TERMS OF REFERENCE (ToR) – CONSULTANCY SERVICES FOR CONDUCT BUSSNESS IMPACT TO ENABLE INSTALLATION OF FIRE HYDRANT, DELUGE AND FIRE DETECTION AND SUPPRESSION SYSTEMS AND REACTIVE POWER COMPENSATION STUDY OF GRID NETWORK.

1. BACKGROUND

Tanzania Electric Company Limited (TANESCO), a state owned vertically integrated electric utility company, is the main operator in the electricity sector in Tanzania. Currently, operates the system with Generation consisting mainly of Hydro and Thermal based Generation with an installed capacity of 1573.65MW composed of hydro 573.7MW (36.44%), natural gas power plants 901.32 MW (57.25%), liquid fuel power plants 88.80MW (5.64%) and Biomass plants 10.5MW (0.67%). The country's maximum demand is 1230.08 MW which composed of grid connected (96.20%), off grid (1.70%) and imports from neighbouring countries (2.01%).

The company's transmission system comprises of fifty-seven (57) Substations interconnected by transmission lines. Transmission lines network comprises of 3010.7 km of 220 kV, 1672.57 km of 132 kV, 543 km of 66kV and 670 km 400kV totalling **5896.27 km** by the end of December 2019.

TANESCO Power System is characterized by the location of the most power plants being situated in the southeast of the country while the major load centres, Dar es Salaam and Coast regions are in the East; Arusha is in the north; Dodoma and Morogoro in the middle; Mwanza, Geita and Shinyanga in Lake zone and Mbeya in the South. Power transmission to these areas is limited via a backbone of 400kV operating in 220kV running from Iringa – Dodoma-Singida-Shinyanga and multiple 220, 132 and 66kV lines with associated substations running from south to all over the country to carter for the load.

Like many other power systems, the generation and transmission parts of the Tanzania Power System are in the order of +30 years. Rising power demand in the country has reduced the operational margins of the 220kV main grid, and also the 132kV and the 66kV sub-transmission grids throughout the country. The condition which necessitated the move to 400kV; however, the same poses operational challenges with regard to voltage profile stability in the grid network.

In addition to that, fire hazard has also remained to be the highest risk in TANESCO operations due to the nature of company core activities that is Generating, Transmitting and Distributing electricity where heat can easily be generated as a by-product. The company has recorded several fire accidents mostly in grid substations where inadequate firefighting equipment has been among the reasons of not been able to contain the fire to minimize the damage. That being the case, adequate fire prevention and protection is required to be installed to the company assets such as Generators, Transformers, Switch gears, Machineries, buildings and other items all to ensure the company meet its objective.

Most of the firefighting equipment currently existing are trolley and portable fire equipment and few grid substations has fire detection. In the event of fire accident which mostly include explosion the most suitable and recommended firefighting equipment are deluge, fire detection and suppression system and fire hydrant system. In this case to ensure installation of the respective fire protection infrastructure, design works and cost quantification has to be compiled to facilitate funding and ultimately installation.

2. OBJECTIVES OF THE ASSIGNMENT

In order to ensure that, no loss of equipment or minimal loss due to fire accident in the grid substations, TANESCO wishes to install fire detection, protection and suppression system in the grid substation starting with ten (10) key substations. These are Ilala, Kipawa, Msamvu, Tagamenda, Zuzu, Ibadakuli, Singida, Njiro, Nyakato and Mwakibete Substations.

In addition to that, in order to restore the operational margins at the earliest and specially to restore voltage stability and maintain voltages within nominal limits in the face of ever rising load, TANESCO also wishes to install reactive power compensation on the Tanzanian grid as may be required, starting with the 400kV grid and coming down to the 220, 132kV and 66kV sub-transmission grids.

The key objectives of installing fire detection, protection and suppression system and reactive power compensation equipment on the grid are: -

a. To ensure minimum damage and/or no loss of property and equipment in the event of fire outbreak.
b. To limit fire spread to other equipment and infrastructure in the substation in the event of fire accident.
c. To ensure safe operating environment of substation staff in the respective grid substation and avoid loss of life in the event of fire accident.
d. Increase power transfer on the existing 220kV, 132kV and 66kV lines as well as future 400kV network to enable them meet future power demand in the medium term.
e. Keep voltages on the 400kV, 220, 132 and 66kV networks within the statutory and regulatory limits of +/-5% irrespective of loading conditions.

3. SCOPE OF WORK

In order to meet the above objectives, the scope of work is divided into two separate assignments as follows:

3.1 ASSIGNMENT I: DALUGE, FIRE DETECTION AND SUPPRESSION SYSTEM

The consultancy services under this assignment will include the following activities: -

i. To conduct site visits to (10) selected grid substations and take all necessary details and requirements (measurements) for designing purpose. The consultant shall provide transport for his own staff during the entire period of the assignment.
ii. Prepare a final report including detailed engineering design and technical specifications for selected solution of Deluge system per power transformers,

Fire detection and suppression system for Control building and fire hydrant system to the selected grid substations.

iii. Seek approval of the design from Commissioner of M/s Fire and Rescue Force as pre legal requirements.

iv. Prepare draft bid document based on the designed solution.

