TANZANIA ELECTRIC SUPPLY COMPANY LIMITED

"We light up your life"

Terms of Reference for Provision of Consultancy services for construction supervision of the proposed 87.8 MW Kakono Hydropower Project (KHPP) and Transmission line in Kagera Region, Tanzania.

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TANESCO HEAD OFFICE - DODOMA,
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Contents

ACRONYMS

AfDB	African Development Bank
AFD	French Development Agency
EU	European Union
RNE	Royal Norwegian Embassy
IPoE	Independent Panel of Expert
OHTL	Over Head Transmission Line
OSHA	Occupational Safety and Health Administration
RCC	Reinforcement Concrete
EPC	Engineering Procurement and Construction
MW	Megawatt
NEMC	National Environment Management Council
kV	Kilo voltage
IPtot	Total Installed Power
FIDIC	International Federation Consulting Engineers
HPP	Hydropower Project
GWh	Annual Growth Power
EPP	Emergency Preparedness Plan
EA	East Africa
ESIA	Environmental and Social Impact Assessment
SEP	Stakeholder Engagement Plan
RAP	Resettlement Action Plan
TANESCO	Tanzania Electric Supply Company Limited
TBS	Tanzania Bureau of Standards
PAP	Project-Affected People

TERMS OF REFERENCE

Provision of Consultancy Services for Design Review, Tendering and Construction supervision of proposed 87.8 MW Kakono Hydropower and Transmission line Project.

1. INTRODUCTION

The Government of Tanzania through the Tanzania Electricity Supply Company Limited (TANESCO) is developing Kakono hydropower project in Kagera River. The project has been studies to full feasibility level in 2014 and later updated in 2019. The overall project objective is to supply electric power from Kakono hydropower station to the national grid and thereby provide stability of power supply in the North West Grid to ensure stable supply of power in the Lake zone and to the nearby countries through EA power pool.

1.1 Location

Kakono hydropower potential site is located on the Kagera River, NW Tanzania near the border with Uganda, approximately 90 km west of Bukoba Municipality. Kakono is the furthest downstream hydropower potential (run-of the river) site among the potential sites existing on Kagera River. The site can be identified on the standard 1:50,000 Nyakanyasi sheet no. 2/1. Kakono site is approximately 50 km from Kyaka Township which is located on Bukoba - Mutukula tarmac road.

1.2 Project Development Objective

The project development objective is "to increase on-grid energy production from least- cost renewables to address the electricity deficits in north-western Tanzania." The development of Kakono HPP will displace the use of fossil fuels in the north-western corner of Tanzania in the Lake Zone where costly diesel power generators are often brought online to either supplement the grid supply or improve the quality of supply to avoid prolonged blackouts and brownouts.

The proposed Kakono hydropower plant, approximately 90 km west of Bukoba Municipality in the north-western corner of Tanzania, will be situated downstream of the three sites, namely, Rusumo, Murongo/Kikagati and Nsongezi along the Kagera River.

The Project will entail the construction of a concrete-faced rockfill dam (about 42 m high and 1,380 m long) and a gravity roller-compacted concrete dam (about 61 m high and 284 m long) producing a hydropower potential exploited through an outdoor powerhouse at the toe of the dam. The dam will create a small reservoir with a live storage volume of 90 million cubic meters allowing the option of daily or weekly regulation of the river flow when necessary. The plant, with an envisaged installed generation capacity of 87.8 MW, will normally operate as a run-of-the-river facility producing about 524 GWh annually corresponding to a plant factor of 68 percent. The energy will be transported through a 38.5 km long 220 kV transmission line to the existing substation at Kyaka.

1.3 Status of the studies for Kakono HPP

The Kakono HPP was studied to full feasibility level by Norplan A.S. of Norway and completed in November, 2014. The study included ESIA for both HPP and the transmission line.

In 2018 March, TANESCO engaged M/s SP Studio Pietrangeli Consulting Engineers (from Italy) to undertake additional geotechnical Investigations, update the feasibility study and subsequently prepared a conceptual design including tender documents. The following are the salient features from the updated Feasibility Study for Kakono Hydropower Project dated October 2019: -

Plant/Site	Kakono
River	Kagera
Gross Head	33 m
Full Supply Level	1189 m.a.s.l
Turbine Discharge	316 m3/s
Installed Capacity	87.8 MW
Average annual Energy	524 GWh
Investment cost MUSD	287.6
Construction time	52 Months

From the above results the project is technically observed to be a feasible which offers safe, rational and reliable setup which reduces technical risks related to its implementation to the minimum extent.

The evacuation of power from Kakono HPP to the national grid is through the nearest existing substation Kyaka 132/33kV approximately 38.87 km which is connected to Uganda Power System by 132kV transmission line and continues up to Bukoba. The East Africa Power Pool plans to construct 220 kV line in the near future.

