Prepayment Metering System

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### History of Prepayment in Eskom

- In 1988 Eskom developed the "Electricity for All" concept
- Customers had to be supported by limited Eskom resources.
- The system had to operate with minimal management intervention and optimal maintenance.
- The standard billing system required a lot of day-to-day management to process accounts and to maintain connections and disconnections.
- Many of the areas where potential customers reside had almost no infrastructure.

### History of Prepayment in Eskom (continued)

- There were no fixed addresses in the new informal settlement areas.
- There was high unemployment, no bank accounts and no postal services
- Many customers did not understand bills
- Eskom ‘facilitated’ the development of the basic prepayment electricity system which is still in use today
- More than 5 million prepaid meters installed to date in South Africa (Eskom and Municipalities)
  - 3.6 million for Eskom
  - increasing by approximately 250 000 annually.
Prepaid experiences ... ‘learnt the hard way’

Orange Farm ‘Informal Settlement’ – 70 km south of Johannesburg was first project in 1990
- Concrete poles were used
- Covered 11kV conductor was used
- 60 Amp meters installed in shacks
- Assumption that meters were foolproof
- Meters designed to go on a free supply mode when faulty or reached max life span

Prepayment Value Chain

MANAGE REVENUE CYCLE KEY VALUE CHAIN (MRC VC)
Prepayment Support Structure

- Research & Development
- Key Management Centre
- Systems Support
- Info Architecture
- CC&B – OVS Support
- Financial Controls
- Recon’s & Settlements

High level overview of Value Chain

MRC VC: Prepayment

- Off-Line Vending
- Online Vending
- Prepayment Meter Management
- Vending Support Management
- Manage Free Basic Electricity
- Revenue Loss
- Cash Management
# Prepayment Balance Score Card

## Overview of the Prepayment Metering System

- Allows customers to pay for a credit token in advance
- Enables automatic switch off if credit in the meter expires

This has the potential to:

- Increase cash flow for utility
- Lower operating costs and management complexity
- Prevent bad debts and recover arrears from billed customers (Convert billed customers to Prepayment System)
- Sustainable solution with community involvement
Prepayment System Components

- Prepayment is a strategic tool in managing revenue within a utility

- Management System
  - Computer system with database, management tools, reporting and security features

- Vending outlets
  - Computer based terminals where tokens are sold.

- Prepaid Meters
  - Electronic meter with display, keypad and disconnect switch

Typical Prepayment System
**Electrification**

- 152,125 new connections in 2006/7
- More than 3.4 million households electrified since 1991
- Free basic electricity since 2003
  - Free 50kWh to poor households
  - 97% of local municipalities participating in this government initiative
  - Improved the lives of more than one million people

**Cumulative number of homes electrified**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>1,500,000</td>
</tr>
<tr>
<td>2003</td>
<td>1,750,000</td>
</tr>
<tr>
<td>2004/5</td>
<td>2,000,000</td>
</tr>
<tr>
<td>2005/6</td>
<td>2,250,000</td>
</tr>
<tr>
<td>2006/7</td>
<td>2,500,000</td>
</tr>
<tr>
<td>2007/8</td>
<td>2,750,000</td>
</tr>
<tr>
<td>2008/9</td>
<td>3,000,000</td>
</tr>
<tr>
<td>2009/10</td>
<td>3,250,000</td>
</tr>
<tr>
<td>2010/11</td>
<td>3,500,000</td>
</tr>
</tbody>
</table>

**Standardization of Prepaid Meters**

- **Proprietary Meters**
  - Different meters from different suppliers
  - Different tokens – proprietary tokens
  - Each supplier had own vending system
  - Different meter sizes
  - When meter fails, same product used to replace product that failed.
    - **Strong possibility of being locked into one supplier**

- **Standard Transfer Specification (STS) Meters**
  - Standard Common Base
  - Standard tokens
  - Standard vending systems from different suppliers.
  - Faulty meters can be interchanged
  - Eliminated the possibility of being locked into one supplier
Current Meters in use

- Meters from Different Manufacturers
- Common Base for all Meters
- Different meters fit onto the ‘Common Base’

