



## **BIDDING DOCUMENT FOR**

### **PROCUREMENT OF GOODS**

**Procurement of RTUs, Multiplexers, Gateway & Adaptation Materials (Transducers & Interposing Relays & Control Cables) to connect to KPLC SCADA System**

**ICB No: KP1/6A.1/OT/4/22/A96**

**Project: KENYA ELECTRICITY MODERNIZATION PROJECT (KEMP)**

**Purchaser: KENYA POWER AND LIGHTING COMPANY PLC**

**Country: Kenya**

**Issued on: 16<sup>th</sup> March, 2022**

# **Preface**

This bidding document has been prepared by Kenya Power as based on The World Bank Standard Bidding Document (SBD), “Procurement of Goods” (April 2015).

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## **PART 1 – Bidding Procedures**



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# Section I. Instructions to Bidders

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## Section I. Instructions to Bidders

### A. General

1. **Scope of Bid**
  - 1.1 In connection with the Invitation for Bids, **specified in the Bid Data Sheet (BDS)**, the Purchaser, **as specified in the BDS**, issues these Bidding Documents for the supply of Goods and Related Services incidental thereto as specified in Section VII, Schedule of Requirements. The name, identification and number of lots (contracts) of this International Competitive Bidding (ICB) procurement are **specified in the BDS**.
  - 1.2 Throughout these Bidding Documents:
    - (a) the term “in writing” means communicated in written form (e.g. by mail, e-mail, fax, telex) with proof of receipt;
    - (b) if the context so requires, “singular” means “plural” and vice versa; and
    - (c) “day” means calendar day.
2. **Source of Funds**
  - 2.1 The Borrower or Recipient (hereinafter called “Borrower”) **specified in the BDS** has applied for or received financing (hereinafter called “funds”) from the International Bank for Reconstruction and Development or the International Development Association (hereinafter called “the Bank”) in an amount **specified in BDS**, toward the project named **in BDS**. The Borrower intends to apply a portion of the funds to eligible payments under the contract for which these Bidding Documents are issued.
  - 2.2 Payment by the Bank will be made only at the request of the Borrower and upon approval by the Bank in accordance with the terms and conditions of the Loan (or other financing) Agreement. The Loan (or other financing) Agreement prohibits a withdrawal from the Loan (or other financing) account for the purpose of any payment to persons or entities, or for any import of goods, if such payment or import, to the knowledge of the Bank, is prohibited by decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations. No party other than the Borrower shall derive any rights from the Loan (or other financing) Agreement or have any claim to the proceeds of the Loan (or other financing).
3. **Corrupt and Fraudulent Practices**
  - 3.1 The Bank requires compliance with its policy in regard to corrupt and fraudulent practices as set forth in Section VI.

3.2 In further pursuance of this policy, Bidders shall permit and shall cause its agents (where declared or not), sub-contractors, sub-consultants, service providers or suppliers and to permit the Bank to inspect all accounts, records and other documents relating to the submission of the application, bid submission (in case prequalified), and contract performance (in the case of award), and to have them audited by auditors appointed by the Bank.

#### 4. Eligible Bidders

4.1 A Bidder may be a firm that is a private entity, a government-owned entity—subject to ITB 4.5—or any combination of such entities in the form of a joint venture (JV) under an existing agreement or with the intent to enter into such an agreement supported by a letter of intent. In the case of a joint venture, all members shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms. The JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution. **Unless specified in the BDS**, there is no limit on the number of members in a JV.

4.2 A Bidder shall not have a conflict of interest. Any Bidder found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest for the purpose of this bidding process, if the Bidder:

- (a) directly or indirectly controls, is controlled by or is under common control with another Bidder; or
- (b) receives or has received any direct or indirect subsidy from another Bidder; or
- (c) has the same legal representative as another Bidder; or
- (d) has a relationship with another Bidder, directly or through common third parties, that puts it in a position to influence the bid of another Bidder, or influence the decisions of the Purchaser regarding this bidding process; or
- (e) participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all Bids in which such Bidder is involved. However, this does not limit the inclusion of the same subcontractor in more than one bid; or
- (f) any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the works that are the subject of the bid; or

- (g) any of its affiliates has been hired (or is proposed to be hired) by the Purchaser or Borrower for the Contract implementation; or
  - (h) would be providing goods, works, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of the project specified in the BDS ITB 2.1 that it provided or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm; or
  - (i) has a close business or family relationship with a professional staff of the Borrower (or of the project implementing agency, or of a recipient of a part of the loan) who: (i) are directly or indirectly involved in the preparation of the bidding documents or specifications of the contract, and/or the bid evaluation process of such contract; or (ii) would be involved in the implementation or supervision of such contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Bank throughout the procurement process and execution of the contract
- 4.3 A Bidder may have the nationality of any country, subject to the restrictions pursuant to ITB 4.7. A Bidder shall be deemed to have the nationality of a country if the Bidder is constituted, incorporated or registered in and operates in conformity with the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed sub-contractors or sub-consultants for any part of the Contract including related Services.
- 4.4 A Bidder that has been sanctioned by the Bank in accordance with the above ITB 3.1, including in accordance with the Bank's Guidelines on Preventing and Combating Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants ("Anti-Corruption Guidelines"), shall be ineligible to be prequalified for, bid for, or be awarded a Bank-financed contract or benefit from a Bank-financed contract, financially or otherwise, during such period of time as the Bank shall have determined. The list of debarred firms and individuals is available at the electronic address **specified in the BDS.**
- 4.5 Bidders that are Government-owned enterprises or institutions in the Purchaser's Country may participate only if they can establish that

they (i) are legally and financially autonomous (ii) operate under commercial law, and (iii) are not dependent agencies of the Purchaser. To be eligible, a government-owned enterprise or institution shall establish to the Bank's satisfaction, through all relevant documents, including its Charter and other information the Bank may request, that it: (i) is a legal entity separate from the government (ii) does not currently receive substantial subsidies or budget support; (iii) operates like any commercial enterprise, and, inter alia, is not obliged to pass on its surplus to the government, can acquire rights and liabilities, borrow funds and be liable for repayment of its debts, and can be declared bankrupt; and (iv) is not bidding for a contract to be awarded by the department or agency of the government which under their applicable laws or regulations is the reporting or supervisory authority of the enterprise or has the ability to exercise influence or control over the enterprise or institution.

- 4.6 A Bidder shall not be under suspension from bidding by the Purchaser as the result of the operation of a Bid-Securing Declaration.
- 4.7 Firms and individuals may be ineligible if so indicated in Section V and (a) as a matter of law or official regulations, the Borrower's country prohibits commercial relations with that country, provided that the Bank is satisfied that such exclusion does not preclude effective competition for the supply of goods or the contracting of works or services required; or (b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's country prohibits any import of goods or contracting of works or services from that country, or any payments to any country, person, or entity in that country.
- 4.8 A Bidder shall provide such evidence of eligibility satisfactory to the Purchaser, as the Purchaser shall reasonably request.

**5. Eligible Goods and Related Services**

- 5.1 All the Goods and Related Services to be supplied under the Contract and financed by the Bank may have their origin in any country in accordance with Section V, Eligible Countries.
- 5.2 For purposes of this Clause, the term "goods" includes commodities, raw material, machinery, equipment, and industrial plants; and "related services" includes services such as insurance, installation, training, and initial maintenance.
- 5.3 The term "origin" means the country where the goods have been mined, grown, cultivated, produced, manufactured or processed; or, through manufacture, processing, or assembly, another

commercially recognized article results that differs substantially in its basic characteristics from its components.

## **B. Contents of Bidding Document**

### **6. Sections of Bidding Document**

- 6.1 The Bidding Documents consist of Parts 1, 2, and 3, which include all the Sections indicated below, and should be read in conjunction with any Addenda issued in accordance with ITB 8.

#### **PART 1 Bidding Procedures**

- Section I. Instructions to Bidders (ITB)
- Section II. Bidding Data Sheet (BDS)
- Section III. Evaluation and Qualification Criteria
- Section IV. Bidding Forms
- Section V. Eligible Countries
- Section VI. Bank Policy-Corrupt and Fraudulent Practices

#### **PART 2 Supply Requirements**

- Section VII. Schedule of Requirements

#### **PART 3 Contract**

- Section VIII. General Conditions of Contract (GCC)
- Section IX. Special Conditions of Contract (SCC)
- Section X. Contract Forms

- 6.2 The Invitation for Bids issued by the Purchaser is not part of the Bidding Document.

- 6.3 Unless obtained directly from the Purchaser, the Purchaser is not responsible for the completeness of the document, responses to requests for clarification, the Minutes of the pre-Bid meeting (if any), or Addenda to the Bidding Document in accordance with ITB 8. In case of any contradiction, documents obtained directly from the Purchaser shall prevail.

- 6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Documents and to furnish with its Bid all information or documentation as is required by the Bidding Documents.

- 7. Clarification of Bidding Documents**
- 7.1 A Bidder requiring any clarification of the Bidding Document shall contact the Purchaser in writing at the Purchaser's address **specified in the BDS**. The Purchaser will respond in writing to any request for clarification, provided that such request is received prior to the deadline for submission of bids within a period **specified in the BDS**. The Purchaser shall forward copies of its response to all Bidders who have acquired the Bidding Documents in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. If so **specified in the BDS**, the Purchaser shall also promptly publish its response at the web page **identified in the BDS**. Should the clarification result in changes to the essential elements of the Bidding Documents, the Purchaser shall amend the Bidding Documents following the procedure under ITB 8 and ITB 22.2.
- 8. Amendment of Bidding Document**
- 8.1 At any time prior to the deadline for submission of bids, the Purchaser may amend the Bidding Documents by issuing addenda.
- 8.2 Any addendum issued shall be part of the Bidding Documents and shall be communicated in writing to all who have obtained the Bidding Documents from the Purchaser in accordance with ITB 6.3. The Purchaser shall also promptly publish the addendum on the Purchaser's web page in accordance with ITB 7.1.
- 8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their bids, the Purchaser may, at its discretion, extend the deadline for the submission of bids, pursuant to ITB 22.2.

### **C. Preparation of Bids**

- 9. Cost of Bidding**
- 9.1 The Bidder shall bear all costs associated with the preparation and submission of its bid, and the Purchaser shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
- 10. Language of Bid**
- 10.1 The Bid, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Purchaser, shall be written in the language **specified in the BDS**. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages into the language **specified in the BDS**, in which case, for purposes of interpretation of the Bid, such translation shall govern.

**11. Documents  
Comprising the  
Bid**

11.1 The Bid shall comprise the following:

- (a) Letter of Bid in accordance with ITB 12;
- (b) completed schedules , in accordance with ITB 12 and 14
- (c) Bid Security or Bid-Securing Declaration, in accordance with ITB 19.1;
- (d) alternative bids, if permissible, in accordance with ITB 13;
- (e) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 20.2;
- (f) documentary evidence in accordance with ITB 17 establishing the Bidder's qualifications to perform the contract if its bid is accepted;
- (g) documentary evidence in accordance with ITB 17 establishing the Bidder's eligibility to bid;
- (h) documentary evidence in accordance with ITB 16, that the Goods and Related Services to be supplied by the Bidder are of eligible origin;
- (i) documentary evidence in accordance with ITB 16 and 30, that the Goods and Related Services conform to the Bidding Documents;
- (j) any other document **required in the BDS.**

11.2 In addition to the requirements under ITB 11.1, bids submitted by a JV shall include a copy of the Joint Venture Agreement entered into by all members. Alternatively, a letter of intent to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all members and submitted with the bid, together with a copy of the proposed Agreement.

11.3 The Bidder shall furnish in the Letter of Bid information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Bid.

**12. Letter of Bid  
and Price  
Schedules**

12.1. The Letter of Bid and Price Schedules shall be prepared using the relevant forms furnished in Section IV, Bidding Forms. The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under ITB 20.2. All blank spaces shall be filled in with the information requested.

**13. Alternative Bids**

13.1. Unless otherwise **specified in the BDS**, alternative bids shall not be considered.

**14. Bid Prices and Discounts**

- 14.1 The prices and discounts quoted by the Bidder in the Letter of Bid and in the Price Schedules shall conform to the requirements specified below.
- 14.2 All lots (contracts) and items must be listed and priced separately in the Price Schedules.
- 14.3 The price to be quoted in the Letter of Bid in accordance with ITB 12.1 shall be the total price of the bid, excluding any discounts offered.
- 14.4 The Bidder shall quote any discounts and indicate the methodology for their application in the Letter of Bid, in accordance with ITB 12.1.
- 14.5 Prices quoted by the Bidder shall be fixed during the Bidder's performance of the Contract and not subject to variation on any account, **unless otherwise specified in the BDS**. A bid submitted with an adjustable price quotation shall be treated as nonresponsive and shall be rejected, pursuant to ITB 29. However, if in accordance with the BDS, prices quoted by the Bidder shall be subject to adjustment during the performance of the Contract, a bid submitted with a fixed price quotation shall not be rejected, but the price adjustment shall be treated as zero.
- 14.6 If so specified in ITB 1.1, bids are being invited for individual lots (contracts) or for any combination of lots (packages). Unless otherwise **specified in the BDS**, prices quoted shall correspond to 100 % of the items specified for each lot and to 100% of the quantities specified for each item of a lot. Bidders wishing to offer discounts for the award of more than one Contract shall specify in their bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Discounts shall be submitted in accordance with ITB 14.4 provided the bids for all lots (contracts) are opened at the same time.
- 14.7 The terms EXW, CIP, and other similar terms shall be governed by the rules prescribed in the current edition of Incoterms, published by The International Chamber of Commerce, **as specified in the BDS**.
- 14.8 Prices shall be quoted as specified in each Price Schedule included in Section IV, Bidding Forms. The dis-aggregation of price components is required solely for the purpose of facilitating the comparison of bids by the Purchaser. This shall not in any way limit the Purchaser's right to contract on any of the terms offered. In quoting prices, the Bidder shall be free to use transportation through carriers registered in any eligible country, in accordance

with Section V, Eligible Countries. Similarly, the Bidder may obtain insurance services from any eligible country in accordance with Section V, Eligible Countries. Prices shall be entered in the following manner:

- (a) For Goods manufactured in the Purchaser's Country:
  - (i) the price of the Goods quoted EXW (ex-works, ex-factory, ex warehouse, ex showroom, or off-the-shelf, as applicable), including all customs duties and sales and other taxes already paid or payable on the components and raw material used in the manufacture or assembly of the Goods;
  - (ii) any Purchaser's Country sales tax and other taxes which will be payable on the Goods if the contract is awarded to the Bidder; and
  - (iii) the price for inland transportation, insurance, and other local services required to convey the Goods to their final destination (Project Site) **specified in the BDS.**
- (b) For Goods manufactured outside the Purchaser's Country, to be imported:
  - (i) the price of the Goods, quoted CIP named place of destination, in the Purchaser's Country, as **specified in the BDS;**
  - (ii) the price for inland transportation, insurance, and other local services required to convey the Goods from the named place of destination to their final destination (Project Site) **specified in the BDS;**
- (c) For Goods manufactured outside the Purchaser's Country, already imported:
  - (i) the price of the Goods, including the original import value of the Goods; plus any mark-up (or rebate); plus any other related local cost, and custom duties and other import taxes already paid or to be paid on the Goods already imported.
  - (ii) the custom duties and other import taxes already paid (need to be supported with documentary evidence) or to be paid on the Goods already imported;

- (iii) the price of the Goods, obtained as the difference between (i) and (ii) above;
  - (iv) any Purchaser's Country sales and other taxes which will be payable on the Goods if the contract is awarded to the Bidder; and
  - (v) the price for inland transportation, insurance, and other local services required to convey the Goods from the named place of destination to their final destination (Project Site) **specified in the BDS.**
- (d) for Related Services, other than inland transportation and other services required to convey the Goods to their final destination, whenever such Related Services are specified in the Schedule of Requirements:
- (i) the price of each item comprising the Related Services (inclusive of any applicable taxes).
- 15. Currencies of Bid and Payment**
- 15.1 The currency(ies) of the bid and the currency(ies) of payments shall be **as specified in the BDS.** The Bidder shall quote in the currency of the Purchaser's Country the portion of the bid price that corresponds to expenditures incurred in the currency of the Purchaser's country, unless otherwise **specified in the BDS.**
- 15.2 The Bidder may express the bid price in any currency. If the Bidder wishes to be paid in a combination of amounts in different currencies, it may quote its price accordingly but shall use no more than three foreign currencies in addition to the currency of the Purchaser's Country.
- 16. Documents Establishing the Eligibility and Conformity of the Goods and Related Services**
- 16.1 To establish the eligibility of the Goods and Related Services in accordance with ITB 5, Bidders shall complete the country of origin declarations in the Price Schedule Forms, included in Section IV, Bidding Forms.
- 16.2 To establish the conformity of the Goods and Related Services to the Bidding Documents, the Bidder shall furnish as part of its Bid the documentary evidence that the Goods conform to the technical specifications and standards specified in Section VII, Schedule of Requirements.
- 16.3 The documentary evidence may be in the form of literature, drawings or data, and shall consist of a detailed item by item description of the essential technical and performance characteristics of the Goods and Related Services, demonstrating substantial responsiveness of the Goods and Related Services to the technical specification, and if applicable, a statement of

deviations and exceptions to the provisions of the Section VII, Schedule of Requirements.

16.4 The Bidder shall also furnish a list giving full particulars, including available sources and current prices of spare parts, special tools, etc., necessary for the proper and continuing functioning of the Goods during the period **specified in the BDS** following commencement of the use of the goods by the Purchaser.

16.5 Standards for workmanship, process, material, and equipment, as well as references to brand names or catalogue numbers specified by the Purchaser in the Schedule of Requirements, are intended to be descriptive only and not restrictive. The Bidder may offer other standards of quality, brand names, and/or catalogue numbers, provided that it demonstrates, to the Purchaser's satisfaction, that the substitutions ensure substantial equivalence or are superior to those specified in the Section VII, Schedule of Requirements.

**17. Documents  
Establishing the  
Eligibility and  
Qualifications  
of the Bidder**

17.1 To establish Bidder's their eligibility in accordance with ITB 4, Bidders shall complete the Letter of Bid, included in Section IV, Bidding Forms.

17.2 The documentary evidence of the Bidder's qualifications to perform the contract if its bid is accepted shall establish to the Purchaser's satisfaction:

(a) that, if **required in the BDS**, a Bidder that does not manufacture or produce the Goods it offers to supply shall submit the Manufacturer's Authorization using the form included in Section IV, Bidding Forms to demonstrate that it has been duly authorized by the manufacturer or producer of the Goods to supply these Goods in the Purchaser's Country;

(b) that, if **required in the BDS**, in case of a Bidder not doing business within the Purchaser's Country, the Bidder is or will be (if awarded the contract) represented by an Agent in the country equipped and able to carry out the Supplier's maintenance, repair and spare parts-stocking obligations prescribed in the Conditions of Contract and/or Technical Specifications; and

(c) that the Bidder meets each of the qualification criterion specified in Section III, Evaluation and Qualification Criteria.

**18. Period of  
Validity of Bids**

18.1. Bids shall remain valid for the period **specified in the BDS** after the bid submission deadline date prescribed by the Purchaser in

accordance with ITB 22.1. A bid valid for a shorter period shall be rejected by the Purchaser as nonresponsive.

- 18.2. In exceptional circumstances, prior to the expiration of the bid validity period, the Purchaser may request bidders to extend the period of validity of their bids. The request and the responses shall be made in writing. If a Bid Security is requested in accordance with ITB Clause 19, it shall also be extended for a corresponding period. A Bidder may refuse the request without forfeiting its Bid Security. A Bidder granting the request shall not be required or permitted to modify its bid, except as provided in ITB 18.3.
- 18.3. If the award is delayed by a period exceeding fifty-six (56) days beyond the expiry of the initial bid validity, the Contract price shall be determined as follows:
  - (a) In the case of fixed price contracts, the Contract price shall be the bid price adjusted by the factor **specified in the BDS**.
  - (b) In the case of adjustable price contracts, no adjustment shall be made.
  - (c) In any case, bid evaluation shall be based on the bid price without taking into consideration the applicable correction from those indicated above.

## **19. Bid Security**

- 19.1. The Bidder shall furnish as part of its bid, either a Bid-Securing Declaration or a bid security, as **specified in the BDS**, in original form and, in the case of a bid security. In the amount and currency **specified in the BDS**.
- 19.2. A Bid Securing Declaration shall use the form included in Section IV, Bidding Forms.
- 19.3. If a bid security is specified pursuant to ITB 19.1, the bid security shall be a demand guarantee in any of the following forms at the Bidder's option :
  - (a) an unconditional guarantee issued by a bank or financial institution (such as an insurance, bonding or surety company);
  - (b) an irrevocable letter of credit;
  - (c) a cashier's or certified check; or
  - (d) another security **specified in the BDS**,

from a reputable source from an eligible country. If the unconditional guarantee is issued by a financial institution located outside the Purchaser's Country, the issuing financial institution shall have a correspondent financial institution located in the Purchaser's Country to make it enforceable. In the case of a bank guarantee, the bid security shall be submitted either using the Bid Security Form included in Section IV, Bidding Forms, or in another substantially similar format approved by the Purchaser prior to bid submission. The bid security shall be valid for twenty-eight (28) days beyond the original validity period of the bid, or beyond any period of extension if requested under ITB 18.2.

- 19.4. If a Bid Security is specified pursuant to ITB 19.1, any bid not accompanied by a substantially responsive Bid Security shall be rejected by the Purchaser as non-responsive.
- 19.5. If a Bid Security is specified pursuant to ITB 19.1, the Bid Security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder's signing the contract and furnishing the Performance Security pursuant to ITB 42.
- 19.6. The Bid Security of the successful Bidder shall be returned as promptly as possible once the successful Bidder has signed the contract and furnished the required performance security.
- 19.7. The Bid Security may be forfeited or the Bid Securing Declaration executed:
  - (a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letter of Bid, or any extension thereto provided by the Bidder ; or
  - (b) if the successful Bidder fails to:
    - (i) sign the Contract in accordance with ITB41; or
    - (ii) furnish a performance security in accordance with ITB 42.
- 19.8. The bid security or Bid- Securing Declaration of a JV must be in the name of the JV that submits the bid. If the JV has not been legally constituted into a legally enforceable JV at the time of bidding, the bid security or Bid-Securing Declaration shall be in the names of all future members as named in the letter of intent referred to in ITB 4.1 and ITB 11.2.
- 19.9. If a bid security is **not required in the BDS**, pursuant to ITB 19.1, and

- (a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letter of Bid, or
- (b) if the successful Bidder fails to: sign the Contract in accordance with ITB 41; or furnish a performance security in accordance with ITB 42;

the Borrower may, **if provided for in the BDS**, declare the Bidder ineligible to be awarded a contract by the Purchaser for a period of time **as stated in the BDS**.

## 20. Format and Signing of Bid

- 20.1 The Bidder shall prepare one original of the documents comprising the bid as described in ITB 11 and clearly mark it "ORIGINAL." Alternative bids, if permitted in accordance with ITB 13, shall be clearly marked "ALTERNATIVE." In addition, the Bidder shall submit copies of the bid, in the number **specified in the BDS** and clearly mark them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.
- 20.2 The original and all copies of the bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation **as specified in the BDS** and shall be attached to the bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the bid where entries or amendments have been made shall be signed or initialed by the person signing the bid.
- 20.3 In case the Bidder is a JV, the Bid shall be signed by an authorized representative of the JV on behalf of the JV, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives.
- 20.4 Any inter-lineation, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the bid.

## D. Submission and Opening of Bids

## 21. Sealing and Marking of Bids

- 21.1. The Bidder shall enclose the original and all copies of the bid, including alternative bids, if permitted in accordance with ITB 13, in separate sealed envelopes, duly marking the envelopes as "ORIGINAL", "ALTERNATIVE" and "COPY." These envelopes containing the original and the copies shall then be enclosed in one single envelope.
- 21.2. The inner and outer envelopes shall:
  - (a) bear the name and address of the Bidder;

- (b) be addressed to the Purchaser in accordance with ITB 24.1;
  - (c) bear the specific identification of this bidding process indicated in ITB 1.1; and
  - (d) bear a warning not to open before the time and date for bid opening.
- 21.3. If all envelopes are not sealed and marked as required, the Purchaser will assume no responsibility for the misplacement or premature opening of the bid.
- 22. Deadline for Submission of Bids**
- 22.1. Bids must be received by the Purchaser at the address and no later than the date and time **specified in the BDS**. When so **specified in the BDS**, bidders shall have the option of submitting their bids electronically. Bidders submitting bids electronically shall follow the electronic bid submission procedures **specified in the BDS**.
- 22.2. The Purchaser may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Documents in accordance with ITB 8, in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.
- 23. Late Bids**
- 23.1. The Purchaser shall not consider any bid that arrives after the deadline for submission of bids, in accordance with ITB 22. Any bid received by the Purchaser after the deadline for submission of bids shall be declared late, rejected, and returned unopened to the Bidder.
- 24. Withdrawal, Substitution, and Modification of Bids**
- 24.1. A Bidder may withdraw, substitute, or modify its Bid after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization (the power of attorney) in accordance with ITB 20.2, (except that withdrawal notices do not require copies ). The corresponding substitution or modification of the bid must accompany the respective written notice. All notices must be:
- (a) prepared and submitted in accordance with ITB 20 and 21 (except that withdrawal notices do not require copies), and in addition, the respective envelopes shall be clearly marked “WITHDRAWAL,” “SUBSTITUTION,” or “MODIFICATION;” and
  - (b) received by the Purchaser prior to the deadline prescribed for submission of bids, in accordance with ITB 22.
- 24.2. Bids requested to be withdrawn in accordance with ITB 24.1 shall be returned unopened to the Bidders.

- 24.3. No bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Letter of Bid or any extension thereof.

## 25. Bid Opening

- 25.1. Except as in the cases specified in ITB 23 and 24, the Purchaser shall publicly open and read out in accordance with ITB 25.3 all bids received by the deadline at the date, time and place **specified in the BDS** in the presence of Bidders' designated representatives and anyone who choose to attend. Any specific electronic bid opening procedures required if electronic bidding is permitted in accordance with ITB 22.1, shall be as **specified in the BDS**.
- 25.2. First, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelope with the corresponding bid shall not be opened, but returned to the Bidder. If the withdrawal envelope does not contain a copy of the "power of attorney" confirming the signature as a person duly authorized to sign on behalf of the Bidder, the corresponding bid will be opened. No bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening. Next, envelopes marked "SUBSTITUTION" shall be opened and read out and exchanged with the corresponding Bid being substituted, and the substituted Bid shall not be opened, but returned to the Bidder. No Bid substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at bid opening. Envelopes marked "MODIFICATION" shall be opened and read out with the corresponding Bid. No Bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at Bid opening. Only bids that are opened and read out at Bid opening shall be considered further.
- 25.3. All other envelopes shall be opened one at a time, reading out: the name of the Bidder and whether there is a modification; the total Bid Prices, per lot (contract) if applicable, including any discounts and alternative bids; the presence or absence of a Bid Security, if required; and any other details as the Purchaser may consider appropriate. Only discounts and alternative bids read out at Bid opening shall be considered for evaluation. The Letter of Bid and the Price Schedules are to be initialed by representatives of the Purchaser attending bid opening in the manner **specified in the BDS**. The Purchaser shall neither discuss the merits of any bid nor reject any bid (except for late bids, in accordance with ITB 25.1).
- 25.4. The Purchaser shall prepare a record of the bid opening that shall include, as a minimum: the name of the Bidder and whether there

is a withdrawal, substitution, or modification; the Bid Price, per lot (contract) if applicable, including any discounts, and alternative bids; and the presence or absence of a Bid Security, if one was required. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders.

### **E. Evaluation and Comparison of Bids**

- 26. Confidentiality**
- 26.1 Information relating to the evaluation of bids and recommendation of contract award, shall not be disclosed to bidders or any other persons not officially concerned with the bidding process until information on Contract Award is communication to all Bidders in accordance with ITB 40.
- 26.2 Any effort by a Bidder to influence the Purchaser in the evaluation or contract award decisions may result in the rejection of its Bid.
- 26.3 Notwithstanding ITB 26.2, from the time of bid opening to the time of Contract Award, if any Bidder wishes to contact the Purchaser on any matter related to the bidding process, it should do so in writing.
- 27. Clarification of Bids**
- 27.1 To assist in the examination, evaluation, comparison of the bids, and qualification of the Bidders, the Purchaser may, at its discretion, ask any Bidder for a clarification of its Bid. Any clarification submitted by a Bidder in respect to its Bid and that is not in response to a request by the Purchaser shall not be considered. The Purchaser's request for clarification and the response shall be in writing. No change, including any voluntary increase or decrease, in the prices or substance of the Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Purchaser in the Evaluation of the bids, in accordance with ITB 31.
- 27.2 If a Bidder does not provide clarifications of its bid by the date and time set in the Purchaser's request for clarification, its bid may be rejected.

- 28. Deviations, Reservations, and Omissions**
- 28.1 During the evaluation of bids, the following definitions apply:
- (a) “Deviation” is a departure from the requirements specified in the Bidding Documents;
  - (b) “Reservation” is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Documents; and
  - (c) “Omission” is the failure to submit part or all of the information or documentation required in the Bidding Documents
- 29. Determination of Responsiveness**
- 29.1 The Purchaser’s determination of a bid’s responsiveness is to be based on the contents of the bid itself, as defined in ITB 11.
- 29.2 A substantially responsive Bid is one that meets the requirements of the Bidding Documents without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that:
- (a) if accepted, would
    - (i) affect in any substantial way the scope, quality, or performance of the Goods and Related Services specified in the Contract; or
    - (ii) limit in any substantial way, inconsistent with the Bidding Documents, the Purchaser’s rights or the Bidder’s obligations under the Contract; or
  - (b) if rectified, would unfairly affect the competitive position of other bidders presenting substantially responsive bids.
- 29.3 The Purchaser shall examine the technical aspects of the bid submitted in accordance with ITB 16 and ITB 17, in particular, to confirm that all requirements of Section VII, Schedule of Requirements have been met without any material deviation or reservation, or omission.
- 29.4 If a bid is not substantially responsive to the requirements of Bidding Documents, it shall be rejected by the Purchaser and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.
- 30. Nonconformities, Errors and Omissions**
- 30.1 Provided that a Bid is substantially responsive, the Purchaser may waive any nonconformities in the Bid.
- 30.2 Provided that a bid is substantially responsive, the Purchaser may request that the Bidder submit the necessary information or

documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the bid related to documentation requirements. Such omission shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

30.3 Provided that a bid is substantially responsive, the Purchaser shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component.

**31. Correction of  
Arithmetical  
Errors**

31.1 Provided that the Bid is substantially responsive, the Purchaser shall correct arithmetical errors on the following basis:

- (a) if there is a discrepancy between the unit price and the line item total that is obtained by multiplying the unit price by the quantity, the unit price shall prevail and the line item total shall be corrected, unless in the opinion of the Purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the line item total as quoted shall govern and the unit price shall be corrected;
- (b) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
- (c) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.

31.2 Bidders shall be requested to accept correction of arithmetical errors. Failure to accept the correction in accordance with ITB 31.1, shall result in the rejection of the Bid.

**32. Conversion to  
Single Currency**

32.1 For evaluation and comparison purposes, the currency(ies) of the Bid shall be converted in a single currency as **specified in the BDS.**

**33. Margin of  
Preference**

33.1 **Unless otherwise specified in the BDS,** a margin of preference shall not apply.

**34. Evaluation of  
Bids**

34.1 The Purchaser shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be permitted.

34.2 To evaluate a Bid, the Purchaser shall consider the following:

- (a) evaluation will be done for Items or Lots (contracts), as **specified in the BDS**; and the Bid Price as quoted in accordance with clause 14;
  - (b) price adjustment for correction of arithmetic errors in accordance with ITB 31.1;
  - (c) price adjustment due to discounts offered in accordance with ITB 14.3;
  - (d) converting the amount resulting from applying (a) to (c) above, if relevant, to a single currency in accordance with ITB 32;
  - (e) price adjustment due to quantifiable nonmaterial nonconformities in accordance with ITB 30.3;
  - (f) the additional evaluation factors are specified in Section III, Evaluation and Qualification Criteria;
- 34.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in bid evaluation.
- 34.4 If these Bidding Documents allows Bidders to quote separate prices for different lots (contracts), the methodology to determine the lowest evaluated price of the lot (contract) combinations, including any discounts offered in the Letter of Bid Form, is specified in Section III, Evaluation and Qualification Criteria
- 34.5 The Purchaser's evaluation of a bid will exclude and not take into account:
- (a) in the case of Goods manufactured in the Purchaser's Country, sales and other similar taxes, which will be payable on the goods if a contract is awarded to the Bidder;
  - (b) in the case of Goods manufactured outside the Purchaser's Country, already imported or to be imported, customs duties and other import taxes levied on the imported Good, sales and other similar taxes, which will be payable on the Goods if the contract is awarded to the Bidder;
  - (c) any allowance for price adjustment during the period of execution of the contract, if provided in the bid.
- 34.6 The Purchaser's evaluation of a bid may require the consideration of other factors, in addition to the Bid Price quoted in accordance with ITB 14. These factors may be related to the characteristics, performance, and terms and conditions of purchase of the Goods

and Related Services. The effect of the factors selected, if any, shall be expressed in monetary terms to facilitate comparison of bids, unless otherwise **specified in the BDS** from amongst those set out in Section III, Evaluation and Qualification Criteria. The criteria and methodologies to be used shall be as specified in ITB 34.2 (f).

**35. Comparison of Bids**

35.1 The Purchaser shall compare the evaluated prices of all substantially responsive bids established in accordance with ITB 34.2 to determine the lowest evaluated bid. The comparison shall be on the basis of CIP (place of final destination) prices for imported goods and EXW prices, plus cost of inland transportation and insurance to place of destination, for goods manufactured within the Borrower's country, together with prices for any required installation, training, commissioning and other services. The evaluation of prices shall not take into account custom duties and other taxes levied on imported goods quoted CIP and sales and similar taxes levied in connection with the sale or delivery of goods.

**36. Qualification of the Bidder**

36.1 The Purchaser shall determine to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated and substantially responsive bid meets the qualifying criteria specified in Section III, Evaluation and Qualification Criteria.

36.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 17.

36.3 An affirmative determination shall be a prerequisite for award of the Contract to the Bidder. A negative determination shall result in disqualification of the bid, in which event the Purchaser shall proceed to the next lowest evaluated bid to make a similar determination of that Bidder's qualifications to perform satisfactorily.

**37. Purchaser's Right to Accept Any Bid, and to Reject Any or All Bids**

37.1 The Purchaser reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to contract award, without thereby incurring any liability to Bidders. In case of annulment, all bids submitted and specifically, bid securities, shall be promptly returned to the Bidders.

**F. Award of Contract**

**38. Award Criteria**

38.1 Subject to ITB 37.1, the Purchaser shall award the Contract to the Bidder whose bid has been determined to be the lowest evaluated bid and is substantially responsive to the Bidding Documents,

provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily.

**39. Purchaser's  
Right to Vary  
Quantities at  
Time of Award**

39.1 At the time the Contract is awarded, the Purchaser reserves the right to increase or decrease the quantity of Goods and Related Services originally specified in Section VII, Schedule of Requirements, provided this does not exceed the percentages **specified in the BDS**, and without any change in the unit prices or other terms and conditions of the bid and the Bidding Documents.

**40. Notification of  
Award**

40.1 Prior to the expiration of the period of bid validity, the Purchaser shall notify the successful Bidder, in writing, that its Bid has been accepted. The notification letter (hereinafter and in the Conditions of Contract and Contract Forms called the "Letter of Acceptance") shall specify the sum that the Purchaser will pay the Supplier in consideration of the supply of Goods (hereinafter and in the Conditions of Contract and Contract Forms called "the Contract Price"). At the same time, the Purchaser shall also notify all other Bidders of the results of the bidding and shall publish in *UNDB online* the results identifying the bid and lot (contract) numbers and the following information:

- (i) name of each Bidder who submitted a Bid;
- (ii) bid prices as read out at Bid Opening;
- (iii) name and evaluated prices of each Bid that was evaluated;
- (iv) name of bidders whose bids were rejected and the reasons for their rejection; and
- (v) name of the successful Bidder, and the Price it offered, as well as the duration and summary scope of the contract awarded.