1.4 Project Components

Kakono HPP is a planned run-of-river project with an intake reservoir with limited active storage capacity of (V=150Mm3). According to the 2019 Feasibility studies, the project will include an RCC gravity dam with two conventional concrete blocks (H=61m, L= 284m) in the river bed, a concrete Face Rockfill Dam on the left and right abutment (Hmax=48m, L= 1380m) and an outdoor power house located at the dam toe (IPtot=87.8 MW, E=524GWh/year). The power will be evacuated to the national grid through the nearby 132kV/33kV Kyaka substation located in Missenyi district. The following are projects components: -

- **Component 1: Hydropower plant** This will encompass the civil works and electromechanical supply as well as the balance of plant for the proposed 87.8 MW run-of-the-river generation facility and the switchyard. Also, the works will entail the construction of permanent camps (i.e., staff accommodation) and offices including a primary school and a health center in

addition to a 28 km long asphalted access road integrated in the Project. Construction of the access road and auxiliary works

- **Component 2: Evacuation facilities** This component will cover the evacuation facilities, namely, the supply and construction of a 220 kV single-circuit overhead transmission line, 38.5 km long, and the extension and uprating of the existing substation at Kyaka from 132/33 kV to 220/132/33 kV
- **Component 3: Project administration and management.** This will comprise both consulting and non-consulting services:
- **Component 4: Implementation of the Environmental and Social Management and Monitoring Plan, ESMMP**

1.5 Project Financing

The Project is financed through a joint effort of the financers including the African Development Bank, AFD and European Union (EU-AIP).

1.6 Project Procurement and Contract Package

Procurement of this Project will be based on Open Competitive Bidding Procedures as indicated in the Bank's Rules and Procedures for use of Consultants May 2008 Edition, Revised July, 2012 and updated August, 2020. The contract package of Kakono HPP includes the following;

(i) Lot 1 – Construction of the access road and auxiliary works
(ii) Lot 2 – Construction of Civil Works and Hydraulic Steel Structures
(iii) Lot 3 – Electrical and Electromechanical works
(iv) Lot 4 – Construction of Transmission Line and Extension of Kyaka substation

Table 0:1 The bid document will be composed as follow: -

Lot	Procurement Method	Works concerned
LOT 1	NCB Procurement Package	Access roads, access road bridge, site roads, permanent camps and Offices/facilities including all the activities to make the site accessible, build engineering such administration offices, housing, water, sewage, electricity, offices, schools, clinic, recreational areas, fencing and parking area.
LOT 2	ICB Procurement Package	River diversion works, Gravity Dam, Embankment Dam, Non Overflow Dam, Spillway (Overflow Dam – Spillway), Bottom Outlet And Control Building, Power house, Switchyard and Hydraulic Steel Structures (Intake, Spillway, Bottom outlet, Draft tube stoplog, and Crane)
LOT 3	ICB Procurement Package	i) **MECHANICAL SUPPLY** (Turbine, governor and auxiliaries, Drainage and

		dewatering systems, Cranes equipment, Spare parts including blades set, HVAC, Firefighting system, sewage treatment, water supply, ii) **ELECTRICAL SUPPLY** (Synchronous Generators (10.5 kV, 50.6 MVA), Switchgear, excitation system, cabling, neutral point, 53.1MVA Step-up transformers with on-load tap changer and accessories (including a spare unit)) iii) AUXILIARY SYSTEMS (Auxiliary transformers, LV unit distribution boards and main distribution board, Cable connection between step-up transformers and switchyard, 220kV, SCADA, Earthing system, and Balance of Plant (Diesel generator, lighting/socket/PV systems, DC battery system, MV cable lines, mechanical workshop, hydraulic measurement systems)) iv) SUBSTATIONS (220kV equipment bay at Kakono & Kyaka, Control, protection and metering with optic fibre at Kakono & Kyaka, Busbars and ancillary equipment, Spare parts for electrical equipment and BoP, Contractor's design and investigations)
LOT 4	**ICB Procurement Package**	i. for supply, installation, testing and commissioning of 220 kV Transmission line from Kakono HPP to nearby Substation along the 220kV transmission line. Kakono HPP to Kyaka Substation route length is 38.7 km. ii. For Supply, installation, testing and commissioning of 132/33Kv Kyaka Substation Extension

1.7 Project Executing Agency

The United Republic of Tanzania is the borrower of two separate loans from the African Development Bank and Agence Française de Développeme (AFD).

The Tanzania Electricity Supply Company (TANESCO) will be the Implementing Agency of the project. TANESCO will be responsible for overall coordination of the project implementation activities.

1.8 Project Coordination

To ensure effective coordination and implementation of the project, TANESCO will establish project implementation Teams (PITs) for the purpose of implementing the project components that fall within their territories. The PITs will manage all aspects of project implementation, assisted by the project consultant. The PITs shall include a Project Manager, Substation Engineer, Transmission Engineer, Protection Engineer, Hydrologist, Civil Engineer/Dam instrument, Accountant, Procurement Specialist, Environmental Specialist, Social Expert and Monitoring and evaluation expert.

1.9 Project Site Organization

The Project site organization shall be set up by the Consultant in order to control all aspects of the implementation of the Project. All staff of the Project shall be under the sole responsibility of the Consultant. However, in order to enhance the in-house capability of TANESCO in Project Management and Supervision, Counterpart Staff shall be assigned by TANESCO as required to the Project Site Organization established by the Consultant.

2.0 Objective and purpose of consultancy services

2.1 Purpose

The purpose of this consultancy assignment is to assist TANESCO in the preparation and implementation of the project as it has been drawn and concluded in the final Feasibility Report submitted in October 2019.

2.2 Main Objective of the Consultancy services

The main objective of the supervision consultant is to serve as Owner's Engineer to the procuring agency/TANESCO and ensure the successful implementation and timely delivery of 87.8 MW Kakono HPP and transmission line project. This will encompass the consultancy services for project management and supervision of the hydropower plant, transmission line, and substation works including the related facilities. The scope of services for the recruited consulting firm will include: (i) reviewing the technical designs to prepare gender-responsive draft bidding documents, providing support to TANESCO throughout the bidding process, and supervising the construction works; and (ii) contract management as well as quality assurance, cost and schedule control, and monitoring of issues in relation to the relevant safeguards. Also, the Consultant will undertake a gender-responsive capacity assessment of TANESCO, EWURA, MoFP and MoE in relation to sustainable development of hydro resources including the operation and maintenance of hydropower plants. Also, the Consultant shall ensure that all elements of the project implementation including the construction contracts for auxiliary works, main works, RAP and ESMP are well coordinated, thus minimizing

the scope for completion and commissioning delays due to programming constraints or incompatibilities between individual components.

