



**Kenya Power**

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*Central Office – P.O. Box 30099, Nairobi, Kenya  
Telephone – 254-020-3201000  
Fax No. 254-02-310336  
Stima Plaza, Kolobot Road  
Nairobi, Kenya*

M/s.

3<sup>rd</sup> October, 2016

Dear Sir/Madam

**ADDENDUM I FOR TENDER NO. KP1/9AA-2/OT/16-ID/16-17 FOR SUPPLY, INSTALLATION AND COMMISSIONING OF 132kv TRANSMISSION METERING AT BAMBURI - MOMBASA**

**1. RELATIONSHIP WITH THE PRINCIPAL TENDER DOCUMENT**

Save where expressly amended by the terms of this Addendum, the Principal Tender Document shall continue to be in full force and effect.  
The provisions of this Addendum shall be deemed to have been incorporated in and shall be read as part of the Principal Tender Document.

**2. Please find the following clarifications as requested:-**

**3. SECTION III – INSTRUCTIONS TO TENDERERS**

- i. Every page of the uploaded document should be signed by authorized signatory.
- ii. Tenders submitted by a Joint Venture of two or more firms (consortium) as a partner shall comply as per Section 3.5.
- iii. Variations shall be paid if undertaken subject to issuance of a variation order and approval from project manager and rates adopted from the bid prices.

**4. SECTION IV – BID DATA SHEET (Appendix to Instructions to Tenderers)**

Clause 3.6 -Time of completion of works shall be 9 months.

Clause 3.42 – Award of Contract shall be awarded to the lowest compliant evaluated bidder. This is a lump sum turnkey contract, unit rate may be used to determine any variation amount on specific items.

## 5. SECTION V – EVALUATION CRITERIA

Part II (b) - Technical Evaluation under clause 3.20 of the ITT. It will include the following stages: The following will be scored.

NO.	EVALUATION ATTRIBUTE	WEIGHTING %
7.2.2.1	<p>Neatness of document as per Tender Format i.e.</p> <ul style="list-style-type: none"> <li>a) sequence based uploading</li> <li>b) Clarity of information, legibility</li> <li>c) Proper labeling of each download</li> <li>d) Proper referencing of contents</li> <li>e) Relevance of all attached documents in conformity with the requested information in Tender document</li> </ul>	<p><b>5 Marks broken down into 1 mark for each parameter.</b></p>
7.2.2.2	<p><b>EXPERIENCE</b></p> <p><i>Accomplishments: (previous &amp; current projects) Details of building projects undertaken successfully within the last 5 years each worth Ksh. 200Million Experience in the construction of substations and transmission lines. Details of projects undertaken successfully within the last 5 years with evidenced of 3 by letters of reference from clients, certificates of occupation and completion certificates for the respective projects. (For a project to qualify it must be at least 70% complete. For Projects that are not completed, letters of reference from respective Architects and Clients must be provided.</i></p> <ul style="list-style-type: none"> <li>a. <i>2 Substation projects-5Marks</i></li> <li>b. <i>2 transmission line projects-5marks</i></li> <li>c. <i>Confirmation by clients on adherence to timelines-2 marks(completion certificates)</i></li> <li>d. <i>General Civil &amp; building works-3marks</i></li> </ul>	<p><b>15</b></p>
7.2.2.3	<p><b>PROFESSIONAL QUALIFICATION</b></p> <p><i>Qualified Technical staff in the company relevant to the power infrastructure industry who will actively be involved in the proposed project. Provide employment/appointment letters, contracts of the key personnel including length of service and termination date, CV, Academic and professional certificates and evidence of registration with relevant professional bodies and Telephone contacts. AS PER TABLE ' B'</i></p> <ul style="list-style-type: none"> <li>i) <i>Project management team comprising of team leader,</i></li> </ul>	<p><b>25</b></p>

	<p>registered engineers in civil engineer ,electrical construction/ installation/commissioning engineer, Design engineer (6) marks</p> <p>ii) works supervisors with a bias in lattice towers erection, transmission line overhead works, civil foundation works, substation installation,.....4 marks</p> <p>iii)Skilled workers,artisans,craftsmen-5 marks</p> <p>iv)Safety officer-competence to receive kplc permits and also trained in occupation safety, first aid etc with over 5 years in active site supervision-5 marks</p> <p>v) Tenderers undertaking- The Tenderer's undertaking that the key site management and technical personnel will be available for the contract. full marks for employee commitment- 5 marks</p>	
7.2.2.4	The bidder shall submit a contract methodology describing a full and comprehensive work plan for the implementation of this particular project as per TABLE A below.	30
7.2.2.5	Proposed execution timeline for project-written commitment for compliance with clients requirement	5
7.2.2.6	<p>Tools and equipment to be used in the service.</p> <p>i. Transmission line construction tools – 5 marks</p> <p>ii. Substation construction- civil works equipment and tools 5 marks</p> <p>iii. substation electrical installation and stringing tools- 4 marks</p> <p>iv. testing and commissioning tools-3marks</p> <p>v)Design software and application tools-3marks</p> <p>Provide documentary evidence of ability to lease or hire relevant equipment not owned by the company. Give a description of their application and performance to demonstrate technical capacity and an undertaking that the tools and equipment will be available for the execution of the contract.</p>	20
	<b>TOTAL</b>	<b>100</b>

