ETHEKWINI ELECTRICITY ANNUAL REPORT 2022/2023

FOREWORD

As we continue with our mission to be Africa's foremost energy distributor, it is imperative that we look back and take stock of the work that has been done thus far. The last few years have not been kind to the energy industry. There has been more evolution in the last five years when compared to the previous ninety-five years. This is a test of the energy industry's agility to change during volatile times.

Amid all these challenges, we have remained steadfast in our pursuit to deliver service of the highest quality with the most impact and the least financial burden to our citizens. The unit has worked tirelessly this past year to ensure that electricity provision is sustained and that maintenance projects are positioned strategically to ensure the continued strength of our electricity grid. To modernise our operations, the unit is set to develop and implement technology inspired projects that will improve our service and overall customer experience.

With that being said, the last year has not been one without its own challenges. The theft and vandalism of electrical infrastructure continues to be a frequent occurrence that dents service delivery. While our Revenue Protection teams remain diligent in their efforts to combat this scourge, the issue seizes to grind to a halt. We have increased security patrols in high theft zones. While this has proved to be effective, the cost of these services is steep, pushing up our expense budget.

Moreover, the ever-increasing energy costs are putting immense pressure on all South African municipalities. This has a devastating impact on all spheres of society. As costs spiral out of control, it is inevitable that revenue collection difficulties will rise. The unit is now faced with a unique challenge of advancing innovative solutions that will ensure sustained revenue collection rates.

As we continue to electrify our communities and grow our economy, we must intensify our efforts towards of energy efficiency and demand side management. Having concluded yet another challenging year, I would like to thank my staff for their commitment and effort thus far, in serving our customers to the best of their ability. They have displayed unbending resilience and untamed character in the fulfilment of our collective duties of service. My team and I remain resolute in our mission to serve.

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HV OPERATIONS DEPARTMENT

Department Overview

The HV Operations Department is responsible for the planning, construction, operation, and maintenance of eThekwini Electricity's primary network of high voltage cables, lines and substations. The projects undertaken by this department are to provide for increased bulk capacity and to improve the reliability of the regions HV electricity supply. Accordingly, they are typically large, high-cost projects which require considerable time and attention to satisfy environmental legislation in the first instance and then 30 months or more in the construction phase. The branch prides itself in reliable, state of the art solutions for the delivery of high voltage power from its intake points to customers and secondary networks.

HV PLANNING BRANCH

The HV Planning Branch is responsible for planning the Electricity Unit's primary network of high voltage (HV) underground cables, overhead transmission lines, switching stations and substations. The timeline for providing HV infrastructure spans several years and therefore necessitates careful planning to ensure that there is sufficient HV infrastructure in place to meet the demand of all customers in a sustainable manner. The HV Planning Branch is the custodian of the transmission network master plan which is inclusive of a 20-year capital program that allows for HV network development, reliability, and refurbishment requirements. Analysis of the transmission network is conducted using power system analysis software for network load flow, voltage stability and fault level studies. Application for Council funding, acquisition of land and servitudes, environmental impact assessment approvals and completion of preliminary designs are also completed by the branch.

HIGHLIGHTS:

- The branch provided an interim electricity supply to SAPREF Refinery as a mitigation strategy after 132 kV cables were damaged.
- Approval of Development Charges Policy by Council in April 2023 clarifies funding responsibility for bulk infrastructure thereby reducing capital expenditure risk to the City.
- The central operation of the Wayleaves and Excavations Office by Roads and Stormwater reduces the risk of damage to HV cables as excavations are now controlled.

EXISTING PROJECTS

- 132/11 kV Automobile Supply Park Substation (ASP) at Reunion – pre-feasibility stage.
- 132 kV Oil Filled Cable Replacement to SAPREF Refinery – on hold.
- 132/11 kV Sukuma Substation Bus Section – Planning process complete – await funding
- 132/11 kV Sunningdale Substation Bus Section – Planning process complete – await funding
- 132/11 kV Morelands Substation Upgrade – Planning phase in progress, design to be finalised
- 132/11 kV Moriah Substation – on hold due to lower power forecast by Developer
- 132/11 kV Phoenix Industrial Park Substation Bus Section and Transformer Replacement – Planning process complete – await funding
- 132/11 kV Chatsworth Substation Bus Section Installation and Transformer Replacement -Design proposal stage.
- 132/11 kV Roberts Substation Switchboard Replacement, Protection Upgrade and Boundary Wall Construction – Resolving approval from Department of Water and Sanitation in terms of Water use Act.
- 132/11 kV Sibaya Substation – Project put on hold due to poor economic activity.
- 132/11 kV Verulam Substation – Planning process complete – included in next MTREF - unfunded.
- 275/132 kV Durban South Substation Transformer Replacement and Switchgear Upgrade – Design proposal stage
- 132/11 kV Toyota Substation 132 kV Bus Section – draft MOA submitted to TSAM for approval.
- PRASA Durban Station Substation migration of 33 kV to 11 kV supply – construction phase
- PRASA Booth Substation migration of 33 kV to 11 kV Supply – servitude acquisition
- 132 kV Quarry Switching Station replacement of 132 kV COMPASS switchgear with conventional outdoor switchgear – preliminary design stage
- 132 kV Ottawa/Umgeni Overhead Transmission Line upgrade – pre-feasibility stage
- 275/132 kV Klaarwater Substation yard upgrade – pre-feasibility stage
- 132 kV Centrum Switching Station
- 132 kV Overhead Transmission Lines out of Inyaninga 400/132 kV Substation – preliminary design stage
- 132/11 kV Mpumalanga Substation: pre-feasibility stage
- 132/11 kV Frametex Substation reconfiguration: pre-feasibility stage
- 132/11 kV Shongweni SS: preliminary design stage

KEY CHALLENGES

- Forecasts for expansion of h igh voltage networks in the northern and western suburbs was provided by Tongaat Hullett Developments, that is now in business rescue. This affects planned new high voltage infrastructure roll out by both Eskom and eThekwini Electricity.
- The branch has encountered delays in the 33 kV network phase out due to delays in projects required to replace these sources of supply.
- The branch was unable to handover completed design packages for projects due to capital constraints.

ACHIEVEMENTS

- Developing skills to assess embedded generation applications.

HV PROJECTS BRANCH

HV Projects Branch is responsible for the detailed design, specification of equipment and management of major system reinforcement projects which include cables, lines and substations with voltages ranging from 275kV to 11 kV.

HIGHLIGHTS

- The awarding of a three-year 132 kV Gas Insulated Switchboards Contract
- Commissioning of the new 132 kV Addington-Old Fort Cable
- Commissioning of the new 132 kV Dalton-Cathedral Cable
- Commissioning of various 132/11 kV Transformers

CHALLENGES

- Funding constraints impeding progress on projects.

EXISTING PROJECTS

- Alice Street 132/11 kV Substation: Upgrade of the substation with two additional transformers and replacement of the existing 11kV board. Civils design underway.
- Austerville 132/11 kV Substation: New 132/11 kV substation aimed at relieving the aged 33/11 kV substations in the Jacobs area and further reinforcing the 11kV network. Civil works in progress.
- Avoca 132/11 kV Substation: The commercial and residential load demand in the area has increased and

firm capacity needs to be upgraded from 30 MVA to 60 MVA. Commissioning in final stages.

- Bulwer 132/11 kV Substation: The commercial and residential load demand in the Glenwood area has increased and the 11 kV system needs to be reinforced. Civil works completed, 132 kV cables installed and 11 kV board and ICAP equipment in procurement stages.
- Cathedral 132/11 kV Transformer: New transformer to be procured to replace old unreliable transformer.
- Durban South 275 kV Bus Section: Required to improve security of supply at this strategic substation. Installation of plant and equipment pending network constraints.
- Jameson Park 132/11 kV Substation: The commercial; and residential load demand in the area has increased resulting in the need to upgrade the existing 33/11kV Substation and replace it with two new 30 MVA 132/11 kV transformers, associated plant and equipment. Cables and GIS. ICAP commissioning in final stages. Transformers to be done as phase 2.
- KE Masinga 132/11 kV Substation: The commercial and residential load demand in the city has increased and the 11 kV system needs to be reinforced. Major plant installed. Cable works completed. ICAP in final commissioning stage.
- Kingsburg 132/11 kV Substation: The commercial and residential load demand in the area has increased and the firm capacity needs to be upgraded from 30 MVA to 60 MVA. Detailed civil works design in progress.
- Klaarwater 275/132 kV Substation: Upgrade current four 250 MVA transformers to 315 MVA due to the increase in load. First two transformers commissioned.
- Kloof 132/11 kV Substation: New 132/11 kV substation aimed at replacing the ageing Kloof Substation and increasing reliability in the area. Civil works completed. Electrical equipment to be installed once Stockville and Mahogany Substations are in the final stages.
- La Mercy 132/11 kV Substation Reinforcement: The commercial and industrial load demand in the area has increased and the firm capacity needs to be upgraded from 30 MVA to 60 MVA. Two additional transformers have been installed, one commissioned and the last one in final commissioning stage.
- Lotus Park 275/132 kV Substation: Replacement of the old obsolete protection and control equipment with the newer IEC 61850 compliant integrated control and protection (ICAP) equipment. Commissioning in progress.
- Mahogany Ridge 132/11 kV Substation: The commercial and residential load demand in the Westmead and Mahogany Ridge areas have increased, and the 11 kV system needs to be reinforced with additional 60 MVA firm capacity. Civil works and 132 kV overhead line designs have been completed. Installation of the overhead lines in progress.

- Ntuzuma 132/11 kV Transformer. Replacement of the old transformer that had failed. New transformer installed. Commissioning of the protection equipment in progress.
- Ottawa 132/11 kV Substation: The commercial and industrial load demand in the area has increased and the firm capacity needs to be upgraded from 30 MVA to 60 MVA. Additional transformers have been installed. Procurement of other equipment in final stages.
- Rossburgh 132/11 kV Substation: New 11 kV capacity to replace the 33 kV network that is being phased out. ICAP commissioning in final stage.
- Springpark 132/11 kV Substation: The commercial and industrial load demand in the Springpark area has increased and the 11 kV system needs to be reinforced. Civil works completed and critical equipment has been delivered. Awaiting 11 kV gear and ICAP equipment.
- Stockville 132/11 kV Switching Station: New switching station proposed to feed the new proposed sub stations in Mahogany Ridge and Kloof areas. This switching station will also feed the existing Westmead, Marrianridge, Hillcrest and Waterfall Substations, which will eliminate security of supply risks and operational limitations applicable to existing circuits. Civil works currently underway on site and the installation of the 132 kV overhead line in progress.
- Umbongintwini 132/11 kV Substation: Civil works complete. Switchgear and transformers to be procured.
- Umdloti Beach 132/11 kV Substation: The commercial and residential load in the area has increased and the firm capacity needs to be upgraded from 30 MVA to 60 MVA. Transformers installed and commissioning of the protection and control equipment in final stages.
- Umgeni 132/33/11 kV Substation: Replacement of the old obsolete protection and control equipment with the newer IEC 61850 compliant integrated control and protection (ICAP) equipment. Commissioning in progress.
- Umlazi 132/11 kV Substation: Replacement of the damaged 11 kV switchboard. Completed and awaiting the final re-commissioning of existing transformers.
- Underwood 132/11 kV Substation: New 132/11 kV substation to increase the capacity in the area. Civil works have been completed and 132 kV GIS equipment delivered. Cable installed. Awaiting installation of ICAP equipment and 11 kV gear.
- Woodlands 132/11 kV Substation: Upgrade of the current 132/33 kV substation. Civil works design underway.
- Westmead 132/11 kV Substation: New 132 kV bus section required to improve the security of supply in the Westmead area. Procurement in final stages.
- Replacement of the old 11 kV withdrawable switchboards with new fixed pattern type at Bayhead, Esplanade, Isipingo, Marrianridge and Toyota Substations. Procurement in final stages.

HV SUBSTATIONS BRANCH

The HV Substations Branch is responsible for the operation and maintenance of equipment that has voltage ranging from 11 kV up to 275 kV. The main intake points from Eskom are at the four 275 kV National Key Point Substations. The 275 kV is then transformed to 132 kV; 132 kV transformed to 33 kV and 11 kV, and 33 kV is then transformed to 11 kV and in a few cases to 6,6 kV.

The types of equipment that the HV Substation Branch is responsible for includes busbars, capacitors, circuit breakers, instrument transformers, isolators, lightning masts, power line carriers, power transformers and surge arresters.

HIGHLIGHTS

- Overhaul of the Pineside Substation switchgear following a catastrophic failure.
- Isipingo Substation retrofit of 11 kV oil filled circuit breakers with vacuum circuit breakers, as a results substation life extended.
- Commencement of a project to upgrade Klaarwater, Durban North, and Durban South National Key-Point Substations guard houses.
- Continuously repairing equipment that were out of commission in various high voltage substations.
- Overhaul maintenance and repairs of 11kV switchgear panels and circuit breakers at various strategic substations.
- Appointment of a service provider to repair 16 x 132 kV circuit breakers with hydraulic leaks.
- Provision of budget to repair/replace all high voltage SF6 gas leaking circuit breakers.
- Overhaul maintenance of ten high voltage transformers in various substations to improve reliability of power supply within eThekwini Municipality.
- Commencement of recruitment process to fill eight critical Electricians posts that will assist to reduce maintenance backlogs.

LOWLIGHTS

- Incidents of copper theft in high voltage substations has risen and is currently threatening the functionality of substations.
- Delay of insurance claim for substations that were affected by 2022 floods.

CHALLENGES

- Capital and operational budget cuts have affected the implementation of a few projects such as guard house upgrade, substations perimeter wall upgrade, and high voltage equipment overhaul in various substations.

FUTURE PLANS

- The branch will initiate a project to replace all high voltage porcelain current transformers, voltage transformers and Circuit breakers in eThekwini Electricity network to reduce risk of explosion and damage to adjacent equipment.
- Initiate a project to maintain ageing 132 kV GIS boards within eThekwini Municipality network.
- Design and installation of 132kV bus section in existing substations to improve substations operability and load transfer.

HV LINES BRANCH

The HV Lines Branch is responsible for the operation and maintenance of the high voltage overhead lines network consisting of 163 circuit kilometres of 275 kV, 485 circuit kilometers of 132 kV and 13 circuit kilometres of 33 kV overhead line.

HIGHLIGHTS

The complete installation of HV Lines towers theft detection units to act as an early warning system during theft of tower members and prevent collapsing of towers.

