REG NO 2003/011612/30

CD 40/2022

SUPPLY AND DELIVERY OF SMART PREPAID ELECTRICAL METERS WITH SPLIT CUSTOMER INTERFACE UNITS AND CONCENTRATORS

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1. INVITATION

CENTLEC (SOC) Ltd (herein referred to as CENTLEC) hereby invite bidders to bid for the supply and delivery of smart prepaid electrical meters with spilt customer interface units and concentrators as detailed in the specification below for a period of thirty-six (36) months.

The CENTLEC areas of supply, where these meters would be installed, include the Greater Mangaung area (Bloemfontein, Botshabelo, Thaba Nchu, Dewetsdorp, Wepener and Van Stadensrus), Kopanong and Mohokare, as well as any other Municipality that may be added as part of the SDA.

2. MINIMUM SUBMISSION REQUIREMENTS

Any omission of the listed items would render an automatic disqualification

2.1 Supply unique security personal identification number (PIN) and/or original TAX Clearance Certificate for TAX compliant status.

2.2 Supply municipal services (water, sanitation, rates and electricity) clearance certificate or Lease Agreement with a current Bill and rates clearances, or Current Bill of Account not owing more than 30 days. In a case where the services are paid for by the Landlord, the lease agreement must be signed by the applicable stakeholders.

- 2.2.1 In an event that the Bidder utilizes prepaid services (e.g. water and or electricity) a valid municipal clearance certificate(s) must still be provided.
- 2.2.2 Bidders that are CENTLEC (SOC) Ltd customers are also expected to attach a valid electricity clearance certificate.

2.3 Submit proof of registration on the National Treasury Centralized Supplier's Database

2.4 Submit proof of ISO 9001 accreditation for the manufacturer of the goods.

3. LOCAL CONTENT PRE-QUALIFICATION

Preferential Procurement Regulations 2017 section 8 (Local production and content) states that:

(2) An organ of state must, in the case of a designated sector, advertise the invitation to tender with a specific condition that only locally produced goods or locally manufactured goods, meeting the stipulated minimum threshold for local production and content, will be considered.

(*5) A tender that fails to meet the minimum stipulated threshold for local production and content is an unacceptable tender.*

NB!!! Bidders are required to complete Annexure C, D & E for declaration of Local Content %.

These designated sectors include the following (But are not limited) with the minimum threshold:

Designated Sector	Minimum Threshold
(Smart) Prepaid Electricity Meters	70%

4. SCOPE OF WORK

The scope of this bid document includes the following requirements and services relating to the delivery and supply of Smart Prepaid Meters, CIU's and Concentrators:

This specification sets the required minimum level of functionality for meters that are required to manage residential and commercial consumption in the areas currently supplied by CENTLEC. At present, residential and commercial customers are supplied by means of single and three phase kWh meters while Bulk customers are supplied by means of three phase quadrant meters. Single and three phase kWh meters should be configurable in credit or in pre-paid mode.
The meters shall allow for the monitoring, remote meter reading, control and reporting on electricity consumption via a two-way communication system from a centralized computerized existing CENTLEC master station. The system master station includes facilities for remote disconnection of kWh meters as well as two auxiliary switched outputs to enable geyser and appliance control for all kWh meters.

The meter must have open protocol to integrate with the current Smart Metering system CENTLEC currently employs, the meter software system can be stand-

alone but should be able access all the data as specified at all time.