3.2 ASSIGNMENT II: REACTIVE POWER COMPENSATION STUDY

The consultancy services under assignment II is divided into two parts including the following activities:

3.2.1 Part I (Lump Sum Contract)

In Part I of the Consultant's Services, the activities to be carried out by the Consultant are to provide engineering design services and procurement support to TANESCO. This will involve the following: -

i. Carry out power system analysis of the 400, 220, 132 and 66kV grids to identify existing and future transmission constraints and their root causes viz, voltage stability, loop flows, transient stability, oscillations, thermal limits etc. The consultant shall also determine the dynamic reactive power requirements for various nodes of the network. Where necessary, the consultant shall also assess the impact of the existing 33/11kV network with their respective compensation equipment to the study.

ii. For identified constraints, carry out further analysis to determine the ideal compensation solution; ie type (static or dynamic), size and optimum location of the compensation required to meet the stated compensation objectives.

iii. Evaluate the performance of the possible compensation technology options in relation to power losses, cost, reliability, harmonic performance, network steady- state and dynamic performance, protection, and environment conditions.

iv. Carry out field work to confirm practical suitability of proposed solutions such as availability of space in the determined locations, ie 400, 220, 132 and 66kV busbars (substations).

v. Present the recommended compensation solutions describing fully the technology choices, MVAr ratings, steady state/dynamic performance, reliability, costs, protection, etc in a draft and final report. The final report shall take into account TANESCO's reaction to the draft report. The report presentation shall be accompanied by a power point presentation to an audience of TANESCO staff at a venue and time to be arranged by the Consultant in consultatION with TANESCO.

vi. Preparation of equipment design, technical specifications and draft bid document for the selected solution and technology.

vii. Assist TANESCO in procurement process which includes participating in opening of the bids, evaluation, and negotiation of the best evaluated bid ending into contract award.

In particular, TANESCO wishes to compensate the Zambia – Tanzania – Kenya (ZTK) 400kV system as a matter of outmost urgency. The Consultant shall therefore treat compensation of the ZTK corridor as a priority and separately carry out items above in respect of compensating the ZTK before embarking on all the other tasks under assignment II.

TANESCO will arrange for the Consultant to inspect the sites and obtain all relevant technical data for correct design. It is envisaged that the engineering studies and design including the Final design report will be completed at the Employer's country. TANESCO staff shall participate at each stage of the engineering services including in all the studies carried out at the Consultant's local office for capacity building.

3.2.2 Part II (Time based Contract)

In this part of the assignment, the Consultancy Service activities to be carried out by the Consultant are supervision of installation and general project management of the reactive power compensation project. The same will involve: -

3.2.2.1 Project Management and Supervision:

i. Project Management and supervision of the EPC contractor(s) on installation of the proposed reactive power compensation equipment in the 200, 132 and 66kV grid substations. The same shall include but not limited to the following:

- Review project schedules submitted by the contractors and prepare a detailed project master schedule on the basis of the contractor(s) schedules;
- Review and recommend for Employer's approval any sub-contractors proposed by the contractors;
- Review and approve all relevant contractors engineering designs/drawings and survey drawings prior to equipment/plant manufacturing and implementation at site;
- Review and recommend for employer's approval any proposed scope or design changes by the contractor(s);

ii. Liaise with Project Management and supervision consultant under TAZA project during studies. Supervision of EPC contractors on installation of the proposed equipment will be done by the consultant under TAZA. Likewise, installation of the same will be done by the respective EPC contractors at site for each Lot as proposed.

iii. Supervise, monitor, and provide regular reporting to Employer on the implementation of the proposed transmission investments works to ensure that they are delivered to the right quality, timely and in a cost effective manner.

iv. Prepare monthly and Quarterly progress reports for Employer's review and approval before submission to the rest of the stakeholders including the project financiers.

v. Organize and manage site meetings and other contract management meetings, to be held at least once a month. Prepare minutes of such meetings and circulate to the Employer and other relevant stakeholders within seven days from the date of the meeting.

vi. Provide the necessary transportation for the Consultant's own staff prior to the award of contracts for the proposed transmission infrastructure investments.

vii. Provide fully furnished office premises for use by both the Employers' counterpart staff and the Consultant's team during project implementation. All costs for maintaining the required office premises shall be borne by the Consultant.

viii. The Consultant shall inform the Employer two months before the expiration of the Performance Guarantees and Advance Payment Guarantees of all the relevant works contracts. In case the contractors do not extend the guarantee(s), the consultant shall assist the Employer to call the corresponding guarantee(s) one (1) week before their expiry date.

