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## **TERMS OF REFERENCE (ToR)**

### **Energy Audit and Power Quality Assessment of Block A, Block B and Block C**

#### **1.0 Background**

KCMC University operates a range of academic, administrative, and clinical-support buildings whose reliable power supply underpins teaching, research, and critical institutional systems, including Information and Communication Technology (ICT) infrastructure. In recent months, Block A, Block B and Block C have exhibited signs of electrical irregularities, including voltage fluctuations, intermittent power outages, and unexplained spikes in energy consumption. These irregularities present operational, safety, and financial risks, and may indicate underlying faults within the wiring, distribution boards, or connected loads.

The Directorate of ICT, in its capacity as a cross-cutting enabler of institutional infrastructure, has requested that a qualified energy audit team be engaged to assess, diagnose, and recommend remedial measures for the electrical systems of the three buildings.

#### **2.0 Objectives**

##### **2.1 General Objective**

To conduct a comprehensive energy audit and power quality assessment of Block A, Block B and Block C in order to establish actual power consumption patterns, evaluate the condition and stability of the electrical supply, and identify any faults or risks requiring corrective action.

##### **2.2 Specific Objectives**

1. Measure and record actual electrical energy consumption for each building over an appropriate monitoring period (baseline load profiling);
2. Assess voltage stability, load balancing across phases, and power factor at main distribution boards and key sub-circuits;
3. Identify sources of voltage fluctuation, intermittent outages, and abnormal consumption spikes;
4. Inspect wiring, distribution boards, circuit breakers, and earthing systems for faults, overloading, or non-compliance with safety standards;
5. Evaluate the adequacy of existing power protection measures (e.g., surge protection, UPS, stabilizers) for sensitive equipment, including ICT infrastructure;
6. Quantify energy losses and identify opportunities for energy efficiency and cost savings;
7. Recommend prioritized corrective, preventive, and improvement measures, including any need for capacity upgrades or dedicated circuits.

#### **3.0 Scope of Work**

The audit shall cover the electrical installations, distribution systems, and connected loads of the following buildings:

- Block A - full electrical distribution system, sub-circuits, and connected critical loads;
- Block B - full electrical distribution system, sub-circuits, and connected critical loads;
- Block C - full electrical distribution system, sub-circuits, and connected critical loads.

The scope shall include, but is not limited to: main incoming supply and metering points; distribution boards and sub-boards; wiring and cabling condition; earthing and lightning protection systems; power factor correction equipment (if any); and connected loads such as lighting, HVAC, ICT/server equipment, and other significant electrical installations within each building.

## 4.0 Methodology

The engaged energy audit team is expected to apply a structured and evidence-based methodology, including but not limited to:

1. Preliminary walk-through inspection of all three buildings to identify visible risks and establish a monitoring plan;
2. Installation of power quality/data-logging meters at main and selected sub-distribution points for a continuous monitoring period of not less than seven (7) days per building, capturing voltage, current, power factor, harmonics, and load demand;
3. Review of historical utility bills and available consumption records for trend analysis;
4. Physical inspection and testing of wiring, breakers, earthing, and protective devices using appropriate instrumentation;
5. Stakeholder consultation with ICT, Estates/Facilities, and building occupants to capture reported incidents and operational concerns;
6. Data analysis and root-cause identification for observed irregularities;
7. Preparation of a findings and recommendations report, including cost estimates for proposed corrective works.

## 5.0 Deliverables

- Inception report outlining the detailed work plan, monitoring schedule, and methodology (within 5 working days of commencement);
- Raw and processed power quality/consumption data for each of the three buildings;
- Draft Energy Audit Report covering findings, root-cause analysis, and recommendations for each building;
- Final Energy Audit Report incorporating feedback from KCMC University, including an executive summary, prioritized action plan, and indicative cost estimates for recommended remedial works;
- A presentation of key findings and recommendations to university management (VC, DVC-PFA, ICT Directorate, Estates).

## 6.0 Timeframe

The assignment is expected to be completed within six (6) weeks from the date of contract signing/commencement, according to the indicative schedule below:

| Activity                                              | Duration | Output           |
|-------------------------------------------------------|----------|------------------|
| Inception & walk-through inspection (all 3 buildings) | Week 1   | Inception report |
| Metering, data-logging & field measurements           |          | Raw data set     |
| Wiring/board/earthing inspection & testing            | Weeks 2  | Inspection notes |
| Data analysis & root-cause assessment                 |          | Analysis summary |
| Draft report submission & review                      | Week 3   | Draft report     |
| Final report & presentation to management             |          | Final report     |

## **7.0 Qualifications and Requirements of the Audit Team / Firm**

- Registered electrical engineering firm or certified energy auditor, in good standing with the relevant Tanzanian regulatory body (e.g., ERB - Engineers Registration Board);
- Demonstrated experience conducting energy audits or power quality assessments for institutional, commercial, or healthcare facilities within the last five (5) years;
- Possession of appropriate calibrated instrumentation for power quality monitoring and electrical testing;
- At least one registered Professional Engineer (electrical) on the assigned team;
- Ability to commence and complete the assignment within the stipulated timeframe.

## **8.0 Reporting and Coordination**

The audit team shall report administratively to the Vice Chancellor's office through the Deputy Vice Chancellor - Planning, Finance and Administration (DVC-PFA). It shall coordinate technical access and day-to-day logistics with the Directorate of ICT and the University Facilities Services (UFS).

## **9.0 Budget and Payment**

The cost of the assignment shall be covered by the budget for the current financial year, 2026/2027. Payment terms shall be discussed and agreed upon at contract signing.

## **10.0 Approval**

These Terms of Reference are submitted for consideration and approval by the Vice Chancellor, with copy to the Deputy Vice Chancellor - Planning, Finance and Administration (DVC-PFA).

**Prepared by:**

A handwritten signature in blue ink, appearing to be 'Gabriel M', with a stylized, cursive script.

**Gabriel M**  
Ag. Head-ICT,  
KCMC University