC	Yes	In Progress
Total				R 142 million		1 of 1	

The purpose of the Electrification programme is to eradicate the service delivery backlog currently experienced within the eThekwini Electricity area of supply boundary. The programme is aimed at providing electrical service connections to customers that have applied for electricity in both the formal and informal sector. The electrification programme is aimed at improving the quality of life of both individual customers and communities through sound application of network design and service delivery principles to ensure that a safe and efficient quality of service is provided to customers

Benefits associated to the programme are those of aligning to the City's IDP whilst increasing the sales of electricity via increasing the customer base. The reduction of illegal connections associated with the provision of services as well as the possibility of reduction of infrastructure theft.

Associated Budget	Funding Source	Time frame	Status
•R 142 100 000	•ISUP Grant Funding (ISUG)	•3 Years	•In Progress

33.2 MV Cable Replacement Programme

The implementation of the cable replacement programme aligns with the following tactical goals, objectives, and initiatives:

- Goal 4: Improve Customer satisfaction
- Goal 11: Improve loss control
- Goal 12: Enhance maintenance efficiency and effectiveness
- Goal 13: Strengthen infrastructure resilience and security

The goal of the programme is to improve the network performance by reducing the duration of power outages to customers.

Programme goal: To reduce the number of cable related faults on the MV network by 60% (during the first phase (1-5 years), second phase 75% (6-10 years), third phase 95% (11-20 years).

The cable replacement programme will improve operational effectiveness through improved health of cable within the MV network thus improving availability and reliability of our MV cable infrastructure.

The increase reliability/capacity of our network can lead to improved economic participation within our area of supply. Improved customer satisfaction will increase investment confidence and economic participation among customers residing within our area of supply.

This programme will address the following customer, business and operational KPA and KPI's

Table 48 - MV Cable Replacement Programme KPA's

KPA	KPI
KPA 1 Cable reliability and integrity	KPI 1 Reduction of outages related to cable breakdowns by (20% annually)

The programme consists of the following related projects, Electrification Project, System Improvement project and Switchgear replacement project.

The programme manager is Senior Manager: MV/LV Maintenance Planning & Works, supported by project managers for each of the key projects identified below.

The resources for the abovementioned projects are sufficient given that they will be supported by the technical project team consisting of technicians, technologists, and engineers.

Each year the technical project team executes projects with a same scope as highlighted for the abovementioned project as per budget allocated for each financial year.

Table 49 - MV Cable Replacement Programme Summary

MV Cable Replacement programme							
Project	**KPI 's**	**Start Year**	**End Year**	**CAPEX required**	**OPEX required**	**Project implementation capacity**	**Status**
Cable Replacement	SAIDI	2025	2045	R 276 M		Yes	Identified
Total				R 276 M			

The cable replacement program is intended to identify problematic/aged MV cables within eThekwini's area of supply and develop project to replace the identified cable within a newer healthier and reliable MV cable considering the projected energy demand on the cable or any future expansion with will need to be catered for in the replacement of the cable.

The implementation of the cable replacement program will have the benefit of improving the availability and reliability of the MV network. This will have the benefit of customer satisfaction as they will have less outages related to cable failures since these types of failures can have lengthy repair times.

The estimated budget on the initial list of identified problematic/aged MV cable which require urgent replacement is two hundred and seventy-six million rand.

Currently the funding of replacement of these cables is sourced from the capital budget which provided to the unit to perform system improvement/replacement projects. The capital budget allocation is limited and insufficient for the cable replacement project required by the unit.

The developed project timeframe for the replacement of problematic/aged cable has been developed over the following timeframes: 1-5 years, 6-10 years, 11-20 years, however depending on the challenges encountered during project execution these projects may not be executed as planned on the document.

33.3 MV System Improvement Programme – Switchgear Replacement Project

The switchgear replacement program aligns with the following tactical goals, objectives, and initiatives:

Goal 4: Improve Customer satisfaction

Goal 11: Improve loss control

Goal 12: Enhance maintenance efficiency and effectiveness

Goal 13: Strengthen infrastructure resilience and security

Programme goal: To improve network reliability and protection functionality by reducing the number of distributor substations that are sitting on temporary switch pillars thereby improving fault duration and customer impact.

This programme will address the following customer, business and operational KPA and KPI's

Table 50 - MV System Improvement Programme KPA's

KPA	KPI
Network Reliability	No of Switch pillars replaced with switchgear
	SAIDI – Reduction fault duration and customer impact

The programme manager is Senior Manager: MV/LV Construction Planning & Works supported by Chief Engineers & Depot Manager for each of the key projects identified below.

These resources (PM's) are sufficient, each region has one Chief Engineer & a respective depot managers. Programme is supported by external resources through contract E.9860 switchgear contract to deliver, install and commission. Chief

Engineer is to conduct feasibility studies, design and procure. Depot Manager facilitates the installation and commissioning.

Table 51 - MV System Improvement Programme Summary

MV System Improvement program							
Project	**KPI 's**	**Start Year**	**End Year**	**CAPEX required**	**OPEX required**	**Project implementation capacity**	**Status**
MV Switchgear Replacement	SAIDI	2024	2027	R129 million	TBC	Yes	In Progress
Cable Differential Protection Commissioning	SAIDI	2024	2027	TBC	TBC	No	Identified
Total				R129 million		1 of 2	

MV Switchgear Replacement The proposed solution is to replace damaged and obsolete medium voltage (MV) switchgear boards with new, reliable equipment, addressing the issues caused by decommissioned switchgear that have been temporarily substituted with switch-pillars /RMUs.

The switchgear replacement programme Intended Benefits is to will improve network reliability and operability by reducing number of distributor substations that are sitting on temporary switch pillars that have no protection & telecontrol functionality thereby improving the duration of faults and reduce impacted customers.

Estimated Budget	Funding Source	Time frame	Status
• R129,100,000	• Currently this is funded through the MTREF by USDG Funding	• 3 Year	• In Progress

33.3.10 Cable Differential Protection Commissioning

This need has been identified.

33.4 MV System Improvement Programme

This programme aligns with the following tactical goals:

Goal 6: Optimise outage management – initiative 3 to optimise electrical distribution network to improve reliability and resiliency.

Goal 15: Reform investment management practices – initiative 4. Implement a MV/LV Investment programme.

Programme goal: To improve MV network for reliability ,operability & safety by replacing and upgrading aged infrastructure ,building network interconnectors for contingency and network reconfiguration during faults and planned maintenance.

Programme will reduce the cost of unserved energy by reducing number of outages ,time taken to restore supply and number of customers impacted during faults.

This programme will address the following customer, business and operational KPA and KPI's

Table 52 - MV System Improvement Programme KPA's

KPA	KPI
KPA 1 Network Reliability	KPI 1 SAIDI
	KPI 2 SAIFI

The programme manager is Senior Manager: MV/LV Construction Planning & Works, supported by Chief Engineers and Construction Depot managers each of the key projects identified below.

Table 53 - MV System Improvement Programme Summary

MV System Improvement program							
Project	KPI 's	Start Year	End Year	CAPEX required	OPEX required	Project implementation capacity	Status
Mpumalanga Distributor Substation Refurbishment Project	SAIDI & SAIFI	2024	2027	42 million	TBC	Yes	Initiated
Bonela System Improvement Project	SAIDI & SAIFI	2024	2027		TBC	Yes	Initiated
KwaNgcolosi Rural Area System Improvement Project	SAIDI & SAIFI	2025	2028	58 million	TBC	Yes	Initiated
Inanda Ntuzuma KwaMashu System Improvement Project	SAIDI & SAIFI	2025	2028	38 million	TBC	Yes	Identified
Verulam CBD project	SAIDI & SAIFI	2024	2027	32 million	TBC	No	Initiated
Phoenix System Improvement project	SAIDI & SAIFI	2024	2027	R18 million	TBC	No	Identified
Adams & Umbumbulu Areas system Improvement Project.	SAIDI & SAIFI	2025	2028	R 27 million	TBC	No	Identified
Total				R215 m	TBC	4 of 7	

33.4.10 Mpumalanga Distributor Substation Refurbishment Project

Mpumalanga area previously fell under Eskom area of supply. The community experiences on-going wide area supply interruptions. As a solution the distributor substation refurbishment project was identified to rebuild 6 distributor substations inherited from Eskom as they do not comply with safety regulations as well as eThekwini specifications and have been vandalized. The buildings will be done through architecture & building services department. Equip the distributor substations with new switchgear.

