STS and Load Control to SMART – AMEU 2010
This presentation seeks to explain ....

+ **Migration of STS prepayment to smart**
  - Discuss the Remote Access Terminal (RAT) Concentrator
  - Various components required for Smart
  - Monitoring
  - What are the main advantages
  - Software functions
  - Standards

+ **The Future of Load Management**
  - Change from one way to two way communication
  - Combined conventional ripple with Smart solutions

+ **How much money can be “recovered” is the question?**
Global distribution of STS and AMI systems (2010)
Rapid transition to **multi-part STS** prepayment systems

**Multi-Part (Wired) Prepayment System**

**Single Part Prepayment Meter**

**Multi-Part (PLC) Prepayment System**
Multi-part remote access STS prepayment solutions

Remote Access Terminal (RAT)

GSM/GPRS Network

WAN

Communications Controller (Suptalk)

Ethernet (LAN)

Prepayment Vending System (Suprima)

Split Prepayment Meters (MCU’s)

Customer Interface Units (CIU’s)

Benefits of Remote Access Terminals
Site characteristics – Clustersed topology

Phase 1 (Red)
Phase 2 (Blue)
Phase 3 (White)

Mini-sub (with RAT)
Meter kiosks

RAT installed in Mini-sub # 55
Site characteristics – Distributed topology

Three Meter Panels

Block A

Block B

Block C

RAT installed in Sub-Station

Benefits of Remote Access Terminals
Sub-station panel layout

Landis+Gyr ZMD I&C Meter
*Used for check metering purposes*

Remote Access Terminal (RAT)
*Connected to Three Phase Supply*

Connection Block

Circuit Breaker
*For isolation of RAT test set-up*

Preferred installation with both RAT and Check metering
Remote Access Terminal - Features

+ Feature overview
  - **Self discovers** Cashpower PLC meters in its range
  - **Monitors communications** between meters and their customer interface units
  - Reports meter or remote access terminal **events** (such as tamper or power failure)
  - **Stores meter data** and uploads to communications controller at scheduled times
  - Enables **two way communication** with existing STS prepayment meters

+ Benefits
  - **Fraud detection and revenue protection**
  - Remote auditing of prepayment meter installations
  - **Two way communications**
Communications Controller - Dashboard capabilities

+ Typical capabilities
  - Indicates if meters have alarms or conditions that need investigation
  - Rapid site health overview, each block represents a Remote Access Terminal
  - Facility to define Remote Access Terminal groups

+ Benefits
  - High level overview of status of Remote Access Terminal for administrator – “Birds eye view”
  - Can “drill down” for more details and audit of specific meters
Meter audits

+ Typical capabilities
  - Status by meter serial number
  - Meter events (e.g. tampered)
  - Meter tasks (e.g. get register information)
  - Meter readings (half hourly readings) with filter, tabular and chart formats
  - Detailed meter status
  - Send STS tokens to the meter

+ Benefits
  - Remote audits – know the status of the meter, identify tampered meters
  - View meter register information on demand for fault finding and analysis
Integrating **STS** and **AMI** systems into a smart grid

+ Some customers in a **STS** prepayment meter site may decide to pay for conversion to a more complex smart AMI meter with;

+ These needs can be accommodated with **AMI** meters fitted with their own GSM/GPRS modems, that connect directly to the back office via **DLMS/Cosem** protocols.

+ Utilities need to invest in multi-vendor integration layers to provide a flexible service offering. These should support the messaging structures of the IEC 61968 **Common Information Model**

+ **IDIS** compliance (Interoperable Device Interface Specification)
Load Management has also changed
Topology of 3rd Generation Load Management

Smart Infrastructure
- ERP (SAP)
- MDUS
- Gridstream AIM
- Data Concentrators
- Network
- Smart Meters
- Ripple Receiver
- Hybrid Load Switch L740
- 2-Way Communication

Load Management
- Command Centre
- SCADA
- Control Centre
- Injections
- Hybrid Load Switch L740
- Ripple Signal
- 2-Way Communication

Closed Loop Control

Smart Infrastructure Load Management
Hybrid Load Switch L740
Ripple ... Loop Control15
Data Concentrators Injections
Smart Infrastructure Load Management
Hybrid Load Switch L740
Key Product Hybrid Load Switch

- 2-way PLC and ripple control technology
- Autonomous under-frequency load shedding
  - Remote parameterisation
  - Backup clock with calendar
  - Self-learning functionality
- Feedback about power failure, open-circuit and tampering detection
Hybrid Load Switches

- Command Center
- Substation
- Load Manager FPS LM
  - Closed Loop Control
- Ripple System
- Gridstream AIM
- Smart Meters
- Feedback El. Power
- All Ripple Standards
- 2-way PLC PLAN Standard
- Fix
- Variable
Commercial benefits of Remote Access Terminals

“Eskom loses R3.6 billion a year due to theft “

Elizabeth Dipuo Peters, Energy Minister, 30 June 2010

- Eskom and the country's municipalities lose more than 5% of their annual turnover to electricity theft
- Up to 50% (5850 GWh) of Eskom’s non-technical losses in the 2008/09 financial year appear to be the result of theft
- This resulted in a financial loss of up to R3.6 billion a year for Eskom, and the same figure for municipalities
- But Peters pointed out that if the illegal connections causing the loss were made legal, the consumers would have received a percentage of their power use as free basic electricity (FBE). "Should each connection be using the average of 180kWh per month, it means the free basic electricity would have reduced the losses to around 72 percent of the above values and thus the loss would be reduced to R1.8 billion to R2.6 billion per year.

+ With Eskom and municipalities combined, and taking into account the impact of FBE, the financial value amounts to R4.4 billion of lost revenue per annum due to electricity theft.
Conclusions

+ Remote Access Terminals facilitate a **dramatic reduction of energy theft**
+ They are quick and easy to deploy and they are **self funding** from energy savings and revenue improvements
+ They connect existing & emerging STS meters into a **coherent smart grid strategy**
+ **Consumers** receive an enhanced, more flexible and more sustainable service