40.2 Until a formal Contract is prepared and executed, the notification of award shall constitute a binding Contract.

40.3 The Purchaser shall promptly respond in writing to any unsuccessful Bidder who, after notification of award in accordance with ITB 40.1, requests in writing the grounds on which its bid was not selected.

**41. Signing of  
Contract**

41.1 Promptly after notification, the Purchaser shall send the successful Bidder the Contract Agreement.

- 41.2 Within twenty-eight (28) days of receipt of the Contract Agreement, the successful Bidder shall sign, date, and return it to the Purchaser.
- 41.3 Notwithstanding ITB 41.2 above, in case signing of the Contract Agreement is prevented by any export restrictions attributable to the Purchaser, to the country of the Purchaser, or to the use of the products/goods, systems or services to be supplied, where such export restrictions arise from trade regulations from a country supplying those products/goods, systems or services, the Bidder shall not be bound by its bid, always provided however, that the Bidder can demonstrate to the satisfaction of the Purchaser and of the Bank that signing of the Contract Agreement has not been prevented by any lack of diligence on the part of the Bidder in completing any formalities, including applying for permits, authorizations and licenses necessary for the export of the products/goods, systems or services under the terms of the Contract.
- 42. Performance Security**
- 42.1 Within twenty eight (28) days of the receipt of notification of award from the Purchaser, the successful Bidder, if required, shall furnish the Performance Security in accordance with the GCC, subject to ITB 34.5, using for that purpose the Performance Security Form included in Section X, Contract Forms, or another Form acceptable to the Purchaser. If the Performance Security furnished by the successful Bidder is in the form of a bond, it shall be issued by a bonding or insurance company that has been determined by the successful Bidder to be acceptable to the Purchaser. A foreign institution providing a bond shall have a correspondent financial institution located in the Purchaser's Country.
- 42.2 Failure of the successful Bidder to submit the above-mentioned Performance Security or sign the Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. In that event the Purchaser may award the Contract to the next lowest evaluated Bidder, whose bid is substantially responsive and is determined by the Purchaser to be qualified to perform the Contract satisfactorily.



## Section II. Bid Data Sheet (BDS)

The following specific data for the goods to be procured shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITB). Whenever there is a conflict, the provisions herein shall prevail over those in ITB.

ITB Clause Reference	A. General
ITB 1.1	The reference number of the Invitation for Bids is : <b>KP1/6A.1/OT/4/22/A96</b>
ITB 1.1	The Purchaser is: <b>KENYA POWER AND LIGHTING COMPANY PLC</b>
ITB 1.1	<p>The name of the ICB is: <b>Procurement of RTUs, Multiplexers, Gateway &amp; Adaptation Materials (Transducers &amp; Interposing Relays &amp; Control Cables) to connect to KPLC SCADA System.</b></p> <p>The identification number of the ICB is: <b>KP1/6A.1/OT/4/22/A96</b></p> <p>The number and identification of lots (contracts) comprising this ICB is:  <b>There are no lots in this ICB, and as per ITB 34.2(a), Bids will be evaluated for the entire bid as one contract.</b></p>
ITB 2.1	<p>The Borrower is <b>The Government of Kenya.</b></p> <p><b>The Purchaser is Kenya Power &amp; Lighting Company Ltd who is a national electric utility company which transmits, distributes and retails electricity to customers throughout the country</b></p>
ITB 2.1	Loan or Financing Agreement amount: <b>USD257.50</b> million (equivalent) It is intended that part of the proceeds of this credit will be applied to eligible payments under this contract
ITB 2.1	The name of the Project is: <b>Kenya Electricity Modernization Project - (KEMP)</b>
ITB 4.1	Maximum number of members in the JV shall be: <b>Three (3)</b>
IITB 4.4	A list of debarred firms and individuals is available on the Bank's external website: <a href="http://www.worldbank.org/debarr">http://www.worldbank.org/debarr</a> .
<b>B. Contents of Bidding Documents</b>	
ITB 7.1	For <b><u>Clarification of bid purposes</u></b> only, the Purchaser's address is: <b>Attention:</b>

	<p><b>ENG. NICHOLAS KIMINDA</b>  <b>CHIEF ENGINEER, PROJECTS (SUBSTATIONS)</b>  <b>THE KENYA POWER AND LIGHTING COMPANY PLC,</b>  <b>STIMA PLAZA, 2ND FLOOR</b>  <b>KOLOBOT ROAD, PARKLANDS</b>  <b>P.O BOX 30099 - 00100</b>  <b>NAIROBI, KENYA</b></p> <p>Telephone: +254-20-3202051</p> <p>Electronic mail address: <a href="mailto:NKiminda@kplc.co.ke">NKiminda@kplc.co.ke</a> and Copy to:  <a href="mailto:Bangima@kplc.co.ke">Bangima@kplc.co.ke</a> / <a href="mailto:Aomar@kplc.co.ke">Aomar@kplc.co.ke</a></p> <p>The Employer should receive requests for clarification no later than <b>14 days</b>.</p>
<b>ITB 7.1</b>	Web page: <a href="http://www.kplc.co.ke">www.kplc.co.ke</a>
	<b>C. Preparation of Bids</b>
<b>ITB 10.1</b>	<p>The language of the bid is <b>English</b>.</p> <p>All correspondence exchange shall be in <b>English</b> language.</p> <p>Language for translation of supporting documents and printed literature is <b>English</b>.</p>
<b>ITB 11.1 (j)</b>	<p>The Bidder shall submit the following additional documents in its bid:</p> <ul style="list-style-type: none"> <li>(i) Manufacturer's authorization in case the bidder is not a manufacturer</li> <li>(ii) For goods manufactured outside Kenya, applicable relevant valid ISO 9001:2015 certification and for goods manufactured in Kenya - valid KEBS Diamond Mark of Quality Certificate or KEBS Standardization Mark Certificate.</li> <li>(iii) Technical Particulars/characteristics duly completed and signed by the manufacturer as per Annex A (Guarantee Technical Particulars) of the Technical Specifications.</li> <li>(iv) Type Test Certificates and their Reports or Test Certificates and their Reports from the designated bodies for full compliance with Tender Specifications</li> <li>(v) The accreditation certificate for the testing laboratory to ISO/ IEC 17025</li> <li>(vi) Additional information such as brochures/catalogues/drawings and any other describing in detail the proposed items.</li> <li>(vii) The Manufacturer's Declaration of Conformity to reference standards</li> </ul>

	<p>(viii) Statement of compliance to tender specifications (indicate deviations if any and supporting documents in the bid)</p> <p>(ix) Documentary Evidence indicating the Bidder's Supplies record as stipulated in Section III of the Evaluation Criteria, 3.1 post qualification requirements, (i) Financial Capability, (ii) Experience and Technical Capacity and (iii) Supply Capacity</p>
<b>ITB 13.1</b>	Alternative Bids <b>shall not be</b> considered.
<b>ITB 14.5</b>	The prices quoted by the Bidder <b>shall not</b> be subject to adjustment during the performance of the Contract.
<b>ITB 14.6</b>	Prices quoted for each item of a lot shall correspond at least to <b>100</b> percent of the quantities specified for this item of a lot.
<b>ITB 14.7</b>	The Incoterms edition is: <b>2020</b>
<b>ITB 14.8 (b) (i) and (c) (v)</b>	Place of Destination: <b>CIP Mombasa</b>
<b>ITB 14.8 (a) (iii);(b)(ii) and (c)(v)</b>	"Final destination (Project Site)": Juja Road National Control Centre
<b>ITB 15.1</b>	<p>The price shall be quoted by the bidder in:</p> <ol style="list-style-type: none"> <li>i. In KES (Kenya Shillings) further referred to as 'the local for those inputs of the requirements that the bidder expects to supply from within the purchaser's country, and</li> <li>ii. In up to any three freely convertible foreign currencies of any country further referred to as 'foreign currency requirements''. In addition to the local currency for those inputs of the requirements that the bidder expects to supply from outside the purchaser's country.</li> </ol> <p>The Bidder <i>is</i> required to quote in the currency of the Purchaser's Country the portion of the bid price that corresponds to expenditures incurred in that currency.</p>
<b>ITB 16.4</b>	Period of time the Goods are expected to be functioning (for the purpose of spare parts): <b>N/A</b>
<b>ITB 17.2 (a)</b>	Manufacturer's authorization is: <b>Required</b>
<b>ITB 17.2 (b)</b>	<p>After sales service is: <b>Not Required</b></p> <p><b>However, a one (1) year warranty is required as stipulated in the General</b></p>

	<b>Conditions of the Contract 28.3.</b>		
<b>ITB 18.1</b>	The bid validity period shall be <b>180</b> days.		
<b>ITB 18.3 (a)</b>	The bid price shall be adjusted by the following factor(s): <i>Not Applicable</i>		
<b>ITB 19.1</b>	A <i>Bid Security</i> shall be required.		
	If a bid security shall be required, the amount and currency of the bid security shall be		
	<b>No.</b>	<b>USD</b>	<b>KES</b>
	Bid Security	32,400	3,560,000
<b>ITB 19.3 (d)</b>	Other types of acceptable securities: <b>N/A</b>		

<b>ITB 19.9</b>	N/A
<b>ITB 20.1</b>	In addition to the original of the bid, the number of copies is: <b>Two (2) and a soft copy in PDF provided in a flash disk.</b>
<b>ITB 20.2</b>	<p>The written confirmation of authorization to sign on behalf of the Bidder shall consist of:</p> <ul style="list-style-type: none"> <li>(a) The power of attorney</li> <li>(b) In the case of Bids submitted by an existing or intended JV an undertaking signed by all parties (i) stating that all parties shall be jointly and severally liable, if so required in accordance with ITB4.1(a), and (ii) nominating a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution.</li> </ul>
<b>D. Submission and Opening of Bids</b>	
<b>ITB 22.1</b>	<p>For <b>bid submission purposes</b> only, the Purchaser's address is:  Attention:  <b>The General Manager, Supply Chain &amp; Logistics</b></p> <p><b>The Kenya Power and Lighting Company</b>  <b>3<sup>rd</sup> Floor, Stima Plaza, Kolobot Road, Parklands</b>  <b>City: Nairobi</b>  <b>ZIP/Postal Code: 30099-00100</b>  <b>Country: Kenya</b></p> <p><b>The deadline for the submission of bids is: 26<sup>th</sup> April 2022</b>  <b>Time: 10:00Hrs East African Time</b></p> <p>Bidders <b><i>shall not</i></b> have the option of submitting their bids electronically.</p> <p>If bidders have the option of submitting their bids electronically, the electronic bidding submission procedures shall be: <b>N/A</b></p>
<b>ITB 25.1</b>	<p>The bid opening shall take place at:  <b>Stima Plaza, Auditorium</b>  <b>Street Address: Kolobot Road, Parklands</b>  <b>Floor/ Room number: Ground Floor ,</b></p>

	<p><b>Room number: Stima Plaza Auditorium</b></p> <p><b>City: Nairobi</b></p> <p><b>Country: Kenya</b></p> <p><b>Date: 26<sup>th</sup> April 2022</b></p> <p><b>Time: 10:00Hrs East African Time</b></p> <p>If bidders have the option of submitting their bids electronically, the electronic bidding opening procedures shall be: <b>N/A</b></p>
<b>ITB 25.3</b>	<p>Three (3) Representative of the purchaser shall initial the Letter of Bid and Price Schedules.</p> <ul style="list-style-type: none"> <li>i. The bid shall be initialed by all representatives and shall be numbered.</li> <li>ii. Any modification to the unit or total price shall be initialed by the representatives of the purchaser.</li> </ul>
<b>E. Evaluation and Comparison of Bids</b>	
<b>ITB 32.1</b>	<p>The currency that shall be used for bid evaluation and comparison purposes to convert all bid prices expressed in various currencies into a single currency is: <b>Kenya Shillings (KES)</b></p> <p>The source of exchange rate shall be: <b>The Central Bank of Kenya</b></p> <p>The date for the exchange rate shall be <b>The Central Bank of Kenya Selling Rate at the closing date of submission of bids.</b></p>
<b>ITB 33.1</b>	<p>A margin of domestic preference <i>shall not</i> apply.</p> <p>If a margin of preference applies, the application methodology shall be defined in Section III – Evaluation and Qualification Criteria.</p>

<b>TB 34.2(a)</b>	Evaluation will be done for <i>Select Items</i>  Note:  <i>Bids will be evaluated for each item and the Contract will comprise the item(s) awarded to the successful Bidder.</i>
<b>ITB 34.6</b>	The adjustments shall be determined using the following criteria, from amongst those set out in Section III, Evaluation and Qualification Criteria:  (a) Deviation in Delivery schedule: <b>No</b>  (b) Deviation in payment schedule: <b>No</b>  (c) the cost of major replacement components, mandatory spare parts, and service: <b>No</b>  (d) the availability in the Purchaser's Country of spare parts and after-sales services for the equipment offered in the bid: <b>Yes</b>  (e) the projected operating and maintenance costs during the life of the equipment: <b>No</b>  (f) the performance and productivity of the equipment offered: <b>Yes</b>

	<b>F. Award of Contract</b>
<b>ITB 39.1</b>	The maximum percentage by which quantities may be increased is: <b>10%</b> The maximum percentage by which quantities may be decreased is: <b>10%</b>

# **Section III. Evaluation and Qualification Criteria**

## **Contents**

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<b>3. Qualification (ITB 36).....</b>	<b>38</b>

## 1. Evaluation (ITB 34)

### 1.1. Evaluation Criteria (ITB 34.6)

The Purchaser's evaluation of a bid may take into account, in addition to the Bid Price quoted in accordance with ITB Clause 14.8, one or more of the following factors as specified in ITB 34.2(f) and in BDS referring to ITB 34.6, using the following criteria and methodologies.

- (a) Delivery schedule. (as per Incoterms specified in the BDS)

The Goods specified in the List of Goods are required to be delivered within the acceptable time range (after the earliest and before the latest delivery date, both dates inclusive) specified in **Section VII, Schedule of Requirements** Bids offering delivery after the specified latest delivery date shall be treated as non-responsive

- (b) Deviation in payment schedule. *Not Allowed*
- (c) Specific additional criteria: **BDS 34.6**

### 1.2. Multiple Contracts (ITB 34.4)

**Not Applicable**

### 1.3. Alternative Bids (ITB 13.1)

*Not Permitted*

## 2. Qualification (ITB 36)

### 2.1 Post qualification Requirements (ITB 36.1)

After determining the lowest-evaluated bid in accordance with ITB 35.1, the Purchaser shall carry out the post qualification of the Bidder in accordance with ITB 36, using only the requirements specified. Requirements not included in the text below shall not be used in the evaluation of the Bidder's qualifications.

- (a) If Bidder is Manufacturer :
- (i) Financial Capability

The Bidder shall furnish documentary evidence that it meets the following financial requirement(s):

- a) Historical financial performance; by Submission of audited balance sheets or if not required by the law of the bidder's country, other financial statements acceptable to the Employer, for the last five (5) years to demonstrate the current soundness of the bidders financial position and its prospective long term profitability.

In the event of joint venture, each party must meet this requirement.

- b) The minimum average annual turnover as indicated on the table below which is Calculated as total certified payments received for contracts in progress or completed, within the last five(5) years

<b>Scope</b>	<b>Minimum Average Annual Turnover (USD) Million</b>
Supply of RTUs ,Telcoms and necessary adaptation materials as per specification	<b>1,000,000</b>

In the event of a joint venture, all parties combined must meet this requirement.

(ii) Experience and Technical Capacity

The Bidder shall furnish documentary evidence to demonstrate that it meets the following experience requirement(s):

- (a) The Bidder shall have minimum of five years' experience in manufacturing SCADA and Telcom materials. In the event of joint venture, the party who will supply goods must meet this requirement.
- (b) The Bidder shall submit the type test reports and certificates from the relevant International or National Testing/Standards Authority or ISO/IEC 17025 accredited independent laboratory for RTUs, multiplexers and Adaptation Materials. In the event of joint venture, the party who will supply goods must meet this requirement.
- (c) The Bidder shall furnish documentary evidence to demonstrate that it has supplied similar goods during the last five years. In the event of a joint venture all parties combined must meet this requirement.

**Note:** Where the Bidder is not from the purchaser's country, then the Bidder shall furnish documentary evidence to demonstrate that it has supplied minimum quantities of SCADA and Telcom materials tabulated below, outside the country of Bidder during the last five years (for one lot or for multiple lots).

<b>Description Of Goods</b>	<b>Quantity</b>
Remote Terminal Units(RTUs)	34 units
SDH Equipment	24 units
Fibre Optic Cable(ADSS)	120km
Control Cables	22150m
110DC-48VDC Converters	20 units

Transducers	405 units
Interposing Relay	4431 units
Multiplication Relays	862 units
Command Relays	465 units
Multi-functional Meter(MFMs)	162 units

- (b) If Bidder is not manufacturer:

If a Bidder is not a manufacturer, but is offering the Goods on behalf of the Manufacturer under Manufacturer's Authorization Form (Section IV, Bidding Forms), the Manufacturer shall demonstrate the above qualifications (i), (ii), (iii) and the Bidder shall demonstrate that it has successfully completed at least **2 contracts** of similar goods in the past **5 years**

**If Bidder is not manufacturer:**

If a Bidder is not a manufacturer, but is offering the Goods on behalf of the Manufacturer under Manufacturer's Authorization Form (Section IV, Bidding Forms), the Bidder shall demonstrate the qualifications below in (i), (ii), (iii).

- (i) Financial Capability

The Bidder shall furnish documentary evidence that it meets the following financial requirement(s):

- a) Historical financial performance; by Submission of audited balance sheets or if not required by the law of the bidder's country, other financial statements acceptable to the Employer, for the last five (5) years to demonstrate the current soundness of the bidders financial position and its prospective long term profitability.
- b) The minimum average annual turnover as indicated on the table below which is Calculated as total certified payments received for contracts in progress or completed, within the last five (5) years

No.	Minimum Average Annual Turnover (USD) Million
Supply of RTUs ,Telecoms and necessary adaptation materials as per specification	1,000,000

- c) In the event of a joint venture all parties combined must meet the requirement in (i) (a), (b) & (c) above.

- (ii) The Manufacturer who provided the Manufacture's authorization shall demonstrate and meet Experience Capacity and supply capacity as given above ( ii, & iii of If bidder is a Manufacturer )

### 1.1 Technical Evaluation

In addition to the criteria listed in ITB 35.2 (a) – (c) the following factors shall apply:

The bidder shall demonstrate as part of the requirements of ITB 16.1 the supply and support capabilities through detailed presentation of the firm's design, engineering, installation and supply management methodology.

The following site by site method statements shall be evaluated for compliance with the requirements of section VI and VII of the bidding document

- a. Supplied SCADA Equipment and accessories capability to integrate with KPLC SCADA and Telecom system in nearest Regional control center(RCC)
- b. Clear Methodology of supplied equipment's installation,integration,tests and commissioning
- c. Supplied SCADA Equipment protocols ready to be integrated into Substation local Automation & Control – Adaptation and modifications engineering.
- d. Bidder shall have proof of experience in the rehabilitation for protection and/or RTU in existing substation
- e. Experience in local support of Installation and erection of SCADA & Telecoms Equipment.
- f. Ability to replace any malfunctioning equipment with ease
- g. Extended guarantees of the equipments
- h. Supply Management. The contractor will give a presentation of supply time
- i. Quality control measures, a narration of specific quality control mechanisms measures at design, construction, erection, installation, testing and commissioning of the supplied equipment
- j. One time licenses of the supplied equipments
- k. All necessary softwares and backups required to install the equipments
- l. Ability to offer training and remote support in installation of the equipments without additional cost
- m. Equipment must have open platforms for easy integrations to any existing equipments
- n. Safety, Health and Environmental plan necessary –This should Include a narration of expected safety risks, taking into account local conditions and mitigation measures that will be adopted to ensure that the supply projects are completed without accidents, with minimum negative impact on the environment.

### 1.1.1 Technical Guarantee Schedules

The technical guarantee schedules shall be evaluated in comparison with the requirements in Section VI of the bidding document. The technical guarantee schedules must fully conform to the requirements.

### 1.1.2 Technical Requirements for Facilities

1. Equipment and materials supplied shall meet the technical requirements, requirements of type test, routine test, and electrical test after installation as specified in technical specifications
2. The manufacturer of the major equipment including
  - i. RTU/Gateway
  - ii. Telecommunications Equipments/switches
  - iii. Fibre Optic cable
  - iv. DC system
  - v. Transducers
  - vi. Interposing relays
  - vii. Multiplication relays

is required to have been awarded a valid ISO:9001 2015 Certificate or equivalent Quality Assurance Certification.

The manufacturers of major equipment must have supplied similar equipment that have been in service for at least five (5) years outside the country of manufacture RTU and telecommunications equipments shall be operated in Kenya network Substation

## 1.2 Economic Evaluation

The following factors and methods will apply:

### (a) Time Schedule:

Time to complete the supply from the contract effective date specified in Article 3 of the Contract Agreement: **4 months(Maximum)**. No credit will be given for earlier completion. Bids offering a completion date beyond the maximum designated period shall be rejected.

### (b) Functional Guarantees of the facilities

The Equipment must meet minimum (or maximum) requirements stated in the Specifications for functional guarantees as below:

<b>Functional Guarantee</b>	<b>Required</b>	<b>Guaranteed by the Bidder</b>
Availability of Equipment to Control Centers	99.50%	
Maintainability	As per class RT4 for mean repair time defined in IEC 870-4	
Data Integrity and Accuracy	As per class 13 for IE 10 exp.-14 Accuracy class A3 of IEC 870-4	
Inter-operability and Open Protocols	Data Acquisition from Different Vendors' Equipment	
Gateways	Secure and Substation Hardened	
Scalability of RTUs	At least 30% or more spare data points/contacts. Readily Expandable for future Expansion	



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## Section IV. Bidding Forms

### Table of Forms

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## Letter of Bid

*The Bidder must prepare the Letter of Bid on stationery with its letterhead clearly showing the Bidder's complete name and address.*

*Note: All italicized text is for use in preparing these form and shall be deleted from the final products.*

Date: **[insert date (as day, month and year) of Bid Submission]**

ICB No.: **[insert number of bidding process]**

Invitation for Bid No.: **[insert identification]**

Alternative No.: ***[insert identification No if this is a Bid for an alternative]***

To: ***[insert complete name of Purchaser]***

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB 8)\_\_\_;
- (b) We meet the eligibility requirements and have no conflict of interest in accordance with ITB 4;
- (c) We have not been suspended nor declared ineligible by the Purchaser based on execution of a Bid Securing Declaration in the Purchaser's country in accordance with ITB 4.6
- (d) We offer to supply in conformity with the Bidding Documents and in accordance with the Delivery Schedules specified in the Schedule of Requirements the following Goods: **[insert a brief description of the Goods and Related Services];**
- (e) The total price of our Bid, excluding any discounts offered in item (f) below is:

In case of only one lot, total price of the Bid **[insert the total price of the bid in words and figures, indicating the various amounts and the respective currencies];**

In case of multiple lots, total price of each lot [insert the total price of each lot in words and figures, indicating the various amounts and the respective currencies];

In case of multiple lots, total price of all lots (sum of all lots) [insert the total price of all lots in words and figures, indicating the various amounts and the respective currencies];

- (f) The discounts offered and the methodology for their application are:

(i) The discounts offered are: [Specify in detail each discount offered.]

- (ii) The exact method of calculations to determine the net price after application of discounts is shown below: **Specify in detail the method that shall be used to apply the discounts**;
- (g) Our bid shall be valid for a period of [*specify the number of calendar days*] days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (h) If our bid is accepted, we commit to obtain a performance security in accordance with the Bidding Documents;
- (i) We are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process in accordance with ITB 4.2(e), other than alternative bids submitted in accordance with ITB 13;
- (j) We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by a member of the World Bank Group or a debarment imposed by the World Bank Group in accordance with the Agreement for Mutual Enforcement of Debarment Decisions between the World Bank and other development banks. Further, we are not ineligible under the Employer's country laws or official regulations or pursuant to a decision of the United Nations Security Council;
- (k) We are not a government owned entity/ We are a government owned entity but meet the requirements of ITB 4.5;<sup>1</sup>
- (l) We have paid, or will pay the following commissions, gratuities, or fees with respect to the bidding process or execution of the Contract: **[insert complete name of each Recipient, its full address, the reason for which each commission or gratuity was paid and the amount and currency of each such commission or gratuity]**

Name of Recipient	Address	Reason	Amount

(If none has been paid or is to be paid, indicate "none.")

- (m) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed; and

<sup>1</sup> Bidder to use as appropriate

- (n) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.
- (o) We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in any type of fraud and corruption

Name of the Bidder\* **[insert complete name of person signing the Bid]**

Name of the person duly authorized to sign the Bid on behalf of the Bidder\*\* **[insert complete name of person duly authorized to sign the Bid]**

Title of the person signing the Bid **[insert complete title of the person signing the Bid]**

Signature of the person named above **[insert signature of person whose name and capacity are shown above]**

Date signed **[insert date of signing]** day of **[insert month]**, **[insert year]**

\*: In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder

\*\* : Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid Schedules.

## Bidder Information Form

*[The Bidder shall fill in this Form in accordance with the instructions indicated below. No alterations to its format shall be permitted and no substitutions shall be accepted.]*

Date: *[insert date (as day, month and year) of Bid Submission]*

ICB No.: *[insert number of bidding process]*

Alternative No.: *[insert identification No if this is a Bid for an alternative]*

Page \_\_\_\_\_ of \_\_\_\_\_ pages

1. Bidder's Name <i>[insert Bidder's legal name]</i>
2. In case of JV, legal name of each member : <i>[insert legal name of each member in JV]</i>
3. Bidder's actual or intended country of registration: <i>[insert actual or intended country of registration]</i>
4. Bidder's year of registration: <i>[insert Bidder's year of registration]</i>
5. Bidder's Address in country of registration: <i>[insert Bidder's legal address in country of registration]</i>
6. Bidder's Authorized Representative Information  Name: <i>[insert Authorized Representative's name]</i> Address: <i>[insert Authorized Representative's Address]</i> Telephone/Fax numbers: <i>[insert Authorized Representative's telephone/fax numbers]</i> Email Address: <i>[insert Authorized Representative's email address]</i>
7. Attached are copies of original documents of <i>[check the box(es) of the attached original documents]</i>  <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with ITB 4.3. <input type="checkbox"/> In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 4.1. <input type="checkbox"/> In case of Government-owned enterprise or institution, in accordance with ITB 4.5 documents establishing: <ul style="list-style-type: none"> <li>• Legal and financial autonomy</li> <li>• Operation under commercial law</li> <li>• Establishing that the Bidder is not dependent agency of the Purchaser</li> </ul>
2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

## Bidder's JV Members Information Form

*[The Bidder shall fill in this Form in accordance with the instructions indicated below. The following table shall be filled in for the Bidder and for each member of a Joint Venture]].*

Date: *[insert date (as day, month and year) of Bid Submission]*

ICB No.: *[insert number of bidding process]*

Alternative No.: *[insert identification No if this is a Bid for an alternative]*

Page \_\_\_\_\_ of \_\_\_\_\_ pages

1. Bidder's Name: <i>[insert Bidder's legal name]</i>
2. Bidder's JV Member's name: <i>[insert JV's Member legal name]</i>
3. Bidder's JV Member's country of registration: <i>[insert JV's Member country of registration]</i>
4. Bidder's JV Member's year of registration: <i>[insert JV's Member year of registration]</i>
5. Bidder's JV Member's legal address in country of registration: <i>[insert JV's Member legal address in country of registration]</i>
6. Bidder's JV Member's authorized representative information Name: <i>[insert name of JV's Member authorized representative]</i> Address: <i>[insert address of JV's Member authorized representative]</i> Telephone/Fax numbers: <i>[insert telephone/fax numbers of JV's Member authorized representative]</i> Email Address: <i>[insert email address of JV's Member authorized representative]</i>
7. Attached are copies of original documents of <i>[check the box(es) of the attached original documents]</i> <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above, in accordance with ITB 4.3. <input type="checkbox"/> In case of a Government-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and absence of dependent status, in accordance with ITB 4.5.
2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

## Price Schedule: Goods Manufactured Outside the Purchaser's Country, to be Imported

(Group C bids, goods to be imported)								Date: _____
Currencies in accordance with ITB 15								ICB No: <b>KP1/6A.1/OT/4/22/A96</b>
								Alternative No: _____
								Page N° _____ of _____
1	2	3	4	5	6	7	8	9
Line Item N°	Description of Goods	Country of Origin	Delivery Date as defined by Incoterms	Quantity and physical unit	Unit price CIP <i>Mombasa</i> in accordance with ITB 14.8(b)(i)	CIP Price per line item (Col. 5x6)	Price per line item for inland transportation and other services required in the Purchaser's country to convey the Goods to their final destination including agency fees for clearing and forwarding charges for Mombasa Port and border points (KPLC Juja Rd Substation, National Control Center )specified in BDS	Total Price per Line item (Col. 7+8)
	<b>SCADA Equipment at Substations</b>							
1.	New Remote Terminal Unit (RTU)			34				
2.	SDH-Mux			25				
3.	Current Transducers			142				
4.	Resistant Transducers			48				
5.	Multi Transducer for HV side			180				
6.	Tap Position Transducers			35				
7.	Interposing Relays 110vdc			4231				
8.	Interposing Relays 48vdc			200				
9.	Command Relays- 110vdc			465				

10.	Multiplication Relays- 30vdc			262				
11.	Multiplication Relays-110vdc			600				
12.	Multi-Function Meters			162				
13.	2.5mm <sup>2</sup> 12 core control cable			13800				
14.	2.5mm <sup>2</sup> 7 core armored control cable			6650				
15.	2.5mm <sup>2</sup> 4 core cable			1700				
16.	Cable glands			340				
17.	DIN rails in meters			68				
18.	110VDC-48VDC Converters			20				
	<b>Other Necessary Material</b>							
19.	48VDC Power supply cards/Modules			15				
20.	RTUs communication cards			15				
21.	Ragged Substation switches			25				
22.	Protocol converters			30				
23.	SFP Modules							
24.	GBE SFPs 120kms			4				
25.	GBE SFPs 80kms			4				
26.	SDH STM4 120kms			4				
27.	SDH STM1 100kms			6				
28.	SDH STM4 80kms			6				
29.	SDH STM1 80kms			6				
30.	SDH STM1 60kms			6				

31.	Various Patch codes								
32.	SC-FC 20 m			20					
33.	FC-LC 20 m			20					
34.	SC-LC 20 m			20					
35.	LC-LC 20 m			10					
36.	48 cores ADSS Fibre Cable			120					
37.	Wall Mounted ODFs			34					
38.	Joint Boxes			30					
	<b>FAT and Local Training</b>								
39.	FAT for 2 Staff in days			5					
40.	Factory Training for 4 Engineers in days			14					
41.	Local hands on Training in days			10					
42.	Configuration tools/Laptops with software			16					
								Total Price	

Name of Bidder [*insert complete name of Bidder*] Signature of Bidder [*signature of person signing the Bid*] Date [*Insert Date*]

## Price Schedule: Goods Manufactured Outside the Purchaser's Country, already imported\*

(Group C bids, Goods already imported)										Date: _____	
Currencies in accordance with ITB 15										ICB No: <b>KP1/6A.1/OT/4/22/A96</b>	
										Alternative No: _____	
										Page N° _____ of _____	
1	2	3	4	5	6	7	8	9	10	11	12
Line Item N°	Description of Goods	Country of Origin	Delivery Date as defined by Incoterms	Quantity and physical unit	Unit price including Custom Duties and Import Taxes paid, in accordance with ITB 14.8(c)(i)	Custom Duties and Import Taxes paid per unit in accordance with ITB 14.8(c)(ii) , [to be supported by documents]	Unit Price net of custom duties and import taxes, in accordance with ITB 148 (c) (iii) (Col. 6 minus Col.7)	Price per line item net of Custom Duties and Import Taxes paid, in accordance with ITB 14.8(c)(i) (Col. 5×8)	Price per line item for inland transportation and other services required in the Purchaser's country to convey the goods to their final destination, as specified in BDS in accordance with ITB 14.8 (c)(v)	Sales and other taxes paid or payable per item if Contract is awarded (in accordance with ITB 14.8(c)(iv)	Total Price per line item (Col. 9+10)
										Total Bid Price	

Name of Bidder *[insert complete name of Bidder]* Signature of Bidder *[signature of person signing the Bid]* Date *[insert date]*

## Price Schedule: Goods Manufactured in the Purchaser's Country

Purchaser's Country  
\_\_\_\_\_

(Group A and B  
bids)

Date: \_\_\_\_\_

Currencies in accordance with ITB 15

ICB No KPI/6A.1/OT/4/22/A96

1	2	3	4	5	6	7	8	9	10
Line Item N°	Description of Goods	Delivery Date as defined by Incoterms	Quantity and physical unit (No.)	Unit price EXW	Total EXW price per line item (Col. 4×5)	Price per line item for inland transportation and other services required in the Purchaser's Country to convey the Goods to their final destination <b>KPLC Juja Rd Substation</b>	Cost of local labor, raw materials and components from with origin in the Purchaser's Country % of Col. 5	Sales and other taxes payable per line item if Contract is awarded (in accordance with ITB 14.8(a)(ii))	Total Price per line item (Col. 6+7)
A	<b>SCADA Equipment at Substations</b>								
1	New Remote Terminal Unit (RTU)		34						
2	SDH-Mux		25						
3	Current Transducers		142						
4	Resistant Transducers		48						
5	Multi Transducer for HV side		180						
6	Tap Position Transducers		35						
7	Interposing Relays 110vdc		4231						
8	Interposing Relays 48vdc		200						
9	Command Relays-110vdc		465						
10	Multiplication Relays-30vdc		262						
11	Multiplication Relays-110vdc		600						
6	Multi-Function Meters		162						
7	2.5mm <sup>2</sup> 12 core control cable		13800m						
8	2.5mm <sup>2</sup> 7 core armored control cable		6650m						

9	2.5mm <sup>2</sup> 4 core cable		1700m					
10	Cable glands		340					
11	DIN rails		68m					
12	110VDC-48VDC Converters		20					
<b>B</b>	<b>Other Necessary Material</b>							
13	48VDC Power supply cards/Modules		15					
14	RTUs communication cards		15					
15	Ragged Substation switches		25					
16	Protocol converters		30					
17	SFP Modules							
	GBE SFPs 120kms		4					
	GBE SFPs 80kms		4					
	SDH STM4 120kms		4					
	SDH STM1 100kms		6					
	SDH STM4 80kms		6					
	SDH STM1 80kms		6					
	SDH STM1 60kms		6					
18	Various Patch codes							
	SC-FC 20 m		20					
	FC-LC 20 m		20					
	SC-LC 20 m		20					
	LC-LC 20 m		10					
19	48 cores ADSS Fibre Cable		120km					
20	Wall Mounted ODFs		34					
21	Joint Boxes		30					
<b>C</b>	<b>FAT and Local Training</b>							
22	FAT for 2 Staff in days		5					
24	Factory Training for 4 Engineers in days		14					
23	Local hands on Training in days		10					

24	Configuration tools/Laptops with software		6					
<b>Total Price</b>								

Name of Bidder ..... Signature of Bidder ..... Date .....