3.0 SCOPE AND APPROACH

This section describes the detailed scope of works of the Consulting Services required for the Project. The Consultant shall be available during construction contract negotiations to assist TANESCO in the contract negotiation with the successful Bidders and prepare minutes of negotiation and also Contract Documents. Negotiation and Contract Award for the transmission line lots shall be carried out by TANESCO.

Proper administration and disbursement of the contracts, the consultant will assist preparing Contract Documents for works.

3.1 Detailed Scope of the Work

The scope of the consultancy services has been categorized into three (3) different phases, which are presented below.

3.1.1 Phase 1 (Pre-construction Stage):

The works will include inception works from review of the available documents, preparation of user requirements and procurement process of the EPC contractors. The pre-construction phase will continue up to award of Contracts for EPC contractors.

The Consultant role during the pre-construction stage shall include but not limited to the following:

a) Review of project documents including tender documents, RAP, ESMP, engineering studies and design based on 2019 Feasibility study;
b) Preparation of Inception Report;
c) Preparation of project user's requirements;
d) Assistance to TANESCO during procurement processes (advertisement, clarification, site visit, evaluation and contract negotiations);
e) Assistance to TANESCO in Planning and Coordinating of RAP implementations and ESMP activities;
f) Assistance to TANESCO in establishing, reviewing and monitoring timeline for project implementation;
g) Prepare update time schedule for the project (consultant services as well as the implementation project);
h) Prepare update Logical Framework Approach matrix;
i) Prepare update cost estimate for the project;
j) Attendance at regular meetings with TANESCO, and others as required;
k) Project reporting to TANESCO.

3.1.2 Phase 2 (Construction Stage):

The consultant shall act as the Owner's Engineer as defined in the standard contract documents and with the duties described therein. All notices, instructions, orders,

certificates, approvals of the design and all other communications under the contract should be reviewed and verified by the consultant before submitting to TANESCO for approval. The Consultant shall coordinate all activities as listed in the ESMP during project implementation.

The main objective of the owner's engineer assignment for the Kakono HPP is to ensure that the project is carried out efficiently and in compliance with the requirements of the Contracts and to the standards and requirements of AfDB and other Development Partners. In order to achieve this goal, the owner's engineer shall carry out the following tasks on behalf of TANESCO;

a) Review and approval of detailed and final engineering design of the project prepared by the EPC contractors to ensure technical soundness prior to implementation of works;
b) Carrying out supervision of works to ensure compliance with the approved Designs, Drawings, Specifications, Contracts, Tanzania Grid codes, schedule of work and best Engineering practice;
c) Coordination of project activities of all parties executing the project to achieving the planned implementation schedule;
d) Review, supervise and monitor Contractors' quality and safety plans;
e) Reviewing, evaluating, discussing and verification of payment invoices issued by Contractors;
f) Preparation and provision of certificates and approval for payments for works completed in accordance with the Contract;
g) The Consultant shall ensure smooth completion of the project through effective supervision and monitoring of construction progress;
h) During the project construction period the Consultant shall conduct project progress meetings in a timely manner;
i) Review of project submittals;
j) Attend Factory Acceptance Tests at site and/or at manufacturers premises;
k) Carrying out supervision of activities during installation, testing and commissioning;
l) Preparation and monitoring of defect list during defect liability period and/or warranty period and supervise correction of defects;
m) Assessment and evaluation of claims from the contractor and assist the client on reasonable measures for settlement of dispute in cases agreements cannot be reached;
n) Coordination of RAP and ESMP activities in timely manner;
o) Monitoring of timeline and progress of all project components and identifying potential critical activities;
p) Liaison and compliance to local and international standards from relevant authorities (NEMC, OSHA, TBS, etc.);
q) Liaison with panel of experts;
r) Preparation of project manual, specifying the routines to be followed.

s) Preparing and submitting periodic and other reports on above matters to TANESCO;
t) Approval of issuance of acceptance and completion certificates;
u) Preparation of Project Completion report.

3.1.3 Phase 3 (Post-construction stage):

The consultant shall assist TANESCO in matters related to warranties, guarantees and defect liabilities. Also, participate in an inspection at the end of the defect liability period, confirm as built drawings and preparation of the completion report.
The Consultant's role during the post-construction stage shall include but not limited to the following:

a) Supervision of correction for defects under all contracts;
b) Collation and preparation where appropriate of Operations and Maintenance manuals, as-built drawings and other design/construction records;
c) Coordination of monitoring of RAP and ESMP activities;
d) Liaison and compliance to local and international standards from relevant authorities (NEMC, OSHA, TBS, etc.);
e) Liaison with panel of experts;
f) Timely Reporting to TANESCO.

3.4 Deliverables

The Owner's Engineer main deliverables include; The Consultancy will be directly responsible for monitoring the Project's performance against the agreed indicators that will be reported on a monthly, quarterly, and yearly basis. The monthly and quarterly progress reports will be prepared by the supervision consultant.

a. Submit annual audit reports (comprising financial & technical, procurement and ES compliance),
b. Submit quarterly progress reports and monthly ES reports.

