

# Eskom Experience on AMI Implementation

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August 2011

Lilongwe, Malawi



- Smart Grid Enablement (SGE) Programme
- Project background
- Challenges
- Lessons learned
- Questions

- The SGE programme manages new and emerging technologies and initiatives that enable the next generation distribution electricity grids,
- These technologies are seen as enablers of next generation utility grid, that is, SMART GRIDS.
- SGE Projects:
  - Advanced Metering Infrastructure (AMI) Project – previously referred to as the Homeflex Project.
  - Utility Load Manager (ULM) Research Project.
  - Soweto Split Metering Project.

# Key Drivers

Comply with National Regulations

National regulation mandates the **use of smart systems** and **time-of-use tariffs** for customers consuming over 1000kWh per month by 2012. **Reg. 773**

Shift load

Shift load of **medium to high (500kWh/month) residential consumers** (LSM 7, 8, 9) through TOU tariff from the morning peak period and the evening peak period

System Emergency Load Limiting

**Load limiting of non-essential appliance load** during system constraints/emergencies intelligent distribution network & smart meters. Approved by Board IFC (Mar 2008)

Change customer behavior with Pricing Signals

Incentivize the **efficient use of electricity, power conservation** through TOU tariff to **promote lifestyle changes**. Approved by Board IFC (Mar 2008)

Maximize Operational efficiencies

Achieve improved **billing accuracy** through automated reading, **Call Centre costs** through lowering customer bill enquiries, & on-site **maintenance costs** through remote diagnosis metering Infrastructure capability

Lower Economic Cost Options

Enable a comprehensive & **cost-effective DSM strategy** to meet the continued increase in Eskom's peak demand and capacity requirements.

Implement a National solution

Roll-out to Eskom's residential market thereafter to municipalities

Increase profitability

**Reduce Eskom's distributor purchase costs** thereby increasing profitability through load shifting

Provide value added customer services

Provide **new services & value adding options** to meet customer increased need for flexibility & lower costs

Demand Response Strategy

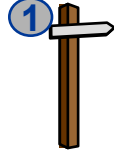
Smart solutions compliant to Eskom metering and residential load management requirements. **(ICAS 18/04/2011 presentation)**

- Implement residential TOU tariffs.
- Implement Load Limiting Capabilities.

# Project Overview: AMI Project Journey

## Since 1995

Eskom's Residential Time-of-Use (TOU) Tariff journey has begun.



## In 2005

A Request for Proposal (RFP) is issued to invite vendor proposals for AMI solutions.



## In 2007

AMI Metering business case is updated with the PoC results.



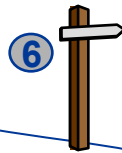
## In 2006

RFP responses are evaluated and three solutions are selected for Proof of Concept (PoC). The PoC reveals strengths and weaknesses among the participating vendors.



## Jan 2008

Early 2008 Cabinet approves interventions to address electricity shortage, these included PCP and AMI Metering.



## In 1998 - 2003

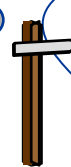
Eskom embarks on pilot projects to test the TOU tariff called HomeFlex.



## 10

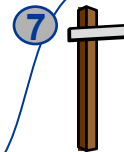
## September 2010

Commence installation /deployment of 10,000 AMI Meters at selected sites



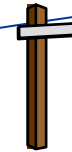
## March 2008

Electricity Regulation Act which mandates that all customers consuming above 1000kWh be on TOU tariffs not later than 2012 is gazetted.



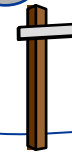
Apr 2010  
ICAS Approval to time, scope and budget extension

## 9



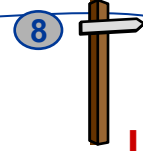
## Feb 2009

Updated Meter Vendor RFP ready to be issued to market.



## Late 2008

Industry drafted and accepted NRS049 is published by SABS to ensure uniform AMI installations in South-Africa. This forces Eskom to re-issue the 2005 RFP.



