

Municipal Electricity Metering






LEADING THE ELECTRICITY DISTRIBUTION INDUSTRY



ACTOM

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Intention of presentation

- Introductory comments
- Offer a simple overview of metering technologies
- Offer short description, advantages
- Provide a few simple conclusions

Setting the stage

According to a 2006 CSIR/cidb Discussion Document: “Towards a framework for the maintenance of municipal infrastructure: In support of government growth objectives”, findings were:

1. Municipalities account for **43% of total** volume of electricity sales (Eskom supplies the balance)
2. Few municipalities generate electricity themselves
3. Municipalities are responsible for the entire distribution system, including the **metering systems**

NRS 057

- Guideline to minimum standards
- Based on nominal size of load

Load	Accuracy Class			
	Active energy meter	Active energy meter	CT	VT
> 100 MVA	0.2S	1	0.2	0.2
10 – 100 MVA	0.5S	2	0.2	0.2
1 – 10 MVA	1	2	0.5	0.5
100kVA – 1 MVA	1	3	0.5	0.5
< 100kVA and whole current	2	3	1	-

NRS 057

In addition NRS provides:

- Clear distinction is made between “meter” and “metering equipment”
 - **Meter** = device employed to measure and totalise the variable consumption of a electricity
 - **Metering equipment** = all components, including the meter making up the metering installation.

i) Interval and TOU metering systems

- Meters are also referred to as credit or post paid meters
- Traditionally – electromechanical technology
- Evolved functionality with advent of solid state technology
- Many extra service when compared to electro-mechanical
- Offering a wide range of possibilities
- Can form part of a complex metering system
- Services benefit utilities and consumers
- Traditionally for commercial and industrial installation (Large Power Users)

Services offered (1)

Load Profile

- Record of time stamped consumption data every integration period (30 minutes in RSA)
- Allows for the analysis and the definition of a "customer's consumption pattern"
- Determine most effective billing algorithms
- Provides information about the loading of the electric system and input to the forecast of the energy request
- Status's recorded to provide network information and events experienced

Services offered (2)

TOU (Time-of-Use)

- TOU tariffs take into account definite time slots or integration periods
- each of 30 minute duration during the day
- days during a month using holidays, workdays and weekends
- months constituting the low and high peak seasons
- Modelling the outcome of applying alternative TOU tariffs is made possible with the availability of load profile data

Services offered (3)

Monitoring and Service Interruption

- Monitoring allows for optimum management of distribution networks
- Assists with reduction of losses in line and service interruptions
- High-end meters provide real time recording of number of instance and duration of electrical service breakdowns
- Assist the utility to know cause of the problem before sending service teams to fix it

Services offered (4)

Interface with the SCADA and Control Systems

- Measured parameters communicated to a SCADA (Supervisory Control and Data Acquisition) or control systems
- Actual measured quantities, weighted pulses or parameter status indications
- These control systems used on the electrical grid to make control and forecasts of load demand

AMR systems (1)

- AMR = Automated Meter Reading
- Automatically collecting data (consumption, diagnostic, and status) from metering devices
- Store in central database
- Purpose: billing, troubleshooting and analyzing
- Saves periodic trips to read a meter
- Billing accurate as near real time data used (no estimation)
- Availability of data allows utilities and customers to manage electric energy consumption
- Various communication options enabling AMR

AMR system ownership

1. **AMR system ownership**
 2. **AMR Hosting is a back-office solution**
 - Track electricity consumption over the Internet
 - Data stored in a centralized database
 - Use web application to analyze data with various online analysis tools
- Executive Major of Ekurhuleni Metropolitan Municipality, Clr Ntombi Mekgwe: “.... internet based metering will be extended to include every demand meter in the City”