3.4. 1 Phase 1 – Pre-construction stage

- Inception Report
- Employer's Requirements
- Tender Documents for EPC contracts
- Evaluation and negotiation Reports
- Signed EPC Contracts

3.4.2 Phase 2 – Construction stage

- Detailed design and construction design prepared and submitted by EPC contractors
- Monthly progress Report
- Quarterly progress Report
- Project Completion Report

3.4.3 Phase 3 – Post - construction stage

- O & M manual prepared and submitted by EPC contractors
- Monthly progress Report
- Quarterly progress Report
- Final project Completion Report
- As-built drawings submitted by EPC contractors

3.5 Scope of Services Phase 1 – Pre construction stage

3.5.1 Engineering and designs

This shall include Review of project documents including tender documents, RAP, ESMP, engineering studies and design based on 2019 Feasibility study covering:

i) Review Project layout and design for HPP and OHTL based on performance and least cost options;
ii) Project implementation, resources planning and cost estimate;
iii) Reporting to TANESCO

The studies and design will be based on existing hydrological, topographical and geological data collected in previous phases.

3.5.2 Preparation of tender documents

The Consultant shall review and update the available Bidding Documents and prepare any required/missing documents in accordance with Financier requirement. The scope shall include but not limited to the following: -

- Assistance during bidding process (responses to request for clarifications, arrangement of site visits, preparation of minutes etc.)
- Assistance during evaluation of the bids, post qualification and contract negotiations

3.6 Scope of Services Phase 2 – Construction stage

3.6.1 Design of Engineering Works & equipment (Civil & Electromechanical)

The Consultant will be responsible for review and approval of the design of the auxiliary works, civil works, electromechanical equipment's, power evacuation facility in accordance with the provisions of the contracts. Also, the consultant shall be responsible for review of the submitted documents and drawings to determine compliance within the agreed timescale as provided in the Contracts.

In the event of non-compliance, the Consultant shall provide details of such non-compliance and issue a "Notice for Correction". In the event that the submittals are found to be compliant with the provisions of the Contract the Consultant shall issue a "approval notice".

3.6.2 Supervision of Construction works

The Consultant shall supervise implementation of the project contracts. Activities to be performed on site for the civil, electrical and electromechanical works will consist of the following:

a) Review and verification of the Quality Assurance and schedule of the executed works, supervise tests performance required for quality compliance of materials used in construction, in particular soils, rocks, aggregates, cement, reinforcement steel bars, etc. analyze test results;
b) Check the quality control and safety procedures proposed by the contractors in accordance to relevant international and local regulations (TBS, OSHA, etc);
c) Approve the equipment acceptance procedures to be followed on site by contractors;
d) Recommend any additional modification/variations judged to be necessary in relation to the provisions set forth in the contract;
e) Verification of Dam Monitoring and Instrumentation Systems, the consultant shall check the civil works for their correct placement, installation, connection, verify readings and issuance of acceptance certificates;
f) Inspect and supervise measures needed to ensure safety and environmental protection;
g) Gather all information concerning the site, drawings, sketches and ensure "as-built" drawings for all works are submitted by EPC Contractor;
h) Issue completion and pre-commissioning certificates for the equipment;
i) Ensure that all arrangements required by the environmental and social management plan have been made by the contractors responsible for carrying out the works;
j) Monitoring of Construction Progress;
k) Coordinate, supervise and inspect all aspects of construction, fabrication and assembly;
l) Check the conformity of the drawings with the contractual arrangements on site;
m) Monitor defects reports and the corresponding replacement of damaged equipment;
n) If necessary and where appropriate adapt drawings and working design documents to actual site conditions;
o) Check all final layouts of structures built by the contractors, on the basis of the layout drawings;
p) Check and approval of contractor's construction methods, temporary installations and equipment;
q) Checking the quality control procedures for the concrete mix designs, and steel bars proposed by the contractors;
r) Perform the necessary checks to assess the progress of works and conformity to country and international regulations;
s) Issue payment certificate and record all payment made by the client;

t) Issue completion certificates for the equipment;

u) Reporting to TANESCO.

The Consultant shall monitor the progress of the construction and pursue compliant to the latest agreed version of the Project Implementation Schedule. The Consultant shall arrange periodic co-ordination meetings with the contractors and client to discuss project progress, and to assist in deriving suitable remedial action where necessary to address issues arising. The Consultant shall report regularly to TANESCO at least monthly and more frequently in the event of specific circumstances requiring immediate consideration.

3.6.3 Monitoring of Installation, erection and Performance of Equipment

The Consultant shall monitor the installation of the hydro-mechanical and electro-mechanical equipment,220kV transmission line and all other related main equipment with the associated facilities including workshop inspection and main factory acceptance tests. In particular, the Consultant shall:

a) Monitor compliance with deadlines for manufacturing, testing, shipping and supplying equipment on site by performing systematic inspections;

b) Ensure that equipment comply to contract specifications and standards;

c) Examine any required modification in relation to the contract specifications. Any modification leading to additional costs must be submitted to the TANESCO for approval;

d) Examine and approve the programme for testing and works acceptance proposed by the contractors;

e) Participate in works acceptance procedures and draw up the reports for each works inspection;

f) Ensure that the main items of equipment have been subjected to the prescribed tests on the basis of the corresponding test certificates, which must be submitted to the Consultant for approval;

g) Participate in the type and routine tests for the main items of equipment both on site and at manufacturer's premises.