TABLE A FOR 7.2.2.4				
No	Item	Description of works to be undertaken by the contractor or subcontractor	Marks allocation	Reference Documents (where applicable)
1	Preliminary engineering brief ( <i>Description of the scope of adaptation works including methods and technologies that the contractor will apply</i> )		2	
2	Drawings, Layout and Single line diagrams for substation (source & destination)		5	
3	Civil Works		3	
6	Control and Protection		5	
7	Substation Automation and Substation Level Communication Protocol ( <i>Functional descriptions of the system and shall include topological drawings for the system</i> )		3	
8	Transmission line design		5	
9	Testing plan ( <i>Factory and Sites</i> )		2	
11	Project management and Mobilization schedule		2	
12	Safety Health and Environment  <i>Detailed safety procedure relevant to working in a live substation from geotechnical survey to erection and commissioning &amp; compliance to Bamburi &amp; kplc safety procedures.</i>		4	
13	Quality Control Measures		2	
14	Completeness of works ( <i>Confirmation that all other works not mentioned above, but covered in the specifications and required</i> )		2	

<b>TABLE A FOR 7.2.2.4</b>				
<b>No</b>	<b>Item</b>	<b>Description of works to be undertaken by the contractor or subcontractor</b>	<b>Marks allocation</b>	<b>Reference Documents (where applicable)</b>
	<i>for completeness shall be carried out)</i>			

<b>TABLE 'B' FOR 7.2.2.3</b>			
<b>No.</b>	<b>Position (Per Lot)</b>	<b>Total Work Similar Experience (years)</b>	<b>In Similar Works Experience (years)</b>
1	Project Manager	7	3
2	Design Engineer	7	3
3	Testing and Commissioning Engineer - Electrical	5	3
4	Construction/Installation Engineer - Electrical	5	3
5	Civil Engineer	5	3
6	Safety Health & Environment Officer	5	2
7	Project supervisors	10	5

Tenderers will proceed to the next evaluation stage if they score a **minimum of 75% in Parts II (b) above.**

**SECTION X – GENERAL CONDITIONS OF CONTRACT**

Clause 8.37 Force Majeure – The contractor is protected in case of force de' majeure or war.

**SECTION IX – SPECIAL CONDITIONS OF CONTRACT**

- i. Limitation of liability is 0.5% per month (liquidated damage) 5% defects and liability is 18 months.

## **TECHNICAL CLARIFICATION**

- i. Line turning co-ordinates is as per attached appendix I.

### **Technical Questions**

- **Quantity of isolators will be as follows;** Isolators facing the 132kv line on both stations will be with Earth switch and ones facing the busbar will be without Earth switch. Therefore there will be a total of 2No. Isolators with Earth switch and 2no. Without Earth switch in price schedule.
- There will be **NO** 132kv cable on the line.
- On both stations bay take off at Bamburi 132kv substation and at the terminal in the Bamburi factory there will be Bay control unit with display hence must be included in price schedule.
- In price schedule must include on implementation line differential protection panel since line is short (relay must however have distance protection with permissive and blocking scheme incorporated) , Bay control unit and Energy meter since all will be installed at the new Bamburi 132/33kv substation line take off.
- In price schedule must include, Bay control unit and separate commercial Energy meter cubicle, overcurrent and line differential protection at Bamburi factory station.
- Implement a low impedance busbar protection scheme at New Bamburi 132/33kv substation with provided relay having at least 2No. Spare analogue inputs (current).
- Telecommunication and SCADA installation to be included since the equipment's will also be supplied by the bidder/ contractor and commission.
- In price schedule include OPGW 48 core and associated accessories
- At Bamburi factory metering substation supply, install and commission RTU and multiplexer
- Upgrade RTU at New Bamburi 132/33kv substation to accommodate new bay

### **OPGW – Detailed Technical Specifications (Dts)**

#### **At Bamburi Cement Factory;**

1. An RTU/SAS to capture requisite signals at the 132kV switchyard; The RTU/SAS gateway shall be required to communicate these signals on IEC 60870-5-104. Configuration parameters (ie gateway IP address, NCC/RRCC host addresses & signals required) shall be communicated to the contractor during design or implementation stage.
2. An SDH Multiplexer to transport these signals from here to NCC/Rabai RCC;