3.2.2.2 Occupational health, safety, environmental, and social issues on site:

The Consultant shall**:**

a) Review and recommend for approval by the Employer, the Contractor Environmental and Social Management Plan (CESMP). Each contract will have its own CESMP that will be prepared by the respective contractor.
b) Monitor the implementation of both the ESMP and the implementation of recommendations and mitigation measures from the Environmental and Social Impact Assessment (ESIA) report.
c) Ensure that the contractors, any domestic or nominated sub-contractors or visitors to the site adhere to all local/national health, ESHS, labor and working conditions, land use and resettlement laws and regulations.

d) Depending on the activity being undertaken at site, ensure that the site and the contractors' workers or any persons visiting the site are provided with:

(i) The necessary personal protective equipment (PPE), and adequate training on use of the PPE, and that adequate safety measures are implemented, including: issuance of safety helmets, boots, gloves, goggles; implementation of guard rails, safety equipment, and necessary site signs and hazard warnings;

(ii) Gender segregated sanitary facilities at each substation where installation works will take place;

(iii) Awareness, sensitization and regular training sessions for all workers employed/engaged in relation to the project on the prevention of HIV/AIDS and other communicable diseases such as COVID-19, gender-based violence (GBV), and sexual harassment;

e) Ensure that the contractors prepare and implement appropriate site plans/layouts that clearly delineates storage areas, access areas, walkways, and site offices from construction areas; and that of adequate cautionary and hazard warning signs and first aid equipment are provided at each site.

f) For work carried out in the proximity of live electrical equipment, ensure that proper isolation, de-energizing, earthing and demarcation of the safe working areas have been done and that the right procedures are followed for the issuance of safety documents before contractors can commence work. Upon completion, the works the Consultant shall ensure that the right procedures are followed by the contractors' personnel to cancel the safety documents. In addition, the Consultant will ensure that such works are carried out under the supervision of a competent person approved by the Employer.

g) Ensure that contractors' staff are given adequate training and regular briefings on safety procedures, both through meetings and in writing, of the possible dangers of follow the instructions of the competent person while working in close proximity to live electrical equipment.

h) Routinely review and undertake audits and inspections of Contractor's ESHS training records, accident logs, community liaison records, ESHS inspection and monitoring findings and other ESHS related documentation, as necessary, to confirm the Contractor's compliance with ESHS requirements;

i) Promptly report any identified non-compliance issues to the contractors and the Employer and work with these parties to define acceptable time bound remedial action/s in the event of a noncompliance with the Contractor's ESHS obligations. In the case of any significant or material ESHS incident (such as death or serious accident, or communicable diseases such as COVID 19 etc.), the Consultant shall report the event to the Employer within 24 hours and ensure appropriate measures are taken to ensure the safety of workers and the general public, while long term corrective/preventive measures are being discussed with the Employer and the contractor/s to prevent the recurrence of similar incidents.

j) Prepare and submit to the Employer, as part of monthly progress report, issues on ESHS project construction compliance and performance.

3.2.2.3 Quality Control:

The Consultant shall:

a) Ensure that the works are constructed in compliance with the approved designs, specifications, and drawings

b) Ensure that the materials used and workmanship conform with the contractual specifications

c) Carry out inspection of materials at the manufacturers' works as per approved drawings and technical specifications in line with the Contract/s.

d) Undertake site supervision to countercheck project quality, adherence to time schedule and quantity utilization as per invoice and works progress.

e) Compile systematic records of the contractor's site activities to be included in the project's monthly and quarterly reports to be submitted the Employer.

f) Review and certify as necessary the achievement of the contractual milestones and progress/quality against the requirements of the works contracts.

g) Furnish timely assistance and direction to the contractor(s) in all matters related to interpretation of the contract documents, testing and other matters related to contract compliance and progress of the project

h) Inform the Employer of any problems or potential problems that may arise during the implementation of the works contracts and make recommendations of possible mitigation measures to the Employer

3.2.2.4 Inspection, Testing and Acceptance during Manufacturing (FAT)

The Consultant shall be required to attend and witness all Factory Acceptance Test (FATs) and Type Tests and all required site tests and approve the associated reports for submission to the Employer for all proposed equipment/plant such as: (a) Static Vars Compensators (SVC's); (b) reactors; (c) switchgears and instrument transformers; (d) protection and control equipment; and (e) Medium voltage and low voltage switchgear if may be proposed in the report. For fair and consistent evaluation, the Consultant shall state in his proposal day rates for FAT to be witnessed in different geographical areas i) in Europe, ii) in Africa and iii) in Asian countries. Such rates shall include remuneration, hotel accommodation, air and ground travel as well as miscellaneous travel cost. For the purposes of the Consultant's proposal, it shall be assumed that there will be an average of five (5) FATs running over a five (5) day period for of the contract lots.