1.1 HV Lines electrical faults were minimized due to the effective and pro-active maintenance of HV Lines.

1.2 The following contracts are in place and assisting in the maintenance of HV lines assets:

1.2.1 E.9406-A: Refurbishment of line towers

1.2.2 E.9668: Theft detection unit contract

1.2.3 E.9699: Procurement of 132 kV and 275 kV insulators

1.2.4 E.9431: Bush Clearing contract

1.2.5 E.9788: Professional Engineering, project management Services

1.3 Awaiting the award of the following key contract:

1.3.1 27636-5E: Refurbishment of line towers (Renewal of E.9406-A for next two years)

2. CHALLENGES

2.1 Encroachment of asset servitude and corridors remain the highest risk to infrastructure: This challenge needs proper enforcement of Municipal laws and policies.

2.2 Illegal electricity connections make use of high voltage pylon towers to attach wires for elevation and such crime delays/prevents inspection and maintenance of these infrastructures. In most cases, officials are intimidated and threatened.

2.3 Illegal dumping prevented access for inspection and maintenance.

2.4 The inability to retain staff has resulted in high staff turnover. This had negative consequences for the branch as it fell short on specific skills and the elevated level of competency required associated with working in a high voltage lines environment. A program to train and retain personnel, specifically the targeted group as per the employment equity plan will need to be developed and implemented urgently.

2.5 Suitable off road (4×4) vehicles are still a challenge as access roads are becoming more difficult to negotiate with the encroachment of informal settlements and developments within the power line corridors: This will be mitigated by working with Roads and City Fleet Department to build suitable access roads and procure suitable vehicles, respectively.

2.6 Business forum: Intimidation, demanding work, demanding money from contractors on HV Lines contracts.

2.7 Denied access by private property owners.

2.8 Soil erosion on access routes and bridges washed away.

2.9 HV Lines Building: minor maintenance of leak proofing the roof at the boardroom, filing room and distribution board is partially completed, painting is outstanding. Walls are cracking and paint is peeling off.

3. PRIORITY PROJECTS COMPLETED

3.1 Refurbishment of the following assets has been completed:

3.1.1 Ottawa-Cornubia 132 kV line

3.1.2 Durban North-Old Fort Grid 132 kV line

3.1.3 Ottawa – Umdloti 132 kV line

3.1.4 Lotus Park – Plangweni 132 kV line

3.1.5 Lotus Park – Isipingo 132 kV line

3.2 Completed repairs of assets which were damaged by major faults:

3.2.1 Stringing of OPGW on Lotus Park – Plangweni 132 kV T1 -T12

3.2.2 Access route from T26 to T24 -Klaarwater – Woodlands

3.2.3 Stringing OPGW from T1 to T7 and phase conductors from T4 to T5 Klaarwater – Coedmore 132 kV line.

4. FUTURE PLANS

4.1 The following key lines have been prioritized for refurbishment execution projects due to a limited budget allocation for the branch. The priority is as follows:

4.1.1 Ottawa-Durban North (continuation) 275 kV
4.1.2 Klaarwater-Woodlands 132 kV
4.1.3 Umgeni-Avoca 132 kV
4.1.4 Durban North-Parlock 132 kV
4.1.5 Illovo-Durban South 275 kV
4.1.6 Ottawa-Canelands 132 kV T17-T53
4.1.7 Quarry-Roberts 132 kV
4.1.8 Umgeni-Reservoir Hills 132 kV
4.1.9 Quarry-Bellair 132 kV
4.1.10 Parlock-Umgeni 132 kV
4.1.11 Ottawa-Parlock 132 kV T1-T18
4.1.12 Klaarwater-Quarry 132 kV
4.1.13 Lotus Park-Plangweni 132 kV

4.2 Building Access routes (bridges) to Umgeni-Avoca and Umgeni-Reservoir hills
4.3 Hillcrest-Waterfall, investigate solutions for access and maintenance of monopoly structures.
4.4 Fault path indicators have been procured and we are awaiting integration with Communication for implementation.
4.5 Continue with asset construction and refurbishment projects.
4.6 Participate on national and international technical platforms to learn and share knowledge with other utilities.
4.7 Conduct research on the use of satellite images to monitor and control servitude encroachments.
4.8 Use of weather information systems to analyze electrical network disruptions and improve response times during adverse weather conditions.
4.9 To procure tractor and lay bed (tow-truck) to mitigate challenges experience with access routes and for transporting of TLB and tractor.

4.10 Installation of step bolts for the following lines:
4.10.1 Tee-Mariannridge T1-T10
4.10.2 Klaarwater-Coedmore T1-39
4.10.3 Durban North – Parlock
4.10.4 Klaarwater – Umgeni
4.10.5 Bellair - Rossburgh

4.11 Conductor repair of La Mercy-Tongaat T12-T13.
4.12 Re-insulation of the following towers:
4.12.1 Bellair-Mayville T1-T11
4.12.2 Tee-Duffs Road T1-T3
4.12.3 Hillcrest-Waterfall T1-22 and T38-49
4.12.4 Ottawa – Durban North
4.13 Bellair-Rossburgh, T11 replacement (tower struck by a truck)

HV CABLES BRANCH

The HV Cables branch is responsible for operation and maintenance of the 132kV and 33kV underground power cable assets that form part of the primary network. HV Cables is also responsible for the construction and the maintenance of 11kV cables within the boundaries of high voltage substations. The construction of 132kV cables is managed by the HV Projects branch then handed over to HV Cables on commissioning for operation and maintenance.
Highlights

- Repaired Umgeni-Pinetown No.1 and No.2 132 kV XLPE cables- An extensive damage on this cable from Umgeni to Pinetown was done by a third party, this affected half of the Pinetown area. The repair was completed and energised within 72 hours.
- Repaired Congella-Connaught 33 kV PILC cable- There were load constraints at Connaught substation after cable faulted, cable repairs needed urgent attention. HV Cable repaired the initial fault, a second and a third fault was noticed the cable. This cable's fault prioritised, the repair was completed and energised using inhouse teams to restore supply.
- Repaired Old Fort-Esplanade No.2 33 kV Oil cable- The work was undertaken to repair the circuit of 33kV Oil, Old Fort-Esplanade No.2, suspected fault was the cable joint. This was cut out, both cables on either side were tested to be clear. New joints were prepared, the repair was completed using inhouse teams to restore supply.
- Cable outer sheath tests – Serving tests are critical as they form part of preventative maintenance on high voltage cables. This maintenance task was previously outsourced. A programme for conducting serving tests in-house was developed. This programme involved on-job training of the electricians. 132 kV cables were tested through this programme.
- Excavation contract – A 36-months maintenance contract was awarded beginning of the financial year. This contract is currently being utilised and provides additional resources for maintenance.

CHALLENGES

- Mayville substation – The explosion that occurred at Mayville substation resulted on the 11 kV board damage. Most of the customers fed from this substation were left without power for a prolonged period. This created restlessness from the community and made it difficult to restore supply as soon as possible.
- Test equipment – There is a shortage of specialised cable testing equipment to monitor the condition of the cables. The existing equipment is old and outdated, thus due for replacement.
  Due to non-availability of funds, the procurement of test equipment has been delayed.

- **Third party cable damage –** Third party cable damage continue to rise. This is caused by the wide spread fibre installations in the city which have resulted in several cable damages during excavation or drilling. Third parties excavate without locating underground services and damage cables. Where damages are minor, third parties backfill without notifying eThekwini Electricity, and these damages cause major faults at a later stage.
- **Copper Theft –** Copper theft challenge persists. 11 kV transformer loop cables, copper earthing bars and copper piping in oil cubicles are the most targeted. Copper cables on the HV Cables workshop are also being cut on the storage drums.
- **Maintenance of pressurised cables –** Delays in completion of cable replacement projects have led to the continued operation of aged gas and oil filled cables. There are leaks in several cables due to ageing as these cables have been in service for over 40 years.
- **Shortage of staff –** There are several critical vacant posts at HV Cables that makes it a challenge for the branch to be fully effective, namely: Clerk of Work, 10 electricians and Electricians assistants.
- **City fleet –** There is a shortage of vehicles that staff need to perform daily duties. Challenges experienced at licencing, COR, COF exacerbate the problems even further.
- **Shortage of material –** Shortage of stock items material delays maintenance on the network, compro mising the security of supply.

FUTURE PLANS

- **Training and Development of staff -** HV cables staff is competent to perform works at 11 kV and up to 33 kV. The branch's future focus is to continue to develop competencies for performing works in all relevant technical areas up to 132 kV.
- **Staff Training –** Training newly appointed staff will be a priority. The most recent employees to join the branch include an Engineer, Superintendent and Electricians.
- **Procurement of testing equipment -** HV Cables plans to improve the reliability of the underground cables through condition assessment. Plans for procuring necessary test equipment including training of the staff are already in place and awaits availability of funds.
- Improve cable link boxes for existing 132kV XLPE underground bonding cubicles.

HV NETWORK CONTROL BRANCH

The High Voltage Network Control Branch comprises of four divisions: HV Network Control, System Performance, Network Management and Control Systems.

The HV Network Control Division is responsible for the safe operation and efficient performance of the High Voltage Network, which incorporates two HV Network Control Centres with remote control and alarm facilities. eThekwini's primary transmission network, being the supply from 275 000V down to 6 600 V is staffed, monitored, and controlled 24/7 from these network control centres using a sophisticated Supervisory Control and Data Acquisition (SCADA) system.

The System Performance Division is responsible for network optimization, ensuring the HV Network can meet the demand for electricity, statistical reporting, and quality of supply to the bulk points for the 11 000/6 600 V distribution system and large industrial customers that are connected directly to the HV Network.

The Network Management Division is responsible for the installation and maintenance of the SCADA System that is required for the efficient monitoring and control of the Unit's critical HV and MV infrastructure. The Control Systems Division is responsible for the installation and maintenance of security systems at HV substations which includes CCTV, Access Control and Perimeter Intrusion Detection Systems (PIDS).

HIGHLIGHTS

- As part of the Unit's physical security initiative, the branch continues to install CCTV and electric fence systems with the strategic objective of curbing rampant theft at HV substations. All our extremely critical substations are now fully kitted with the latest state-of-the-art internet protocol (IP) CCTV cameras.
- The daily implementation of loadshedding by Eskom has proven that the automated loadshedding software continues to be beneficial to the operational efficiency and capability in the control room and improving customer satisfaction.
- The mammoth task of producing two revisions of the loadshedding schedules after the April 2022 floods were successfully implemented and proved beneficial to the electrical network and the customers.
- One of our employees graduated with a Doctor of Philosophy in Technology.

CHALLENGES

eThekwini's HV network continues to remain in an abnormal state following the devastating April 2022 floods that damaged HV infrastructure. These increased network abnormalities have led to severe network constraints making it challenging to prevent outages during planned and unplanned work.

The HV Network Control Branch suffered the loss of key experienced staff in various divisions as eThekwini Electricity struggles to retain a full complement of authorised HV control officers and engineering scarce skills.

The long-standing vacancy of the Senior Manager – HV Network Control post posed an operational challenge within the branch.

NEW TECHNOLOGIES

As part of the organisation's digitisation strategy, the Branch is continuing to digitise legacy workflows that impede process efficiencies. One such project that is currently underway is the move away from manual switching logs to a fully digital switch-plan utility. This tool will reduce operator error, ensure consistency across operator switching movements and improve overall outage restoration time

The Branch continues to make strides in enabling data-driven asset management practices. Through this process, key operational insights about the grid will be made available to stakeholders through easy-to-use visualisation methods.

The Branch has been able to pilot several projects as part of its strategic plan to extend grid visibility at a reduced cost to remote assets that are currently unmonitored. The following projects utilize advanced technology solutions such as the Internet of Things (IoT), complex transducers, and embedded technology. These projects include monitoring streetlights, DC chargers, oil gauge cables, and temperature. The embedded technology is also used to create SCADA graphical user interfaces (GUIs) that can potentially reduce costs.

MV/LV OPERATION DEPARTMENT

DEPARTMENT OVERVIEW

The MV/LV Operations department is responsible for the planning, construction, operation, and maintenance of the Unit's medium and low voltage network. The Department plays a significant role in connecting new customers to the electrical grid, thus helping to spread electrical services to all sectors of the Community. The Department is also responsible for providing public/street lighting technologies into the city. Further to the above roles, the Department manages and controls all medium to low voltage substations.

Advancements in technology with the benefit of cost/operational optimization is driving significant changes in the electricity supply industry and the MV/LV Department is strategically embracing these advancements to improve the overall operation, stability, and reliability of the network. The Department has embraced the Internet of Things and the 4th Industrial Revolution and is working on various strategies towards the implementation of a Smart Grid, so that we can better serve our customers.

NETWORK CONTROL BRANCH

The Network Control branch is responsible for the management of Medium and Low Voltage electrical network. This branch is divided into three streams to assist in the effective and efficient management of the electrical network including several types of outages. The Medium Voltage stream consists of three regional Control Rooms whereas the Low Voltage stream has six of the Control Rooms, geared to manage the field crews to safely restore the electricity supply. The Faults stream is the dedicated first line response to all reported faults and emergencies. Our teams work tenaciously at ensuring that customers have a safe and reliable supply of electricity.

HIGHLIGHTS AND LOWLIGHTS OF THE 22/23 YEAR

The socio-economic conditions of the nation have reflected in the growing number of infrastructure theft cases. This has unfortunately left the grid vulnerable and susceptible to load related faults. The torrential rains and flooding experienced in April 2022 have demonstrated the wrath of Mother Nature during times of volatile climate change.

Although the branch finds itself compounded by growing faults, strained circuits due to extensive equipment damage and thinning budgets to support all operational related activities, we acknowledge the tides of change all around us as we persevere to provide a sustainable service to our customers.
For the period under review the following faults were attended to:

TYPE OF FAULT	NUMBER OF INCIDENTS
LV Faults	95,914
MV Faults	3,932
Total	99,846

The organisation, through its sound leadership, has navigated us through the pandemic and we are positioned to tackle our challenges head on.

Challenges faced in the year

The lack of external funding to secure the implementation of the Advanced Distribution Management system has halted the project indefinitely. The lack of direct access to third party internet service providers have increased the time to repair communication related issues.

