

Africa First Smart Metering System Standard

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CONLOG



2024 SARPA Convention

Africa's Electrification Ambitions and Challenges

2025: Continental Master Plan
interconnecting 5 power pools

2030: Universal Access to
Electricity

2030: World Bank Group –
+300 million homes

2040: Africa Single Electricity
Market (AfSEM)



Insufficient generation

Non-technical losses

Demand management

Cost of supply

Renewable limitations

Inconsistent standards

Lack of technical expertise

Smart Metering is key to the success of these initiatives and to address the challenges



What is the Africa Smart Meter Standard?

- A technical electricity meter specification, tailored for the current and future needs of African Utilities
- Developed with input of all members of the Association of Power Utilities Africa (APUA), representing 42 African countries
- Managed, prepared and published by the Africa Electrotechnical Standardization Commission (AFSEC) Technical Committee TC13
- Published as AFSEC 51300-1 Smart Metering Systems – General requirements – Part 1: Smart Electricity Meters



A Smart Meter Specification, for Africa, by Africa



How was it developed?

- Structured IEC process, managed by AFSEC TC13
- Inclusive process with inputs from all APUA, AFSEC and industry experts
 - ESKOM
 - Namibia, Nigeria, Senegal, South Africa
 - Conlog, Itron, Landis+Gyr
- **Country and Vendor Independent**

Stages in the Development of IEC Standards



Why was it developed?

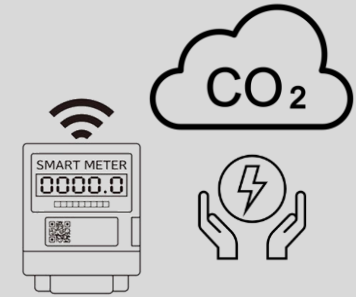
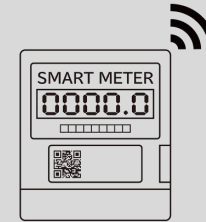
	Yesterday	Tomorrow
PRODUCTION	 Few Large Power Plants	 Many Small Power Producers
MARKET	 Centralized, Mostly National	 Decentralized, Ignoring Boundaries
TRANSMISSION	 Based on Large Power Lines and Pipelines	 Including Small Scale Transmission and Regional Supply Compensation
DISTRIBUTION	 Top to Bottom	 Both Directions
CONSUMER	 Passive, Only Paying	 Active, Participating in the System

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- The needs of utilities are evolving:
 - Smart metering
 - SSEG
 - Demand Management
- Consumer empowerment and consumption awareness
- Return on Investment
 - Reliability
 - Performance
 - Fit for purpose
 - Future proof
 - Multiple suppliers



Why is this relevant for South Africa?



Generation 1

- Energy access focus
- Basic postpaid with billing
- Manual or customer readings

Generation 2

- Revenue Enhancement and Loss Reduction focus
- Prepaid metering
- Connected or stand alone

Generation 3

- Grid management focus
- Advanced demand management
- ToU and Step Tariff
- Integration of renewable energy

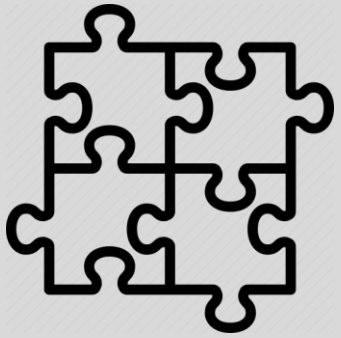
Generation 4

- Smart grid focus
- Customer Centricity
- Freedom of service provider
- Home energy management
- CO₂ emission monitoring

South Africa is transitioning from Generation 2 to Generation 3



What is unique about this specification?