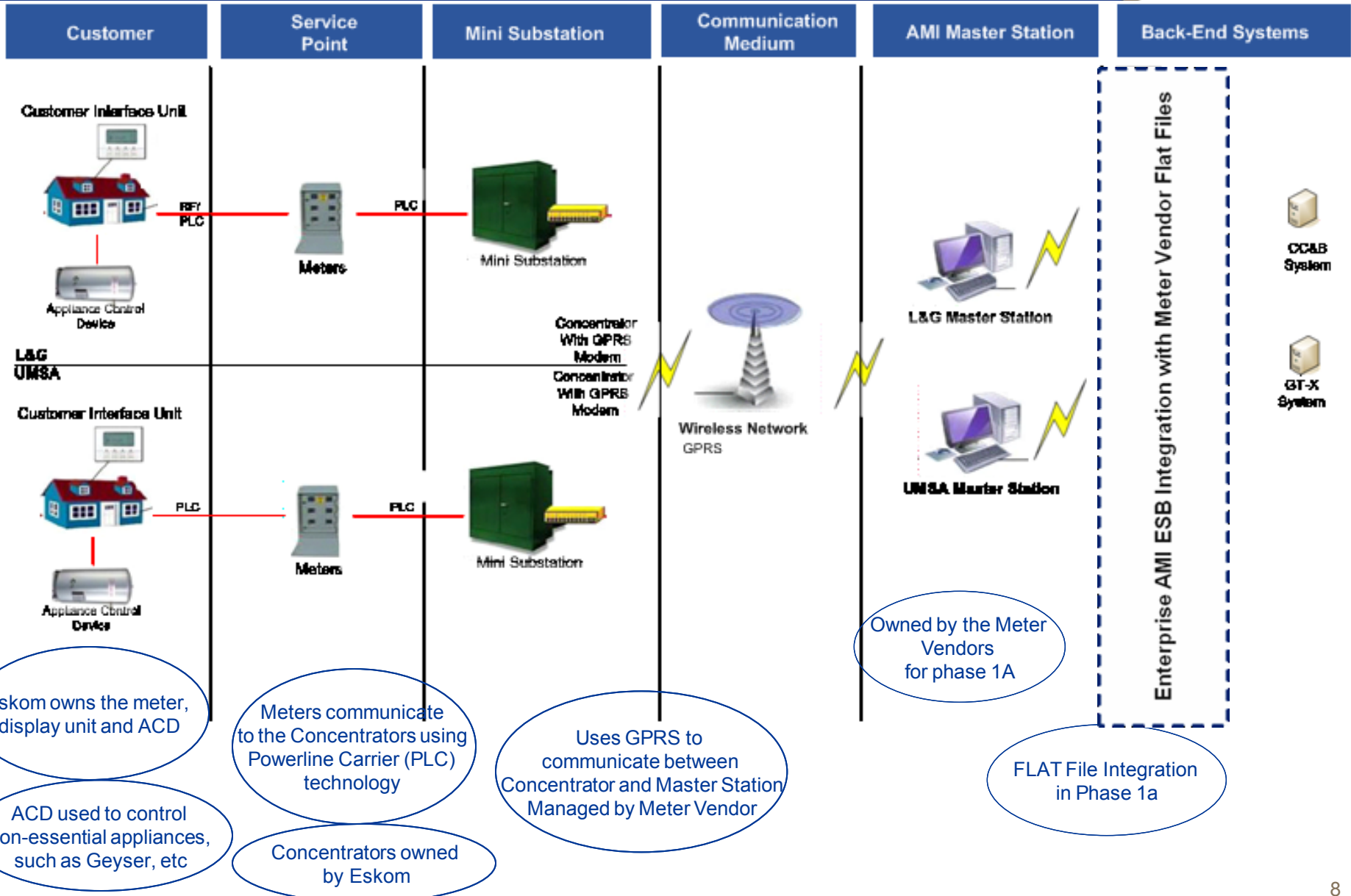
→ November 2011

AMI Meters Operational and integrated to Eskom's back-end systems for ERA Phase1 (TOU Billing; Load Control per Schedule)



