



Challenges and Risks in universal provision of electricity energy in South Africa

Promoting Energy Access for urban poor in Africa

Approaches and Challenges in Slum Electrification

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Agenda

- Key Facts about Eskom
- Background
- Challenges and Risks encountered
- Mitigation strategies
- Prepayment and Vending Technology



Key facts

Eskom, South Africa's electricity utility:

- is one of the top 10 utilities in the world by generation capacity
- is among the top 11 by sales
- generates approximately 95% of electricity used in South Africa
- generates approximately 45% of electricity used in Africa
- State Owned and Regulated through the National Energy Regulator
- **Currently Running out of Generating Capacity and busy with a major Generation Capacity Build Programme**
- employees (number) 32 674
- customers (number) 3 963 164
- electricity sales (GWh) 218 120
- nominal capacity (MW) 42 618
- net maximum capacity (MW) 37 761
- power lines (all voltages) (km) 359 854



Background

- Eskom started its **mass electrification** in earnest in the late 1980's to early 1990's ("**Electricity for All Campaign**", a few years before the historic Democratic elections
- This was as a Total Distribution **Energy Losses** have been **increasing** in the past few years
- Immediately after the Democratic elections, South Africa experienced an **increased migration** from **rural** to **urban** cities and from the **neighbouring countries** which made it **difficult** for cities to cope with housing
- That lead to the **increase** in **informal settlements** near major cities
- The cities are hard at work trying to **formalise** these informal settlements and electrification is an important aspect of that formalisation
- On the other hand Eskom is also hard at work **electrifying the rural communities** in collaboration with the South African Government to fuel **rural development**, with the hope that this will **reduce the need** for **mass urban migration**



Challenges encountered

- Many of the areas where potential customers reside had almost **no infrastructure**
- No fixed addresses, high unemployment, no bank accounts and no postal services
- Many customers were illiterate and did not understand bills
- Non-payment of services
- Meter Tampering and energy theft
- Infrastructure vandalism
- Access problems
- Low consumption levels – long payback periods
- This made it impossible for Eskom to provide the “normal service offering” which needed customers to have the above
- Generation Capacity Shortages



Legal Aspects - New Electricity Regulation Act

- Disconnections and possible statutory offences:
 - New Occupational Health and Safety Act 85 of 1983 Sec 43(5)
 - Electrical Installations Regulations of 1992: Regulations 3(5), 6(a), 6(c), 12, 5(2), 23
- Theft of Electricity
 - Common Law: Theft and Damage to Property: Non-corporal
- Possible solution:
 - Amendment to the legislation, or
 - Lay theft charges and see what the court decides
 - Court may decide to expand the common law definition of theft.



How we mitigated against the Challenges and Risks

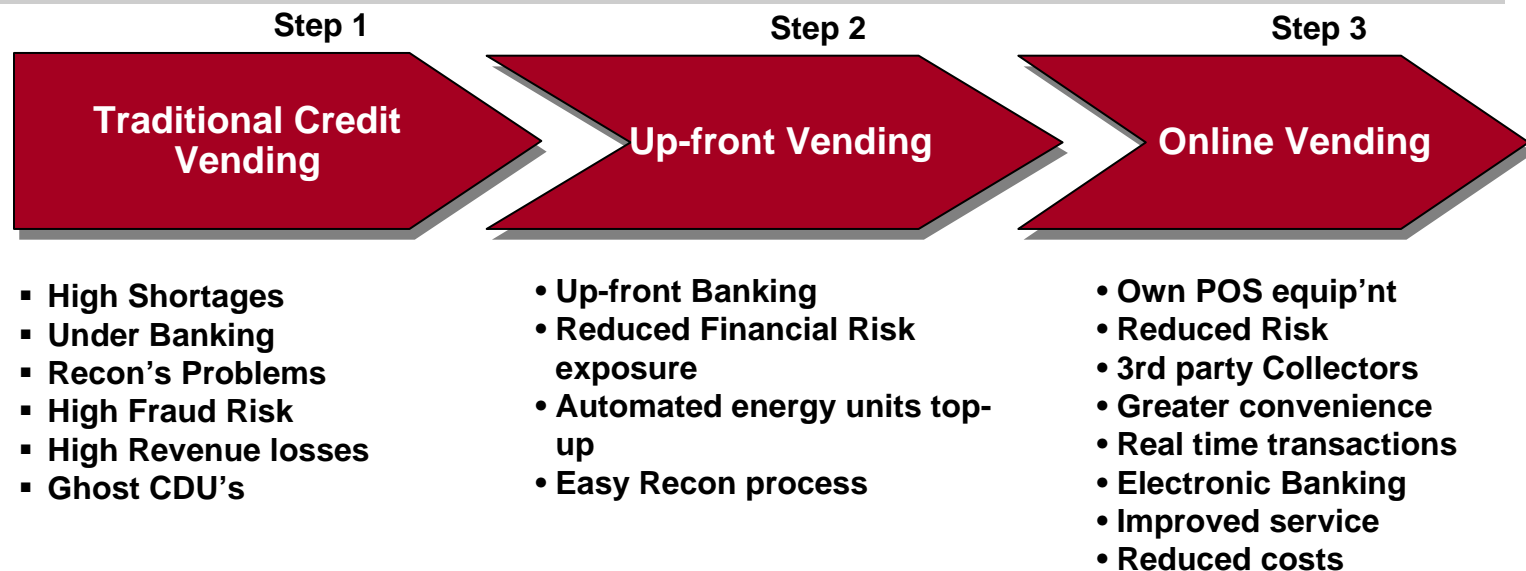
- Re-design the **electrification network infrastructure** – *to reduce cost per connection*
- Work with National and Local Government to **proclaim** some of the **informal settlements** to for **electrification** and other services (roads, water, sewage, etc.)
- Investigate the prospects of “Energisation” in areas where electrical infrastructure is non-existent (especially in Rural areas)
- Work with social security where “**FREE BASIC SERVICES**” are offered
- Introduced the **Prepayment** Metering and **Vending** Technology
 - This evolved from the basic Prepayment and Vending Technology to **On-Line Vending** and **Split-metering** with coms capabilities and secured
- Introduced more Revenue Protection Audits and other technologies to mitigate energy theft
 - This was refocused lately with the implementation of a holistic Energy Losses Management Programme, which also incorporates community involvement in dealing with the problem of energy loss management and infrastructure theft / vandalism