5. NORMATIVE REFERENCES

Document	Title
Standards containing prescriptive references	
SANS/IEC 62052-31	Electricity metering equipment (a.c) – General requirements, tests and test conditions – Part 31: Metering equipment.
SANS/IEC 62052-21	Electricity metering equipment (a.c.) – General requirements, tests and test conditions – Part 21: Tariff and load control equipment
SANS/IEC 62052-21	Electricity metering equipment (a.c) – Particular requirements: Static meters for active energy (classes 1 and 2)
SANS/IEC 62053-23	Electricity metering equipment (a.c) – Particular requirements – Part 23: Static meters for reactive energy (classes 2 and 3).
SANS/IEC 62055-41	Electricity metering – Payment systems – Part 41: Standard transfer specification (STS) – Application layer protocol for one-way token carrier systems.
SANS/IEC 62055-51	Electricity metering – Payment systems – Part 51: Standard transfer specification (STS) – Physical layer protocol for one-way numeric and magnetic card token carriers
SANS/IEC 62055-52	Electricity metering – Payment systems – Part 52: Standard transfer specification (STS) – Physical layer protocol for two-way virtual token carrier for direct local connection
SANS/IEC 62056-21	Electricity metering – Data exchange for meter reading, tariff and load control – Part 21: Direct local data exchange.
NRS 096-1	Electricity metering – Ancillary specifications – Part 1: The sealing of electricity meters.
IEEE 802.16	Broadband wireless Metropolitan Area Networks (MANs)
SANS/IEC 62051	Electricity metering – Glossary of terms.
SANS 164-1	Plug and socket-outlet systems for household and similar purposes for use in South Africa – Part 1: Conventional system, 16 A 250 V a.c.
SANS 474 (NRS 057)	Code of practice for electricity metering.
SANS 1524-1	Electricity payment systems – Part 1: Prepayment meters.
SANS/IEC 61334	Distribution automation using distribution line carrier

Document	Title
Standards containing prescriptive references	
	systems – Parts 1,3,4,5 and 6
SANS/IEC 62054-21	Electricity metering (a.c.) – Tariff and load control – Part 21: Particular requirements for time switches.
SANS/IEC 62058-31	Electricity metering equipment (a.c) – Acceptance inspection – Part 31: Particular requirements for static meters for active energy (class 0,5; 1 and 2). (Replacing IEC 6135)
SANS/IEC 60529	Degrees of protection provided by enclosures (IP Code).

6. TECHNICAL SPECIFICATIONS

6.1 ELECTRICAL ENERGY METERS

6.1.1 Single-Phase PLC

(i) Physical characteristics

The meter shall be manufactured in accordance with the BS standard foot-print for single phase meters. To prevent tampering, the meters shall be manufactured in such a way that the active unit, connections and breaker/contact switch shall be covered and sealed with plastic seals, lead seals or sealing wire. Breaking of these seals and opening of the meter shall result in immediate tamper detection (indication with tamper flag) and the automatic internal disconnection of the meter. Resetting of the tamper disconnection should only be done by means of an engineering code. Provision shall be made to prevent insect infestation (IP53 rating).

(ii) General Characteristics

The meter shall disconnect the supply in the event of:

(a) Expiry of credit
(b) Current exceeding the requested rated current
(c) Any attempt at tampering or breaking the seals

The meter shall be of a design measuring kWh consumed. The rated current of the single phase meter shall be programmed for 60 amps although specified as 80 Amps and the minimum rated current of the three-phase meter at least 100 Amps per phase.

The meters shall comply in full respect to the latest STS standards as prescribed in NRS 009 and SANS 1524. All the meters shall be programmed

with preloaded eight (8) units.

THE METER SHALL BE OF A DESIGN AND MANUFACTURED TO INCLUDE THE FOLLOWING:

(a) Programmable load limiting (Power limit in Amps)
(b) Front panel tamper indication
(c) Automatic keypad and trip test facility
(d) Tamper indication
(e) Remaining credit in kWh
(f) Total energy used in kWh
(g) Number of transactions
(h) Breaker status (On/Off)
(i) Meter number and software version number

Remote reset of split meter (tripped due to no credit) when crediting an input of energy (kWh)
Each consignment of meters shall be supplied with acceptable test certificates clearly stating the percentage error of each meter in the consignment. No consignment will be accepted unless it is accompanied by test certificates.
The successful bidder shall also submit details of the standards authority against which the test equipment has been calibrated thereby confirming the accuracy of the test certificates.

Single-Phase PLC	
Phase	Single
Voltage range	220 - 240V (L-N)
Current range	20 - 80A
Frequency	50Hz
IEC approvals - Accuracy	IEC 62053-21:2003, 62053-23:2003
IEC approvals - Ingress protection	IEC 60529:1989 (IP53 rating)
Product Life	15 years (10 years Certified)
Maximum (Voltage)	120 % of the maximum voltage.
Maximum (Current)	120 % of the maximum current.
Insulation	4kV RMS 50Hz
Impulse withstand	12kV 1.2/50µs, 40ohm source
Temperature - Operational	-40°C to +55°C
Temperature - Storage	-40°C to +85°C

The meter shall operate from the phase voltage (no external auxiliary supply requirement).