RISKS AND OPPORTUNITIES

- Decreased budgets have caused technical projects to be rescoped and some halted.
- Lack of overtime budgets have caused decreased output in fault restoration

BRIEF DESCRIPTION OF MODERN TECHNOLOGIES/INNOVATIONS EMPLOYED WITHIN THE BRANCH

- Improved server management on cyber security devices using online monitoring of server health.
- Increased user friendliness of remote monitoring interfaces for the Control Centre

NEW PROJECTS AND PROGRESS ON EXISTING PROJECTS

The completion of the Distribution Automation project remains high on the agenda of the branch notwithstanding the limited budget and strained staff. The intelligent medium voltage devices, remote terminal units (RTU), assists in restoring outages more efficiently through early fault detection, fault finding and load flow analysis. We have re-planned the project and will continue to use advanced data analytics and routine maintenance of these devices to improve the situational awareness in the Control Centres. Maintenance and cyber security methods are of utmost importance in the next year as we focus on our existing infrastructure and ways to make it more robust and resilient.

We will ensure the highest safety standards are met to ensure an acceptable quality of supply and service to our fellow citizens. In the year ahead we will continue to be pro-active in transformation of the electric grid by digitalization and embracing emerging innovative business models.

CONSTRUCTION PLANNING & WORKS BRANCH

The core functions of this branch are to design and construct electrical infrastructure to connect new customers to the grid. Demands on the electrical network increase with the addition of new customers, and the higher consumption from existing customers. The network must be upgraded to ensure adequate reliability and quality of supply.

There has been increasing expectations with regards to service delivery during the year. The branch continuously strives to deliver on the increasing expectations.

HIGHLIGHTS AND LOWLIGHTS OF THE 22/23 YEAR

HIGHLIGHTS:

- Despite numerous challenges work continued and the branch met some of its targets.
- Maintained a full complement of management team during the year in review.

LOWLIGHTS:

- SCM process has caused delays in getting contracts approved and that affected service delivery.

CHALLENGES FACED IN THE YEAR

- Shortage of material caused delays, and some projects were completed late
- SCM delays in awarding of contracts we currently do not have a House Service contract
- Vehicle unavailability caused delays for the execution team
- Reduced Budget impacted on service delivery
- Shortage of tools due to budget cuts

RISKS AND OPPORTUNITIES

- Increasing backlogs in electrification of dwellings
- Reduced capital budgets and cannot undertake and initiate network improvements and network strengthening

MODERN TECHNOLOGIES/INNOVATIONS EMPLOYED WITHIN THE BRANCH

- An increasing number of customers are applying for small scale embedded generation.
- Installation of new generation smart prepaid meters, in keeping with modern technology trends.

NEW PROJECTS AND PROGRESS ON EXISTING PROJECTS

CENTRAL REGION:

Informal Settlements:

- Palmiet informal settlement electrical reticulation done, house service connections in progress

Network replacement:

- City Central substation decommissioning complete.

CENTRAL WESTERN REGION:

Formal Housing:

- Kloof Ext electrical reticulation complete
- Sinoshaka Housing in progress
- Crux Place Housing in progress

New Supply:

- Bulk Supply to Shongweni Mall complete
- 8 Ficus Place complete
- Wiltshire Clover Dairy Project complete
- Hammersdale Mall complete

NORTHERN WESTERN REGION:

Informal Settlements:

- Redcliffe Area 2 informal settlement electrical reticulation completeFormal Housing:
- Sunhills Phase 1A electrical reticulation complete

New Supply:

- Othongathi Mall Development complete
- Cairnspark Close Development complete
- Trade Zone 2 development in progress
- 2 Charnwood Development complete
- Whetstone Business Park Phase 1 complete
- Canelands Reservoir DSS in progress

Network replacement:

- Trenance Park Cable replacement in progress
- Tongaat Roadworks in progress

SOUTHERN REGION:

Informal Settlements:

- Uganda informal settlement electrical reticulation complete
- Malukazi Phase 1 in progress

Formal Housing:

- Nkanku Road housing project electrical reticulation done, house service connections in progress.

New Supply:

- 51 Arbour Road in progress

Network Improvement:

- Sbu Mkhize/ Enkanyisweni network reliability and reinforcement project complete
  Illovo Township reinforcement project complete.

Informal Settlements:

- KwaMtamntengayo informal settlement electrification complete
- KwaNdengezi-KwaLinda informal settlement electrical reticulation complete
- Bottle Brush informal settlement electrical reticulation complete
- Horseshoe informal settlement electrical reticulation complete
- Raffia Road Monkey Land informal settlement electrical reticulation complete

New Supply:

- 170 Wharfside Road in progress
- 89 Barrier Lane in progress
- 100 Richmond Road in progress
- 1 River Plate Road in progress
- 46 St Ives Road in progress
- 316 Chamberlane Road in progress

Network replacement:

KwaNdengezi cable replacement complete

MAINTENANCE PLANNING & WORKS BRANCH

The Maintenance Planning and Works Branch is responsible for inspection, maintenance planning and maintenance implementation on all medium and low voltage apparatus as well as the repair of associated faults on the electrical distribution network within the municipal supply area. The Branch comprises of six regional Maintenance Works Depots and a Maintenance Planning Division based at the Electricity Headquarters. The Branch consists of a Senior Manager, Managers, Specialist Engineer, Engineers, Technicians, Electricians, and the various levels of administration as well as assistant staff. The maintenance of eThekwini Electricity's distribution network is vital in ensuring the integrity and reliability of supply to the City's large customer base. This division prides lofty standards and strives to comply with various national standards and the Power Quality Charter to meet the requirements of customers. With the ever-growing and ever-aging Electricity Unit's distribution network, the Maintenance Planning Division is constantly seeking strategies to better manage and maintain all the assets installed on the distribution network to ensure reliable electricity supply for all customers of eThekwini Electricity.

HIGHLIGHTS AND LOWLIGHTS OF THE 22/23 YEAR

HIGHLIGHTS

- Percentage of tactical maintenance achieved is above 60%.
- Some maintenance depots have managed to reduce the out of commission equipment to the acceptable number.
- Central depot managed to commission Ridgeview Major to Dunbar DSS cable that was stolen few years ago during Harry Gwala Highway expansion.
- The branch has increased the number of multi-competent artisans to 35.

LOWLIGHTS

- The scourge of NDM vehicle hijackings hinders service delivery and cause trauma to staff.
- High rate of cable theft further depletes the limited OPEX budget.
- The branch had a NOSA star rating of 3 at the end of the fiscal year 2022/23.
- The shortage of material in stores contributed to the delay in restoring supply to customers.
- The shortage of vehicles (trucks) lead to the Artisans doubling up on existing vehicles thereby reduce productivity.
- The limited number of posts for technical staff such as Electricians lead to the number of contrac tor teams, by far, exceeds the number of electricians that are permanently employed by eThekwini Electricity.
- The lack of Controls in the Enterprise asset Management system (JDE) lead to some staff members requisitioning material without the proper authorisation.
- The reliance on Architectural Services lead to some capital projects not being completed as Architectural services could not carry them through.
- Poor productivity of staff during normal working hours resulting in work extending beyond normal working hours
- Protest action following outages, resulting in staff having to respond on extended overtime hours

CHALLENGES FACED IN THE YEAR

- The reduction of both capital and operating expenditure impacted on the ability to carry out actions associated with service delivery e.g. filling of some of the posts and less substation building maintenance.
- The closing down of the standby facility where the standby staff stays resulted in the standby staff having to be fetched from home and be delivered to their place of stay after doing standby work. This led to many delays in commencing with urgent work and in turn increased the supply restoration times. It also increased the overtime hours during standby work.
- The unavailability of material in stores created frustration within the staff when they were called to restore supply to customers after electrical faults had occurred.
- Implementation of budget checking created over budget on stores requisition that led to depots not being able get material on time to conduct repairs.
- The continuous uncontrolled excavations by fibre optic companies continue to increase the number of cable damages that lead to constant outages.
- The scourge of vandalism in electrical networks that resulted in electrical supply interruptions. In some cases, the vagrants destroyed distribution substation (DSS) doors and made the DSS's their place of stay. This became a safety issue as they could break clearance to live electrical equipment and be electrocuted.
- The amount of infrastructure theft that impacted on electrical supply interruptions and high cost to replace the stolen part of the electrical networks.
- The lack and delay of funding of the substation security system contract is a huge setback.

RISKS AND OPPORTUNITIES

- The theft posed a high risk to the reliability of the electrical networks.
- The copper theft is a world-wide phenomenon that render the continuity and quality of supply very uncertain.
- The increased number of customers versus the unchanging number of employees that serve those customers limits their ability to respond to customer needs promptly.
- The reliability on external contractors creates a scenario where the organisation does not act swiftly to increase its human capital.
- The ageing network reduces the reliability of the network and make it susceptible to frequent failures.
- The amount of network non-tactical maintenance by far outweighs the work done on tactical maintenance.

MODERN TECHNOLOGIES/INNOVATIONS EMPLOYED WITHIN THE BRANCH

- The branch has employed partial discharge testing of equipment for predictive maintenance.

NEW PROJECTS AND PROGRESS ON EXISTING PROJECTS

- The substation equipment replacement project was undertaken on ongoing process and R134 million was spent.

LIGHTING WORKS BRANCH

The Lighting Works Branch is responsible for the construction and maintenance of streetlights for eThekwini Municipality's entire area of supply. Beyond responding to complaints from the public, the Lighting Works Branch is responsible for the maintenance repairs of inspections conducted by the branch's Lighting Planning inspectors.

HIGHLIGHTS AND LOWLIGHTS OF THE 22/23 YEAR

- Installation of high mast lights at intersections, highways, and stadiums
- Being able to manage streetlight maintenance of the city with extremely limited resources
- The escalating streetlights infrastructure theft across the city
- Purchase of LED fittings with an extended 10-year warranties

CHALLENGES FACED IN THE YEAR

- Unavailability of bucket trucks (vehicles) to conduct streetlights maintenance
- Ongoing theft of streetlight infrastructure
- Damage to streetlight poles because of vehicle accidents

RISKS AND OPPORTUNITIES

- Theft and damage to lighting infrastructure

MODERN TECHNOLOGIES/INNOVATIONS EMPLOYED WITHIN THE BRANCH

- All current replacements are will energy-saving LED luminaires

NEW PROJECTS AND PROGRESS ON EXISTING PROJECTS

- Replacement of incandescent fittings with LED fitting using grant funding

LIGHTING PLANNING BRANCH

The planning, design, inspection, and maintenance planning of the public lighting infrastructure for the eThekwini Municipality is undertaken by the Lighting Planning Branch. This includes the planning and design of new lighting installations, upgrading of existing lighting infrastructure, maintenance and maintenance planning of existing installations, research and investigation into new lighting technologies and bulk lamp replacements.

The lighting planning branch has 3 divisions, which are:

- Lighting Planning & Design
- Lighting Research & Investigation
- Lighting Maintenance Planning

Repairs and maintenance accounts for 80 percent of the operating budget and this is further broken down into planned lighting maintenance, bulk lamp replacement and pole painting. Currently, the municipality is responsible for keeping lights on in approximately 213 000 streetlight installations, 250 parks, 12 beaches, 17 subway lanes, 31 swimming pools and 93 stadia and sports fields.

The Branch has filled all vacancies within its structure and continues to work on building their skills and experience. The long-term goal of the branch is to implement modern, energy efficient and effective public lighting systems that are vandal proof as well as systems that could be easily monitored and controlled.
Lighting Planning & Design Division is primarily responsible for the planning and design of capital projects.
The Lighting Research and Investigation Division is responsible for all activities related to the Electricity Procurement Forum as well as the Bid Specification, Bid Evaluation and Bid Adjudication Committees. Contracts up to the value R200 000 000 were handled by this division, this past financial year.
The Maintenance Planning Division is responsible for the inspection and identification of hazards on the public lighting system. Major challenges are illegal connections and infrastructure theft. A summary of the division's activities are as follows:

- Continued inspections of street light poles, arms, fittings, and infrastructure to identify hazardous conditions.
- Preventative maintenance due to identified hazards, repairing, and redesigning in advance
- Poles testing for all poles along highways, freeways, and major routes.
- Identifying losses caused by cable theft.
- High mast inspections along the beaches, townships, and roads
- Inspections of sport fields, park, and footpaths.

HIGHLIGHTS AND LOWLIGHTS OF THE 22/23 YEAR.

HIGHLIGHTS:

- Continued and met lighting planning and lighting inspection targets for the year despite the numerous challenges.
- Maintained a full complement of staff during the year in review.
- Successful LED rollout plan which is now adopted as a standard by the Unit to phase out the traditional HID (High Intensity Discharge) lamp technology

LOWLIGHTS:

- Inability to explore the full benefit of solar technology for street light applications yet due to non-approval of pilot sites in compliance with SCM guidelines, although research continues in this regard.
- Inability to utilise full capital budget allocations due to resource restrictions.
- Long turn around periods at various stages in the SCM process which has caused delays in getting contracts approved and hence a negative impact on service delivery.

CHALLENGES FACED IN THE YEAR

- The continued reduction of the operating and capital budgets has severely impacted on the ability to carry out planned and unplanned worked effectively and efficiently.
- Theft and vandalism of infrastructure remains the unit's major challenge as this hugely negates the positive impact of effective lighting in the city.
- Migration problems with the various IT systems, i.e., Groupwise to MS Outlook, Ellipse to JDE, etc.
- Implementation of new contract monitoring systems have resulted in further SCM delays

RISKS AND OPPORTUNITIES

- Implementation of online meetings limits the "waiting period" for committee meetings, thus enables efficient use of resources. However, online meetings do come with a fair number of disadvantages as well.
- Opportunity to streamline structures and processes and re-evaluate organogram and resource requirements.

BRIEF DESCRIPTION OF MODERN TECHNOLOGIES/INNOVATIONS EMPLOYED WITHIN THE BRANCH

- The most significant change was the implementation of the LED technology strategy across the whole spectrum of the luminaire range. By implementing this strategy, we plan to reduce our carbon footprint.
- Also considering introducing over-voltage protection in LED luminaires which will reduce the possibility of outages and save costs with the reduction in new LED luminaire purchases and faults. Key factor for consideration will be the capital cost for the over-voltage protection device versus the maintenance cost benefit.
- Another factor for consideration is an integral daylight switch which is more reliable than previous versions. The new proposal is that the daylight switch must have the same lifespan of the luminaire.

