

**ZANZIBAR ELECTRICITY CORPORATION (ZECO)**  
**ZANZIBAR ENERGY SECTOR TRANSFORMATION AND ACCESS PROJECT (P169561)**

**TERMS OF REFERENCE FOR CONSULTANCY SERVICE FOR DESIGN, PROCUREMENT SUPPORT  
AND SUPERVISION OF SCADA/EMS & SCADA/DMS/OMS/GIS SYSTEMS**

**1. Background**

The United Republic of Tanzania, through the Ministry of Water, Energy and Minerals (MoWEM) of Zanzibar, intends to implement the Zanzibar Energy Sector Transformation and Access Project (ZESTA) with financing from the World Bank. The objective of the proposed project is to expand access to reliable and efficient electricity services and to scale up renewable energy generation in Zanzibar. The project will be implemented over a period of six years and will comprise of three components:

*Component 1: Renewable Energy and Storage Infrastructure Development*

This component will support development of Zanzibar island's first grid-scale solar PV generation plant and battery storage infrastructure. The investment will improve security of supply in Unguja and help to meet the growing electricity demand in the near term, while paving the way for future scale-up of renewable energy.

*Component 2: Grid Modernization and Access Scale-up*

This will include construction of the first 132kV high voltage transmission backbone infrastructure to meet the growing power demand, evacuate power from the proposed solar PV power plant and improve power supply quality and reliability across Unguja. In addition, the proposed project will finance investments for distribution network strengthening and electricity access scale-up.

*Component 3: Sector Institutional Strengthening and Project Implementation Support*

This component will support project implementation, sector institutional strengthening, and design and implementation of key planning, strategy, and regulatory frameworks, including those on energy efficiency and gender.

The project will be implemented by Zanzibar Electricity Corporation (ZECO) and the Ministry of Water, Energy and Minerals (MoWEM) of Zanzibar. ZECO will implement Component 1, Component 2, and relevant parts of Component 3, while MoWEM will implement the bulk of Component 3. ZECO will establish a dedicated Implementation Unit headed by a Project Manager and supported by staff with requisite technical, fiduciary, and social and environmental safeguards skills.

This terms of reference have been developed to describe the requirements for consultant services, to carry out consultancy works including planning, design, preparation of project specifications and tendering including, supervision of proposed new SCADA/EMS System to cater for Transmission network (under construction and the existing) under the project package.

Similarly, to carry out planning, design, preparation of project specifications and tendering including, supervision of Proposed new SCADA/DMS/OMS System for existing distribution network and the one which is planned for construction.

Zanzibar Electricity Corporation (ZECO) intend to procure Modern SCADA/EMS and SCADA/DMS/OMS/GIS Systems for control and supervision of existing Transmission and distribution networks as well as transmission and distribution network under construction which is under the scope of this project. This shall include maintenance support and capacity building.

## **2.0 Project Objectives**

The main objective of the consultancy services is to carry out planning, design, preparation of project specifications, supervision for implementation of the project and preparation of final and other project reports regarding to Proposed new SCADA/EMS system for Transmission network and SCADA/DMS/OMS/GIS System for distribution network as well as OPGW telecommunication infrastructure, focusing in enhancing power system supervisory control and data acquisition. Other objective is to ensure that issuing of central switching command from ZECO Grid Control Center (ZGCC) (to be built) to all four (4) substations (namely 150MVA, 132/33/11KV Mtoni substation, 40MVA, 132/33KV MTC substation, 120MVA, 132/33KV Makunduchi substation and 120MVA, 132/33KV Matemwe substations) as well as command to 132kV Welezo switching station) is achieved and data (power system parameters) from the mentioned stations are acquired and transmitted to ZGCC. ZECO Distribution Control center (ZDCC) (building and systems) complete with SCADA System, Distribution Management System, Outage Management System (OMS), Call Center facilities and GIS database facilities is also foreseen for implementation during this project

Thus, quality of power supply (i.e. declared quality of supply parameters) will be realized through implementation of SCADA/EMS System (Energy Management System) for Transmission and Distribution SCADA, Distribution Management System (DMS), Outage Management System (OMS), Call Center Facilities and GIS database system for distribution network.