3.6.4 Commissioning Tests and Works Completion Inspection

Commissioning tests shall be witnessed by the Consultant with the participation of the TANESCO's employees or nominees. The Consultant shall ensure compliance with the established test procedures and performance levels, check the quality and conformity of test reports collect all documents, and approve the test reports drawn up by contractors. These reports shall be signed jointly by the Consultant, TANESCO and the Contractor.

At the end of the construction works and commissioning the Consultant shall:

a) Receive from the contractor detailed program for site tests, which shall consist of commissioning tests, trial operation for the subsequent units and performance and efficiency tests;

b) Witness the specified acceptance procedures for all the structures and equipment (power generation plant, transmission lines and extension of Kyaka substation) and issue the corresponding certificates in agreement with the TANESCO;

c) Check and approve the as-built drawings and diagrams provided by contractors;

d) Review and approve the operation and maintenance manuals provided by contractors.

3.6.5 Certification and Approval of Payments

The Consultant shall review and certify the Contractor's entitlement to payment based on project milestone achieved as defined milestones in contract.

3.6.6 Co-ordination of RAP and ESMP

The Consultant shall liaise with TANESCO for implementation of the Resettlement Action Program and the Environmental and Social Management Plan. The Consultant shall monitor progress by coordinate activities between the Contractors and TANESCO. The Consultant shall draw the immediate attention of the TANESCO to any slippage in the progress of these activities in order that remedial actions to be put in place in a timely manner to allow completion of critical activities.

3.6.7 Site Meetings and Reporting

The Joint Project Manager/ Resident Project Manager and the Consultant staff shall hold site meetings regularly as required with the contractors' site representatives and TANESCO's Staff.

The meeting shall deal with the following matters.

- Approval or rejection of executed work elements;
- Contractor's work schedule
- Contractor's work method,
- Temporary works and additional works (if any)

Minutes of the meeting shall be prepared and signed by the participating parties. Copies of the minutes shall be given to the participants and to the TANESCO's Project Implementation Units within five (5) days after completion of the meeting.

. Other members of the Resident Engineer's field staff shall also attend the meeting.

The consultant shall be responsible to chair the meetings and handling of the minutes. The main objectives of the meetings are to review the project progress reports, and to evaluate the actual site progress. The Joint PIU meetings shall be held every three months. All transport, accommodation and allowance of the Clients' personnel shall be borne by the Consultant.

The allowance rate for accommodation for each staff including hotel and incidental expenses shall be considered USD 450 per day. The Consultant shall chair regular

site meetings with the Contractors to be held at least once per month. This should be done in all three phases.

3.7 Scope of Services Phase 3 – Post - Construction stage

3.7.1 Supervision for Correction of Defects

The Consultant shall provide consulting services to TANESCO during Defects Liability Period of all works (civil, electrical and electro-mechanical equipment). The consultant shall conduct quarterly visits and/or on notification for provision of services during defect liability period, experts from the consultant team will be made available according to the man-month allocated to supervise the activities of the Contractors in rectifying identified defects in the project works and shall ensure that the final works are in accordance with the contract.

Phase 3 shall be carried out by the consultant on receipt of written notification to commence the services. Phase 3 shall be done in accordance with man-month allocated.

3.8 Management of Warranties and Guarantees

The Consultant shall manage all issues related to warrantees and guarantees in accordance with project contracts.

3.9 Preparation of Operation and Maintenance Manuals, As-built drawings

The Consultant shall supervise preparation of detailed Operation and Maintenance Manuals for all works of the Project. Also, the Consultant shall review and approve as built drawings provided by the EPC contractors for the power plant, transmission line and extension of Kyaka substation under all Contracts and shall ensure that these are submitted to TANESCO.

3.10 Site Meetings

The Consultant shall attend and chair regular site meetings with the Contractors to be held at least once per month. The Consultant shall draw up minutes of meetings, periodic defects, correction status reports and shall timely issue such reports to the TANESCO within five (5) days after the meeting.

3.11 INFORMATION EXCHANGE AND REPORTING

3.11.1 Information Exchange

The Owner's Engineer shall check, review, comment and verify the submitted documents according to the time schedule indicated in the contracts.

The Owner's Engineer shall understand practical rules governing the exchange of data and information, the submittal, examination and control procedures of technical notes and drawings, the certification of work progress as well as the transmission of information to TANESCO as explained below;

3.11.2 Technical Documents

Technical Documents are referred to detail design documents consisting of layouts and drawings, calculations, reports, schedules, construction procedures, method statements, Quality control documents, design changes documents for EPC contracts and recorded notes on visits to construction site, manufacturers workshops, design offices and others.

All information produced by the Contractor (submittals) shall be communicated to the Consultant with the awareness of TANESCO.

3.12 Reporting

The Consultant shall report regularly to TANESCO. These reports will primarily serve to record the status of each contractual element of the project with regard to progress of all aspects of the project, identifying any impending problems with respect to project coordination, time over-runs or any situations potentially having cost implications.

a) Monthly report

After jointly site inspection and meeting Consultant shall submit monthly progress reports (hard and soft copies) covering technical and financial matters pertaining to the contracts for construction of the project to TANESCO throughout the duration of the services. The Consultant shall also provide a monthly report of progress relating to the RAP and ESMP drawing upon information from monitoring of the activities of the implementing agencies. The reports will be structured consistent with the individual contracts under the consultant supervision. Programming interface issues will also be addressed in the reports. The reports will be submitted by the 7th day of the month following the reporting period. The monthly report shall be drawn up in soft copy and five (5) hard copies in English.

b) Quarterly report

Throughout the duration of the main works, detailed quarterly reports (hard and soft copies) will be submitted one weeks after the end of each quarter. These reports shall be drawn up in soft copy and five (5) hard copies in English.

c) Preliminary completion report

At the end of the works and after provisional acceptance of the installations under the contracts, the Consultant shall send a preliminary completion report within a period of two months. This report shall take into account both technical and financial aspects and will be produced in soft copy and five (5) hard copies in English.

d) Final completion report

At the end of the guarantee period and after final acceptance under the contracts, the preliminary completion report drawn up after the provisional acceptance of the works shall be updated to form the final completion report for the works. This will then be sent in soft copy and five (5) hard copies in English.