### Price and Completion Schedule - Related Services

Currencies in accordance with ITB 15						
						Date: _____
						ICB No: <b>KP1/6A.1/OT/4/22/A96</b>
						Alternative No: _____
						Page N° _____ of _____
1	2	3	4	5	6	7
Service N°	Description of Services (excludes inland transportation and other services required in the Purchaser's country to convey the goods to their final destination)	Country of Origin	Delivery Date at place of Final destination	Quantity and physical unit	Unit price	Total Price per Service (Col. 5*6 or estimate)
<i>[insert number of the Service ]</i>	<i>[insert name of Services]</i>	<i>[insert country of origin of the Services]</i>	<i>[insert delivery date at place of final destination per Service]</i>	<i>[insert number of units to be supplied and name of the physical unit]</i>	<i>[insert unit price per item]</i>	<i>[insert total price per item]</i>
<b>Total Bid Price</b>						

Name of Bidder *[insert complete name of Bidder]* Signature of Bidder *[signature of person signing the Bid]* Date *[insert date]*



## Form of Bid Security

### (Bank Guarantee)

*[The bank shall fill in this Bank Guarantee Form in accordance with the instructions indicated.]*

*[Guarantor letterhead or SWIFT identifier code]*

**Beneficiary:** *[Purchaser to insert its name and address]*

**IFB No.:** *[Purchaser to insert reference number for the Invitation for Bids]*

**Alternative No.:** *[Insert identification No if this is a Bid for an alternative]*

**Date:** *[Insert date of issue]*

**BID GUARANTEE No.:** *[Insert guarantee reference number]*

**Guarantor:** *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that \_\_\_\_\_ *[insert name of the Bidder, which in the case of a joint venture shall be the name of the joint venture (whether legally constituted or prospective) or the names of all members thereof]* (hereinafter called "the Applicant") has submitted or will submit to the Beneficiary its bid (hereinafter called "the Bid") for the execution of \_\_\_\_\_ under Invitation for Bids No. \_\_\_\_\_ ("the IFB").

Furthermore, we understand that, according to the Beneficiary's conditions, bids must be supported by a bid guarantee.

At the request of the Applicant, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of \_\_\_\_\_ (\_\_\_\_\_) upon receipt by us of the Beneficiary's complying demand, supported by the Beneficiary's statement, whether in the demand itself or a separate signed document accompanying or identifying the demand, stating that either the Applicant:

- (a) has withdrawn its Bid during the period of bid validity set forth in the Applicant's Letter of Bid ("the Bid Validity Period"), or any extension thereto provided by the Applicant; or
- (b) having been notified of the acceptance of its Bid by the Beneficiary during the Bid Validity Period or any extension thereto provided by the Applicant, (i) has failed to execute the contract agreement, or (ii) has failed to furnish the performance security, in

accordance with the Instructions to Bidders (“ITB”) of the Beneficiary’s bidding document.

This guarantee will expire: (a) if the Applicant is the successful bidder, upon our receipt of copies of the contract agreement signed by the Applicant and the performance security issued to the Beneficiary in relation to such contract agreement; or (b) if the Applicant is not the successful bidder, upon the earlier of (i) our receipt of a copy of the Beneficiary’s notification to the Applicant of the results of the bidding process; or (ii) twenty-eight days after the end of the Bid Validity Period.

Consequently, any demand for payment under this guarantee must be received by us at the office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758.

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*[Signature(s)]*

***Note: All italicized text is for use in preparing this form and shall be deleted from the final product.***

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## **Form of Bid Security (Bid Bond)**

*Not Applicable*

## **Form of Bid-Securing Declaration**

*Not Applicable*

## Manufacturer's Authorization

*[The Bidder shall require the Manufacturer to fill in this Form in accordance with the instructions indicated. This letter of authorization should be on the letterhead of the Manufacturer and should be signed by a person with the proper authority to sign documents that are binding on the Manufacturer. The Bidder shall include it in its bid, if so indicated in the **BDS**.]*

Date: *[insert date (as day, month and year) of Bid Submission]*

ICB No.: *[insert number of bidding process]*

Alternative No.: *[insert identification No if this is a Bid for an alternative]*

To: *[insert complete name of Purchaser]*

### WHEREAS

We *[insert complete name of Manufacturer]*, who are official manufacturers of *[insert type of goods manufactured]*, having factories at *[insert full address of Manufacturer's factories]*, do hereby authorize *[insert complete name of Bidder]* to submit a bid the purpose of which is to provide the following Goods, manufactured by us *[insert name and or brief description of the Goods]*, and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with Clause 28 of the General Conditions of Contract, with respect to the Goods offered by the above firm.

Signed: *[insert signature(s) of authorized representative(s) of the Manufacturer]*

Name: *[insert complete name(s) of authorized representative(s) of the Manufacturer]*

Title: *[insert title]*

Dated on \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ *[insert date of signing]*



## **Section V. Eligible Countries**

### **Eligibility for the Provision of Goods, Works and Non Consulting Services in Bank-Financed Procurement**

In reference to ITB 4.7 and 5.1, for the information of the Bidders, at the present time firms, goods and services from the following countries are excluded from this bidding process:

A list of debarred firms and individuals is available on the Bank's external website:

<http://www.worldbank.org/debarr>.



## Section VI. Bank Policy - Corrupt and Fraudulent Practices

Guidelines for Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers, dated January 2011.

### “Fraud and Corruption:

1.16 It is the Bank’s policy to require that Borrowers (including beneficiaries of Bank loans), bidders, suppliers, contractors and their agents (whether declared or not), sub-contractors, sub-consultants, service providers or suppliers, and any personnel thereof, observe the highest standard of ethics during the procurement and execution of Bank-financed contracts.<sup>2</sup> In pursuance of this policy, the Bank:

- (a) defines, for the purposes of this provision, the terms set forth below as follows:
  - (i) “corrupt practice” is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;<sup>3</sup>
  - (ii) “fraudulent practice” is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;<sup>4</sup>
  - (iii) “collusive practice” is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;<sup>5</sup>
  - (iv) “coercive practice” is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;<sup>6</sup>

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<sup>2</sup> In this context, any action to influence the procurement process or contract execution for undue advantage is improper.

<sup>3</sup> For the purpose of this sub-paragraph, “*another party*” refers to a public official acting in relation to the procurement process or contract execution. In this context, “*public official*” includes World Bank staff and employees of other organizations taking or reviewing procurement decisions.

<sup>4</sup> For the purpose of this sub-paragraph, “*party*” refers to a public official; the terms “*benefit*” and “*obligation*” relate to the procurement process or contract execution; and the “*act or omission*” is intended to influence the procurement process or contract execution.

<sup>5</sup> For the purpose of this sub-paragraph, “*parties*” refers to participants in the procurement process (including public officials) attempting either themselves, or through another person or entity not participating in the procurement or selection process, to simulate competition or to establish bid prices at artificial, non-competitive levels, or are privy to each other’s bid prices or other conditions.

<sup>6</sup> For the purpose of this sub-paragraph, “*party*” refers to a participant in the procurement process or contract execution.

- (v) "obstructive practice" is:
- (aa) deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or
  - (bb) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under paragraph 1.16(e) below.
- (b) will reject a proposal for award if it determines that the bidder recommended for award, or any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;
- (c) will declare misprocurement and cancel the portion of the loan allocated to a contract if it determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement or the implementation of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;
- (d) will sanction a firm or individual, at any time, in accordance with the prevailing Bank's sanctions procedures,<sup>7</sup> including by publicly declaring such firm or individual ineligible, either indefinitely or for a stated period of time: (i) to be awarded a Bank-financed contract; and (ii) to be a nominated<sup>8</sup>;
- (e) will require that a clause be included in bidding documents and in contracts financed by a Bank loan, requiring bidders, suppliers and contractors, and their sub-contractors, agents, personnel, consultants, service providers, or suppliers, to

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<sup>7</sup> A firm or individual may be declared ineligible to be awarded a Bank financed contract upon: (i) completion of the Bank's sanctions proceedings as per its sanctions procedures, including, inter alia, cross-debarment as agreed with other International Financial Institutions, including Multilateral Development Banks, and through the application the World Bank Group corporate administrative procurement sanctions procedures for fraud and corruption; and (ii) as a result of temporary suspension or early temporary suspension in connection with an ongoing sanctions proceeding. See footnote 14 and paragraph 8 of Appendix 1 of these Guidelines.

<sup>8</sup> A nominated sub-contractor, consultant, manufacturer or supplier, or service provider (different names are used depending on the particular bidding document) is one which has either been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.

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permit the Bank to inspect all accounts, records, and other documents relating to the submission of bids and contract performance, and to have them audited by auditors appointed by the Bank.”



## **PART 2 – Supply Requirements**



# **Section VII. Schedule of Requirements**

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### List of Goods and Delivery Schedule

Line Item N□	Description of Goods	Quantity	Physical Unit	Final (Project Site) Destination as specified in BDS	Delivery (as per Inco terms) Date		
					Earliest Delivery Date	Latest Delivery Date	Bidder's offered Delivery date [ <i>to be provided by the bidder</i> ]
1	Remote Terminal Units	34	No	JujaRd,National Control Center Nairobi South	Within 3 months after contract date	4 Months after contract date	
2	SDH Equipments and Gateways	24	No				
3	110VDC-48VDC Converters	20	No				
4	Fibre Optic Cable	120	Km				
5	Transducers	405	No				
6	Interposing Relays and Other Relays	5758	No				
7	Control cable and accessories	22150	M				
8	MFMs	162					
9	Laptops	6	No				

## **2. Technical Specifications**

## **Section VI. Employer's Requirements**

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## **ACRONYMS**

SCADA/EMS – Supervisory Control and Data acquisition/Energy Management system

KPLC - Kenya power and Lighting Co. Ltd.

RTU – Remote terminal unit

SAS – Substation automation system

# Scope of Supply of Plant and Installation Services by the Contractor

## CHAPTER ONE

### 1.1 Project Scope

The Project covers the manufacture, testing, supply, insurance, packing for export, shipment, delivery to site and unloading.

In particular, the project comprises:

- (i) Supply of SCADA and Telecommunication materials
- (ii) All supplied equipment be made SCADA ready with all equipment configured for necessary interface of the controls, indications, alarms, measurement and metering data from the substations to the SCADA / EMS system.
- (iii) Local training on installation of the supplied SCADA equipment and telecommunications equipment's
- (iv) Installation manuals and methodologies complete with drawings and documentation and other facilities for project management as described in the detailed specifications.

### 1.2 Project Timelines

The project is expected to be completed **in 4 Months** from inception.

### SPECIFICATIONS

No	Station	Description of Equipment in station	New Remote Terminal Unit (RTU)	SD H-Mux	Current Transducers	Resistance Transducers	Multi Transducer for HV side	Interposing Relays	Comm and Relays	Multipliation Relays	Transducers for Tap Position	Multi-Function Meter	2.5 mm <sup>2</sup> 12 core control cable in meters	Cable Glads for the 12 core cable	2.5m m <sup>2</sup> 7 core armored control cable in meters	Cable Glads for 7core ACC	35mm DIN rails(As per EN 60715) in Meters	Standar Cable Ties(N o.)	4 core 2.5 mm <sup>2</sup> cable in meters	110 VD C-48V DC Converters
1	Awendo	2 No. 7.5 MVA 33/11kV TX, 3 no. 11 kV feeders	1	1	3	2	4	111	20	30	2	3	500	50	200	10	2	50	50	1
2	Chavakali	1 No. 7.5 MVA 33/11kV TX,3 no. 11 kV feeders	1	1	4	1	5	75	15	25	1	2	500	50	200	10	2	50	50	1
3	Isiolo	2 No. 7.5 MVA 33/11kV TX, 2 no. 11 kV feeders	1	1	2	2	4	100	20	30	2	3	500	50	200	10	2	50	50	1
4	Kisian-Kisumu	2 No. 7.5 MVA 33/11kV TX, 4 no. 11 kV feeders	1	1	4	2	4	121	24	30	2	6	500	50	200	10	2	50	50	0
5	Kanyakine 33/11kV	1 No. 7.5 MVA 33/11kV TX, 1 No. 2.5 MVA 33/11kV TX, 3 no. 11 kV feeders	1	1	3	1	3	121	22	25	1	2	500	50	200	10	2	50	50	1
6	DCK 33/11 kV	3No. 11kV feeder	1	1	3	1	2	100	18	15	1	1	500	50	200	10	2	50	50	0
7	Embakasi capacitor Bank	2 No. 66/11kV Tx bays, 2 No. 11kV capacitor bank bays	1	0	2	0	4	121	24	30	2	0	500	50	200	10	2	50	50	0
8	EPZ 66/11kV	3 no. 66kV line Bays, 1 no. 23 MVA 66/11 kV TX Bay, 4 no. 33kV feeders, 3 No. 11 kV feeders	1	0	8	2	8	121	24	30	2	7	300	50	200	10	2	50	50	0

9	Kitui 33/11 kV	2 No. 7.5 MVA 33/11kV TX, 3 no. 11 kV feeders	1	1	3	2	4	121	20	30	2	3	300	50	200	10	2	50	50	1
10	Kegati Substation	1 No. 23 MVA 132/33kV TX Bay, 3 No. 33 kV feeders	1	1	4	1	5	120	24	20	1	3	500	50	100	10	2	50	50	0
11	Kiambere Reactors	2 no. reactor Bays	1	1	0	0	2	100	18	10	0	2	300	50	100	10	2	50	50	0
12	Litein 33/11kV	1 No. 7.5 MVA 33/11kV TX	1	1	3	1	3	121	22	10	1	2	300	50	200	10	2	50	50	1
13	Makuyu	2 No. 7.5 MVA 33/11kV TX, 4 no. 11 kV feeders	1	1	5	2	6	150	18	20	1	4	500	50	200	10	2	50	50	1
14	Nairobi South 66/11 kV	1 No. 7.5 MVA 66/11kV TX	1	1	4	1	2	120	18	20	1	4	300	50	200	10	2	50	50	0
15	Nandi Hills	1 No. 7.5MVA 33/11kV TX, 2 no. 33 kv Lines, 4 No. 11 kv feeders	1	1	4	1	5	120	18	20	1	4	400	50	250	10	2	50	50	1
16	Narok 33/11 kV	2 No. 7.5 MVA 33/11kV TX, 3 no. 11 kV feeders	1	1	3	2	6	121	20	20	2	3	500	50	200	10	2	50	50	1
17	Njoro 33/11kV	1 No. 7.5 MVA 33/11kV TX	1	1	4	1	3	120	18	20	1	4	300	50	200	10	2	50	50	1
18	Nyamininia 33/11kV	1 No. 7.5 MVA 33/11kV TX, 1 No. 2.5 MVA 33/11kV TX, 3 no. 11 kV feeders	1	1	3	2	6	120	18	20	2	3	300	50	200	10	2	50	50	1
19	Sagana 33/11kV	1 No. 7.5 MVA 33/11kV TX, 1 No. 2.5 MVA 33/11kV TX, 2 no. 11 kV feeders	1	1	3	2	6	120	18	20	2	3	300	50	200	10	2	50	50	1
20	Sibembe 33/11kV	2No. 7.5 MVA 33/11kV TX, 3 no. 11 kV feeders	1	1	3	2	6	120	18	20	2	3	300	50	200	10	2	50	50	1
21	Webuye	2 No. 7.5 MVA 33/11kV TX, 3 no. 11 kV feeders	1	1	3	2	6	120	18	20	2	3	300	50	200	10	2	50	50	1

22	Lanet 33/11 kV	7 no. 33kV feeders, 5 no. 33kV bus sections, 1 No. 23MVA 33/11kV TXs, 2 No. 7.5 MVA 33/11kV TXs, 9 no. 11kV feeders and a bus coupler	1	0	20	2	11	250	20	30	2	20	500	50	200	10	2	50	50	0
23	Lessos 132/22 kv	2 No. Tx 132kV Bay, 2 No. 33kV Incomers, 3 No. 33 kV Feeder Bays	1	0	3	2	4	121	20	30	2	3	400	50	200	10	2	50	50	0
24	Makande 33/11 kV	2 no. 23MVA 33/11kV TX, 3 no. 33kV incomers, 9 no. 11kV feeders and a bus coupler	1	0	10	2	6	200	20	30	2	10	500	50	100	10	2	50	50	
25	Maungu KPC	3 No. 132 kV Line Bays	1	1	1	0	3	120	18	18	0	3	300	50	200	10	2	50	50	1
26	Mtito Andei KPC	3 No. 132 kV Line Bays	1	1	1	0	3	120	18	18	0	3	300	50	200	10	2	50	50	1
27	Simba National cement Nakuru	3 No. 132 kV Line Bays	1	1	1	0	3	120	18	18	0	3	300	50	200	10	2	50	50	1
28	Sultan Hamud KPC	3 No. 132 kV Line Bays	1	1	1	0	3	120	18	18	0	3	300	50	200	10	2	50	50	1
29	Ruaraka 132/33 kV	2 No. 132kV Line Bays, 2 No. 132/66 kV Tx Bay, 8 No. 66kV Feeder Bays, 2 No. 66/11 kV Tx Bays, 9 No. 11 kV feeders with a bus section	1	1	10	4	16	300	60	60	4	20	500	50	200	10	2	50	50	1
30	Voi Substation	2 No. 132kV Line Bays, 1 No. 132/33kV Tx Bay, 5 No. 33kV Feeder Bays	1	0	6	2	18	200	50	50	4	6	500	50	300	10	2	50	50	0
31	Kikuyu 66/11 kV	3 no. 66kV line Bays, 2 no. 23 MVA 66/11 kV TX Bay, 6 no. 11kV feeders and a Bus coupler	1	0	11	2	7	131	21	50	2	10	500	50	200	10	2	50	50	0

32	Thika Depot	1 no. 66kV line Bay, 1 no. 18MVA 66/33 kV TX Bay, 3 no. 33kV feeders	1	0	0	2	5	106	15	30	3	3	500	50	200	10	2	50	50	
33	Turkwel 11/220 kV	2no. 220kV Lines' bays, 2no. 220kV Tx bays and 2no. Generators	1	0	0	2	6	120	16	30	2	6	500	50	200	10	2	50	50	0
34	University Way	7 no.x 11 kV feeders	1	1	7	0	1	80	7	15	0	7	300	50	200	10	2	50	50	1
<b>Totals</b>			<b>34</b>	<b>25</b>	<b>142</b>	<b>48</b>	<b>180</b>	<b>4431</b>	<b>465</b>	<b>862</b>	<b>35</b>	<b>162</b>	<b>13800</b>	<b>1700</b>	<b>6650</b>	<b>340</b>	<b>68</b>	<b>1700</b>	<b>1700</b>	<b>20</b>

## General information

### 1.2.1 Training

Training as detailed in the specifications shall be provided by the Contractor. The scope of training shall be subject to the Project Manager approval. As part of knowledge transfer, **On The Job Training** where the Employer's staff shall be availed necessary participation for purposes of knowledge. A SCADA configuration bench shall be established for purpose of simulating life system and aiding engineers to practice integrations. This bench will be used for On Job training

## Equipment Technical Requirements during Manufacturing

### 1.2.2 RTU panels, cubicles and racks

Panels, cubicles and marshaling racks shall generally be free standing and shall be constructed of folded sheet steel of adequate thickness to provide rigid support for the control and monitoring equipment which shall be mounted thereon.

Panels shall be mounted on channel base frames which shall provide a toe recess. Panels and cubicles designed for personnel access shall be provided with metal floors and shall be suitably ventilated. Doors shall be provided with a lock which may be opened by a person within the panel without the use of a key. It shall be possible to open all panels associated with one unit by the use of one master key. Adequate lighting and power points for hand tools shall also be provided.

The overall height of cubicles and racks housed in the relay room shall not exceed 2.20 m and the color shall be subject to the approval of the Project Manager/Employer.

All instruments and control devices shall be easily accessible and capable of being removed for maintenance purposes.

Cable connections to panels and cubicles shall be equipped with suitable seals so as to prevent the ingress of dust or vermin or the propagation of possible fires. During installation, a provisional sealing of cable penetrations is required.

### 1.2.2.1 Cubicles

In the relay rooms all equipment for voltages exceeding 60 V is normally accommodated in separate cubicles or is installed within the cubicles in such a way that a clear separation is achieved and separate connection terminals are used.

Cubicles which are installed in non air-conditioned rooms shall be provided with thermostatically controlled heating elements. Each thermostat shall have an adjustable set point which shall be adjusted during the commissioning period to such a value that no moisture shall occur on the equipment and during periods of high ambient temperature the temperature rating of the equipment is not exceeded. Subject to the Project Manager's approval, the general design should be as follows. Other solutions are subject to the Project Managers approval.

- The electronic equipment shall consist of plug-in modules, mounted in 19" or CEPT slim racks. Empty slots shall be covered with dummies.
- The cubicles shall be equipped with hinged frames to which the 19" racks are assembled.
- Other equipment, such as terminal blocks shall be mounted on a mounting plate in the rear of the cubicle.
- The opening angle of the door and the hinged frame shall be at least 120 degrees in order to have good access to all equipment in the cubicle.
- The cabling/wiring from the hinged frame to the other equipment in the cubicle shall be adequately protected and of sufficient length and flexibility.
- The cubicles shall be equipped with cubicle lighting.
- The cubicles shall be dust-free.
- Each cubicle shall be labeled. The labels shall be clear and durable.
- The cubicles shall be free-standing cubicles.

The anti-corrosion treatment and painting of the cubicles shall be in accordance with the specified environment and shall be described in the offer.

### 1.2.2.2 Ventilation

Heat dissipation of cubicle mounted equipment shall be kept as low as possible. The average heat dissipation per typical cubicle and the temperature rise inside the cubicle from the maximum ambient temperature shall be stated in the Tender.

Components generating a lot of heat shall be adequately spaced from their mounting boards and from other components.

The naturally cooled equipment shall have means for indicating and alarming any significant reduction in air flow, and the equipment shall be so protected that no damage occurs due to failure of the forced cooling. The full requirements of the performance specification shall be maintained until the protective device operates. The Bidder shall state how long the equipment can remain in operation at maximum ambient temperature without cooling system. Air flow through the equipment for cooling shall first be passed through an efficient dust filter arranged to permit individual filters to be removed for cleaning

The cubicles shall be equipped with high temperature alarm (lamp and potential-free closing contact). The alarm shall be connected to the RTU.

The approval of the Project Manager must be obtained in all cases where it is intended to incorporate forced cooling

### 1.2.3 Power supplies and fusing

Fuse ratings and time characteristics shall be such that in all cases a fault within an individual item or module will cause the fuse associated with that item, to rupture and thus disconnect that item from the power supply, before the main fuse is affected.

Failure of a main fuse shall affect the overall operation of the plant as less as possible.

Failure of a main control fuse shall be indicated in the control area by means of an alarm. This alarm shall state the identity of the failed main fuse.

Failure of an individual module or component fuse shall be indicated by a general alarm which shall state the cubicle type in which the fuse has failed and an individual signal in the respective control module shall be initiated.

The design of the electrical power supplies and fusing system shall ensure that any faults in modules or other devices, which may block sequence logic interlocks, automatic control systems or other control systems are restricted to the system in which the fault has occurred.

All electronic devices shall be protected against transient voltage levels which would otherwise damage the device.

Drive command modules or devices which take over their function must be separately fused.

Interlocks and protection logics for drives can be fused together with the drive command module if these logics are used only for the particular control circuit of the drive concerned. Otherwise they must be fused with the logic of the associated sub-group.

Lamp amplifiers for status indications, alarm indications and criteria call-up (non-fulfilled control criteria) shall be fused in groups independently of the logic equipment.

Binary signal conditioning and analog limit value modules should be fused separately, but may also be fused with the corresponding drive control of the drive control level as long as the signals are used only for remote and logic controls (interlocking, protection) of the drive concerned.

When a binary transmitter or limit value is used for several drives or groups the fusing shall be effected separately or be subdivided into logical groups so that any fault arising is confined as far as possible to a drive or group.

All measuring circuits shall be separately fused. If the analog signal will be distributed by analog signal conditioning and distribution modules, the fuses shall be located on these modules.

If analog signal distribution and limit value modules functions are arranged physically adjacent to one another, the limit value modules can also be fused with the corresponding measuring circuit.

All closed-loop circuits, including their drives and thyristor controllers, if any, shall be fused separately, but if the control circuit fuse fails, the capability of controlling the drive manually shall be retained.

#### 1.2.4 Indicators

All indicators mounted on control desks and panels shall be flush mounted. The minimum size for indicators mounted on the various sections of the panels shall be:

- non-urgent indicators 96 x 96 mm
- important indicators 144 x 144 mm
- mimic diagrams 48 x 48 mm

The minimum accuracy tolerance for these indicators shall be 2.5% of span. Indicators shall generally be of the moving coil type but electronic type digital indicators are also acceptable.

Where digital indicators are used these shall be provided with at least 4 digit indications.

Indicators mounted on local gauge boards shall be of circular type and shall have a minimum case diameter of 160 mm. All local indicators shall be housed in robust dust and moisture proof

cases suitable for open air installation. The read-out window for indicators, recorders and similar equipment shall be non-reflecting, anti-static and minimize parallax errors.

All control instruments shall be rectangular or square type, with the exposed metal portions of all cases having the same finish, trim and general appearance. Instrument and meter scales shall be white with black markings. Instrument cases shall be dust- proof.

Each instrument shall have a zero adjustment device so that the zero position of the pointer can be adjusted without removing the cover. For frequency measurement purposes it is not permissible to use reed type frequency meters except for the synchronizing equipment.

#### 1.2.5 Electronic equipment

Where possible, plug-in type printed circuit boards shall be used.

External connections to the boards shall be by plug and socket connection.

All electronic components, including integrated circuits, transistors, resistors, capacitors and inductors shall be selected in order to ensure long life and stable operation. Indication lamps used in conjunction with electronic circuits shall be light emitting diodes.

All relay equipment shall use modern plug-in type circuit boards, containing standard type miniature relays, which can be plugged- in and easily replaced on sockets on the circuit boards.

Only a few types of standard relays shall be used. All relays shall be of the encapsulated type.

For time relays transistorized relays shall be used. Time-setting shall be effected by means of setting knobs on the front panel.

#### 1.2.6 Switches and relays

Switches mounted in the control panels shall be of the miniature or sub-miniature type.

The function of the pushbutton shall be clearly shown. Discrepancy switches or pushbuttons shall be provided for the operation of switchgear and the initiation of drives. Discrepancies between the switch position and the plant state shall be indicated by an integral light which shall illuminate the switch in a flashing mode of operation.

Indicating instruments having maximum and/or minimum contacts shall not be used for any main system. All surfaces used for electrical contacts shall be silver, gold or silver alloy. If the Contractor wishes to use other metals he shall give clear reasons.

The connection between low-voltage electronic control circuits and power circuits shall consist of interposing relays for linking the two systems. All relays have to be of the encapsulated type.

### 1.2.7 Measurement of electrical parameters

Remote indicators for electrical quantities such as power, voltage, current frequency, etc. will be of the milliamp type .

Solid state electronic type transducers will then be provided to convert the output of current and voltage transformers into an impressed direct current in the range 0 – 20 mA or 4 – 20 mA.

### 1.2.8 Wiring, cabling terminals

In particular wiring within panels etc. shall be supported on trays and shall be segregated according to voltage level. Wiring carrying A.C. and D.C. voltage shall also be segregated.

All panels, cubicles and racks shall be factory wired. Where they must be supplied in more than one section, electrical connections between the sections shall be via terminal strips provided for this purpose.

Spare cores shall be terminated at terminal strips in such a way so as to give a maximum length of core and shall be ferruled in such a way so as to indicate that they are spare cores.

Terminal strips at the transmitters shall be of the screw type. Screw type terminals shall have a metal insert between screw and conductor. In electrical, relay and control rooms advanced semi-automatic connection techniques, like terminal point, wire-wrap shall be used. Wire wrap and terminal point connections shall be performed using an approved semi-automatic or automatic, power operated hand tool.

Terminal strips within panels shall be set at an angle to afford easy identification and access.

### 1.2.9 Labeling

The identification and lettering of scales dials and inscription, i.e. name-plate labels, etc. shall be in English.

The metric system shall be used for all scales according to the ‘General technical requirements’.

The Contractor shall supply all labels, nameplates, instruction and warning plates necessary for the identification and safe operation of the individual equipment and the plant and all inscriptions shall be in the English language.

The identification and classification of all measuring points must be shown on diagrams to be produced by the supplier and entered in the respective lists.

### 1.2.10 Painting

However, panels, cubicles, control equipment and marshaling racks are to be supplied with the final painting, whereby external surfaces shall be semi-gloss.

Local mounted cubicles, housing control and monitoring equipment shall be protected against rust and corrosion by a protective coating such as galvanized zinc, which shall be applied as a first factory coat.

In all cases where site erection work exposes bare metal, such as the drilling or punching out of holes for cable or pipe entry, these areas shall be protected by the immediate application of a protective first coat similar to the original.

The shade and grade of paint are to be agreed to by the Project Manager and must harmonize with the overall architectural design.

Any machined or bright faces and parts which are not painted must be protected against corrosion by suitable agents prior to installation.

After completion of installation and commissioning, but before Taking Over the Contractor shall make good all marks, scratches and damage to the painted surface of all equipment supplied under this contract irrespective of the cause.

The Contractor shall also take every reasonable precaution to prevent damage to panels and cubicles during the course of erection and commissioning. Repairs to panel and cubicle paintwork shall be carried out in such a way so as to restore the equipment to its original factory condition and shall be to the satisfaction of the Project Manager.

## **1.3 Documentation and Drawings**

### 1.3.1.1 General

The Contractor shall prepare and submit to the Project Manager for approval dimensioned general and detailed design drawings and other pertinent information of all equipment specified in the Bid Documents. Unless otherwise agreed the information shall be exchanged on paper. Approval of drawings shall not relieve the Contractor of his obligations to supply the equipment in accordance with the Specifications. The Contractor is responsible for any errors that may appear in the approved documents. He shall as soon as an error has been detected, deliver the corrected documents to the Project Manager for re-approval.

If the equipment is to be connected to existing equipment the connection shall be documented in a coherent and overlapping way at least containing terminal identification in old equipment.

Schematic diagrams shall contain complete loops within new and old equipment.

All text on documents provided by the Contractor shall be in the English language in addition, if necessary, to that of the country of origin. All drawings shall be dimensioned in millimeters.

The Contractor shall, during the total project time, maintain a List of Documentation to be updated by him whenever needed. The List of Documentation shall include the date of original issue of each document submitted as well as the dates of every revision. The List of

Documentation shall also include a time schedule for the submittal of the documentation.

Symbols used for electrical equipment shall be in accordance with IEC 60617. The Contractor shall establish a coherent system for physical and functional reference designation in accordance with IEC61346. A similar systematic scheme shall be defined for cable numeration. These schemes shall be used throughout on the drawings and documentation and the designation shall be labelled on the components and cables.

In addition to what is stated in Conditions of Contract, the following shall apply:

- The sizes of all documents and drawings shall conform to the ISO standard, i.e.:
  - A1 594mm x 841mm
  - A2 420mm x 594mm
  - A3 297mm x 420mm
  - A4 210mm x 297mm
- Sizes larger than A1 shall be avoided. The schematic diagrams and, apparatus and cable lists shall be of size of A4 except for one original and possible transparency copies of schematic diagrams that shall be in A3. Scales to be used on the drawings shall be 1:10, 1:20, 1:40, 1:50 and multiples of this series.
- All drawings made special for this project including civil works drawings, mechanical drawings, layout drawings and circuit diagrams shall be compiled on a computer aided drawing system and as part of the as built documentation be handed over on a CD with a format readable in AutoCAD version 14 or another format to be agreed upon in addition to the paper copies.
- All drawings shall be bound in hard covers.

### 1.3.2 Bid Drawings

The Employer's drawings attached to the Bid Documents are of informative character. These drawings are intended to illustrate the basic requirements to be satisfied. It is the responsibility of the Contractor to prepare a detailed layout showing the manner in which the various items of equipment offered can be accommodated to best advantage within the available area.

The Contractor is at liberty to offer arrangements based on significantly different principles where it is considered that these offer economic or technical advantages. It is 93ynchroniz, however, that the main Bid should comply with the principles shown in the enclosed drawings, other arrangements being submitted solely as alternatives to the main offer.

Significant changes in the layouts caused by the Employer may warrant price adjustments.

However, no adjustments will be applied for minor changes due to incorporation of the Contractor's equipment.

The Bidder shall in his Bid enclose overall drawings showing dimensions, main working principles, and internal components and fixing methods to a detail level allowing the Employer to evaluate the functionality and completeness of the plant and equipment.

### 1.3.3 Progress Plans

The Progress Plans shall at least contain the following milestones:

- Essential information delivered from Employer
- Documentation for approval from Contractor to Employer
- Release of factory documentation
- Factory Tests
- Shipment
- Delivery to Site (Final destination)

### 1.3.4 Exchange of Interface Information

The Contractors shall in due time supply interface information to other sub-contractors where needed. The Contractor is in particular required to check that all foundations and fixations of his equipment is sufficiently dimensioned to meet the forces acting upon it. If the Contractor feels that he lacks such information from other contractors he is obliged to request such from the

Project Manager. The Contractor cannot claim liability exemption for his own contractual responsibilities because of actions performed or omitted by other sub-contractors.

#### 1.3.5 Final Documentation

The Contractor shall also deliver manuals for operation and maintenance. These shall at least contain the following information:

- Detailed description of the equipment, the individual components, relevant clearances, tolerances, allowable temperatures, settings etc.
- Descriptions of main principles including flow diagrams, single line diagrams, circuit diagram, connection diagram, cable schedules, software documentation etc.
- Operational instruction. These shall illustrate the operational sequences in a clear and concise way.
- Test and adjustment procedures containing instruction for test and adjustment of the equipment under operation, after inspection and maintenance
- Test reports
- Spare part lists
- Maintenance instructions split into:
  - Manuals for preventive maintenance indicating periodic inspections, cleaning, lubrication and other routine maintenance.
  - Repair manuals describing fault location, dismantling, re-assembly etc.

The documentation shall leave the operators and maintenance personnel in position to operate the plant in a safe and optimal way and to perform repairs usual to be done by such personnel. The Project Manager shall approve the manuals before final submission.

# CHAPTER TWO

## RTUs & ADAPTATION WORKS OF SUBSTATION

### 1.4 Data acquisition system

KPLC has an existing central SCADA system situated at the National Control centre, with regional control centres in Nairobi (NRCC), Lessos (WRCC), Kiganjo (MRCC) and Rabai (CRCC).

The SCADA central system is an ABB AB product Network Manager Rel3.8.

The configuration is such that, all transmission and generating sub-stations are monitored and controlled from the national control Centre.

Most distribution stations are monitored and controlled from their respective regional control centres

#### 1.4.1 Existing Teleinformation Plan

The teleinformation plan defines the data (status indications, alarms, measurements, Energy meter readings) that are acquired by the SCADA system from the substations. It also defines the devices for which remote control from the Master stations is, or will be established.

The tele information plan for the existing SCADA system can be summarized as follows:

##### 1.4.1.1 Controls:

At all substations equipped with RTUs, CBs and motorized Isolators are remote controlled.

The transformer tap changers of are remote controlled

Trip/Lockout relays are reset from respective control centres where applicable

##### 1.4.1.2 Status Indications:

Status indications of circuit breakers, isolators and earthing switches are acquired via the RTUs/SAS at the substations and indicated at the Control Centres. ON and OFF positions for status indications are acquired independently allowing the detection of undefined positions.

Tap changer position indications are acquired from the transformers together with information of control selectors for “master / follower / independent” “manual /automatic” and “local / supervisory”.

#### 1.4.1.3 Alarms:

Individual and grouped alarm messages are acquired from the RTU/SAS and transmitted to the corresponding RCC’s and the NCC. Since the sub-stations are different in state and have equipment from different manufacturers, the alarms from each may have a slight variation.

#### 1.4.1.4 Measurements:

Selected busbar voltages are acquired from the substations. Bus voltage acquisition does not always include all busbar sections at a substation

Selected active and reactive power as well as in some cases current measurements for overhead line feeders are acquired (bi-directional)

Selected active and reactive power and current for generators

Active and reactive power in selected transformer feeders (bi-directional)

Frequency at selected stations.

At the Control Centres the information is processed and displayed. The received measurement values are evaluated regarding upper or lower limit violation.

Further the direction of the energy flow is acquired and indicated at the Control Centres.

#### 1.4.1.5 Energy Metering

Energy meter values (MWh) are transmitted from various stations to the NCC through SCADA.

For system operation daily analysis, control assistants take half-hourly readings (MW) from all stations through telephone and enter them into separate office LAN computer. These information is also available from reports that may be obtained from the historical servers of the SCADA/Ems system.