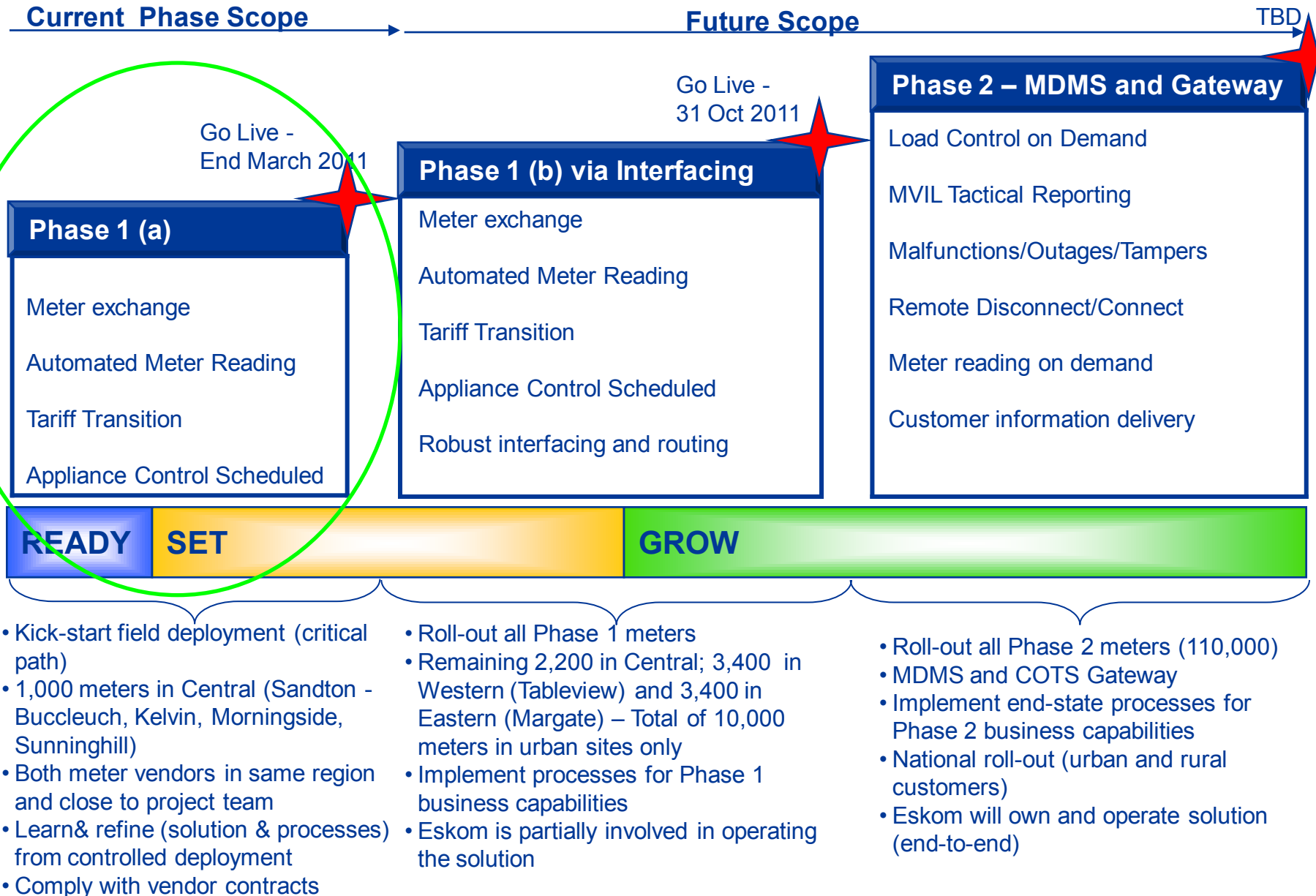
- Procure through a open tender process a solution which includes smart meters, appliance control devices, customer interface units, data concentrators and master station (multiple vendors).
- Solution requirements are based on the industry specification for Smart Meter, NRS049:2008, Advances Metering Infrastructure (AMI) for Residential and Commercial Customers.
- Install 10,000 meters to single phase customers Small Power Users (SPU) in Phase 1 in 3 Eskom regions.
  - *The remaining 110,000 customers will be part of a future release (ERA Phase 2).*
- Analyze the Process and Technology impacts to embed the technology into the business.
- Recruit targeted customers to signup to the Homeflex Tariff
- Implement a simplified master station integration layer during Phase 1. In parallel go out on open tender for COTS Gateway and Meter Data Management System (MDMS)
- Conduct lessons learnt in preparation for the next Phase/s.

# AMI Solution Overview





# AMI Project Phases



Function Name	Description
• Meter exchange	This function defines initiating and performing a successful AMI meter exchange. This includes the necessary manual feedback data required to update the meter to service point (SP) link within CC&B.
• Automated Meter Reading	This function defines collecting AMI meter readings from the meters and uploading of the readings into CC&B for billing via the Meter Vendor's Master Stations. This includes both normal and TOU meter readings.
• Tariff Transition	This function defines the process of converting a customer from the current tariff to the TOU (AMI Homeflex 4) tariff.
• Appliance Control – TOU	The load control schedule controls the time periods when the customers' appliance control devices will switch off the pre-selected non-essential devices (e.g. geyser and swimming pool pump, etc). The schedule is linked to the TOU tariff peak periods.