Meter ports
P1: Main communication port to main server via communications module (CM).
P2: Local meter optical port for meter reading, setup and configuration

P3: Meter port to communicate with In-house display module
P4: Meter port to communicate with disconnect devices

Communication links

L1: Main communications link between Smart Meter server and communications node/ concentrators:

I. Physical medium: Fibre optic links, Wimax, GPRS, internet link
II. Communication protocols TCP/IP
III. Metering protocol DLMS/COSEM

L2: Links between meters and concentrator/ communication node

I. Physical medium: RF mesh, PLC, cable
II. Communication protocol: relevant open standard e.g. IEEE 802.12.5
III. Metering protocol DLMS/COSEM

L3: Link between meter and in-house display module

I. PLC or RF
II. Protocol: Open standard

L4: link between meter load control outputs and disconnect devices in customer house

I. RF or PLC
II. Protocol: Open standard

L5: Any form of communication between the server and the meter will be acceptable.

6.1.2 **Three-Phase PLC**

(i) Physical characteristics

The meter shall be manufactured in accordance with the BSS foot-print for single phase meters. To prevent tampering, the meters shall be manufactured in such a way that the active unit, connections and breaker/contact switch shall be covered and sealed with plastic seals, lead seals or sealing wire. Breaking of these seals and opening of the meter shall result in immediate tamper detection (indication with tamper flag) and the automatic internal disconnection of the meter. Resetting of the tamper disconnection should only be done by means of an engineering code. Provision shall be made to prevent insect infestation (IP53 rating).

(ii) General Characteristics

The meter shall disconnect the supply in the event of:

(a) Expiry of credit
(b) Current exceeding the requested rated current
(c) Any attempt at tampering or breaking the seals

The meter shall be of a design measuring kWh consumed. The rated current of the single phase meter shall be programmed for 60 amps although specified as 80 Amps and the minimum rated current of the three-phase meter at least 100 Amps per phase.

The meters shall comply in full respect to the STS standards as prescribed in NRS 009 and SANS 1524. All the meters shall be programmed with preloaded eight (8) units.

THE METER SHALL BE OF A DESIGN AND MANUFACTURED TO INCLUDE THE FOLLOWING:

(a) Programmable load limiting (Power limit in Amps)
(b) Front panel tamper indication
(c) Automatic keypad and trip test facility
(d) Tamper indication
(e) Remaining credit in kWh
(f) Total energy used in kWh
(g) Number of transactions
(h) Breaker status (On/Off)
(i) Meter number and software version number

Remote reset of split meter (tripped due to no credit) when crediting an input of energy (kWh)
Each consignment of meters shall be supplied with acceptable test certificates clearly stating the percentage error of each meter in the consignment. No consignment will be accepted unless it is accompanied by test certificates.
The successful tenderer shall also submit details of the standards authority against which the test equipment has been calibrated thereby confirming the accuracy of the test certificates.

Three-Phase PLC	
Phase	Three
Voltage range	220 - 240V (L-N) / 380 - 415V (L-L)
Current range	20 -100A and 20 - 160A
Frequency	50Hz
IEC approvals - Accuracy	IEC 62053-21:2003, 62053-23:2003
IEC approvals - Ingress protection	IEC 60529:1989 (IP53 rating)
Product Life	15 years (10 years Certified)
Maximum (Voltage)	120 % of the maximum voltage.
Maximum (Current)	120 % of the maximum current.
Temperature - Operational	-40°C to +55°C
Temperature - Storage	-40°C to +85°C

Meter ports
P1: Main communication port to main server via communications module (CM).
P2: Local meter optical port for meter reading, setup and configuration
P3: Meter port to communicate with In-house display module

P4: Meter port to communicate with disconnect devices

Communication links

L1: Main communications link between Smart Meter server and communications node/ concentrators:

I. Physical medium: Fibre optic links, Wimax, GPRS, internet link
II. Communication protocols TCP/IP
III. Metering protocol DLMS/COSEM

L2: Links between meters and concentrator/ communication node

I. Physical medium: RF mesh, PLC, cable
II. Communication protocol: relevant open standard e.g. IEEE 802.12.5
III. Metering protocol DLMS/COSEM