The consultant shall also:

a) follow up on and report on contractor's compliance with deadlines for manufacturing, testing, shipping and supplying equipment on site;

b) Ensure that equipment and materials conform to contract specifications and standards;

c) Ensure that the equipment and materials do not contain any internationally banned chemicals or substances and that specifications (environmental related like noise levels of transformers) are in line with international and national environmental requirements and standards;

d) Examine and approve the program for factory testing and acceptance proposed by the contractor, participate in works acceptance procedures and prepare reports for each inspection;

e) Ensure that all equipment and materials have been subjected to type tests already and certified and all additional tests described in the Bid documents have are performed accordingly;

f) Participate in factory tests for the main items of equipment at contractor/suppliers factories in collaboration with the Employer;

g) Approve, in consultation with the Employer, samples of materials, goods, components and workmanship that require prior approval before placing orders for purchase, manufacturing, and /or installation;

h) In the event of contractual disputes, assist the Client in collating and preparing factual documentation and recommend a line of actions. If required by the Client, the Consultants will attend hearings.

3.2.2.5 Inspection, Testing and Acceptance of materials prior to shipment to site

The Consultant shall:

a) Conduct post shipment material quality inspection audits prior to acceptance for shipment and delivery to site;

b) The Consultant shall ensure that equipment and materials delivered to site are in conformity with stipulated specifications and approved designs.

3.2.2.6 Cost Control, cash flow projections, and financial appraisal reports:

The Consultant shall:

a) Review and recommend for payment by the Employer as necessary all contractors' invoices. The recommendation for payment of contractors' invoices shall be submitted to the Employer accompanied by payment certificates prepared in a format that has been pre-agreed with the Employer;

b) Review and recommend for approval by the Employer as necessary all contractors' requests for variation orders. The recommendation for approval of contractors' variation order request shall be submitted in a format that has been pre-agreed with the Employer;

c) Prepare cash flow projections based on the contractors' schedules, actual and projected progress to assist the Employer to plan effectively for payments to the contractors during project implementation. The format cash flow projects shall be agreed ex ante with the Employer;

d) Up-date and submit the cash flow projections to the client on a quarterly basis. The updated between projected and actual expenditure.

3.2.2.7 Progress monitoring and documentation

The Consultant shall:

a) Prepare monthly statements of payments for works executed by contractors. The format of the statements shall be agreed with the Employer. All relevant measurement sheets and quality schedules shall be submitted together with the statement signed by Employers' representatives and the Consultant's site supervisors including all relevant support documents;

b) Monitor, check and approve construction works on site, which forms the basis for Contractor's periodic invoicing;

c) Consultant shall assist the Employer to review the Joint Measurement Certificate (JMC) based on the approved construction works or services rendered by contractor(s).

3.2.2.8 Instructions to contractors

The Consultant shall be required to issue instructions/guidance related to suspension of the construction works in instances where the contractor/s are in gross negligence or non-compliance with the ESHS requirements.

3.2.2.9 Variation of scope for construction contracts

Where change of scope is for the successful completion of their contracts, the Consultant shall review and recommend as necessary for approval by the Employer prior to issuing any instructions to the contractors. Where the issue of an instruction is related to the safety of the works, installations, contractors' staff, non-compliance with ESHS requirements, or any other emergency, the Consultant shall issue the instruction, and notify the Employer at the earliest opportunity providing full details to substantiate the issues instruction/s.

3.2.2.10 Progress reports and photographs

The Consultant shall:

a) Prepare progress photographs on the first day of each month to be displayed appropriately at site and for submission to the Employer with the monthly progress reports;

b) Prepare monthly and quarterly progress reports outlining the progress achieved in the reporting period, including an update on actual against planned progress, and challenges encountered and associated remedial measures;

c) Prepare a Draft Project Completion Report based on the Financier's Reporting format or a format acceptable to the Employer and submit the Employer within four (4) weeks from completion of project works;

d) Prepare Final Project Completion Report incorporating comments made by the Employer and financier and submit to the Employer within eight weeks from completion of project works.

3.2.2.11 Completion of construction and handover of the project to the Employer

a) The Consultant conduct final inspection of project works together with the Contractor's and Employer's representatives before formal handover to the Employer;

b) The Consultant shall supervise and monitor the contractors pre-commissioning and commissioning testing of the project works and submit reports and results of the tests to the Employer in pre-agreed test sheets including any follow up actions needed;

c) The Consultant shall carry out inspection of the project works jointly with the Contractors and Employer's representatives and agree on the snag list to be included in the defects notification. The Consultant shall also supervise the rectification of defects and ensure that the operation and maintenance manuals are received from the contractors and handed over to the Employer as required in the works contracts;

d) The Consultant shall prepare and issue completion certificates, that appropriately outlines any pending issues and snags to be rectified during the defects liability period;

e) The Consultant shall review and approve for issuance to the Employer all the operation and maintenance manuals prepared by contractor(s) for the facilities constructed under the project;

f) In the event of contractual disputes, assist the Client in collating and preparing factual documentation and recommend actions for resolution of the disputes. The Consultant shall attend any dispute hearings as required by the Employer;

g) During the closing phase of the contracts, the consultant shall review and approve all "as built drawings", ensuring that any changes introduced during construction have been incorporated.

h) Upon the receipt of Contractors notice of completion, the Consultant shall advise the Employer to issue completion certificates-to signify full completion of the works in line with the relevant contract provisions.