- **Installation**

- **New Field Devices**

- Data Concentrators (DC)
    - AMI Meters



- **AMI Meter Supplier contracted to install AMI field devices**

- Pre-site Visits – Accompany vendors on Pre-site visits
    - Meter Exchanges – Accompany vendor on meter exchanges to better understand the installation process

- **Maintenance**

- Field Services will provide first line support for all AMI Field Devices. EDFS will provide second line support.
  - Meter Vendors are being requested to provide proposals for second line support for all AMI Field Devices FS and EDFS teams are required to be trained

- **Storage of AMI spares** – AMI Meters, Display units and Appliance Control Devices
- **Storage** of returned **Appliance Control Devices** that are in a good condition.
- **Installation Process** – Work Orders to be created for Field Services staff who will be accompanying the Meter Supplier on certain installations (for training purposes only)
- **Meter Movement Management** – Capture the AMI change-outs on MATS, support customer service to capture change-out into CC&B.
- **Malfunctioning meters and concentrators** – receive a report from the Meter Supplier of malfunctioning meters and concentrators and create work orders.
- Meter Supplier will require the **keys** to the transformer, stubby and kiosk boxes.

- **Customer impact**

- Reduction of targeted customer base due to conversions to prepaid – attributed to high IBT charges & therefore customers convert to prepaid meters because they want more control over their bills.
- Access to customers to attend forums and to install CIUs and ACDs inside their homes.
- All customers in the targeted areas were interested in the tariff and technology, including Sectional title customers and three-phase customers. This raised some expectations for those customers not targeted.

- **SABS Test**

- Delays from SABS to issue test reports and certificates. Eskom can only install SABS approved products

- **Testing of web services integration layer**

- Testing with 2 vendors – logistic challenge

- Customer selection can be difficult due to inconsistency or incomplete data stored in CC&B (e.g. address lines, CNL, etc.)
- Outage Booking – requirement to book outages 35 days in advance requires a large lead time
  - Incorrect feeders/transformers (mix-ups)
- Space constraints in Mini-sub/kiosks to support new devices (DC, ACD Transmitter, etc.)
- Physical state of Transformer Kiosks (Ant mounds)
- Quality of installations
  - Tools; Grommets
- Region to procure / order the Eskom's meter movement books to be utilized during the installation
- Provide Field Services with the new AMI meter serial numbers / barcode to capture into MATS
- Contractor IDs and Magnetic boards must be ordered in advance

- Customer Services
  - Plan for resources to capture Meter Change Outs in CC&B (potential for regional backlogs)
  - Plan for data correction as a result of Customer Interaction and Marketing
  - Dedicated customer services teams may be required to ensure that data is captured correctly in all systems.

- Basic communication about the projects to customers is required as early as possible.
- Reliance on the Chairman of the Home Owners Association to communicate with customers (neighbours) – customer forums, outages etc:
  - Some complexes are not run optimally, miscommunication does occur where the information from Eskom does not filter through to the residents of the complex.
  - May reflect badly on Eskom; the mitigation should be for Eskom to get more involved (hands on) and send out “Connects” for installations per complex.
- Ensure that the local councillors are involved from the start.
- Customer forums:
  - Eskom must have a collective voice when seeing customers
  - Meter vendors should not be invited to customer forums
- Project activities and communication with Walk-in Centre and Contact Centre staff must be on-going during installations
- Need for FS to advise of changes that may affect interaction with customers on an ad-hoc basis



- Resistance to change (internal & external)
- Marketing is difficult due to the fact this is a targeted customer base and Eskom cannot go on a large scale marketing campaign so as not to raise expectations
- Singing customers up on the Homeflex tariff – only to implement after winter season because the prices are extremely high during this period
- The roll out of the AMI solution affects role players across all the value chains; i.e. from field services to IT and customer services
- Customer confusion due to the fact that there are 2 types of meter suppliers with two different looking devices with the same features
- AMI roll out is a learning curves for meter installations, appliance control device and customer interface units for both Eskom and suppliers.
- Lag between meter change outs and updating of customer information in the billing system. Don't underestimate this process.
- Data issues

- Meters and applicable devices must be properly tested in advanced. Consider Accelerated Life Test (ALT).
- Meters must have been properly calibrated – calibration certificate per meter
- Installers must be experienced and authorised as per utility requirements
- Appoint internal inspectors/ auditors to inspect completed installation regularly
- Develop AMI technical skills internally, if possible before project implementation commences.
- Have contingency budget for the project for:
  - Meter and concentrator boxes,
  - Three phase installations
  - Extra Concentrators
  - Unknown customers
- Have a well defined plan to handle change outs
- All installations issues must be rectified when installations are done
  - e.g burnt terminal blocks, burnt wires, loose connections, etc.

# AMI Project KPIs

Achievements	Phase 1 Target	Previous Total	This week	Total to date
Data Concentrators installed	167	21	0	21
Meters installed	10 000	880	0	880
MMF captured in CC&B	10 000	800	0	800
Customer interface units installed	10 000	177	0	177
Appliance control devices installed	10 000	0	0	0

Achievements	Presented to date	Presented previous week	Number of customers reached
Customer Forums (events)	7	1	39
Customer conversion to TOU tariff	10 000	0	0

