



KENYA ELECTRICITY GENERATING COMPANY PLC

RFx: 5000014998

KGN-OLK-027-2024

TENDER FOR, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF 110VDC INDUSTRIAL BATTERY BANKS FOR OLKARIA V POWER STATION.

(Reserved for Women Enterprise)

Dated: 9th April, 2024

Addendum No.1.

In accordance with the Tender for, Supply, Installation, Testing and Commissioning of 110VDC Industrial Battery Banks for Olkaria V Power Station, KenGen issues an Addendum No.1 as follows:

1. NOTICE OF SECOND MANDATORY SITE VISIT

Notice of Second Mandatory Site Visit (for bidders who did not attend the 1st Mandatory Site visit)

There shall be a Mandatory Site Visit on **12th April, 2024** at Olkaria V Power Station starting at 10.00 a.m.

Note;

Those who attended the 1st Mandatory Site visit need **NOT** to attend but they can attend if they wish. However, bidders **MUST** attach the site visit certificate issued to the tender document during bid submission.

REVISED PRICE SCHEDULE FOR GOODS

Tender for Supply, Installation, Testing and Commissioning of 110VDC Industrial Battery Banks for Olkaria V Power Station.

PRICE SCHEDULE (DDP, OLKARIA V POWER STATION)

Item	DESCRIPTION	Unit of Measure	QUANTITY	UNIT PRICE	TOTAL PRICE
1	2V, 1100AH, Flooded Lead Acid maintenance type (OPzS) batteries	PC	114		
2	Contactors	PCs	4		

3	Rectifier Diode Module	PCs	4		
4	Moulded case Circuit breakers (MCCBs)	PCs	4		
5	Battery to charger connecting cables, Batteries Clamps, Inter-cell connectors, paralleling cable connectors complete for all the cells. Power cables, and civil/building items, Charger system changes accessories.	LOT	1		
6	Battery racks, Batteries Installation, testing and Commissioning, charger works.	LOT	1		
7	Acid electrolyte (sufficient for all the cells in this schedule)	LOT	1		
8	Portable syringe Hydrometer	PC	4		
Total					
Discount (%) if any					
Total Cost DDP to Olkaria V Power Station					
Country of Origin					
Make & Model for 2V, 1100AH, Flooded Lead Acid maintenance type (OPzS)					
Currency of Tender					
Delivery Period					

Tenderer's name (Company) _____

Signature & Rubber-stamp _____ Date _____

PART 2: SUPPLY REQUIREMENTS

SECTION V - SCHEDULE OF REQUIREMENTS

TECHNICAL SPECIFICATIONS

GENERAL INFORMATION

1. These specifications describe the basic requirements for goods. Tenderers are requested to submit with their offers the detailed specifications, drawings, catalogues, etc. for the products they intend to supply.
2. Olkaria V is a geothermal power station located approximately 137kms North of Nairobi and about 42 km from Naivasha town. It is accessible by an all-weather road and the usual amenities are available.
3. All equipment and materials shall be designed, manufactured and tested, in accordance with the latest editions of relevant IEC standards and codes, unless specifically excluded elsewhere in the specification.
4. A tenderer shall quote for the COMPLETE schedule in order to qualify as responsive.
5. In execution at site, you shall follow all Statutory & KenGen corporate requirements for quality, environmental, health & safety, and Kenya Wildlife Services (KWS) requirements

Notes Applicable to All Items:

1. The Goods to be supplied must be new and unused.
2. Unless otherwise specified, all goods must have a warranty of at least 12 months after testing of equipment at site.
3. References to brand names or catalogue numbers designated by the Procurement entity in its Technical Specifications, are intended to be descriptive only and not restrictive. The tenderer may substitute alternative standards, brand names, and/or catalogue numbers in its tender, provided that it demonstrates to the Procurement entity's satisfaction that the substitutions ensure substantial equivalence to those designated in the Technical Specifications.
4. Delivery must be for a complete schedule. Partial delivery will not be accepted.
5. Relevant descriptive literature/Brochure of the items in each schedule showing conformity to technical specifications shall be provided with the bid. Irrelevant literature downloaded from the Internet is not acceptable.
6. A tenderer will quote for supply of the complete schedule in order to qualify as responsive. Award will be for the complete schedule.
7. Attach battery brochure that should have the discharge characteristics of the battery among other specifications as outlined in this section.
8. All batteries MUST be of the same manufacturing batch and appropriate brochures MUST be provided along with the Original Equipment Manufacturers authorization. A warranty of 1 year from the date of commissioning MUST be provided within which defects noted and not attributable to the Client, shall be addressed by the Supplier.
9. All the dimensions and capacities of the batteries to be supplied shall not be less than those required in these specifications. Deviations from the basic requirements if any shall be explained in details with the offer with supporting data such as calculation sheets etc. The procuring entity reserves the right to reject the products if such deviations shall be deemed critical to the use and operation of the products.

SPECIFICATIONS

Item 1: 1100AH, 2V Vented Lead Acid maintenance type Batteries (OPzS) deep cycle

General Specifications

1. KenGen PLC, intends to add at Olkaria V, 2 (two) Mains battery banks for supplying 110V DC for control, plant protection, Emergency oil pump, and inverter source for unit 240Vac UPS system. Each bank shall consist of a total of 54 cells each rated at 2Volts, 1100Ah connected in series. The bidder shall supply, install, test and commission the flooded lead acid 110VDC 2No. battery banks.

2. The current system has two inter-linked chargers charging one battery bank, with one charger having the capacity to charge the existing battery bank. The scope of this tender SHALL involve modifying the current arrangement such that one extra battery bank is introduced and will be connected to one of the two chargers, with the existing battery bank left with one charger. The design shall be such that, there is protected coupling of the two systems on duty and hot standby modes. The bidder shall incorporate the design in the bid and factor all the materials & tasks required in the bid price. This design shall form part of technical evaluation.

To achieve this, some circuit breakers, contactors and diodes shall be itemized as requirements hereunder. These items shall be utilized in charger system changes, with any extra supplied as a loose item. Other items required for charger system changes shall be quantified from the design and included as accessories with associated works being factored as part of installation, tests & commissioning costs.

3. An additional six (6) batteries shall be delivered as spares.

4. The existing charger configuration where one battery bank for each unit is connected to 2 chargers shall be studied, and the proposed modifications discussed. After agreement with the Electrical and automation engineers the new configuration shall be implemented. The bidder may need to contact the charger manufacturer.

5. To incorporate the 2 new battery banks to the existing chargers, the contractor shall modify the existing charger setting, replace the existing contactors with the new 500A MCCBs in the circuits, and test the circuit to confirm all the functionalities of the chargers. However, the contactor arrangement can still be maintained if the availed design by the bidder is approved by KenGen and it incorporates contactors.

6. Design and introduce a cable link from the batteries to the charger. The cable shall be designed to carry the rated current of the battery banks.

7. Due to the limited room space available the tenderer shall supply the tall tower battery design type whose dimensions will be in the limits of (mm) 275(L) X 210 (W) X 851 (H)

8. The bidder shall prepare metallic racks made from heavy duty painted mild steel and thick wooden blocks to KenGen's approval. Bidder shall submit the rack arrangement alongside the bid for evaluation. The bidder shall be responsible for all the civil works that will be associated with the project.

9. A portable provision, may be a metallic checker plate stair-cased platform for easy access to the top of the new battery installation shall be provided.

10. The vented lead acid (OPzS) tubular plate flooded battery shall offer 20+ years design life according to the standard IEC60896-11 and DIN standard 40736-1.

11. The batteries shall be the flooded Lead Acid type of batteries (OPzS).

12. Cells to be supplied shall be vented lead acid, (OPzS) tubular plate, deep cycle batteries with all the necessary clamps, tinned connecting links/flexible jumper cables, terminal shrouds, terminals/connecting links insulating covers, bolts, nuts and washers in adequate quantities to interconnect all the cells into sets of appropriate voltage banks. All connection bolts, nuts, washers

& lock washers shall be of stainless steel or high-grade plated brass so as to last the lifetime of the batteries.