To improve quality of supply in the Mpumalanga area, reduce frequency & duration of faults and customer impact.

Estimated Budget	Funding Source	Time frame	Status
• R42 million	• Currently funded through the MTREF by the USD Grant Funding	• 3 years	• Initiated

33.4.11 Bonela System Improvement Project

The Bonela area is plagued with poor quality of supply due to network faults and overload trip outs following load shedding. The network configuration is in an abnormal state due to ongoing theft of infrastructure. The overload trip outs following load shedding are due to cold load pickup when supply is restored after load shedding. The situation is aggravated by illegal connections that are further overloading the network.

To improve quality of supply in the Bonela area once the project is completed, provided the theft does not continue at the current rate.

Estimated Budget	Funding Source	Time frame	Status
•R TBC	•Currently funded through the MTREF by the USD Grant Funding	•3 years	•Initiated

33.4.12 KwaNgcolosi Rural Area System Improvement Project

The KwaNgcolosi area is currently fed from radial networks with no contingency . The area is inundated by faults with only one old distributor substation with outdated equipment proving protection functionality in the area. The project will improve network operability by installing new distributors at strategic locations and new cables to improve the reliability of the network in the area

To improve loading and operability of the network in KwaNgcolosi area and ability to increase load.

Estimated Budget	Funding Source	Time frame	Status
•R58 million	•Currently funded through the MTREF by the USD Grant Funding	•3 – 5 years	•Identified

33.4.13 Inanda Ntuzuma KwaMashu System Improvement Project

The project in the INK area includes a suite of projects to upgrade medium voltage (MV) cables from Ntuzuma Major SS to Ntuzuma A,B & G DSS. Installation of new cables from Newlands West Major to the new Midway Mall as a backup for the existing cables. Reconfigure MV networks supplying Inanda Glebe.

To upgrade aged infrastructure ,improve loading and operability of the network in the area.

Estimated Budget	Funding Source	Time frame	Status
•R38 million	•Currently funded through the MTREF by the USD Grant Funding	•3 – 5 years	•Identified

33.4.14 Verulam CBD System Improvement Project

Verulam CBD medium voltage (MV) network has some cables that were installed approximately 40 years ago. The Verulam CBD is experiencing frequent power outages with limited network reconfiguration due to aged infrastructure. The project entails the upgrade of various medium voltage (MV) cables supplying Verulam CBD and surrounding industrial areas. Project dependent on the upgrade of Verulam Major substation

To upgrade aged infrastructure, improve loading and operability of the network in the area provided the refurbishment of Verulam Major substation is completed.

Estimated Budget	Funding Source	Time frame	Status
•R32 million	•Currently funded through the MTREF by the USD Grant Funding	•3 – 5 years	•Inititated

33.4.15 Phoenix System Improvement project

Grove-End is supplied by underground Medium Voltage (MV) network which is a ring feed between Clayfield Major Substation 5550 and Eastbury Major Substation 7210. Area is inundated by faults due to aged infrastructure, loading and limited number of distributor substations and even switch-pillars for network reconfiguration. The project includes new distributor substation, reconfiguration of network and building of contingency cable to improve reliability of supply in the Phoenix area.

To upgrade aged infrastructure, improve loading and operability of the network.

Estimated Budget	Funding Source	Time frame	Status
•R18 million	•Currently funded through the MTREF by the USD Grant Funding	•3 – 5 years	•Inititated

33.4.16 Adams & Umbumbulu Areas system Improvement Project.

Upgrade and strengthen medium voltage lines and cables that supply Adams Mission, Adams Rural, Izwelisha etc which have long radial networks and capacity constraints. Two new distributor substations are also required in the area.

The main project benefit would be to improve loading and operability of the network in the area

Estimated Budget	Funding Source	Time frame	Status
•R28 million	•Currently funded through the MTREF by the USD Grant Funding	•3 – 5 years	•Inititated

33.5 MV Expansion Programme

This programme is in development.

33.6 MV Grid Modernisation Programme

This programme requirement is noted. Initiation of this programme is dependent on improved governance and management which will aid in the development of business cases for grid modernisation.

34.0 HV Infrastructure Programmes

Figure 45 illustrates the HV infrastructure (HVI) programmes.

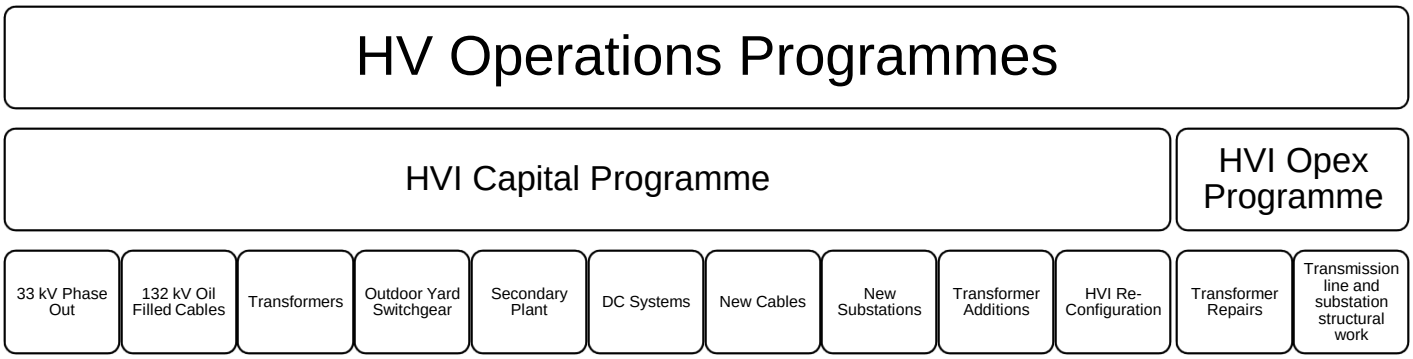

Figure 44 - HVI Programmes

There are two broad programme categories for HVI; namely the capex and opex funded programmes.

34.1 HVI Capital Programme

Programme goal: The overall goal of the HVI capital asset programme is to replace high voltage assets on a planned basis rather than run to failure, cater for new power demand and to extend the useful life of existing in service HVI.

The HVI capital programme comprises of three main categories of projects: namely

1. Replacement – this programme comprises of various HVI projects that focuses on replacing assets that provide electricity to existing customers.
2. Expansion – this programme comprises of various HVI projects that focuses on the provision of electricity to new customers and or suburbs in the City.
3. Refurbishment – this programme comprises of various HVI projects that are aimed at extending the useful life of in-service assets.

This programme aligns with the following tactical goals:

- Goal 12: Enhance maintenance efficiency and effectiveness.
- Goal 13: Strengthen infrastructure resilience and security.
- Goal 15: Reform investment management practices.
- Goal 16: Enhance project efficiency and delivery.
- Goal 17: Strengthen asset management practice.

This programme contributes to:

A. Reducing the risk of unexpected failures of high voltage assets.
B. Reducing maintenance costs.
C. Reducing the burden on already stretched resources.
D. Providing a safer working environment for field staff.
E. Reducing the risk of significant and sustained power outages.
F. Securing the long lead items for typical high voltage assets
G. Solving the spares obsolescence challenges on aged assets.
H. Provision of electrical capacity to support demand.
I. Extending the life of existing in service HVI.

The technical specifications for new HVI were improved, calling for extended warranties that transfer risk to the original equipment manufacturers for longer timeframes on newly commissioned HVI. This results in lower repair costs than the standard one-year warranty that OEMs traditionally offered contributing to lower repair costs on newly commissioned HVI.

