Terms of Reference
Project Supervision Consultant for Nepal Electricity Authority: Electricity Supply and Reliability Improvement Project

I. Introduction

The Government of Nepal (GoN) has received US$120 million of IDA credit to implement "the Electricity Supply Reliability Improvement Project (ESRIP or the Project)". The objective of the Project is to improve distribution network and to enhance the quality, resilience and reliability of electricity services in different areas of Nepal. The Project is also expected to bring expanded and more dependable electricity service to the consumers and supplement the GoN's and other development partners efforts in enhancing the distribution system in Nepal. The Project will be implemented by Nepal Electricity Authority (NEA). Following activities are planned to be implemented under the Project:

- **Activity 1: Strengthening of NEA's Distribution Network:** This activity will support: (a) construction of new 33/11 kilovolt (kV) substations near the load centers identified by NEA in selected areas of Nepal; (b) construction of new 33 kV lines to these substations; (c) upgrade of existing and construction of new 33 kV, 11 kV, and 0.4 kV feeders and distribution lines and 11/0.4 kV distribution transformers in load centers of selected areas.
- **Activity 2: Installation of automated control and operation system**: This activity will support: (a) installation of auto reclosure (AR) and smart load break switches (SLBS) in 33 and 11kV feeders; (b) installation their control and communication mechanisms; (c) interfacing of this newly installed system with NEA's current structure.
- **Activity 3: Strengthening of NEA's Commercial Systems**: This activity will support: (i) installation of Automated Metering Infrastructures (AMI) replacing the conventional metering systems for consumers, distribution feeders, and distribution transformers; (ii) installation of meter data management (MDM), customer information system (CIS), consumer portal, communication systems and gateways, and other related infrastructure; (iii) establishment of relevant functionalities, such as data recording and management systems, and data analytical tools; and (iv) establishment of billing system within the AMI center with invoicing, collection, reporting, and other relevant functional ties.

For this assignment, NEA is looking for a consulting firm, to be employed as a Project Supervision Consultant (PSC), to support the implementation of Activity 1. Specifically, under Activity 1, following tasks are planned:

A. *Construction of 9 numbers of 33/11 kV substation and associated 33 kV new lines in several areas, particularly in the eastern part of Nepal.* The contract for the construction of these substations and lines will be divided into two lots. The brief location of the substations and associated 33 kV Lines are provided in Table 1 below:

Table 1: Tentative Location of the new 33 kV substation and lines

Lot	District	Substation Name	Capacity (MVA)	33 kV line Length (km)	Tapping Point
Lot 1	Illam	Mai	3.00	16	Godak SS
	Panchthar	Phalelung	3.00	7	NEA 33kV Line
	Taplejung	Phaktanglung	3.00	17	Sanima Hydro
		Meringden	3.00	5	Mewa Hydro

Lot 2	Jhapa	Birta	24.00	2	Nearby 33kV NEA Line
	Sunsari	Harinagara	24.00	3	
	Sankhuwasabha	Chichila	3.00	12	Chhuyankutti, Sankhuwasaba
	Udayapur	Ghurmi	8.00	30	Nishankhe , Okhaldhunga
		Beltar	8.00	14	Balardaha, Saptari

B. *Upgradation of existing distribution system in different areas of Nepal.* The activities include the refurbishment and construction of 11 and 0.4kV lines, composite lines and distribution transformers. The contract for this task will be divided into two lots. The general locations of the sites with tentative line length and transformer numbers are provided in the Table 2 below:

Table 2: Tentative location and tentative quantity of the distribution system upgradation sites

Package	Lot	Sites	Description	Upgradation (km)	New Construction/Installation (km)
Package 2	Lot 1	Koshi Province (Jhapa, Morang, Sunsari, Udaypur Illam and Dhankuta Districts)	11 kV	350	200
			LT Line	900	400
			Transformers	600	
	Lot 2	Kailali and Kanchanpur Districts of Sudurpaschim Provinces	11 kV	350	130
			LT Line	390	200
			Transformers	390	

II. Objective of the Assignment

The objective of the assignment is to:

- Conduct technical and engineering review and construction management services of the works under Activity 1, including on-site supervision and interface management.
- Provide regular and timely updates to NEA the progress of works and emerging issues.

III. Scope of Work

Task 1: Design review during implementation of contracts.