Interoperability
and Security



Metrology



Disconnect
device



Accounting



Tamper
detection



Climatic
conditions



Open Standards

Communication

Protocol

Vending

G3-PLC
Alliance



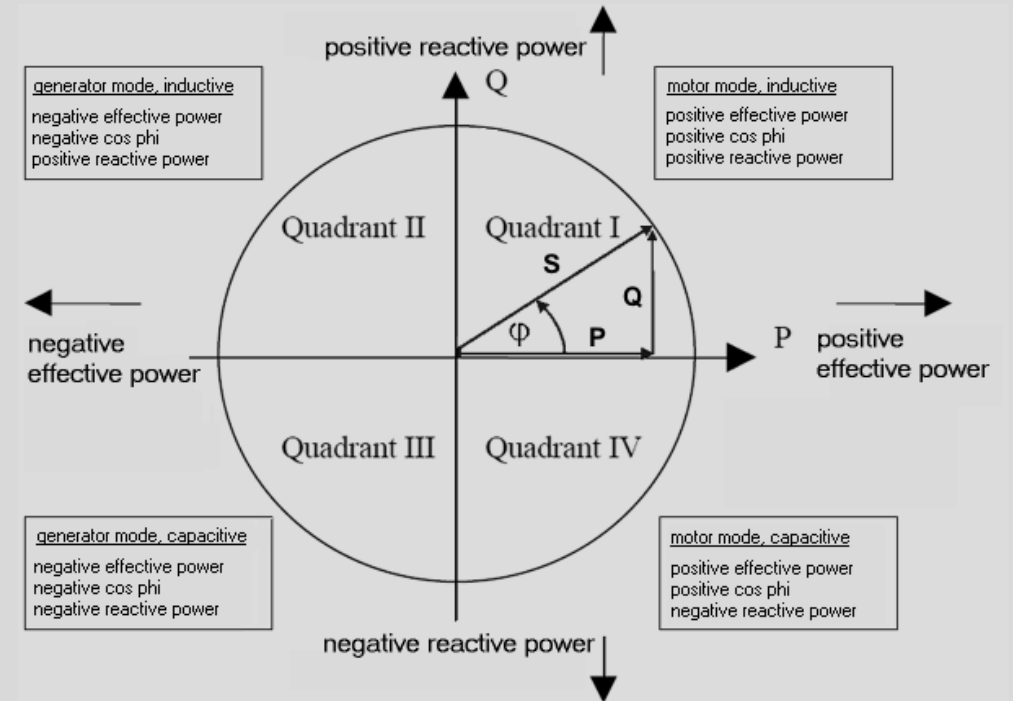
M-Bus
wireless **OMS**®



iDiS
Interoperability – simplified



- 4-quadrant measurement
- Small Scale Energy Generation (SSEG)
- Reactive surcharge billing



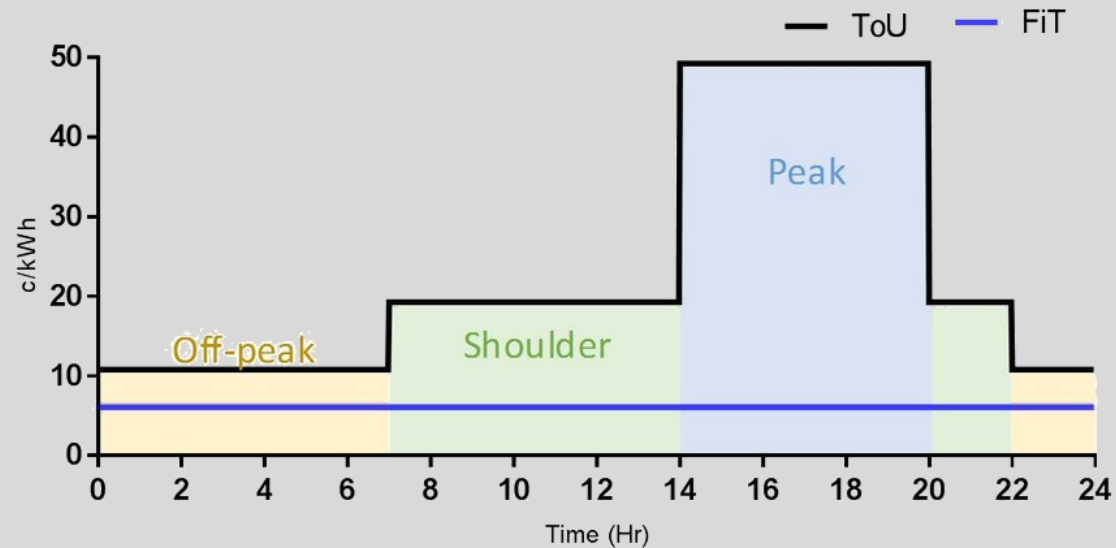
Disconnection device

- Common point of failure
- Rated by Utilization Category (UC)
- UC2 minimum requirement