NEW PROJECTS AND PROGRESS ON EXISTING PROJECTS

- Energy Office in collaboration with Lighting Planning are in the process of measuring actual streetlight consumption and energy-saving on the 250W hps vs 100W Beka Schreder Ledlume XP2 LED.
- Many of the projects undertaken by the branch involves liaison and interaction with other units within the municipality and external entities such as Roads Provision, Architectural Department, Parks, Leisure & Cemeteries, Roads and Stormwater, Catalytic Projects, Tongaat Hallett and a host of developers and external electrical consultants. The branch plans and designs conventional and special lighting projects for these entities and considers any specific requirements for each of them.
- Plans are also underway to replace many of the ageing high mast structures such as 15m, 18m, 30m, 40m and 45m in various areas such as Lamontville, Blue Lagoon, Durban CBD, Mustering Fields, Kings Park Diving Pool, and Phoenix Industrial Park.

OTHER PROJECTS INCLUDE:

- Continual redesign of street lighting by removing 9m gum poles and replacing with 9m steel poles and concreting of underground cables where large scale theft and vandalism have occurred viz. Higginson H/way, MR577
- M13/Essex Terrace, Sherwood
- Dennis Shepstone Road, Ridgeview
- Ablution floodlighting for informal settlements
- Providing electrical connections for Wi-Fi hotspots at Durban CBD & Central Beachfront
- LED lighting on new IRPTN Bus Routes: MR 577 (Newlands East Drive to Marble Ray Drive), N2 to Inanda Road Sea Cow Lake, Teakfield Road to North Coast Road.
- Continued expansion of the LED street lighting rollout across all wattages to replace HID lamps.

- Redesign of roadways from 9m gum poles to the standard 9m and 12m steel pole to incorporate reinforcing due to ongoing hacking-down of streetlight poles in remote areas.• Redesign of the reinforced steel pole to incorporate additional security measures
- Redesign of the high mast pole to incorporate anti-vandal proof measures
- Griffiths Nxenge H/way, Umlazi – Replacement of 12m standard steel poles with reinforced steel poles and cable joints at pole positions
- Florida Road, Morningside – refurbishment of 80W LED catenary luminaires.

TECHNICAL SUPPORT DEPARTMENT

DEPARTMENT OVERVIEW

The Technical Support Department provides a diverse range of specialist services to the Electricity Unit. The department comprises of eight branches, namely, Communication Networks Branch, Electrical Workshops Branch, Infrastructure Asset Management Branch, Mechanical Workshops Branch, Network Drawing Office and Survey Branch, Protection and Test Branch, SHERQ & Training Branch and Technology Services Branch. Collectively, these branches ensure that all resources are effectively and efficiently utilised so that value is added to the internal and external customers of the Electricity Unit.

COMMUNICATION NETWORKS BRANCH

The Communication Networks Branch's mission is 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.

HIGHLIGHTS

- The branch continued work on the "Core Network Project." The scope of work for the 2022-2023 financial year included completion of a project initiation document, a comprehensive risk register and product descriptions.
- The branch continued work on the "Services Policy Project." The scope of work for the 2022-2023 financial year included the development of a Service Level Agreement (SLA) template, an SLA for high voltage SCADA services, and an SLA for high voltage tele-protection services. Two KPIs have been established to indicate the value add that Communication Networks provides to the Electricity Unit.
- KPI 1 – Total services - To date 422 communication services have been logged.
- KPI 2 – Net services added per annum – 58 communication services have been added in 2022/23.

LOW LIGHTS

- No contracted services budget was assigned to Communication Networks by the Expenditure Unit. This prevented fibre optic and pilot cable repair work from being undertaken which increased the backlog of out of service infrastructure.
  Significant effort was put into replacing 12/19 vehicles assigned to Communication Networks. Unfortunately, three vehicles were seconded from the branch to another branch.
- The Human Capital Unit were unable to provide timeous support to the recruitment process due to the introduction of the Municipal Staff regulations.
- There was no Electricity Unit strategy in place or in use.

CHALLENGES

- Support from SCM was lacking in aiding the organisation to adapt to the new environment.
- Support from Administration in operating and maintaining facilities is still lacking.
- Access to ICT resources were lacking to support staff from efficiently functioning off site.

ELECTRICAL WORKSHOP BRANCH

This Branch was established to ensure that all equipment received from the manufacturers are tested prior to installation into the electricity network. The branch is also responsible for repairing equipment which has failed. In addition, the branch is also responsible for supplying other Departments with insulating oil which is utilised for transformers and switchgear. Over the years this branch has evolved to undertake specialised intrusive maintenance on MV switchgear and transformers.

ACTIVITIES

- Testing of new received equipment to make sure they meet specifications determined by Technology Services Branch prior to installation on site.
- Repairing damaged and leaking equipment, including transformers, auto-reclosers, switchgear and mini-substations both at the workshop and on site.
- Disposal of cables which are returned from site due to failure. These cables are cut into one metre lengths to prevent being utilised illegally back into the electricity Network. Goods for Disposal form is used to receive the cables from the Contractors for confirmation of job completion and payment.
- Disposal of switchgear and related equipment including transformers due to failure and irreparable conditions.
- Supply of regenerated oil to the MV/LV Operations and HV Operations Departments, which is utilised in electrical apparatus.

HIGHLIGHTS

- Oil Plant was maintained, thereby producing high quality oil for the business.
- Mobile crane was repaired and is operational.

LOWLIGHTS

- Accumulation of huge amount of equipment in the workshop due to no disposal contract in place.
- Theft of equipment and spares has increased in the Electrical Workshops.

CHALLENGES

- The workshop buildings are old and require rehabilitation, with lack of funds posing a serious challenge.
- Slow SCM process for repair and purchase of equipment in the Branch.
- No contracts in place for disposal of equipment creating huge backlogs in the workshop.

NEW PROJECTS AND PROGRESS ON EXISTING PROJECTS

- Establishment of Switchgear Specialised Maintenance Division. Recruitment and training of staff in progress. Procedures based on OEM requirements to be compiled.
- Feasibility study on fire protection around oil storage tanks using a non-flammable gas.

INFRASTRUCTURE ASSET MANAGEMENT BRANCH

The purpose of the Infrastructure Asset Management Branch is to manage the planning and implementation of the branch within the Electricity Unit through provision of leadership in respect of defining and aligning the management, financial and functional key performance areas that support the Unit's objectives as well as the City's strategic objectives.

HIGHLIGHTS

- The Branch managed to source funding for vacant critical Works Coordinator posts and the recruitment process is at advanced stages. The imminent appointment of Works Coordinators will assist the branch to enhance the level of support it provides to several maintenance branches within the Electricity Unit. This enhanced level of support is expected to accelerate Unit's maturity in work planning and control activities, which will have a direct impact of network performance.
- The branch continued with the implementation of Lumada Asset Performance Management (APM) system and in 2022/23 testing was completed and system migrated from demo environment to production environment. This tool transforms real-time and historical asset data into strategic insights of the condition, performance, and risk of assets. This will be a key tool that will be utilised to prevent asset failures while optimising asset lifecycle costs and assisting in renewal or replacement decisions. The scope of first phase of implementation included power transformers and high voltage circuit breakers. There are currently 220 assets (power transformer and high voltage circuit breakers) that are currently monitored.

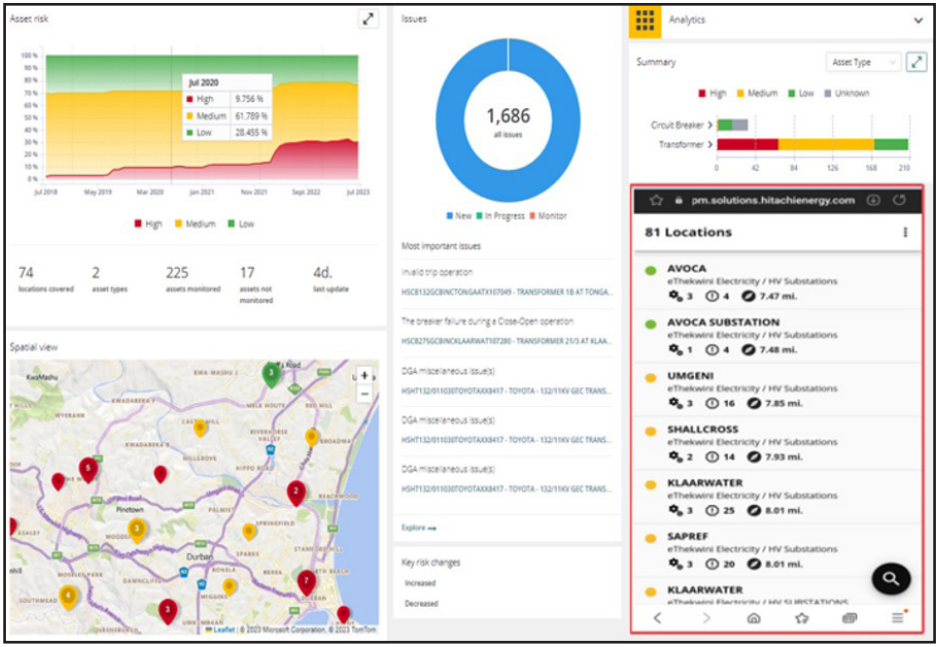


Figure - Illustration of Lumada APM main dashboard [Contact Brain Sibiya on 082 557 2204 for better quality screenshots]

LOWLIGHTS

The resignation and promotion of two of the branches key resources, namely the Technical Officer and the Works Coordinator, resulted in a significant decline in the level of support the branch provides to the HV department. The branch acted swiftly and commenced with the recruitment process to fill these posts and the process for both these posts is now at advanced stages.
The delay in resolving integration between two key asset management information system continue to cause a disconnect between technical and financial management of infrastructure assets, therefore hindering analysis required for asset management decision making.

KEY ACTIVITIES OR PROJECTS

Some of the initiatives that the branch will embark on during the 2023-24 financial year include, but not limited to:

- Review and finalise the asset management related strategic documentation. These are the Strategic Asset Management Plan (SAMP), Asset Management Plan (AMP) and 10-year budget plan. The Unit's AMP is an input into the City's Integrated Asset Management Plan (IAMP), which forms part of the Service Delivery and Budget Implantation Plan (SDBIP). Preparation of these documentation is in line with the Council and National adopted Standard for Infrastructure Delivery (CIDMS) and the need to ensure better alignment between budgeting and strategy.
- Review, finalisation and sign-off of the key business processes.
- Stabilisation of the Lumada asset performance management (APM) and full integration with Ellipse and other relevant systems.
- Provide support on the implementation of field service manager (FSM) module across the Electricity Unit; and
- Drive the asset realignment project that aims at aligning the Unit's asset register with the requirements of both GRAP 17 and Cities Infrastructure Delivery Management System (CIDMS). Part of the project scope will also to achieve alignment between the technical and financial asset registers.

These are part of activities meant to accelerate the unit's asset management maturity which is vital in ensuring that infrastructure assets are making the best possible contribution to high quality services to customers.

MECHANICAL WORKSHOP BRANCH

The Mechanical Workshop Branch provides a specialist mechanical support service to the Electricity Unit. These are the Works Programming Division, Fitting, Machining & Rigging Division and Welding Workshop Division. The Branch is involved in a wide range of repetitive fabrication, production, and maintenance. There are also diverse mechanical tasks that change daily as per customer's requirements, but in line with the branch being a mechanical support function to the electricity distribution network.

Routine activities include costing, planning, design, research and purchasing of materials and equipment for works orders received, manufacturing of galvanised equipment, repairs to fibreglass ladders, maintenance and fabrication of electrical equipment, installation of support structures, rigging services and safety inspections. The branch also is also responsible for the manufacturing and repair of electrical infrastructural equipment and component fabrication.

HIGHLIGHTS

- The compressor and load testing machine tender specifications were drafted and will be submitted to the BSC for approval in the next financial year.
- The branch has installed a 2 500 mm × 1 500 mm noticeboard to display current and upcoming MMD projects, as well as progress and challenges for each project. This improves communication in the branch and will be used as a tool to track progress on a weekly basis, as well as to increase productivity.
- The branch completed and delivered all urgent projects to main stores on time and on budget.
- Recruitment of three Fitting, Machining and Rigging Assistants (awaiting City Manager's approval).

LOWLIGHTS

- The branch has lost three employees due to illness.
- Two employees have resigned.

CHALLENGES

- The branch did not receive a sufficient budget for machinery maintenance.
- The branch could not efficiently procure mils steel materials for fabrication due to delays in the award of contract E.9644.
- The branch is experiencing excessive delays at City Fleet, which results in a shortage of vehicles to respond to customer's requests on time.

FUTURE PLANS

- Procurement and installation of a testing facility for all fabricated brackets to continuously ensure reliability of manufactured galvanised equipment.
- Upgrade the compressed air system to ensure adequate pressure at the farthest outlet.
- Continue with the time-and-motion studies for key activities.
- Acquire new rigging equipment to perform specialised functions within the Unit.
- Procure new copper casting machine to perform specialised fabrication activities.
- Conduct a detailed design review on all MMD brackets and implement changes where necessary.
- Develop and implement a safe operating procedure for streetlight pole covers.

NETWORK DRAWING OFFICE & SURVEY BRANCH

This is a support Branch to the Electricity Unit which comprises of six Divisions, namely Administration, Geographic Information Systems (GIS), Network Records, Special Projects, Survey Services and Utility Plans. The focus of the branch is to maintain an accurate geo-spatial representation of all underground and overhead electrical assets in a connected network, provide an efficient GIS, support other enterprise systems and first line GIS user support to all GIS users and provide a survey service.

The Administration Division provides an administrative service to the five internal Divisions. A printing and scanning service to the Electricity Unit as well as external service providers that are contracted to the Unit. The Division also scans all as-built documents to an image repository

THE GIS DIVISION maintains and supports the GIS desktop and web applications, database, back-end technologies, hosting hardware and software licensing. The division is also responsible for researching, developing, and implementing new GIS solutions, tools and processes related to the use of the GIS and the electrically connected network by the Unit to efficiently plan, maintain, and manage the electrical reticulation infrastructure.

THE NETWORK RECORDS DIVISION is responsible for updating and maintaining an accurate geo-spatial representation of the underground and overhead electrical network in the GIS to provide information for operations and technical systems. The division also provides Draughtspersons at the Unit's Construction and Maintenance Depots to assist the technical staff with reticulation information in the GIS.

THE SPECIAL PROJECTS DIVISION uses CAD technology to update and maintain the Low Voltage Circuit Diagram database and make these diagrams available on the Unit's scanned document repository. This division produces design and documentation for the Unit and updates drawings in the codes of practice for the Technology Services Branch.

THE SURVEY DIVISION provides survey services to internal and external customers by; confirming survey information and servitude boundaries to avoid encroachments, surveying overhead lines, underground cables, and equipment location for the Unit, locating cable and pole encroachments for insurance claims as well as tracing cables for accurate cable location. The division also surveys and creates layout plans for the electrification of informal settlement projects.