In addition to the specific responsibilities set out above, the Consultant shall support the Employer with the project's contract closure activities as follows:

a) Establish and agree with the Employer the criteria to be used for confirming completion of the contracts (tasks finished, deliverables finished, testing completed, training requirements completed, equipment installed, tested and operating, operation and maintenance manuals submitted, site rehabilitation, etc.);

b) Follow up with the Employer to nominate a representative for to signing the project completion report and confirm the Employer's officers who will be involved in each step of the acceptance process and the post-construction activities;

c) Convene and hold a contract-closing meeting attended by the Employer, contractors, and relevant stakeholders during which the draft project completion report will be presented;

d) Carry out a post-contract evaluation of the works, achievements, the processes undertaken and the management of the contract and prepare and submit a final report.

4. PROGRESS MEETINGS

The Consultant shall regularly convene Progress Meetings attended by the contractors' site representatives and Employer's Staff as required to ensure smooth implementation of the project.

The meeting shall cover, among other things, the following matters:

a) Contractor's work schedule and progress of the works contracts;

b) Pending reviews/issues related to contractor's designs, procurement;

c) Challenges and associated mitigation;

d) Community/work force relations; etc.

The Consultant shall be responsible for preparing and submitting for reviewing and signing off of all minutes of *meeting to the Employer and the contractors.* All site meetings shall be presided over by the Consultant's Resident Project Manager.

4.1 Ad-hoc Site Meetings

Whenever necessary to address emerging issues or events with significant impact on the project's implementation or potential to meet its intended objectives, the Consultant shall convene ad-hoc meetings with the Contractors and Employer's representatives.

4.2 Arrangement of Monthly Progress Meetings

The Consultant shall arrange monthly site meetings with the contractor/s to discuss issues and corrective measures as pertaining to the design, procurement, construction progress, and other issues of technical or contractual/administrative nature. The Consultant will prepare minutes of the Monthly Progress Meetings including agreed upon actions and share will all relevant parties within five (days) from the date each meeting.

4.3 Site Diary

The Consultant shall maintain a daily log of not more than three pages ((Site Diary) at each site that captures that following:

a) Weather conditions;

b) Major works completed, accepted or rejected;

c) Written instructions given to the contractors;

d) Problems encountered;

e) Site meetings and other events, which have a bearing on the project. The diary shall record information discussed at site meetings, including discussions on incidents and complaints/grievances;

f) Events, incidents, and complaints incidents and complaints from contractors, affected local persons/communities, contractors' workers etc. and how these have been handled or resolved.

5. TRAINING

It is expected that during the execution of the Contract, the Consultant will undertake a training and capacity building program for the Client's staff as part of the consulting services. The Consultant shall provide both in-class type training and on-the-job training.

The Consultant's proposal shall include the proposed training program. However, this training program will be optional. The costs of the proposed training will not be considered in the evaluation. The proposed training will be discussed at the contract negotiations with the first ranked Consultant and finalize with the Client. The time of signature of the consultancy service contract the agreed training program cost would be included in the contract price.

5.1 On-Job Counterpart Training

The Employer considers these contracts as an opportunity to train some relevant staff through secondment to the Consultant and the Contractors as counterpart staff. The Consultant shall provide on-the-job training to selected Employer's staff during part II of the project that includes, among others, project/contract management, design reviews, and pre-commissioning and commissioning checks and tests, and implementation of project environmental and social requirements as established in the relevant project documentation.

This training will include stakeholder engagement and effective community relations as well as laws relating to land use.

5.2 Classroom Training

Considering the Regional importance and complex nature of the Project, the Consultant shall conduct special/in-depth training for Employer's staff in Dar es Salaam on the following areas:

- Studies for reactive power compensation project and technical specifications. The same aims at building capacity to TANESCO's staff on carrying out studies for reactive power compensation of grid network and preparation of technical specifications.

The training sessions shall involve power point presentations at a venue to be arranged by the Consultant and handout of printed material in properly bound folders to the participants. Drinks and snacks shall also be provided during this training.

6. ORGANIZATION OF OFFICES

The Consultant shall make its own arrangement for office space and equipment facilities (phone, e-mail, internet, computers, copying, editing, etc.) and accommodation including an appropriate room to conduct meetings accommodating 15 people, as the case may be, and provide office facilities in Dodoma (main office) and Dar es Salaam (sub-office) and any other facilities deemed necessary for execution of the scope of services. Both the offices in Dodoma and Dar es Salaam will accommodate both the Consultant's team and the Employer's PIU staff.