Prepayment and Vending Technology

Eskom Prepayment Strategy

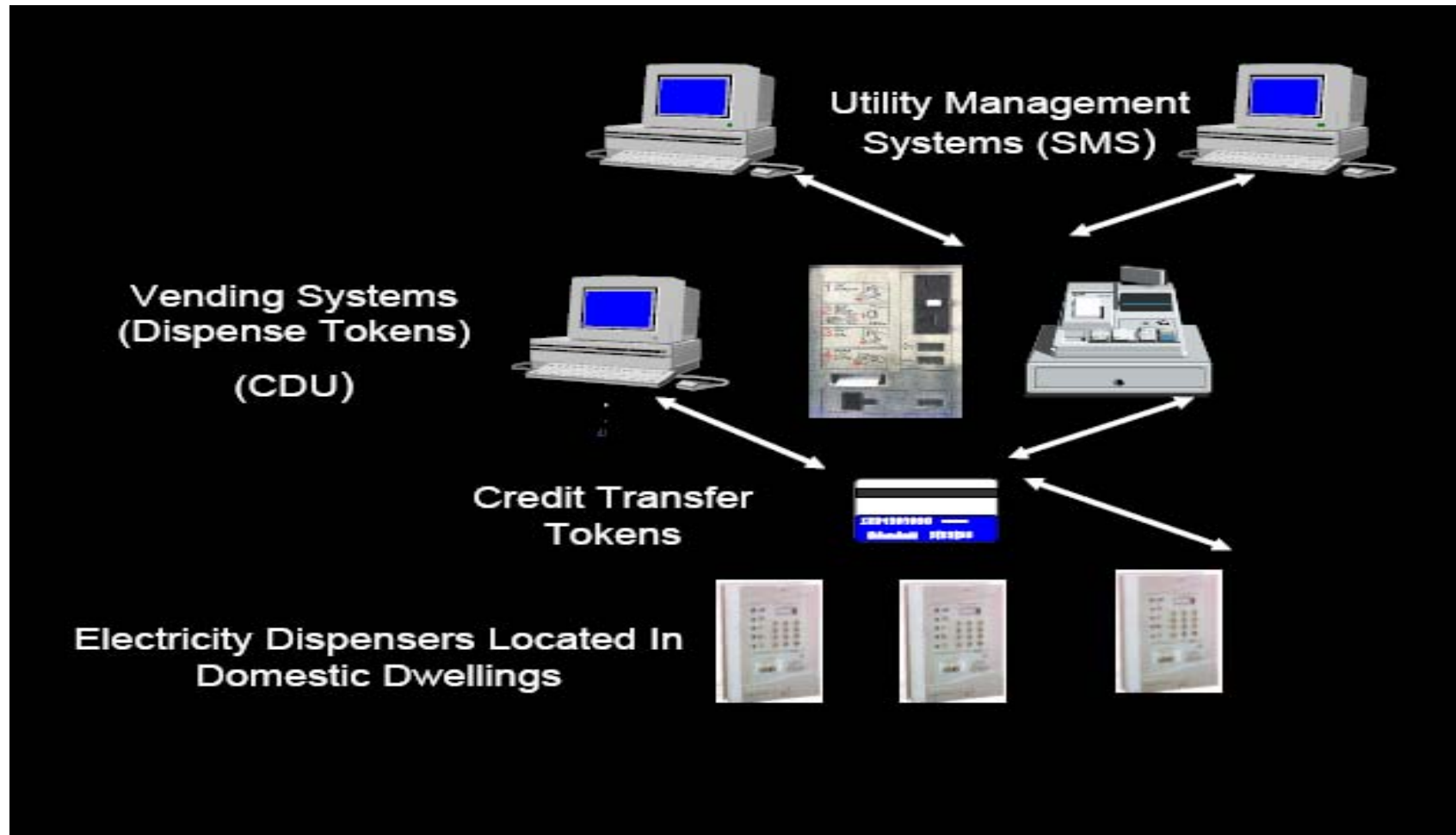
Reduces risk of consumption without payment and improves cash flow