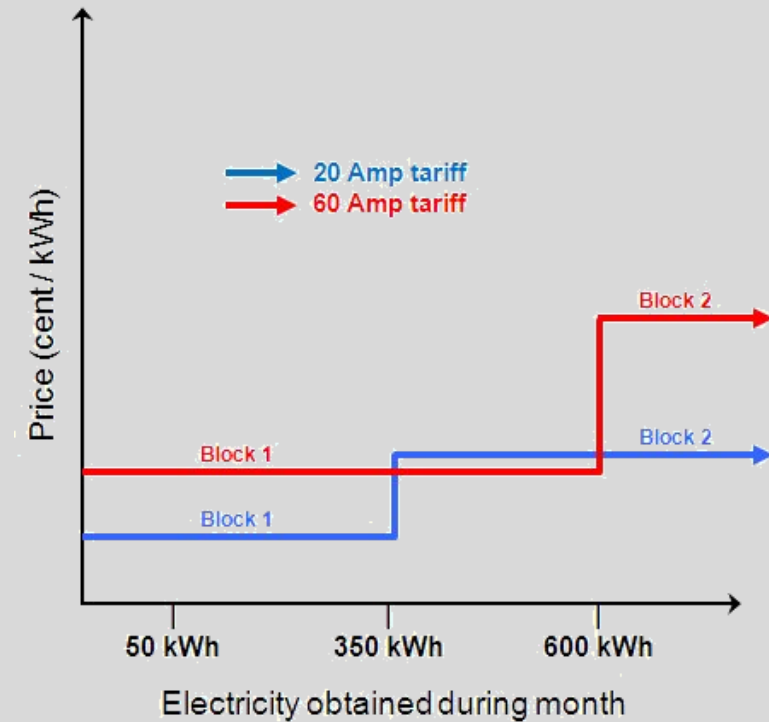
	UC1	UC2	UC3	UC4
Rated safe short-time withstand current	3kA	4,5kA	6kA	10kA
Rated operational short-time withstand current	1,5kA	2,5kA	3kA	4,5kA
Rated short-circuit making capacity	1,5kA	2,5kA	3kA	4,5kA