13. Flexible jumper wires for implementing parallel/series connections must also be supplied.
14. Appropriate labels for numbering the cells must also be supplied. These should be waterproof and should be yellow on a black background. They should be of stick-on type. Handwritten labels will not be accepted.
15. These cells will be used in conjunction with a constant voltage battery charger. They will therefore be subjected to a constant trickle or float charge while on standby.
16. The nominal voltage will be 2 Volts per cell, @1100Ah. The final voltage after a 10-hour discharge rate shall be in accordance with IEC- 60896 or more superior standards.
17. Constant current and constant power discharge data should conform to tables 1 and 2 respectively.
18. Bidder must have capacity to install, test and commission the batteries. The batteries shall be subjected to site commissioning tests (including temperature rise, individual cell voltage, charging and discharge among others). Batteries MUST pass the capacity test for them to be accepted
19. The electrolyte supplied shall be sufficient for all the batteries supplied and shall also be of high purity diluted Sulphuric acid with a specific gravity of 1.240 ± 0.010 at 20°C. Factory filled batteries will also be accepted.
20. The supplier to submit the constant current battery discharge table together with the bid submission, also the Discharge characteristic curve, Charge voltage Vs ambient temperature curve, Discharge capacity vs ambient temperature curve, Self-discharge characteristic curve. Life characteristics of cyclic use.
21. Supplier to provide an installation, testing and commissioning procedure. Test equipment for the capacity test will be provided by the supplier. Supplier to indicate type of test equipment to be used for the discharge test.

Table 1
Constant current discharge at 20°C

End Voltage (Volts per cell)	15 minutes	2hours	5hours	10hours	20 hours
1.70	1051	467.4	249.7	147.5	84.6
1.75	912.2	442.5	243.6	144.9	83.4
1.80	403.6	403.6	231.5	130.4	81.3
1.85	602.5	350.0	209.8	124.5	77.0

Table 2
Constant Power Discharge in Watts per cell at 20°C

End Voltage (Volts per cell)	15 minutes	2hours	5hours	10hours	20 hours
1.70	1772.3	840.9	465.9	280.2	162.8
1.75	1583.1	801.2	455.5	275.9	160.7
1.80	1371.0	739.1	434.8	267.7	157.1
1.85	1104.5	650.8	397.2	250.2	149.4

Special Requirements

1. Positive electrodes: Die cast tubular plates with low antimony lead alloy for longer life.
2. Negative electrodes: Pasted flat plates provide perfect balance with the positive plates to give maximum performance.
3. Separators with extremely high porosity and low internal resistance.
4. Terminals: Lead alloy leak proof pole with brass insert designed to give minimum resistance and maximum current flow.
5. Container: Molded from durable, transparent styrene acrylonitrile (SAN) to allow electrolyte level and cell condition to be monitored to make it user friendly and easy to monitor. All the cell information shall be printed/molded on the container, and this information shall include model, ampere hour, voltage, IEC standard, month/date of manufacture, country of manufacture. Any form of stickers to the cell container for this information shall not be accepted.
6. Electrolyte- Diluted Sulphuric acid with a specific gravity of 1.240 ± 0.010 (maximum level) at 20 °C for a fully charged cell.
7. Tall tower type design to lower the foot print due to the limited space available in the battery room.
8. Plastic encapsulated bolt-on terminals. The corrosion resistant bolt on terminals with brass inserts provide better electrical performance and resistance to wear and tear of the terminals.
9. Reliable: Shall be extremely reliable for stand by float operation.
10. Vent plugs: Specially designed with ceramic dome, which filters the sprayed acid and is fire retardant.
11. Insulated inter cell connectors from tin-plated brass and electrical insulation that resists acid attack or Flexible, fully insulated cable connectors with insulated screw with probe hole on the top for electrical measurement.
12. Performance conforms to IEC 60896-11
13. Quality System: Batteries manufactured system that meets or exceeds the requirements of ISO 9001:2015 ISO 14001:2015 and ISO 45001:2015. Signed, stamped and dated documentary evidence from the manufacturer to be provided.