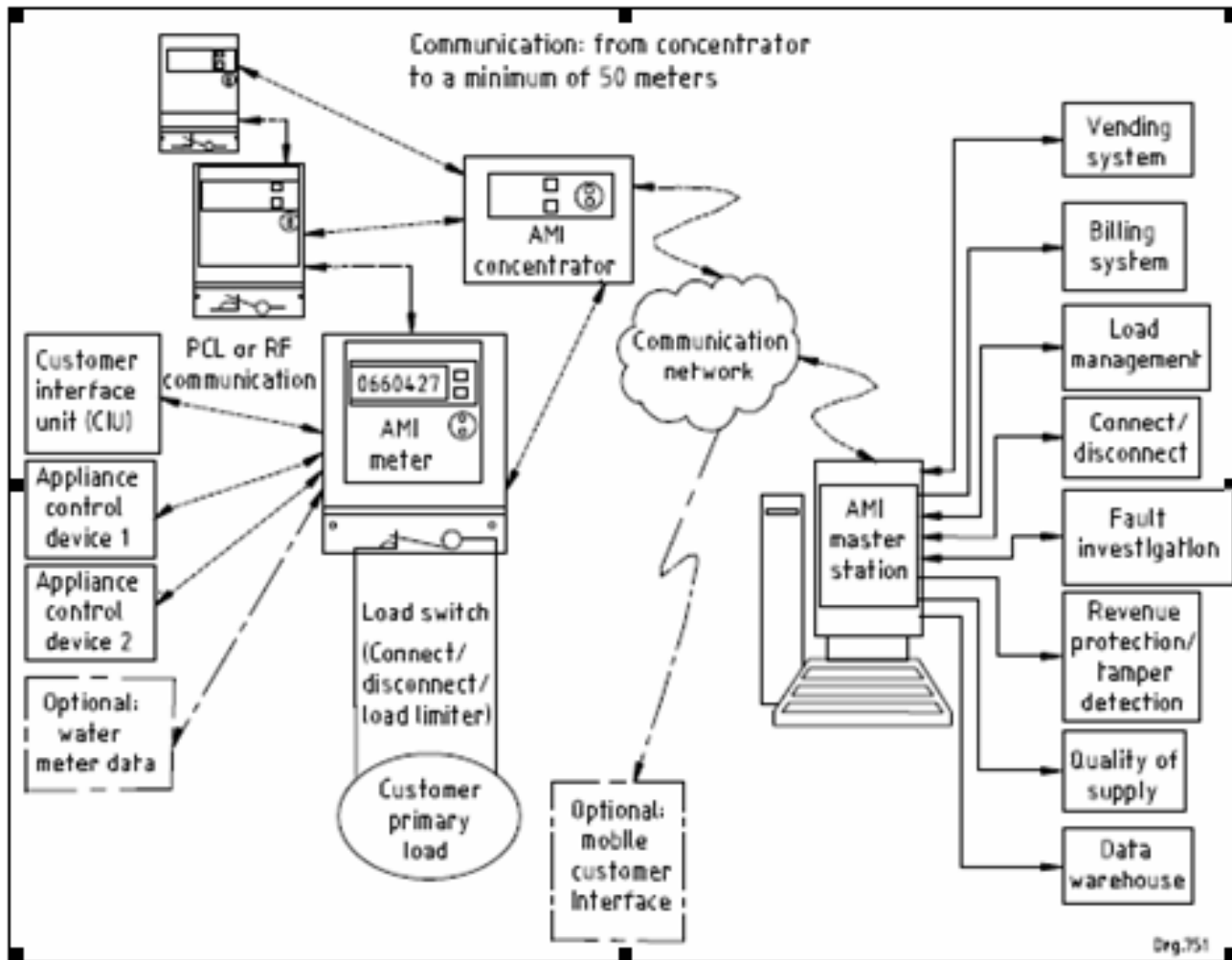
ii) Prepayment metering systems

- Use prepayment meter for various reasons, including reducing the non payment for services
- Requires the customer to make advance payment before electricity can be used
- If credit is exhausted then the supply of electricity is cut off by the meter
- Customer has a visible indication of consumption and credits left
- Meters recharged by entering a unique STS encoded 20-digit number using a keypad
- Various technologies available

