



# KenGen

KENYA ELECTRICITY GENERATING COMPANY LIMITED

KGN-HYD-023- 2017

**TENDER FOR DESIGN, MANUFACTURE, FACTORY TRAINING AND TESTING, DELIVERY, SUPERVISION OF ASSEMBLY, INSTALLATION, TESTING AND COMMISSIONING OF A 20/25 MVA, 11/143.7 kV, ONAN/ONAF GENERATOR STEP-UP TRANSFORMER FOR MASINGA POWER STATION**

15<sup>th</sup> September 2017

**ADDENDUM 1**

In accordance with the Tender for Design, Manufacture, Factory Training and Testing, Delivery, Supervision of Assembly, Installation, Testing and commissioning of a 20/25 MVA, 11/143.7 kV, ONAN/ONAF Generator Step-Up Transformer for Masinga Power Station, KenGen hereby issues Addendum 1.

This addendum addresses the following issues:

- A. LV Winding Structure
- B. Transformer Condition Monitoring
- C. Commissioning equipment
- D. Tender closing date
- E. Price schedule

**1. LV WINDING STRUCTURE**

Reference is made to clause 9.2 on page 59 of 128, which shall be changed to read as follows:

“9.2 The LV Winding shall have a single layer helical design. The HV Main Winding shall have a disc partly interleaved design. The HV Regulating Winding shall have a disc design.”

Consequently, the new clause in this addendum revises the first item in page 2 of clarification 1.

**2. TRANSFORMER CONDITION MONITORING**

**25. Transformer Condition Monitoring**

The following specifications shall be replace the entire clause 25 (i.e. from 25.1 – 25.8) of the tender document. The price of the transformer condition monitoring system shall be included in the transformer price. It is part of the scope of this tender.

## **25.1. CMU Hardware & Software**

The CMU shall be to operate within the following environmental conditions

+10 °C to +50 °C temperature, 95% humidity non-condensing

The CMU may be installed on the transformer's marshalling kiosk or in a separate panel. The cooling in the kiosk or panel shall be sufficient to guarantee long life of the CMU. The panel shall have an IP 54 Protection or higher.

The CMU shall have a universal power supply range of 85 – 240V AC/DC. The CMU shall have a Human Machine Interface (HMI) that shall display measurands of the transformer, allow for setting of parameters within the CMU, display trends, alarm and historical data.

The CMU shall perform real-time data collection and analysis. The CMU shall allow access to the historical data and its settings via web browser or via client application tool supplied together with the CMU. Such a tool shall also allow data trending and analysis. The web browser and/or client application tool shall be supplied by the bidder and shall be free of annual licensing. This tool shall be installed in a laptop provided the client (KenGen) and shall have capabilities of viewing historical data, downloading the data in spreadsheet format or any other format for further analysis

Historical data shall be available and accessible in graphical form e.g. charts, graphs, etc. The language used by the HMI shall be English.

The communication from the laptop to the CMU shall be via RS232 or USB to enable local access for troubleshooting and routine maintenance checks.

The CMU shall be ready for communication using the following protocols: Modbus TCP/IP, Ethernet 10/100, DNP3 (Distributed Network Protocol), TCP/IP (Ethernet), RS232/RS 485, USB

The CMU shall have digital inputs and outputs, analogue inputs and outputs, RTD inputs, sufficient for the monitoring functions described here below.

## **25.2. MONITORING FUNCTIONS**

The CMU shall monitor the following functions on the transformer

### **25.2.1. MONITORING ACTIVE PART**

- a) 3 Phase Power – active, reactive power
- b) Transformer losses
- c) Measurements: voltage, current, frequency,
- d) Winding temperature ( 2 phases),
- e) hot-spot temperature (calculated as per IEC 60076-6/IEEE )
- f) Oil temperature (top & bottom)
- g) Ambient temperature
- h) Moisture in oil
- i) Transformer ageing

### **25.2.2. MONITORING OF COOLING SYSTEM**

- a) Control of cooling for up to 4 cooling stages
- b) Operating parameters (currents, running duration) of individual/grouped fans
- c) Operating parameters (currents, running duration) of individual/grouped pumps
- d) Flow of Oil

- e) Cooling System Inlet and Outlet Temperatures (individual values, difference)
- f) Cooling Efficiency
- g) Current consumption of individual/group fans and pumps.

**3. COMMISSIONING EQUIPMENT.**

As part of the commissioning equipment, the bidder shall bid for the supply of the following equipment to be used during factory testing, site testing and commissioning.

The technical specifications for the equipment are:

<b>Technical Data</b>	<b>Specifications</b>
Output	
Measurement voltage	10 ( @50Ω load) V pp
Output impedance	50 Ω
<b>Performance</b>	
Frequency Range ( SFRA )	10 to 30M Hz
Dynamic Range	150 dB ( @20Hz to 2MHz)
Accuracy	0.1 dB (down to -50dB)
<b>Features</b>	
Intended Use	Mobile
Interface	USB
Internal printer	No
Battery	Yes
<b>Normal operating conditions</b>	
Rated AC power supply voltage	100 to 240 V(AC)
Power supply frequency	50 to 60 Hz
<b>Environmental conditions</b>	
Temperature	- 10 to 55°C
Humidity	20 to 90 %r.H., non condensing
<b>Accessories</b>	
Transport Case	Yes
Test lead and adapter set	Yes
Aluminium braids	Yes
Power supply and battery charger	Yes
User Manual	Yes
USB cable	Yes
Software "Primary Test Manager" (CD ROM)	Yes

#### 4. TENDER CLOSING DATE

Given the review on the scope of the tender, the date closing date is extended from 26<sup>th</sup> September 2017 at 2:00pm to **10<sup>th</sup> October 2017 at 2:00pm**

#### 5. PRICE SCHEDULE

Due to the changes above on the scope of the tender, the following price schedule shall replace the section of the tender price referred to as "MAIN PRICE SCHEDULE" found on page 95 of 128

The main part of the price schedule shall be replaced as follows:

<b>MAIN PRICE SCHEDULE</b>							
<b>No.</b>	<b>Ref. Clause (Section V)</b>	<b>Description</b>	<b>QTY</b>	<b>UOM</b>	<b>Type/ Model</b>	<b>Unit Price</b>	<b>Cost</b>
A.		3-phase, 20/25 MVA, 11/143.7 kV, 50 Hz, OLTC, YNd1, ONAN/ONAF, oil-immersed, transformer as specified	1	PC			
B.		Transformer Condition Monitoring	1	Set			
C.		Factory training and factory assessment tests	1	Lot			
D.		Commissioning Equipment	1	Set			
E.		Supervision of assembly, oil-filling installation & commissioning on site	1	Lot			
F.		Testing and commissioning	1	Lot			
G.		Working Drawings, Operation & maintenance manuals as specified	1	Lot			
H.		Routine operation and maintenance training on site	1	Lot			
I		All other items not specified but necessary to complete the works (attach list)		lot			
<b>SUB TOTAL</b>							
<b>16% VAT</b>							
<b>TOTAL</b>							
<b>CURRENCY</b>							

**All other terms and conditions remain unchanged**

**ACKNOWLEDGEMENT OF ADDENDUM. 1**

We, the undersigned hereby certify that the addendum is an integral part of the document and the alterations set out in the Addendum have been incorporated in the tender proposal.

Signed.....

Tenderer.....