#### 1.4.1.6 Existing RTUs/SAS

Different types of RTUs&/ SAS have been installed at various substations for data acquisition in the KPLC network. These are :

- Collector 400 RTU manufactured by ASEA (one station)
- RTU 560 manufactured by ABB.
- SAS and RTU manufactured by NR Electric
- MicroSCADA substation Automation system manufactured by ABB
- CLP 500 substation Automation system manufactured by EFACEC, Portugal
- SICAM station manager manufactured by Siemens
- SAS manufactured by Crompton Grieves
- SAS manufactured by Conco,SA
- MicomC264 substation Automation system manufactured by Areva/Alstom
- SAS manufactured by Sprecher systems.
- SAS manufactured by GE

Most of the RTUs/SASs have some spare capacity with available expansion capabilities. For the stations under this contract that need expansion, the contractor shall supply RTUs with the available spare capacities and cater for the required expansion so that by end of project stations shall have a minimum of 10% spare capacity.

The existing RTUs/SAS are mostly double port RTUs using IEC 60870-5-101/104 transmission protocols to control centres.

Transmission stations are configured to communicate to the National control centre, as well as its appropriate regional control centre

Distribution stations are basically configured to communicate with its regional control centre

#### 1.4.2 New RTUs

For supervisory control and acquisition of data, as defined in the teleinformation plan described below, the following equipment and works are required at the station level:

- New Remote Terminal Units (and/or expansion of the existing RTUs/ SAS)
- Interfacing Marshalling Cubicles ( extended where existing to accommodate all data points in station)
- Interface terminal blocks at the existing station control and protection panels or at the station equipment itself.

- Cabling between RTUs/SAS and the points where the required data are available (either marshalling cubicles or interface terminal blocks in existing control and relay panels at the stations)
- Wiring modifications and additional de-coupling relays
- Galvanic isolation of all signals from process to RTU
- Analogue and digital transducers

#### 1.4.2.1 The Tele information Plan

Based on the present and future functional requirements, the Contractor shall consider and supply the equipment with the following tele information plan for the SCADA in stations:

##### **1.4.2.1.1 Control of circuit breakers and isolators**

Supervisory control of all 33 kV, and 11 kV Circuit Breakers (CBs) as well as selected 220kV, 132 kV and 66 kV CBs

- Supervisory control of all 33 kV and 11 kV as well as selected 220kV, 132 kV and 66 kV line and busbar isolators.
- Remote reset of master –trip relays
- Remote control of master-follower- Independent and Manual –Auto selection for Tap Changers

##### **1.4.2.1.2 Voltage control / voltage regulation:**

- Remote control of reactors (all voltage levels) and capacitors (11kV only). Control of the respective CBs is included above.
- Remote control of all on-load tap changers for all 33/11 kV, 66/11 kV, 66/33 kV transformers, as well as for selected 220/11kV, 132/11 kV and 132/33 kV transformers

##### **1.4.2.1.3 Status Indications:**

- Status indication of all 33 kV and 11 kV circuit breakers at substations equipped with RTUs supplied under this contract or already existing and require expansion. For acquisition of 11 kV, 33 kV, 66kV 132 kV and 220 kV CB status indications the auxiliary contacts of only one pole shall be wired for CB closed position and for open position.
- Status indication of all 33 kV and 11 kV line and busbar isolators as well as 220kV, 132kV and 66 kV isolators at selected stations equipped with RTUs supplied under this contract

or already existing and require expansion. For 33 kV and 11 kV substations equipped with with-drawable CBs, the position of the CB (in switching position / withdrawn) shall be indicated instead.

- Position indication of on-load tap changers of all 66/11 kV, 66/33kV and 33/11 kV transformers, as well as selected 132/11 kV and 132/33 kV transformers.
- Status indication of “Local / Remote”, “Automatic / Manual” and “Master / Follower” mode of automatic voltage regulators where applicable

#### **1.4.2.1.4 Alarms:**

##### *1.4.2.1.4.1 Bay Alarms:*

For each bay, the following protection signals are desired and shall be made available:

- “Main Protection 1 Trip” (MP1)
- “Backup Protection Trip” (BPT)
- “PT Fail “ (PTF)
- “Trip Circuit Faulty” (TCF)
- “Protection A Faulty” (PAF)
- “SF6 Low 1<sup>st</sup> Step (SF1)
- “SF6 Low 2<sup>nd</sup> Step (SF2)
- “CB Spring Charging Failure” (SCF)
- “Autorecloser Operated” (ARO)
- “Local Control Position of Selector Switch” (LCP)
- “CB Pole discrepancy protection” (CBD)

##### *1.4.2.1.4.2 Transformer alarms:*

- “Temperature Alarm” (TTA) oil and winding temperature as grouped alarm
- “Temperature Trip” (TTT) oil and winding temperature as grouped alarm
- “Buchholz Alarm” (TBA) tank and OLTC as grouped alarm
- “Buchholz Trip” (TBT) tank and OLTC as grouped alarm
- “Transformer Oil Level (Low and High)” (TOL)
- “Transformer Cooling fan Trouble” (TCT)
- “Transformer Bank out of Step” (TBS)

- “Transformer Bank Independent” (TBI)
- “Transformer OLTC Control/Supply Failure” (TCC)

#### 1.4.2.1.4.3 Busbars Alarms:

- Busbar differential protection trip (BDT)

#### 1.4.2.1.4.4 Station alarms and warnings:

- 110 V DC alarm (DA1)
- 110 V Battery Charger A Trouble (CA 1)
- 110 V Battery Charger B Trouble (CB 1)
- 48 V DC alarm (DA4)
- 48 V Battery Charger A Trouble (CA 4)
- 48 V Battery Charger B Trouble (CB 4)
- Protection Panel DC Supply Trip (PPS)
- Station Control Disabled (SCD)
- RTU alarm (RTU)
- Communication alarm (COM)

The different type of alarms to be acquired from each type of bay in the network substations is shown in **Table 2-2** below.

Whereas **Table 2-3** shows the number of alarms to be acquired from the bays for the different voltage levels

Table 2-1 Type of alarms per bay in substations

Type of Alarm	Line Bay	Trans-former Bay	Trans-former	Coupler Bay	Busbar	Station
Local / Remote	LCP	LCP		LCP		
Main Protection 1 Trip	MP1	MP1		MP1		
Back-up Protection Trip	BPT	BPT		BPT		
CB Pole Discrepancy	CBD	CBD		CBD		
PT Fail	PTF				PTA	
Trip Circuit Faulty	TCF			TCF		
Protection A Faulty	PAF			PAF		
SF6 Low 1 <sup>st</sup> Step	SF1			SF1		

Type of Alarm	Line Bay	Transformer Bay	Transformer	Coupler Bay	Busbar	Station
SF6 Low 2 <sup>nd</sup> Step	SF2			SF2		
CB Spring Charging Failure	SCF	SCF		SCF		
Autorecloser Operated	ARO					
Circuit Breaker Faulty	CBF	CBF		CBF		
Temperature Alarm			TTA			
Temperature Trip			TTT			
Buchholz Alarm			TBA			
Buchholz Trip			TBT			
Transformer Oil Level (Low and High)			TOL			
Transformer Cooling fan Trouble			TCT			
Transformer Bank out of Step			TBS			
Transformer Bank Independent			TBI			
Transformer OLTC Control/Supply Failure			TCC			
Busbar Differential Prot. Trip					BDT	
110 V DC alarm						DCA
110 V Battery Charger A Trouble						CA 1
110 V Battery Charger B Trouble						CB 1
48 V DC alarm						DCB
48 V Battery Charger A Trouble						CA 4
48 V Battery Charger B Trouble						CB 4
Protection Panel DC Supply Trip						PPS
RTU Alarm						RTU
Communication Alarm						COM

Table 2-2 Number of alarms per voltage levels

Type of Alarm	Line Bay	Trans-former Bay	Trans-former	Coupler Bay	Busbar	Station
220 kV Alarms	12	8	9	3	1	9
132 kV Alarms	12	8	9	3	1	9
66 kV Alarms	9	8	9	3	1	9
33 kV Alarms	7	8	9	3	1	7
11 kV Alarms	4	4	0	3	1	0

- Note: Voltage for transformers relates to high voltage side

#### Measurements:

- Busbar voltages (separate for each busbar and bus section) of all 66 kV, 33 kV and 11 kV busbars and selected 132 kV and 220 kV busbars
- Frequency at each major power station and connection point to neighbouring countries
- Active / reactive power for  
All 220, 132, 66 kV and 33 kV line feeders (at both ends of the lines) and for the 11 kV feeders  
All 220/11 kV, 132/33 kV, 66/11 kV, 33/11 kV, 66/33 kV transformers (at the high voltage and the low voltage side)
- generator feeders of selected Power stations
- Line current of each 11 kV feeders
- 48 V DC auxiliary voltages
- 110 V DC auxiliary voltages

#### Energy Metering:

- At all incoming feeders to the distribution network

#### 1.4.3 New Remote Terminal Units (RTUs)

This Specification describes the new Remote Terminal Units (RTUs) to be supplied to KPLC as part of the SCADA for distribution stations project.

The intent of the Specification is to describe KPLC's needs for the `new RTUs to be provided. Each bidder is encouraged to propose its standard RTUs to the extent possible, as long as it meets or exceeds the requirements of this Specification.

The 48V DC supply equipment for the RTUs and adaptation equipment as well as for the telecommunication equipment provided under the contract and described in other section of this document is also specified in subsequent chapters.

#### 1.4.3.1 General information and scope

- ***Remote terminal units***

In this project, new RTUs shall be supplied by the Contractor. The stations to be equipped with RTUs and the RTU sizing is as detailed in the scope of supply, SCADA System Alarms show details about the controls to be executed and the status indications measurements, alarms and metered values to be acquired from each individual substation. An overview of the required RTUs as well as the communication linking to SCADA Systems can be taken out of **Table 1-1** under the details of the scope of supply.

Each individual RTU to be supplied under the Contract shall be fully equipped for the actual amount of data to be acquired and commands to be executed plus a spare capacity of 25% for each type of data. The 25% installed spare capacity for the new RTUs to be provided under the Contract is included in the data count given in **Table 1-1** in the scope of supply.

In addition, each RTU shall be expandable in the field by at least 50% of the size of the initial point capacity of **Table 1-1** by addition of Input and Output cards only. The addition of enclosures, internal cabling/wiring, chassis, or power supplies shall not be necessary when adding these I/O cards.

The Supervisory Control & Data Acquisition (SCADA) System at the NCC and RCC's shall be able to scan the RTUs utilizing the communication network described in chapter 3 of this document.

- ***Interfacing works***

The Contractor shall supply all necessary equipment and material including transducers, auxiliary relays, interposing relays, cables, wiring, terminal blocks, test switches, isolation devices, conduits, cable trays/trenches and any other equipment required to interface the RTUs with the substation equipment.

The data points shown in **Attachment 1**(site survey reports) of this specification are wired up to the existing RTUs either directly from the station control and monitoring equipment or via interface marshalling cubicles depending on the amount of signals.

#### 1.4.3.2 Functional requirements for new RTUs

- ***Remote terminal units***

The new RTUs shall be programmable, with real time clock, 104ynchronized by an external source, process Input and Output (I/O) modules, CPU, memory and data transmission equipment. The new RTUs to be supplied and installed under the project shall provide at least the following functions:

- single command outputs, double command outputs
- regulation command outputs e.g. raise/lower command outputs for transformer tap changer control
- analog setpoint transmission and output
- single, double and multiple state digital inputs
- analogue measured inputs
- metering pulse inputs for acquisition of energy meter values
- Sequential Event Recording (SER) with time stamping of events at the RTU
- RTU time synchronization
- Self testing and diagnostic functions for detection and reporting of any error
- automatic re-starting function
- Database and parameter setting by menu-controlled dialogues from a local PC and remotely from the corresponding control centre with downloading function.
- Support encryption and LAN/WAN access
- Shall support IEC 61850 protocol for process communication

Bidders shall with their offer inform about the different types of data transmission protocols available and for the proposed type of RTU.

- Telecontrols

The RTU shall have the capability for the SCADA system master station to select and control specified power system devices. The following power system devices will be controlled by the RTU:

- two-state devices such as circuit breakers and isolators
- multi-state devices such as transformer tap changers

### **Tele commands**

The RTU shall ensure that only the correct output is selected for two state devices before command execution.

Operation of control outputs shall be via a select-check-execute command sequence. The control sequence shall include the following:

- The SCADA system shall transmit a command message addressing the proper RTU and the control point within the RTU, and indicate the control action desired.
- The RTU shall initialize its control logic, reassemble the command message, and transmit the reassembled message to the SCADA system. The message sent to the SCADA system shall be generated by the RTU's point selection logic.
- The SCADA system shall check the returned message for validity and, if valid, shall issue an execute command to the RTU.
- The RTU shall operate the control point selected only after the execute command has been received.

The control action shall be executed only if the select-check-execute sequence is performed without error or interruption. The RTU shall reset its control logic upon any error in the sequence or if the execute command is not received within a pre-defined time after the command message is received at the RTU.

The impedance of the output circuit shall be measured to detect jammed contacts.

The point selection logic for the control output shall be designed to preclude operation of an unselected output under single component failure conditions. That is, no single component shall be capable of selecting and operating an output point by itself.

In no case, any unwanted telecommand shall be given to the process in case of an RTU power failure.

The RTU communications protocol shall also support "immediate execute" contact outputs (where an operation can be commanded without the validity check and execute message exchange) for control output types such as On Load Tap Changer (OLTC) raise / lower command outputs.

### **Analog setpoint control**

The RTU shall provide for analog setpoint control and variable pulse width outputs although this type of control as it would be required for LFC.

- **Teleindications**

Teleindication refers to status information of operational equipment monitored by the system. Such teleindications include status information of switching devices, event information, alarms, etc.

The RTU shall report teleindications by exception but shall also allow the SCADA system to demand – scan status data even if the data has not changed.

### **Status indications**

The status (open / closed) of two state devices such as circuit breakers or isolators shall be acquired by 2 independent, potential – free contacts or by 2 interposing relays, one for each position. Position indications shall be checked for validity and undefined states like open **and** closed (1 | 1) or **neither** open **nor** closed (0 | 0) shall be alarmed. The RTU shall provide for run-time-monitoring, adjustable to the HV equipment operation parameters, to avoid alarming of undefined states while the equipment (e.g. isolator) is operating.

### **Alarms**

Alarms shall be acquired as single indications via potential – free contacts which are either available at the initiating equipment or to be generated by paralleling relays to be provided under the project.

### **Digital parallel input**

The RTUs shall have the ability to handle digital measurands, e.g. four digits BCD. Transformer tap position shall be coded by means of a diode matrix to a BCD code before connecting to the digital parallel inputs of the RTU. The Tender shall include complete functional and electrical specifications of possible input codes and input circuits in the tendered system.

- **Telemeasurements**

Analogue measurements can be acquired from either an analogue input board supplied by the output of an analog transducer, a transducer less measurement board or a communication network

The analog signals shall be converted to digital mode by an analog-to-digital converter, to which the inputs are connected. All inputs of a module shall be measured within one cycle, regardless of the number of inputs in use. Thus new points can be added to the RTU without reprogramming. Analog measurements shall be transmitted to the master station with 12 bits or 11 bits + sign bit.

- Telemetry

The transmission of integrated totals refers to the transmission of measurable quantities which are integrated over a specified period of time. The integration shall take place before transmission. The measured quantity such as active or re-active energy (kWh, kVarh), which is presented as defined pulses which are read into an integrating register of the RTU from a pulse output or a closing contact of an energy meter.

Transfers of the accumulated counts into a storage area shall be initiated every 1 minute by the RTU clock. In case of a failure to scan, e.g. due to failure of the telecommunication system, 1-minute integrated totals over a period of not less than 1 day shall be stored at the RTU

Pulse accumulator data shall be assigned to a scan group for scanning of the accumulated values from the SCADA system.

- Sequence of Event Recording (SER)

The RTU shall be capable of Sequence-of-Events (SER) data collection at a time resolution less than the operating speeds of the power system devices. Any digital input points in the RTU may be assigned, programmable as an SER data point. In general, a breaker position change and any alarm from a protection device that has initiated a trip signal is defined as an event for SER.

Multiple transitions of a device, such as the tripping and subsequent reclosing of a breaker, shall be considered as a series of separate events. Each time an event is detected, the RTU shall time-tag the event and store it together with the time-tag of the event for transmission to the SCADA system with the next scan.

The buffer shall be sized to store, as a minimum, a number of events equal to three times the number of SER points implemented in the RTU.

The time-tag recorded with each event shall be generated from a clock internal to the RTU.

**Separating capability**

The RTU shall be capable of correctly determining the sequence of events for which their occurrence is separated by  $\geq 1$  ms (separating capability class SP4 of IEC 60870-4)

**Time resolution**

The resolution of the time tag shall be 10 ms.

- Common time base

The internal clock of each RTU shall be synchronized either from, a Contractor supplied and installed time synchronization source, such as a Global Positioning System (GPS) or an omega synchronizing signal.

The synchronization shall be done periodically such that the time-tags in each RTU shall be within five milliseconds (5 ms) accuracy between all RTUs.

Tenderers shall clearly indicate the method used for time synchronization and describe in detail how the required accuracy is achieved.

In the RTU there shall be a digital output from which time synchronization messages can be forwarded to external devices. The frequency of the activation of the message shall be adjustable.

- Data transmission

The data transmission network will consist of dedicated data channels and/or TCP/IP network utilizing fibre optic transmission media, power line carrier and radio transmission.

The RTU shall be capable of providing both legacy and cutting edge communication interfaces.

The new RTUs shall be capable of “dual port function”, utilizing different protocols on at minimum 2 separate RTU communication ports simultaneously. Communication protocols shall be implemented by modifiable firmware in the RTU. Reconfiguration of the RTU database may be necessary when an RTU’s communications protocol is changed due to the difference in the functions supported by the protocol.

The Contractor shall provide and implement RTUs with standard IEC 60870-5-101 communications protocol as well as IEC 60870-5-104 communications protocol. Both protocols shall be included and shall be selectable for each of the RTUs by parameterization. The interfaces to the different communication media for IEC 60870-5-101 and IEC 60870-5-104 shall be provided by the RTU hardware.

The RTU protocol shall be non-proprietary for use within KPLC. The Contractor shall provide all details and parameter settings used under the IEC 60870-5-101 and IEC 60870-5-104 protocols. KPLC shall be authorized to disclose the RTU protocol to third party suppliers.

#### 1.4.3.3 Equipment characteristics

##### ***Remote terminal units hardware***

- Enclosures

The Contractor shall provide enclosures meeting the following requirements:

- Swing racks supported by heavy gauge hinges shall be provided so that only front access to components and wiring is required for routine maintenance and troubleshooting.
- Provisions for top and bottom cable entry. Cable entries shall be provided with protection against insect and animal entry, and sealed to prevent dust and sand contamination.
- Protection class of the enclosures shall be
  - for indoor cabinets IP52 minimum
  - for outdoor cabinets IP64 minimum.
- Suitable signal and safety ground networks within the enclosure.
- Convenience outlets at 230 V AC, shall be provided.
- Power supply

The Contractor shall supply any hardware required to convert the 48 V battery voltage to the required internal voltages for the RTU hardware. The RTUs shall be capable of operating with ungrounded or grounded (either polarity) input power.

In RTU DC distribution, Miniature Circuit Breakers (MCBS) with alarm contact shall be used, i.e. fuses are not accepted.

- Control disable switch

For each station a manual key type selector switch shall be provided to locally disable all control outputs at a station. The key-type selector switch shall be installed at the RTU such that it can be operated without opening the RTU panel. The outputs from the RTU shall be disabled by breaking the power supply connection to the control output. An auxiliary contact on this switch shall be wired to a contact input in the RTU to report the control disable switch's status to the SCADA system.

- Interconnections

All connections between the RTU's termination facilities and signal wiring shall be through barrier-terminal blocks with knife-switch isolation, mounted in the RTU panel or an adjacent marshalling cabinet, if not already exist in the Substation. Terminal blocks shall be screw-type, with full depth insulating barriers. There shall be galvanic isolation of all signal wiring via interposing relays

- Distributed RTUs

RTUs shall have the capability to gather data from other smaller or distributed RTUs or local intelligent substation instrumentation using standard RJ45 Ethernet , or directly connected RS-232C- or RS 485- channels with or without modems. The distance between the different control locations may reach up to 500 m.

- Digital inputs

The digital inputs shall be opto-isolated, signal voltage 48 V DC. Other voltages shall also be possible by changing the matching resistor in the input circuit.

Contact bouncing of the interposing relays shall be filtered. The bounce filtering time shall be 7ms. Input circuits with selectable bounce filtering time setting shall be used.

The indications shall preserve the chronological order of events inside the RTU.

Oscillating inputs as a result of e.g. a faulty relay chattering shall be blocked locally at the RTU.

- Analogue inputs

In analogue measurements, the information to the analog input modules of the RTU is given in the form of analog current supplied by the output of measuring transducers. Measuring transducers shall normally be installed in the switch/control gear.

In analog input modules, the following current input ranges shall be available:

- unipolar 0-5 mA, 0-10 mA, 4-20 mA, 0-20mA
- bipolar +/- 5 mA. +/-10 mA,+/-20mA

It shall be possible to change the input range for each individual input, by software means, instead of changing the input resistor.

The analog input circuit shall have a precise DC impedance less than 200 ohms for current inputs. This impedance must not vary more than half of the accuracy of the Analog to Digital Converter (ADC) with influence values such as temperature, etc.

In the input circuit galvanic isolation shall be provided from mechanical earth and electrical earth between different inputs.

The circuits of the analog input module shall be protected against disturbances caused by switching transients and against disturbances from power and radio frequencies present at outstations.

The scanning of each input shall not introduce any error on the analog information.

For each input it must be possible, without disturbing the other inputs,

- to isolate the input from the ADC and close the analog circuit,
- to connect, on the ADC side, a test set for maintenance or adjustments,
- to measure the analog input value without disturbing the measurement (addition of an mA meter over a link which is then disconnected).

The analog information shall be converted into digital value by the ADC which can be common for all inputs. Analog measurements shall be transmitted to the master station with at least 11 bits plus sign bit.

The total accuracy must be better than 0.5% of the nominal range of a measurement calculated from RTU's analog input up to Control Centre. A calculation of the total accuracy in the wide sense as well as in the restricted sense as per IEC 870 – 4 shall be included in the Tender.

The input circuits must withstand a permanent overload of 30% without any damage.

In case of input overload the output message shall be either

- the exact value corresponding to the input or
- the maximum value that is possible to code (with the correct sign).
- Pulse inputs

The counter register shall be 16 bit. The maximum input frequency shall be 25 Hz. In practice, the pulses will be dimensioned in a way that max. frequency is less than 5 Hz. Interposing relays will not be used.

- ***RTU firmware requirements***

The RTUs shall meet the following characteristics of the firmware to support the functions of the RTUs. The Contractor shall use standard firmware as much as possible.

All firmware shall be completely and consistently documented. It shall not be necessary to perform modification to firmware, logic, or data for expansion within the sizing parameters defined for the RTU.

At the time the RTU is accepted, all firmware delivered must be up to date and in final form, including all standard firmware changes and field changes initiated by the Contractor or the Contractor's suppliers prior to acceptance. The firmware documentation must reflect these changes.

Firmware shall be loadable by service notebook locally at minimum, download of firmware and parameter sets through SCADA system, using the data communication links. In any case changing of EPROMs or similar devices shall not be necessary when updating RTUs firmware.

- Initialization / restart program

Firmware shall be provided to enable the RTU to restart itself upon manual request and automatically under the conditions of power restoration, memory parity errors, and hardware failures. The firmware shall initialize the RTU and begin execution of the RTU functions without intervention by the SCADA system. All RTU restarts shall be reported to the SCADA system.

- Fail safe processing

In the case of irrecoverable faults such as power supply failures, firmware malfunctions, or any other detected condition that may affect the security of indications and controls, the RTU shall place itself in a secure state that prohibits the transmission of false indications or the execution of erroneous control outputs. The detection of these error conditions shall be the responsibility of the RTUs self-test and operations monitoring firmware.

- Database maintenance

The Contractor shall supply software to configure each RTU's database where this information is located in software and/or firmware at the RTU. The software shall completely generate or modify the database of the RTUs. The database software shall have error detection services and shall produce a printed listing of the input data and the resulting RTU database configuration.

- Down loading of database from SCADA system

The RTU shall support the change of the RTU's configuration and processing parameters by messages from the SCADA system. These changes shall include, but not be limited to scan group definitions, analog limits, SER point allocation and buffer definitions.

- Diagnostic firmware

The Contractor shall supply diagnostic firmware for both off-line local tests and on-line self-diagnostic capability built into the RTU. The RTU shall enter an off-line state during the execution of off-line diagnostics, and this off-line state shall be reported to the SCADA system. The RTU shall include a remote diagnostics communication port and shall be capable of executing off-line diagnostics from an external computer terminal connected to this remote diagnostics port.

### ***Interfacing equipment***

- Interposing relays

Interposing relays for tele commands and digital inputs shall be provided by the supplier.

The relays shall be installed in the switch / control gear and shall have the following characteristics:

For tele commands:

- Coil voltage shall be 48 VDC; Coil voltage variation shall be +20%.
- Signal voltage on the contact circuit shall normally be 110 VDC, but other voltages may also exist.
- The rated contact current shall be minimum 5 ADC making/breaking. In exceptional cases, where CB coils are to be switched directly by the interposing relay, installed under the contract, additional contactors might be required to cope with the switching currents of the CB coils. In such cases, these contactors shall be provided under the contract.

For tele indications:

- Coil voltage shall normally be 110 VDC; (other voltages may also exist) coil voltage variation shall be  $\pm 20\%$ .
- Signal voltage on the contact circuit shall be 48 VDC.
- The rated contact current shall be minimum 3 A DC making/breaking and 1 A continuously

Relays with two (2) normally open and two (2) normally closed contacts shall be provided.

Contact bounce shall be less than 8 ms and contact age shall be 10 exp. 6 operations.

Dielectric strength shall be 2 kV, 50 Hz-1 min between one circuit and the earthing point and between independent circuits, 1 kV, 50 Hz for 1 min between two terminals of the same circuit, Impulse test voltage: 5 kV (IEC 60255-5).

Plug-in type relays and sockets shall be used with sockets directly mounted on a DIN rail.

All necessary arrangements must be made so that the plugging – in and out are easy and performed without any risk of damaging of relay parts.

The relays shall be fitted with a visual operation indicator (either mechanical or LED).

### ***Transducers***

The new transducers shall be of the latest state-of-the-art solid state technology, not requiring frequent calibration and preventive maintenance and shall be free from electro-magnetic interference and noise. They shall use electronic surface components and all its internal parts are protected by a tropicalization varnish. Transducers shall comply with the latest international standards and, mandatory, to the IEC 60688-1 publication.

Transducers shall be programmable and the respective programming equipment/software shall be provided in this contract.

Transducers shall in general be installed in the control or protection board of the switchgear equipment. Transducers shall be plugged into a safety socket and shall be easily removable and replaceable during operation. If the transducer uses current circuits, these circuits are automatically shorted when extracting the transducer from its socket.

Transducers shall comply with the following requirements:

- Accuracy of the measurements for MW, MVar, voltages shall be better than 0,5% of full scale over a temperature of 0 to 50 °C.
- Maximum ripple shall not exceed 2% peak to peak.
- Response time to 99% of final value shall not exceed 0.5 sec.
- The analogue output of the transducers inputs to the RTU shall be isolated, unipolar or bipolar, 2 – wire Load independent DC current of 0 to 10 mA, or  $\pm 10$  mA or 4-20mA.
- Transducer burdens shall not exceed 2 VA per PT element and 2 VA per CT element. The contractor shall provide calculations of the additional burden imposed by the transducer and the associated wiring / cabling for each transducer installed under the project during the detailed design stage of the project.
- Transducers shall be able to withstand a short period (1 second) overload of up to 50 A without damage and have a withstand voltage of 4 kV/50 Hz/ 1 min and 5 kV/1.2/50  $\mu$ s, according to IEC 60255-4 C1. III.

Frequency transducer shall have an input range from 45 Hz to 55 Hz.

Active and re-active power measurements shall be made 3 phase – 3 wire for distribution indoor switchgear circuits and 3 phase – 4 wire for other circuits.

A single phase-to-phase voltage shall be acquired for each measurement point. Voltage transducer shall provide for expanded scale of  $\pm 20\%$  of the rated voltage.

OLTC transformer tap positions are available either in analogue form or from drum switches with individual switches for each tap position (e.g. one out of 19).

Transformer tap position from the drum switches shall be coded by means of a diode matrix to two digit BCD code before connecting to the digital parallel inputs of RTU.

For transformer tap position available in analogue form, analogue transducers shall be provided. These transducers shall convert the current tap position of the TC to a suitable sealed analogue input to the RTU.

### ***Cables***

The instrumentation cables from the RTU electronics cabinet to the interface terminals at the substation control / switchgear shall be delivered by the Contractor.

The characteristics of the cables shall be as follows:

- Number of cores  $n * (2+1) * 0,8 = 2, 4, 8, 12, 24, 48$ , with  $2 + 1 =$  a pair of conductors + surrounding screen and  $0.8 =$  cross-sectional area of screen.
- The outer PVC sheath shall be rodent proof and meet flame test requirements of IEC 60323-3 category C. Manufacturer's name, manufacturer's type, core quantity and cross-section, year and month of manufacturing shall be indicated.
- Individual leads shall have colour coding.
- Pair-twisted cores, each pair and the whole core surrounded by protective screen shall be used for connection of transducer secondaries to the RTUs. For connection of controls, status indications and alarms cables with protective screen surrounding the whole core are acceptable.

In the design made by the Contractor the following shall be taken into account:

- Separate cables shall be used for:
  - telecommands,
  - teleindications and alarms
  - measurements transducer secondary outputs (mA)
  - metering (kWh)
- The number of cables should be as low as possible.

#### 1.4.3.4 Power supply for substations

At all stations where no adequate power supply exists and new RTUs and telecommunication equipment shall be installed, the Contractor shall supply a new and complete 48V DC power supply system including a 48V DC battery, charger(s), low voltage disconnect switch, all DC distribution equipment and cabling required for the uninterruptable supply of 48V DC power to the RTU as well as the communications equipment provided under the Contract.

The battery and charger sets shall be sized to adequately supply the loads to be connected to the battery. The rectifier output shall be  $k \times S$  where

$$k = 1.5$$

S = sum of the following:

- input power in kVA of the largest tendered RTU
- input power to the new telecommunication equipment provided under the contract.

The battery capacity shall be  $C = 1.5 \times C_n$ , where  $C_n$  is the capacity to feed the above total load for eight (8) hours.

The battery chargers shall provide normal system power and shall be capable of recharging a fully discharged battery in twelve hours while supplying normal system power. The chargers shall have 240 volt, 1 phase input power. Where duplicated chargers are to be provided, both chargers shall have an output diode in the positive pole to prevent back-feeding a failed charger. The batteries shall be sealed, maintenance free lead acid type. As they are sealed, there are no special ventilation requirements, and as such the batteries may even be placed in the substation control rooms or communications equipment rooms.

A low voltage disconnect switch shall be provided for protection of the battery. The 48 Volt DC system distribution panel shall be a fused switch distribution panel board. The low voltage disconnect switch and fuse panel shall be provided with local alarms as well as alarm contacts. The low voltage disconnect switch shall be equipped with external by-pass switch to be used for maintenance purposes.

#### 1.4.3.5 Spare parts and test equipment

- ***Spare parts***

The Contractor shall furnish a list of recommended spare parts and test equipment for the purchased RTUs to maintain reliable RTU operation. The spare parts list shall be subdivided into:

- short-term spare parts that are necessary for two (2) years of operation. These spare parts shall be included in the contract.
- long-term spare parts that are necessary for ten (10) years of operation.

The Contractor shall guarantee the availability of spare parts for a period of at least 15 years and shall make available at no cost to KPLC the manufacturing drawings and rights to manufacture those subassemblies which the manufacturer will not support, or discontinues support thereafter. For each subassembly, the specific components supplied shall be identified and referenced in the supplied documentation.

#### 1.4.3.6 RTU performance requirements

- ***Availability***

An availability of 99.9% is required exclusive of communication channel availability. An RTU shall be considered unavailable when:

- any function is lost for all points of a single type
- one input card or output card of each type fails
- More than one input card or output card of the same type fails.

- ***Maintainability***

The RTU design shall facilitate isolation and correction of all failures. The following features which promote rapid problem isolation and replacement of failed components shall be included:

- self-diagnostic capabilities continuously monitoring operation of the RTU
- on-line error detection capabilities including detection of memory, CPU, communication faults, and input/output errors and failures with detailed reporting of detected errors to the SCADA system
- Local indication of RTU failures.

- ***Message security***

Each message transmitted shall include an error detection code to exclude erroneous messages being accepted as valid.

## CHAPTER THREE

### TELECOMMUNICATIONS

#### 1.5 FIBER OPTIC LINKS

The Detailed Technical Specifications for the fiber telecommunications solution shall be set out as follows;

1. The fiber optic cable specifications
2. Fiber Optic Test Equipment Specifications
3. The fiber optic terminal equipment specifications
4. The fiber optic cable & terminal equipment Spares requirement
5. Testing
6. Training

##### 1.5.1 GENERAL

KPLC intends to integrate several existing distribution substations yet to be automated to the existing SCADA infrastructure.

This shall employ the use of various telecommunication solutions to connect these substations to their respective regional control centres for primarily SCADA connectivity and additionally for telephony and office data connectivity.

##### 1.5.2 FIBER OPTIC CABLE SPECIFICATIONS-ADSS

The total estimated cable length to be supplied is approximately 120Kms

### ENGINEERING

**Fibre Optic Cable/OPGW:** A cable/wire that contains individual glass fibers, designed for the transmission of digital information, using light pulses

**All Dielectric Self Supporting (ADSS):** A cable that is designed for aerial applications and does not require a separate cable messenger.

**OTDR:** Optical Time Domain Reflectometer: A device used for characterizing a fiber, whenever an optical pulse is transmitted through the fiber and the resulting backscatter and reflections are measured as a function of time.

**Single Mode Fiber (SM):** An optical fiber with a small core diameter in which only a single mode of light is capable of propagation.

**Multi-mode Fiber:** An optical fiber whose core diameter is large compared with the optical wavelength and which, consequently, a larger number of light modes are capable of propagation.

**Splicing:** Making a permanent junction between optical fibers. This may be thermally fused or mechanically applied.

**Minimum Bend Radius:** The minimum radius a fiber may be bent before optical losses are induced

**ODF-** Optical distribution frame

### **1.5.2.1 PROJECT SUMMARY AND DESIGN PRINCIPLES FOR THE ADSS/OPGW FIBER OPTICAL CABLE**

The basic information and design principles for the ADSS Fiber Optic in this project is only meant to offer general guidelines to the tenderers and is only meant to assist in the preparation of bids. Further details and more precise information are expected to be obtained during the site visits and route surveys which are mandatory.

#### **1. Design Principles Of Proposed Aerial ADSS Fibre Cable**

The proposed Fibre cable shall be single mode, 48 core All-Dielectric Self-Supporting Cable (ADSS). This is a fibre cable that consists of the requisite number of tubes/elements as per the specified number of fibers and has fillers that are used to preserve the cable geometry. The tubes are further stranded around a dielectric central strength member and bound in a jacket.

The cable shall be designed and manufactured in accordance with the following standards:

- Fiber count: 48
- Fiber type: Single Mode
- Construction: Typical minimum span length of 150m
- Cable IEEE 1222
- Fiber IEC 60793, ITU-T G.655
- Color code ANSI/EIA 359-A, IEC 60304

### **i. Optical Distribution Frames (ODFs)**

The ODFs shall be wall mounted and supplied complete with patch panel, SM pig tails with FC connectors and splice tray cassettes.

The table below indicates the intended distribution of the wall mounted ODFs.

## **2. Detailed Cable Characteristics**

### **i. General**

The ADSS optical cable shall be of non-metallic Aerial type designed for installation on 132 kV Power transmission lines as well as 66kV/33kV and 11kV distribution lines with minimum span lengths of 100 mts. The Bidder shall offer ADSS containing 48 Nos. of Single Mode (SM) optical fibers in conformity with ITU-T G-655 standards. The cable shall be designed to withstand all prevailing environmental conditions including the effects of high electric and magnetic fields produced by the proximity of live power conductors.