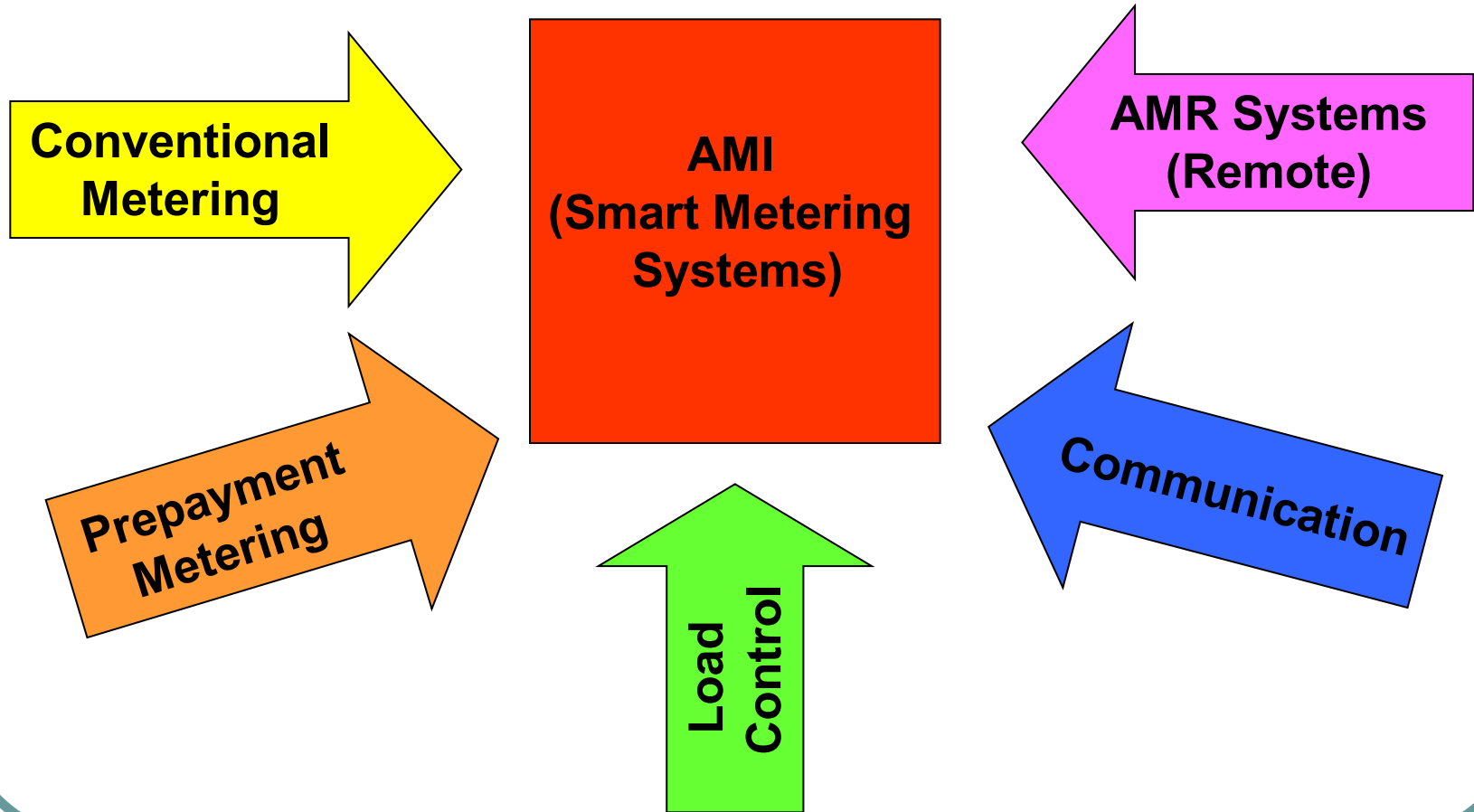
iii) AMI systems

- AMI = Advanced Metering Infrastructure,
 - often referred to as Smart Metering Systems
- AMI consists of the various system components, including:
 - Smart meters and associated equipment
 - Load control infrastructure
 - Modems, communication networks and other communication infrastructure
 - Management system and IT infrastructure
- NRS 049 gives guidance

NRS 049 Typical Arrangement



AMI – influences drawn



What is a Smart meter? (1)

The **SMART METER** is a generic term for meter with:

- Bi-directional communication
- Both conventional (credit) and prepayment modes
- Keypad (STS token entry and information/status)
- Remotely accessible (reading and configuration)
- Remote disconnection and reconnection
- Dynamic tariffs
- Customized demand control strategy
- Anti-tamper management
- Remote-Vending and Self-Vending based on STS
- Integrate to distribution automation systems

Advantages of AMI System

- Remote meter reading
- Remote- and Self-Vending based on STS possible
- Data analysis and Vending report (management)
- Comprehensive line losses analysis management
- Anti-tamper management
- Remote disconnection and reconnection via manual and automated algorithms
- Customer service and interface to Billing System
- Customized demand control (local and remote)

Conclusion

- Numerous technologies to choose from
- Each technology has its place in the scheme of the metering environment
- Cost justification to determine most suitable solution
- Integration between systems are more achievable than before, thus allowing integrated solutions
- No one technology answer

We are going with you!!!