BATTERY BASIC CONSTRUCTION SPECIFICATIONS

	Item	Description
1	Nominal Voltage	2V
2.	Nominal Capacity (10HR)	1100AH @ 10hr-rate to 1.85V per Cell, 20 °C
3.	Positive electrodes	Die cast tubular plates with low antimony lead alloy for longer life
4.	Negative electrodes	Pasted flat plates provide perfect balance with the positive plates to give maximum performance.
5.	Cells needed	114 cells
6.	Dimensions (mm)	275(L) X 210 (W) X 851 (H) or smaller
7.	Container material	SAN transparent container
8.	Rated Capacity	1100 AH/ 110A (10hr, 1.85V/Cell, 25 °C

9.	Maximum discharge current	5000A
10.	Internal resistance	Approximately 0.24 mΩ
11.	Operating temperature range	Discharge: -20-55°C Charge: 0-40 °C Storage: -15-40 °C
12.	Float charging Voltage	2.23 to 2.25 Vdc per cell at 20 °C
13.	Maximum Charging current	150A
14.	Short circuit current	8450Amps
15.	Self-discharge	Self-discharge rate less than 2.8.% per month at 20 °C
16.	Terminal	Thread insert and bolt

Item 2: Contactor

These contactors shall be utilized in charger system changes as indicated in earlier sections.

	Specifications	Description
1	Product name	TeSys F
2	Product	Contactors
3	Device	LC1F500
4	Voltage	DC
5	Poles	3
6	Contacts	Normally open contacts
7	Rated operational voltage	690Vac/ 460Vdc
8	Rated operational current	AC-1: 700A AC-3: 500A
9	Rated breaking capacity	4,000A
10	Mounting	Panel
11	Contactors coil	TeSysF- LX4FK-110VDC

Item 3: Rectifier Diode Module

These diodes shall be utilized in charger system changes as indicated in earlier sections.

	Specifications	Rating
1	Rectifier diode module	
2	Voltage	1600V
3	Current	600A
4	Maximum forward Voltage drop	1.9V
5	Single tube package	UL 15010203

Item 4: Moulded Case Circuit Breaker (Q6)

These MCCBs shall be utilized in charger system changes as indicated in earlier sections.

	Specifications	Rating
1	Voltage	415
2	Rated current	500A
3	Utilization category	Category A
4	Poles	3
5	Protected poles description	3D

6	Breaking capacity Icu at 440Vac	36kA
7	Trip Unit name	TM-D
8	Trip unit technology	Thermal Magnetic
9	Trip unit rating	500A at 40°C
10	Rated Impulse withstand voltage	8kV
11	Mounting	Panel mounting
12	Dimensions	140x110x255mm.
Accessories		
13	Auxiliary contact	1-Normal open 1-Normal close

Item 5: Portable Syringe Type Hydrometer~ for Lead Acid batteries

The specification are as below

1. Used for measuring the density of the electrolyte solution contained in the lead-acid battery. The range shall be between 1100 kg/m³ to 1300 kg/m³.
2. Scale graduation each 5kg/m³- 10 kg/m³ with color bands.
3. It shall consist of
 - a. A clear transparent glass barrel containing the hydrometer float.
 - b. A rubber flexible nozzle fitted onto the lower end of the barrel
 - c. A compressible, elastic bulb which makes an air tight fit over the upper end of the barrel.
 - d. A perforated plug which allows free passage of air but prevents the float from entering the bulb.

DELIVERY, INSTALLATION & COMMISSIONING.

Delivery

The supplier shall deliver all items to Olkaria V Power Station store, with batteries packed in a manner that shall be suitable for handling using either forklift or overhead crane facility.