### **ii. Mechanical and Environmental specifications for 48 core SM (9/125) ADSS fiber optic cable**

The cable shall be constructed from materials which have been technically proven and able to withstand the electrical and environmental conditions.

Table below gives the desired mechanical and environmental specifications for the ADSS Fiber Optic Cable for minimum performance characteristics.

Table 3.3 mechanical and environmental Specifications for 48 Core SM (9/125) ADSS Fiber Optic Cable

### **iii. General Specifications for the Optical Distribution Frame (ODF)**

**Error! Reference source not found.** Below gives the general technical specification for the Optical Distribution Frames.

Table 0-3 General Specifications for ODF

### **iv. Fitting Materials**

All fitting materials shall conform to the approved standards by **IEEE1222**. The bidder shall attach type test certificates from the certifying bodies.

### **v. Applicable Standards**

Unless otherwise specified in this specification, all requirements for individual components and completed cable shall mainly be in accordance with the following standard specifications;

IEEE std 1222, IEC 60794-4, IEC 60793-1, IEC 60793-2, IEC 60794-1, ITU-T G.655, EIA 492A, EIA 472A, EIA 598 or ANSI/EIA 359-A-1985, ISO 9001 and ISO 14001.

#### **1.5.2.2 SCADA & TELEPHONY COMMUNICATION INTEGRATION OF NEW DISTRIBUTION STATION INTO KPLC SCADA SYSTEM:**

When the Distribution Substation being automated is linked to an existing already automated substation via a fiber link, the integration proposal requires the following;

1. Point to Point FO terminal equipment, 2 UNITS PER LINK, capable of handling 64KBps speech channel where required and Ethernet data traffic, VLAN configurable
2. A Ruggedcom or equivalent switch at the existing station
3. All necessary accessories & configuration to achieve the link above in fig 1 above.

#### **1.5.2.3 MULTIPLEXER REQUIREMENTS**

#### **1.5.2.4 STATION SWITCH REQUIREMENTS**

The function of this switch shall be purely to connect RTU from distribution station into the existing SCADA network at the backbone for onward transmittal of both to the relevant control centers-RCC

#### **TESTING**

- Factory Acceptance Tests (FAT) Systems shall pass agreed set out tests before they may be shipped to site. KPLC shall witness FATs unless he waives this in writing. FAT preparation costs shall be borne by contractor except transport and accommodation. FAT shall be carried by two KPLC staff for 5 days.
- Site Acceptance Tests (SAT) Systems shall pass agreed set out tests before they may be put into operation and before they are Taken Over

The System will be accepted by KPLC if both:

- The System and all items of equipment have successfully completed all the specified tests
- All failures, problems and reservations noted during the tests have been corrected to the satisfaction of KPLC.

- If either of these conditions has not been complied with, then the necessary corrective action shall be agreed between the Contractor and KPLC.

### 1.5.3 TRAINING

The Contractor shall provide 2 weeks training for four KPLC staff at the supplier's manufacturing premises for each type of equipment supplied. All training costs shall be borne by Contractor except travel to manufacturers place and accommodation which shall be borne by KPLC. The scope of each service shall be given. The training content shall be subject to approval of the project Manager.

#### 1.5.3.1 Enclosures

##### **1.5.3.1.1**

All equipment shall be housed in single sheet steel cubicles segregated into compartments by sheet steel separators, and of height of 9 U and width of 840mm. The cubicle shall be wall mounted.

##### **1.5.3.1.2**

Cubicles shall have a hinged front cover with locking facilities, giving full access to all components and cable connections. The front cover shall be solid and transparent.

##### **1.5.3.1.3**

The cubicles shall satisfy the requirements of corrosion protection as specified and shall be ventilated and protected to class IP42.

##### **1.5.3.1.4**

Where ventilation openings are provided these shall be fitted with drip-proof louvers and fine mesh wire or perforated screens to exclude small insects and vermin.

### 1.5.3.1.5

A gland plate shall be provided sufficient for all incoming and outgoing cables including spare capacity

### 1.5.3.2 TECHNICAL SPECIFICATIONS

Technical specifications describe the basic requirements for goods. In addition to the information and documentation in the Tender Document regarding the technical aspects of this tender, all Tenderers shall comply with the following -

#### 1.5.3.3 Part A - General Requirements

1. Technical documentation shall be in English language. The specific items on offer shall be marked clearly for the goods they intend to supply.
2. Deviations from the basic requirements, if any, shall be explained in detail in writing with the offer, with supporting data including calculation sheets, detailed drawings and certified test reports. The Procuring Entity reserves the right to reject the goods if such deviations shall be found critical to the use and operation of the goods.
3. The Supplier shall submit a commentary on the Guaranteed Technical Particulars (GTP) as well as a Statement of Compliance to Technical Specifications. In submitting the GTP and Statement of Compliance, the Suppliers and or Manufacturers should provide cross-references to the documents submitted.
4. The Statement of Compliance shall be in table form, and shall cover in detail, all clauses of the specification(s).
5. Detailed contact information including title, e-mail, facsimile, telephone or any other form of acceptable communication of the testing and standards body used shall be provided.
6. Where Type Test Certificates and their Reports and or Test certificates and their Reports are translated into English, all pages of the translations must be signed and stamped by the testing authority.
7. The Manufacturer's Declaration of Conformity to reference standards and copies of quality management certifications including valid ISO 9001: 2000 shall be submitted for

evaluation. For locally manufactured goods this requirement is not mandatory but all Test Reports and Certificates shall be certified by KEBS or its appointed agent(s), in which case a letter of Accreditation will be required.

8. In all cases where the level of galvanizing and painting is not specifically stated in the detailed Technical Specifications, the general requirement shall be for a uniform coating of thickness not less than 80 microns.
9. Suppliers are required to provide information on proper representative(s) and or workshop for back-up service and or repair and maintenance including their names, telephone, facsimile, e-mail, physical and postal addresses, along with their offers.
10. Suppliers shall be aware of requirements and regulations guiding Design, Supply and installation of radio masts by the Communication Commission of Kenya and relevant local authorities.
11. It shall be the responsibility of the suppliers to obtain necessary permits and approval from local authorities and the regulator, Communication Commission of Kenya.
12. The supplier shall submit detailed drawings for approval. Detailed Technical Specifications for the goods appear hereafter.

### **1.5.3.4 CHAPTER FOUR**

#### **48 VDC SUPPLY**

##### **DC-DC CONVERTER**

##### **110VDC-48VDC 10A HIGH POWER CONVERTER TECHNICAL SPECIFICATIONS**

- DC-DC Converter of 110vdc-48vdc 10A high power converter is specially designed for meeting the requirements of all kinds of communication equipments of communication and electric power departments.
- DC-DC Converter of 110vdc-48vdc 10A high power converter adopts the high frequency switching technology and has many good points, including high accuracy voltage stabilizing, low output noise, strong capacity of resisting disturbance, small volume, light weight, beautiful external shape

- DC-DC Converter of 110vdc-48vdc 10A high power converter is the ideal configuration supplying power to the communication equipments of different voltage grades

## **GENERAL REQUIREMENTS**

Technical documentation shall be in English language. The specific items on offer shall be marked clearly for the goods they intend to supply.

The Tenderer shall submit the Schedule of Guaranteed Technical Particulars (GTP) completed by the Manufacturer. In submitting the GTP, cross-references should be made to the documents submitted.

Deviations from the tender specifications, if any, shall be explained in detail in writing, with supporting data including calculation sheets, detailed drawings and certified test reports and submitted together with the Tender. In submitting the deviations, cross-references should be made to the documents submitted. Kenya Power reserves the right to reject the goods if such deviations shall be found critical to the use and operation of the goods.

Detailed contact information including title, e-mail, facsimile, telephone or any other form of acceptable communication of the testing and standards body used shall be provided.

Where Type Test Certificates and their Reports and or Test Certificates and their Reports are translated into English, all pages of the translations must be signed and stamped by the testing authority.

A Copy of the manufacturer's valid quality management system certification i.e. ISO 9001 shall be submitted for evaluation. For locally manufactured goods this requirement is not mandatory but all Test Reports and Certificates shall be certified by the Kenya Bureau of Standard (KEBS) or its appointed agent(s), in which case a letter of Accreditation must be submitted.

In all cases where the level of galvanizing and painting is not specifically stated in the detailed Technical Specifications, the general requirement shall be for a uniform coating of thickness not less than 80 microns.

Suppliers are required to provide information on proper representative(s) and or workshop for back-up service and or repair and maintenance including their names, telephone, facsimile, e-mail, physical and postal addresses, along with their offers.

## 1.6 DETAILED TECHNICAL SPECIFICATIONS

- Modular design
- Input and output complete isolation, safety and credibility.
- Advance current control mode and stable & reliable circuit topological structure.
- The key parts all adopt the imported components, and main technical indexes are much higher than the national related standards
- All-around protection functions, output over/under voltage, over current, short-circuit and over temperature protection of whole body
- Adopt no-master automatic equalized current technology, can parallel connection, convenient to extend the capacity
- AC and DC input are available, and AC and DC can be fully isolated by electricity
- All DC-DC Converter support multi-unit connect in parallel with large power output

### 1.6.1.1 PROTECTION

- AC and DC surge suppression as per ANSI/IEEE 37.90.1 (SWC)
- AC Lightning arrester as per ANSI/IEEE C62.11
- AC input circuit breaker c/w with a high DC volts shunt trip and Open circuit form C alarm contact.
- Two (2)-pole DC output circuit breaker.
- Two (2)-pole battery maintenance disconnect switch.
- High DC voltage shutdown/disconnect
- Low DC voltage disconnect for batteries.
- All circuit breakers are to be coordinated with the AC input, battery and rectifier short circuit capabilities. (Specify the KA rating of each)

### 1.6.2 MANUALS, DRAWINGS AND MAINTENANCE SOFTWARE

As part of tender offer, the tenderer shall submit proposed design drawings showing:

- Component arrangement in cabinets, racks
- Block diagram showing wiring connections and operation principle.

After the award of the tender shall come complete with installation, operation and maintenance manuals. As built drawings, individual test report and complete bill of materials shall also be provided.

The equipments shall be delivered with Maintenance software's, if any, with fully paid licences.

### 1.6.3 TRAINING

The supplier shall offer onsite technical training for operation and maintenance of this equipments.

#### TESTS

Tests at Factory

## 1.6.4 SCHEDULES

### 1.6.4.1 Guaranteed Technical Specifications

#### GUARANTEED TECHNICAL PARTICULARS (GTPS)

*(to be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records, four customer reference letters, the manufacturer's experience and copies of complete type test reports for tender evaluation, all in English Language)*

**Tenderer name:**

**Signature:**

**Technical Parameter for DC-DC converter 110VDC-48VDC**

	KPLC REQUIREMENTS	MANUFACTURER/ SUPPLIERS OFFER
Brand	State	
Model	State	
Input voltage range	State	
Output voltage range	State	
Output rated value	State	
Output Current	State	
Load regulation	State	
Power grid regulation	State	
Degree of imbalance for equalized current	State	
Phone weighted noise voltage	State	
Peak—peak noise	State	
Wide frequency noise	State	
Discrete noise	State	
Efficiency	State	
Dynamic response	State	
Working temperature	State	
Cooling mode	State	
MTBF	State	
insulation strength	State	
Rack		

CLAUSE NO.	CLAUSE REQUIREMENTS	KPLC REQUIREMENTS	MANUFACTURER/SUPPLIERS OFFER
	<b>Remote Terminal Units</b>		
	Manufacturers Name and address	State	
	Type	State	
	Country of Manufacture	State	
	Bidder's Name and address	State	
1	Scope	Specify	
2	Terms and definitions	Specify	
3	Applicable standard(s)	State	
4	Requirements		
4.1	Service conditions	Specify	
4.1.2	Physical conditions	Specify	
4.1.2	Safety and environmental requirements	State compliance	
4.2	General requirements		
4.2.1	Free standing Panels, cubicles and marshalling racks, constructed from folded sheet steel of adequate thickness	Specify	
4.2.2	Panels and cubicles designed for personnel access shall be provided with metal floors and shall be suitably ventilated. Doors shall be provided with a lock, which may be opened by a person within the panel without the use of a key.	Specify	
	It shall be possible to open all panels associated with one unit by the use of one master key	Specify	
	Adequate lighting and power points for hand tools shall be provided	Specify	
4.2.3	overall height of cubicles and racks	≤2.20 metres	
	Powder coated, pebble grey colour RAL-7035	State	
	Thickness of powder coating	≥80 microns	

4.2.4	Cable connections shall be equipped with suitable seals to prevent rodents and ingress		Specify	
	Cable plates shall be factory drilled, but blocked with removable stoppers, easily knocked off at site		Specify	
4.2.5	Cubicles shall be provided with thermostatically controlled heating elements		Specify	
	Adjustable set point for thermostat		Specify	
4.3	DESIGN AND CONSTRUCTION			
4.3.1	Power consumption fully equipped			
4.3.1.1- 4.3.1.5	Specify all compliance requirements in these clauses		Specify	
4.3.1.6	Power consumption fully equipped		Specify	
4.3.2	Indicators and Electronic Equipment			
4.3.2.1	Control desk Indicators		flush mounting	
	Minimum sizes of indicators (mm)	Non-urgent indicators	96 x 96	
		Important indicators	144 x 144	
	Mimic diagrams	48 x 48		
4.3.2.2	Local gauge boards desk Indicators		Circular type	
	Minimum case diameter (mm)		160	
4.3.2.3	The read-out window for indicators, recorders and similar equipment shall be non-reflecting, anti-static and minimize parallax errors		Specify	
4.3.2.4	Use of pug-in type printed circuit boards		Specify	
	All electronic components, including integrated circuits, transistors, resistors, capacitors and inductors shall be selected in order to ensure long life and stable operation		Specify	
	Indication lamps used in conjunction with electronic circuits shall be light emitting diodes		Specify	
4.3.2.5	All relay equipment shall use modern plug-in type circuit boards, containing standard type miniature		Specify	

	relays, which can be plugged- in and easily replaced on sockets on the circuit boards.		
	relays shall be of the encapsulated type	Specify	
	transistorized relays for time relays, with setting knobs for time setting	Specify	
4.3.2.6	Switches for mounting in the control panels shall be of the miniature or sub-miniature type	Specify	
	Provide discrepancy switches or push buttons	Specify	
	Discrepancies between the switch position and the plant state shall be indicated by an integral light	Specify	
	Integral light shall illuminate the switch in a flashing mode of operation.	Specify	
4.3.2.7	surfaces used for electrical contacts shall be silver, gold or silver alloy	Specify	
4.3.2.8	Connection between low-voltage electronic control circuits and power circuits shall consist of interposing relays for linking the two systems.	Specify	
	relays have to be of the encapsulated type	Specify	
4.3.3	Remote Terminal Units (RTUs) and Interfaces for SCADA		
4.3.3.1	Galvanic isolation of all signals from process to RTU through interposing relays.	Specify	
4.3.3.2	Accommodate signal from both Analogue and Digital transducers	Specify	
4.3.3.3	Tele information plan requirements		
a)	single command outputs, double command outputs	Specify	
b)	regulation command outputs e.g. raise/lower command outputs for transformer tap changer control	Specify	
c)	analogue set point transmission and output	Specify	
d)	single, double and multiple state digital inputs	Specify	

e)	analogue measured inputs	Specify	
f)	metering pulse inputs for acquisition of energy meter values	Specify	
g)	Sequential Event Recording (SER) with time stamping of events at the RTU	Specify	
h)	RTU time synchronization	Specify	
i)	Self-testing and diagnostic functions for detection and reporting of any error	Specify	
j)	Automatic re-starting function corresponding control centre with downloading function.	Specify	
l)	Support encryption and LAN/WAN access	Specify	
m)	Shall support IEC 61850 protocol for process communication	Specify	
4.3.3.4	RTU to be fully equipped for actual amount of data to be acquire and commands to be executed plus spare capacity of 25% for each type of data	Specify	
	RTU shall be expandable in the field by at least 50% of the size of the initial point capacity by addition of Input and Output cards only	Specify	
	The addition of enclosures, internal cabling/wiring, chassis, or power supplies shall not be necessary when adding these I/O cards.	Specify	
4.3.3.5	RTU shall be accessible through the communication network for the Supervisory Control & Data Acquisition (SCADA) System at the National Control Centre (NCC) and Regional Control Centres (RCC) to scan.	Specify	
4.3.3.6	Plug-in type relays shall be used with sockets directly mounted on a DIN rail.	Specify	
	Plugging – in and out are easy and performed without any risk of damaging of relay parts.	Specify	
4.3.4	RTU firmware requirements		

4.3.4.1	RTU firmware characteristics		
(i)	Use of standard firmware	Specify	
(ii)	Firmware shall be completely and consistently documented	Specify	
(iii)	It shall not be necessary to perform modification to firmware, logic, or data for expansion within the sizing parameters defined for the RTU	Specify	
(iv)	all firmware delivered must be up to date and in final form, including all standard firmware changes	Specify	
(v)	Firmware shall be loadable by service notebook locally at minimum, download of firmware and parameter sets trough SCADA system, using the data communication links.	Specify	
(vi)	Changing of EPROMs or similar devices shall not be necessary when updating RTUs firmware	Specify	
4.3.5	Enclosures Requirements		
4.3.5.1	Swing racks supported by heavy gauge hinges such that only front access to components and wiring is required for routine maintenance and troubleshooting.	Specify	
4.3.5.2	Provisions for top and bottom cable entry with protection against insect and animal entry.	Provide	
	Sealed to prevent dust and sand contamination		
4.3.5.3	Protection class for indoor cabinets	$\geq$ IP 52	
	Protection class for outdoor cabinets	$\geq$ IP 64	
4.3.5.4	Suitable signal and safety ground networks within the enclosure.	Provide	
4.3.5.5	230V AC power outlets	Provide	
4.3.5.6	DC Power supply		

a)	Any hardware required to convert the 48 V battery voltage to the required internal voltages for the RTU hardware shall be provided and adequate	Specify	
b)	The RTUs shall be capable of operating with ungrounded or grounded (either polarity) input power.	Specify	
4.3.5.7	Dielectric strength/Impulse voltage test	$\geq 2.5\text{kV}$ , 1 minute	
4.3.6	Interposing Relays	Specify	
4.3.6.1	Tele commands	Specify	
a)	Coil voltage shall be 48 VDC; Coil voltage variation shall be $\pm 20\%$ .	Specify	
b)	Signal voltage on the contact circuit shall normally be 110 VDC	Specify	
c)	The rated contact current shall be minimum 5ADC making/breaking.	Specify	
4.3.6.2	Tele indications		
a)	Coil voltage shall be 110 VDC; Coil voltage variation shall be $\pm 20\%$ .	Specify	
b)	Signal voltage on the contact circuit shall normally be 48VDC	Specify	
c)	The rated contact current shall be minimum 3ADC making/breaking.	Specify	
4.3.6.3	2NO and 2NC contacts for interposing relay	Specify	
4.3.6.4	Relays shall be fitted with a visual operation indicator (either mechanical or LED)	Specify	
4.3.6.5	Mode of operation	Specify	
	commands		
	indications		
	measured values		
	Pulse train code	Specify	
	address-bloc		

	information-block, indications		
	measured values		
	commands		
	metering readings		
	check bits		
	Hamming Distance		
	Dimension of RTU cabinets and Marshalling Cubicle (packs) completely equipped and wired	Specify	
	height	cm	
	Width	cm	
	Depth	cm	
	Protection class for cubicles (IP 52 min.)	Specify	
<b>4.3.7</b>	<b>Transducers</b>		
4.3.7.1	Electrical parameters – Current, voltage, active power, reactive power, apparent power, frequency and power factor	Specify	
4.3.7.2	Four programmable analogue outputs, two digital outputs and RS-485 Modbus functionality.	Specify	
4.3.7.3	programmed via easy-to-use software compliant with IEC 60688	Specify	
	Galvanically isolated outputs with the following characteristics in table 1.	Specify	
4.3.7.2	Relays Characteristics of the digital programmable transducers	Specify	
a)	Measurement Accuracy	Class0.2, 0.5	
	Main frequency	45-65Hz	
b)	Voltage Circuit (Un)	3×100-693 V (3-wire system) 3×57.7/100 V to 3×400/693 V (4-wire system)	

c)	Current circuit (In)	1-5 A	
d)	Transducer supply	40-120 VDC	
e)	Communication Ports		
	USB port	USB Mini-B connector Modbus RTU 38400 baud (auto)	
	Serial RS port	Three screw terminals for $\leq 6$ mm <sup>2</sup> Modbus RTU 1200 – 38400 baud	
f)	Digital outputs (No)	2	
g)	Analogue outputs(No)	4	
4.3.7.4	a) Accuracy of the measurements	Voltages 0.5% of full scale Temperature 0 – 50oC	
	b) Maximum ripple	2% pk to pk	
	c) Response time to 99% of final value	<0.5 sec	
4.3.7.5	analogue output of the transducers inputs to the RTU shall be isolated, polar or bipolar, 2 – wire Load independent DC current of 0 to isolated, polar 10 mA, or $\pm 10$ mA or 4-20mA	Specify	
4.3.7.6	Transducer burden	<2VA per CT	
4.3.7.7	Short time overload	$\geq 50$ VA	
4.3.7.8	MW Transducer		
i.	DIN rail mounting	Specify	
ii.	Connection shall be 3-Phase, 4-Wire	Specify	
iii.	Inputs 110V AC and 1Amp	Specify	
iv.	Programmable output characteristic	Specify	

v.	Output shall be 0 - $\pm 20$ mA	Specify	
vi.	Auxiliary power supply shall be 110 V AC/DC	Specify	
vii.	Relay Terminals-shall be screw type terminals large enough to accommodate at least 4mm <sup>2</sup> cable	Specify	
viii.	Screw type terminals	Specify	
ix.	Terminals indelibly marked	Specify	
4.3.7.9	MVAr Transducer		
i.	DIN rail mounting	Specify	
ii.	Connection shall be 3-Phase, 4-Wire	Specify	
iii.	Inputs 110V AC and 1Amp	Specify	
iv.	Programmable output characteristic		
v.	Output shall be 0 - $\pm 20$ mA	Specify	
vi.	Auxiliary power supply shall be 110 V AC/DC	Specify	
vii.	Relay Terminals-shall be screw type terminals large enough to accommodate at least 4mm <sup>2</sup> cable	Specify	
viii.	Screw type terminals	Specify	
ix.	Terminals indelibly marked	Specify	
4.3.7.10	Current Transducer		
i.	Input 0- 1Amp	Specify	
ii.	Output 0 – 20 mA	Specify	
iii.	Auxiliary power supply shall be 110 V AC/DC	Specify	
iv.	Relay Terminals-shall be screw type terminals large enough to accommodate at least 4 mm <sup>2</sup> cable	Specify	
<b>4.3.7.10</b>	<b>Voltage /Current/Active/Reactive Power Transducers</b>		
i.	Manufacturer		
ii.	Type		
iii.	Accuracy (at ambient temp. 0 – 50°C)	%	
iv.	Ripple (peak to peak)	%	
v.	Response time to 99 % of final value	sec.	
vi.	Input voltage	V	

vii.	Output current	mA DC.	
viii	Input		
ix	Current	A	
x	Voltage	V	
xi	Output current	mA DC.	
xii	Auxiliary voltage	V DC.	
xiii	Test voltage (input to earth)	kV	
xiv	Power consumption	VA	
xv	Module dimension	cm x cm	
xvi	DIN rail mounting	Specify	
xvii	Input 0- 110 V AC	Specify	
xviii.	Output 0 – 20 mA	Specify	
xviv.	Auxiliary power supply shall be 110V AC, separately connected.	Specify	
xx.	Relay Terminals-shall be screw type terminals large enough to accommodate at least 4mm <sup>2</sup> cable	Specify	
xxi.	Screw type terminals	Specify	
xxii	Terminals indelibly marked	Specify	
<b>4.3.8</b>	<b>MFM</b>	<b>Specify</b>	
4.3.8.1	Unit shall be of numerical design	Specify	
4.3.8.2	LCD display – Lines of measurands displayed simultaneously	≥4	
4.3.8.3	Keypad shall be simple to allow scrolling between the various measurands	Specify	
4.3.8.4	The unit shall measure instantaneous values of; rms voltage, both phase – phase and phase to ground, phase currents, active power, reactive power, apparent power, energy, frequency, power factor and phase angle per phase.	Specify	
4.3.8.5	Measurement of time stamped values		

i.	Maximum and minimum demand for current and power (MW & MVA)		Specify	
ii.	Unbalance voltage and current		Specify	
iii.	harmonic distortion(THD) and Total Demand Distortion(TDD) for current and voltage		Specify	
4.3.8.6	Input ratings	Current	1 A AC	
		Voltage	110V AC	
4.3.8.7	Continuously withstand	Current	2 A AC	
		Voltage	260V AC	
4.3.8.8	Flush mounted		Specify	
4.3.8.9	3-phase , 4-wire on the secondary current and voltage		Specify	
<b>4.3.9</b>	<b>SDH Multiplexer Panel</b>		Specify	
	Equipment Manufacturer			
	Make and Model			
	Four E1 data ports			
	Four Ethernet ports			
	Access units for P0 (64kBps), n x P0 ,E1 or n x E1 services.			
	Can support Drop/Insert features in/out of the P0 &E1			
	Can support E1 to E1 channel pass through and n x P0 cross connect between the E1's			
	STM-1 Optical aggregate up to 140 MBps			
	<b>Interfaces</b>			
	Data Rate 2.048 Mbps on E1 on 4 wire Krone Block or RJ 11 connector			
	Connector RJ-45 for Ethernet connectivity upto 100Mbps per port with VLAN configuration capability			
	FXO & FXS for 2 wire P0 (64Kbps) telephony extension from PAX			

E1 interface complies with: ITU G.703, G.704, G.706, G.732 for TDM & SDH compatibles Complies ITU Jitter G.823 & G.824		
Ethernet Range of up to 300 feet		
Timeslot assignment is programmable, allowing data from each data port and from the sub-E1 port to be placed automatically into consecutive timeslots. Alternatively, timeslots can be allocated manually, at user discretion.		
Clock source can be taken from the recovered receive clock signal, an internal oscillator, one of the data ports, or the sub-E1 port.		
<b>SFP aggregate modules (UPLINK)</b>		
Required ar per link lengths		
Minimum capacity of STM-1		
Single mode, 9/125 dual fiber, LC connector		
TX power (take into account the standard cable and splice loss for 9/125 single mode.)	Tenderer to state	
Rx sensitivity	Tenderer to state	
20 Meters Single mode patch cords with LC to FC connectors		
<b>Management:</b>		
Out-of-band via V.24 (RS232) supervisory port and IP port		
SNMP internal agent,		
Front Panel Status Display		
In band management remote access using spare bits or selected Timeslot		
Maintenance capabilities include <ul style="list-style-type: none"> <li>1. User-activated local loop backs</li> <li>2. Remote loop backs at the E1 main link, sub-E1 and data ports.</li> </ul>		

	Logging facility for E1 /Ethernet network performance monitoring and most recent alarms		
	Alarm mask configurable for any alarm		
	<b>Power Source</b>		
	Equipment shall be capable of being supplied through 240 Volts AC and -48Volts DC		
	Power Consumption by the Multiplexers	Tenderers to state	
	<b>1) Other requirements</b>		
	Rack Mountable 19 inch with mounting brackets		
	Height (Tenderers to state)		
	Depth (Tenderers to state)		
	Weight (tender to state)		
	<b>Environment</b>		
	Temperature 5°C to 50°C		
	Humidity Up to 90%, non-condensing		
	Altitude up to 3000m ASL		
	<b>Type approval &amp; Warranty</b>		
	Warranty for 1 year		
4.3.9.1	conform to the universal platform supporting TDM and packet-switched technology	Specify	
	should have modular platform ready for future expansion	Specify	
4.3.9.2	Have combined access and transport multiplexer from sub rate 64 kBit/s up to SDH TM-16.	Specify	
4.3.9.3	Full support of legacy data, voice and utility-specific interfaces	Specify	
(i)	Voice: 2/4 wire E&M, FXS, FXO, including conferencing	Specify	
(ii)	Data: V.24/V.28, V.35, V.11, RS-485, RS232/V.28, X.21, G.703 64kBit/s, E1	Specify	
(iii)	Tele protection compliant with IEC 60834-1	Specify	

(iv)	IEEE C37.94 for direct connection of differential protection relays	Specify	
(v)	Supports multiple optical fiber transmission distances	Specify	
4.3.9.4	SDH Multiplexer shall be able to do and have		
a)	Point-to-multipoint configurations for legacy SCADA protocols	Specify	
b)	Logical bridging instances for real separation of critical user data traffic	Specify	
c)	Bidirectional switching for redundant channel routing of protection signals	Specify	
d)	Optical interfaces (SFP based) up to 12 cages	Specify	
e)	Electrical interfaces from 4 – 24 ports	Specify	
f)	10/100/1000 BaseT	Specify	
g)	L2 switching and L3 routing functionality	Specify	
h)	Specific functionality for SCADA applications	Specify	
i)	Redundant CPU, Redundant power feeding, Very high MTBF	Specify	
j)	Design for the utility substation environment	Specify	
k)	User-friendly network management system	Specify	
4.3.9.5	Cubicles for SDH Multiplexer shall fulfil the following requirements		
(i)	Standard - IEC 62208	Specify	
(ii)	Standard - IEC 60529	Specify	
(iii)	indoor free standing cabinet with front door and lock	Specify	
(iv)	Ambient conditions for indoor installations only - IEC 60439-1	Specify	
(v)	standard dimensions	HxWxD) 2000 x 800 x 600 mm without side panels	Specify

	2065 x 806 x 605 mm single cubicle with side panels and eye bolts		
(vi)	Other dimensions - 2000 x 800 x 800 mm or 2000 x 600 x 600 mm	Specify	
(vii)	Can be assembled and shipped in multiple cubicle combinations of max. four cubicles, supplied with right or left opening doors	Specify	
(viii)	cabinets with structured steel, inside & outside surface colour RAL 7035	Specify	
(ix)	Have passive convection cooling via ventilation outlets in the lower and upper part of the door	Specify	
(x)	Can be supplied with a swing frame or fixed frame for installing 19" racks and modules	Specify	
(xi)	standard protection conforming to protection class IP 54	Specify	
(xii)	very good screen attenuation against electromagnetic disturbances over the entire frequency range	Specify	
(xiii)	Have power distribution and cabinet alarm system	Specify	
4.3.9.6	Enclosure frames for SDH Multiplexer shall fulfil the following requirements	Specify	
(i)	frame shall be of sturdy construction	Specify	
(ii)	hollow section frame is made of 16 times rolled steel	Specify	
(iii)	holes on the frame shall be punched in 25 mm DIN pitch pattern	Specify	
(iv)	corners shall be strengthened with welded die cast corner connectors	Specify	
(v)	accessories and internal mounting plates ensure a high degree of flexibility to integrate communication equipment	Specify	

Appendix A	TESTING & INSPECTION	State	
A.1.	Responsibility of carrying out tests		
A.2.	Acceptance tests to be witnessed by KPLC at factory before shipment	State	
A.3.	Copies of test reports shall be packaged together with the respective SCADA equipment	State	
A.4.	Copies of Type Test Reports submitted with tender	State	
A.5.	Inspection at the stores and replacement of rejected items	State	
<b>4.3.10</b>	<b>Switch Requirement</b>		
	<i>Make and Model</i>		
	Equipment Manufacturer	Tenderer to state	
	Make and Model	Tenderer to state	
	<b>Uplink – Ethernet Interface</b>		
	Minimum of two RJ45 & two SFP (single mode) Ports		
	Uplink Capacity of 10/100/1000 MBps		
	Auto – negotiation Ethernet function		
	Auto MDI/ MDIX function		
	Full/ Half Duplex select ability		
	Flow Control Functionality IEEE 802.3x		
	<b>Down Link Ethernet Interface</b>		
	Minimum of four RJ45 Connector Ports		
	Uplink Capacity of 10/100 MBps		
	Auto – negotiation Ethernet function		
	Full/ Half Duplex select ability		
	Flow Control Functionality IEEE 802.3x		
	<b>Software Functions</b>		
	Support Link Aggregation of a minimum of 2 trunk groups		

Support RSTP IEEE 802.1w standard & enabling/ disabling RSTP on each port		
Supports VLAN setup with upto 10 VLANs working simultaneously, IEEE 802.1Q VLAN standard with support also for Port based VLAN		
Supports 2 level access rights User account Management as well as role based user authentication for Telnet and SSH		
<b>Management:</b>		
RS 232 Console Port supplied complete with requisite cable		
SNMP / Ethernet Port with front panel RJ 45 connection for Telnet, SSH and/or Web based utility management		
<b>Power Source</b>		
Equipment shall be capable of being supplied through 240 Volts AC and -48Volts DC		
Power Consumption by the Uplink switches	Tenderers to state	
<b><i>Other requirements</i></b>		
Rack Mountable 19 inch with mounting brackets		
Height (Tenderers to state)		
Depth (Tenderers to state)		
Weight (tender to state)		
20 Meters Single mode patch cords with LC to FC connectors		
Requisite single mode SFP modules to achieve link		
<b>Environment</b>		
Temperature 5°C to 50°C		
Humidity Up to 90%, non-condensing		
Altitude up to 3000m ASL		
<b>Type approval &amp; Warranty</b>		
Warranty for 1 year		

	<b>Station Switch Requirement</b>		
	<b>Transmission Rate</b>		
	Transmission Rate of 10/ 100Mbps		
	<b>Interfaces</b>		
	Minimum of four RJ45 electrical Interface ports		
	<b>Management:</b>		
	RS 232 Console Port supplied complete with requisite cable		
	<b>Power Source</b>		
	Equipment shall be capable of being supplied with 48Volts DC		
	Power Consumption by the station switch		
	<i>Other requirements</i>		
	35mm DIN rail mounted		
	<b>Environment</b>		
	Minimum Temperature range of -10°C to 60°C		
	Minimum of IP 40 Ingress Protection class		
	Fanless Operating Condition		
	Heavy Duty cast aluminum enclosure or equivalent		
	<b>Type approval &amp; Warranty</b>		
	Warranty for 1 year		
<b>4.3.11</b>	<b>ADSS</b>		
	Fiber counts	48	
	Minimum Operating Load	6000 N	
	Minimum Bending Radius Installation  Long Term	20xO.D.   10xO.D.	
	Minimum. Compressive Loading	4000 N / 10 cm	
	Impact Resistance	4.4 J, 3 x 2 times	

	Twist (Torsion)	10 turns of 180° on 125xO.D.sample, both ways.	
	Storage Temperature Range	-50° C to +50° C	
	Operating Temperature Range	-40° C to +50° C	
	Core Fluid Penetration	1 m sample, 1 m water head for 24 Hrs	
	Distance Between Poles	Up to 100M	
	Warranty	15 years	
	UV Resistance		
	Outer Cable Markings	Property of Kenya Power & Lightening Company	
	Packing	Rolls for various sections to be determined by distance between section poles but not less than 1000M	
	Length marking	Every meter	
	Color of Cable	Black	
	Performance	Allowed attenuation per Km for the 9/125 micron single mode fiber optic cable 2) 1310 0.4 db/km 3) 1550 0.3 db/km	

	Fusion splice loss	Maximum allowed loss 0.1db	
	<b>ODF</b>		
	Fiber optic wall mounted ODF	Fiber optic patch panel 48 ports SM wall mounted with enclosure	
		splice tray cassette,	
		48 pigtails terminated on <b>FC</b> connectors	
		Dust proof housing & lockable with key	
Appendix B	<b>QUALITY MANAGEMENT SYSTEM</b>		
B.1.	Quality Assurance Plan (QAP)	State	
B.2.	Copy of ISO 9001:2008 Certificate	State	
B.3.	Manufacturer's experience	State	
	Manufacturing Capacity (units per month)	State	
	List of previous customers	State	
	Customer reference letters	State	
Appendix C	<b>TECHNICAL DOCUMENTATION</b>		
C.1.	Documents submitted with tender	State	
C.2.	Documents to be submitted by supplier to KPLC for approval before manufacture	State	
C.3.	No of copies of technical manuals to be provided.	State	
C.4.	Recommendations for use, care, storage and routine maintenance	Provide	
Appendix D	<b>PACKAGING AND DELIVERY</b>		
D.1.	Specify mode of packaging to be used	Specify	

D.2	Specify mode of Marking to be used	Specify	
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#### **1.6.4.2 Recommended Spare Parts**

The Tenderer shall enter in this schedule the recommended spares and its prices which he recommends for 3 years operation with individual quantities and prices

Kenya Power may order all or any of the spares so recommended at his discretion.