Typical ToU Tariff Profile



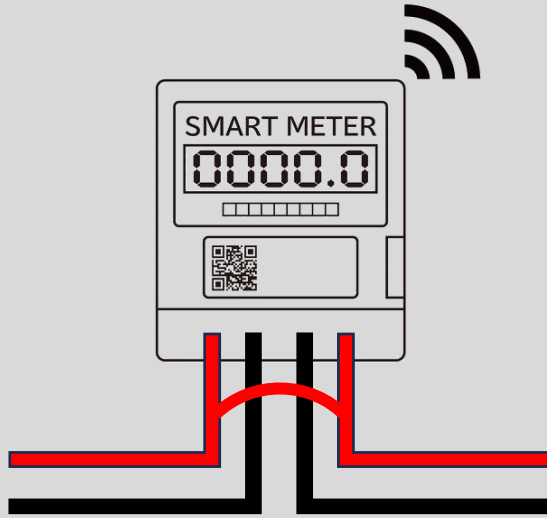
Typical Step Tariff Profile



Users would prefer Currency to kWh

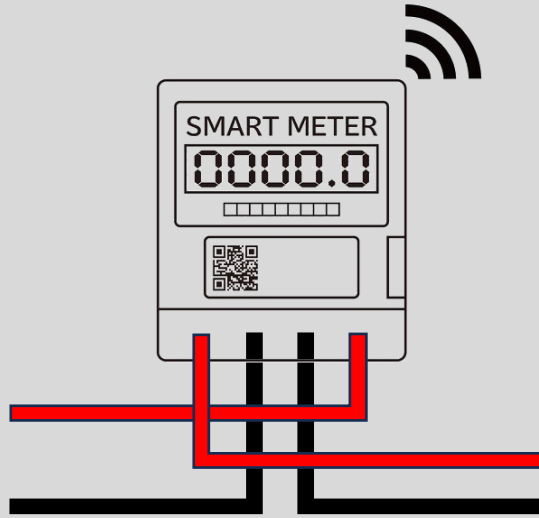


Tamper detection



Live bypass

- Absence of Live current, presence of Neutral current



Phase reversal

- Bi-directional measurement



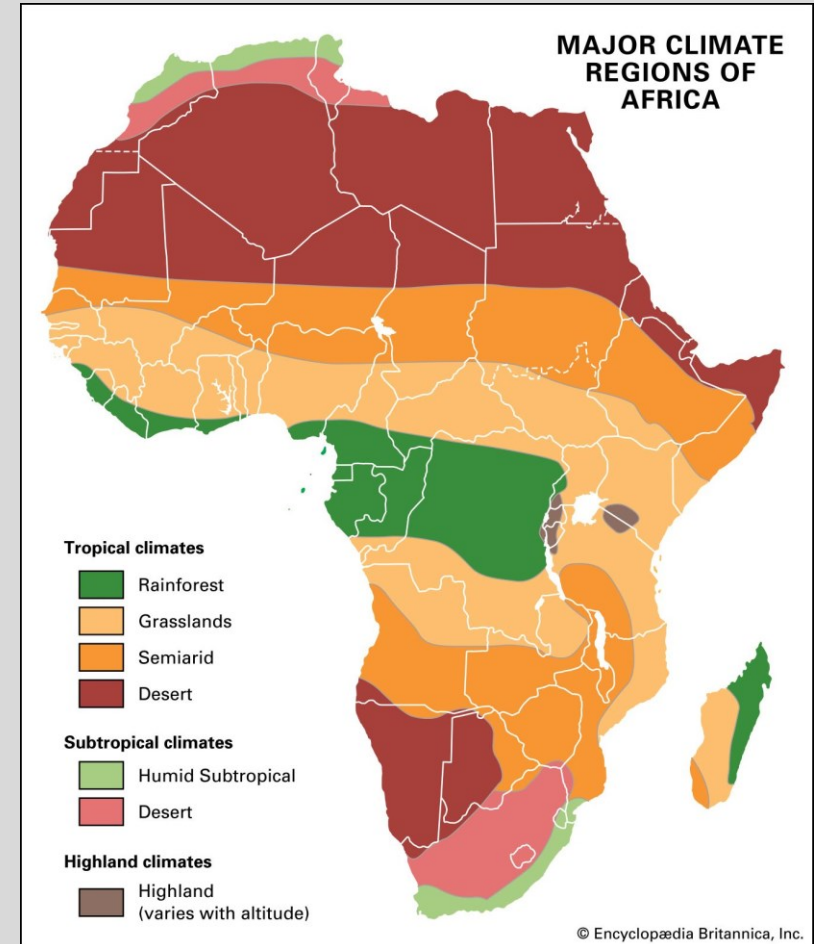
Terminal cover

- Backup supply



Climatic conditions

- Temperature
 - Accuracy in hot climates
- Humidity
 - Electrical reliability in harsh climatic conditions



How does this help municipalities?

- Demand Management
 - Intelligent load limiting
 - Intelligent load shedding
- Revenue Enhancement
 - Accuracy
 - Loss detection and reduction
- Access to Energy
 - Simple installation process
- Customer Centricity
 - kWh or Currency
 - Tracible billing improves collection
- Interoperability
- Financial
 - Return on Investment
 - Multiple vendors

Single standard that meets the needs of municipalities



AFSEC51300

RT29 Smart Meter
Specification

ESKOM Smart
Meter Specification

*Standard will formally be formally published at the AFSEC
9th General Assembly on 4-5 September 2024 in Rwanda*



THANK YOU