THE UTILITY PLANS DIVISION attends to all wayleaves, provides electrical network information to internal and external customers and responds to all written correspondence received by the branch.

HIGHLIGHTS

- Four staff are currently studying towards a Bachelor of Commerce Degree in IT Management.
- Two staff are currently studying Bachelor of Arts degree in Environmental Management.
- One staff member is studying towards a Degree in Public Administration.
- Considerable progress was made in developing Standard Operating Procedures (SOPs) in the Branch.

LOWLIGHTS

- The Branch achieved a three-star NOSA rating.
- The Branch only achieved 20% of the training that was planned on the Workplace Skills Plan.
- Two staff members resigned.

CHALLENGES

- Inability to fill vacant Draughting posts that required changes to Job Descriptions has created a backlog with the capture of the as-builts of the network reticulation.

- Inability to upgrade existing and to acquire additional computer desktop hardware has strained the resources in the Branch.
- The unavailability and poor service by the City Fleet Unit, has made it difficult to provide an efficient support service to the Electricity Unit.
- Delays and unavailability of information (as-built drawings and master data change documents), to up date the electrical network reticulation database.
- Poor maintenance of buildings and offices, particularly the lifts at the HQ building, have created enormous challenges for staff with disabilities to access the building.
- The Unit's scan database has been updated by the ICT Branch, but there is a significant backlog of Distri bution Applications and as-built sketches which need to be scanned and uploaded.
- The data migration for the electric and communications models has created the need to implement data improvement plans to enhance the quality of the data in both models. The backlog capture of data into the Communications data model is still a work in progress.

NEW TECHNOLOGIES BEING DEPLOYED WITHIN THE BRANCH

- A new application to assist the Business Risk Branch to spatially capture and analyse theft incidents and patterns, was developed.
- A new application to spatially identify maintenance routes for the inspection of medium voltage equipment was developed. The data in this application will need to be reviewed before it is published on the Staff GIS Viewer.
- The Survey Division has completed the writing a specification for the procurement for a Scanning Total Station for the Division. There was no funding in the current financial year to procure this equipment.

NEW PROJECTS

- The Survey Division has contributed to the development of a new electronic application module for all new survey requests. The implementation has temporarily been put on hold due to the upgrade of Ellipse, being prioritised.
- Consultation with the Asset Management Branch has commenced to implement work planning and control in the Survey Division.

PROGRESS ON EXISTING PROJECTS

Four informal settlements were surveyed, to assist the MV/LV Network Panning Branch to create new designs for these informal settlements

A report was written to provide customised training on the new electric and telecommunications data models. The report was approved, and this training is available to the Unit for the next 24 months.
The implementation of the Designer Module for MV/LV Planning Branch is a work in progress for the Electric Model. Some gaps to the existing CAD technology have been identified and will be addressed going forward. The Branch is exploring the creation of a proposed layer to expose planned designs to the Unit.

PROTECTION & TEST BRANCH

The Protection and Test Branch compromises of five technical divisions, namely, DC Systems, Protection Engineering, Protection Maintenance, Protection Test and Protection Construction. These divisions are collectively responsible for the forward planning, analysing, designing, updating, setting, configuring, testing, commissioning, auditing, maintaining, and repairing of all protection and DC systems in the Electricity Unit's network. The optimal operation of the protection and DC systems is vital as it is these systems that will ensure the rapid and selective isolation of the electrical supply under fault conditions thereby reducing risk to the plant, people, and the environment. The Branch is also responsible for the investigation of protection and DC system related mal operations. In addition, the branch provides other crucial services like cable fault location as well as various equipment testing, commissioning, and repair services to the Electricity Unit.

HIGHLIGHTS

- Despite the lack of high voltage substations DC systems contract, hundred percent of HV substations DC systems were maintained within the cycle.
- Hundred percent of distributor substation DC systems were maintained within the cycle. The DC systems were replaced in 25 distributor substations.
- The protection maloperation were conducted and reported within seven days.
- The protection clearances were issued within seven days of receiving a request where there was no outstanding information.
- The target of maintaining seven high voltage substations 11 kV board and bring them within the cycle was exceeded. Eight high voltage substation 11 kV boards were maintained and brought within the cycle.
- A total of nine standard operating procedures were developed and/or reviewed, against the target of three.
- Planned maintenance of 11 kV boards in 261 distributor substations, with a total of 1 458 bays, was completed within the cycle.
- All protection philosophies that were requested by HV Planning for new and refurbishment projects, were issued to HV Planning.
- The Protection Test Division undertook and completed 4 042 cable fault locations and performed dielectric withstand voltage testing on 197 pieces of equipment to confirm the integrity of the equipment insulation.

LOWLIGHTS

- The failure to acquire sufficient protection relay spares due to the late award of procurement contract and due to the original equipment manufacturer being unable to supply the ordered spares in time. The war between Russia and Ukraine has affected many manufacturers' capability to supply their customers in t ime. The lead times have increased tremendously.
- There was common failure of F and G cards from GE relays. The spare cards had to be sourced from other relays that were meant for other projects due to the absence of the contract to procure spare cards.
- The delay in the recruitment process led to the failure to fill the two crucial Protection Engineer posts. The non-appointment had to be declared to align the recruitment process with the new Municipal Staff Reg ulations. Filling of vacancies for the new Protection Construction Division was on hold due to unavailability

of funds.

- The high number of call outs for Test Officers to undertake cable fault locations impacted negatively on limited overtime budgets.
- Whilst we were in the process of reinstating protection schemes at Edwin Swales Substation that was flooded in April 2021, the substation was vandalised. The secondary plant wiring and the DC systems were affected.
- The non-award of the contract for HV substation battery chargers and battery banks hindered the process of replacing these items which have exceeded their useful lives.
- There were two Section 24 reportable incidents that emanated from employee injuries on duty which affected the Branch's DIFR and NOSA rating.
- The failure to replace the Test Officer vehicles that are in a poor condition reduced the ability to respond efficiently to cable fault location incidents.
- The absence of the circuit breaker failure scheme at Klaarwater Substation's 132 kV outgoing circuit led to the stripping off, of the 132 kV busbar when Shallcross Substation 132kV circuit breaker failed to clear the fault on the Shallcross Substation 132 kV outgoing feeder at Klaarwater Substation. The protection operated but the circuit breaker did not trip due to insufficient gas in its interrupting chamber and no lockout alarms were received at HV Network Control.

CHALLENGES

- The SCM process remain the biggest challenge. The contracts were delayed due to inconsistent demand from the Bid Committees. Hence, some contracts were awarded late towards the end of the financial year and others were not awarded at all in the last financial year. This hampered the implementation of remedial work such as replacement of obsolete relays, repairing of failed modules in relays, replacement of old battery chargers and battery banks in HV substations, etc.
- The ageing vehicle fleet that is used by the Test Officers. The vehicles were used whilst they were not in good condition which was a danger to the drivers and other road users. In the process of keeping with up the number of cable fault locations and equipment testing, the vehicles had to be swapped with Communication Networks Branch vehicles which in turn affected the Communication Networks Branch. The risk was transferred from Protection and Test Branch to Communication Networks Branch.
- The reduction of both the Capex and Opex budgets are a challenge in the ability of the Branch to under take activities that optimise service delivery. There are posts that have no funding, so they cannot be filled.
- The theft and vandalisation of substations remain a challenge in maintaining the continuous operation of electrical protection equipment and circuits.
- The commissioning of new distributor substation without cable/line differential protection is still a challenge. The primary plant protection gets to be protected by the back-up protection. In some of the existing distributor substations, the unit protection is still decommissioned owing to the absence of communication networks between the substations.
- The turnaround time in the repair of faulty/broken down vehicles is too high. Hence, vehicles are not always available for the operations.
- The condition of the vehicles use by the staff in the DC Systems Division is not satisfactory. Their r

eplacement is dependent on the already cut capital expenditure budget.

- The number of HV substations that have non-tripping 132 kV circuit breakers has led to the modification of protection schemes e.g., at Umgeni Substation, where three 132 kV circuit breakers are unhealthy. As a result, the protection was modified such that any fault in any of the three outgoing 132 kV feeders will cause the bus-section circuit breaker and incomer circuit breaker to isolate all the three outgoing feeders. This will interrupt supply to a much larger area.

- The number of faults in the MV cable networks that provide auxiliary supply to HV substations equipment including the battery chargers, led to the DC voltage in substations dropping below minimum DC voltage levels required by substation equipment. There are cases where the HV Network Control Branch was forced to switch off the entire substation to protect the substation plant and equipment from being destroyed by long-lasting, high-magnitude fault currents where protection could not work due to the absence of DC voltage.

NEW TECHNOLOGIES

There were no new technologies which were introduced in the last financial year.

NEW PROJECTS AND PROGRESS ON EXISTING PROJECTS

The project to reinstate the protection schemes at Edwin Swales Switching Station was put on hold because of the security issues at the substation. The HV Substations Branch still must improve the security at the substation and repair the parts of the substation that were damaged during the burglary at the substation. The project will continue when the above security issues have been addressed.

The project to replace the control room and protection scheme at Edwin Swales Substation is in progress. The HV Planning Branch was tasked to initiate a project to establish a new control room with new 132 kV protection panels at Edwin Swales Switching Station. The new control room would be established on the higher level to avoid the reoccurrence of the effects of floods in future.

The replacement of the 11 kV board at Toyota Substation is the new project that is handled by HV Projects Branch in consultation with Protection and Test Branch.

The commissioning of the protection schemes at Prospecton Substation is in progress. It is handled by the HV Projects Branch using external consultant.

SHERQ & TRAINING BRANCH

The Sherq and Training Branch is responsible for the planning, implementation, and monitoring of systems to ensure compliance with various legislation throughout the Electricity Unit. This includes conducting risk assessments, undertaking safety and environmental inspections and audits, providing technical and safety related training as well as competency accreditation to all persons engaged in construction and maintenance works, conducting investigations into machinery-related incidents, and introducing effective measures to prevent recurrences. The branch is also responsible for various technical skills development

programs and special projects that are related to development of Artisans, Technicians and Engineers such as Apprenticeship, Learner/Candidate Technician and Candidate Engineer training programs.
The Technical Training Division of the branch is fully accredited by Quality Council for Trades and Occupations (QCTO) under the Department of Higher Education and Training as a Skills Development Provider for aspiring electricians as well as an official Electrical Trade Test Centre.

As part of the skills outreach program, the branch is highly involved in various career symposiums promoting Electrical Engineering to school learners and tertiary students as a career choice. The branch offers bursary schemes to qualifying students with good academic results who are pursuing Electrical/Electronic/Computer Engineering studies at the university level.

CHALLENGES AND SOLUTIONS

- High rate of IOD incidents from various departments due to staff negligence and poor workmanship. Solution: Vigorous health and safety compliance inspections and random safety audits were carried out by safety personnel to ensure compliance with legislation. Also, toolbox talks, and training of staff were undertaken to mitigate against the risk of high number of incidents.

- Budget constraints in the Municipality had negative impact on budget that is required to expand training capacity of the Technical Training Centre and embark on new projects to meet service delivery objectives of the Unit.

Solution: Additional funds were requested and awaiting approval.

HIGHLIGHTS AND LOWLIGHTS

- Successful filling of critical posts which had a positive impact on service delivery.
- Successful completion of Candidate Technician and Apprenticeship training programmes which are critical for service delivery and creation of employment opportunities in the country.
- Budget constraints impacted negatively on critical maintenance of the Training Centre facilities.
- High rate of disabling injuries from various branches within the Electricity Unit resulting to low productivity of staff.

FUTURE PLANS

- Establishing the PV Green Card Training and Testing Centre which will be responsible for training and assessments of PV Installers that are accredited by the South African Photovoltaic Industry Association (SAPVIA).
- Expansion of the technical training facilities and organogram of the Branch to cater for future programs and training needs.
- Implementation of the online booking system of training facilities.

TECHNOLOGY SERVICES BRANCH

This Branch consists of three different divisions, namely, the Engineering Division, Quality and Investigation Division as well as the library. These divisions collectively ensure that the electrical products procured are fit for purpose by compiling the correct technical specifications, ensuring quality control at stores, and investigating equipment failures.

One of the functions of the branch is conducting research into cost effective ways of distributing electricity. This function can be divided into two namely, the cost of goods purchased, and the costs associated with the installation, operation, maintenance and disposal of the said goods. Over and above the issues relating to construction and maintenance, safety of staff and public is high on the agenda both during the selection of a particular type of good and during its application. The branch's primary goals include the adjudication of all tenders for technical equipment, material and services supplied to the Unit as well as the creation and maintenance of all technical codes of practice and instructions used by Electricity Unit's staff and contractors.

The branch continued with its active participation in NRS Workgroups and SANS Workgroups in conjunction with other municipalities, Eskom, mines, and major suppliers. This participation intended to promote uniform requirements for equipment and design methods used in distribution systems.

HIGHLIGHTS

- The Branch managed to advertise and award majority of the contracts despite the numerous non-technical issues faced within the SCM tender process as well as the changes in legalisation that took place. These changes in legalisation led to delays in the tender process because of the rework and new templates that needed to be created and employed to comply with the said changes in legislation.
- The Branch managed to successfully migrate to the new BEC report format required by the Bid Evaluation Committee (BEC) despite the many initial challenges. Numerous reports in this format have already been tabled and supported by the BEC.
- The Branch also managed to finalise the technical specification for a specialised theft deterrent cable for house service connections. The tender to procure the item has already been advertised. This specialised cable will be piloted during the next financial year, in areas within the Unit's area of supply where there is a known high risk of theft.

LOWLIGHTS

- The process of awarding tenders continues to be painstakingly long. The Branch is currently commencing the contract renewal process at least 14 months prior to expiry of the existing contract. In some instances, this length of time is proving to still be insufficient.
- The Branch was unable to advertise and fill vacancies due to financial constraint placed on the Unit.

CHALLENGES

- Due to financial constraints placed on the Unit, the Branch had to delay the introduction of some initiatives, e.g. the new method of labelling MV cable joints and terminations could not be implemented because funding for the relevant training equipment was not available.
- Deferrals at bid committees, due to non-technical reasons that were beyond the scope of the Branch, remained a major challenge. These delays will and have resulted in some contracts not being awarded timeously.
- Navigating around the tender process remains a major challenge. Apart from the delays experienced in various stages in the process, the failure of many recommended bidders to extend their bid price validity because of the time lapse from the date of tender closing, led to even further delays in finalising the award of contracts. These delays will and have resulted in some contracts not being awarded timeously or being declared as a non-award.
- The resulting non-awards of tenders detailed above affected the supply of certain stock items. This included products and materials that were produced locally as well as those that were imported. The Branch therefore had to undertake additional evaluations to find alternate products and materials to replace the said items to ensure adequate stock items were available to maintain the electrical supply to consumers.