L3: Link between meter and in-house display module

I. PLC or RF
II. Protocol: Open standard

L4: link between meter load control outputs and disconnect devices in customer house

I. RF or PLC
II. Protocol: Open standard

L5: Any form of communication between the server and the meter will be accepted

6.1.3 **Operational Requirements of meters**

All the meters should be easily programmable to operate either as prepayment or post payment (Credit) meters

The following non-interval data shall be stored on the meter and it shall be able to be retrieved through remote communication

- Total energy;
- Energy per Time-of-use period;
- Status alarms to verify the integrity of the data.
- Event recording i.e. tokens entered
- Tamper detection;
- Supply outage
- Over and under voltage;
- The limit setting shall be configurable from ±5% to ±15% of nominal voltage, as a minimum;
- An event shall be recorded if over and under voltage is sustained for a pre-defined period. This period shall be settable from 1 to 3 600 seconds;
- The date and time of the beginning of the event, and the date and time of

the end of the event shall be stored;
- For each under-voltage event the minimum voltage that occurred during the period shall be recorded. For three phase meters, the phases affected shall also be recorded;
- Disconnect / reconnect;
- Master station appliance (load) control override; and Meter configuration change.

6.1.4 **Communication**

a) The communication network will be a combination of the CENTLEC's Fibre Optic network from the Server (LAN)/Power Station to all the Distribution Centres (fibre optic communication) on the network.

b) The system shall support different transmission networks for communicating with the meters and collecting data from them. The system shall support the following communication media:

- GSM 900/GPRS (Global System for Mobile Communications)
- GSM 1800/GPRS
- GPRS/3G (General Packet Radio Service / 3G – video calls, browsing Internet)
- GPRS/5G
- TCP/IP (Transmission Control Protocol and Internet Protocol)
- ADSL (Asymmetric digital subscriber line)
- LTE (Long Term Evolution, 4G mobile communication standards)

c) The system shall communicate with meters using internationally recognized standards and communication protocols, such as:

- DLMS/COSEM (IEC 62056) - mandatory (Device Language Message Specification / Companion Specification for energy metering) Standard for electricity metering data exchange
- IEC 1107 (EN61107) – mandatory
- SCTM – optional
- FNP – optional
- IEC 870-5-102 – optional
- Mod Bus RTU
- DNP3

6.1.5 **Customer Interface Unit (CIU) - Requirements**

6.1.5.1 The CIU should be Plug & Play and inter-changeable with other meters (1-phase and 3-phase) of the same make, as well as with other brands within CENTLEC infrastructure. Current brand names include Unique Mbane, Shanghai Xieling, Hexing, Inhemeter and Sangxing.

6.1.5.2 The graphical display shall be able to display messages of 255 characters.

6.1.5.3 The customer interface unit shall incorporate coloured indicators to indicate the active tariff rate.

6.1.5.4 Buttons shall be provided for to allow for navigation of the information (Buttons must be rugged-made of silicon rubber)

6.1.5.5 The customer interface unit shall allow for a communication/setup interface to configure the display with the correct meter information.

6.1.5.6 The digits of the values must be at least 4mm in height.

6.1.5.7 It is preferable that the CIU display be capable of being read in the dark (Back lights).

6.1.5.8 The display unit shall be capable of functioning after the meter has disconnected with the electricity supply.

6.1.5.9 The communication between the meter and the customer interface unit shall be via power line or communication wire.

6.1.5.10 The unit shall display the appliance switching status of the meter. The unit shall be capable to graphically display consumption and cost graphs for daily, weekly and monthly values.

6.1.5.11 CIU`s must have a two (2) years manufacturers guarantee delivered with each batch. Failure of CIU in the guarantee period will constitute replacement by the supplier at no cost to CENTLEC.