As part of this task, PSC will review and comment on Pre-Construction Survey (PCS) report, design documents, drawings, other relevant technical documents, including those of equipment, civil works, materials, plans, procedures, schedules, etc.

submitted by contractors and manufacturers. The review and comments shall be carried out in coordination with NEA's engineers. PSC is specifically expected to carry out the following:

- Review and comment on all aspects of design and standards proposed by contractors. The minimum list of drawings has been attached as Annexure I.
- Review and comment on detailed specifications.
- Check calculations and drawings prepared by contractors and ensure that calculations and designs are in accordance with current standards and codes of practice.
- Review the results of technical investigations done by contractors.
- Review the final design and recommend for approval.
- Review and comment on engineering documents, construction specification, construction procedures and equipment installation methods.
- Review proposed, plans, procedures, measures related commissioning of equipment and systems.
- Review and recommend the revised bill of quantity submitted by the

  the contractor for approval.
- Maintain dialogues with the contractors' design staff.
- Attend design review and progress meetings with NEA and contractors/manufacturers and issue minutes of meeting to NEA.
- .Prepare necessary tools such as Design Control Progress Record (DCPR) as per the format agreed with NEA required for review process of design, drawings, manuals, method statements, etc. to track and check the progress of the review process.
- Coordinate the activities of different contractors as appropriate.
- Prepare and update project schedule (in Gantt chart) by using commercially available software (MS project, Primavera) etc. in coordination with the NEA and the contractors.
- Consultant shall prepare and update document tracking index with details of documents received from contractor and its comments/observations/recommendations/approvals send back to contractor. The well organized and accurate records index file shall be submitted to the client fortnightly.
- The above-said review and recommendation shall be carried out entirely in close association with NEA engineers so that transfer of technical expertise will take place effectively. During this period, the Consultant will also prepare a spreadsheet required for design, and prepare manual for checking design and drawings as per requirements.
- The Consultant shall submit comments and observations on design reports to NEA in a single submission, rather than on multiple submissions over a longer period of time.
- The minimum list of design drawings (available to NEA and will be submitted by the Contractor) that needs to be reviewed and recommended for approval are attached in the ANNEXURE-I. However, the Consultant shall have to prepare detail Master Design Drawing List (MDDL) for review, comments, observations and recommendation for approval on the design drawings available to NEA and submitted by the Contractor

Task 2: Construction supervision, quality assurance and inspection for contracts

PSC will carry out supervision of works during implementation. PSC is specifically expected to carry out the following:

- Prepare the Design and Monitoring Framework (DMF) for reporting purposes, which will include, among others, project indicators, their baseline, benchmarks, milestones, and achievements.
- Conduct construction site supervision.
- Monitor progress of the supply, construction, and installation schedules.
- Provide required guidance to contractors to comply with the specifications.
- Review of site-based variation and contractor's claim and recommend to the Employer for approval detailing and explaining any variation/price adjustment in project cost and implementation time from the originals.
- Review, comment, and compile the Operation and Maintenance (O&M) manuals provided by contractors for accuracy and adequacy.
- Prepare a detailed Project and Contract Control Program (PCCP) using the Gantt chart. Prepare suitable formats required by site representatives for site supervision.
- Assist NEA in works related to factory tests organized by contractors and manufacturers of major equipment, including but not limited to: inspections and witnessing of acceptance tests during manufacturing (factory test) of materials and equipment.
- Review and provide feedback on the installation and construction plan.
- Assessing Extension of Time (EOT) for Completion of the Project as claimed by the Contractor(s) and prepare reply letters on behalf of NEA for each Extension of Time raised by contractors within the stipulated time period in the contract between NEA and Contractor;
- Advise NEA in resolving disputes/claims and prepare reply letters on behalf of NEA for each claim raised by contractors within the stipulated time period in the contract between NEA and Contractor;
- Review and provide feedback on the commissioning plan and program, and acceptance tests.
- Witness and assist NEA during acceptance testing and commissioning of distribution system equipment and systems. The Consultant shall assist NEA in this phase of the project and coordinate with the Contractor in addressing any issues with the project components that are unsatisfactory. At the end of this period, and when all acceptance tests have been completed to the Consultant's satisfaction, the Consultant will advise NEA that the construction is complete and all the project components are ready to be declared fully operational.
- Conduct joint verification of delivered equipment at site and issuance of delivery certificate.
- Supervision of dismantling works of existing distribution network and verification of quantity of dismantled materials submitted by the Contractors to be returned to concerned Distribution Centers of NEA.
- Review and compile as built drawings and review the operation and maintenance manual provided by the contractors for accuracy and adequacy and assist NEA in taking over the completed facilities. The Consultant shall also prepare and recommend for completion certificate, provisional/final taking over certificates for the facilities completed. Whenever due for the works or part of the works, alert NEA for work deficiencies and outstanding items, if any. The Consultant shall also confirm the remedial measures taken by the contractor and recommend for operational and Final taking over certificates.