4.0 LOGISTICS, IMPLEMENTATION ARRANGEMENTS AND TIMING

4.1 Location

The site for Construction of Kakono HPP and TL project is in Kagera Region, located about 1600 km north-west of Dar es Salaam and 1200 km from Dodoma. Most activities during the Phase 1 Pre-construction stage will take place at the TANESCO headquarters in Dodoma/Dar es Salaam.

The consultant will be stationed where most of the administration works will be conducted. The Phase 2 Construction stage of the project the consultant will be stationed in Kagera at the project site.

4.2 Implementation Arrangements

TANESCO will provide the following data, services and facilities free of charge for the duration of the consulting services:

- All relevant available reports, data and information
- TANESCO will assist in Facilitation of all correspondences to other Authorities/Agencies (visa, data, permits, insurance, material &equipment's clearing etc)

The following has to be arranged by the consultant:

- All local transports and insurances
- Accommodation and office space for the consultant

TANESCO will form PIU who will work on full time or as per requirements in the project agreement. The team will provide liaison with the TANESCO headquarters, regional offices, other government institutions etc. Furthermore, the team will be responsible for coordinating additional counterpart staff, which TANESCO will engage to provide assistance required to complete specific tasks.

4.3 Capacity Building and Training

Training and technology transfer components are important aspects of projects. The primary purpose of capacity building is to enhance the technical capacity and thereby improve project sustainability. The consultant is therefore expected to be fully aware of this philosophy and should exert their best efforts in involving TANESCO personnel in all aspects of the planning, design and supervision work to be carried out.

The Consultant shall prepare a preliminary program for training of various categories of professionals in the proposal, which later will be finalized in cooperation with the Client. The proposal should include specialized training in the fields of engineering

planning, surveying, hydrology, engineering geology, engineering optimization and design, environment and Project Management. Although the Consultant shall prepare the preliminary training program inclusive of the indicative budget, the cost of the trainings is not part of evaluation of the Consultant's Financial Proposal. This activity to prepare the training program shall be part of the Phase 1 Pre – construction stage.

4.4 Time Schedule

The services are expected to be delivered over a period of six years and two months comprising;

- Phase 1 – Pre-construction stage services – 12 months
- Phase 2 – Construction stage services – 52 months
- Phase 3 – Post- construction stage services – 12 months

5.0 QUALIFICATIONS AND EXPERIENCES

5.1 Engineering Activities

The Consultant team shall in briefly comprise of at least the following key personnel with specializations listed below. These key staff should be dedicated to the project for Consultancy Services of the Kakono Hydropower Project and their time commitment clearly identified and adhered to during implementation period of the entire project consulting services.

a) Project Manager/Team Leader
b) Resident Engineer
c) Civil Engineer
d) Hydrologist/Water Resources Engineer
e) Geotechnical Engineer/ Engineering Geologist
f) Electromechanical Engineer(s)
g) Electrical Engineer
h) Transmission Line Engineer
i) Power System specialist
j) Procurement/Contract specialist
k) Environmental Expert
l) Social Safeguard specialist
m) Gender Expert

It is however practical for some of the above mentioned personnel to work on backstopping arrangement from the home office or as may be arranged by the Consultant himself.

5.2 Key Experts

The following key experts are foreseen to be required in the core team. The core team is expected to carry out most of the on-site activities as per allocated man-months. However, the presence of all the key experts is not expected to be

necessary during the complete implementation phase. The core team members should have in-depth international expertise as well as local and regional knowledge.

Table 5:0:1 Required qualifications for experts

No.	Position in Team	Required Qualifications, Experience and Roles
1	Project Manager/Team leader	**Qualification** The team leader should have minimum Master's degree in hydropower, electrical, mechanical, civil engineering (or other related field) or equivalent professional qualification **Experience** Minimum experience of fifteen (15) years, out of which ten (10) years should be in hydropower and a strong background in construction of Hydropower Projects, project management, procurement, contract management, construction supervision of similar works and other related (for this position) tasks as described in detail in these Terms of Reference. **Roles** The Project Manager/Team Leader shall be responsible for the proper conduct of the entire supervision of construction of the hydropower plant, transmission line project and shall be the principal contact person between the project supervision/ management team and the Client.
2	Resident Engineer	**Qualification** Graduate in Civil Engineering or relevant qualification from recognized institution **Experience** Minimum of fifteen (15) years of experience, out of which ten (10) years should be in hydropower. **Roles** The Resident Engineer shall be responsible for day to day site activities of the project.
3	Civil Engineer	**Qualification**

		Graduate in Civil Engineering from recognized institution and postgraduate is added advantage **Experience** Minimum experience of ten (10) years, out of which a minimum of eight (8) years must be in the design of civil components of hydropower projects **Roles** The Civil Engineer shall be responsible for design, inspection and monitoring of civil related infrastructures of the project.
4	Hydrologist/ water resources engineer.	**Qualification** The hydrologist shall have a minimum MSc degree qualification in a relevant field **Experience** Minimum of fifteen (15) years overall experience and ten (10) years of relevant experience. The Hydrologist shall be a professional with proven experience in hydrological data analysis and modeling in connection with river basin management and dam designs in developing countries. They shall also have proven track record in climate change modeling and scenario building in river basins and associated economic activities on large-scale infrastructure, including dams. **Roles** He/she shall be responsible for catchment management, conducting hydrological analysis and sediment modeling .