RISKS AND OPPORTUNITIES

- The Branch noted a trend of suppliers failing to meet the demands of Unit from either a quality or availability perspective. To overcome this, where feasible, contracts were awarded to more than one supplier or manufacturer to mitigate this risk.

- The Branch noted a trend in MV cable joint and termination failures. A project was initiated to investigate the potential reasons contributing to the said failures. This involved investigating current work practices via site assessments, root cause failure analysis (RCFA) via the dissection of failed specimens, as well as product design assessments using finite element analysis software. Post investigation, the Branch initiated multiple interventions to mitigate against the potential causes of the failures.

The inventions included the compilation of a code of practice to improve current work practices, updating and amending training modules to allow competent installers to better understand the critical installation aspects of MV accessories, the compilation of a formal process for the extraction, preservation and dissection of failed specimens to improve the RCFA process, the introduction of specialised MV cable accessory labels to improve accountability aspect and the compilation of a technical instruction to limit the installation of MV accessories to underground mains Competent Trade-Tested Electricians.

- The Branch noted that there were some compatibility issues with the individual components available to undertake cast resin LV cable joints. These issues arose because of the joint components being ordered s eparately. The Branch has since compiled a new technical specification for comprehensive joint kit solutions to eliminate the component compatibility issues. The technical specification was also aligned to

the requirements of national standards to ensure that quality and type tested products are procured. The contract for these kits has already been awarded and the new LV cast resin cable joint kits are currently in use.

NEW PROJECTS UNDERTAKEN AND PROGRESS ON THE PROJECTS

- Due to the backlog on the implementation of 'smart' ring main units (RMUs), the option of having ' smart ready' RMUs that can later have remote terminal units (RTUs) installed was explored and has been implemented in the latest contract. This has resulted in initial cost saving while ensuring that the latest RTU technology can be deployed on the RMU when required.
- The increase in electricity theft from miniature substations (MSSs) has resulted in numerous MSSs failing prematurely. Several LV side solutions have been researched and implemented with little to no success because the perpetrators soon learn how to overcome the theft deterrent solution. The Branch has worked with the relevant OEMs to look at other viable solutions that can be employed on the MV side. A technical specification for the MV side solution has been developed and included in the latest MSS tender that will be advertised soon.

- Significant research into alternative (theft deterrent) conductor materials for use in house service cables has been conducted and a technical specification for a specialised cable consisting of copper clad aluminium alloy conductors has been compiled in accordance with national and international standards. A tender has been advertised for the procurement of the specialised cable. Once the contract is awarded, the cable will be piloted at strategic sites and rolled out further based on the results of the pilot. The Branch continues to actively research alternatives and/or theft deterrent methods that can be employed with LV copper cables.

- Following routine site inspections, the Branch had noted that in-service PVC insulated cables utilised for tap-off connections from overhead lines, suffered severe insulation degradation. Investigation into the cable insulation material revealed that the PVC insulation on the current cables was not UV stable. The Branch has since introduced UV stabilised PVC insulated cables to prevent this occurrence. These UV stabilised cables are available on the Unit's current cable contract.

- Research into specialised doors which can be utilised at the Unit's distributor substations is being conducted. The proposed door design needs to minimise the migration of salt laden air and vermin into t he substation which has proved detrimental to the plant and equipment within the substation as well as also prevent unauthorised access and the subsequent theft of electrical infrastructure. A technical s pecification for these doors is being developed.

- A low capacity (20 A) small power distribution unit (SPDU) and an intermediate capacity (40 A) SPDU have been introduced in the new SPDU tender. These items will cater for the Unit's planned electrification projects for rural and informal dwellings. The use of the low capacity and intermediate capacity units for the said projects will reduce the capital expenditure incurred as well as assist in limiting loads to within the planned forecast.

CUSTOMER & RETAIL SERVICES DEPARTMENT

DEPARTMENT OVERVIEW

The Customer and Retail and Services Department provides a customer contact and retail services function for the Electricity Unit. The Department has over 5 branches that collectively perform a diverse range of essential functions.

PRICING & MARKETING BRANCH

The key role of the branch is to price electricity energy costs as well as to provide a guideline for standardized electricity connection costs and other sundry charges. The branch also encompasses the Unit's marketing portfolio, which is based on information and awareness of the electricity unit's products and services. The marketing division's main purpose is to bridge the communication gap between our customers and the unit.

In recent years, balancing revenue recovery across various sectors continues to be a challenge as the branch aspire to ensure affordability while stimulating economic growth by keeping energy prices as low as possible.

The branch's industrial time of use tariffs are cost reflective, meaning what the municipality pays to Eskom is equivalent to what it charges its customers. The branch has also reviewed its connection and sundry charges.

REVENUE PROTECTION BRANCH

The Revenue Protection Branch encompasses all utility activities that ensure minimization of losses from both a revenue and a cost perspective. This is achieved through efficient disconnections of illegal connections and customers whose accounts are in arrears, thus enforcing credit control measures and ensuring that revenue is collected timeously.

HIGHLIGHTS

- Through the Token Identifier (TID) Rollover Project, the branch has managed to install all its active pur chasing meters which are just over 260 000. The branch achieved this months ahead of the 24 November 2024 deadline.
- The Branch also deployed a Smart Service System, an IOT system to move from all paper-based tasks to an online system to ensure that all work is tracked and easily managed.
- The Branch is at an advanced stage with its implementation of a Smart Vending System allowing customers to access their smart meter information on a mobile application. This system will also assist in data cleansing and the correctness of billing.
- The smart systems are currently in development and will be progressively rolled out as project milestones are achieved.

CHALLENGES

- Electricity losses have been historically averaging below 8%. However, there has been a rapid rise in electricity losses, averaging between 10% and 12%. Therefore, the meter sweep program must be intensified to manage and reduce future losses.

- There have been delays in awarding the contracts relating to forensic investigations and protective structures. This has impacted efforts to curb losses.
- The tendency to tamper and bypass meters has increased as electricity prices continue to rise above inflation. Higher than inflationary increases are severely affecting customer affordability.
- The non-availability of key materials, such as meters, due to budget constraints has slowed down the meter sweep program, impacting the Branch's ability to reduce non-technical losses.

FUTURE PLANS

- The Branch is working towards having weekly clean-up operations (Operation Khucululа). In this operation, the Branch will focus on removing illegal connections and disconnecting all bypassed/ tampered meters.

METER ENGINEERING BRANCH

The core responsibility of the Meter Engineering Branch is to ensure all metering equipment used for billing purposes is appropriately specified, tested, installed, and maintained. To ensure these objectives are executed efficiently, the branch is sub divided into specialized divisions. These sections are Advanced Metering & Projects, Metering Workshop, Whole Current Metering (Construction and Maintenance) and the Bulk Metering division.

HIGHLIGHTS

- The branch continued to rollout Smart Residential meters which brought about considerable benefits] such as the ability to remotely read these meters.
- There was training and re-skilling of staff across all of eThekwini Electricity's departments in the adoption of smart metering and technologies.
- Progress was made in relation to renewable energy by working towards embedded generation tariffs and metering systems to.
- The branch completed business processes which brings it closer towards being ISO9001 compliant.

LOWLIGHTS

- The procurement process of metering equipment was severely affected by the floods and that had a negative impact on our operations as well as our technical divisions.
- Budget cuts resulted in delayed projects which affected the long-term plans for the branch.
- Vacant posts were frozen, hence this inability to fill these posts exerted pressure on the branch.

CHALLENGES

- Failure of test equipment coupled with financial constraint increased backlog for the branch.
- Testing labs were unable to process requests from stakeholders and this affected turnaround time for meter tests.
- The branch could not conduct training which left staff without certificates required.
- Backlog from previous years and an increased number of new applications increased installation time.

RISKS AND OPPORTUNITIES

- Closure of businesses due to financial difficulties resulted many terminations of metering connections.
- The long-term effects of the pandemic and the floods will impact the branch's strategic goal by 3-8 years.
- The cost of electricity is pushing customers towards other alternatives such as solar thereby reducing the need for municipal dependency. This affects the business model in the medium to long term.

NEW TECHNOLOGIES/INNOVATIONS

- Commencement of SSEG testing on LPU's will reduce manual methods of calculation and promote green energy. It will also foster better customer buy in and trust as the equipment used is specified to meet international standards.
- AMI implementation will see more consistent reading of customer meters. The use of this technology will reduce the carbon footprint as meter readings will be done remotely further reducing travel costs and pollution.
- Local content requirements for procurement of equipment will ensure that the country benefits from manufacturing of equipment. This will boost the economy and sustain the city's citizens.

NEW PROJECTS AND PROGRESS ON EXISTING PROJECTS

- The branch is set to continue with its meter replacement project, whereby older meters are replaced with smart meters. This will set the foundation for a smart metering system. A key component will be the implementation of an AMI master station. This will assist eradicate load shedding. This load limiting drive will see the city use smart meters to control the load during times of need when the national grid is under pressure. The project will also help the city prevent total black outs due to load shedding and alternatively have customers with electricity, albeit with limited load.
- The Branch is investigating the methods and technologies of digitisation or cloud-based word order tracking to enable paperless processes.

CUSTOMER SERVICE BRANCH

This Customer Services Branch is responsible for the processing of all applications for supply, registration of customers for billing purposes, meter reading services, auditing of meter readings, resolving meter reading account queries/disputes, technical advisory service, and the cashiering facilities. There are six Customer Service Centres around the eThekwini Municipality area of supply. There has been a lot of emphasis placed on service delivery, to which the branch has allocated a lot of resources to address service delivery concerns.

CHALLENGES

- The branch struggled to recruit sufficiently experienced staff to meet its goals.
- Lack of funds challenged the continuation of projects such as the construction of a new Customer Service Centre.

HIGHLIGHTS

- The launch of the new DA online system proved that eThekwini Electricity is leading the pack as the first metro in the country to use it.
- The new Queuing Management System and Customer Survey System are both in procurement stages.
- The new meter reading system called MARS (Meter Automated Reading System) is now operational and it was designed internally.

  The branch has established an SMS system which advises consumers on the progress of their applications.

  The branch has started developing an automated meter reading submission system for submissions made via email.

  The branch is also in the process of developing a fully digital customer service platform which will enhance customers communication with the department electronically.
- The branch's efforts to secure its Centres' ISO 9001 status is at an advanced stage.

  Smart meters continue to be rolled out across the city; this initiative will fully automate meter readings received by the city.

LOWLIGHTS

- SCM delays for awarding of contracts and renewal of lease agreements.
- Financial constraints which results in key positions not being filled.

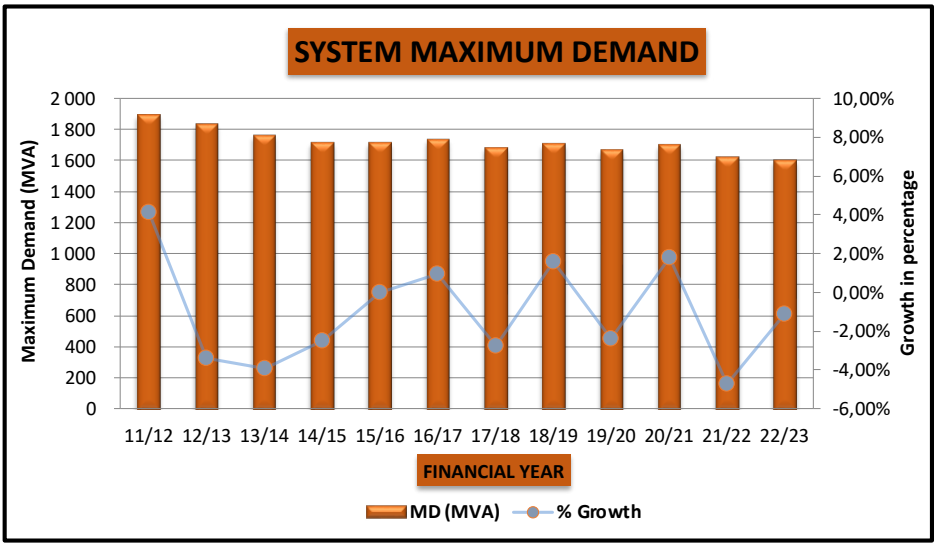
CONTACT CENTRE BRANCH

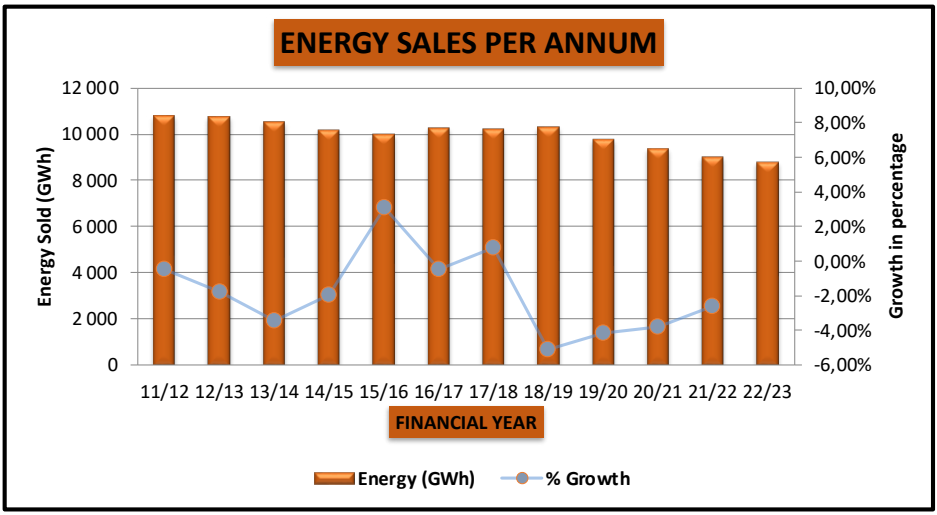
The Electricity Contact Centre is a crucial point on which all eThekwini Electricity consumers report electricity faults and outages 24hours, 365 days. The branch's trained operators are fully equipped to assist consumers in logging of faults and outages, assist with load shedding queries, aiding in prepaid meters, street lighting faults, reports of theft and damaged equipment as well as other administration enquiries that are to the benefit of eThekwini Electricity's service delivery.