The City Council approved the Development Charges Policy in April 2023 which seeks to provide a framework for the implementation of development charges. The trigger for determining whether a development charge must be paid is once the land development application has been approved in terms of SPLUMA. The basis on which the amount of a development charges is calculated based on the increased impact that a new or changed use will have on the existing infrastructure. This policy allows the Municipality to recover the capital cost for bulk and link engineering services for greenfield developments or re-zoning existing developments that triggers higher power capacity. This policy provides an alternative source of funding for capital projects and will be rolled out.

This programme will address the following customer, business and operational KPA and KPI's

Table 54 - HVI Programme KPA's

KPA	KPI
KPA 1 - Basic Service Delivery	KPI 1 – Compliance with grid code
	KPI 2 – Compliance with environmental regulations
KPA 2 - Local Economic Development	KPI 3 – Provision of capacity before demand
	KPI 4 – Adherence to (n-1) design philosophy

The planning activities for the asset replacement programme are completed using in-house resources from the HV Planning Branch.

The electrical detailed designs, technical specifications, project, and contract management activities are completed using in-house resources from the HV Projects Branch.

The building and civil designs, technical specifications, project, and contract management activities are completed by the City's centralised Architecture Department.

The programme manager is Senior Manager: HV Network Control, supported by project managers:

1. Senior Manager: HV Planning & Senior Manager: HV Projects for each of the replacement, expansion and refurbishment programmes.
2. Senior Manager: HV Substations, Senior Manager: HV Lines for the major maintenance programme.

The delivery of planned projects was negatively affected by challenges in setting up contracts for the various high voltage equipment as well as delays in the building and civil work packages. This has resulted in a backlog of HV replacement projects.

In order to work through the backlog and handle new projects, as a start, all HV Planning and HV Projects vacancies must be filled if the current approach for infrastructure builds is to continue. There is an alternative outsourced turnkey approach that could be explored with lower in-house engineering and project management resources.

Table 55 - HVI Capital Programme Summary

HVI Capital Programme							
Project/ Fiscal Year	**25/26**	**26/27**	**27/28**	**28/29**	**29/30**	**Project implementation capacity**	**Status**
Replacement							
33 kV network phase out	R140 M	R162.3M	R42.5M	R11.5M	R1M	Yes	Initiated
33 kV switchgear	R89.3M	R41M	R20M	R30M	R2M	Yes	Initiated
11 kV oil switchboard	R100M	R17M	R5M	-	-	Yes	Initiated
Transformers	R1M	R40M	R22M	R50M	R10M	Yes	Initiated
Outdoor yard equipment	R7.75M	R5M	R5M	R1M	R0.5M	Yes	Initiated
132 kV Oil Filled Cables	-	R36.1M	R51.8M	R46.3M	-	Yes	Identified
DC systems	R2.88M	R2.92M	R4.16M	R2.68M	-	Yes	Identified

HVI Capital Programme							
Project/ Fiscal Year	**25/26**	**26/27**	**27/28**	**28/29**	**29/30**	**Project implementation capacity**	**Status**
Secondary plant (control and protection)	R35.2M	R112M	R240M	R390M	R700M	Yes	Identified
Expansion							
New cables	-	-	R80M	R59M	R115M	Yes	Initiated
New lines	R9.6M	R135M	R96M	R85M	R24M	Yes	Initiated
New Substations	R123.8M	R133.6M	R124M	R383M	R390.5M	Yes	Initiated
New switching stations	R28M	R45M	R50M	R41M	R25M	Yes	Initiated
Transformers	R78.3M	R218.5M	R168	R51.5M	R5.5M	Yes	Initiated
Refurbishment							
132 kV indoor GIS switchboards		R85.54M	R137.2M	R51.5M	R29.9M	No	Identified
HVI re-configuration	R13M	R57.5M	R31.5M	R19.5M	R18M	Yes	Initiated
Total per year	R627M	R1091M	R1077M	R1222M	R1311M		
Total					**R 5329M**		

34.1.1 33 kV Phase Out

The objective of these projects is to replace predominantly the aged 33 kV networks comprising of cables, lines and transformers.

The 33 kV network is characterized by:

- Aged plant and equipment.
- Plant operating at maximum designed capacity.
- Unreliable and potentially unsafe plant.
- Transformers subject to leaks and no longer able to operate at designed capacity.
- Oil filled circuit breakers which require maintenance after most fault clearance operations
- Fluid-filled or gas-filled cables operate under pressure and are now subject to frequent leaks, due to the fragile state of the lead sheathing, which requires high levels of manpower to locate and repair.
- Supervisory monitoring and control of the 132/33 kV substations exists, but not for the next level of 33/11 kV or 33/6,6 kV.

The benefits of implementing this project are:

- Elimination of dual transformation with the new standard 132/11 kV substations
- Maintaining supply to existing customers whilst new substations are constructed

- Introduction of supervisory control and monitoring of equipment
- Mitigation of the risk of catastrophic failures of aged network
- Provision of a safer work environment for field staff
- Improved network reliability
- Reduction in maintenance costs and manpower needed for operating an aged network

The bulk of HVI projects fall within this group and were initiated almost two decades ago. The unit has phased out twenty-six 33/11 kV substations to date. There are eighteen 33/11 kV substations that need to be decommissioned, of which sixteen have advanced plans in place for load transfers. There are two substations that are still in the planning phase.

There are seven points of supply to various PRASA and Transnet sites that involves joint planning with these entities to ensure that there is a migration to 11 kV and 132 kV where future forecasted power demand justify the higher supply voltage.

34.1.2 132 kV Fluid-filled Cables

The objective of these projects is to replace 132 kV fluid-filled cables with XLPE cables in the CBD. The core problem being addressed is that most 132 kV underground fluid-filled cables have reached the age of 40 years. These cables are prone to damage by uncontrolled excavation in the City, which renders the circuit out of service for weeks whilst the fault location is determined, joint bays are excavated, the cables finally jointed and thereafter the hydraulic circuit re-commissioned. Typical times to remove moisture on a 132 kV fluid-filled cable repair ranges between 5 to 30 days and beyond. This long repair time is unacceptable at a 132 kV level. The city has seen an exponential increase in damage to underground services in general which are caused mainly by fibre optic service providers expanding the fibre network in the city. The problem with uncontrolled excavation will be addressed by the draft excavation by-law, which the Electricity Unit was party to compiling.

The proposal is to replace the fluid-filled cables with newer generation cables, that use cross linked polyethylene (XLPE) as the insulation medium, with a design lifespan of 60 years. The replacement of the fluid-filled cables with XLPE cables will reduce the average time required for the repair of damaged/faulted cables by roughly 25 days.

The replacement of fluid-filled cables will be handled on a turnkey basis by private cable manufacturing companies that will supply, install and commission the cable circuits.

34.1.3 11 kV Oil Switchboards

The objective of this project is to replace all 11 kV oil switchboards/circuit breakers (OCBs) that have oil as an insulating medium with switchboards that have vacuum circuit breakers at 132/11 kV substations. Replacement of indoor oil circuit breakers located at 132/33 kV and 33/11 kV substations will be addressed as part of an existing 33 kV phase out plan.

The benefits of implementing this project are:

- Mitigation of the risk of catastrophic failures associated with OCB’s
- Provision of a safer working environment for field staff
- Improved network reliability
- Reduction in maintenance costs and manpower needed for OCB’s

34.1.4 Transformers

The objective of this project is to replace power transformers that fail in service and/or are flagged as unsafe for operation based on condition assessment results that may show gradual deterioration of condition or a sudden deterioration after a major fault event.

