TERMS OF REFERENCE
PROJECT SUPERVISION CONSULTANT
For Electricity Grid Modernization Project (EGMP)

A. Background

About 63% of the population of Nepal had access to electricity in 2010 which has increased to 90% including solar energy in 2020. Nepal is planning to achieve 100 percent access to electricity by 2023 and reliable and efficient electricity for all by 2030. Where the demand has been rapidly increasing, the quality and reliability of electricity supply do not meet the requirement. NEA has to work on both meeting the electricity demand and improving the quality and reliability of electricity supply. The current challenges to meet electricity demand and improve quality and reliability of supplied electricity are the construction of new transmission infrastructure and upgradation of existing infrastructures. Further, meeting electricity demand through expansion of transmission infrastructures and enhancing quality and reliable electric supply can be helpful to exploit full potential benefit of the investment made in electricity sector which will play valuable role in poverty alleviation, industrialization of nation and improvement of quality of life of the people.

Modernization of existing transmission and distribution system is also imperative for NEA to improve transmission system stability and to minimize cost of the service delivery. NEA is enthusiast to step in modern era of energy sector by introducing Distribution system automation, Grid Substation Automation and Smart Metering. The proposed project "Electricity Grid Modernization Project" will include expansion and upgradation of Transmission system Infrastructures, Automation of Transmission and Distribution System along with the implementation of Advanced Metering Infrastructures which will improve operational efficiency of NEA, provide safe and reliable electricity supply at cheaper rate to the customers and in turn improve financial health of NEA.

The overall objective of the proposed project is to augment the transmission and distribution system and to modernize electricity system in order to meet the future demand of electricity for all consumers and to improve reliability and quality of electric supply through advanced control and monitoring mechanisms of transmission and distribution system.

The implementation of the project will expand transmission capacity in and outside of Kathmandu valley, modernize distribution system within Kathmandu valley with the installation of smart meters and construction of distribution command and control center which help to reduce system losses and line outages thereby improving system stability and reliability. In addition, construction of new substation and transmission lines along with expansion of existing substations will help to meet the growing demand for electricity and accelerate the pace of electrification which increases the economic growth of the country and improves livelihood. The project is also lined up to achieve reliable and efficient electricity for all by 2030 (National Energy Crisis Reduction and Electricity Development) and improvement of Energy Trade Infrastructure in SASEC countries.

There is strong need of transmission capacity enhancement, distribution system modernization and reinforcement, not only within the Kathmandu valley but throughout the country. To fulfill these much needed requirement, EGMP has been proposed with the following outputs.

Output 1: Electricity Transmission capacity in project areas strengthened and modernized

a. Construction of Dandakhet to Rahughat 25 km long 132 kV transmission line and associated substations of 200 MVA 220/132 kV & 30 MVA 132/33 kV in Rahughat and 30 MVA 132/33 kV in Dandakhet in Myagdi district.

b. Construction of 40 km long 132 kV transmission line from Ghorahi in Dang to Madichaur in Rolpa, and associated substation of 132/33 kV 30 MVA
c. Construction of 25 km long 220 kV transmission line from Lapang in Dhading district to Ratamate in Nuwakot district and 23 km long 132 kV transmission line from Borang to Lapang in Dhading district and associated substations of 220/132 kV 200 MVA, 132/11 kV 30 MVA and 132/33 kV 30 MVA at Borang
d. Construction of substations of 132/33 KV 2*65 MVA at Keraun, Morang
e. Construction of substations of 132/33 KV 2*65 MVA at Surkhet
f. Construction of substations of 132/33 KV, 63 MVA at Pantang, Sindhupalchowk
g. Automation of around 40 grid substations
h. Upgradation of existing 120 km 132 kV from Pathlaiya to Dhalkebar, 30 km 132 kV Duhabi to Kusaha, and 35 km 66 kV inside Kathmandu Valley transmission lines with more efficient high-temperature-low-sag conductors.

Output 2: Electricity distribution system in project areas modernized

a. Construction of distribution command and control center in Kathmandu
b. Installation of additional smart meters for remaining 350,000 customers in Kathmandu Valley
c. Construction of 132/11 kV, 22.5 MVA substation in Keraun, Morang and 30 km long 33 kV distribution lines
d. Construction of 33/11 kV 16.6 MVA substation to meet the increasing demand and enhance quality, reliability of power supply to about 35,000 customers in Surkhet, Karnali Province
e. Construction of 33/11 kV 8 MVA substation in Madichaur
f. Construction of 33/11 kV 8 MVA substation in Lapang
g. Construction of 33/11 kV 8 MVA substation in Borang
h. Construction of 33/11 kV 8 MVA substation in Pangtang
i. Providing knowledge on safe and efficient energy use for 2,000 electricity consumers (including about 40% women and disadvantaged group)