Installation

During installation the batteries in item No. 1 shall be divided into 2 banks comprising of 54 pieces per bank and connected in series to give a total of 110V, 1100AH system.

The supplier shall provide adequate flexible copper cable/ appropriate connectors for paralleling. The installation, testing and commissioning shall be quoted as a separate item

† The 2 battery banks will be for purposes of providing a second bank for each unit, with each bank having a series connection of 54 cells on a new rack provided by the bidder. The final rack design shall be reviewed by KenGen’s Electrical and automation engineers after signing of contract.

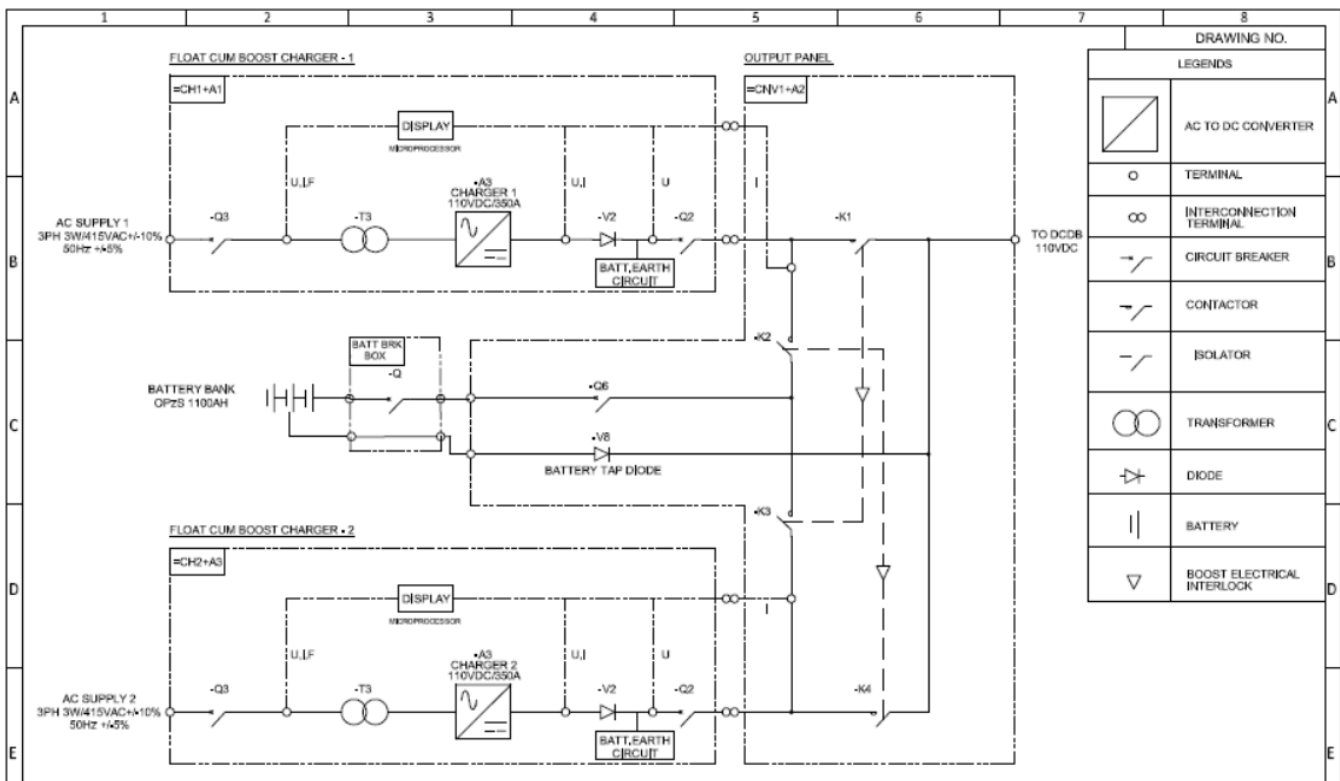
† The existing charger configuration shall be studied, and the new modification incorporated and tested. The bidder shall study the existing system where the current single bank per unit is connected to **two chargers**, with the desired modification being each charger connected to one battery bank (one being the existing, the second being the new battery bank) with a tie between the two. One system (battery bank and charger) will be duty with the second system being on hot standby such that if the selected duty system fails, there will be seamless transfer of the load to the standby system, with any system having the capacity to be selected as duty or standby This design must be submitted together with the bid for technical evaluation, where it may be necessary for the bidder to contact the OEM of the current scheme. Upon successful award, the winning bidder must ensure that the scheme works as desired for the delivery to be evaluated as complete. The approval of the design by KenGen does not in any way relieve the bidder off this responsibility. The bidder shall also study the target position of the new batteries and incorporate any materials required for adequate installation, and acceptable commissioning inclusive of any extra cabling, ventilation requirements or civil works.