The benefits of implementing this project are:

- Mitigation of the risk of catastrophic failures of transformers
- Reduction of environmental contamination risk
- Improved network reliability
- Reduction in maintenance costs and manpower needed for aged transformers
- Restoration of (n-1) capacity

34.1.5 Outdoor Yard Equipment

The objective of this project is to replace outdoor yard equipment that:

- Exceeded or are close to end design life.
- No longer have OEM support or OEM in existence.
- Have design shortfalls where circuit breakers that use sulphur hexafluoride gas as an arc quenching medium are plagued with gas leaks.
- Have design shortfalls where circuit breakers that have hydraulic operating mechanisms succumb to oil leaks that cannot be economically repaired on site
- Fail in service

The benefits of implementing this project are:

- Mitigation of the risk of catastrophic failures of aged CT's that often trigger damage to other outdoor plant equipment.
- Reduction in the volume of sulphur hexafluoride gas released to the environment.
- Improved network reliability
- Reduction in maintenance costs and manpower needed for aged outdoor equipment.
- Improved safety for persons in outdoor yard substations

34.1.6 Secondary Plant (Control and Protection)

The objective of the project is to system improvement, the current fleet of electronic relays used by EE can no longer support spares. Hence, unavailability of spare results inability of reconfiguration of the GOOSE on IEDs the P&T, but SCADA branch too conveyed that they do not have the capacity to undertake system requirements for the upgrade on the D400 side currently. The recommendation that both require replacement to occur concurrently. There are various other protection system elements that will be discussed which will form part of the upgrade and network strengthening to reap the benefits such as reliability of supply in EE network.

The problems being addressed in order of occurrences with respect to frequency:

- In terms of rate of failure with a specific fleet or brand of protection relays or IEDs, it will have to be the GE F650 and UR relays with the highest failure rate. These are ironically the latest relays that were procured on the HV Network. They have however already reached their useful life (15-20 years) at many substations.
- Through faults (transformer protection OC or EF protection operating for an 11 kV feeder fault)
- LV REF faults where CT knee points are low.
- Frame earth leakage maloperation for 11 kV feeder faults where the insulation between switchgear frame and earth is eroded.
- SEF non-operation due to low fault current being undetected (most loss of life or injury to people/animals). However, this is more on the 11 kV DSS side.
- Older fibre differential relays failing. ABB and Siemens brand but again these are more than 25 years old.

The benefits of implementing this project are:

- Increase in reliability to customers.
- Improved safety to personnel
- Improved protection capability of substation infrastructure
- Reduced downtime.
- Reduced cost of unserved
- Relays are far beyond their useful life and susceptible to failure.
- No fault recording capabilities for fault analysis.
- Mal-operation of protection which leads to loss of revenue due to unserved energy during the supply interruptions caused by the protection scheme mal operation.

34.1.7 DC Systems

The objective of the project is to system improvement the direct current (DC) systems supply protection systems in substations backup power and allowing emergency switching. The program aims to replace the key elements of the DC system. The battery charger and battery bank are the main components. The battery charger replacement according to best practices is 10 – 15 years. Replacing DC systems, such as battery chargers and batteries, in substation protection systems is crucial for several reasons refer to the potential benefits below. The replacement will occur across the electrical network in the various regions.

Benefits of this projects include:

- Improved reliability – DC systems provide a continuous power supply to critical components like protection relays, circuit breakers, and communication devices. Ensuring these systems are in optimal condition prevents power outages and equipment failures.
- Improved safety of personnel and reduction of potential risks – Properly functioning DC systems are essential for the safe operation of substations. The power emergency systems and alarms, which are vital during fault conditions.
- Improved system performance – Over time, batteries and chargers degrade, reducing their efficiency and reliability. Regular replacement ensures that the system performs at its best, minimizing the risk of unexpected failures.
- Reduced downtime.
- Increase in reliability to customers.

34.1.8 New Cables

The objective of the project is to address the population growth, and the densifications plans of eThekwini Metropolitan, which is growing rapidly, increasing the demand for electricity. To meet this demand and support urban and industrial expansion, high voltage cables are essential. These cables efficiently transmit large amounts of electricity over long distances, ensuring a stable supply and reducing power outages. Upgrading to high voltage cables is crucial for handling the increased load and future-proofing the electrical network. This investment supports economic development, improves residents' quality of life, and attracts new businesses. In summary, high voltage cables are vital for addressing immediate and long-term electrical needs in the eThekwini metro.

Benefits of this projects include:

- Enhanced Reliability – High voltage cables can handle larger loads, reducing the risk of power outages and ensuring a stable electricity supply for both residential and industrial areas.
- Efficiency – These cables transmit electricity over long distances with minimal losses, improving the overall efficiency of the electrical network and reducing energy wastage.
- Future-Proofing – Upgrading the infrastructure prepares the network for future growth and technological advancements, accommodating increased demand and supporting urban densification plans.
- Economic Growth – A reliable and efficient electrical network attracts new businesses, supports existing industries, and improves the quality of life for residents, fostering economic development in the region.

34.1.9 New Lines

The objective of the project is to address power demands in the eThekwini Metropolitan which is experiencing rapid growth in both urban and rural areas. To meet this demand, high voltage lines are essential for efficient power transmission over long distances. These lines connect substations, supporting the N-1 principle, which ensures network reliability by maintaining service despite equipment failures. This infrastructure upgrade is crucial for the metro's densification plans, future growth, and technological advancements. By enhancing the electrical network's resilience and reliability, the rollout of high voltage lines supports economic development, improves residents' quality of life, and attracts new businesses to the region.

Benefits of this projects include:

- Increased Reliability – High voltage lines ensure a stable and continuous power supply by connecting substations and supporting the N-1 principle, which maintains service even if a component fails.
- Efficient Power Transmission – These lines can transmit large amounts of electricity over long distances with minimal losses, improving the overall efficiency of the electrical network.
- Support for Growth – The infrastructure upgrade accommodates future urban and industrial expansion, aligning with the metro's densification plans and technological advancements.

34.1.10 New Substations

The objective of this project is to construct new substations based on forecast electricity demand that cannot be catered for from the existing network as well as to cater for the replacement of substations that operate at obsolete voltage levels.
The benefits of this project include:

- Contributes to the bottom line due to profits made from electricity sales and rates charges.
- Job creation due to new industrial and commercial businesses being provided electricity
- The establishment of housing developments
- Improves network reliability with transfer of load from substations that are being phased out

34.1.11 New Switching Stations

The objective of this project is to allow each substation to be fed directly from circuit breakers installed in a switch yard rather than being teed off an overhead transmission line and relying on the upstream breaker/s to trip in the case of a fault on any of the tee offs.

The benefits of this project include:

- Avoidance in tripping multiple substations that are teed off a single line due to a fault along any one tee off which can result in a wide area outage, covering several suburbs, should a fault occur at any one of the tee offs.
- The protection schemes used for switching stations are more reliable than those used for tee offs.
- Allows for a higher degree of network flexibility.
- Prevents long durations network outages.

34.1.12 Transformer Additions

The objective of this project is to ensure that all HV substation loadings are kept within the designed firm rating. The transformer loading of all high voltage substations are monitored and tracked especially during periods of high demand like the winter and summer peak loadings. This information is used to make decisions on when to add transformers at substations that approach the firm capacity.

The benefits of this project include:

- Provides (n-1) compliance
- Allows connection of new customers and or existing customer applications for additional power.

34.1.13 132 kV Indoor GIS Switchboards

The objective of this project is to extend the life of 132 kV indoor GIS switchboards. A two-pronged approach is proposed for this project. The first step is to engage the services of the OEM's or OEM approved service providers to complete non- intrusive inspections of the various boards. The results of these inspections would then be used to compile the scope of work aimed at extending the life of the switchboards that approach the useful engineering life. There is a chance that the cost to refurbish the boards may far exceed the cost to replace the boards. A decision will be made at that stage

The benefits of this project include:

- Maintain continuity of supply
- Better understanding of condition and option to maintain at reduced cost if required at reduced costs.
- Lower risk in the long term

34.1.14 HVI Re-Configuration

This project group captures HVI re-configuration covering mainly the introduction of 132 kV bus sections and/or dedicated 132 kV circuit breakers to improve the operational flexibility, control and protection of the 132 kV network. The simultaneous outage of a transformer on one circuit and a line outage on the other, at a substation, presents challenges to HV Network Controllers, especially on substations that are close to firm rating. In these cases, MV Controllers often battle to pick up loads with neighbouring substations.