Output 3: Capacity of NEA and electricity users in project area strengthened

The project will support increasing knowledge of at least 30 eligible NEA staff (including 30% women) on NEA's organizational development; complying NEA's audited financial statements for FY 2022 with Nepal Financial Reporting Standards, and operation commencement of NEA's Nepal Power Trade Company Limited by December 2022. The project will also support implementation of key actions from NEA's gender equality and social inclusion (GESI) strategy and operational guidelines in its regional offices, to complement corporate level activities covered under a forthcoming project.

B. Project Organization

Nepal Electricity Authority (NEA) is the Executing Agency (EA) for the proposed project. The term "NEA", "EA" and "the Employer" have the same meaning and may be used interchangeably in this document depending on the context. The Project Management Unit (PMU) is established within the Project Management Directorate (PMD) led by Deputy Managing Director (Project Director) and will be responsible for overall implementation of the project.

The engineering design, supply of plants and equipment, construction, installation, testing and commissioning of transmission lines and associated substations, communications and protection facilities for all subprojects of the Project will be completed through turn-key contracts awarded to contractors following ADB's Procurement Policy (2017,as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time).

A Project Supervision Consultant (PSC) will be recruited to enhance the assurance of sound project implementation, supervision, monitoring and reporting by providing

technical, managerial and project management advices to the PMU and selected contractors. The PSC shall also carry out safeguards related activities of monitoring, reporting, updating and assisting for implementation as required by the ADB safeguard policies. The team of consultants is referred to hereafter as “the PSC” or “the Consultant”. The term “PSC” and “Consultant" may be used interchangeably in this document in depending on the context. The services of the PSC are hereafter referred to as “the Services”.

This document sets forth terms of reference (TOR) for the Services.

C. Objective of the Assignment

NEA seeks through this TOR to engage a team of Project Supervision Consultants (PSC) through a firm in accordance with ADB’s Procurement Policy and Procurement Regulations for ADB Borrowers to supervise and implement the Project.

The services aim at providing high quality professional services in the area of technical and safeguard management (environment and social) to the PMU within PMD in NEA. In terms of technical aspects, the PSC will assist NEA in implementing, supervising, monitoring and reporting the project activities and to ensure that the project will be completed according to the schedule and that the completed project will deliver the quality, capacity, performance, reliability and economic life as required by the Employer’s requirement defined in the turn key contracts with the contractors. The PSC will support the PMU in implementation of safeguards requirements including monitoring and reporting of the project complying with ADB’s requirements. The PSC will also support PMD in effective establishment of newly proposed safeguard unit by developing clear terms of reference of NEA’s deputed staffs, safeguards management system, safeguards monitoring system, GESI institutionalization and implementation, project risk management system, standard operation procedures, staff instructions among others.

D. Scope of the Services, Tasks (Components) and Expected Deliverables

a. Scope of the Services

The PSC is expected to deliver the Services for:

i. Project supervision, implementation, monitoring and reporting
ii. Safeguard management, implementation, monitoring and reporting
iii. Capacity building of NEA staff.

In order to define the scope of services provided by the PSC, the sub-projects are classified into two categories:

Category 1: For this category of sub-projects, the consultant shall supervise, implement, manage (both the Project and Contract), monitor and report the projects and Project activities from technical, safeguard and management aspects as described in detailed tasks. This category includes following projects:

i. Construction of 25 km of 132 kV Dandakhet - Rahughat D/C TL using ACSR Cardinal Conductor, 220/132 kV, 200 MVA & 132/33 kV, 30 MVA Rahughat GIS SS and 132/33 kV, 30 MVA Dandakhet AIS Substation
ii. Construction of 40 km of 132 kV Ghorahi-Madichaur DC TL using ACSR Cardinal Conductor, 132/33 kV, 30 MVA & 33/11 kV, 8 MVA Substation at Madichaur
iii. Construction of 26 km Lapang-Ratmate 220 kV DC Transmission Line using Twin Moose conductor, 23 km of Borang-Lapang 132 kV DC Transmission Line using Bear conductor, 220/132 kV, 200 MVA SS, 132/33, 30 MVA and 33/11, 8 MVA at Lapang and 132/33 kV, 30 MVA & 33/11 kV, 8 MVA SS at Borang