Similarly, to advise on the best way we can implement Maintenance Support Services including the necessary tools and equipment for maintenance of SCADA/EMS System and SCADA/DMS/OMS/GIS System under installation.

## **3.0 Project Descriptions**

The main goal for the proposed project for transmission & distribution systems' SCADA/EMS System and SCADA/DMS/OMS/GIS system respectively is to improve performance of power transmission and distribution systems through smooth operation of the mentioned networks. Also, power system application tools to be supplied with the EMS will serve as modern tools for power system analysis and simulation in both online (real time) and off line.

However, call center to be implemented together with SCADA/DMS system will enhance customer services performance while GIS data base will facilitate both distribution network

operations and customer services improvement. Outage Management System will enhance power system reliability performance monitoring and enhancement.

#### **4.0 Scope of the required Services**

The scope of the consultancy services includes but not limited to planning, design, preparation of project specifications and supervision of:-

- i) Implementation of SCADA/EMS SYSTEM (building and the system) for Transmission network, which shall include SCADA system for supervisory control and data acquisition, Energy Management system (EMS) with power system application for real time and offline power system Monitoring, analysis and simulation
- ii) Implementation of SCADA/DMS System (Building and the systems) for distribution networks which shall include SCADA for supervisory Control and data acquisition, Distribution Management System, Outage Management System (OMS), Call Center facilities and GIS Database.
- iii) Implementation of Optic Fibre Ground Wire (OPGW) Telecommunication system for Transmission to cover transmission lines and All Dielectric Self Support (ADSS) Telecommunication system for distribution network to cover medium voltage distribution line to facilitate SCADA/EMS System communication, SCADA/DMS/OMS/GIS Systems communication and communication for Automatic Meter Reading System and power quality monitoring systems planned for implementation in future. The above shall include supervision of installation of telecommunication's terminal equipment and all interface devices.

In additional to the above, the product Maintenance Support Services, provision of tools, equipment and Training is among the key requirements in order to prolong the system life and support the SCADA/EMS System and SCADA/DMS/OMS/GIS systems products performance.

The Successful Consultant will be required to work co-operatively with ZECO staff, stake holders and the public in general for the best achievement of the following obligations

- i) After the Consultant has received a briefing from ZECO Implementation Unit responsible for implementation of the project, he/she will initiate specific discussion on Proposed Transmission SCADA/EMS System and Distribution SCADA/DMS/OMS/GIS to reach agreement on performance expectation for the project.
- ii) The consultant will request from ZECO all available feasibility study report for selected option and design criteria including system condition, service conditions, and environmental conditions as well as the standards currently in use.
- iii) On completion of feasibility study review, data collection and supplementary interviews the consultant will prepare an inception report that will include:

- The consultant understanding and interpretation of the terms of reference.
  - Changes of terms of reference since the start of assignment.
  - An appraisal of the available information and an outline of the consequential field investigation to be conducted if any so as to complement the information already obtained, including any special investigation which may be required just in case.
  - An updated program for the remainder of the assignment as contained in the Terms of Reference (ToR).
- iv) On completion of the work described in the above aforementioned paragraphs the consultant will prepare a report which will include:
- Planning of the project implementation, Preliminary design with drawings.
  - Outlined project specifications.
  - Implementation of Procurement schedules for both pilot project materials and the Contractor.
  - Specific (Particular) Conditions of contract.
  - Cost estimates.
  - An updated program for the remainder of the assignment as contained in the Terms of Reference (ToR).
- v) To prepare bid documents for procurement of the Contractor for the project and participate on whole process of procurement of Contractors including bids evaluation, award, negotiations and preparation of contracts. All these processes will be done in collaboration with Procurement Management specialists under the ZECO IU.
- vi) In all cases of design aspects, the Consultant will use ZECO Code of practice and standards for construction to achieve more consistent vision, workmanship, performance and improve level of safety. The equivalent standards will be acceptable after requesting approval from ZECO IU.
- vii) To supervise the project and provide other necessary consultancy services for the project as stipulated hereunder:
- Assist on conducting pre-construction meeting with the selected Contractor.
  - Undertake construction supervision, providing resident supervision in appropriate circumstances and advising client - ZECO on any matter not taken into consideration before if any.
  - Conduct site meeting and prepare progress report to be issued to Client ZECO.
  - Prepare certificates for ZECO approval of payments to the Contractors.
  - Supervise testing and commissioning of the constructed SCADA facilities under the project.