There are several substations on EE's HV network where the absence of a 132 kV bus section on the standard four transformer substation was identified by eThekwini Electricity's HV Control Branch and communicated to HV Planning for investigation, feasibility and design of 132 kV bus sections where practicable.

The benefits of implementing this project are:

- Improved operational flexibility
- Marginal increase in capacity
- Improved network reliability

34.2 HVI OPEX programme

Programme goal: The overall goal of the HVI OPEX programme is to use a projectized approach to work through the backlog in the maintenance and repairs of HVI.

The HVI OPEX programme comprises of three main categories of projects: namely

- Transformer maintenance and repairs – this programme focuses on clearing the backlog in power transformer maintenance.
- Transmission line structural work
- Substation structural work

This programme aligns with the following tactical goals:

- Goal 12: Enhance maintenance efficiency and effectiveness
- Goal 13: Strengthen infrastructure resilience and security
- Goal 16: Enhance project efficiency and delivery
- Goal 17: Strengthen asset management practice

This programme contributes to:

1. Reducing the risk of unexpected failures of HVI.
2. Reducing unplanned maintenance costs.
3. Reducing the burden on already stretched maintenance resources.
4. Providing a safer working environment for field staff.
5. Reducing the risk of significant and sustained power outages.
6. Preserving the condition of existing in service HVI thereby reducing the capital funding requirements.

Table 56 - HVI OPEX Programme KPA's

KPA	KPI
KPA 1 - Basic Service Delivery	KPI 1 – Compliance with grid code
	KPI 2 – Compliance with environmental regulations
KPA 2 - Local Economic Development	KPI 3 – Provision of capacity before demand
	KPI 4 – Adherence to (n-1) design philosophy

The planning activities for the HVI OPEX programmes are completed using in-house resources from the HV Lines, HV Substations and Infrastructure Asset Management Branches.

The repair and maintenance technical specifications, project, and contract management activities are completed using in-house resources from the HV Lines and Substation Branches as well as contracted Consultants.

The programme manager is Senior Manager: HV Network Control, supported by project managers: Senior Manager: HV Substations and Senior Manager: HV Lines.

The delivery of planned major maintenance and repair projects was negatively affected by OPEX budget constraints and a shortage of manning levels. This has resulted in a backlog of major maintenance and repair projects. There was good progress noticed on completion of major maintenance and repair projects that was outsourced to the private sector for projects that was funded.

In order to work through the backlog and handle new major maintenance tasks that arise as the HVI ages, funding to outsource the work to the private sector is required.

Table 57 - HV Expansion & Upgrades Programme Summary (OPEX Required)

HV Expansion & Upgrades program							
Project/ Fiscal Year	**25/26**	**26/27**	**27/28**	**28/29**	**29/30**	**Project implementation capacity**	**Status**
Transformer maintenance and repairs	R4.58M	R5.59M	R5.96M	R6.64M	R7.24M	Yes	Initiated
Transmission line & structural work	R49.09M	R59.16M	R59.03M	R68.75M	R79.72M	Yes	Initiated
Substation structural work	R11.77M	R15.65M	R22.40M	R24.81M	R28.28M	Yes	Initiated
Total per year	R65.44M	R80.40M	R87.39M	R100.2M	R115.3M		
Total for five years				R 448.73M			

34.2.1 Transformer Maintenance and Repairs

The objective of this project is to ensure that major maintenance and repair backlogs for power transformers are cleared. A transformer maintenance and repairs program are crucial for maintaining the reliability and efficiency of an electrical network. Its primary purpose is to ensure transformers operate optimally, preventing unexpected failures and extending their lifespan. Regular maintenance and timely repairs help identify and address issues early, reducing the risk of costly emergency repairs and minimizing downtime. Without such a program, the network faces increased risks of power outages, equipment failures, and safety hazards. Neglecting transformer maintenance can lead to higher operational costs, reduced efficiency, and potential regulatory non-compliance, ultimately compromising the stability and safety of the entire electrical system.

The benefits of this project include:

- Clear backlogs – Enhances reliability, extends lifespan, reduces costs, improves efficiency, and ensures safety and compliance.
- Enhanced reliability – Regular maintenance ensures transformers operate efficiently, reducing the risk of unexpected failures and power outages.
- Realise lifespan – Preventive maintenance and timely repairs contributes to achieving engineering life of transformers, delaying the need for premature replacements
- Cost savings – Preventive maintenance helps identify and address issues early, avoiding expensive emergency repairs, minimizing downtime and preventing loss of revenue due to unserved energy
- Improved efficiency – Well-maintained transformers operate more efficiently, reducing energy losses and improving the overall performance of the electrical network.
- Improved safety – Regular inspections and repairs help prevent potential hazards such as overheating, oil leaks, and electrical faults, ensuring a safer environment for both workers and the public.
- Regulatory compliance – Adhering to maintenance schedules and standards ensures compliance with industry regulations and avoids potential fines or legal issues.

34.2.2 Transmission Line Structural Work

The objective of this project is to ensure that transmission line structural is completed timeously. Transmission line structural work is crucial for maintaining the stability and reliability of the electrical grid. This work involves constructing, maintaining, and upgrading the physical structures that support high-voltage power lines, such as towers and poles. Regular inspections and maintenance prevent issues like corrosion and environmental damage, ensuring the longevity and durability of the infrastructure. Upgrading structural components enhances the network's capacity to handle increased demand and technological advancements. Proper structural work also ensures safety for both the workforce and the public by preventing potential failures and hazards. Overall, it is vital for ensuring a reliable power supply, supporting economic growth, and maintaining the integrity of the electrical network.

The benefits of this project include:

- Preservation of condition of transmission line steel work – This prevents corrosion, ensures structural integrity
- Enhanced Reliability – Regular maintenance and upgrades ensure the stability and integrity of transmission lines, reducing the risk of outages and ensuring a consistent power supply.
- Extended Lifespan – Proactive structural work prevents corrosion and environmental damage, significantly extending the lifespan of transmission infrastructure and delaying the need for costly replacements.
- Cost Efficiency – Preventive maintenance helps avoid expensive emergency repairs and minimizes downtime, leading to long-term cost savings for the utility.
- Improved Safety – Ensuring the structural integrity of transmission lines protects both the workforce and the public from potential hazards, creating a safer environment overall.

34.2.3 Substation Structural Work

The objective of this project is to ensure that substation structural is completed timeously. Substation structural work involves constructing, maintaining, and upgrading the physical infrastructure that supports electrical equipment, such as foundations, steel frameworks, control buildings, and protective barriers. The purpose of a substation structural work program is to ensure the integrity, safety, and functionality of these critical structures. Such a program is essential for protecting electrical components from environmental factors, ensuring the safety of personnel, and maintaining reliable operation. Regular inspections and timely upgrades prevent equipment damage, reduce maintenance costs, and mitigate safety hazards. Without a dedicated program, the efficiency and reliability of the electrical network could be compromised, leading to increased risks of outages and operational failures.

The benefits of this project include:

- Preservation of condition of transmission line steel work – Prevents corrosion and structural degradation, ensuring the transmission lines remain strong and functional over time.
- Enhanced Reliability –Regular maintenance and upgrades ensure the structural integrity of substations, supporting the reliable operation of electrical equipment and reducing the risk of outages.
- Improved Safety – A well-maintained substation infrastructure protects personnel and equipment from potential hazards, ensuring a safer working environment.
- Cost Efficiency – Proactive structural work prevents costly emergency repairs and extends the lifespan of substation components, leading to long-term cost savings.
- Regulatory Compliance – Adhering to structural standards and maintenance schedules ensures compliance with industry regulations, avoiding potential fines and legal issues.

35.0 Facilities Investment Programme

The figure below illustrates the initiatives that comprise the Facilities Investment programme.

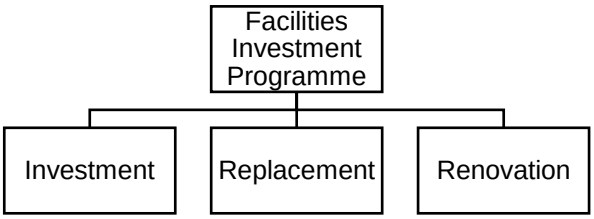

Figure 45 - Facilities Investment Programme

Programme goal 1: to create a cost-effective, productive working environment that meets occupational health and safety standards, by investing in facilities.