† 6 cells will be supplied as spares.

Note:

1. Cells to be supplied dry with the appropriate quantities of electrolyte supplied separately. However, bidders wishing to pre-fill the batteries will be allowed to supply pre-filled batteries
2. All the necessary clamps, connecting links, terminal shrouds, terminals/connecting links insulating covers, bolts, nuts and washers in adequate quantities to interconnect the cells into sets of appropriate voltage banks must be supplied. Jumpers for parallel/series connections must also be supplied
3. Appropriate labels for numbering the cells must also be supplied. These should be water proof and should be black on a white back ground. They should be stick on type. Hand written labels will not be accepted.
4. Cells should be of the same manufacturing batch.

The current charger-battery system is as shown below:



NB: Details of the Charger OEM and any other relevant information will be shared during mandatory site visit upon request.

TECHNICAL EVALUATION SCHEDULE

The schedule below shall be filled, with relevant reference in the bid document indicated. This shall form part of technical evaluation.

ITEM	DESCRIPTION	REQUIREMENT	BIDDERS OFFER/COMMENT
1.	2V, 1100AH, Flooded Lead Acid maintenance type (OPzS)	2V, 1100AH	
2.	Battery Manufacturer	Indicate manufacturer	
3.	Cell Dimensions (mm)	L x W x H	
4.	Battery connection cable to the charger size.	Sizing calculations	

5	Clamps and inter cell connectors complete with adequately rated copper cable connectors for parallel and series connections	Tin plated Copper and covered with heat shrink	
6	Flexible insulated jumper Wires/Conductors	To be provided	
7	Discharge data conforming to tables 1 and 2 in the technical specifications	To be submitted with offer	
8	Final Voltage after 10-hour discharge (should conform to table 1 above)	To be submitted with offer	
9	Stamped, signed and dated Manufacturer Constant Current and constant power Discharge curves and/or data sheets		
10	Appropriate Labelling	Yellow on a black background	
11	Warranty	Minimum 1 year from date of Commissioning	
12	Documentation/Brochures to demonstrate industrial application and high performance	To be submitted with offer	
13	Delivery period	To be provided	
14	High purity diluted Sulphuric acid	1.240 ± 0.010 at 20°C.	
15	Manufacturers Authorization	To be submitted with offer	
16	Documentation/Brochures for the 500A Moulded case Circuit Breakers and the contactors	To be submitted with offer	
17	Portable syringe Hydrometer	To be submitted with offer	
18	Charger modification design. This shall be detailed enough for evaluation.	To be submitted with offer	
19	Bidders list of testing equipment. Indicate charge/discharge equipment and its brochure for evaluation	To be submitted with offer	

Note:

Bidders are advised to ensure that all the technical requirements are met. The above table is a guide to part of the required technical specifications.

Item 18 above on Charger modification is critical and for technical compliance, the bidder MUST clearly demonstrate the design of how to achieve this.

SUPPLIER ACKNOWLEDGEMENT OF ADDENDUM NO. 1

We, the undersigned hereby certify that the Addendum No.1 is an integral part of the document and the alterations set out in addendum has been incorporated in the Tender Proposal.

Signed.....

Tenderer.....

Date.....