



## **Specifications for purchase and delivery of prepaid electricity meters for metering of KWH units**

**Department Name:** Technical (Electrical Section)

**Date:** 14 JANUARY 2020

**Procurement Plan Reference Number:** P696

### **1. Back Ground:**

This is part of an existing ongoing project to replace the metering system to AMI metering at Senqu Municipality in order to sustain revenue and data collection as well as monitor & record QoS, where required. All meters supplied MUST be able to change to STS (Standard Transfer Specification Association) Token Identifier Edition 2 ready (change over by 2024) as approved by the National Institute of Standards and Technology for use up to the year 2045.

### **2. Description of specifications:**

Purchase and delivery of Prepaid Electricity Meters for measurement of Kwh Units that are compatible with AMI BEC 44 and BEC 62 metering systems currently being used. The system must be wireless communication with the keypad. Meters must be programmed with the Senqu Municipality vending supplier group code.

**Please note:** Should a supplier be awarded the tender and the meters do not work on the existing system, the supplier WILL be held financially and legally responsible for any damages or losses that may occur to the Senqu Municipality.

### **3. Pricing & detail**

- All prices must be VAT Incl.
- The tender award only becomes valid from the date of signature of both parties to the compulsory Service Level Agreement that will be supplied by the Senqu Municipality.

Item	Equipment required	1 <sup>st</sup> Year Price per Unit	2 <sup>nd</sup> Year Price per Unit	3 <sup>rd</sup> Year Price per Unit
1	Measurement and Control Unit (MCU) with integrated wireless. Single phase wireless, split configuration. Smart Meter ready			
2	User Interface Unit Wireless UIU (wUIU) Single phase wireless Smart Meter Ready			
3	Appropriate Leaded Varistor (MOV) Single phase wireless, split configuration.			
4	Measurement and Control Unit (MCU). Three phase wired / wireless enable, split configuration. Smart Meter Ready			
5	User Interface Unit w(UIU) Three phase wired / wireless Smart Meter Ready			

6	WMI – GI RF Wireless Three phase wired / wireless enable, split configuration.			
7	Circuit Breaker single phase 63-amp 5KA			
8	Circuit Breaker 3 phase 63-amp 6KA			
9	Pole mounted 2-way meter box			
10	Pole mounted 4-way meter box			
<b>Total Price per Year</b>				
<b>Total Tender Price</b>				
<b>TO BE COMPLETED BY THE TENDERER</b>				
Name and Surname of Tenderer or Authorised Representative declaring their compliance with specifications				
Signature of Tender declaring that He / She complies with all the specifications listed above and below				

**3 (a). Measurement and Control Unit (MCU) with integrated wireless. Single phase wireless, split configuration.**

**MCU dimensions:**

<b>Measurement and Control Unit (MCU) with integrated wireless- General information Active</b>	
Type	Single phase, 2 wire, direct connected wireless prepayment meter
Compatible networks	Single phase, 2-wire, earthed neutral
<b>Electrical ratings</b>	
Accuracy	kWh Class 1
Voltage measurement ( $U_n$ )	110 VAC - 127 VAC / 220 VAC – 230 VAC
Frequency	50 / 60 Hz $\pm$ 5%
Current measurement	$I_b = 5$ A; $I_{max} = 100$ A.
Protective class	Class II double insulated
<b>MCU Enclosure</b>	
Mounting	Rail mounting, with locking clip compatible with 35 mm DIN standard rail
IP Rating	IP54, suitable for installation in a pole-top or outdoor kiosk housing
Equivalent Dimensions	148mm x 40.7mm x 78.5mm
<b>Terminals</b>	
<b>Live Circuit</b>	
Type	Moving-cage terminal
Material	Mild steel/clear passivate
Cable Size	25 mm <sup>2</sup>
<b>Neutral Circuit</b>	
Type	Moving-cage terminal
Material	Mild steel/ clear passivate
Cable Size	16 mm <sup>2</sup>