Installation of Prepaid Meters

- Meter with built-in Ready Board in a ‘Shack’
- Meter installed outside the House for easy maintenance access
Critical Success Factors (CSF)

- Know why you are implementing a prepayment system
- Customers should understand your service philosophy
- Set clear functional and technical specifications
- Set criteria for manufacturers to qualify for tender
- Validate and update customer database regularly
- Keep the implementation process simple
- Develop sound procurement strategy
- Set a vendor selection criteria
- Strong supporting structure
- Vending management
- Energy balancing

Sustainable Prepayment System

- Customers
- Vendors
- Suppliers

- Processes
- Stakeholders
- Technology

- Internal
- External

- Standard Protocols
(CSF): Engage Customers

• Customer education
• Communication with customers
• Continuous community involvement
• Accessibility to handle customer queries

(CSF): Promote prepayment metering system

• Prepare a customer oriented marketing strategy before system installation. (Awareness campaign)
• Downplay benefits to the utility while highlighting benefits to customers
• Target different customer profiles
• Market the benefits continuously
• Solicit the support of influential Leaders to reinforce the benefits for customers.
CSF: System Support Structure

Support Structure

- Maintenance
- Data
- Revenue Protection
- Project Management
- Human Resources
- Technology
- Technical Training
- Finance

(CSF): Energy Balancing

Township/village

Non-Technical Energy Losses = Energy Delivered - Sales - Technical Losses

* technical losses usually estimated @ 10% in Eskom

Bulk/Stats Metering

Sales
(CSF): Vending Management

Introduction of Online Vending System

Vending Strategy & Future Direction

We are here
Online Vending System?

- The “online vending system”, simply described, allows a customer to purchase prepaid electricity via a remote terminal located in a supermarket store, ATM, cell phone or one of the existing vending stations.
- This system enables electricity to be vended from the main server in real-time.
- The system enables customers to purchase tokens nationwide from a central data base via a wide range of channels.
- This allows customer to purchase their electricity tokens from a broader distribution network.
- Promotes easy access, convenience and satisfaction
Online Vending Model Configurations

- Multi-Client Vending
- Gateway Vending

Expansion of Vending Outlets

- Online Vending Server
  - Meter number
  - Tariff Index
  - Supply Group Codes
  - Account number
  - Stand Number
  - Connections fee
  - Customer details
  - Arrears balance

- Retail Chain Stores
- Automatic Teller Machines (ATM’s)
- Engage National Agents using Merchants
Benefits of Online Vending

- Improved data integrity
- Improved tariff management
- Increased vending footprint
- Improved customer convenience
- Improved financial risk management
- Improved financial control and sales data
- Increased business opportunities for small business
- Customers able to purchase tokens nationwide from a central data base

Prepayment Metering system: Cost indications

<table>
<thead>
<tr>
<th>Item</th>
<th>Costs in ‘R’ (approximate)</th>
<th>Costs in ‘$’ (rate @ 7)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Std Common Base Meter (including the base)</td>
<td>420</td>
<td>60</td>
<td>Based on 2007/8 average costs</td>
</tr>
<tr>
<td>Std Split Meter: (Key pad and separate meter box)</td>
<td>720</td>
<td>103</td>
<td>Based on 2007/8 average costs</td>
</tr>
<tr>
<td>Credit Dispensing Unit (including Vending software)</td>
<td>42000</td>
<td>6000</td>
<td>Based on 2007/8 average costs</td>
</tr>
<tr>
<td>System Master Station (including software)</td>
<td>&lt; 49000</td>
<td>7000</td>
<td>Based on 2007/8 average costs</td>
</tr>
<tr>
<td>Online Vending Solution (Similar to Eskom Model)</td>
<td>&lt; 65mill</td>
<td>9mill</td>
<td>Scalable according to requirements, size and local dynamics</td>
</tr>
</tbody>
</table>
Conclusions

- The key drivers for implementing this system should be clearly defined
- Customer requirements and local circumstances should be used to select the appropriate model and technology
- Prepayment solution is only as good as the company or utility’s management system
- Do not implement new technology until it is tried and tested
- Never implement a Proprietary System!
- Engage with other prepayment metering system users to learn from their experiences