- Submit the project completion report providing details of project implementation, problems encountered, mitigation adopted, and detailing and explaining any variation in project cost and implementation from the original estimates.
- Participate in regular planning and progress meetings to monitor the contractors' work progress, delays etc. and issue minutes of meeting to NEA.
- Assist NEA with overall quality assurance mechanism, including implementation of Field Quality Plans (FQP), cost control, and project accounts, etc. Also advise NEA on quality assurance issues during construction and manufacturing process.

Task 3: Verification of Completed Works and Recommendation for Interim and Final Payments

As part of this task, the PSC will be responsible for the following:

- Verification of Measurements: Review and verify the interim and final measurement sheets submitted by the contractor for the completed works at the site.
- Payment Recommendation: After thorough verification, Certify contractors' interim and final invoices for payments as per the provisions in the contract between NEA and Contractor. The contractors' invoices shall be certified within 15 days after receipt of invoices from Contractor.

IV. Team Composition and Qualification Requirements for the Key Experts

The personnel required for this work is expected to be sourced locally from Nepal. PSC's Key staff shall include a team of local experts with extensive experience of design and construction supervision of distribution substation and lines. The team members shall have the skills and experience necessary to undertake the range of tasks set out in this TOR. The PSC's main office is expected to be located at Kathmandu with provisions for necessary staff to be resident at sites as appropriate. The team composition is expected to be the following.

Table 3: Minimum Staffing of Key Experts and Experience Requirements

Key Expert (National)	Location	Qualification Requirements
Team Leader	Resident in Project Office with frequent site visits	At least master's degree in electrical engineering. with 12 years of relevant experience in management of power distribution network construction projects in developing countries. Excellent knowledge of English language.
Electrical Engineer (3 Nos.)	Resident at site locations with frequent liaison with the client	At least bachelor's degree in electrical engineering. At least 10 years of relevant experience in power distribution network; reviews of contractors' drawings & calculations; site supervision. Excellent knowledge of English language.
Civil Engineer (1 Nos.)	Resident at site locations with frequent liaison with the client	At least bachelor's degree in civil engineering. At least 10 years of relevant experience in project management, construction, procurement, planning, design, and supervision of electricity transmission and distribution lines and substation buildings. Excellent knowledge of English language.
Quality-Assurance & Testing-	Resident at site locations with frequent liaison with the client	At least bachelor's degree in electrical engineering. At least 10 years of relevant experience in QA/QC for power distribution projects.

Commissioning Engineer (1 Nos.)		
Electrical Supervisor (4 Nos.)	Resident at site	At least Diploma in Electrical Engineering with at least 7 years of experience in electrical works supervision of distribution substation and lines.
Civil Supervisor (3 Nos.)	Resident at site	At least Diploma in Civil Engineering with at least 7 years of experience in supervision of civil works related to distribution substation and lines.

V. Deliverables and Reporting Requirements

The activities, deliverables and reporting requirements are mentioned below in table 4.

All reports and deliverables shall be in the English language and submitted with all supporting documentation in electronic format (MS Word or the original file format) and accompanied by at least one hard copy. Technical reports shall be submitted in draft for review and comment by NEA, followed by the final report incorporating these comments. Draft documents are not required for progress reports, but any corrections shall be noted in subsequent reports.

Each deliverable will be reviewed by NEA and will be:

- Rejected, where it fails to meet the requirements of the TOR and the contract, or
- Accepted with Comments, where modest editorial revisions are required, or
- Fully Accepted.

Any "Rejected" report shall be resubmitted in draft for further comment. A deliverable 'Accepted with Comments' shall be corrected and then resubmitted until accepted as the final report. Acceptance will not be unreasonably withheld.

The detailed contents of project supervision, implementation progress, and final reports will need to be proposed by the potential consultants as part of their technical proposals and agreed with NEA prior to finalization of contract negotiations.