#### **At existing Bamburi 132kV SS;**

1. Integrate the new bay to the existing ABB RTU 560 via hardwired signals (this is what the existing RTU supports)
2. Upgrade the telecommunication equipment (for the new additional route) to connect to the SDH Multiplexer at Bamburi Cement Factory

#### **The OPGW;**

1. Generic specifications attached.

The scope of work includes supply, installation and commissioning of Optical Ground Wire (OPGW) as detailed below:

**Technical specifications**

<b>From</b>	<b>To</b>	<b>Voltage</b>	<b>Length</b>	<b>Region</b>
Bamburi 132kV SS	Bamburi Cement Factory	132 kV	7 km	Coast

The contract shall include all extra length of OPGW required for sag, down-droppers at intermediate and terminal splices, cut offs etc.

The scope of work shall also include underground fibre optic (FO) cables from the splice boxes to be installed at the substation gantries to the telecommunication rooms in the substation control buildings.

The FO cables to be supplied shall be terminated and spliced at suitably engineered ODFs to be supplied

The transmission line earth wire (OPGW) integrating optical fibres shall be of design and construction to ensure long service with high economy and low maintenance costs. It shall be suitable in every respect for continuous operation at nominal parameters as well as in transient operating conditions under the climatic conditions peculiar to the site.

The diameter of the OPGW shall be equal or less than the existing earth wire in order not to increase the wind load to the towers.

The OPGW shall incorporate at least 48 optical fibres. The OPGW constitution shall be of stranded aluminum-clad steel (ACS) wires or Galvanized steel wires (GS), some of the normal stranding construction being replaced by stainless steel tube bearing the optical fibres. Other OPGW types are acceptable if the required performance characteristics are met.

In their offers, tenderers shall indicate the type of OPGW proposed and shall provide a comparison table showing the electrical and mechanical data of the proposed OPGW and the existing earth wire to be replaced.

All materials used shall be of the best quality and workmanship, and shall be of the highest class throughout with the designs and dimensions of all parts such that the stresses to which the OPGW are subjected to shall not render them liable to distortion or damage under the most severe conditions encountered during installation as well as in service.

Special attention shall be paid to the OPGW stranding process to ensure the necessary tightness between different layers in order to avoid slippage or relative movement of strands or cage formation during stringing.

Stranding tolerances as well as inspection and testing shall be as per IEC 61089 as far as applicable, and to the respective manufacturing standards.

The OPGW manufacturer shall have ISO 9000 quality assurance system certified and shall prove a minimum experience in successful supply of similar OPGW in the last 5 years.

The OPGW installation shall include all cable fittings (tension and suspension spirals, vibration dampers, earth connection etc.), joint boxes, termination boxes, fibre connectors and other accessories required for a complete working fibre link.

The OPGW, access cables and underground cables shall have at least 48 (forty-eight) single mode optical fibres with following characteristics:

- Transmission wavelength: 1310 nm and 1550 nm
- Mode field diameter: 9.0 to 11.5 micrometers ( $\mu\text{m}$ ), including tolerances
- Optical cladding diameter:  $125 \mu\text{m} \pm 2.4\%$
- Cable Attenuation: not greater than 0.40 dB/km for every fibre in every drum at optical wavelength of 1310 nm; and not greater than 0.25 dB/km for every fibre in every drum at optical wavelength of 1550 nm
- Joint attenuation: not greater than 0.1 dB at optical wavelength of 1310 nm and not greater than 0.2 dB at 1550 nm for every fibre, measured on the fully installed joint
- Total dispersion: not greater than 3.5 ps/km.nm at optical wavelength of 1310 nm and not greater than 19.0 ps/km.nm at optical wavelength of 1550 nm
- Core numerical aperture: less than 0.23
- Life span: greater than 30 years

The Contractor is required to supply a graph of attenuation versus wavelength over the range of 1200 nm to 1600 nm

No joints shall be allowed in any fibre in any drum length.

Discontinuities will be acceptable if:

- Less than 0.10 dB in magnitude measured at 1310 nm, and
- OTDR traces from both ends of the cable at 1310 and 1550 nm wavelength show a difference of less than 0.05 dB/km for every fibre in every drum.

The Contractor shall state the refractive index of the optical fibres at 1310 nm and 1550 nm.

The OPGW shall generally be cut and jointed at angle towers, but not at all angle points. It shall be continuously strung with OPGW sections as long as possible. At all angle points the prescribed minimum bending radius shall be observed. If necessary, special tandem or multiple stringing blocks have to be used for stringing the OPGW at angle points.

Tenderers shall supply detailed information, including physical dimensions and weights, of joint, gantry and termination boxes that they propose using. Joint boxes shall be used to join sections of the OPGW together along the route.

The joint boxes shall be of the 'hood' type with encapsulated cable entry and they shall be mounted within the framework of the transmission towers not less than 8 m above the base.