Category 2: For this category of sub-projects, the consultant shall liaise Project Manager and External Consultants that NEA may recruit separately to avail in depth services related to design, supply, construction and construction management services to ensure timely and quality delivery of the NEA's requirement. The PSC shall monitor the project activities and report to the PMU and ADB as required. The PSC shall also assist PMU for safeguard (Environment and Social) implementation and management as well as monitoring the safeguard activities and preparing the Report as required by PMU and ADB. This category includes following projects:

i. Construction of 132/33 kV, 2x65 MVA & 33/11 kV, 16.6 MVA Surkhet Substation
ii. Construction of 132/33 kV, 2x63 MVA & 132/11 kV, 22.5 MVA Keraun Substation, Morang including 30 km of 33 kV lines
iii. Construction of 132/33 kV, 30 MVA & 33/11 kV, 8 MVA Pangtang substation, SIndhupalchowk
iv. Construction of Distribution Command and Control Centre (DCC).
v. 132/66 kV Transmission line conductor upgradation (120 km of 132 kV Pathlaiya-Dhalkebar DC Transmission Line, 30 km of 132 kV Duhabi-Kushaha SC TL, 35 km of 132/66 kV Transmission line in Kathmandu valley)
vi. Installation of Smart Meters and AMI system in Kathmandu valley (Phase II)
vii. Substation Automation of existing 40 grid substations throughout the country outside Kathmandu valley

b. Detailed Tasks

The PSC's detailed tasks are as follows:

b1. Project Monitoring and Reporting

For all the sub-projects listed in Category 1 and 2 as well as for institutional development of PMU, the PSC shall:

i. Develop in-house service standard for PMU for review and approve documents related to contract management, administrative management and settlement of contractor claims within the stipulated time.
ii. Develop effective project progress monitoring system in coordination with the project manager, consultants and contractor.
iii. Develop records system of all correspondence between NEA, contractors, the consultant, ADB and other stakeholders.
iv. Advise NEA on seeking approval from ADB for any variation orders and time extension to be issued to the Contractors.
v. Develop a procedure of commissioning and assist NEA to prepare the commissioning schedule and takeover of completed facilities.
vi. Review project implementation schedule prepared by contractors and assess its technical risks, recommend necessary updates or adjustments to the schedule to both PMU and Contractors.
vii. Monitor and Prepare reports including but not limited to progress reports, safeguard reports, project completion report of all subprojects.
viii. Review the work schedule, work progress and advise PMU for timely completion of the sub-projects.
ix. Other activities reasonably requested by the PMU Head that are related to the contract management of sub-projects.

b2. Project Supervision, Implementation and Management

For all the sub-projects listed in category 1, the PSC shall:

i. Review and advise the NEA on approval of contractor's detailed design in accordance with the Employer's requirements and technical specifications in the contract. The design optimization shall be of prime focus during such review.
ii. Provide oversight of all aspects of the construction in order to assure that it is conducted properly in accordance with the contract and ensuring timely completion with adequate quality and at the stipulated cost.
iii. To ensure quality in project implementation, the PSC shall develop and implement a Quality Assurance Program (QAP). The QAP shall ensure that the plants and equipment supplied and installed meet the performance standards and technical characteristics of the technical specifications. The QAP shall cover all aspects of the project implementation including review and approval of design, quality of works during construction, monitoring schedule, inspection of materials before shipment, upon arrival and upon erection, review of documents to assure quality of delivered goods and comparison of as-built drawings to design. Furthermore, shortcomings in any of the aforementioned areas shall be addressed adequately by QAP.
iv. Assist PMU in implementation and management of the overall Contract of the project including but not limited to recommendation on extension of time, bill verification, variation, etc.
v. Ensure the Contract execution is in accordance with the contract schedule, employer's requirements and technical specifications as specified in the contract and advice the Client to take necessary steps in due course.
vi. Supervise testing and commissioning. All components of lines, substations, SCADA, communications and protection will be subjected to an acceptance test to demonstrate their capability to meet warranted design criteria. For each component subject to test, the consultant will review contractor's test procedures for compliance with manufacturers' requirements and design criteria. The consultant shall witness tests and review test results. If test results are not satisfactory, the consultant shall ensure that any lack of compliance is addressed and that the equipment and overall systems shall be re- tested until compliant results are achieved. 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. The Consultant shall also prepare and recommend a provisional taking over certificate whenever due for the works or part of the works and alert NEA of work deficiencies and outstanding items, if any. The Consultant shall also confirm the remedial measures taken by the contractor, and recommend a final taking over certificate after expiry of the warranty period.
vii. Hand over the completed project including issuance of completion certificates, provisional acceptance and final acceptance certificates to NEA.
viii. Carry out all other activities reasonably requested by PMU Head that are related to project supervision, contract supervision, management and implementation.