5	Geotechnical Engineer/ Engineering Geologist	**Qualification** Post Graduate in relevant field of Engineering from recognized institution **Experience** Minimum experience of fifteen (15) years out of which ten (10) years must be in design and construction of foundations and underground works associated with hydro power projects. **Roles** The Geotechnical Engineer shall be responsible for design, inspection and monitoring of geological and geotechnical issues of the project.
6	Electromechanical Engineer	**Qualification** Graduate in Electromechanical/Mechanical Engineering from recognized institution **Experience** minimum of ten (10) years of experience, out of which eight (8) years should be in hydropower. **Roles** The Electromechanical Engineer shall be responsible for day to day site activities related to supervision of engineering, procurement, fabrication and installation of electromechanical equipment.
7	Electrical Engineer	**Qualification** Graduate in Electrical Engineering from recognized institution **Experience** Minimum of ten (10) years of experience, out of which eight (8) years should be in hydropower **Roles** The Electrical Engineer shall be responsible for day to day site activities related to supervision of engineering, procurement and installation of electrical equipment for the project.
8	Transmission Line	**Qualification**

	Engineer	Graduate in Electrical Engineering or electromechanical from recognized institution **Experience** With at least ten (10) years of experience in the field of substations and high-voltage transmission lines. **Roles** The Transmission Line Engineer shall be responsible for day to day site activities related to supervision of engineering, procurement, construction and installation of transmission and substation for the project.
9	Power System Specialist	**Qualification** Post Graduate in a relevant field of engineering from recognized institution **Experience** Minimum experience of fifteen (15) years, out of which a minimum of ten (10) years must be in supervision of hydropower projects and telecommunication systems. **Roles** He/she shall be responsible for design, integration, configuration, inspection and monitoring of power system control and protection facilities for the project including SCADA system and telecommunications equipment.
10	Procurement/Contract Specialist	**Qualification** Graduate in Procurement /Engineering or any relevant field from recognized institution and registered by relevant professional institution **Experience** Minimum of ten (10) years of experience from international procurement of works contracts. The expert should be familiar with the FIDIC Procurement Guidelines and Regulations. **Roles**

		The Contract Specialist shall be responsible for the proper conduct of the procurement process and contract management.
11	Environmental officer	**Qualification** Graduate in Environmental or Social Sciences or other appropriate discipline. **Experience** Minimum of ten (10) years' cumulative experience in conducting EIA studies in hydropower station infrastructure projects and supervision for implementation of ESMP. He/She must have at least five (5) years of specific experience in similar capacity and projects of similar nature with extensive experience of environmental and social projects in developing countries **Roles** The Environmental officer shall be responsible for preparation and supervision of the implementation of ESMP and related management plans
12	Social Safeguard Specialist	**Qualification** Graduate in Social Sciences or other appropriate discipline with extensive experience of social projects , in developing countries including management of involuntary resettlement programs **Experience** She/he must have a minimum of ten (10) years' cumulative experience in social welfare and community services and at least five (5) years of specific experience in similar capacity in construction industry of similar nature. **Roles** The Social Specialist shall be responsible to manage the day to day communication, appointments and administrative functions of the RAP Program including review and update the resettlement action plan for the project for

		compliance with relevant legislation, standards and regulations.
13.	Gender Expert	**Qualification** Master's degree or equivalent in social sciences, law, gender/women's studies, international development, international relations, or a related field with extensive experience of Gender projects in developing countries. **Experience** • At least 10 years of professional working experience in the field of gender, women's rights and women access to Justice. • At least 10 years of professional working experience in the field of institutional and organizational capacity building. • At least 10 years of professional experience in the field of developing and delivering training programmes on gender and gender mainstreaming. Experience in training on women's access to justice is an asset. • At least 10 previous assignments in areas related to developing gender analysis or gender policy papers, gender responsive planning and budgeting or other relevant fields. **Roles** • Prepare monthly reports (using AFD and AFDB Women template) and submit it to TANESCO highlighting main achievements, including related knowledge products, challenges and lessons learnt. The report should include documentation of significant processes as well which led to actual change or result, and a monthly plan for the next month. • Support the Gender Units in developing selected policies and procedures in line

		with the work plans. • Monthly progress report outlining and describing progress made in line with approved monthly work plan; In addition to a monthly work plan for the next month • Conduct a capacity assessment for the Gender Units at the three institutions, to identify their capacity and organizational strength, weakness, gaps, challenges and opportunities • support the Gender Units to promote gender sensitive working environment at the three institutions, including the Head Quarters and district Offices.

5.3 Support Staff and Backstopping

The Consultant may supplement this list if found necessary, or combine some of the positions if Consultant's experts are experienced in several tasks. The consultant will also be required to put in place adequate site and office support staff to efficiently discharge the responsibilities under the contract.

5.4 Man-month estimate

The minimum total minimum estimate of man-months by the clients is 463 man-months. However, the consultant, based on the complexity of each activity and understanding of the required services to be rendered, shall propose their own quantities of man-months for any of key personnel and the total man-months shouldn't be less that the total minimum estimated by the client (s).