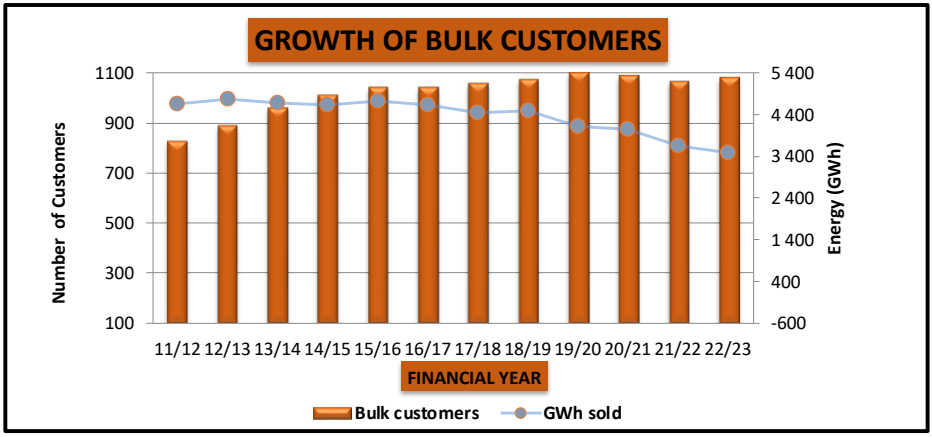
The branch provides service and support for eThekwini Electricity consumers through multiple channels of communication which include telephonic communication, Emails, social media, Website and WhatsApp. Multimedia increases communication efficiency, effectiveness, and potential to communicate message or information.

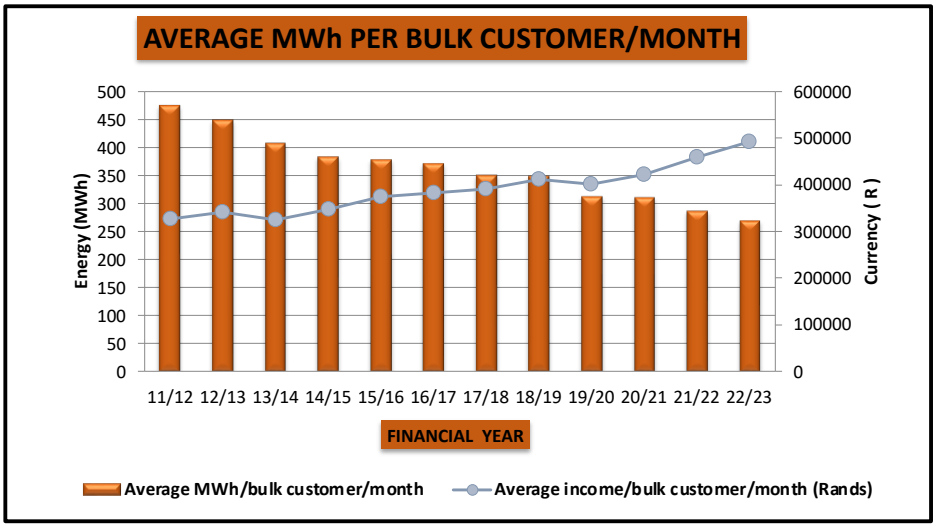
THE BRANCH'S CONTACT DETAILS ARE AS FOLLOWS:

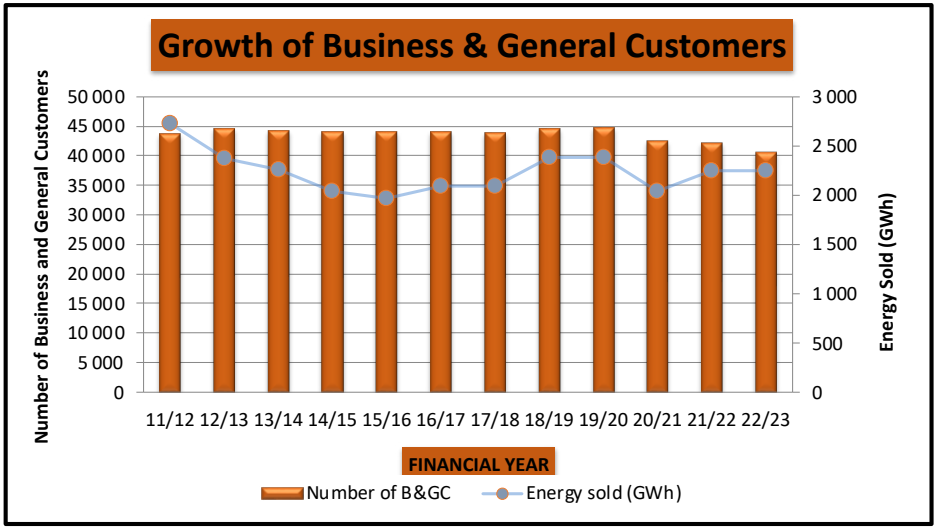
The branch's contact details are as follows:
Toll-free: 080 1313 111; 080 311 1111
WhatsApp: 079 791 2449
Email: Electricity.faults@durban.gov.za
Website: www.durban.gov.za (Services/Electricity/Online Services)
Social media: @eThekwiniM (Twitter & Facebook)

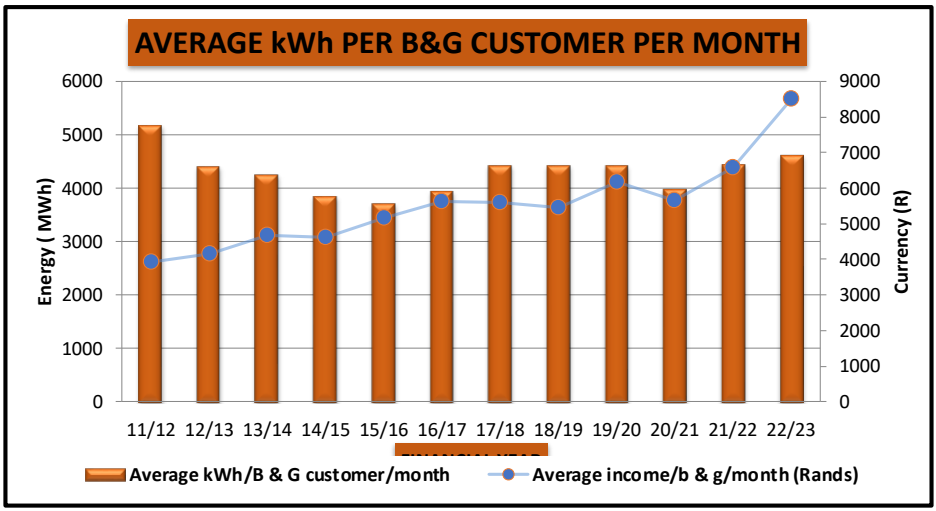

SYSTEM MAXIMUM DEMAND
Maximum Demand (MVA)
2 000
1 800
1 600
1 400
1 200
1 000
800
600
400
200
0
10,00%
8,00%
6,00%
4,00%
2,00%
0,00%
-2,00%
-4,00%
-6,00%
Growth in percentage
11/12 12/13 13/14 14/15 15/16 16/17 17/18 18/19 19/20 20/21 21/22 22/23
FINANCIAL YEAR
MD (MVA)
% Growth

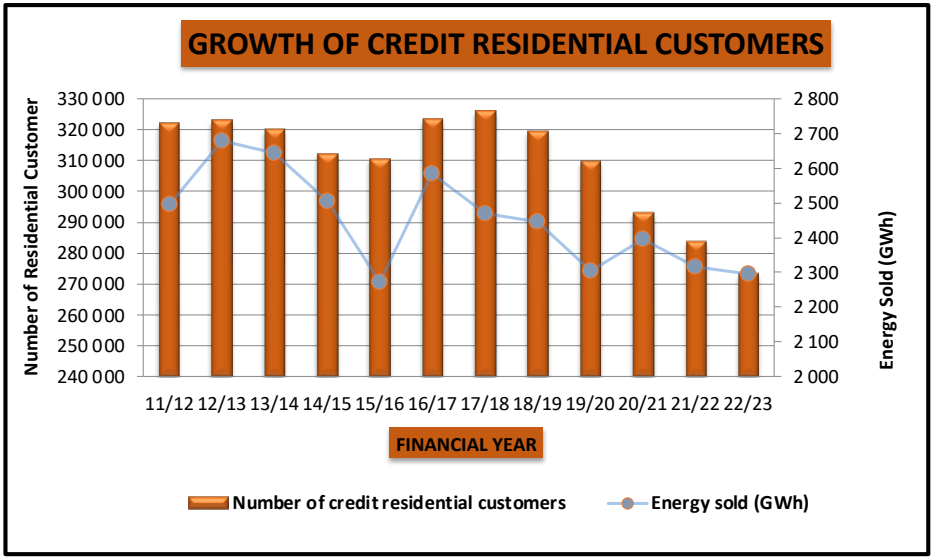

ENERGY SALES PER ANNUM
Energy Sold (GWh)
12 000
10 000
8 000
6 000
4 000
2 000
0
10,00%
8,00%
6,00%
4,00%
2,00%
0,00%
-2,00%
-4,00%
-6,00%
Growth in percentage
11/12 12/13 13/14 14/15 15/16 16/17 17/18 18/19 19/20 20/21 21/22 22/23
FINANCIAL YEAR
Energy (GWh)
% Growth

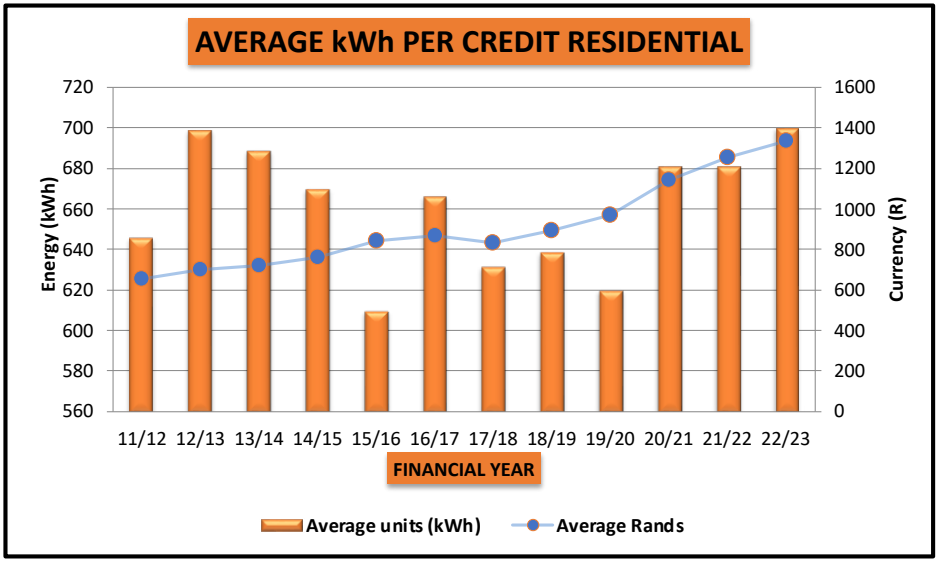

GROWTH OF BULK CUSTOMERS
Number of Customers
1100
900
700
500
300
100
5 400
4 400
3 400
2 400
1 400
400
-600
Energy (GWh)
11/12 12/13 13/14 14/15 15/16 16/17 17/18 18/19 19/20 20/21 21/22 22/23
FINANCIAL YEAR
Bulk customers
GWh sold

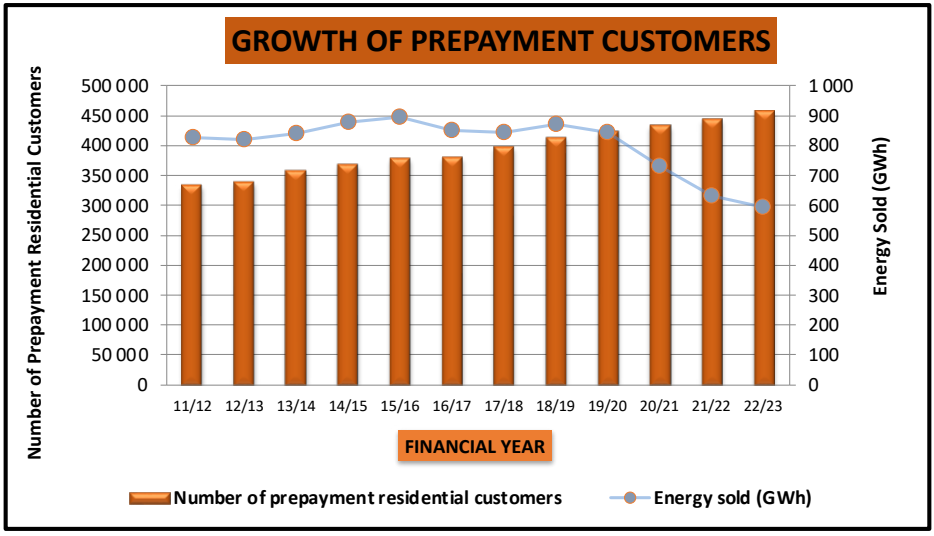

AVERAGE MWh PER BULK CUSTOMER/MONTH
Energy (MWh)
500
450
400
350
300
250
200
150
100
50
0
600000
500000
400000
300000
200000
100000
0
Currency (R)
11/12 12/13 13/14 14/15 15/16 16/17 17/18 18/19 19/20 20/21 21/22 22/23
FINANCIAL YEAR
Average MWh/bulk customer/month
Average income/bulk customer/month (Rands)