The prices for spare parts shall not be included in the Tender Price.

**DOCUMENT NO: KP1/13D/4/1/TSP/11/049**



**Kenya Power**

**SCADA EQUIPMENT AND ASSOCIATED ADAPTATION  
MATERIALS - SPECIFICATION**

A Document of the Kenya Power & Lighting Co. Ltd  
**February 2022**

 <b>Kenya Power</b>	<b>TITLE:</b>  <b>SCADA EQUIPMENT AND ASSOCIATED ADAPTATION MATERIALS - SPECIFICATION</b>	<b>Doc. No.</b>	KPI/13D/4/1/TSP/11/049
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#### 0.1 Circulation List

COPY NO.	COPY HOLDER
1	Manager, Standards
Electronic copy (pdf) on Kenya Power server ( <a href="http://172.16.1.40/dms/browse.php?fFolderId=23">http://172.16.1.40/dms/browse.php?fFolderId=23</a> )	

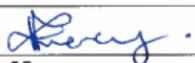
#### REVISION OF KPLC STANDARDS

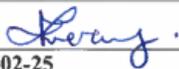
To keep abreast of progress in the industry, KPLC Standards shall be regularly reviewed. Suggestions for improvements to approved standards, addressed to the Manager, Standards department, are welcome.

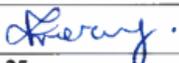
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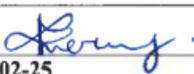
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<b>0.2 Amendment Record</b>					
<b>Rev No.</b>	<b>Date (YYYY-MM-DD)</b>	<b>Description Change</b>	<b>of</b>	<b>Prepared by (Name &amp; Signature)</b>	<b>Approved by (Name &amp; Signature)</b>
Issue 1	2022-02-15	NEW ISSUE		Eng. F. Gicugu	Eng. S. Kimiti
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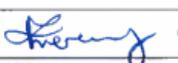
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<p><b>FOREWORD</b></p> <p>This specification has been prepared by Connectivity &amp; Turnkey projects department of Infrastructure Division in collaboration with Standards Department and lays down specification for design, manufacture and testing of SCADA equipment, and associated adaptation materials.</p> <p>This specification is intended for procurement of materials and does not include provision of contract.</p> <p>This specification stipulates the minimum requirements for SCADA equipment and adaptation materials acceptable for use in the company. The suppliers and manufacturers shall ensure adequacy of the design, good engineering practice, adherence to the specification and applicable standards and regulations as well as ensuring good workmanship in the manufacture of the equipment for The Kenya Power &amp; Lighting Company.</p> <p>The other specification(s) in this series is</p> <p><b>KP1/13D/4/1/TSP/11/048: SCADA Requirements for Olkaria II substation additional Transformer</b></p> <p>Users of these Kenya Power specifications are responsible for their correct interpretation and application.</p> <p>The following are members of the team that developed this specification.</p> <table border="1"> <thead> <tr> <th>Name</th> <th>Department</th> </tr> </thead> <tbody> <tr> <td>Eng. Nicholas Kiminda</td> <td>Turnkey/ID</td> </tr> <tr> <td>Eng. Faith Gicugu</td> <td>Standards</td> </tr> </tbody> </table>				Name	Department	Eng. Nicholas Kiminda	Turnkey/ID	Eng. Faith Gicugu	Standards
Name	Department								
Eng. Nicholas Kiminda	Turnkey/ID								
Eng. Faith Gicugu	Standards								
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<p><b>1. SCOPE</b></p> <p>1.1. This specification is for SCADA Equipment and adaptation materials necessary for integrating a substation to KPLC SCADA.</p> <p>1.2. This specification covers the following equipment: -</p> <ol style="list-style-type: none"> <li>Remote Terminal Units (RTUs)</li> <li>SDH Multiplexers</li> <li>Transducers-Current, Resistance, Multi Transducers</li> <li>Multiplication Relays</li> <li>Interposing Relays</li> <li>Multi-Function Meters (MFM)</li> <li>DIN Rails</li> </ol> <p>1.3. The specification also covers inspection and test of the equipment as well as schedule of Guaranteed Technical Particulars to be filled, signed by the supplier and submitted with the Bid for evaluation.</p> <p>1.4. The specification stipulates the minimum requirements for RTUs, SDH Multiplexers, Transducers, Multiplication Relays, Multi-Function Meters, Interposing Relays and DIN Rails.</p> <p><b>2. NORMATIVE REFERENCES</b></p> <p>The following standards contain provisions, which, through reference in this text, constitute provisions of this specification. Unless otherwise stated, the latest edition of the referenced documents (including any amendments) applies.</p> <table border="0"> <tr> <td>IEC 60870-5:</td> <td>SCADA –Telecontrol equipment and systems, Transmission protocols and Network access</td> </tr> <tr> <td>IEC 60870:</td> <td>Telecontrol equipment and System- Equipment compatibility with ISO and ITU-Equipment performance</td> </tr> <tr> <td>IEC 60617: IEC 81346:</td> <td>Graphical symbols for use in electrotechnical diagrams Installations and Equipment - Structuring Principals and reference designations</td> </tr> <tr> <td>IEC 61850:</td> <td>Communication Protocols for Intelligent Electronic Devices(IEDs) at an Electrical substation</td> </tr> <tr> <td>IEC 60255-5:</td> <td>Requirement and tests -Electrical Relays insulation coordination.</td> </tr> <tr> <td>IEC 60688:2021</td> <td>Transducers-Converting AC/DC values to Analog/Digital values</td> </tr> </table>				IEC 60870-5:	SCADA –Telecontrol equipment and systems, Transmission protocols and Network access	IEC 60870:	Telecontrol equipment and System- Equipment compatibility with ISO and ITU-Equipment performance	IEC 60617: IEC 81346:	Graphical symbols for use in electrotechnical diagrams Installations and Equipment - Structuring Principals and reference designations	IEC 61850:	Communication Protocols for Intelligent Electronic Devices(IEDs) at an Electrical substation	IEC 60255-5:	Requirement and tests -Electrical Relays insulation coordination.	IEC 60688:2021	Transducers-Converting AC/DC values to Analog/Digital values
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<p>IEC 60255-22-4      Electrical fast transient/burst immunity test</p> <p>IEC 60332-3      Electric and optical fibre cables under fire conditions</p> <p>IEC 60793      Specifications for both multimode and single-mode optical fibres.</p> <p>ITU-T G.655      Geometrical, mechanical, and transmission attributes of a single-mode optical fibre and cable</p> <p>ANSI/EIA 359-A IEC 60304      Colours for colour Identification and coding</p> <p>IEC 60793-1      Establishes uniform requirements for measuring the attenuation of optical fibre</p> <p>ITU G.703, G.704, G.706, G.732      E1 interface compliance-Multiplexing Equipment characteristics</p>			
<p><b>3. DEFINITIONS AND ABBREVIATIONS</b></p> <p>For the purpose of this specification, the definitions and abbreviations given in the reference standards shall apply together with the following:</p>			
<p><b>3.1. ABBREVIATIONS</b></p> <p>IEC – International Electro technical Commission</p> <p>ISO – International Organization for Standardization</p> <p>OSHA - Occupational Safety and Health Act</p> <p>ASTM - American Society for Testing and Materials</p> <p>CFM - Cubic feet per minute</p> <p>ANSI - American National Standards Institute</p> <p>ITU - International Telecommunication union</p> <p>KPLC - Kenya Power and Lighting PLC</p>			
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<p><b>4. REQUIREMENTS</b></p> <p><b>4.1. SERVICE CONDITIONS</b></p> <p><b>4.1.1. Physical conditions</b></p> <p>4.1.1.1. The equipment shall be tropicalized, designed and constructed for continuous indoor operation in areas with the following atmospheric conditions: -</p> <table> <tr> <td>Maximum ambient temperature:</td> <td>+40° C</td> </tr> <tr> <td>Minimum ambient temperature:</td> <td>-1° C</td> </tr> <tr> <td>Daily average ambient temperature:</td> <td>+30° C</td> </tr> <tr> <td>Relative Humidity (%):</td> <td>95%</td> </tr> <tr> <td>Altitude above sea level (meters):</td> <td>2200 m</td> </tr> <tr> <td>Isockeraunic level (days/year.):</td> <td>180 thunderstorm days per year</td> </tr> <tr> <td>Induced electromagnetic disturbance:</td> <td>1.6 kV</td> </tr> <tr> <td>Pollution class:</td> <td>“Very Heavy” (Level IV), “Heavy” (Level III) as per IEC/TS 60815</td> </tr> <tr> <td>Seismic Zone:</td> <td>Zone V, as per IEEE 693</td> </tr> </table> <p><b>4.1.2. Safety and environmental requirements</b></p> <p>4.1.2.1. The equipment shall be designed and manufactured in accordance with IEC 601010-1 and OIML D 11 safety and environmental standard requirements such that:</p> <ol style="list-style-type: none"> <li>Their errors do not exceed the maximum permissible errors under rated operating conditions.</li> <li>When they are exposed to disturbances, either: <ol style="list-style-type: none"> <li>Significant faults shall not occur, or</li> <li>Significant faults shall be detected and corrected by means of inbuilt checking facility.</li> </ol> </li> </ol> <p>4.1.2.2. Software controlled equipment that are complex in their functionality shall require that the user is guided for the correct use and for achieving correct measurement results.</p> <p>4.1.2.3. The manufacturer shall specify the limiting conditions; storage and transport conditions for each specified influence quantity - quantity which is not the subject of the measurement and whose change affects the relationship between the indication and the result of the measurement.</p> <p>4.1.2.4. Measuring equipment shall have a valid calibration status prior to being confirmed, within a specified metrological requirement.</p> <p><b>4.2. GENERAL REQUIREMENTS</b></p> <p>4.2.1. Panels, cubicles and marshalling racks shall generally be free standing and shall be constructed of folded sheet steel of adequate thickness to provide rigid support for the control and monitoring equipment which shall be mounted thereon.</p>				Maximum ambient temperature:	+40° C	Minimum ambient temperature:	-1° C	Daily average ambient temperature:	+30° C	Relative Humidity (%):	95%	Altitude above sea level (meters):	2200 m	Isockeraunic level (days/year.):	180 thunderstorm days per year	Induced electromagnetic disturbance:	1.6 kV	Pollution class:	“Very Heavy” (Level IV), “Heavy” (Level III) as per IEC/TS 60815	Seismic Zone:	Zone V, as per IEEE 693
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<p><b>4.2.2.</b> Panels shall be mounted on channel base frames, which shall provide a toe recess. Panels and cubicles designed for personnel access shall be provided with metal floors and shall be suitably ventilated. Doors shall be provided with a lock, which may be opened by a person within the panel without the use of a key. It shall be possible to open all panels associated with one unit by the use of one master key. Adequate lighting and power points for hand tools shall be provided.</p> <p><b>4.2.3.</b> The overall height of cubicles and racks housed in the relay room shall not exceed 2.20m. The Panel shall be powder coated, pebble grey RAL-7035 Colour. Thickness of the coating shall be <math>\geq 80</math> microns.</p> <p><b>4.2.4.</b> Cable connections to panels and cubicles shall be equipped with suitable seals to prevent rodents and ingress. Cable plates shall be factory drilled, but blocked with removable stoppers, easily knocked off at site</p> <p><b>4.2.5.</b> Cubicles shall be provided with thermostatically controlled heating elements. Each thermostat shall have an adjustable set point, which can be adjusted to an appropriate value to achieve adequate heating of the panel in order.</p> <p><b>4.3. DESIGN AND CONSTRUCTION</b></p> <p><b>4.3.1. Power supplies and fusing</b></p> <p><b>4.3.1.1.</b> Fuse ratings and time characteristics shall be such that in all cases a fault within an individual item or module will cause the fuse associated with that item, to rupture and thus disconnect that item from the power supply, before the main fuse is affected.</p> <p><b>4.3.1.2.</b> The design of the electrical power supplies and fusing system shall ensure that any faults in modules or other devices, which may block sequence logic interlocks, automatic control systems or other control systems are restricted to the system in which the fault has occurred.</p> <p><b>4.3.1.3.</b> Binary signal conditioning and analogue limit value modules shall be fused separately, but may also be fused with the corresponding drive control of the drive control level as long as the signals are used only for remote and logic controls (interlocking, protection) of the drive concerned.</p> <p><b>4.3.2. Indicators and Electronic Equipment</b></p> <p><b>4.3.2.1.</b> All indicators for mounted on control desks and panels shall for flush mounting. The minimum size for indicators shall be:</p> <ul style="list-style-type: none"> <li>• non-urgent indicators 96 x 96 mm</li> <li>• important indicators 144 x 144 mm</li> <li>• mimic diagrams 48 x 48 mm.</li> </ul> <p><b>4.3.2.2.</b> Indicators for mounting on local gauge boards shall be of circular type and shall have a minimum case diameter of 160 mm. All local indicators shall be housed in robust dust and moisture proof cases suitable for open-air installation.</p> <p><b>4.3.2.3.</b> The read-out window for indicators, recorders and similar equipment shall be non-reflecting, anti-static and minimize parallax errors.</p>			
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<p>4.3.2.4. Where possible, plug-in type printed circuit boards shall be used. External connections to the boards shall be by plug and socket connection. All electronic components, including integrated circuits, transistors, resistors, capacitors and inductors shall be selected in order to ensure long life and stable operation. Indication lamps used in conjunction with electronic circuits shall be light emitting diodes.</p> <p>4.3.2.5. All relay equipment shall use modern plug-in type circuit boards, containing standard type miniature relays, which can be plugged- in and easily replaced on sockets on the circuit boards. Only a few types of standard relays shall be used. All relays shall be of the encapsulated type. For time relays, transistorized relays shall be used. Time-setting shall be effected by means of setting knobs on the front panel.</p> <p>4.3.2.6. Switches for mounting in the control panels shall be of the miniature or sub-miniature type. The function of the pushbutton shall be clearly shown. Discrepancy switches or pushbuttons shall be provided for the operation of switchgear and the initiation of drives. Discrepancies between the switch position and the plant state shall be indicated by an integral light, which shall illuminate the switch in a flashing mode of operation.</p> <p>4.3.2.7. Indicating instruments having maximum and/or minimum contacts shall not be used for any main system. All surfaces used for electrical contacts shall be silver, gold or silver alloy.</p> <p>4.3.2.8. The connection between low-voltage electronic control circuits and power circuits shall consist of interposing relays for linking the two systems. All relays have to be of the encapsulated type.</p> <p><b>4.3.3. Remote Terminal Units(RTUs) Panel</b></p> <p>4.3.3.1. The RTU shall have galvanic isolation of all signals from process to RTU through interposing relays.</p> <p>4.3.3.2. The RTU shall accommodate process signals from Analogue and digital transducers</p> <p>4.3.3.3. Based on the present and future functional requirements, the RTU shall include the following tele information plan for the SCADA in stations.</p> <ol style="list-style-type: none"> <li>a) single command outputs, double command outputs</li> <li>b) regulation command outputs e.g. raise/lower command outputs for transformer tap changer control</li> <li>c) analogue set point transmission and output</li> <li>d) single, double and multiple state digital inputs</li> <li>e) analogue measured inputs</li> <li>f) metering pulse inputs for acquisition of energy meter values</li> <li>g) Sequential Event Recording (SER) with time stamping of events at the RTU</li> <li>h) RTU time synchronization</li> <li>i) Self-testing and diagnostic functions for detection and reporting of any error</li> <li>j) automatic re-starting function</li> <li>k) Database and parameter setting by menu-controlled dialogues from a local PC and remotely from the corresponding control centre with downloading function.</li> <li>l) Support encryption and LAN/WAN access</li> <li>m) Shall support IEC 61850 protocol for process communication</li> </ol>			
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<p>4.3.3.4. Each individual RTU to be supplied shall be fully equipped for the actual amount of data to be acquired and commands to be executed plus a spare capacity of 25% for each type of data. In addition, each RTU shall be expandable in the field by at least 50% of the size of the initial point capacity by addition of Input and Output cards only. The addition of enclosures, internal cabling/wiring, chassis, or power supplies shall not be necessary when adding these I/O cards.</p> <p>4.3.3.5. The RTU shall be accessible through the communication network for the Supervisory Control &amp; Data Acquisition (SCADA) System at the National Control Centre (NCC) and Regional Control Centres (RCC) to scan.</p> <p>4.3.3.6. Plug-in type relays shall be used with sockets directly mounted on a DIN rail. All necessary arrangements must be made so that the plugging – in and out are easy and performed without any risk of damaging of relay parts.</p> <p><b>4.3.4. RTU firmware requirements</b></p> <p>4.3.4.1. The RTUs shall meet the following characteristics of the firmware to support the functions of the RTUs.</p> <ul style="list-style-type: none"> <li>(i) The RTU shall have standard firmware.</li> <li>(ii) All firmware shall be completely and consistently documented.</li> <li>(iii) It shall not be necessary to perform modification to firmware, logic, or data for expansion within the sizing parameters defined for the RTU.</li> <li>(iv) Firmware shall be loadable by service notebook locally at minimum, download of firmware and parameter sets through SCADA system, using the data communication links.</li> <li>(v) Changing of EPROMs or similar devices shall not be necessary when updating RTUs firmware.</li> </ul> <p><b>4.3.5. Enclosures Requirements</b></p> <p>4.3.5.1. Swing racks supported by heavy gauge hinges such that only front access to components and wiring is required for routine maintenance and troubleshooting.</p> <p>4.3.5.2. Provisions for top and bottom cable entry. Cable entries shall be provided with protection against insect and animal entry, and sealed to prevent dust and sand contamination.</p> <p>4.3.5.3. Protection class of the enclosures shall be for indoor cabinets IP52 minimum and for outdoor cabinets IP64 minimum.</p> <p>4.3.5.4. Suitable signal and safety ground networks within the enclosure.</p> <p>4.3.5.5. Convenience outlets at 230 V AC, shall be provided.</p> <p>4.3.5.6. DC Power supply</p> <ul style="list-style-type: none"> <li>a) Any hardware required to convert the 48 V battery voltage to the required internal voltages for the RTU hardware shall be provided and adequate.</li> <li>b) The RTUs shall be capable of operating with ungrounded or grounded (either polarity) input power.</li> </ul> <p>4.3.5.7. Dielectric strength shall be 2.5kV, 50 Hz-1 min between one circuit and the earthing point and between independent circuits. Impulse test voltage: &gt;2.5 kV (IEC 60255-5).</p> <p><b>4.3.6. Interposing Relays</b></p> <p>The relays shall be installed in the switch / control gear and shall have the following characteristics:</p>			
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<p>4.3.6.1. For tele commands:</p> <p>a) Coil voltage shall be 48 VDC; Coil voltage variation shall be <math>\pm 20\%</math>.</p> <p>b) Signal voltage on the contact circuit shall normally be 110 VDC</p> <p>c) The rated contact current shall be minimum 5ADC making/breaking.</p> <p>4.3.6.2. For tele indications:</p> <p>a) Coil voltage shall normally be 110 VDC; (other voltages may also exist) coil voltage variation shall be <math>\pm 20\%</math>.</p> <p>b) Signal voltage on the contact circuit shall be 48 VDC.</p> <p>c) The rated contact current shall be minimum 3A DC making/breaking and 1A continuously</p> <p>4.3.6.3. The interposing relays shall have two (2) normally open and two (2) normally closed contacts. Contact bounce shall be less than 8ms and contact age shall be 10 exp. 6 operations.</p> <p>4.3.6.4. The relays shall be fitted with a visual operation indicator (either mechanical or LED).</p> <p><b>4.3.7. Transducers</b></p> <p>4.3.7.1. The digital programmable transducers shall measure electrical parameters including current, voltage, active power, reactive power, apparent power, frequency and power factor.</p> <p>4.3.7.2. They shall have up to four programmable analogue outputs, two digital outputs and RS-485 Modbus functionality.</p> <p>4.3.7.3. All the outputs shall be programmed via easy-to-use software compliant with IEC 60688 and have galvanically isolated outputs with the following characteristics in table 1.</p>																																																									
<p align="center"><b>Table 1: Characteristics of the digital programmable transducers</b></p> <table border="1"> <thead> <tr> <th>a.</th> <th>Measurement :</th> <th>Minimum requirement</th> </tr> </thead> <tbody> <tr> <td></td> <td>Accuracy</td> <td>Class 0.2, Class 0.5</td> </tr> <tr> <td></td> <td>Main frequency</td> <td>45- 65 Hz</td> </tr> <tr> <td>b.</td> <td><b>Voltage Circuit:</b></td> <td></td> </tr> <tr> <td></td> <td>Nominal measuring voltage (Un)</td> <td>3×100-693 V (three-wire system) 3×57.7/100 V to 3×400/693 V (four-wire system)</td> </tr> <tr> <td>c.</td> <td><b>Current Circuit:</b></td> <td></td> </tr> <tr> <td></td> <td>Nominal measuring current (In)</td> <td>1-5 A</td> </tr> <tr> <td>d.</td> <td><b>Transducer Supply:</b></td> <td></td> </tr> <tr> <td></td> <td>Nominal voltage</td> <td>40-120 DC</td> </tr> <tr> <td>e.</td> <td><b>Communication Ports:</b></td> <td></td> </tr> <tr> <td></td> <td><b>Serial USB port</b></td> <td></td> </tr> <tr> <td></td> <td>Connector</td> <td>USB Mini-B connector</td> </tr> <tr> <td></td> <td>Com. protocol</td> <td>Modbus RTU</td> </tr> <tr> <td></td> <td>Baud rate</td> <td>38400 baud (auto)</td> </tr> <tr> <td></td> <td>Or</td> <td></td> </tr> <tr> <td></td> <td><b>Serial RS485 port</b></td> <td></td> </tr> <tr> <td></td> <td>Connector</td> <td>Three screw terminals for <math>\leq 6 \text{ mm}^2</math></td> </tr> <tr> <td></td> <td>Com. Protocol</td> <td>Modbus RTU</td> </tr> </tbody> </table>				a.	Measurement :	Minimum requirement		Accuracy	Class 0.2, Class 0.5		Main frequency	45- 65 Hz	b.	<b>Voltage Circuit:</b>			Nominal measuring voltage (Un)	3×100-693 V (three-wire system) 3×57.7/100 V to 3×400/693 V (four-wire system)	c.	<b>Current Circuit:</b>			Nominal measuring current (In)	1-5 A	d.	<b>Transducer Supply:</b>			Nominal voltage	40-120 DC	e.	<b>Communication Ports:</b>			<b>Serial USB port</b>			Connector	USB Mini-B connector		Com. protocol	Modbus RTU		Baud rate	38400 baud (auto)		Or			<b>Serial RS485 port</b>			Connector	Three screw terminals for $\leq 6 \text{ mm}^2$		Com. Protocol	Modbus RTU
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	Baud rate	1200 – 38400 baud
f.	<b>Digital outputs:</b>	
	Number of outputs	2
g.	<b>Analogue outputs:</b>	
	Number of outputs	4
	Type	current/voltage bi-polar
	Max voltage (open output)	±20V
	Range/load (current output)	±20mA, ±5mA, ±2mA

4.3.7.4. Transducers shall comply with the following requirements:

- Accuracy of the measurements for MW, MVAR, voltages shall be better than 0.5% of full scale over a temperature of 0 to 50 °C
- Maximum ripple shall not exceed 2% peak to peak.
- Response time to 99% of final value shall not exceed 0.5 sec.

4.3.7.5. The analogue output of the transducers inputs to the RTU shall be isolated, polar or bipolar, 2 – wire Load independent DC current of 0 to isolated, polar 10 mA, or ±10 mA or 4-20mA

4.3.7.6. Transducer burdens shall not exceed 2 VA per PT element and 2 VA per CT element. The contractor shall provide calculations of the additional burden imposed by the transducer and the associated wiring / cabling for each transducer installed under the project during the detailed design stage of the project.

4.3.7.7. Transducers shall be able to withstand a short period (1 second) overload to 50 A without damage and have a withstand voltage of 4 kV/50 Hz/ 1 min and 5 kV/1.2/50 μs, according to IEC 60255-4 C1. III

4.3.7.8. MW Transducer

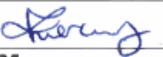
The Transducer shall have the following features: -

- DIN rail mounting
- Connection shall be 3-Phase, 4-Wire
- Inputs 110V AC and 1Amp
- Programmable output characteristic
- Output shall be 0 - ±20 mA
- Auxiliary power supply shall be 110 V AC/DC
- Relay Terminals-shall be screw type terminals large enough to accommodate at least 4mm<sup>2</sup> cable
- Screw type terminals
- Terminals indelibly marked

4.3.7.9. MVAR Transducer

The Transducer shall have the following features: -

- DIN rail mounting
- Connection shall be 3-Phase, 4-Wire
- Inputs 110V AC and 1Amp
- Programmable output characteristic
- Output shall be 0 - ±20 mA

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<p>vi. Auxiliary power supply shall be 110 V AC/DC</p> <p>vii. Relay Terminals-shall be screw type terminals large enough to accommodate at least 4mm<sup>2</sup> cable</p> <p>viii. Screw type terminals</p> <p>ix. Terminals indelibly marked</p> <p>4.3.7.10. Current Transducer</p> <p>The Transducer shall have the following features: -</p> <p>i. Input 0- 1Amp</p> <p>ii. Output 0 – 20 mA</p> <p>iii. Auxiliary power supply shall be 110 V AC/DC</p> <p>iv. Relay Terminals-shall be screw type terminals large enough to accommodate at least 4 mm<sup>2</sup> cable</p> <p>4.3.7.11. Voltage Transducer</p> <p>The Transducer shall have the following Features:</p> <p>i. DIN rail mounting</p> <p>ii. Input 0- 110 V AC</p> <p>iii. Output 0 – 20 mA</p> <p>iv. Auxiliary power supply shall be 110 V AC, separately connected.</p> <p>v. Relay Terminals-shall be screw type terminals large enough to accommodate at least 4mm<sup>2</sup> cable</p> <p>vi. Screw type terminals</p> <p>vii. Terminals indelibly marked</p> <p><b>4.3.8. Multi-Functional Meter (MFM)</b></p> <p>4.3.8.1.This is a power measurement meter for panel mounting. The unit shall be of numerical design</p> <p>4.3.8.2.The unit shall have a large LCD display for displaying four (4) or more lines of measurands simultaneously.</p> <p>4.3.8.3.The keypad shall be simple to allow scrolling between the various measurands.</p> <p>4.3.8.4.The unit shall measure instantaneous values of; rms voltage, both phase – phase and phase to ground, phase currents, active power, reactive power, apparent power, energy, frequency, power factor and phase angle per phase.</p> <p>4.3.8.5.The Unit shall measure time stamped values of the following parameters</p> <p>i. Maximum and minimum demand for current and power (MW &amp; MVA)</p> <p>ii. Unbalance voltage and current</p> <p>iii. Total harmonic distortion(THD) and Total Demand Distortion(TDD) for current and voltage</p> <p>4.3.8.6.The unit shall have the following input ratings, 1Amps and 110V AC phase to phase.</p> <p>4.3.8.7.The unit shall be able to continuously withstand 2Amps and 260 V AC</p> <p>4.3.8.8.The unit shall be for flush mounting on the front of the panel</p> <p>4.3.8.9.The unit shall be for 3 phases, 4 –wire connection on the secondary of current and voltage transformers.</p>			
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<p><b>4.3.9. SDH Multiplexer Panel</b></p> <p>4.3.9.1. The equipment shall conform to the universal platform supporting TDM and packet-switched technology. It should have modular platform ready for future expansion</p> <p>4.3.9.2. The unit shall have combined access and transport multiplexer from sub rate 64 kBit/s up to SDH TM-16.</p> <p>4.3.9.3. Full support of legacy data, voice and utility-specific interfaces</p> <ul style="list-style-type: none"> <li>(i) Voice: 2/4 wire E&amp;M, FXS, FXO, including conferencing functionality</li> <li>(ii) Data: V.24/V.28, V.35, V.11, RS-485, RS232/V.28, X.21, G.703 64kBit/s, E1</li> <li>(iii) Tele protection compliant with IEC 60834-1</li> <li>(iv) IEEE C37.94 for direct connection of differential protection relays.</li> <li>(v) Supports multiple optical fiber transmission distances</li> </ul> <p>4.3.9.4. The SDH Multiplexer shall be able to do and have</p> <ul style="list-style-type: none"> <li>a) Point-to-multipoint configurations for legacy SCADA protocols</li> <li>b) Logical bridging instances for real separation of critical user data traffic</li> <li>c) Bidirectional switching for redundant channel routing of protection signals.</li> <li>d) Optical interfaces (SFP based) up to 12 cages</li> <li>e) Electrical interfaces from 4 – 24 ports</li> <li>f) 10/100/1000 BaseT</li> <li>g) L2 switching and L3 routing functionality</li> <li>h) Specific functionality for SCADA applications</li> <li>i) Redundant CPU, Redundant power feeding, Very high MTBF.</li> <li>j) Design for the utility substation environment</li> <li>k) User-friendly network management system</li> </ul> <p>4.3.9.5. Cubicles for SDH Multiplexer shall fulfil the following requirements: -</p> <ul style="list-style-type: none"> <li>a) IEC 62208 - General requirement empty enclosures for low-voltage switchgear and control gear assemblies</li> <li>b) IEC 60529 - Protection degrees provided for enclosures</li> <li>c) Are indoor free standing cabinet with front door and lock</li> <li>d) Ambient conditions for indoor installations only - IEC 60439-1</li> <li>e) Have the standard dimensions (HxWxD) 2000 x 800 x 600 mm without side panels (2065 x 806 x 605 mm single cubicle with side panels and eye bolts)</li> <li>f) Are also available in other dimensions: 2000 x 800 x 800 mm or 2000 x 600 x 600 mm</li> <li>g) Can be assembled and shipped in multiple cubicle combinations of max. four cubicles, supplied with right or left opening doors</li> <li>h) Are cabinets with structured steel, inside &amp; outside surface colour RAL 7035</li> <li>i) Have passive convection cooling via ventilation outlets in the lower and upper part of the door</li> <li>j) Can be supplied with a swing frame or fixed frame for installing 19" racks and modules</li> <li>k) Have standard protection conforming to protection class IP 54</li> <li>l) Offer a very good screen attenuation against electromagnetic disturbances over the entire frequency range thanks to their optimum electrical contacts of all individual parts</li> </ul>			
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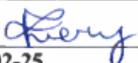
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<p>m) Have power distribution and cabinet alarm system</p> <p>4.3.9.6. Enclosure frames for SDH Multiplexer shall fulfil the following requirements: -</p> <p>(i) Enclosure frame shall be of sturdy construction.</p> <p>(ii) The hollow section frame is made of 16 times rolled steel. The holes on the frame shall be punched in 25 mm DIN pitch pattern. All the edges of the frame shall be rounded. The corners shall be strengthened with welded die cast corner connectors.</p> <p>(iii) The accessories and internal mounting plates ensure a high degree of flexibility to integrate communication equipment. 19" racks and modules can be mounted either on the swing frame or on dedicated fix frame profiles. In both cases, doors at the front and/or at the rear give access to the wiring.</p> <p><b>4.3.10. Din Rail</b></p> <p>4.3.10.1. DIN rail shall be made of brass cold rolled carbon steel sheet with zinc plated/brass finish</p> <p>4.3.10.2. Shall have 18 x M6 slots pitched at 25 mm interval</p> <p>4.3.10.3. Suitable for mounting miniature circuit breakers, terminal blocks, pin relays and contactors</p> <p>4.3.10.4. Shall be 35 mm wide and have a 7.5mm depth, with overall length of 2metres.</p> <p>4.3.10.5. Short circuit capacity shall be 80Amps</p> <p>4.3.10.6. Conforms to BS 5584 Standards and EN50022 standard</p> <p><b>APPENDIX A: TESTING &amp; INSPECTION</b></p> <p>A1. The manufacturers shall carry out all the routine tests of the SCADA equipment on offer at the factory. The tests equipment shall be inspected and tested in accordance with the requirements of IEC 60870-5, IEC61255 and this specification. It shall be the responsibility of the manufacturer to perform or to have performed all the tests specified.</p> <p>A.2. Copies of test reports shall be packaged together with the respective SCADA equipment before delivery to KPLC.</p> <p>A.3. Copies of previous type test Reports for the SCADA equipment issued by third party testing laboratory that is accredited to ISO/IEC 17025 shall be submitted with the tender for the purpose of technical evaluation. The accreditation certification for the third party laboratory shall also be submitted with the tender (all in English Language).</p> <p>A.4. The SCADA Accessories shall be subject to acceptance tests at the manufacturer's works before dispatch. Acceptance tests shall be witnessed by two Engineers appointed by The Kenya Power and Lighting Company Plc (KPLC).</p> <p>A5. The SCADA equipment shall be inspected at the store upon delivery. Upon inspection at the store, the supplier shall replace any equipment, which fail to meet any of the requirements during inspection/test.</p> <p><b>APPENDIX B: QUALITY MANAGEMENT SYSTEM (NORMATIVE)</b></p> <p>B.1. The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the Equipment design, material, workmanship, tests, service capability, maintenance and</p>			
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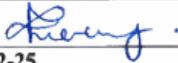
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<p>documentation, will fulfil the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfil the requirements of ISO 9001:2015.</p> <p>B.2. The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications, including copy of valid and relevant ISO 9001: 2015 certificate, shall be submitted with the tender for evaluation.</p> <p>B.3. The manufacturer shall indicate the delivery time of the equipment; manufacturer's monthly &amp; annual production capacity and experience in the production of the type and size of items being offered. A detailed list &amp; contact addresses (including e-mail) of the manufacturer's previous customers for similar type of items sold in the last five years as well as reference letters from at least four of the customers shall be submitted with the tender for evaluation.</p> <p><b>APPENDIX C: TECHNICAL DOCUMENTATION (NORMATIVE)</b></p> <p>C.1. The bidder shall submit its tender complete with technical documents required for tender evaluation. The technical documents to be submitted (all in English language) for tender evaluation shall include the following:</p> <ol style="list-style-type: none"> <li>Fully-filled clause by clause Guaranteed Technical Particulars (GTPs)- Appendix D - stamped and signed by the manufacturer.</li> <li>Copies of the Manufacturer's catalogues, brochures, drawings and technical data for the equipment;</li> <li>Details of the manufacturer's experience; Sales records for the last five years and at least four customer reference letters.</li> <li>Copies of previous test certificates and test reports (As given in Clause A.2) by the relevant International or National Testing/Standards Authority of the country of manufacture (or ISO/IEC 17025 accredited independent laboratory) shall be submitted with the offer for evaluation. A copy of accreditation certificate for the laboratory shall also be submitted (all in English Language);</li> <li>Marking &amp; Packaging details (including packaging materials).</li> </ol> <p>C.2. The successful bidder (supplier) shall submit the following documents/details to The Kenya Power &amp; Lighting Company for approval before manufacture:</p> <ol style="list-style-type: none"> <li>Fully filled clause by clause Guaranteed Technical Particulars (GTPs) stamped and signed by the manufacturer (<b>these are not the ones submitted with the tender</b>);</li> <li>Technical details and design drawings of the equipment to be manufactured for KPLC.</li> </ol>			
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<p>c) Quality assurance plan (QAP) that will be used to ensure that the design, material; workmanship, tests, service capability, maintenance and documentation will fulfil the requirements stated in the contract documents, standards, specifications and regulations.</p> <p>d) Detailed test program to be used during factory testing;</p> <p>e) Marking details and method to be used in marking the equipment</p> <p>f) Manufacturer's undertaking to ensure adequacy of the design, good engineering practice, adherence to the specification and applicable standards and regulations as well as ensuring good workmanship in the manufacture of the equipment for The Kenya Power &amp; Lighting Company;</p> <p>g) Packaging details (including packaging materials).</p> <p>C.3. Each equipment package shall be supplied with detailed user's manual printed in English language to Kenya Power stores. All information shall be unambiguous. All documentation necessary for safety of the equipment as specified in IEC 61010-1 clause 5.4 shall be provided with the equipment.</p> <p>C.4. The supplier shall submit recommendations for use, care, storage and routine inspection/testing procedures, all in the English Language, during the installation of the Equipment.</p> <p><b>APPENDIX D: PACKAGING AND DELIVERY</b></p> <p><b>D.1. PACKING</b></p> <p>(i) Each item shall be packed properly or protected for shipment from the place of manufacture to the KPLC store or designated installation site.</p> <p>(ii) Each crate of package shall contain a packing list in a waterproof envelope and a copy in triplicate shall be forwarded to KPLC prior to dispatch. All items of material shall be clearly marked for easy identification against the packing list.</p> <p>(iii) All cases, packages, etc., shall be clearly marked on the outside to indicate the total weight, to show where the weight is bearing and the correct position of the slings and shall bear an identification mark relating them to the appropriate shipping documents.</p> <p>(iv) All Accessories necessary for mounting the Relays, Instruments and Control Devices on to the panels, for terminations of cables or for labelling of LED indications shall be provided with the Relays, Instruments and Control Devices.</p> <p><b>D.2. MARKING</b></p> <p>D.2.1 All equipment shall be permanently marked with a manufactures trademark and a serial number on a top part of the equipment for traceability in English Language. The following information shall be indelibly marked on each equipment: -</p> <p>a) Manufacturer's name and / or Logo</p> <p>b) Equipment type reference number</p> <p>c) The standard of manufacture (IEC 60885-1, IEC 60832, IEC 61235, ASTM F711-02, OSHA Regulation 1910.269: Part J)</p>			
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- d) Words **“PROPERTY OF KPLC”**.
- D.2.2 The packaging shall be marked as detailed below.
- (a) Consignee: THE KENYA POWER & LIGHTING CO. LTD.
  - (b) Name of Project: PROTECTIVE RELAYS AND CONTROL DEVICES AND INSTRUMENTS FOR PROJECTS
  - (c) Contract No.: .....
  - (d) Port of destination: .....
  - (e) Item Number, Package number and quantity per package: .....
  - (f) Description of Contents: .....
  - (g) Net and gross weight, cubic measure: .....