5.5 Estimated Minimum Consultant's man-months

No.	Key Expert	Phase 1 (Pre-Construction Phase)				
		Lot 1	Lot 2	Lot 3	Lot 4	Estimated Man-month
1	Project Manager/ Team Leader	1	4	4	3	12
2	Civil Engineer	1	4	1	1	7
3	Hydrologist/water resources Engineer	0	2	0	0	2
4	Geotechnical Engineer/ Engineering Geologist	1	3	0	1	5
5	Electromechanical Engineer	0	1	6	2	9
6	Electrical Engineer	0	1	4	4	9
7	Transmission Line Engineer	0	0	0	6	6

8	Power System Specialist	0	0	3	3	6
9	Procurement/Contract Specialist	1	2	2	2	7
Total Minimum Man-month		**4**	**17**	**20**	**22**	**63**

No.	**Key Expert**	**Phase 2 (Construction Phase)**				
		Lot 1	**Lot 2**	**Lot 3**	**Lot 4**	**Estimated Man-month**
1	Project Manager/ Team Leader	12				12
2	Resident Engineer	52				52
3	Civil Engineer	6	38			44
4	Hydrologist/water resources Engineer	0	15	0	0	15
5	Geotechnical Engineer/ Engineering Geologist	2	28	0	2	32
6	Electromechanical Engineer	0	2	32	2	36
7	Electrical Engineer	1	2	27		30
8	Transmission Line Engineer	0	0	0	21	21
9	Power System Specialist	0	10			10
10	Procurement/Contract Specialist	24				24
11	Environmental Officer	52				52
12	Social Safeguard Specialist	52				52
Total Minimum Man-month						**380**

No.	**Key Expert**	**Phase 3 (Post-Construction Phase)**				
		Lot 1	**Lot 2**	**Lot 3**	**Lot 4**	**Estimated Man-month**
1	Project Manager/ Team Leader	1				1
2	Civil Engineer	4				4
3	Electromechanical Engineer	0	0	4		4
4	Electrical Engineer	0	0	4		4
5	Transmission Line Engineer	0	0	0	3	3
6	Environmental Officer	4				4
Total Minimum Man-month						**20**

Cumulative Person-month (Phase 1 + Phase 2 + Phase 3)	**463**

5.6 Project Office and Vehicles

During phase 1 of the assignment the consultant shall be responsible for his own project office and transportation. During the construction the contractors shall

provide transportation for the Consultant and TANESCO PIU. The Construction Contractors will supply the vehicles within three (3) months after receiving the advance payments. The Construction Contractors shall cover all the related costs to those supplied vehicles (insurance, maintenance, fuel, drivers, etc.) during the project supervision phase.

5.7 Payment

The terms of payment shall include a combination of fixed price lump sum elements and variable time-based elements to reflect the nature of the various parts of the assignment. The consultant shall prepare a financial proposal comprising two components as follows: (i) Lump sum for phase 1 and the payment will be made upon completion of the deliverables indicated in phase 1, and (ii) time-based for phase 2 and 3. The payment will be made upon submission of the justification. The proposal should clearly reflect the costing itemized in relation to Phase 1, Phase 2 and Phase 3 as follows: -

Construction of the access road and auxiliary works
Construction of Civil Works and Hydraulic Steel Structures
Electrical and Electromechanical works
Construction of Transmission Line and Extension of Kyaka substation

Table 5:1 Phase 1: Pre – Construction Stage (Lump sum)

Deliverable	Payment
Advance Payment (upon signature of Contract and submission of advance payment Guarantee)	10%
Inception Report Submission	15%
Review and approval of the basic design, preparation of the user's requirement and review of the bidding documents	20%
Approval of the Evaluation reports, Minutes of contract negotiations, and release contract award (award letter) apportioned accordingly to lots	30%
Contract Signature (EPC contractors) apportioned accordingly to the lots and Submission of the Performance Guarantees from the EPC	30%
Site handover and approval mobilization plan	5%

5.7.1 Phase 2: Construction Stage (time-based)

The payment during phase 2 shall include the following fees and expenses: -

i) Home office coordination;
ii) All travel expenses;
iii) All personnel remunerations;
iv) All field expenses including working equipment and materials, local travel

running cost, house accommodation, etc.

v) Expenses of the workshop, meetings including, travel expenses, accommodation, international transport, allowances/per diem, travel insurance, cost of venues, etc.
vi) Project office costs

Also, the invoicing shall be itemized in accordance to the lots. The Financial Proposal shall be clear and formal as possible with breakdowns of each subtotal into remuneration, reimbursable, miscellaneous and grand total for each item. The payment will be made on monthly basis upon submission of invoices in accordance with contractual terms.

5.7.2 Phase 3: Post construction stage (time-based)

Payments will be made according to the person-month distributed over the defect liability period for supervision of the activities of the Contractors in rectifying identified defects in the project works and shall ensure that all matters related to guarantees, warranties and defect liabilities are well managed and concluded as per contract.

6.0 TIME AND MANNING SCHEDULES

The Consultant shall prepare time and manning schedules to be agreed jointly by the Client

7.0 DURATION OF ASSIGNMENT

The timeframe for the entire consultancy services is estimated to be Seventy-six (76) calendar months comprising 63 and 400 person months for lump-sum contract (i.e., Phase 1 - pre-construction Stage) and the time-based contract (i.e., Phase 2 - construction Stage and Phase 3 - post-construction Stage) respectively. The expected time schedules for the lump-sum and time-based contracts are 12 months and 64 months respectively. Consultants may comment on the timeframe in the proposals.

Project Implementation Structure