The Facilities Investment Programme consists of three components, namely the Facilities Investment Programme, Facilities Replacement Programme and Facilities Renovation Programme.

Facilities Investment Programme

Program goal 2: The provision of new buildings/facilities, to provide office space, for Customers Services and staff.

Facilities Replacement Programme

Program goal 3: Replacement of assets, that reached the end of useful life, are incurring high maintenance costs and non-compliant with Regulations.

Facilities Renovation Programme

Program goal 4: This programme comprises of, various projects, aimed at, optimising the existing space usage.

The Facilities Investment Programme, aligns with the following tactical goals:

Goal 3: reform support activities within the electricity value chain

Goal 11: improve loss control

Goal 17: strengthen asset management

And achieves the following benefits, namely:

- Reducing maintenance costs.
- Achieving Legal Compliance.
- Extends useful life of assets.
- Providing a safer working environment for staff and customers.
- Optimisation of existing office space, to cater for additional staff, at a highly reduced cost.
- Avoid higher costs, to accommodate Staff in lease areas and lessen impact to operations, as staff are centrally located.
- Mitigate business risks, associated with fire risks and downtime of operations.
- Enhance the environment, for staff and customers.

This programme will address the following customer, business and operational KPA and KPI's:

Table 58 - Facilities Investment Programme KPA's

KPA	KPI
KPA 1 – Safety	KPI – Safety compliance
KPA 2 - IAM	KPI – No of building repair issues
KPA 3 – Financial	KPI – Leasing costs

The unit has a poor history of facilities related projects. Many past projects have exceeded their estimated costs, not met stakeholder requirements, not completed, and sometimes “gold-plated” due to architectural creativity.

Table 59 - Facilities Investment Programme Summary

Facilities Investment program							
Project	**KPI ’s**	**Start Year**	**End Year**	**CAPEX required**	**OPEX required**	**Project implementation capacity**	**Status**
Springfield Fireline Renewal				R26,000,000			Identified
Springfield Building 09 - Renovations				R52,000,000			Identified
Rotunda - Renovations optimisation				R30,000,000			Identified
Control Building Refurbishment				R120,000,000			Identified
HQ - Building Refurbishment				R470,000,000			Identified
H,Q, Building - HVAC Replacement				R37,000,000			Identified
Control Building - HVAC Replacement				R46,000,000			Identified
Springfield - Stores lift				R10,000,000			Identified
H.Q Building - Lifts Replacement				R12,000,000			Identified
Control Building - Lifts Replacement				R12,000,000			Identified
Isipingo Customer Service Centre				R68,000,000			Identified
H,Q, Building Complex				R20,000,000			Identified
Springfield Building Complex				R100,000,000			Identified
Building Maintenance					R336,000,000		Identified
Total				R 1,003 billion	R 336 million	TBC	

35.1.10 Key Project - Isipingo Customer Service Centre.

High Level Description	Building of new Customer Service Building at Isipingo.
Intended Benefit	Building of new Customer Service Building. to service, Residents, of the South Durban Region. Current lease buildings, in a poor state, of upkeep and high rental. Improved Customer experience and Staff morale.
Estimate Budget	R68 000 000 .00
Funding Source:	Internal
Time Frame:	3 years
Status:	Identified

35.1.11 Key Project - Springfield Fireline Replacement

High Level Description	Replacement of Fire Protection System, at our Springfield Building Complex.
Intended Benefit	Design and installation of Fire Protection System, for Springfield Complex. Comply with legal requirements and mitigate fire risks.
Estimate Budget	R26 000 000 .00
Funding Source:	Internal
Time Frame:	3 years
Status:	Identified

35.1.12 Key Project - H, Q, Building - HVAC Replacement

High Level Description	Replacement /renewal of HVAC System.
Intended Benefit	HVAC System replacement as it exceeds its useful life. Comply with Building regulations. Lower costs on maintenance
Estimate Budget	R37 000 000 .00
Funding Source:	Internal
Time Frame:	3 years
Status:	Identified

35.1.13 Key Project - Control Building - HVAC Replacement

High Level Description	Replacement /renewal of HVAC System.
Intended Benefit	HVAC System replacement as it exceeds its useful life. Comply with Building regulations. Lower costs on maintenance
Estimate Budget	R46 000 000 .00
Funding Source:	Internal
Time Frame:	3 years
Status:	Identified

35.1.14 Key Project - Springfield - Stores lift Replacement

High Level Description	Replacement /renewal of the Main Stores Goods Lift.
Intended Benefit	Lift replacement as it exceeded it useful life. Timely despatch of goods/materials, required for Electrical Network repairs/maintenance. Comply with Building regulations. Lower costs on maintenance.
Estimate Budget	R10 000 000 .00
Funding Source:	Internal
Time Frame:	3 years
Status:	Identified

35.1.15 Key Project - H.Q Building - Lifts Replacement

High Level Description	Replacement /renewal of the H.Q. Building Lifts
Intended Benefit	Lift replacement as it exceeded it useful life. Comply with Building regulations. Lower costs on maintenance.
Estimate Budget	R12 000 000 .00
Funding Source:	Internal
Time Frame:	3 years
Status:	Identified

35.1.16 Key Project - Control Building - Lifts Replacement

High Level Description	Replacement /renewal of the H.Q. Building Lifts
Intended Benefit	Lift replacement as it exceeded it useful life. Comply with Building regulations. Lower costs on maintenance.
Estimate Budget	R12 000 000 .00
Funding Source:	Internal
Time Frame:	3 years
Status:	Identified

35.1.17 Key Project - Control Building- Renovations Optimisation

High Level Description	Renovate Existing Workshop and Office space at Control Building
Intended Benefit	Optimisation of existing office space, to cater for additional staff. Lower cost incurred, with the expansion of existing office /workshop space. Upgrade of Building, to comply with current regulations. Improved Staff morale.
Estimate Budget	R120 000 000 .00
Funding Source:	Internal
Time Frame:	3 years
Status:	Identified

35.1.18 Key Project - Springfield Building 09 - Renovations Optimisation

High Level Description	Renovate Existing Workshop and Office space at Building 09-Springfield Complex
Intended Benefit	Optimisation of existing office space, to cater for additional staff. Lower cost incurred, with the expansion of existing office /workshop space. Upgrade of Building, to comply with current regulations. Improved Staff morale.
Estimate Budget	R52 000 000 .00
Funding Source:	Internal
Time Frame:	3 years
Status:	Identified

35.1.19 Key Project - Rotunda Building - Renovations Optimisation

High Level Description	Renovate existing Office space. at Rotunda Customer Service Building - H.Q. Complex
Intended Benefit	Optimisation of existing office space, to cater for additional staff. Lower cost incurred, with expansion of existing Customer /office space. Upgrade of Building, to comply with current regulations. Improved Staff moral and Customer experience.
Estimate Budget	R30 000 000 .00
Funding Source:	Internal
Time Frame:	3 years
Status:	Identified

35.1.20 Key Project - HQ Building - Renovations Optimisation

High Level Description	Renovate existing Office space at H.Q. Building.
Intended Benefit	Optimisation of existing office space, to cater for additional staff. Lower cost incurred, with the expansion of existing office space. Upgrade of Building, to comply with current regulations. Improved Staff morale.
Estimate Budget	R490 000 000 .00
Funding Source:	Internal
Time Frame:	3 years
Status:	Identified

35.1.21 Key Project - Springfield Main Stores Building Renovations Optimisation

High Level Description	Renovate Existing Workshop and Office space at Stores Building Springfield Complex
Intended Benefit	Optimisation of existing office/workshop space, to cater for additional staff. Lower cost incurred. with the expansion of existing office /workshop space. Upgrade of Building, to comply with current regulations. Improved Staff moral and Customer experience.
Estimate Budget	R100 000 000 .00
Funding Source:	Internal
Time Frame:	3 years
Status:	Identified

35.1.22 Key Project - Building Maintenance

High Level Description	To undertake repairs/ maintenance of the various Buildings, in compliance with Building Regulations, Safety Act, and good house keeping
Intended Benefit	Timely repairs/maintenance of Buildings. Comply with Building regulations. Lower costs on maintenance.
Estimate Budget	R336 000 000 .00
Funding Source:	Internal
Time Frame:	3 years
Status:	Identified

PART 7 - CONCLUSION

36.0 Financial Projections

Due to resource and time constraints, eThekwini Municipality was not in a position to provide projections for the electricity trading service at the time of releasing the first version of this document . This scope will be included in subsequent versions of this document.