- viii) To assist ZECO in the issuing of certificate of substantial completion and final certificate for payments to the contractor.
- ix) Monitor latent defects during the maintenance period.
- x) At the end of maintenance period the consultant will carry out the thoroughly final inspection of the works and both prepare and Deliver As-built drawings local adaptation drawings if any to ZECO. The Consultant will also prepare the evaluation report for the project to find out to what extent the project is successful and give some recommendations for necessary modifications in the model if any and adaption of the same designs to entire ZECO transmission and distribution networks.

The consultant will provide the following reports that will be pattern and parcel of the obligations under the Contract. Each report to be submitted in English in both hard and electronic copy, each report will be issued in five (5) copies with one (1) electronic copy:

**An Inception Report** (to be delivered by the end of the fourth week of the consultancy period) outlining and justifying any changes proposed to the TOR as may be required. The report to indicate the impact of any proposed modifications to the achievement of the desired outcomes of the consultancy and any associated cost variations.

**Weekly Progress Reports** for the ongoing construction activities. A standard form for reporting is to be developed by the consultant and approved by ZECO.

A **Final Report**, to be delivered prior to the end of the consultancy period outlining:

The current state of achievement of the desired outcomes of the consultancy, outputs still required (if any), and recommendations for achieving those improvements and

A description of all stages activities undertaken during the consultancy, and recommendations for future activities if considered necessary.

## 5.0 Qualification and experiences

The following key staff from Consultant is considered essential for the Project and must be included in the tender:

### Team leader (Project Manager)/SCADA EMS Expert:

<i>Qualification:</i>	M Sc. or equivalent in Electrical Engineering Fluent in English
<i>Professional experience:</i>	10 years' experience in project management and design of SCADA/EMS & SCADA/DMS/OMS/GIS systems. The Engineer should have previous experience in procurement, engineering, business

administration; knowledge of international organizations/agencies; previous work experience in projects financed by international financial organization. The Engineer should be well versed with WB's procurement guidelines. The Engineer will manage the Consultant's team as team leader and be the SCADA/EMS Engineer at the same time. Previous experience in developing countries in the region is preferable

**Senior EMS/SCADA Engineer:**

*Qualification:* M Sc. or equivalent in Electrical Engineering  
Fluent in English

*Professional experience:* 10 years of relevant experience in applying design and application of SCADA/EMS systems. Previous experience in developing countries in the region is preferable.

**Senior Telecommunication Engineer:**

*Qualification:* M Sc. or equivalent in Electrical Engineering  
Fluent in English

*Professional experience:* 10 years of relevant experience in applying design and application of telecommunication systems. Previous experience in developing countries in the region is preferable.

**Transmission Line (OPGW) Engineer:**

*Qualification:* BSc. or equivalent in Electrical Engineering  
Fluent in English

*Professional experience:* 5 years of relevant experience in design of transmission lines. Previous experience in developing countries in the region is preferable.

**Senior Electrical Engineer:**

*Qualification:* BSc. or equivalent in Electrical Engineering  
Fluent in English

*Professional experience:* 10 years of relevant experience in applying design and application of RTU and adaptation works. Previous experience in developing countries in the region is preferable.

**Senior Civil Engineer:**

<i>Qualification:</i>	BSc. or equivalent in Civil Engineering Fluent in English
<i>Professional experience:</i>	10 years of relevant experience in power transmission projects. The specific experience of Control Centre Buildings is required, with emphasis on Control Room design. Previous experience in developing countries in the region is preferable.

**5.1 Facilities**

The consultant shall provide all office equipment, office running costs and any other requirement to deliver the expected outcomes and results.

**5.2 Duration and timing**

The consultancy services are expected to be provided from for the period of 18 months. It is anticipated that the design and construction contract procurement process will take 6 months and construction supervision will take 12 months. It is expected that the commencement of the project implementation will be within one month of signing of the construction contract. Defect liability period for facilities shall be 24 months

**6. Monitoring / Progress control**

Monitoring and progress control will be the sole responsibility of Client (ZECO) under the leadership and guidance of the Project Manager. This will be done through reviews of the consultant's work at critical stages.