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<p align="center"><b>APPENDIX E: GUARANTEED TECHNICAL PARTICULARS (GTPS)</b></p> <p align="center"><i>(to be filled and signed by the <u>Manufacturer</u> and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records, four customer reference letters, the manufacturer's experience and copies of complete type test reports for tender evaluation, all in English Language)</i></p> <p><b>Tender No.</b> .....</p>			
<b>CLAUSE NO.</b>	<b>CLAUSE REQUIREMENTS</b>	<b>KPLC REQUIREMENTS</b>	<b>MANUFACTURER/SUPPLIERS OFFER</b>
	Manufacturers Name and address	State	
	Country of Manufacture	State	
	Bidder's Name and address	State	
1	<b>Scope</b>	Specify	
2	Terms and definitions	Specify	
3	Applicable standard(s)	State	
4	<b>REQUIREMENTS</b>		
4.1	<b>SERVICE CONDITIONS</b>	Specify	
4.1.2	Physical conditions	Specify	
4.1.2	Safety and environmental requirements	State compliance	
4.2	<b>GENERAL REQUIREMENTS</b>		
4.2.1	Free standing Panels, cubicles and marshalling racks, constructed from folded sheet steel of adequate thickness	Specify	
4.2.2	Panels and cubicles designed for personnel access shall be provided with metal floors and shall be suitably ventilated. Doors shall be provided with a lock, which may be opened by a person within the panel without the use of a key.	Specify	
	It shall be possible to open all panels associated with one unit by the use of one master key	Specify	
	Adequate lighting and power points for hand tools shall be provided	Specify	
4.2.3	overall height of cubicles and racks	≤2.20 metres	
	Powder coated, pebble grey colour RAL-7035	State	
	Thickness of powder coating	≥80 microns	
4.2.4	Cable connections shall be equipped with suitable seals to prevent rodents and ingress	Specify	
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	Cable plates shall be factory drilled, but blocked with removable stoppers, easily knocked off at site	Specify	
4.2.5	Cubicles shall be provided with thermostatically controlled heating elements	Specify	
	Adjustable set point for thermostat	Specify	
<b>4.3</b>	<b>DESIGN AND CONSTRUCTION</b>		
<b>4.3.1</b>	<b>Power Supplies and fusing</b>		
4.3.1.1-4.3.1.5	Specify all compliance requirements in these clauses	Specify	
<b>4.3.2</b>	<b>Indicators and Electronic Equipment</b>		
	Control desk Indicators	flush mounting	
4.3.2.1	Minimum sizes of indicators (mm)	Non-urgent indicators	96 x 96
		Important indicators	144 x 144
		Mimic diagrams	48 x 48
4.3.2.2	Local gauge boards desk Indicators	Circular type	
	Minimum case diameter (mm)	160	
4.3.2.3	The read-out window for indicators, recorders and similar equipment shall be non-reflecting, anti-static and minimize parallax errors	Specify	
	Use of pug-in type printed circuit boards	Specify	
4.3.2.4	All electronic components, including integrated circuits, transistors, resistors, capacitors and inductors shall be selected in order to ensure long life and stable operation	Specify	
	Indication lamps used in conjunction with electronic circuits shall be light emitting diodes	Specify	
4.3.2.5	All relay equipment shall use modern plug-in type circuit boards, containing standard type miniature relays, which can be plugged-in and easily replaced on sockets on the circuit boards.	Specify	
	relays shall be of the encapsulated type	Specify	
	transistorized relays for time relays, with setting knobs for time setting	Specify	
4.3.2.6	Switches for mounting in the control panels shall be of the miniature or sub-miniature type	Specify	
	Provide discrepancy switches or push buttons	Specify	
	Discrepancies between the switch position and the plant state shall be indicated by an integral light	Specify	

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	Integral light shall illuminate the switch in a flashing mode of operation.	Specify	
4.3.2.7	surfaces used for electrical contacts shall be silver, gold or silver alloy	Specify	
4.3.2.8	Connection between low-voltage electronic control circuits and power circuits shall consist of interposing relays for linking the two systems. relays have to be of the encapsulated type	Specify Specify	
<b>4.3.3</b>	<b>Remote Terminal Units (RTUs) and Interfaces for SCADA</b>		
4.3.3.1	Galvanic isolation of all signals from process to RTU through interposing relays.	Specify	
4.3.3.2	Accommodate signal from both Analogue and Digital transducers	Specify	
4.3.3.3	Tele information plan requirements		
a)	single command outputs, double command outputs	Specify	
b)	regulation command outputs e.g. raise/lower command outputs for transformer tap changer control	Specify	
c)	analogue set point transmission and output	Specify	
d)	single, double and multiple state digital inputs	Specify	
e)	analogue measured inputs	Specify	
f)	metering pulse inputs for acquisition of energy meter values	Specify	
g)	Sequential Event Recording (SER) with time stamping of events at the RTU	Specify	
h)	RTU time synchronization	Specify	
i)	Self-testing and diagnostic functions for detection and reporting of any error	Specify	
j)	Automatic re-starting function corresponding control centre with downloading function.	Specify	
l)	Support encryption and LAN/WAN access	Specify	
m)	Shall support IEC 61850 protocol for process communication	Specify	
4.3.3.4	RTU to be fully equipped for actual amount of data to be acquire and commands to be executed plus spare capacity of 25% for each type of data	Specify	
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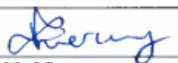
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	RTU shall be expandable in the field by at least 50% of the size of the initial point capacity by addition of Input and Output cards only	Specify	
	The addition of enclosures, internal cabling/wiring, chassis, or power supplies shall not be necessary when adding these I/O cards.	Specify	
4.3.3.5	RTU shall be accessible through the communication network for the Supervisory Control & Data Acquisition (SCADA) System at the National Control Centre (NCC) and Regional Control Centres (RCC) to scan.	Specify	
4.3.3.6	Plug-in type relays shall be used with sockets directly mounted on a DIN rail. Plugging – in and out are easy and performed without any risk of damaging of relay parts.	Specify Specify	
<b>4.3.4</b>	<b>RTU firmware requirements</b>		
4.3.4.1	RTU firmware characteristics		
(i)	Use of standard firmware	Specify	
(ii)	Firmware shall be completely and consistently documented	Specify	
(iii)	It shall not be necessary to perform modification to firmware, logic, or data for expansion within the sizing parameters defined for the RTU	Specify	
(iv)	all firmware delivered must be up to date and in final form, including all standard firmware changes	Specify	
(v)	Firmware shall be loadable by service notebook locally at minimum, download of firmware and parameter sets through SCADA system, using the data communication links.	Specify	
(vi)	Changing of EPROMs or similar devices shall not be necessary when updating RTUs firmware	Specify	
<b>4.3.5</b>	<b>Enclosures Requirements</b>		
4.3.5.1	Swing racks supported by heavy gauge hinges such that only front access to components and wiring is required for routine maintenance and troubleshooting.	Specify	
4.3.5.2	Provisions for top and bottom cable entry with protection against insect and animal entry.	Provide	

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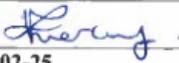
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<b>CLAUSE NO.</b>	<b>CLAUSE REQUIREMENTS</b>	<b>KPLC REQUIREMENTS</b>	<b>MANUFACTURER/SUPPLIERS OFFER</b>	
	Sealed to prevent dust and sand contamination			
4.3.5.3	Protection class for indoor cabinets	≥IP 52		
	Protection class for outdoor cabinets	≥IP 64		
4.3.5.4	Suitable signal and safety ground networks within the enclosure.	Provide		
4.3.5.5	230V AC power outlets	Provide		
4.3.5.6	DC Power supply:			
a)	Any hardware required to convert the 48 V battery voltage to the required internal voltages for the RTU hardware shall be provided and adequate	Specify		
b)	The RTUs shall be capable of operating with ungrounded or grounded (either polarity) input power.	Specify		
4.3.5.7	Dielectric strength/Impulse voltage test	≥2.5kV, 1 minute		
<b>4.3.6</b>	<b>Interposing Relays</b>	<b>Specify</b>		
4.3.6.1	Tele commands	Specify		
a)	Coil voltage shall be 48 VDC; Coil voltage variation shall be ±20%.	Specify		
b)	Signal voltage on the contact circuit shall normally be 110 VDC	Specify		
c)	The rated contact current shall be minimum 5ADC making/breaking.	Specify		
4.3.6.2	Tele indications			
a)	Coil voltage shall be 110 VDC; Coil voltage variation shall be ±20%.	Specify		
b)	Signal voltage on the contact circuit shall normally be 48VDC	Specify		
c)	The rated contact current shall be minimum 3ADC making/breaking.	Specify		
4.3.6.3	2NO and 2NC contacts for interposing relay	Specify		
4.3.6.4	Relays shall be fitted with a visual operation indicator (either mechanical or LED)	Specify		
<b>4.3.7</b>	<b>Transduces</b>			
4.3.7.1	Electrical parameters – Current, voltage, active power, reactive power, apparent power, frequency and power factor	Specify		
4.3.7.2	Four programmable analogue outputs, two digital outputs and RS-485 Modbus functionality.	Specify		
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4.3.7.3	programmed via easy-to-use software compliant with IEC 60688	Specify	
	Galvanically isolated outputs with the following characteristics in table 1.	Specify	
a)	Measurement Accuracy	Class 0.2, 0.5	
	Main frequency	45-65Hz	
b)	Voltage Circuit (Un)	3×100-693 V (3-wire system) 3×57.7/100 V to 3×400/693 V (4-wire system)	
c)	Current circuit (In)	1-5 A	
d)	Transducer supply	40-120 VDC	
e)	Communication Ports	Specify	
	Serial USB port	USB Mini-B connector Modbus RTU 38400 baud (auto)	
	Serial RS485 port	Three screw terminals for ≤ 6 mm <sup>2</sup> Modbus RTU 1200 – 38400 baud	
f)	Digital outputs (No)	2	
g)	Analogue outputs (No)	4	
4.3.7.4	a) Accuracy of the measurements	Voltages 0.5% of full scale Temperature 0 – 50°C	
	b) Maximum ripple	2% pk to pk	
	c) Response time to 99% of final value	<0.5 sec	
4.3.7.5	analogue output of the transducers inputs to the RTU shall be isolated, polar or bipolar, 2 – wire Load independent DC current of 0 to isolated, polar 10 mA, or ±10 mA or 4-20mA	Specify	
4.3.7.6	Transducer burden	<2VA per CT	
4.3.7.7	Short time overload	≥50VA	
4.3.7.8	MW Transducer		
i.	DIN rail mounting	Specify	
ii.	Connection shall be 3-Phase, 4-Wire	Specify	
iii.	Inputs 110V AC and 1Amp	Specify	
iv.	Programmable output characteristic	Specify	

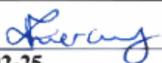
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v.	Output shall be 0 - ±20 mA	Specify	
vi.	Auxiliary power supply shall be 110 V AC/DC	Specify	
vii.	Relay Terminals-shall be screw type terminals large enough to accommodate at least 4mm <sup>2</sup> cable	Specify	
viii.	Screw type terminals	Specify	
ix.	Terminals indelibly marked	Specify	
4.3.7.9	MVAr Transducer		
i.	DIN rail mounting	Specify	
ii.	Connection shall be 3-Phase, 4-Wire	Specify	
iii.	Inputs 110V AC and 1Amp	Specify	
iv.	Programmable output characteristic	Specify	
v.	Output shall be 0 - ±20 mA	Specify	
vi.	Auxiliary power supply shall be 110 V AC/DC	Specify	
vii.	Relay Terminals-shall be screw type terminals large enough to accommodate at least 4mm <sup>2</sup> cable	Specify	
viii.	Screw type terminals	Specify	
ix.	Terminals indelibly marked	Specify	
4.3.7.10	Current Transducer		
i.	Input 0- 1Amp	Specify	
ii.	Output 0 – 20 mA	Specify	
iii.	Auxiliary power supply shall be 110 V AC/DC	Specify	
iv.	Relay Terminals-shall be screw type terminals large enough to accommodate at least 4 mm <sup>2</sup> cable	Specify	
4.3.7.10	Voltage Transducer		
i.	DIN rail mounting	Specify	
ii.	Input 0- 110 V AC	Specify	
iii.	Output 0 – 20 mA	Specify	
iv.	Auxiliary power supply shall be 110V AC, separately connected.	Specify	
v.	Relay Terminals-shall be screw type terminals large enough to accommodate at least 4mm <sup>2</sup> cable	Specify	
vi.	Screw type terminals	Specify	
vii.	Terminals indelibly marked	Specify	
4.3.8	MFM	Specify	
4.3.8.1	Unit shall be of numerical design	Specify	
4.3.8.2	LCD display – Lines of measurands displayed simultaneously	≥4	

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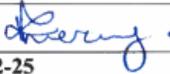
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4.3.8.3	Keypad shall be simple to allow scrolling between the various measurands	Specify		
4.3.8.4	The unit shall measure instantaneous values of; rms voltage, both phase – phase and phase to ground, phase currents, active power, reactive power, apparent power, energy, frequency, power factor and phase angle per phase.	Specify		
4.3.8.5	Measurement of time stamped values			
i.	Maximum and minimum demand for current and power (MW & MVA)	Specify		
ii.	Unbalance voltage and current	Specify		
iii.	harmonic distortion(THD) and Total Demand Distortion(TDD) for current and voltage	Specify		
4.3.8.6	Input ratings	Current Voltage	1 A AC 110V AC	
4.3.8.7	Continuously withstand	Current Voltage	2 A AC 260V AC	
4.3.8.8	Flush mounted		Specify	
4.3.8.9	3-phase , 4-wire on the secondary current and voltage		Specify	
<b>4.3.9</b>	<b>SDH Multiplexer Panel</b>			
4.3.9.1	conform to the universal platform supporting TDM and packet-switched technology	Specify		
	should have modular platform ready for future expansion	Specify		
4.3.9.2	Have combined access and transport multiplexer from sub rate 64 kBit/s up to SDH TM-16.	Specify		
4.3.9.3	Full support of legacy data, voice and utility-specific interfaces	Specify		
(i)	Voice: 2/4 wire E&M, FXS, FXO, including conferencing	Specify		
(ii)	Data: V.24/V.28, V.35, V.11, RS-485, RS232/V.28, X.21, G.703 64kBit/s, E1	Specify		
(iii)	Tele protection compliant with IEC 60834-1	Specify		
(iv)	IEEE C37.94 for direct connection of differential protection relays	Specify		
(v)	Supports multiple optical fiber transmission distances	Specify		
4.3.9.4	SDH Multiplexer shall be able to do and have: -			
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a)	Point-to-multipoint configurations for legacy SCADA protocols	Specify	
b)	Logical bridging instances for real separation of critical user data traffic	Specify	
c)	Bidirectional switching for redundant channel routing of protection signals	Specify	
d)	Optical interfaces (SFP based) up to 12 cages	Specify	
e)	Electrical interfaces from 4 – 24 ports	Specify	
f)	10/100/1000 BaseT	Specify	
g)	L2 switching and L3 routing functionality	Specify	
h)	Specific functionality for SCADA applications	Specify	
i)	Redundant CPU, Redundant power feeding, Very high MTBF	Specify	
j)	Design for the utility substation environment	Specify	
k)	User-friendly network management system	Specify	
4.3.9.5	Cubicles for SDH Multiplexer shall fulfil the following requirements		
(i)	Standard - IEC 62208	Specify	
(ii)	Standard - IEC 60529	Specify	
(iii)	indoor free standing cabinet with front door and lock	Specify	
(iv)	Ambient conditions for indoor installations only - IEC 60439-1	Specify	
(v)	standard dimensions	Specify	
	HxWxD) 2000 x 800 x 600 mm without side panels		
	2065 x 806 x 605 mm single cubicle with side panels and eye bolts		
(vi)	Other dimensions - 2000 x 800 x 800 mm or 2000 x 600 x 600 mm	Specify	
(vii)	Can be assembled and shipped in multiple cubicle combinations of max. four cubicles, supplied with right or left opening doors	Specify	
(viii)	cabinets with structured steel, inside & outside surface colour RAL 7035	Specify	
(ix)	Have passive convection cooling via ventilation outlets in the lower and upper part of the door	Specify	
(x)	Can be supplied with a swing frame or fixed frame for installing 19" racks and modules	Specify	

<b>Issued by: Head of Section, Standards Development</b> Signed:  Date: 2022-02-25	<b>Authorized by: Head of Department, Standards</b> Signed:  Date: 2022-02-25
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 <b>Kenya Power</b>	<b>TITLE:</b> <b>SCADA EQUIPMENT AND ASSOCIATED ADAPTATION MATERIALS - SPECIFICATION</b>	Doc. No.	KP1/13D/4/1/TSP/11/049
		Issue No.	1
		Revision No.	0
		Date of Issue	2022-02-25
		Page 28 of 29	
<b>CLAUSE NO.</b>	<b>CLAUSE REQUIREMENTS</b>	<b>KPLC REQUIREMENTS</b>	<b>MANUFACTURER/SUPPLIERS OFFER</b>
(xi)	standard protection conforming to protection class IP 54	Specify	
(xii)	very good screen attenuation against electromagnetic disturbances over the entire frequency range	Specify	
(xiii)	Have power distribution and cabinet alarm system	Specify	
4.3.9.6	Enclosure frames for SDH Multiplexer shall fulfil the following requirements	Specify	
(i)	frame shall be of sturdy construction	Specify	
(ii)	hollow section frame is made of 16 times rolled steel	Specify	
(iii)	holes on the frame shall be punched in 25 mm DIN pitch pattern	Specify	
(iv)	corners shall be strengthened with welded die cast corner connectors	Specify	
(v)	accessories and internal mounting plates ensure a high degree of flexibility to integrate communication equipment	Specify	
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<b>Issued by: Head of Section, Standards Development</b>		<b>Authorized by: Head of Department, Standards</b>	
Signed: 		Signed: 	
Date: 2022-02-25		Date: 2022-02-25	





## 5. Inspections and Tests

The following inspections and tests shall be performed:

- a. Supplied SCADA Equipment and accessories capability to integrate with KPLC SCADA and Telecom system in nearest Regional control center(RCC)
- b. Clear Methodology of supplied equipment's installation,integration,tests and commissioning
- c. Supplied SCADA Equipment protocols ready to be integrated into Substation local Automation & Control – Adaptation and modifications engineering. Bidder shall have proof of experience in the rehabilitation for protection and/or RTU in existing substation
- d. Experience in local support of Installation and erection of SCADA & Telecoms Equipment.
- e. Ability to replace any malfunctioning equipment with ease
- f. Extended guarantees of the equipments
- g. Supply Management. The contractor will give a presentation of supply time
- h. Quality control measures, a narration of specific quality control mechanisms measures at design, construction, erection, installation, testing and commissioning of the supplied equipment
- i. One time licenses of the supplied equipments
- j. All necessary softwares and backups required to install the equipments
- k. Ability to offer training and remote support in installation of the equipments without additional cost
- l. Equipment open platforms for easy integrations to any existing equipments



## **PART 3 - Contract**



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## Section VIII. General Conditions of Contract

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## Section VIII. General Conditions of Contract

### 1. Definitions

1.1 The following words and expressions shall have the meanings hereby assigned to them:

- (a) “Bank” means the World Bank and refers to the International Bank for Reconstruction and Development (IBRD) or the International Development Association (IDA).
- (b) “Contract” means the Contract Agreement entered into between the Purchaser and the Supplier, together with the Contract Documents referred to therein, including all attachments, appendices, and all documents incorporated by reference therein.
- (c) “Contract Documents” means the documents listed in the Contract Agreement, including any amendments thereto.
- (d) “Contract Price” means the price payable to the Supplier as specified in the Contract Agreement, subject to such additions and adjustments thereto or deductions therefrom, as may be made pursuant to the Contract.
- (e) “Day” means calendar day.
- (f) “Completion” means the fulfillment of the Related Services by the Supplier in accordance with the terms and conditions set forth in the Contract.
- (g) “GCC” means the General Conditions of Contract.
- (h) “Goods” means all of the commodities, raw material, machinery and equipment, and/or other materials that the Supplier is required to supply to the Purchaser under the Contract.
- (i) “Purchaser’s Country” is the country specified in the Special Conditions of Contract (SCC).
- (j) “Purchaser” means the entity purchasing the Goods and Related Services, as specified in the **SCC**.
- (k) “Related Services” means the services incidental to the supply of the goods, such as insurance, installation, training and initial maintenance and other such obligations of the Supplier under the Contract.
- (l) “SCC” means the Special Conditions of Contract.

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- (m) “Subcontractor” means any person, private or government entity, or a combination of the above, to whom any part of the Goods to be supplied or execution of any part of the Related Services is subcontracted by the Supplier.
- (n) “Supplier” means the person, private or government entity, or a combination of the above, whose bid to perform the Contract has been accepted by the Purchaser and is named as such in the Contract Agreement.
- (o) “The Project Site,” where applicable, means the place named in the **SCC**.
- 2. Contract Documents**
- 2.1 Subject to the order of precedence set forth in the Contract Agreement, all documents forming the Contract (and all parts thereof) are intended to be correlative, complementary, and mutually explanatory. The Contract Agreement shall be read as a whole.
- 3. Corrupt and Fraudulent Practices**
- 3.1 The Bank requires compliance with its policy in regard to corrupt and fraudulent practices as set forth in Appendix to the GCC.
- 3.2 The Purchaser requires the Supplier to disclose any commissions or fees that may have been paid or are to be paid to agents or any other party with respect to the bidding process or execution of the Contract. The information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity or fee.
- 4. Interpretation**
- 4.1 If the context so requires it, singular means plural and vice versa.
- 4.2 Incoterms
- (a) Unless inconsistent with any provision of the Contract, the meaning of any trade term and the rights and obligations of parties thereunder shall be as prescribed by Incoterms.
- (b) The terms EXW, CIP, FCA, CFR and other similar terms, when used, shall be governed by the rules prescribed in the current edition of Incoterms specified in the **SCC** and published by the International Chamber of Commerce in Paris, France.
- 4.3 Entire Agreement
- The Contract constitutes the entire agreement between the Purchaser and the Supplier and supersedes all communications,

negotiations and agreements (whether written or oral) of the parties with respect thereto made prior to the date of Contract.

#### 4.4 Amendment

No amendment or other variation of the Contract shall be valid unless it is in writing, is dated, expressly refers to the Contract, and is signed by a duly authorized representative of each party thereto.

#### 4.5 Nonwaiver

(a) Subject to GCC Sub-Clause 4.5(b) below, no relaxation, forbearance, delay, or indulgence by either party in enforcing any of the terms and conditions of the Contract or the granting of time by either party to the other shall prejudice, affect, or restrict the rights of that party under the Contract, neither shall any waiver by either party of any breach of Contract operate as waiver of any subsequent or continuing breach of Contract.

(b) Any waiver of a party's rights, powers, or remedies under the Contract must be in writing, dated, and signed by an authorized representative of the party granting such waiver, and must specify the right and the extent to which it is being waived.

#### 4.6 Severability

If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract.

### 5. Language

5.1 The Contract as well as all correspondence and documents relating to the Contract exchanged by the Supplier and the Purchaser, shall be written in the language specified in the **SCC**. Supporting documents and printed literature that are part of the Contract may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified, in which case, for purposes of interpretation of the Contract, this translation shall govern.

5.2 The Supplier shall bear all costs of translation to the governing language and all risks of the accuracy of such translation, for documents provided by the Supplier.

- 
- 6. Joint Venture, Consortium or Association**
- 6.1 If the Supplier is a joint venture, consortium, or association, all of the parties shall be jointly and severally liable to the Purchaser for the fulfillment of the provisions of the Contract and shall designate one party to act as a leader with authority to bind the joint venture, consortium, or association. The composition or the constitution of the joint venture, consortium, or association shall not be altered without the prior consent of the Purchaser.
- 7. Eligibility**
- 7.1 The Supplier and its Subcontractors shall have the nationality of an eligible country. A Supplier or Subcontractor shall be deemed to have the nationality of a country if it is a citizen or constituted, incorporated, or registered, and operates in conformity with the provisions of the laws of that country.
- 7.2 All Goods and Related Services to be supplied under the Contract and financed by the Bank shall have their origin in Eligible Countries. For the purpose of this Clause, origin means the country where the goods have been grown, mined, cultivated, produced, manufactured, or processed; or through manufacture, processing, or assembly, another commercially recognized article results that differs substantially in its basic characteristics from its components.
- 8. Notices**
- 8.1 Any notice given by one party to the other pursuant to the Contract shall be in writing to the address specified in the **SCC**. The term “in writing” means communicated in written form with proof of receipt.
- 8.2 A notice shall be effective when delivered or on the notice’s effective date, whichever is later.
- 9. Governing Law**
- 9.1 The Contract shall be governed by and interpreted in accordance with the laws of the Purchaser’s Country, unless otherwise specified in the **SCC**.
- 9.2 Throughout the execution of the Contract, the Contractor shall comply with the import of goods and services prohibitions in the Purchaser’s country when
- (a) as a matter of law or official regulations, the Borrower’s country prohibits commercial relations with that country; or
- 9.2 (b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower’s Country prohibits any import of goods from that country or any payments to any country, person, or entity in that country.

**10 Settlement of Disputes**

- 10.1 The Purchaser and the Supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.
- 10.2 If, after twenty-eight (28) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the Purchaser or the Supplier may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given. Any dispute or difference in respect of which a notice of intention to commence arbitration has been given in accordance with this Clause shall be finally settled by arbitration. Arbitration may be commenced prior to or after delivery of the Goods under the Contract. Arbitration proceedings shall be conducted in accordance with the rules of procedure **specified in the SCC.**
- 10.3 Notwithstanding any reference to arbitration herein,
- (a) the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree; and
  - (b) the Purchaser shall pay the Supplier any monies due the Supplier.

**11. Inspections and Audit by the Bank**

- 11.1 The Supplier shall keep, and shall make all reasonable efforts to cause its Subcontractors to keep, accurate and systematic accounts and records in respect of the Goods in such form and details as will clearly identify relevant time changes and costs.
- 11.2 The Supplier shall permit, and shall cause its Subcontractors to permit, the Bank and/or persons appointed by the Bank to inspect the Supplier's offices and all accounts and records relating to the performance of the Contract and the submission of the bid, and to have such accounts and records audited by auditors appointed by the Bank if requested by the Bank. The Supplier's and its Subcontractors and consultants' attention is drawn to Clause 3 [Fraud and Corruption], which provides, inter alia, that acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under this Sub-Clause 11.1 constitute a prohibited practice subject to contract termination (as well as to a determination of ineligibility pursuant to the Bank's prevailing sanctions procedures)

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- 12. Scope of Supply** 12.1 The Goods and Related Services to be supplied shall be as specified in the Schedule of Requirements.
- 13. Delivery and Documents** 13.1 Subject to GCC Sub-Clause 33.1, the Delivery of the Goods and Completion of the Related Services shall be in accordance with the Delivery and Completion Schedule specified in the Schedule of Requirements. The details of shipping and other documents to be furnished by the Supplier are specified in the **SCC**.
- 14. Supplier's Responsibilities** 14.1 The Supplier shall supply all the Goods and Related Services included in the Scope of Supply in accordance with GCC Clause 12, and the Delivery and Completion Schedule, as per GCC Clause 13.
- 15 Contract Price** 15.1 Prices charged by the Supplier for the Goods supplied and the Related Services performed under the Contract shall not vary from the prices quoted by the Supplier in its bid, with the exception of any price adjustments authorized in the **SCC**.
- 16. Terms of Payment** 16.1 The Contract Price, including any Advance Payments, if applicable, shall be paid as specified in the **SCC**.
- 16.2 The Supplier's request for payment shall be made to the Purchaser in writing, accompanied by invoices describing, as appropriate, the Goods delivered and Related Services performed, and by the documents submitted pursuant to GCC Clause 13 and upon fulfillment of all other obligations stipulated in the Contract.
- 16.3 Payments shall be made promptly by the Purchaser, but in no case later than sixty (60) days after submission of an invoice or request for payment by the Supplier, and after the Purchaser has accepted it.
- 16.4 The currencies in which payments shall be made to the Supplier under this Contract shall be those in which the bid price is expressed.
- 16.5 In the event that the Purchaser fails to pay the Supplier any payment by its due date or within the period set forth in the **SCC**, the Purchaser shall pay to the Supplier interest on the amount of such delayed payment at the rate shown in the **SCC**, for the period of delay until payment has been made in full, whether before or after judgment or arbitration award.
- 17. Taxes and Duties** 17.1 For goods manufactured outside the Purchaser's Country, the Supplier shall be entirely responsible for all taxes, stamp duties,

license fees, and other such levies imposed outside the Purchaser's Country.

- 17.2 For goods Manufactured within the Purchaser's country, the Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred until delivery of the contracted Goods to the Purchaser.
- 17.3 If any tax exemptions, reductions, allowances or privileges may be available to the Supplier in the Purchaser's Country, the Purchaser shall use its best efforts to enable the Supplier to benefit from any such tax savings to the maximum allowable extent.

## **18. Performance Security**

- 18.1 If required as specified in the SCC, the Supplier shall, within twenty-eight (28) days of the notification of contract award, provide a performance security for the performance of the Contract in the amount specified in the **SCC**.
- 18.2 The proceeds of the Performance Security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.
- 18.3 As specified in the SCC, the Performance Security, if required, shall be denominated in the currency(ies) of the Contract, or in a freely convertible currency acceptable to the Purchaser; and shall be in one of the format stipulated by the Purchaser in the **SCC**, or in another format acceptable to the Purchaser.
- 18.4 The Performance Security shall be discharged by the Purchaser and returned to the Supplier not later than twenty-eight (28) days following the date of Completion of the Supplier's performance obligations under the Contract, including any warranty obligations, unless specified otherwise in the **SCC**.

## **19. Copyright**

- 19.1 The copyright in all drawings, documents, and other materials containing data and information furnished to the Purchaser by the Supplier herein shall remain vested in the Supplier, or, if they are furnished to the Purchaser directly or through the Supplier by any third party, including suppliers of materials, the copyright in such materials shall remain vested in such third party

## **20. Confidential Information**

- 20.1 The Purchaser and the Supplier shall keep confidential and shall not, without the written consent of the other party hereto, divulge to any third party any documents, data, or other information furnished directly or indirectly by the other party hereto in connection with the Contract, whether such information has been furnished prior to, during or following

completion or termination of the Contract. Notwithstanding the above, the Supplier may furnish to its Subcontractor such documents, data, and other information it receives from the Purchaser to the extent required for the Subcontractor to perform its work under the Contract, in which event the Supplier shall obtain from such Subcontractor an undertaking of confidentiality similar to that imposed on the Supplier under GCC Clause 20.

20.2 The Purchaser shall not use such documents, data, and other information received from the Supplier for any purposes unrelated to the contract. Similarly, the Supplier shall not use such documents, data, and other information received from the Purchaser for any purpose other than the performance of the Contract.

20.3 The obligation of a party under GCC Sub-Clauses 20.1 and 20.2 above, however, shall not apply to information that:

- (a) the Purchaser or Supplier need to share with the Bank or other institutions participating in the financing of the Contract;
- (b) now or hereafter enters the public domain through no fault of that party;
- (c) can be proven to have been possessed by that party at the time of disclosure and which was not previously obtained, directly or indirectly, from the other party; or
- (d) otherwise lawfully becomes available to that party from a third party that has no obligation of confidentiality.

20.4 The above provisions of GCC Clause 20 shall not in any way modify any undertaking of confidentiality given by either of the parties hereto prior to the date of the Contract in respect of the Supply or any part thereof.

20.5 The provisions of GCC Clause 20 shall survive completion or termination, for whatever reason, of the Contract.

## **21. Subcontracting**

21.1 The Supplier shall notify the Purchaser in writing of all subcontracts awarded under the Contract if not already specified in the bid. Such notification, in the original bid or later shall not relieve the Supplier from any of its obligations, duties, responsibilities, or liability under the Contract.

21.2 Subcontracts shall comply with the provisions of GCC Clauses 3 and 7.

**22. Specifications and Standards****22.1 Technical Specifications and Drawings**

- (a) The Goods and Related Services supplied under this Contract shall conform to the technical specifications and standards mentioned in Section VI, Schedule of Requirements and, when no applicable standard is mentioned, the standard shall be equivalent or superior to the official standards whose application is appropriate to the Goods' country of origin.
- (b) The Supplier shall be entitled to disclaim responsibility for any design, data, drawing, specification or other document, or any modification thereof provided or designed by or on behalf of the Purchaser, by giving a notice of such disclaimer to the Purchaser.
- (c) Wherever references are made in the Contract to codes and standards in accordance with which it shall be executed, the edition or the revised version of such codes and standards shall be those specified in the Schedule of Requirements. During Contract execution, any changes in any such codes and standards shall be applied only after approval by the Purchaser and shall be treated in accordance with GCC Clause 33.

**23. Packing and Documents**

23.1 The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the Contract. During transit, the packing shall be sufficient to withstand, without limitation, rough handling and exposure to extreme temperatures, salt and precipitation, and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the goods' final destination and the absence of heavy handling facilities at all points in transit.

23.2 The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract, including additional requirements, if any, specified in the **SCC**, and in any other instructions ordered by the Purchaser.

**24. Insurance**

24.1 Unless otherwise specified in the **SCC**, the Goods supplied under the Contract shall be fully insured—in a freely convertible currency from an eligible country—against loss or damage incidental to manufacture or acquisition, transportation, storage, and delivery, in accordance with the applicable Incoterms or in the manner specified in the **SCC**.