The table below provides an indication of the expected impact of each programme to aid the trading service to increase revenue and manage expenditure in order to generate a surplus.

Table 60 – Expected Impact of Programmes on Financial Performance

Programme	Revenue	Expenditure
INSTITUTIONAL REFORM		
Governance Reform Programme	↑	↓
Financial Reform Programme	↑	↓
Support Services Optimisation Programme	↑	↓
Human Capital Improvement Programme	↑	↓
Training & Development Programme	↑	↓
INFORMATION SYSTEMS & BUSINESS PROCESS RE-ENGINEERING		
Metering Programmes	↑	
ICT/OT Programmes Overview		↓
ICT Systems Programme		↓
ADMS Programme	↑	↓
SCADA EMS Project		
Telecommunications Programme		↓
Digital Contact Centre Programme		
Metering Systems Programme		
GIS Systems Programme		↓
CUSTOMER & REVENUE MANAGEMENT		
Commercial Plans	↑	
Tariff Alignment to Cost of Serve	↑	
Renewable Energy Programme	↑	
Revenue Management Programme	↑	

Programme	Revenue	Expenditure
Revenue Protection Programme	↑	↓
Billing & Collections Programme	↑	
Alternate Revenues Programme	↑	
OPTIMISATION		
Loss Control Programmes		↓
Infrastructure Asset Management Programme	↑	↓
Infrastructure Security Programmes		↓
Streetlighting Programme		↓
Fleet Management Programme		↓
INVESTMENTS FOR SUSTAINABILITY		
MV/LV Operations Programmes	↑	↓
HV Infrastructure Programmes	↑	↓
Facilities Investment Programme		↑

37.0 Conclusion

The principal aim is augmenting revenue by means of better client connections, streamlined invoicing and collection procedures, and strong financial administration. This entails putting into practice plans that maximise already-existing assets and client contacts in order to increase profitability without requiring a significant amount of new client acquisition. There is a growing need for businesses to adapt to changing market conditions and customer expectations. This business and investment plan can help the organisation introduce new services, improve operational efficiency, and respond to market demands effectively. It is essential to make sure that all applicable laws and regulations are followed.

These efforts are anticipated to yield a number of significant advantages. Cash flow and overall income can be greatly improved by these initiatives by streamlining the billing and collections procedures. Improving customer satisfaction and loyalty through customized communication and service enhancements can strengthen relationships with customers and encourage repeat business and recommendations. Simplifying internal procedures and implementing best practices for financial management can cut expenses and boost output, freeing up funds for expansion plans within the company. The initiatives protect the organisation's long-term existence by minimising the danger of legal penalties and reputational harm by making sure regulatory standards are met. These initiatives aim to solve current issues while also taking advantage of growth opportunities, which will ultimately result in a more profitable and sustainable business model.

The proposed commercial plans represent a strategic approach to improving municipal operations and service delivery. Through targeted strategy implementation and technology investment, the municipality can increase revenue, optimise efficiency, and provide better services to its residents. This business justification forms the basis for decision-making and emphasizes the significance of these initiatives in reaching the municipality's long-term objectives.

It must be noted that the unbundling of tariffs to fixed and variable charges will take many years to achieve especially in the residential sectors and in some instances will continue to exist for lower-income households. The subsidies from higher consumption consumers moving to SSEG will decrease as this market segment grows as the higher the consumption the greater the subsidy principle still exists. Revenue from tariffs will be under constant pressure as market conditions evolve, hence, other forms of revenue must be sought. Tariffing is a principle to track and seek customer behaviour change, which must be achieved progressively so as not to shock the market.

Our immediate challenge is to track Eskom tariff restructure and implement EE’s equivalent as soon as it is approved to reduce revenue risk. The CoS will be the basis for all revenue recovered via the tariff mechanism going forward. The introduction of embedded generation has had an adverse effect on the eThekwini Electricity sale of energy. This has forced the utility to move from bundled electricity tariffs to more unbundled net-billing tariff structures which will greatly assist the municipality to recover the network related costs via a network access charge. This tariff structure also allows the prosumer to sell excess energy to the grid as and when not required. The procurement of bi-directional meters is currently hindering the implementation of the new net-billing tariff structures.

This business and investment plan provides a comprehensive plan of action to reform the electricity trading service.

38.0 Revision

Date	Changes	Revision Number
2024/10/21	First draft	V0.1
2024/10/27	Version 1 finalised.	V1.0
2024/10/29	Updates from CFO & CSO.	V1.1
2024/10/30	Replacement of names with designations.	V1.2
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Annexure 1. Programme Structure Template

[Section Number] [Name of Programme]

The figure below illustrates the initiatives that comprise the [X programme].

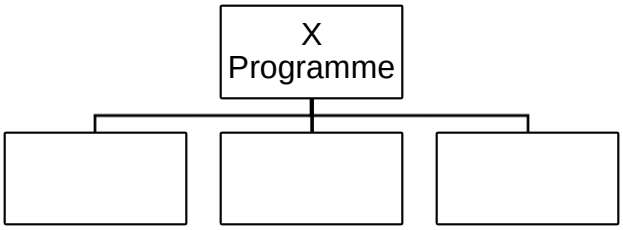

Figure 46 – Programmes Template

[Discuss program alignment, can be more than one goal]

This programme aligns with the following tactical goals: Goal x: xxxx.

[Set an overall goal for the programme]

Programme goal: To improve … by …

[Discuss how this programme contributes to operational effectiveness and financial solvency (loss-reducing or surplus-increasing investments).]

[Discuss potential use of private and development finance and expertise.]

[Discuss programme key performance areas and indicators.]

This programme will address the following customer, business and operational KPA and KPI's

Table 61 - Programme KPA's Template

KPA	KPI
KPA 1	KPI 1
	KPI 2
KPA 2	KPI 3
	KPI 4

[Discuss the programme structure and resources]

The programme consists of the following related projects, Key project 1, Key project 2 and Key project 3

The programme manager is XXX, supported by project managers x,y,z for each of the key projects identified below.

[Discuss if these resources (PM's) are sufficient. If not, what is the plan to supplement project implementation capacity?]

[Discuss history of ability to implement & spend.]

Table 62 - Programme Summary Template

X Programme							
Project	**KPI 's**	**Start Year**	**End Year**	**CAPEX required**	**OPEX required**	**Project implementation capacity**	**Status**
Review the free basic electricity limit.							
Optimise the use of insurance							
Implement a productivity							

X Programme							
Project	**KPI 's**	**Start Year**	**End Year**	**CAPEX required**	**OPEX required**	**Project implementation capacity**	**Status**
management project							
Implement an internal restructuring project							
Restructure outsourcing contracts							
Improve materials managements							
Total				R xxx	R xxx	3 of 4	

39.1.10 Key project 1

[For each key project discuss the following and update the programme table.]