b3. Safeguard Management, Implementation & Monitoring

For all the sub-projects listed in Category 1 and 2 as well as for institutional development of PMU, the PSC shall:

i. Provide overall policy and technical direction on safeguards management for the safeguard unit of the PMU
ii. Establish effective environmental and social planning and due diligence system for new projects aligning the requirement of government and ADB safeguards policies
iii. Develop effective public consultation guidelines and support in implementation for

the PMU to ensure meaningful public consultation during project preparation and implementation.

iv. Provide necessary technical assistance to facilitate the implementation, management and monitoring of environmental and social safeguards
v. Develop, organize and deliver environmental and social training programs and workshops for the PMU and contractors staffs at the field level, contractors, field supervision staff and other implementing agency officials as needed, on safeguard requirements and their management
vi. Develop grievance handling system within PMU and project level to ensure project complaints relating are addressed with corrective action and adequately documented
vii. Support the subprojects in obtaining necessary clearances from local environmental/archaeological regulatory authorities for sub-projects, where applicable
viii. Establish a system to ensure that the EMPs/RPs/IPPs are included in the design, and in the bidding documents
ix. Ensure compliance with EMPs/RPs/IPPs during the construction period and maintain close coordination with the technical teams of the PMU
x. Develop guidelines on community participation in environmental/social monitoring
xi. Develop safeguards risk management system for the PMU to identify and manage the safeguards risk of the project
xii. Coordinate with individual consultants and prepare consolidated high quality environment and social safeguard monitoring report as and when required by NEA and ADB.

c. Gender and Social Inclusion (GESI)

For all the sub-projects listed in Category 1 and 2 as well as for the institutional development of PMU, the PSC shall

i. Support NEA in facilitation and coordination to institutionalize GESI mainstreaming according to the approved GESI strategy and operational guidelines of NEA
ii. Assist NEA and provide GESI related advice to implement, report and monitor GESI action plan of the project as necessary

d. Capacity Building of NEA staff

i. One of the basic objectives of the consulting services is the transfer of technology in this field to the NEA's staffs. This will be achieved by involving the NEA staffs with the international experts as much as possible in various activities of the project implementation during field works of the Consultant.

E. Team Composition & Qualification/ Experience Requirements for the Experts and their Responsibilities

a. Team Composition

It is estimated that in total 260 person-months of services are required with 55 person months from international experts and 205 person months by national non-key experts. Details on expertise and person month requirements are in Table 1. The international expertise and national technical experts should be provided by a consulting firm specializing in designing the transmission and substation in partnership with national firm(s) and/or individual national consultants in Nepal.

Table 1: Expertise and Person Month Inputs

S. No.	Expertise	No of PM	Total REM	Total REM
			Field	Home
A.	**International Consultants (Key Experts)**			

1	Team Leader/ Substation Engineer- Electrical	24	23	1
2	Transmission Engineer – Electrical	6.0	5.5	0.5
3	SCADA/Communications Engineer	3.0	2.5	0.5
4	Protection Engineer	3.0	2.5	0.5
5	Geotechnical Engineer	2.0	1.5	0.5
6	Civil Engineer	5.0	4.5	0.5
7	Structure Engineer	3.0	2.5	0.5
8	Environmental Safeguard Specialist	3.0	2.5	0.5
9	Social Safeguards Specialist	3.0	2.5	0.5
10	Bio-Diversity Expert	3.0	2.5	0.5
	Sub Total- A	**55**	**49.5**	**5.5**
B.	**National Consultant (Non-key)**			
1	Substation Engineer - Electrical	12	12	
2	Transmission Line Engineer - Electrical	10	10	
3	SCADA/Communications Engineer	5	5	
4	Civil Engineer	18	18	
5	Health and Safety Safeguard Specialist	10	10	
6	Civil Supervisor	150	150	
	Sub Total-B	**205**	**205**	
	Total (A+ B)	**260**	**254.5**	**5.5**

b. Qualification/Experience Requirements for the Experts

International Experts

i. **Team Leader and Substation Engineer-Electrical** shall have preferably Master's Degree in Electrical Engineering / High Voltage Engineering / Power System Engineering and preferably more than 15 years' experience in design, construction and supervision of substation projects. The expert shall be experienced in detail design and construction of both AIS and GIS substation of 220 kV or above voltage level. The expert shall have previous experience in detail design, preparation of technical specifications & cost estimate and construction supervision of transmission substation of different voltage levels. It is expected that the amount of time spent by the Team Leader in the field will not be less than 90 percent of the required total person month inputs from the Team Leader during the execution of the project.