6.1.5.12 CIU`s must comply with at least IP53 rating.

6.1.6 **Display Information on CIU**

Display information	Meter display	Customer interface unit
Meter identification number (serial number)	Yes	Yes
Date and time	Yes	Yes
Off peak kWh (import)	Yes	Yes
Peak kWh (import)	Yes	Yes
Total kWh (import)	Yes	Yes
Off peak kWh (export)	Yes	Yes
Peak kWh (export)	Yes	Yes
Total kWh (export)	Yes	Yes
kVArh quadrant 1	Yes	Yes
kVArh quadrant 2	Yes	Yes

kVArh quadrant 3	Yes	Yes
kVArh quadrant 4	Yes	Yes
Current demand (kW)	Yes	Yes
Interval energy consumption (kWh)	No	Yes
Current tariff period	Yes	Yes
Energy cost (current billing month)	No	Yes
Energy cost (previous interval)	No	Yes

6.1.7 **Concentrators**

Voltage	
Reference Voltage	3 x 230/400V
Voltage range	0.8…..1.15U
Frequency	50Hz ±5%
Power consumption	
In voltage Circuit	≤ 10VA
In current Circuit	≤ 2.5VA
Communication Interface	To IEC 62056-21
Optical interface (IR)	
RS485 interface	To ISO-8482
PLC interface	To read meter data
Protocol	DL/T 645-2007
GPRS Interface	To main station
LAN (option)	To main station
Radio Frequency	To main station
RS232 interface	For service on site
USB interface	For download software
Other Data	
Weight	Approx.3.3kg
Dimension (L×W×D)	290x180x95mm
Surface mounted	

6.1.8 **Concentrator - Requirements**

6.1.8.1 The Concentrator should be able to connect, communicate and interrogate data from meters (1-phase and 3-phase) of the same make, as well as with other brands within CENTLEC infrastructure. Current brand names include Unique Mbane, Shanghai Xieling, Hexing, Inhemeter and Sangxing.

6.1.8.2 The graphical display shall be able to display messages of 255 characters.

6.1.8.3 The customer interface unit shall incorporate coloured indicators to indicate the connectivity status.

6.1.8.4 Buttons shall be provided for to allow for navigation of the information (Buttons must be rugged-made of silicon rubber)

6.1.8.5 The digits of the values must be at least 4mm in height.

6.1.8.6 It is preferable that the Concentrator display be capable of being read in the dark (Back lights).

6.1.8.7 The display unit shall be capable of functioning after the Concentrator has disconnected with the electricity supply.

6.1.8.8 The communication between the meter and the Concentrator shall be via power line.

6.1.8.9 The communication between the Concentrator and the Back-end System will be as per the mentioned communication modes under item 6.1.4 above.

6.1.8.10 Concentrators must have a two (2) years manufacturers guarantee delivered with each batch. Failure of Concentrator in the guarantee period will constitute replacement by the supplier at no cost to CENTLEC.

6.1.8.11 Concentrators must comply with at least IP53 rating.

General Information

	DESCRIPTION	ITEM 6.1.1 & 6.1.2	ITEM 6.1.5	ITEM 6.1.7
1.1	Manufacturer	_____	_____	_____
1.2	Country of origin	_____	_____	_____
1.3	Type of Meter	_____	_____	_____
1.4	Number of similar sold in the last five (5) years in South Africa	_____	_____	_____
1.5	List of other local authorities and Municipalities with similar in use (specified separately)			
	ESKOM approved (Yes/No)	_____	_____	_____
1.6	Certificate No.			
	SANS approved (Yes/No)			
1.7	Certificate No.			
	Protocol supported by meter	_____	_____	_____
1.8	(e.g., FLAG, Chirps, DLMS, COSEM, etc.)			
		_____	_____	_____

7. SPECIAL CONDITIONS

7.1 Warranties of a minimum of one (1) year on all meter-related equipment including communication modules, concentrators, keypads, etc.

7.2 Suppliers must provide CENTLEC with a stand-alone software system that has the ability to read the prepaid meter memory even when the display is broken or damaged, and full access to interrogate the meter and any other readings from the meter via an optical eye cable.

7.3 Certification of the meters.

7.4 Provide initial training, with training manuals, for all new products and assist technically with the modem setup and comms modules particularly for Concentrators.

7.5 Specified delivery times on an order, 4 to 6 weeks from placing the order.

7.6 The supplier must be able to provide proof of the latest accuracy of a meter installed if the need arises, maybe as an extra service, by physically testing the installation.

7.7 Full access to the protocol as and when needed for integration purposes. This clause shall be part of the SLA between CENTLEC and the successful bidder.

8. EVALUATION CRITERIA

All proposals submitted will be evaluated in accordance with the criteria set out in the policy of Supply Chain Management of the Entity.