<b>Sealing</b>	
Enclosure	Factory sealed, no user serviceable parts
Security sealing of terminals	Security seal compatible with stainless steel wire and ferrule seal
<b>Operating environment</b>	
Area of application	Indoor / Outdoor in a suitable outdoor rated kiosk or enclosure
Operating temperature range	-10 °C to 60 °C
Storage temperature range	-25 °C to 70 °C
Relative humidity	Maximum 95% non-condensing
<b>Operation</b>	
Credit entry mechanism	Keypad; encrypted numeric tokens
Credit encryption method	STS Edition 2 (See Section 1)
<b>Metrological performance</b>	
Measurement direction	Forward and reverse detection and metering
Consumption indicator	Visible LED
Latch and Power status	Visible LED
Communications Link Status	Visible LED
Liquid Crystal Display (LCD)	7 digits + icons; icon information, numeric information
Accurate metering range	0.05 I <sub>b</sub> to I <sub>max</sub>
Meter constant (LED flash rate)	1000 imp / kWh
Short circuit current	30 x I <sub>max</sub> for one half cycle at rated frequency
Base current (I <sub>b</sub> )	5 A
Maximum current (I <sub>max</sub> )	80 A
<b>Disconnection Device</b>	
Type	Single pole latching contactor, 80 A.
<b>Insulation; Over voltage and Surge Protection</b>	
Insulation system classification	Protective class II
Insulation level	4 kV rms for 1 minute
Over voltage withstand	1.9 U <sub>n</sub> for 48 hours
Impulse voltage	6 kV
<b>Communication Circuitry</b>	
Type	RF wireless communications between MCU and UIU. Meter operation is independent of UIU function
Communication Distance	100 metres line of sight
<b>Alternate Communications ports</b>	
Direct probe port	STS101-1 compliant
USB port	STS101-1 compliant

### 3 (b). User Interface Unit Wireless UIU (wUIU) Single phase wireless. Smart Meter ready

<b>User Interface Unit w(UIU)</b>	
Type	RF Wireless
<b>Communication Circuitry</b>	
Type	RF wireless communications between MCU and CIU. Meter operation

	is independent of CIU function
Communication Distance	Minimum 100 metres line of sight Provision to be made for range extension in the case of building or foliage interference
<b>Operating Environment</b>	
Operating Temperature Range	-10 °C to 60 °C
Storage Temperature Range	-25 °C to 70 °C
<b>UIU Enclosure</b>	
Type	Wall mounted
Rating	IP 54
Material	UV stable polycarbonate/ABS blend with flame retardant
Type	Language-independent
Components	Pictographic/Numeric LCD display, keypad, rate of consumption indicator, audio feedback
Liquid Crystal Display (LCD)	At least 7 digits + 11 icons; icon information; numeric information display of various meter information such as credit levels, token entry
Minimum character size	10mm
Keypad	12-key, international standard layout including "information" and "backspace" keys, telephone type configuration with four rows and 3 columns, tactile feedback and Braille assist.
Buzzer	Feedback on key press, Token Accept and Reject melodies, low-credit alarms as a factory-programmable option
<b>Power source</b>	
Type	Options of Lithium battery, NiMH or Alkaline
Operational life	Minimum of 3 years operational life
<b>Sealing</b>	
Enclosure	Factory sealed, no user serviceable parts

### 3 (c). Leaded Varistor (MOV) Single phase wireless, split configuration.

Leaded Varistor (MOV) - General information	
Type	Disk Type
Application	Overvoltage protection
Features	High Peak surge current rating of 25kA
<b>Nomenclature</b>	
L	Disk type, metallized
32	Rated disk diameter
K	Tolerance of $V_v$ at 1mA: $\pm 10\%$
460	Max AC voltage
P	Epoxy resin coating