The accommodation of relevant Employer's staff members at the Dar es Salaam sub-office is to facilitate ease of access to information and liaison with other key institutions/ stakeholders in Dar es Salaam including Financiers, Tanzania Revenue Authority (TRA), Tanzania Ports Authority (TPA), Government Procurement Services Agency (GPSA), Tanzania Bureau of Standards (TBS) and the Government Chemist Laboratory Authority (GCLA).

7. REPORTING AND PROJECT DELIVERABLES REQUIREMENTS

The consulting firm shall produce the project deliverables and reports during the course of carrying out of the assignments as follows:

7.1 ASSIGNMENT I

(i) Submission of Work plan one (1) week after effectiveness of the contract.
(ii) Site visit and data collection for three (3) weeks.
(iii) Design of firefighting systems (Deluge per working Transformer/Reactor, fire detection and suppression and Fire hydrant with pump and water reserve tank) for Two (2) weeks.
(iv) Seek approval from commissioner of Fire and Rescue Force for one (1) week.

(v) Prepare bill of quantity per substation per designed fire protection system for Two (2) weeks.
(vi) Submission of Draft Final Report (3 copies) for one week.
(vii) Submission of final report after incorporating review comments from the Employer for two (2) weeks (7copies to be provided).

7.2 ASSIGNMENT II

(i) Inception Report

The Inception Report will demonstrate the consultant's understanding of the assignment and proposed methodology, source of information and approach/ methodology be used for carrying out the assignment. The Inception Report will include a proposed time line of activities, work plan and implementation strategy, schedule, supervision and reporting mechanisms, resource planning and allocation strategy, and strategy for communication with the Employer and relevant project stakeholders. The final Inception Report shall be submitted after prior review by TANESCO within 4 weeks of contract effectiveness.

(ii) Design Report

The draft Design Report (DR) will follow the completion of the surveys/site visits and validation of proposed designs in the feasibility reports (for ZTK projects) and analysis of the reactive power compensation of the grid network for review and comment. The final DR incorporating the comments of TANESCO will form the basis for the subsequent activities leading to the issuing of the Tender Documents. The final Design Report shall be submitted after prior review by TANESCO within 16 weeks of contract effectiveness.

(iii) Bidding Document(s)

Prior to issuing the draft bidding documents, it is necessary that the Consultant provides an overview of the project scope, including cost estimates, technical specifications, bills of quantities and a draft implementation schedule. The draft bidding documents shall follow a latest AFD's standard document submitted to TANESCO within 6 weeks after approval of the design report for the purpose of Employer and Financier 'No Objection'. The final bidding documents shall be submitted to TANESCO in a softy copy format (both PDF and Word editable version) for the Employer to produce an appropriate number of copies in order to enable a satisfactory distribution to the bidders.

(iv) Bid Evaluation Report (BER)

The consultant shall participate with the Employer in evaluation of the bids, and will be responsible for preparing the report with recommendations for successful bidder(s). The BERs are expected to be submitted within 3 weeks after bid submission date.

(v) Contract Documents

The consultant shall participate in the contract negotiation and prepare Minutes of contract negotiations with the successful bidder(s). The Consultant shall also finalize Contract documents, as per the AFD's standard contract document and submit to the Employer within fourteen (14) days from the date of negotiation.

(vi) Monthly Progress Report

The consultant shall provide short comprehensive progress reports on the tenth day of each calendar month. The report shall include records of site meetings, site visits, physical and financial progress. Contractor's physical and financial progress, Contractor's plant equipment and labour deployment, weather conditions, implementation of social and environmental instruments, ESHS events and all other relevant details. To be submitted on the tenth day of the succeeding months.

The format of reports must be discussed and agreed upon with TANESCO.

(vii) Quarterly Progress Report

The Consultant shall prepare and submit Quarterly Progress Reports (QPRs) to the Employer within 15 days from the end of each reporting quarter. The structure and format of the QPRs shall be agreed ex-ante with the Employer and shall include the status of the project contracts, progress achieved over the reporting period, challenges encountered and associated mitigation measures, contractor's compliance with the relevant environmental and social safeguards instruments, ESHS compliance and recorded incidents, and any other aspects of the project that the Employer should be made aware of.

The QPRs shall also cover the implementation of the ESMP and highlight any challenges affecting project implementation and recommend viable corrective actions.

(viii) Preparation of Type Tests/ FAT Reports

The Consultant shall prepare and submit to the Employer all reports for **Type Tests/** Factory Acceptance Testing (FAT) activities within ten (10) days from the completion of a type test/FAT.

The reports shall be submitted in Two (2) hard copies and one soft copy.

(ix) **Final Completion Report (FCR) for each project**

After completion of the works, the consultant shall prepare a Final Completion Report outlining all aspects of the project implementation, financial costs, suggestions and recommendations for future design and construction techniques and routine maintenance practice to be followed after completion of the project the format of report must be discussed and agreed upon with the Employer. The draft will be submitted to Employer within four weeks of project completion for approval.