Table 4: Output and Deliverables

Activities	Outputs and deliverables	Timeline	Number of copies
Comment on pre-construction survey report, design documents, drawings and technical documents submitted by contractors and manufactures, including, on specifications, schedules, procedures, manufacturers' drawings and documents, installation plans, commissioning plans, etc.	Comment sheets and final recommendation letters,	Within 5 days after each review.	2
General report on project, update of detailed project/contract control program using the Gantt chart, update on project activities, project progress, potential issues etc.	Monthly and quarterly progress report	At the end of each calendar month	1

Activities	Outputs and deliverables	Timeline	Number of copies
Witness site testing and inspection of equipment	Comments sheets and final recommendation reports	Within 5 days after each site testing and commissioning	1
Factory Acceptance Test (FAT) (one person, one visit with maximum 7 (Seven) days per each contract for the FAT of following equipment as applicable. 1.Power Transformer, 2. Distribution transformer,	FAT reports and comments sheets and recommendations Report on shop inspection and test witnessing and on arrival site acceptance of materials	FAT reports within two weeks of the test if the test is inspected by the PSC or comment sheets and final recommendations within 5 days of the review of test report submitted, if not inspected by the PSC.	1
Supervise construction and installation works and provide guidance to contractors	Monthly and quarterly progress report,	At the end of each calendar month	1
Verify the completed tasks and recommendation for interim and final payments	Recommendation letter of payment	within 5 days after each verification	2
Witness and assist NEA during acceptance Testing and Commissioning (T&C)	T & C completion report	Within 5 days of each T&C	2
Project completion reporting	Final report	Within 2 weeks of issuance of project completion certificate	2 Hard Copies + 1 Soft Copy

VI. Client's Inputs

The Employer will provide all necessary data and information related to the Project. PSC will make its own arrangements for office accommodation, residential accommodation, transport, and any other required facilities both at the site and in its main office in Kathmandu.

VII. Remuneration and Payment

Remuneration Payment for Consulting Services: Remuneration payment will be based on deliverables and output completed. The details about the payment basis shall be included in the RFP Documents.

Reimbursable expenses and payment: The reimbursable expenses will be paid based on actual expenses occurred. PSC needs to take prior approval from NEA before incurring reimbursable expenses. For claim of reimbursables, the PSC shall submit the required original bills and receipts. The reimbursable activities are expected to be as follows, however, the details of the reimbursable expenses shall be included in RFP Documents.

- Travel expenses to and within sites
- Lodging expenses – for travelling away from base location
- Miscellaneous (Communication, Printing, stationeries etc.)

VIII. Implementation Time Schedule and Effort Level

Activity 1 of the Project is expected to be about 24 months. PSC's time schedule and effort level shall reflect the expected timeline. The proposed the level of experts' time input is estimated at 288.42 person-months. It is anticipated that PSC shall mobilize immediately after the contract is effective. Indicative person months of the expertise required to execute the services is identified in Table below:

Expertise	Domestic Consultants (pm)
Team Leader	12.05
Electrical Engineer	33.05
Civil Engineer	32.68
Quality-Assurance & Testing-Commissioning Engineer	8.82
Electrical Supervisor	54.55
Civil Supervisor	147.27
TOTAL	**288.42**

Annexure – I

The minimum list of design, drawings and calculations that needs to be reviewed and recommended for approval are attached herewith. However, the Consultant shall have to prepare detail Master Design Drawing List (MDDL) for each package for review, comments, observations and recommendation for approval on the design drawings available to NEA and submitted by the Contractor

S.N.	DRAWINGS/DOCUMENTS TITLE
1.	Single Line Diagram of substation
2.	Electrical layout (plan & section) drawing
3.	Overall General Arrangement drawing
4.	Structure loading diagram cum layout drawing
5.	Switchyard Foundation layout drawing
6.	Erection Key Diagram (plan & section)
7.	Indoor Cable trench layout drawing
8.	Outdoor Cable trench layout drawing
9.	Buried cable trench layout drawing
10.	Lighting Fixture & conduit layout – Control Building, Switchyard
11.	Earthing layout
12.	Layout drawing for gravel and fence
13.	Switchyard Road & drain layout drawing
14.	Layout drawing of Visual Monitoring System
15.	Panel layout in Control room building
16.	Power cable termination schedule
17.	Control cable termination schedule
18.	Equipment Foundation Design Calculation and Drawings
19.	Boundary Wall and Approach Road Layout
20.	Buildings Structural Design Calculation and Drawings