K49	Customized cable leads
<b>Electrical Data</b>	
<i>Maximum ratings (85°C)</i>	
Max operating AC Voltage	$V_{RMS} = 460V$
Max operating DC Voltage	$V_{DC} = 615V$
Surge Current (8/20µs) 1 time	$I_{max} = 25000A$
Energy absorption (2 ms)	$E_{max} = 660J$
Average power dissipation	$P_{max} = 1.2W$
<i>Characteristics (25°C)</i>	
Varistor Voltage at 1mA	$V_V = 750V \pm 10\%$
Clamping voltage at 200A (8/20µs)	$V_{Cmax} = 1240V$
Typ. Capacitance at 1kHz	$C = 1200pF$
<b>LEADS</b>	
Lead length	90mm $\pm 10\%$
Strip Ends	9mm

**3 (d). Measurement and Control Unit (MCU). Three phase wired / wireless enable, split configuration.**

<b>Measurement and Control Unit (MCU) - General information</b>	
Active	
Type	Three phase, 4-wire, direct connected prepayment meter with power overload protection
Compatible networks	Three phase, 4-wire, earthed neutral
<b>Electrical ratings</b>	
Accuracy	kWh Class 1
Voltage range	110 VAC - 127 VAC / 220 VAC – 230 VAC
Frequency range	50 / 60 Hz $\pm 5\%$
Voltage circuit burden	1.07 W and 9.26 VA @ 230V
Current circuit burden	□□□□VA @ Base reference current $I_b$
Current measurement	$I_b = 10 A$ ; $I_{max} = 100 A$ . Overload current to be programmed to 63 A
Protective class	Class II double insulated
<b>MCU Enclosure</b>	
Mounting	BS Footprint
IP Rating	IP54, suitable for installation in a pole-top or outdoor kiosk housing
Equivalent Dimensions (must be able to be fitted on the pole.)	343.8 mm x 177.2 mm x 72.4 mm
<b>Terminals</b>	

<b>Live Circuit</b>	
Type	Moving-cage terminal
Material	Mild steel/clear passivate
Cable Size	25 mm <sup>2</sup>
<b>Neutral Circuit</b>	
Type	Moving-cage terminal
Material	Mild steel/ clear passivate
Cable Size	25 mm <sup>2</sup>
<b>Communications Link</b>	
Type	2-way spring clip terminal
Material	Mild steel/nickel
Cable Size	0.7 mm <sup>2</sup>
<b>Sealing</b>	
Enclosure	Factory sealed, no user serviceable parts
Security sealing of terminals	Security seal compatible with plastic or stainless-steel wire and ferrule seal
<b>Operating environment</b>	
Area of application	Indoor / Outdoor in a suitable outdoor rated kiosk or enclosure
Operating temperature range	-10 °C to 60 °C
Storage temperature range	-25 °C to 70 °C
Relative humidity	Maximum 95% non-condensing
<b>Operation</b>	
General	Credit store with decrement-on-use
Credit entry mechanism	Keypad; encrypted numeric tokens
Credit encryption method	STS Edition 2 (See Section 1)
<b>Metrological performance</b>	
Measurement direction	Forward and reverse detection and metering
Consumption indicator	Visible LED
Latch and Power status	Visible LED
Liquid Crystal Display (LCD)	7 digits + icons; icon information, numeric information
Meter constant (LED flash rate)	
Accurate metering range	0.05 I <sub>b</sub> to I <sub>max</sub>
Starting current	0.004 I <sub>b</sub> Class 1      0.005 I <sub>b</sub> Class 2
Short circuit current	30 x I <sub>max</sub> for one half cycle at rated frequency
Base current (I <sub>b</sub> )	10 A
Maximum current (I <sub>max</sub> )	100 A Overload current to be programmed to 63 A
<b>Disconnection Device</b>	
Type	Single pole latching contactor, 100 A
<b>Insulation; Over voltage and Surge Protection</b>	
Insulation system classification	Protective class II
Insulation level	4 kV rms for 1 minute
Over voltage withstand	1.9 U <sub>n</sub> for 48 hours