8. DURATION OF ASSIGNMENT

The consultancy services duration for each assignment is as outlined below:

8.1 ASSIGNMENT I

The consultancy is estimated to be provided for a period of twelve (12) weeks. The consultant can however propose own assessment based on least short time with justification and provide schedule with breakdown for various activities called for in the Terms of Reference, including the field activities.

Activities	**Schedule**
Submission of work plan	1 week
Visit ten substations and take measurements	3 weeks
Design Deluge system per working Transformer/Reactor, Fire detection and suppression system and Fire hydrant system.	2 weeks
Seek approval from Commissioner of Fire and Rescue Force	1 week
Prepare bill of quantity pre substation per designed fire protection system	2 weeks
Hand over the draft report with approved drawings	1 weeks
Finalize reports	2 weeks
Total	**12 weeks**

Basing on scope of work and duration of assignment the consultant will provide a cost plan to carry-out the works.

8.2 ASSIGNMENT II

The consultancy contract is expected to take twenty-two (22) calendar months (excluding Defect Liability Period-12 months) from the date of effectiveness of the contract as detailed below:

(i) PART I:

Four (4) months - Review of the existing reports e.g. feasibility study reports for ZTK; analysis of the existing grid network; site visits; design and technical specifications; bidding document; bid evaluation; contract negotiations; and contract document preparation.

(ii) PART II:

(a) Eighteen (18) months – Management and supervision of detailed designs, manufacture, delivery, construction, erection, installation, testing and commissioning (works contract duration).

9. TEAM MEMBER COMPOSITION, QUALIFICATIONS AND EXPERIENCE

9.1 ASSIGNMENT I

Consultant shall have the following experience:

(i) The company should have a minimum experience of 5 years of professional in Fire Protection systems.

(ii) The company should have a proof records of Implementing fire detection and suppression systems design and installation in compliance and implementation of national and international standards, codes, laws and regulations.

(iii) The team leader should have at least 5 years' general experience in fire protection particularly fire detection and suppression systems design.

(iv) Must possess either an undergraduate or postgraduate or both degree in fire engineering with sound knowledge in fire protection systems design/related field shall be considered.

(v) The other fire protection expertise should have a minimum experience of 4 years' experience in fire engineering and in particular fire protection systems design and possess a certification on that area.

(vi) The team must have an expert to undertake drawing, must possess a minimum experience of 5 years and a proven experience in Computer Aided Design (CAD)

The consultant will be expected to be fluent in English including report writing abilities and be able to work closely with TANESCO staff and report to Manager Safety who will be an official representative of TANESCO in the project.

9.2 ASSIGNMENT II

a) Qualification of the firm

The consulting firm that is to be selected shall have its core business as consultancy in the power transmission and distribution sector. The Consultant must be highly qualified and should have sufficient experience and track record of providing similar services related to the technical studies such as reactive power compensation, design, compensation equipment/plant specifications, and preparation and management of contracts for transmission lines and substations with a voltage of 220kV and above. The Consultant shall also have competence in undertaking the supervision of construction activities for transmission lines and substation of 220kV and above voltages, including review of contractor's designs, supervision of construction activities, undertaking factory acceptance tests, and conducting pre-commissioning and commissioning tests. The Consultant shall submit evidence of firm's previous experience in similar projects, as indicated above, in the Sub-Saharan Africa region and elsewhere. International experience and experience with World Bank financed projects are necessary to carry out the assignment.

The Consultants are free to propose a staffing plan and skill mix necessary to successful carry out the assignment.

The Consultant shall be required to maintain the presence of a Resident Project Manager at site for the entire duration of the project construction activities. During the Site Supervision, the Resident Project Manager shall be deployed to Tanzania on a permanent basis during the assignment and will be required to visit the project sites regularly to ensure effective supervision and monitoring of the construction works under the different contracts.

b) Qualification of the key staff

The consultant shall select the best key personnel to meet the specific requirements of the assignment. The team shall comprise of but not limited to the following key experts:

(i) Project Manager

The Resident Project Manager will be responsible for managing the implementation of the services and regular communication with the Employer and the construction contractors.
The Resident Project Manager will also be responsible for the day-to-day management of the Consultant's team and shall have good communication skills in the English language.

The Resident Project Manager shall responsible for organizing and running of the regular project progress review meetings. The Resident Project Manager shall have, at a minimum, a bachelor degree in Electrical/Civil Engineering or other relevant area and a minimum of 10 years of relevant professional experience (planning, managing and supervising works related to design and construction of transmission lines and substations at 220kV voltage level and above.

The Resident Project Manager shall have managed at least two (2) reactive power compensation projects of similar nature and complexity. Experience in similar projects in the Sub Saharan African region will be an added advantage.

(ii) Power System Expert

The Power System expert shall have, at a minimum, a Bachelor Degree in Electrical Engineering (or equivalent) from a recognized institution with at least 10 years' experience and minimum 5-year international experience in Power system studies using an internationally recognized power system analysis software/tool including PSSE. In addition to that, the expert shall have experience in the design, installation, supervision, and testing/commissioning of power system installations of 220kV voltage level and above. The power system expert shall have a good oral and written communication skills in English.

