23rd AMEU Technical Convention
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Benoni Township Electrical Normalisation Project - Case Study

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Today’s Discussion

1. Background
2. Audit / Investigation Findings
3. High Level Scope
4. Pilot
5. Benefits of Projects
6. Conclusion
Background - Project Triggers

Focus Areas
- Preventative Maintenance
- Re-Design Network
- Rebuild Network
- Employ Technology to Curb Vandalism and Illegal Connections
- Community Involvement

Contributors
- Vandalised System
- Old Equipment
- Old Designs
- Illegal Connections
- Overloading Network

Safety
- High Energy Losses
- Network Performance

Background - Project Triggers
Background - Customer Base

- Aston, 88
- Clayville, 1135
- Wattville, 3044
- Duduza, 15059
- Katlehong, 37800
- Daveyton, 16868
- Vosloorus, 36603
- Tsakane, 26961
- Etwatwa, 21726
Residential losses - kWh (12 months)

1. Establishment of Scope for Audit
2. Conduct Field Audit/Data Collection
4. Develop Business Case
5. Conduct Pilot/Split Metering/Vandal Proof
6. Rollout Project in Phases
Every Mini-Sub and Overhead transformers were inspected.

Inspection was carried out to establish the general condition, accessibility, operational labeling, safety compliance and loads/loading of network equipment.

The As-Build drawings were updated.

The LV amps per feeder were recorded to get an indication of the loading and unbalance per feeder.

All the MV and LV conductor sizes were visually checked and recorded.
Field Investigation Findings

Safety Risk (Public and Employees)

Overloading
Solution (Business Case)

» Short Term:
  > Repair open mini Subs & open wires (High Safety Risk)
  > Increase maintenance inspection period in high risk areas

» Long Term:
  > Resign network
  > Implement a solution for protection mini subs and reduce theft
Normalise and refurbish the existing electrical MV and LV networks by:
  > Replacing old, vandalised and obsolete MV and LV equipment.
  > Redesign & rebuilding some sections of the network.

Install split metering for all households in the townships by:
  > Installing prepaid split meters with communication
  > Installing protective shells for all mini subs
  > Installing protective kiosks with protective shells

Data collection (Customer and Network data) and update Eskom databases
## Pilot Site: Katlehong (Nhlapo)

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<tr>
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<tbody>
<tr>
<td>Number of Mini Subs:</td>
<td>22</td>
<td>Number of CIU:</td>
<td>1442</td>
</tr>
<tr>
<td>Number of Kiosks:</td>
<td>213</td>
<td>Cost of Pilot</td>
<td>R12m</td>
</tr>
<tr>
<td>Number of Meters:</td>
<td>1442</td>
<td>Implementation</td>
<td>1 Year</td>
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The split prepayment meter consists of two parts, the **meter (MIU)** and the **customer interface unit (CIU)**.

Communication between the meter and the customer interface unit is by means of Power line Communication.

The prepayment meter is STS compliant and is installed in a secure enclosure.
Interface Units

MIU

CIU
Secure Enclosures

6mm Mild Steel

Motor Driven

From 6 to 24 Meters per kiosk
Monthly Max Demand Profile for a sample of 234 Customers and Individual Demand per Mini Sub

Individual 315kVA Mini Sub Demand

Individual 500kVA Mini Sub Demand
Sales Purchases for 1442 Customers in Nhlapo

Energy Sales Nhlapo

kWh

Date

Apr-07  Jun-07  Aug-07  Oct-07  Dec-07  Feb-08  Apr-08  Jun-08  Aug-08  Oct-08  Dec-08  Feb-09  Apr-09  Jun-09  Aug-09  Oct-09

61306  25,951  63,784  42,553  73,387  101,034  172,243  207,904  298,689  263,998  299,296  238,545  304,320  313,876  354,810  620,723

285,488  281,091  235,500  582,733  258,536  230,635  241,010  286,750  233,205  310,345  380,526  444,756  389,236  301,504
Benefits Realised

> Safe and secure network
> Improvement in network performance
> Reduction in non technical energy losses
> Reduction in illegal connections and vandalism
> Customer satisfaction
> Reduction of loading on Mini-boxes, MV transformers, caused by illegal connections – up to 20%
Lessons Learned and Way Forward

- Community involvement is very important
- Customer interaction (marketing) must be done extensively
- Develop a comprehensive preventative maintenance plan.
- Ownership of the system is key
- To ensure proper first line maintenance, Field staff must be well trained on the technology.
- Can be a solution for vandalism and illegal connections
Thank You