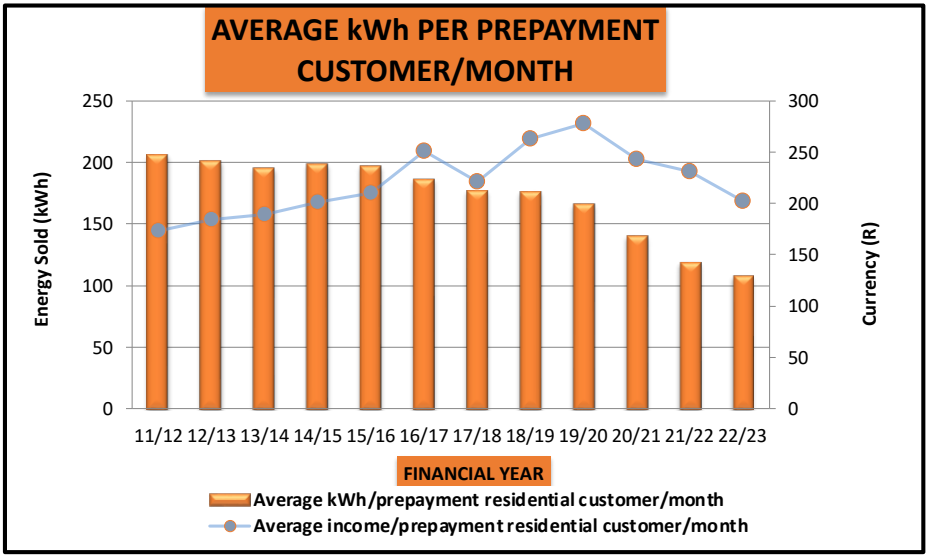

Growth of Business & General Customers
Number of Business and General Customers
50 000
45 000
40 000
35 000
30 000
25 000
20 000
15 000
10 000
5 000
0
3 000
2 500
2 000
1 500
1 000
500
0
Energy Sold (GWh)
11/12 12/13 13/14 14/15 15/16 16/17 17/18 18/19 19/20 20/21 21/22 22/23
FINANCIAL YEAR
Number of B&GC
Energy sold (GWh)

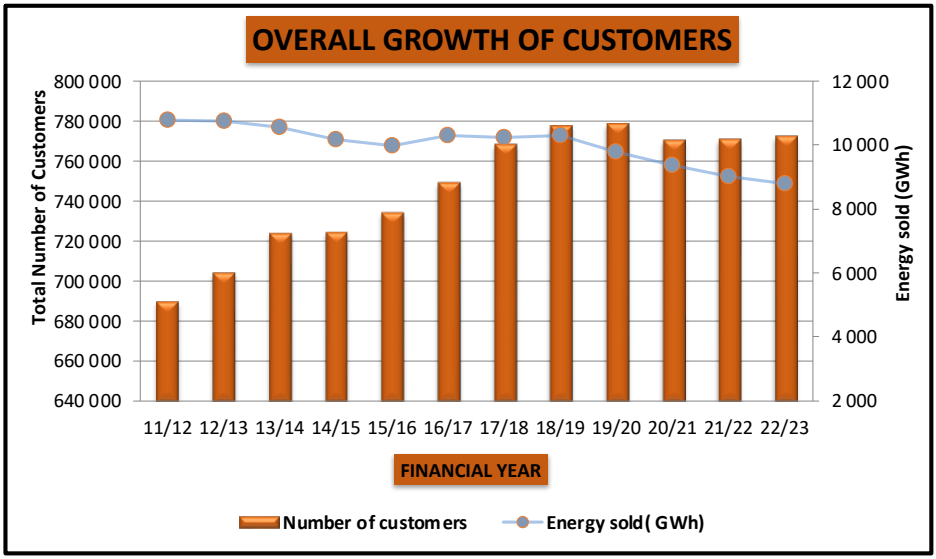

AVERAGE kWh PER B&G CUSTOMER PER MONTH
Energy (MWh)
6000
5000
4000
3000
2000
1000
0
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Currency (R)
11/12 12/13 13/14 14/15 15/16 16/17 17/18 18/19 19/20 20/21 21/22 22/23
Average kWh/B & G customer/month
Average income/b & g/month (Rands)

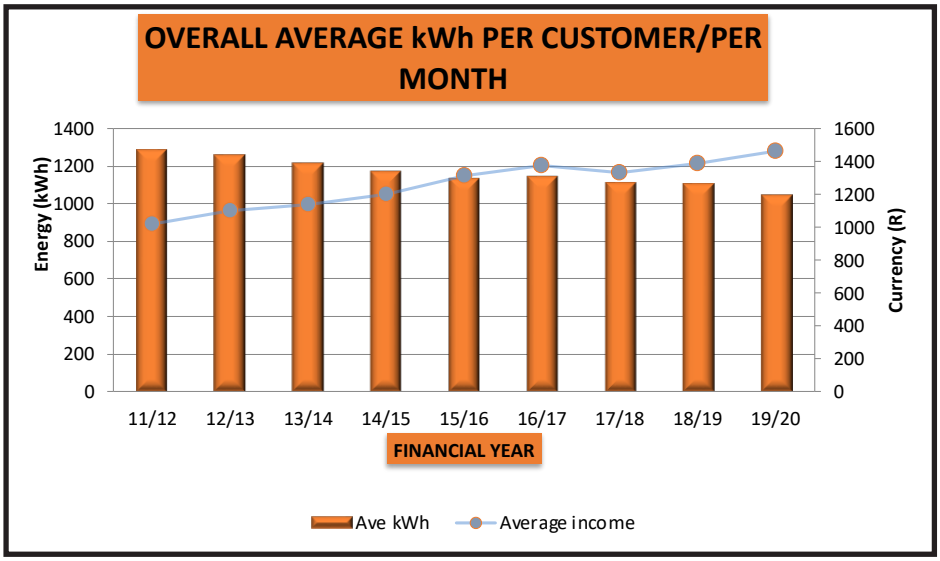

GROWTH OF CREDIT RESIDENTIAL CUSTOMERS
Number of Residential Customer
330 000
320 000
310 000
300 000
290 000
280 000
270 000
260 000
250 000
240 000
2 800
2 700
2 600
2 500
2 400
2 300
2 200
2 100
2 000
Energy Sold (GWh)
11/12 12/13 13/14 14/15 15/16 16/17 17/18 18/19 19/20 20/21 21/22 22/23
FINANCIAL YEAR
Number of credit residential customers
Energy sold (GWh)

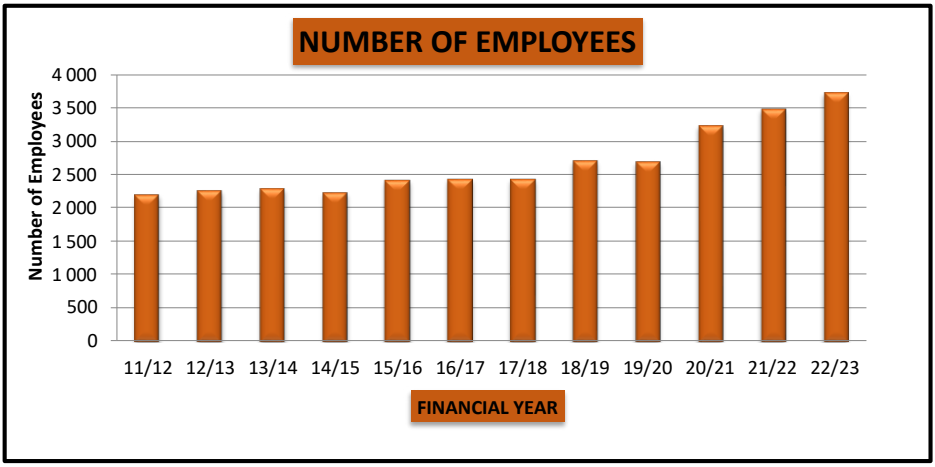

AVERAGE kWh PER CREDIT RESIDENTIAL
Energy (kWh)
720
700
680
660
640
620
600
580
560
1600
1400
1200
1000
800
600
400
200
0
Currency (R)
11/12 12/13 13/14 14/15 15/16 16/17 17/18 18/19 19/20 20/21 21/22 22/23
FINANCIAL YEAR
Average units (kWh)
Average Rands

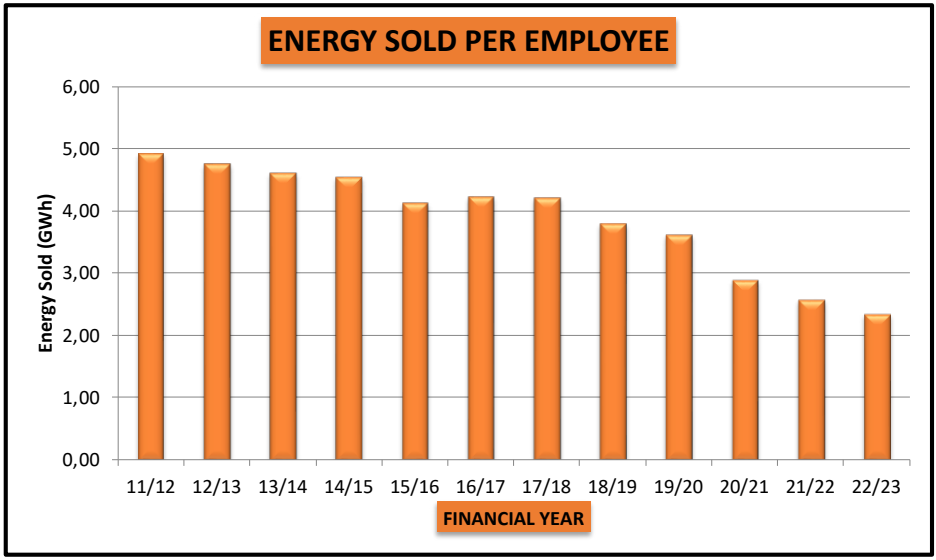

GROWTH OF PREPAYMENT CUSTOMERS
Number of Prepayment Residential Customers
500 000
450 000
400 000
350 000
300 000
250 000
200 000
150 000
100 000
50 000
0
1 000
900
800
700
600
500
400
300
200
100
0
Energy Sold (GWh)
11/12 12/13 13/14 14/15 15/16 16/17 17/18 18/19 19/20 20/21 21/22 22/23
FINANCIAL YEAR
Number of prepayment residential customers
Energy sold (GWh)


AVERAGE kWh PER PREPAYMENT CUSTOMER/MONTH
Energy Sold (kWh)
250
200
150
100
50
0
300
250
200
150
100
50
0
Currency (R)
11/12 12/13 13/14 14/15 15/16 16/17 17/18 18/19 19/20 20/21 21/22 22/23
FINANCIAL YEAR
Average kWh/prepayment residential customer/month
Average income/prepayment residential customer/month


OVERALL GROWTH OF CUSTOMERS
Total Number of Customers
800 000
780 000
760 000
740 000
720 000
700 000
680 000
660 000
640 000
Energy sold (GWh)
12 000
10 000
8 000
6 000
4 000
2 000
11/12 12/13 13/14 14/15 15/16 16/17 17/18 18/19 19/20 20/21 21/22 22/23
FINANCIAL YEAR
Number of customers
Energy sold(GWh)


OVERALL AVERAGE kWh PER CUSTOMER/PER MONTH
Energy (kWh)
1400
1200
1000
800
600
400
200
0
Currency (R)
1600
1400
1200
1000
800
600
400
200
0
11/12 12/13 13/14 14/15 15/16 16/17 17/18 18/19 19/20
FINANCIAL YEAR
Ave kWh
Average income


NUMBER OF EMPLOYEES
Number of Employees
4 000
3 500
3 000
2 500
2 000
1 500
1 000
500
0
11/12
12/13
13/14
14/15
15/16
16/17
17/18
18/19
19/20
20/21
21/22
22/23
FINANCIAL YEAR


ENERGY SOLD PER EMPLOYEE
Energy Sold (GWh)
6,00
5,00
4,00
3,00
2,00
1,00
0,00
11/12
12/13
13/14
14/15
15/16
16/17
17/18
18/19
19/20
20/21
21/22
22/23
FINANCIAL YEAR

CUSTOMER BASE STATISTSICS

NUMBER OF CUSTOMERS	Cust.	18/19	19/20	20/21	21/22	22/23
Business & General	Cust.	44,739	44,781	42,587	42,156	40,593
Private Residences	Cust.	319,335	309,641	293,117	283,605	273,532
Other	Cust.	4	4	4	4	4
Bulk	Cust.	1,070	1,100	1,087	1,063	1,078
Prepayment	Cust.	412,049	422,950	433,011	443,517	456,800
TOTAL	**Cust.**	**777,197**	**778,476**	**769,806**	**770,345**	**772,007**

SECTOR OF USE	Units	18/19	19/20	20/21	21/22	22/23
Business & General	kWh	2,378,069,186	2,378,069,186	2,041,808,884	2,252,894,727	2,248,474,112
Private Residences	kWh	2,447,513,532	2,303,963,160	2,395,538,432	2,316,970,386	2,296,453,415
Other	kWh	136,791,814	143,631,405	158,353,624	166,271,305	156,373,624
Bulk	kWh	4,483,985,959	4,121,115,060	4,051,689,804	3,654,223,157	3,490,511,244
Prepayment	kWh	870,381,359	842,748,732	731,856,126	632,550,498	592,671,994
TOTAL	**kWh**	**10,316,741,850**	**9,789,527,543**	**9,379,246,869**	**9,022,910,073**	**8,784,484,389**

UNITS GROWTH	Units	18/19	19/20	20/21	21/22	22/23
Business & General	kWh	1.72%	0.00%	-14.14%	10.34%	-0.20%
Private Residences	kWh	-0.94%	-5.87%	3.97%	-3.28%	-0.89%
Other	kWh	0.00%	5.00%	10.25%	5.00%	-5.95%
Bulk	kWh	0.81%	-8.09%	-1.68%	-9.81%	-4.48%
Prepayment	kWh	3.01%	-3.17%	-13.16%	-13.57%	-6.30%
TOTAL	**kWh**	**0.76%**	**-5.11%**	**-4.19%**	**-3.80%**	**-2.64%**

INCOME (R)	Units	18/19	19/20	20/21	21/22	22/23
Business & General	Rand	2,931,255,844	3,322,740,748	2,896,566,980	3,322,740,748	4,141,731,294
Private Residences	Rand	3,413,458,247	3,607,595,706	4,011,419,659	4,264,705,807	4,382,311,252
Other	Rand	76,293,983	81,039,468	86,080,123	92,510,308	98,264,450
Bulk	Rand	5,271,702,988	5,299,092,206	5,502,632,288	5,849,207,624	6,374,469,577
Prepayment	Rand	1,301,576,143	1,410,283,769	1,263,354,153	1,228,871,104	1,110,731,915
TOTAL		**12,917,993,222**	**13,639,712,429**	**13,673,973,080**	**14,665,525,282**	**16,009,244,039**

CENTS/UNIT	Units	18/19	19/20	20/21	21/22	22/23
Business & General	Cents	123.26	139.72	141.86	147.49	184.20
Private Residences	Cents	139.47	156.58	167.45	184.06	190.83
Other	Cents	55.77	56.42	54.36	55.64	62.84
Bulk	Cents	117.57	128.58	135.81	160.07	182.62
Prepayment	Cents	149.54	167.34	172.62	194.27	187.41
TOTAL		**125.21**	**139.33**	**145.79**	**162.54**	**182.24**


STOP