Utilising technologies and processes to manage prepaid points of supply

Prepayment gives customers daily visibility of consumption thus enabling improved budgeting

Typical Prepayment System





Evolution 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

Current

- Standard vending systems from different suppliers.
- Faulty meters can be interchanged
- Eliminated the possibility of being locked into one supplier

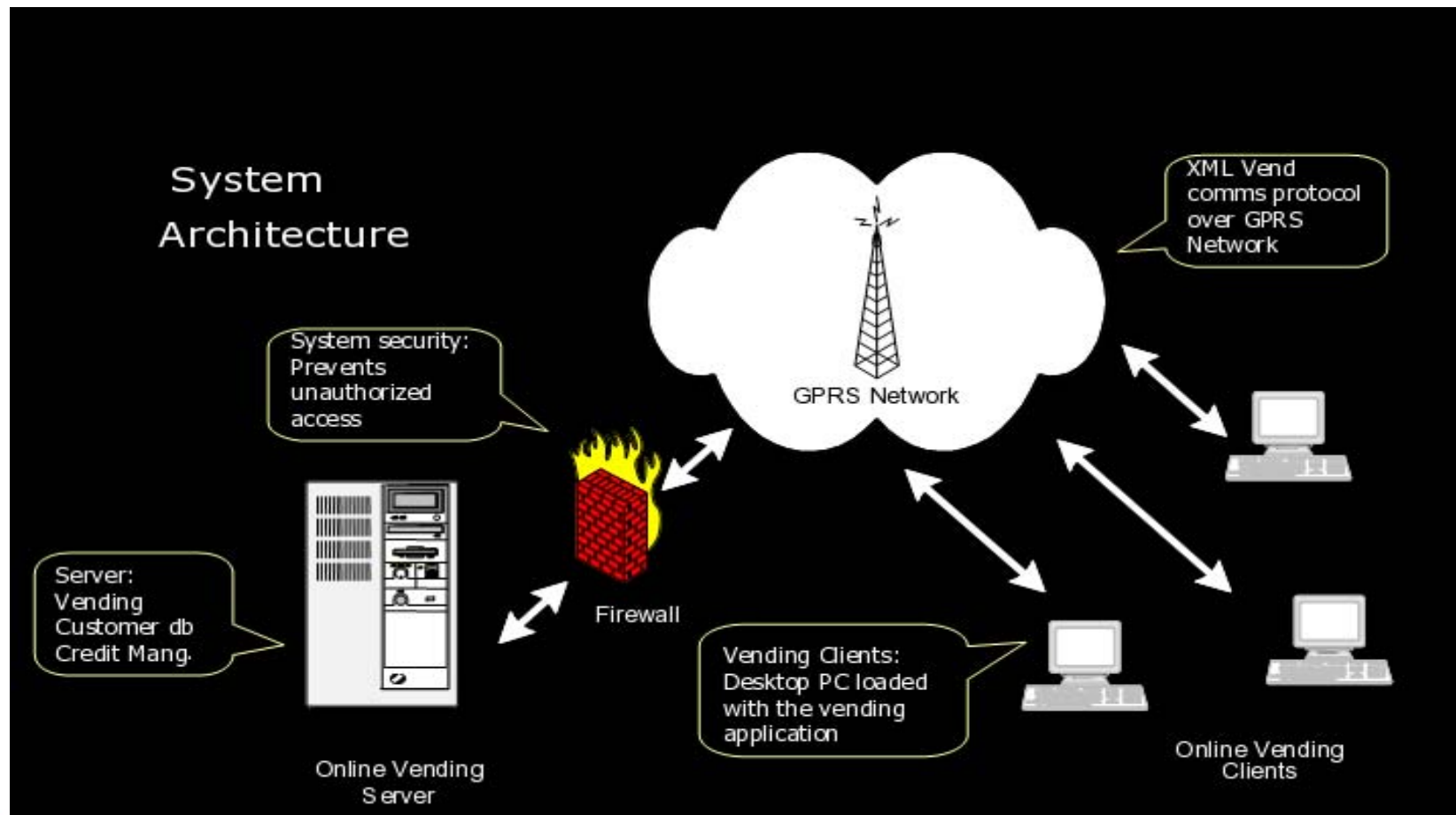




Lessons Learnt

- Meter tampering and vandalism
- Database Integrity - slow system update
- Lack of real time or near real time data.
- Integrity of Sales - Data corruption
- Loss of cash from vending stations - poor security
- Shortage of skilled prepayment staff in the country
- Potential rejection of prepayment system by customers.
- Lack of Revenue Management Skills
 - Inability to measure energy delivered to all towns, settlements and customers accurately
 - Poor vending management

Online Vending

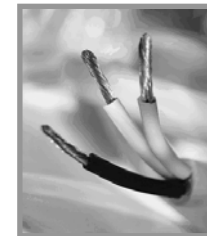


Migration to Online Vending





The End



Thank you for your time