Note: All fibre jointing and testing shall be carried out at ground level, after which the joint box shall be lifted into position and the cable loops carefully secured to the tower members in such a manner that there is no risk of damage to the cable from persons climbing the towers.

Contractors shall provide detailed specifications for all types of cable accessories (anchor and suspension spirals, vibration dampers, earth connections and clamps, etc.) used in the installation of the OPGW.



Optical ground wire suspension and tension assemblies shall be based on pre-formed spiral armatures according to the OPGW cable manufacturer's specification so as to assure the required minimum bending radius of the ground wire and to avoid concentrations of mechanical stresses applied to the cable.

The suspension assemblies (armor grip suspension) shall be based on helical rods made of high-tensile, corrosion-resistant aluminum alloy. For the tension assemblies the helical rods shall be of aluminum clad steel for the ACS type OPGW.

It is understood that all other small parts, for instance for fixing the OPGW along the tower structure from the earth wire peak up to the OPGW joint box and cable accessories are supplied under the contract.

The safety factors for the OPGW suspension and tension assemblies shall be at least equal to those prescribed for the earth wire as per VDE 0210.

The manufacturer of the spiral armatures shall have experience of at least 5 years successful production of the offered type of fittings.

The underground fibre optic (FO) cables to be provided and installed between the splice boxes at the substation gantries to the optical fibre distribution frame (ODF) installed inside the telecommunication room at the substation control buildings shall be armored by stranded galvanized steel wires or sheet. Tenderers shall indicate the type and construction of the underground cables included in their offer.

### **Inspection and Testing**

The following minimum tests shall be performed after complete installation:

- Fibre-optic cable field acceptance test;  
The Contractor shall perform field acceptance test and document the results of the installed cable to verify the cable's performance as required by this Specifications. The Contractor shall notify KPLC in advance so that the KPLC staff can witness these tests. If the cable does not pass the field acceptance test, the Contractor shall replace the cable at the Contractor's expense with cable that does meet these Specifications
- Attenuation per distance / uniformity;  
The Contractor shall measure the attenuation-vs.-distance and attenuation uniformity of the fibres while the cable is on the reel as well as of the installed cable using an Optical-Time-Domain-Reflectometer (OTDR). Measurements will be made at 1310 nm and 1550 nm. The attenuation of the fibre-optic cable shall not exceed the requirements in these Specifications.
- Attenuation with bending;  
The Contractor shall perform attenuation with bending tests using a 260 mm diameter mandrel on the cable and a 75 mm and 25 mm mandrel on selected individual fibres. The attenuation due to bending shall not exceed the requirements in these Specifications.
- Tensile strength of cable;  
The Contractor shall extract a sample length of cable from each reel and subject it to a pulling tension of 550 kg force and inspect for cable damage due to stress. The Contractor shall measure before, during, and after the test pull. The attenuation increase due to tensile stress shall not exceed the requirements in these Specifications

The Kenya Power and Lighting Co. Ltd. - KPLC			
Tender Schedules	Unit	Required Data	Tendered Data
Number of fibres		≥ 48	
Core diameter	μm	8.3 or 9 with a 3% tolerance	
Cladding design, either matched or depressed			
Clad diameter	μm	125.0 ± 2.4%	
Core-clad concentricity		< 2%	
Coating diameter	μm	250.0 ± 15	
Coating concentricity	≥	0.70	
Attenuation: 1310 nm	dB/km	≤ 0.40	
1550 nm		≤ 0.25	
Bending attenuation: 1310 nm	dB/km	≤ 0.40	
1550 nm		≤ 0.25	
Temperature dependence	dB/km	≤ 0.05 (-20°C-+85°C)	
Cut-off wavelength	nm	≤ 1250	
Chromatic dispersion:			
Zero dispersion at	nm	1310 ± 12 1550 ± 15	
Zero dispersion slope (max.)	ps/nm <sup>2</sup> (km)	0.092 0.085	
Mode field diameter:			
1300 nm	mm	9.30 ± 0.50	
1550 nm	mm	10.50 ± 1.00	
IL-proof test level	g/m <sup>2</sup>	35 x 10 <sup>6</sup>	
Splice attenuation	dB/ splice	0.02	
Connector loss	dB/connector	< 0.5	

Kindly note that due to restriction of wayleaves corridor the foundation design of the towers should not be more than 4 meters square and the line is single circuit tower and not double circuit tower.

The tender closing date has been extended from 6<sup>th</sup> October, 2016 to close on **18<sup>th</sup> October, 2016 at 10. a.m.** The procuring entity will open the bids immediately thereafter on the same day.

All other terms and conditions of the tender remains the same.

Yours faithfully,

**For: KENYA POWER & LIGHTING COMPANY LIMITED.**

  
**BERNARD NGUGI**  
**GENERAL MANAGER, SUPPLY CHAIN**