[High level Description]

[Intended Benefits]

[Estimated Budget]

[Funding Source]

[Time frame]

[Status]

Annexure 2. Facilities Investment Projects

Key Project	High Level Description	Intended Benefit	Estimate Budget	Funding Source	Time Frame	Status	Risks , if not undertaken	Department	Branch
Springfield Fireline Renewal	Replacement of Fire Protection System, at our Springfield Building Complex.	Design and installation of Fire Protection System, for Springfield Complex. Comply with legal requirements and mitigate fire risks.	R26,000,000.00	Internal	3 years	Identified	Fire risk to Main Stores, Strategic Stock , I.C.T Server room, various Workshops and Staff offices.	Electricity	Administration and Finance
Springfield Building 09 - Renovations	Renovate existing Workshop and Office space.	Optimisation of existing office space, to cater for additional staff. Lower cost incurred ,with the expansion of existing office /workshop space. Upgrade of Building, to comply with current regulations. Improved Staff moral and Customer experience.	R52,000,000.00	Internal	3 years	Identified	Higher costs ,to accommodate Staff in lease areas. Operations experiences delays , as Staff at different locations.	Electricity	Administration and Finance

Key Project	High Level Description	Intended Benefit	Estimate Budget	Funding Source	Time Frame	Status	Risks , if not undertaken	Department	Branch
Rotunda - Renovations optimisation	Renovate existing Customer Service area and Office space.	Optimisation of existing office space, to cater for additional staff. Lower cost incurred ,with expansion of existing Customer /office space. Upgrade of Building, to comply with current regulations. Improved Staff moral and Customer experience.	R30,000,000.00	Internal	3 years	Identified	Higher costs ,to accommodate Staff in lease areas. Operations experiences delays , as Staff at different locations.	Electricity	Administration and Finance
Control Building Refurbishment	Renovate existing Workshop and Office space.	Optimisation of existing office space, to cater for additional staff. Lower cost incurred ,with the expansion of existing office /workshop space. Upgrade of Building, to comply with current regulations. Improved Staff moral.	R120,000,000.00	Internal	3 years	Identified	Higher costs ,to accommodate Staff in lease areas. Operations experiences delays , as Staff at different locations.	Electricity	Administration and Finance

Key Project	High Level Description	Intended Benefit	Estimate Budget	Funding Source	Time Frame	Status	Risks , if not undertaken	Department	Branch
HQ - Building Refurbishment	Renovate existing Workshop and Office space.	Optimisation of existing office space, to cater for additional staff. Lower cost incurred ,with the expansion of existing office /workshop space. Upgrade of Building, to comply with current regulations. Improved Staff moral.	R470,000,000.00	Internal	4 years	Identified	Higher costs ,to accommodate Staff in lease areas. Operations experiences delays , as Staff at different locations.	Electricity	Administration and Finance
H,Q, Building - HVAC Replacement	Replacement /renewal of HVAC System .	HVAC System replacement as it exceeds its useful life. Comply with Building regulations. Lower costs on maintenance.	R37,000,000.00	Internal	3 years	Identified	Noncompliance to Building Regulations, Higher cost to maintain.	Electricity	Administration and Finance
Control Building - HVAC Replacement	Replacement /renewal of HVAC System .	HVAC System replacement as it exceeds its useful life. Comply with Building regulations. Lower costs on maintenance.	R46,000,000.00	Internal	3 years	Identified	Noncompliance to Building Regulations, Higher cost to maintain.	Electricity	Administration and Finance

Key Project	High Level Description	Intended Benefit	Estimate Budget	Funding Source	Time Frame	Status	Risks , if not undertaken	Department	Branch
Springfield - Stores lift	Replacement /renewal of the Main Stores Goods Lift .	Lift replacement as it exceeded it useful life. Timely despatch of goods/materials , required for Electrical Network repairs/maintenance. Comply with Building regulations. Lower costs on maintenance.	R10,000,000.00	Internal	2 Years	Identified	Loss of revenue , as Contractors and Staff, cannot obtain materials required, for timely repairs / maintenance work ,on Electrical Network.	Electricity	Administration and Finance
H.Q Building - Lifts Replacement	Replacement /renewal of the H.Q. Building Lifts	Lift replacement as it exceeded it useful life. Comply with Building regulations. Lower costs on maintenance.	R12,000,000.00	Internal	2 Years	Identified	Noncompliance to Building Regulations, Higher cost to maintain.	Electricity	Administration and Finance
Control Building - Lifts Replacement	Replacement /renewal of the Control Building Lifts	Lift replacement as it exceeded it useful life. Comply with Building regulations. Lower costs on maintenance.	R12,000,000.00	Internal	2 Years	Identified	Noncompliance to Building Regulations, Higher cost to maintain.	Electricity	Administration and Finance

Key Project	High Level Description	Intended Benefit	Estimate Budget	Funding Source	Time Frame	Status	Risks , if not undertaken	Department	Branch
Isipingo Customer Service Centre	Building of new Customer Service Building.	Building of new Customer Service Building. to service, Residents ,of the South Durban Region. Current lease buildings, in a poor state, of upkeep and high rental. Improved customer experience and Staff moral.	R68,000,000.00	Internal		Identified	Higher lease and operational costs and poor Customer interaction. Current Building old.	Electricity	Administration and Finance
H,Q, Building Complex	Renovate Buildings to comply to Building Regulations	Optimisation of existing office space, to cater for additional staff. Lower cost incurred ,with the expansion of existing office /workshop space. Upgrade of Building, to comply with current regulations. Improved Staff moral and Customer experience.	R20,000,000.00	Internal	3 years	Identified	Noncompliance to Building Regulations, Higher cost to maintain.	Electricity	Administration and Finance

Key Project	High Level Description	Intended Benefit	Estimate Budget	Funding Source	Time Frame	Status	Risks , if not undertaken	Department	Branch
Springfield Building Complex	Renovate Buildings to comply to Building Regulations	Optimisation of existing office space, to cater for additional staff. Lower cost incurred ,with the expansion of existing office /workshop space. Upgrade of Building, to comply with current regulations. Improved Staff moral and Customer experience.	R100,000,000.00	Internal	3 years	Identified	Noncompliance to Building Regulations, Higher cost to maintain.	Electricity	Administration and Finance
Sundry Tools and Equipment (Block sum)	Purchase new/replacement sundry tools and equipment to upgrade / purchase new tools and equipment .	Provide Staff with necessary tools and equipment. sufficient resources. Staff sufficient resources	R1,500,000.00	Internal	3 years	Identified	Staff cannot perform tasks due to lack of tools and/or equipment's	Electricity	Administration and Finance
Furniture and Office Equipment (Block sum)	Purchase new/replacement of furniture and office equipment	Provide Staff with necessary furniture and office equipment. Staff sufficient resources.	R1,500,000.00	Internal	3 years	Identified	Staff cannot perform tasks due to lack of furniture and/or office equipment tools/equipment's	Electricity	Administration and Finance

Key Project	High Level Description	Intended Benefit	Estimate Budget	Funding Source	Time Frame	Status	Risks , if not undertaken	Department	Branch
Transport Assets	Purchase of new and replacement Vehicles and Plant	Staff have reliable fleet ,to under repairs /maintenance of Electrical Network. Reduction in loss revenue, due to faster restoration, of power, during power outrage .	R450,000,000.00	Internal	3 Years	Identified	Increase in revenue loss, due to delayed response times.	Electricity	Administration and Finance
Opex requirements over next 3 years , where no funding is available, to service the need, based on current budget constraints.									
Key Project	**High Level Description**	**Intended Benefit**	**Estimate Budget**	**Funding Source**	**Time Frame**	**Status**	**Risks , if not undertaken**	**Department**	**Branch**
Building Maintenance	To undertake repairs/ maintenance of the various Buildings , in compliance with Building Regulations, Safety Act and good housekeeping.	Timely repairs/maintenance of Buildings. Comply with Building regulations. Lower costs on maintenance.	R336,000,000.00	Internal	3 years	Identified	Noncompliance to Building Regulations, Higher cost to maintain.	Electricity	Administration and Finance

Key Project	High Level Description	Intended Benefit	Estimate Budget	Funding Source	Time Frame	Status	Risks , if not undertaken	Department	Branch
Plant /Vehicle Maintenance	To undertake repairs/ maintenance of the Plant and Vehicles .	Timely repairs/maintenance of Fleet. Fewer breakdown and disruption to Services.	R240,000,000.00	Internal	3 years	Identified	Noncompliance to Traffic Regulations, Higher cost to maintain.	Electricity	Administration and Finance