(iii) Reactive Power Compensation Specialist

The reactive compensation specialist shall have, at a minimum, a Bachelor Degree in Electrical Engineering (or equivalent) from a recognized institution with at least 10 years' experience and minimum 5-year international experience in analysis and design of reactive power solutions using an internationally recognized system analysis software/tool. In addition to that, the expert shall have experience in the design, installation, supervision, and

testing/commissioning of power system installations of 220kV voltage level and above. The reactive compensation specialist shall have a good oral and written communication skills in English.

(iv) Substation Engineer

The Substation Engineer shall have, at a minimum, a Bachelors' Degree in Electrical Engineering. The Substation Engineer should have 10 years' experience in designing, managing and supervising works related to upgrading, construction/rehabilitation, supervision, and testing/commissioning of high voltage substations of 220kV voltage level and above. The Substation Engineer shall have thorough experience and knowledge of the different key substation equipment/plant such as power transformers, reactive power compensation equipment, instrument transformers and various substation switchgear. The Substation Engineer shall have experience on at least two (2) similar projects. The Substation Engineer shall also have good oral and written communication skills in English.

(v) Occupational Health and Safety (OHS) Specialist

The OHS Specialist shall have a Bachelor's Degrees or Diploma (e.g. NEBOSH) in occupational health and safety and previous experience with similar projects in the electricity sector. The OHS Specialist shall have thorough knowledge and experience on risk assessment, OHS audit and inspections, emergency and incident response and reporting, incident investigation, and OHS management systems. The OHS Specialist shall have excellent oral and written communication skills in the English language and good communication skills in Kiswahili will be added advantage.

(vi) Substation Works Site Supervisor for

The Substation Works Site supervisor shall have a degree in Electrical/Civil or Mechanical Engineering from a recognized institution and at least seven (7) years' experience in supervising works related to the construction and rehabilitation of high voltage substations. The Substation Works Site supervisor shall have experience in management and supervision of at least three projects of similar nature and scope. The Site supervisor shall have excellent oral and written communication skills in English. Good understanding of spoken and written Kiswahili will be an added advantage.

(vii) Procurement Specialist

The Procurement Specialist shall have a degree in Procurement or equivalent from a recognized institution and at least seven (7) years' experience in procurement of high value contracts of similar energy projects financed by multilateral development agencies e.g. World Bank, African Development Bank etc. with a demonstrated strong track record. The procurement specialist shall have excellent oral and written communication skills in English.

c) Consultant Level of efforts

The Consultant shall indicate in his proposal sufficient level-of-effort (LOE) for proper execution of the project. Considering the technical and financial evaluation, taking note that the contract shall be awarded to a single consultant.

The Consultant shall clearly indicate the level of effort (person-months) for all home office and field-based activities and the deployment plan for site supervision activities. The Consultant shall provide a schedule with breakdown for the various activities called for in the TORs, including the home office and field activities.

Part II of the assignment is expected to be completed in 18 months, for an estimated total level of efforts of 70 person-months. Remuneration will be on the basis of a time-based pricing of the services.

10. DUTIES AND RESPONSIBILITIES OF THE EMPLOYER

The Employer shall avail adequate staff under the Project Implementation unit (PIU) headed by Project Coordinator/Overall Project manager. The availed staff shall work closely with the Consultant, representing TANESCO and assist in provision of existing project information and data when required during implementation of both parts I and II of the project. The PIU staff will be fully integrated into the consultant's team.

The PIU staff will participate in the review and approval of detailed designs and any submissions by the EPC contractor(s) that require approval, follow-up on the site works, monitoring environmental implementation plans, participate in installation, commissioning and witnessing tests including factory acceptance tests.

These staff shall, however, be under the control of and be paid by the Employer. They shall not be held responsible for any failure on the consultant to deliver the project with the desired quality.

ANNEXES:

Annex I – List of Grid Substations

ANNEX I:

TANESCO GRID SUBSTATIONS

S/NO	SUBSTATION	REGION
1.	NJIRO GRID SUBSTATION (220/132/33kV)	ARUSHA
2.	SINGIDA GRID SUBSTATION (400/220/33kV)	SINGIDA
3.	IBADAKULI GRID SUBSTATION (220/132/33kV)	SHINYANGA
4.	NYAKATO GRID SUBSTATION (220/132/33kV)	MWANZA
5.	MWAKIBETE GRID SUBSTATION (220/33kV)	MBEYA
6.	TAGAMENDA GRID SUBSTATION (220/132/33 kV)	IRINGA
7.	MSAMVU GRID SUBSTATION (220/132/33kV)	MOROGORO
8.	ILALA GRID SUBSTATION (132/33kV)	DSM
9.	KIPAWA GRID SUBSTATION (132/33 kV)	DSM
10.	ZUZU GRID SUBSTATION (400/220/33kV)	DODOMA