The most suitable candidate will then be selected. Please take note that CENTLEC (SOC) Ltd is not bound to select any of the firms submitting proposals.

Furthermore, technical competence is the principal selection criteria, CENTLEC (SOC) Ltd will evaluate the technical criteria first, and will only look at the price and BBBEE level of contribution if it is satisfied with the technical evaluation. As a result of this, CENTLEC (SOC) Ltd does not bind itself in ***any way*** to select the firm offering the lowest price.

The relative technical weighting of the criteria is as follows:

8.1EVALUATION TABLE

No.	Criteria	Description	Points
1.	Track record and experience	Have they provided these services in the last four years? A maximum of 3 reference letters of confirmation is required. a. Two (2) letter = **10 points** b. Three (3) letters = **20 points**	20
2.	Local (Mangaung) operational capability and economic investment	Does the bidder have a local office with operational capability and will they use local resources and procure from local businesses Or what is their plan to do this during the duration of this project? **a.** Existing and established local office (CENTLEC distribution area) = **15 points** b. If not (Within South Africa)= **5 points**	15
3.	Delivery times	**a.** Delivery within 4 weeks = **15 points** **b.** Delivery within 5 weeks = **10 points** c. Delivery after 6 weeks = **0 points**	15
4.	Bidders should present and demonstrate the list of equipment	Samples to be supplied to CENTLEC evaluation committee to prove functionality as per the specified requirements: a. Single-Phase and Three-Phase PLC/RF/Wired prepaid meter = **10 points** b. Data Concentrators = **10 points** c. Software that reads the memory of the prepaid meter = **20 points** d. CIU able to communicate with the meter when power is off = **10 points**	50
	TOTAL		**100**

A bidder who gets a minimum of 75 points and above on will qualify to the next stage. Individual tenders would have to be evaluated according to the preferential point system. The bidder must score minimum points as follows:

Item 1 – 10 points
Item 2 – 5 points
Item 3 – 10 points
Item 4 – 50 points; in the Evaluation Criteria.

The point system applicable to this project will be: 90/10

8.2 PRICE AND REFERENTIAL POINTS SCORING – STAGE 2 (Price and B-BBEE status)

All Bidders that have passed the technical evaluation threshold of 75 points would also be scored based the 90/10 principle where 90 Points is for the Price and 10 points for B-BBEE as per the detail given below

Price and referential points scoring – (Stage 2)

A Maximum of 90 Points is allocated for price on the following basis:

$$Ps = 90\left(1 - \frac{Pt - Pmin}{Pmin}\right)$$

Where

Ps = Points Scored for comparative price of bid under consideration

Pt = Comparative Price of bid under consideration

Pmin = Comparative Price of lowest acceptable bid

8.2.1 Points awarded for B-BBEE Status Level of Contribution

In terms of Regulation 5(2) and 6(2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table below;

B-BBEE Status Level of Contributor	Number of Points (90/10 System)
1	10
2	9
3	6
4	5
5	4
6	3
7	2
8	1
Non-Compliant Contributor	0

9. PRICING

All bidders should develop their quotation using the following pricing schedule:

Table 1 – Price schedule

PRICE SCHEDULE FOR PREPAID METERS **[all prices are per prepaid meter and exclusive of VAT]**				
ITEM NO.	**DESCRIPTION**	**Manufacturer and item code**	**Lead time for delivery (weeks)**	**COST PER ITEM (RANDS)**
1	Single-Phase PLC and Wired Prepaid Meters			
2	Three-Phase PLC and Wired Prepaid Meters			
3	Directly connected Single-Phase kVA/kWh Smart Meter (5 to 100A)			
4	Directly connected Three-Phase kVA/kWh Smart Meter (5 to 100A)			
5	Directly connected Three-Phase kVA/kWh Smart Meter (5 to 160A)			
6	Concentrators			

10. CONTACT INFORMATION

10.1 For any further technical information regarding the document contents please contact Mr. K Mohlakane e-mail: Kenneth.Mohlakane@centlec.co.za. Such queries must be done in writing; the email address provided serves this purpose. The answer to one question will be sent to all the other prospective bidders that have bought the bid documents.

10.2 For Supply Chain related questions, please contact Ms. Palesa Makhele at 051 412 2753 or at Palesa.Makhele@centlec.co.za