**25. Transportation and Incidental Services**

- 25.1 Unless otherwise specified in the **SCC**, responsibility for arranging transportation of the Goods shall be in accordance with the specified Incoterms.
- 25.2 The Supplier may be required to provide any or all of the following services, including additional services, if any, **specified in SCC**:
- (a) performance or supervision of on-site assembly and/or start-up of the supplied Goods;
  - (b) furnishing of tools required for assembly and/or maintenance of the supplied Goods;
  - (c) furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied Goods;
  - (d) performance or supervision or maintenance and/or repair of the supplied Goods, for a period of time agreed by the parties, provided that this service shall not relieve the Supplier of any warranty obligations under this Contract; and
  - (e) training of the Purchaser's personnel, at the Supplier's plant and/or on-site, in assembly, start-up, operation, maintenance, and/or repair of the supplied Goods.
- 25.3 Prices charged by the Supplier for incidental services, if not included in the Contract Price for the Goods, shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the Supplier for similar services

**26. Inspections and Tests**

- 26.1 The Supplier shall at its own expense and at no cost to the Purchaser carry out all such tests and/or inspections of the Goods and Related Services as are specified in the **SCC**.
- 26.2 The inspections and tests may be conducted on the premises of the Supplier or its Subcontractor, at point of delivery, and/or at the Goods' final destination, or in another place in the Purchaser's Country as specified in the **SCC**. Subject to GCC Sub-Clause 26.3, if conducted on the premises of the Supplier or its Subcontractor, all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no charge to the Purchaser.
- 26.3 The Purchaser or its designated representative shall be entitled to attend the tests and/or inspections referred to in GCC Sub-Clause 26.2, provided that the Purchaser bear all of its own costs and expenses incurred in connection with such attendance

including, but not limited to, all traveling and board and lodging expenses.

- 26.4 Whenever the Supplier is ready to carry out any such test and inspection, it shall give a reasonable advance notice, including the place and time, to the Purchaser. The Supplier shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Purchaser or its designated representative to attend the test and/or inspection.
- 26.5 The Purchaser may require the Supplier to carry out any test and/or inspection not required by the Contract but deemed necessary to verify that the characteristics and performance of the Goods comply with the technical specifications codes and standards under the Contract, provided that the Supplier's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to the Contract Price. Further, if such test and/or inspection impedes the progress of manufacturing and/or the Supplier's performance of its other obligations under the Contract, due allowance will be made in respect of the Delivery Dates and Completion Dates and the other obligations so affected.
- 26.6 The Supplier shall provide the Purchaser with a report of the results of any such test and/or inspection.
- 26.7 The Purchaser may reject any Goods or any part thereof that fail to pass any test and/or inspection or do not conform to the specifications. The Supplier shall either rectify or replace such rejected Goods or parts thereof or make alterations necessary to meet the specifications at no cost to the Purchaser, and shall repeat the test and/or inspection, at no cost to the Purchaser, upon giving a notice pursuant to GCC Sub-Clause 26.4.
- 26.8 The Supplier agrees that neither the execution of a test and/or inspection of the Goods or any part thereof, nor the attendance by the Purchaser or its representative, nor the issue of any report pursuant to GCC Sub-Clause 26.6, shall release the Supplier from any warranties or other obligations under the Contract.

## **27. Liquidated Damages**

- 27.1 Except as provided under GCC Clause 32, if the Supplier fails to deliver any or all of the Goods by the Date(s) of delivery or perform the Related Services within the period specified in the Contract, the Purchaser may without prejudice to all its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to the percentage specified in the SCC of the delivered price of the delayed Goods or unperformed Services for each week or part thereof of delay until actual delivery or performance, up to a maximum

deduction of the percentage specified in those **SCC**. Once the maximum is reached, the Purchaser may terminate the Contract pursuant to GCC Clause 35.

## **28. Warranty**

28.1 The Supplier warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.

28.2 Subject to GCC Sub-Clause 22.1(b), the Supplier further warrants that the Goods shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship, under normal use in the conditions prevailing in the country of final destination.

28.3 Unless otherwise specified in the **SCC**, the warranty shall remain valid for twelve (12) months after the Goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated in the **SCC**, or for eighteen (18) months after the date of shipment from the port or place of loading in the country of origin, whichever period concludes earlier.

28.4 The Purchaser shall give notice to the Supplier stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof. The Purchaser shall afford all reasonable opportunity for the Supplier to inspect such defects.

28.5 Upon receipt of such notice, the Supplier shall, within the period specified in the **SCC**, expeditiously repair or replace the defective Goods or parts thereof, at no cost to the Purchaser.

28.6 If having been notified, the Supplier fails to remedy the defect within the period specified in the **SCC**, the Purchaser may proceed to take within a reasonable period such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.

## **29. Patent Indemnity**

29.1 The Supplier shall, subject to the Purchaser's compliance with GCC Sub-Clause 29.2, indemnify and hold harmless the Purchaser and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney's fees and expenses, which the Purchaser may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design,

trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract by reason of:

- (a) the installation of the Goods by the Supplier or the use of the Goods in the country where the Site is located; and
- (b) the sale in any country of the products produced by the Goods.

Such indemnity shall not cover any use of the Goods or any part thereof other than for the purpose indicated by or to be reasonably inferred from the Contract, neither any infringement resulting from the use of the Goods or any part thereof, or any products produced thereby in association or combination with any other equipment, plant, or materials not supplied by the Supplier, pursuant to the Contract.

- 29.2 If any proceedings are brought or any claim is made against the Purchaser arising out of the matters referred to in GCC Sub-Clause 29.1, the Purchaser shall promptly give the Supplier a notice thereof, and the Supplier may at its own expense and in the Purchaser's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.
- 29.3 If the Supplier fails to notify the Purchaser within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Purchaser shall be free to conduct the same on its own behalf.
- 29.4 The Purchaser shall, at the Supplier's request, afford all available assistance to the Supplier in conducting such proceedings or claim, and shall be reimbursed by the Supplier for all reasonable expenses incurred in so doing.
- 29.5 The Purchaser shall indemnify and hold harmless the Supplier and its employees, officers, and Subcontractors from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney's fees and expenses, which the Supplier may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract arising out of or in connection with any design, data, drawing, specification, or other documents or materials provided or designed by or on behalf of the Purchaser.

**30 Limitation of Liability**

- 30.1 Except in cases of criminal negligence or willful misconduct,
- (a) the Supplier shall not be liable to the Purchaser, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Supplier to pay liquidated damages to the Purchaser and
  - (b) the aggregate liability of the Supplier to the Purchaser, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment, or to any obligation of the supplier to indemnify the purchaser with respect to patent infringement

**31. Change in Laws and Regulations**

- 31.1 Unless otherwise specified in the Contract, if after the date of 28 days prior to date of Bid submission, any law, regulation, ordinance, order or bylaw having the force of law is enacted, promulgated, abrogated, or changed in the place of the Purchaser's country where the Site is located (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the Delivery Date and/or the Contract Price, then such Delivery Date and/or Contract Price shall be correspondingly increased or decreased, to the extent that the Supplier has thereby been affected in the performance of any of its obligations under the Contract. Notwithstanding the foregoing, such additional or reduced cost shall not be separately paid or credited if the same has already been accounted for in the price adjustment provisions where applicable, in accordance with GCC Clause 15.

**32. Force Majeure**

- 32.1 The Supplier shall not be liable for forfeiture of its Performance Security, liquidated damages, or termination for default if and to the extent that its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.
- 32.2 For purposes of this Clause, "Force Majeure" means an event or situation beyond the control of the Supplier that is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of the Supplier. Such events may include, but not be limited to, acts of the Purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.

32.3 If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such condition and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

**33. Change Orders  
and Contract  
Amendments**

33.1 The Purchaser may at any time order the Supplier through notice in accordance GCC Clause 8, to make changes within the general scope of the Contract in any one or more of the following:

- (a) drawings, designs, or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the Purchaser;
- (b) the method of shipment or packing;
- (c) the place of delivery; and
- (d) the Related Services to be provided by the Supplier.

33.2 If any such change causes an increase or decrease in the cost of, or the time required for, the Supplier's performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price or in the Delivery/Completion Schedule, or both, and the Contract shall accordingly be amended. Any claims by the Supplier for adjustment under this Clause must be asserted within twenty-eight (28) days from the date of the Supplier's receipt of the Purchaser's change order.

33.3 Prices to be charged by the Supplier for any Related Services that might be needed but which were not included in the Contract shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the Supplier for similar services.

33.4 Subject to the above, no variation in or modification of the terms of the Contract shall be made except by written amendment signed by the parties.

**34. Extensions of  
Time**

34.1 If at any time during performance of the Contract, the Supplier or its subcontractors should encounter conditions impeding timely delivery of the Goods or completion of Related Services pursuant to GCC Clause 13, the Supplier shall promptly notify the Purchaser in writing of the delay, its likely duration, and its cause. As soon as practicable after receipt of the Supplier's notice, the Purchaser shall evaluate the situation and may at its

discretion extend the Supplier's time for performance, in which case the extension shall be ratified by the parties by amendment of the Contract.

34.2 Except in case of Force Majeure, as provided under GCC Clause 32, a delay by the Supplier in the performance of its Delivery and Completion obligations shall render the Supplier liable to the imposition of liquidated damages pursuant to GCC Clause 26, unless an extension of time is agreed upon, pursuant to GCC Sub-Clause 34.1.

### **35. Termination**

#### 35.1 Termination for Default

- (a) The Purchaser, without prejudice to any other remedy for breach of Contract, by written notice of default sent to the Supplier, may terminate the Contract in whole or in part:
  - (i) if the Supplier fails to deliver any or all of the Goods within the period specified in the Contract, or within any extension thereof granted by the Purchaser pursuant to GCC Clause 34;
  - (ii) if the Supplier fails to perform any other obligation under the Contract; or
  - (iii) if the Supplier, in the judgment of the Purchaser has engaged in fraud and corruption, as defined in GCC Clause 3, in competing for or in executing the Contract.
- (b) In the event the Purchaser terminates the Contract in whole or in part, pursuant to GCC Clause 35.1(a), the Purchaser may procure, upon such terms and in such manner as it deems appropriate, Goods or Related Services similar to those undelivered or not performed, and the Supplier shall be liable to the Purchaser for any additional costs for such similar Goods or Related Services. However, the Supplier shall continue performance of the Contract to the extent not terminated.

#### 35.2 Termination for Insolvency.

- (a) The Purchaser may at any time terminate the Contract by giving notice to the Supplier if the Supplier becomes bankrupt or otherwise insolvent. In such event, termination will be without compensation to the Supplier, provided that such termination will not prejudice or affect any right of action or remedy that has accrued or will accrue thereafter to the Purchaser

### 35.3 Termination for Convenience.

- (a) The Purchaser, by notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for the Purchaser's convenience, the extent to which performance of the Supplier under the Contract is terminated, and the date upon which such termination becomes effective.
- (b) The Goods that are complete and ready for shipment within twenty-eight (28) days after the Supplier's receipt of notice of termination shall be accepted by the Purchaser at the Contract terms and prices. For the remaining Goods, the Purchaser may elect:
  - (i) to have any portion completed and delivered at the Contract terms and prices; and/or
  - (ii) to cancel the remainder and pay to the Supplier an agreed amount for partially completed Goods and Related Services and for materials and parts previously procured by the Supplier.

### **36. Assignment**

- 36.1 Neither the Purchaser nor the Supplier shall assign, in whole or in part, their obligations under this Contract, except with prior written consent of the other party.

### **37. Export Restriction**

- 37.1 Notwithstanding any obligation under the Contract to complete all export formalities, any export restrictions attributable to the Purchaser, to the country of the Purchaser, or to the use of the products/goods, systems or services to be supplied, which arise from trade regulations from a country supplying those products/goods, systems or services, and which substantially impede the Supplier from meeting its obligations under the Contract, shall release the Supplier from the obligation to provide deliveries or services, always provided, however, that the Supplier can demonstrate to the satisfaction of the Purchaser and of the Bank that it has completed all formalities in a timely manner, including applying for permits, authorizations and licenses necessary for the export of the products/goods, systems or services under the terms of the Contract. Termination of the Contract on this basis shall be for the Purchaser's convenience pursuant to Sub-Clause 35.3.



## APPENDIX TO GENERAL CONDITIONS

### Bank's Policy- Corrupt and Fraudulent Practices

*(text in this Appendix shall not be modified)*

#### **Guidelines for Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers, dated January 2011:**

##### **“Fraud and Corruption:**

1.16 It is the Bank's policy to require that Borrowers (including beneficiaries of Bank loans), bidders, suppliers, contractors and their agents (whether declared or not), sub-contractors, sub-consultants, service providers or suppliers, and any personnel thereof, observe the highest standard of ethics during the procurement and execution of Bank-financed contracts.<sup>9</sup> In pursuance of this policy, the Bank:

- (a) defines, for the purposes of this provision, the terms set forth below as follows:
  - (i) “corrupt practice” is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;<sup>10</sup>
  - (ii) “fraudulent practice” is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;<sup>11</sup>
  - (iii) “collusive practice” is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;<sup>12</sup>

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<sup>9</sup> In this context, any action to influence the procurement process or contract execution for undue advantage is improper.

<sup>10</sup> For the purpose of this sub-paragraph, “*another party*” refers to a public official acting in relation to the procurement process or contract execution. In this context, “*public official*” includes World Bank staff and employees of other organizations taking or reviewing procurement decisions.

<sup>11</sup> For the purpose of this sub-paragraph, “*party*” refers to a public official; the terms “*benefit*” and “*obligation*” relate to the procurement process or contract execution; and the “*act or omission*” is intended to influence the procurement process or contract execution.

<sup>12</sup> For the purpose of this sub-paragraph, “*parties*” refers to participants in the procurement process (including public officials) attempting either themselves, or through another person or entity not participating in the procurement or selection process, to simulate competition or to establish bid prices at artificial, non-competitive levels, or are privy to each other's bid prices or other conditions.

- (iv) “coercive practice” is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;<sup>13</sup>
- (v) "obstructive practice" is:
  - (aa) deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or
  - (bb) acts intended to materially impede the exercise of the Bank’s inspection and audit rights provided for under paragraph 1.16(e) below.
- (b) will reject a proposal for award if it determines that the bidder recommended for award, or any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;
- (c) will declare misprocurement and cancel the portion of the loan allocated to a contract if it determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement or the implementation of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;
- (d) will sanction a firm or individual, at any time, in accordance with the prevailing Bank’s sanctions procedures,<sup>14</sup> including by publicly declaring such firm or individual ineligible, either indefinitely or for a stated period of time: (i) to be awarded a Bank-financed contract; and (ii) to be a nominated<sup>15</sup>;

<sup>13</sup> For the purpose of this sub-paragraph, “party” refers to a participant in the procurement process or contract execution.

<sup>14</sup> A firm or individual may be declared ineligible to be awarded a Bank financed contract upon: (i) completion of the Bank’s sanctions proceedings as per its sanctions procedures, including, inter alia, cross-debarment as agreed with other International Financial Institutions, including Multilateral Development Banks, and through the application the World Bank Group corporate administrative procurement sanctions procedures for fraud and corruption; and (ii) as a result of temporary suspension or early temporary suspension in connection with an ongoing sanctions proceeding. See footnote 14 and paragraph 8 of Appendix 1 of these Guidelines.

<sup>15</sup> A nominated sub-contractor, consultant, manufacturer or supplier, or service provider (different names are used depending on the particular bidding document) is one which has either been: (i) included by the bidder

- (e) will require that a clause be included in bidding documents and in contracts financed by a Bank loan, requiring bidders, suppliers and contractors, and their sub-contractors, agents, personnel, consultants, service providers, or suppliers, to permit the Bank to inspect all accounts, records, and other documents relating to the submission of bids and contract performance, and to have them audited by auditors appointed by the Bank.”
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in its pre-qualification application or bid because it brings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.



## Section IX. Special Conditions of Contract

The following Special Conditions of Contract (SCC) shall supplement and / or amend the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

*[The Purchaser shall select insert the appropriate wording using the samples below or other acceptable wording, and delete the text in italics]*

<b>GCC 1.1(i)</b>	The Purchaser's country is: <b>KENYA</b>
<b>GCC 1.1(j)</b>	The Purchaser is: <b>KENYA POWER &amp; LIGHTING COMPANY PLC</b>
<b>GCC 1.1 (o)</b>	The Project Site(s)/Final Destination(s) is/are: <i>Juja Road Substation (National Control Centre)</i>
<b>GCC 4.2 (a)</b>	The meaning of the trade terms shall be as prescribed by <b>Incoterms</b> .
<b>GCC 4.2 (b)</b>	The version edition of Incoterms shall be <b>INCOTERMS 2020</b>
<b>GCC 5.1</b>	The language shall be: <b>ENGLISH</b>
<b>GCC 8.1</b>	For <b>notices</b> , the Purchaser's address shall be:  <b>Attention:</b> Chief Engineer, Projects (Substation) The Kenya Power and Lighting Company Stima Plaza, Kolobot Road 2 <sup>nd</sup> Floor P.O Box 30099 - 00100 Nairobi, Kenya  Telephone: 254-20-3201051 Electronic mail address: <a href="mailto:Nkiminda@kplc.co.ke">Nkiminda@kplc.co.ke</a>
<b>GCC 9.1</b>	The governing law shall be the law of: <b>THE REPUBLIC OF KENYA</b>
<b>GCC 10.2</b>	The rules of procedure for arbitration proceedings pursuant to GCC Clause 10.2 shall be as follows:  <i>(a) Contract with foreign Supplier:</i>  GCC 10.2 (a)—Any dispute, controversy or claim arising out of or relating to this Contract, or breach, termination or invalidity thereof, shall be settled by arbitration in accordance with the UNCITRAL Arbitration Rules as at present in force.  <i>(b) Contracts with Supplier national of the Purchaser's country:</i>

	<p>In the case of a dispute between the Purchaser and a Supplier who is a national of the Purchaser's country, the dispute shall be referred to adjudication or arbitration in accordance with the laws of the Purchaser's country.</p>
<p><b>GCC 13.1</b></p>	<p>Details of Shipping and other Documents to be furnished by the Supplier are</p> <p><u>For Goods Supplied from Abroad into the Purchaser's Country</u></p> <p>The Purchaser requires that the Goods be shipped Incoterms 2010 CIP to place of destination to in accordance with the schedule of requirements as stipulated in the bid document.</p> <p>(a) Upon each shipment, the Supplier shall notify the Purchaser by paper mail, email or fax the full details of each shipment including Contract number, shipment number, description of goods, quantity, each means of transport, each transport bill number and the date of each shipment, port of discharge, etc. The Supplier shall courier the following documents in one copy to the Purchaser:</p> <ul style="list-style-type: none"> <li>(i) The Manufacturer's invoice showing Goods description, quantity, unit price, total amount;</li> <li>(ii) Non- negotiable airway bill/Bill of lading;</li> <li>(iii) Packing list identifying contents of each Package;</li> <li>(iv) Manufacturer's warranty certificate;</li> <li>(v) Inspection certificate issued by the nominated inspection agency and the Manufacturer's factory inspection report; and</li> <li>(vi) Certificate of origin.</li> <li>(vii) Insurance Certificate issued by a Kenyan registered firm</li> </ul> <p>The above documents shall be received by the Purchaser before arrival of the Goods and, if not received, the Supplier will be responsible for any consequent expenses.</p> <p><u>For Goods from within the Purchaser's Country</u></p> <p>The Purchaser procuring requires entity desires that the Goods be delivered as per Incoterms 2020 EXW to destination in Kenya in</p>

	<p>accordance with the schedule of requirements as stipulated in the bid document.</p> <p>Upon delivery of Goods to the transporter, the Supplier shall notify the purchase and email or courier the document to the Purchaser:</p> <ul style="list-style-type: none"> <li>(i) Copies of the Supplier's invoice showing Goods description, quantity, unit price, and total amount</li> <li>(ii) Delivery note, railway or truck receipt</li> <li>(iii) Manufacturer's or Supplier's warranty certificate</li> <li>(iv) The Supplier's inspection report</li> <li>(v) Certificate of origin</li> </ul> <p>The above documents shall be received by the Purchaser before arrival of the Goods and, if not received, the Supplier will be responsible for any consequent expenses.</p>
<b>GCC 15.1</b>	<p>The prices charged for the Goods supplied and the related Services performed <i>shall not</i> be adjustable.</p>
<b>GCC 16.1</b>	<p><b><i>Sample provision</i></b></p> <p>GCC 16.1—The method and conditions of payment to be made to the Supplier under this Contract shall be as follows:</p> <p><b>Payment for Goods supplied from abroad:</b></p> <p>Payment of foreign currency portion shall be made as currency of the Contract Price in the following manner:</p> <ul style="list-style-type: none"> <li>(i) <b>Advance Payment:</b> Ten (10) percent of the Contract Price shall be paid within thirty (30) days of signing of the Contract, and upon submission of claim and a bank guarantee (Advance Payment Guarantee) for equivalent amount valid until the Goods are delivered and in the form provided in the bidding documents or another form acceptable to the Purchaser.</li> <li>(ii) <b>On Shipment:</b> Eighty (80) percent of the Contract Price of the Goods shipped</li> </ul>

	<p>shall be paid through Bank transfer (Direct Payment or TT), upon submission of documents specified in GCC Clause 12. The quantities shipped shall be as per delivery schedule. Payment shall be for the specified quantities per delivery period.</p> <p>(iii) <b>On Acceptance:</b> Ten (10) percent of the Contract Price of Goods received shall be paid within thirty (30) days of receipt of the Goods upon submission of claim supported by the acceptance certificate issued by the Purchaser.</p> <p>Payment of local currency portion shall be made in <b>KES</b> within thirty (30) days of presentation of claim supported by a certificate from the Purchaser declaring that the Goods have been delivered and that all other contracted Services have been performed</p> <p><b>Payment for Goods and Services supplied from within the Purchaser's country:</b></p> <p>Payment for Goods and Services supplied from within the Purchaser's country shall be made in <b>KES</b> as follows:</p> <p>(i) <b>Advance Payment:</b> Ten (10) percent of the Contract Price shall be paid within thirty (30) days of signing of the Contract against a simple receipt and a bank guarantee for the equivalent amount and in the form provided in the bidding documents or another form acceptable to the Purchaser.</p> <p>(ii) <b>On Delivery:</b> Eighty (80) percent of the Contract Price shall be paid on receipt of the Goods and upon submission of the documents specified in GCC Clause 13.</p> <p>(iii) <b>On Acceptance:</b> The remaining ten (10) percent of the Contract Price shall be paid to the Supplier within thirty (30) days after the date of the acceptance certificate for the respective delivery issued by the Purchaser.</p>
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<b>GCC 16.5</b>	<p>The payment-delay period after which the Purchaser shall pay interest to the supplier shall be <b>90</b> days.</p> <p>The interest rate for foreign suppliers to be SOFR + 1% (3months maturity) and for local suppliers at the prevailing Central Bank of Kenya (CBK) prevailing Rates.</p>
<b>GCC 18.1</b>	<p>A Performance Security <i>shall</i> be required. The security amount is <b>10%</b> of the contract price.</p> <p>If the unconditional guarantee is issued by a financial institution located outside the Purchaser's Country, the issuing financial institution shall have a correspondent financial institution located in the Purchaser's Country to make it enforceable on contract price.</p>
<b>GCC 18.3</b>	<p>If required, the Performance Security shall be in the form of : <b><i>A Bank Guarantee</i></b></p> <p>If required, the Performance security shall be denominated in “ the currencies of payment of the Contract, in accordance with their portions of the Contract Price”</p>
<b>GCC 23.2</b>	<p>The packing, marking and documentation within and outside the packages shall be:</p> <p>The Goods shall be packed in good condition suitable for Sea/Air/Land dispatch. Hazard in transit to the final destination shall include rough handling and storage in tropical conditions. The manufacturer shall enclose a packing list.</p>
<b>GCC 24.1</b>	<p>The insurance coverage shall be as specified in the Incoterms.</p>
<b>GCC 25.1</b>	<p>Responsibility for transportation of the Goods shall be as specified in the Incoterms.</p> <p>The Supplier is required under the Contract to transport the goods to a specified place of final destination within the purchaser's Country, including insurance and storage, as shall be specified in the Contract, shall be arranged by the Supplier, and related costs shall be included in the contract price.</p>
<b>GCC 25.2</b>	<p>Incidental services to be provided are: Clearance agency services described as follows:</p> <p>For Goods manufactured outside the Purchaser's country, to be imported,</p>

	<p>the Supplier shall be responsible for clearance of the Goods. However, KPLC shall make direct payment to Kenya Revenue Authority (KRA) for the cost of the following:</p> <ol style="list-style-type: none"> <li>1. Custom Duties</li> <li>2. Import Declaration Fees</li> <li>3. Value Added Tax (VAT)</li> <li>4. Railway Development Levy (RDL)</li> </ol> <p>The Supplier has included in its price schedules the agency fees for clearing and forwarding charges for Mombasa Port, inland container depots and border points.</p>
<b>GCC 26.1</b>	The inspections and tests shall be: As per the Technical evaluation in the evaluation criteria
<b>GCC 26.2</b>	<p>The Inspections and tests shall be conducted at Manufacturer's Place.</p> <p>The cost of inspection and tests shall be borne by the bidder. The cost Exclude costs of travel &amp; accommodation from Kenya to Nearest Airport to Manufacturers facility which shall be borne by KPLC.</p>
<b>GCC 27.1</b>	The liquidated damage shall be: <b>0.5 % per week</b>
<b>GCC 27.1</b>	The maximum amount of liquidated damages shall be: <b>10%</b>
<b>GCC 28.3</b>	<p>The period of validity of the Warranty shall be: <b>365</b> days</p> <p>For purposes of the Warranty, the place(s) of final destination(s) shall be:</p> <p><b><i>Juja Road substation</i></b></p>
<b>GCC 28.5</b>	The period for repair or replacement shall be: <b>60</b> days.

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## Section X. Contract Forms

This Section contains forms which, once completed, will form part of the Contract. The forms for Performance Security and Advance Payment Security, when required, shall only be completed by the successful Bidder after contract award.

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# Letter of Acceptance

*[letterhead paper of the Purchaser]*

*[date]*

To: *[name and address of the Supplier]*

Subject: **Notification of Award Contract No.** . . . . .

This is to notify you that your Bid dated . . . . *[insert date]* . . . . for execution of the . . . .  
. . . . .*[insert name of the contract and identification number, as given in the SCC]* . . . .  
. . . . . for the Accepted Contract Amount of . . . . .*[insert amount in numbers and  
words and name of currency]*, as corrected and modified in accordance with the  
Instructions to Bidders is hereby accepted by our Agency.

You are requested to furnish the Performance Security within 28 days in accordance with  
the Conditions of Contract, using for that purpose the of the Performance Security Form  
included in Section X, Contract Forms, of the Bidding Document.

Authorized Signature: \_\_\_\_\_  
Name and Title of Signatory: \_\_\_\_\_  
Name of Agency: \_\_\_\_\_

**Attachment: Contract Agreement**

## Contract Agreement

*[The successful Bidder shall fill in this form in accordance with the instructions indicated]*

THIS AGREEMENT made

the *[ insert: **number** ]* day of *[ insert: **month** ]*, *[ insert: **year** ]*.

BETWEEN

- (1) *[ insert complete name of Purchaser ]*, a *[ insert description of type of legal entity, for example, an agency of the Ministry of .... of the Government of { insert name of Country of Purchaser }, or corporation incorporated under the laws of { insert name of Country of Purchaser } ]* and having its principal place of business at *[ insert address of Purchaser ]* (hereinafter called “the Purchaser”), of the one part, and
- (2) *[ insert name of Supplier ]*, a corporation incorporated under the laws of *[ insert: country of Supplier ]* and having its principal place of business at *[ insert: address of Supplier ]* (hereinafter called “the Supplier”), of the other part :

WHEREAS the Purchaser invited bids for certain Goods and ancillary services, viz., *[insert brief description of Goods and Services]* and has accepted a Bid by the Supplier for the supply of those Goods and Services

The Purchaser and the Supplier agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other contract documents.
  - (a) the Letter of Acceptance
  - (b) the Letter of Bid
  - (c) the Addenda Nos. \_\_\_\_\_ (if any)
  - (d) Special Conditions of Contract
  - (e) General Conditions of Contract
  - (f) the Specification (including Schedule of Requirements and Technical Specifications)
  - (g) the completed Schedules (including Price Schedules)

- (h) any other document listed in GCC as forming part of the Contract
3. In consideration of the payments to be made by the Purchaser to the Supplier as specified in this Agreement, the Supplier hereby covenants with the Purchaser to provide the Goods and Services and to remedy defects therein in conformity in all respects with the provisions of the Contract.
  4. The Purchaser hereby covenants to pay the Supplier in consideration of the provision of the Goods and Services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of *[insert the name of the Contract governing law country]* on the day, month and year indicated above.

For and on behalf of the Purchaser

Signed: *[insert signature]*  
in the capacity of *[ insert title or other appropriate designation ]*  
in the presence of *[insert identification of official witness]*

For and on behalf of the Supplier

Signed: *[insert signature of authorized representative(s) of the Supplier]*  
in the capacity of *[ insert title or other appropriate designation ]*  
in the presence of *[ insert identification of official witness]*

## Performance Security

### (Bank Guarantee)

*[The bank, as requested by the successful Bidder, shall fill in this form in accordance with the instructions indicated]*

*[Guarantor letterhead or SWIFT identifier code]*

**Beneficiary:** *[insert name and Address of Purchaser ]*

**Date:** *\_ [Insert date of issue]*

**PERFORMANCE GUARANTEE No.:** *[Insert guarantee reference number]*

**Guarantor:** *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that *\_ [insert name of Supplier, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called "the Applicant") has entered into Contract No. *[insert reference number of the contract]* dated *[insert date]* with the Beneficiary, for the supply of *\_ [insert name of contract and brief description of Goods and related Services]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of *[insert amount in figures]* (*\_\_\_\_\_*) *[insert amount in words]*,<sup>1</sup> such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without the Beneficiary needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the .... Day of ....., 2...<sup>2</sup>, and any demand for payment under it must be received by us at this office indicated above on or before that date.

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<sup>1</sup> *The Guarantor shall insert an amount representing the percentage of the Accepted Contract Amount specified in the Letter of Acceptance, and denominated either in the currency(ies) of the Contract or a freely convertible currency acceptable to the Beneficiary.*

<sup>2</sup> *Insert the date twenty-eight days after the expected completion date as described in GC Clause 18.4. The Purchaser should note that in the event of an extension of this date for completion of the Contract, the Purchaser would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Purchaser might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six*

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

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*[signature(s)]*

***Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.***

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*months][one year], in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."*

## Advance Payment Security

*[Guarantor letterhead or SWIFT identifier code]*

**Beneficiary:** *[Insert name and Address of Purchaser]*

**Date:** *[Insert date of issue]*

**ADVANCE PAYMENT GUARANTEE No.:** *[Insert guarantee reference number]*

**Guarantor:** *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that *[insert name of Supplier, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called "the Applicant") has entered into Contract No. *[insert reference number of the contract]* dated *[insert date]* with the Beneficiary, for the execution of *[insert name of contract and brief description of Goods and related Services]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum *[insert amount in figures]* () *[insert amount in words]* is to be made against an advance payment guarantee.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of *[insert amount in figures]* (\_\_\_\_\_) *[insert amount in words]*<sup>1</sup> upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating either that the Applicant:

- (a) has used the advance payment for purposes other than toward delivery of Goods;  
or
- (b) has failed to repay the advance payment in accordance with the Contract conditions, specifying the amount which the Applicant has failed to repay.

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<sup>1</sup> *The Guarantor shall insert an amount representing the amount of the advance payment and denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the Purchaser.*

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary's bank stating that the advance payment referred to above has been credited to the Applicant on its account number *[insert number]* at *[insert name and address of Applicant's bank]*.

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Applicant as specified in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that ninety (90) percent of the Accepted Contract Amount, has been certified for payment, or on the *[insert day]* day of *[insert month]*, 2 *[insert year]*, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No.758, except that the supporting statement under Article 15(a) is hereby excluded.

\_\_\_\_\_  
*[signature(s)]*

***Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.***

**SAMPLE FORMAT:****Invitation for Bids****[COUNTRY]****[NAME OF PROJECT]**

Loan No./Credit No./ Grant No.: \_\_\_\_\_

**Contract Title:** \_\_\_\_\_**Reference No.** (as per Procurement Plan): \_\_\_\_\_

1. The *[insert name of Borrower/Beneficiary/Recipient]* *[has received/has applied for/intends to apply for]* financing from the World Bank toward the cost of the *[insert name of project or grant]*, and intends to apply part of the proceeds toward payments under the contract<sup>16</sup>for *[insert title of contract]*<sup>17</sup>.

2. The *[insert name of implementing agency]* now invites sealed bids from eligible bidders for *[insert brief description of Goods required, including quantities, location, delivery period, margin of preference if applicable, etc.]*<sup>18</sup>.

3. Bidding will be conducted through the International Competitive Bidding procedures as specified in the World Bank's Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers *[insert correct title and date of applicable Guidelines edition as per legal agreement]* ("Procurement Guidelines"), and is open to all eligible bidders as defined in the Procurement Guidelines. In addition, please refer to paragraphs 1.6 and 1.7 setting forth the World Bank's policy on conflict of interest.

4. Interested eligible bidders may obtain further information from *[insert name of implementing agency, insert name and e-mail of officer in charge]* and inspect the bidding

<sup>16</sup> Substitute "contracts" where bids are called concurrently for multiple contracts. Add a new para. 3 and renumber paras 3 - 8 as follows: "Bidders may bid for one or several contracts, as further defined in the bidding document. Bidders wishing to offer discounts in case they are awarded more than one contract will be allowed to do so, provided those discounts are included in the Letter of Bid."

<sup>17</sup> Insert if applicable: "This contract will be jointly financed by *[insert name of cofinancing agency]*. Bidding process will be governed by the World Bank's rules and procedures."

<sup>18</sup> A brief description of the type(s) of Goods should be provided, including quantities, location of Project, delivery/construction period, application of margin of preference and other information necessary to enable potential bidders to decide whether or not to respond to the Invitation. Bidding Documents may require bidders to have specific experience or capabilities; such qualification requirements should also be included in this paragraph.

documents during office hours [*insert office hours if applicable i.e. 0900 to 1700 hours*] at the address given below [*state address at the end of this invitation*]<sup>19</sup>.

5. A complete set of bidding documents in [*insert name of language*] may be purchased by interested eligible bidders upon the submission of a written application to the address below and upon payment of a nonrefundable fee<sup>20</sup> of [*insert amount in Borrower's currency or in a convertible currency*]. The method of payment will be [*insert method of payment*].<sup>21</sup> The document will be sent by [*insert delivery procedure*].<sup>22</sup>

6. Bids must be delivered to the address below [*state address at the end of this invitation*]<sup>23</sup> on or before [*insert time and date*]. Electronic bidding will [*will not*] be permitted. Late bids will be rejected. Bids will be publicly opened in the presence of the bidders' designated representatives and anyone who choose to attend at the address below [*state address at the end of this invitation*] on [*insert time and date*].

7. All bids must be accompanied by a [*insert "Bid Security" or "Bid-Securing Declaration," as appropriate*] of [*insert amount and currency in case of a Bid Security*].

8. The address(es) referred to above is(are): [*insert detailed address(es) ]*

[*insert name of office, room number*]

Attn: [*insert name of officer & title*]

[*insert postal address and/or street address*]

[*insert postal code, city, country*]

Tel: [*include the country and city code*]

Fax: [*include the country and city code*]

E-mail: [*insert electronic address if electronic bidding is permitted*]

Web site:

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<sup>19</sup> The office for inquiry and issuance of bidding documents and that for bid submission may or may not be the same.

<sup>20</sup> The fee chargeable should only be nominal to defray reproduction and mailing costs. An amount between US\$50 and US\$300 or equivalent is deemed appropriate.

<sup>21</sup> For example, cashier's check, direct deposit to specified account number, etc.

<sup>22</sup> The delivery procedure is usually airmail for overseas delivery and surface mail or courier for local delivery. If urgency or security dictates, courier services may be required for overseas delivery. With the agreement of the World Bank, documents may be distributed by e-mail.

<sup>23</sup> Substitute the address for bid submission if it is different from address for inquiry and issuance of bidding documents.