Impulse voltage	6 kV
Surge immunity Voltage impulse withstand Current impulse withstand	In excess of 6 kV, 1.2/50µs 5kA / 20µs
<b>Communication Circuitry</b>	
Type	Galvanically isolated, Non-polarized, 2-wire, and half-duplex. Meter operation is independent of UIU function
Rated Impulse Voltage	Peak Voltage 6 kV (1,2/50µs) waveform (According to protective class II)
Insulation properties	(According to protective class II)
Communication Distance	100 metres line of sight

### 3 (e). User Interface unit W(UIU) Three phase wired / wireless

<b>User Interface Unit w(UIU)</b>	
Type	RF Wireless
<b>Communication Circuitry</b>	
Type	RF wireless communications between MCU and CIU. Meter operation is independent of CIU function
Communication Distance	Minimum 100 metres line of sight Provision to be made for range extension in the case of building or foliage interference
<b>Operating Environment</b>	
Operating Temperature Range	-10 °C to 60 °C
Storage Temperature Range	-25 °C to 70 °C
Relative Humidity	Maximum 95% non-condensing
<b>UIU Enclosure</b>	
Type	Wall mounted
Rating	IP 54
Material	UV stable polycarbonate/ABS blend with flame retardant
Type	Language-independent
Components	Pictographic/Numeric LCD display, keypad, rate of consumption indicator, audio feedback
Liquid Crystal Display (LCD)	At least 7 digits + 11 icons; icon information; numeric information display of various meter information such as credit levels, token entry
Minimum character size	10mm
Keypad	12-key, international standard layout including "information" and "backspace" keys, telephone type configuration with four rows and 3 columns, tactile feedback and Braille assist.
Buzzer	Feedback on key press, Token Accept and Reject melodies, low-credit alarms as a factory-programmable option
<b>Power source</b>	
Type	Options of Lithium battery, NiMH or Alkaline

Operational life	Minimum of 3 years operational life
<b>Sealing</b>	
Enclosure	Factory sealed, no user serviceable parts

### 3 (f). WMI – GI RF Wireless. Three phase wired / wireless

<b>WMI - GI</b>	
Type	RF Wireless
<b>Communication Circuitry</b>	
Type	RF wireless communications between MCU and CIU. Meter operation is independent of CIU function – Galvanic isolation
Communication Distance	Minimum 100 metres line of sight Provision to be made for range extension in the case of building or foliage interference
<b>Operating Environment</b>	
Operating Temperature Range	-10 °C to +55 °C
Storage Temperature Range	-25 °C to 70 °C
Relative Humidity	Maximum 95% non-condensing
<b>Insulation</b>	
Impulse voltage	6 kV
Insulation system classification Insulation level	Protective class II 4 kV rms for 1 minute
<b>ICASA</b>	
Approved	
<b>WMI Enclosure</b>	
Type	Pole / Wall mounted
Rating	IP 65
Mounting(equivalent)	35mm Din Mount 12.7mm Bandit strapping
<b>Terminals</b>	
Type	Drop Wire
Wire size	Maximum size 0.7mm
<b>Sealing</b>	
Enclosure	Factory sealed, no user serviceable parts

**The Tender must comply with the Following conditions or will not be considered:**

- Must meet ALL specifications above in order for the Tender Document to be considered.
- This Tender effective date will be from the date of the SLA for a period of three Years.
- The Supplier must give Warranty of 12 months on all products
- Tender must be valid for 90 Days
- Price must include delivery to Lady Grey Eastern Cape.



- Proof of Metering products stipulated in this specification document must be provided in a form of a catalogue or manufacturer specification sheets. This **MUST** be included in the Bid Document in order to evaluate if the correct product is going to be supplied. This is a compulsory request and if not adhered to the Bidder will be disqualified.
- 1<sup>st</sup> to 3<sup>rd</sup> Year Price escalation percentage to be Stipulated on Tender. Price is fixed and cannot be changed when Tender is awarded to a Supplier.
- Suppliers must tender on all products to be considered. Price per Unit is for each item but the Municipality will determine the quantity of each item to be purchased per order.
- Senqu Municipality does not bind itself to any Tender or part thereof received if the conditions are not met from the Supplier.