ii. **Transmission Engineer-Electrical** shall have preferably Master's Degree in Electrical Engineering / High Voltage Engineering / Power System Engineering and shall have preferably more than 10 years of the expert shall be experienced in detail design and construction of transmission line of 220 kV or above voltage level. The past experience shall include design review and supervision of transmission line components and line of 220 kV or above voltage level in overhead system (including systems with HTLS Conductor), preparing technical specifications and designing of 220 kV or above voltage level.

iii. **SCADA/Communications Engineer** shall have preferably Master's Degree in Electrical / Communications Engineering or other relevant discipline with preferably over 10 years of experience in the design, selection and preparation of specification of SCADA and communication systems for transmission lines, substations and control center interfacing. The expert shall have previous experience in designing/planning SCADA/communication system for interconnected/integrated power grid system.

iv. **Protection Engineer** shall have preferably Master's Degree in electrical engineering

with protection specialization and/or further qualifications and training in protection for 220 kV transmission systems and substations, with preferably more than 10 years' experience.

v. **Geotechnical Engineer** shall have preferably Master's Degree in Geotechnical Engineering and preferably more than 10 years' experience, with previous experience internationally in developing countries and with 132kV or above transmission line tower foundations soil testing and for substation structures.

vi. **Civil Engineer** shall have preferably Master's Degree in Civil Engineering, with preferably more than 10 years of experience in design of 132 kV and above voltage level transmission line towers and substation structures. The expert shall have previous experience in design and construction supervision of 132 kV and above voltage level transmission line and substation projects.

vii. **Structural Engineer- Transmission and Substations** shall have preferably Master's Degree in Structural Engineering, with preferably more than 10 years of experience in design of 132 kV and above voltage level transmission line towers and substation structures. The expert shall have previous experience in design and construction supervision of 132 kV and above voltage level transmission line and substation projects.

viii. **Environmental Safeguard Specialist** shall have preferably Master's Degree in Environmental Science, Environment Management, Environmental Engineering or closely related discipline with more than 10 years of professional experience. The expert shall have experience in conducting environmental impact analysis (EIA), initial environmental examinations (IEE) of 132 kV or above voltage class transmission line and substation projects as per international standard and practice as well as well as latest ADB or other donor agencies guidelines with regard to environmental protection and resettlement. The specialist should be conversant with national laws relating to Initial Environment Examination (IEE) / Environmental Impact Assessment (EIA) and ADB's Safeguard Policy Statement 2009.

ix. **Social Safeguard Specialist** shall have preferably Master's Degree in Sociology/Social Science/Anthropological Science with more than 10 years of professional experience. The Specialist shall have experience in preparation of resettlement plan and indigenous peoples plan (IPP) etc., in 132 kV or above voltage class transmission line and substation projects in accordance with the international practices as well as latest donor agencies' guidelines, preferably ADB Guidelines with regard to environmental protection and resettlement. The Specialist should be conversant with national laws relating to land acquisition, resettlement and indigenous people and ADB's Safeguard policy Statement 2009.

x. **Bio-Diversity Expert** shall have preferably Master's degree in Ecology/ Biology/ Environmental Engineering or closely related discipline. The expert shall have a minimum of 15 years of experience in ecological baseline assessment and the assessment of ecosystem services, particularly in context of infrastructure projects.

National Experts

i. **Electrical Engineer (Transmission Line)** shall have preferably Master's Degree in Electrical Engineering/High Voltage Engineering/Power System Engineering and preferably 10 years of experience in preparation of transmission line design and specifications or in construction, testing and commissioning of 132 kV or above voltage class transmission lines.

ii. **Electrical Engineer (Substation)** shall have preferably Master's Degree in Electrical

Engineering/High Voltage Engineering, preferably with more than 10 years of experience in design/construction supervision of 132 kV or higher voltage level air insulated and gas insulated substations. The expert shall have previous experience in detail design, preparation of technical specifications, cost estimate and construction supervision of transmission substations of different voltage levels.

iii. **SCADA/Communications Engineer** shall have preferably Master's Degree in Electrical/Communications Engineering or other relevant discipline with preferably over 10 years of experience in the design, selection and preparation of specification of SCADA and communication systems for transmission lines, substations and control center interfacing.

iv. **Civil Engineer – Transmission and Substations** shall have preferably Master's Degree in Civil Engineering, with preferably more than 10 years of experience in design of 132 kV and above voltage level transmission line towers and substation structures.

v. **Health and Safety Safeguard Specialist** shall have more than 10 years of experience in preparing and implementing environmental, health and safety management plans and supervising environmental, health and safety aspects on construction of 132 kV or above voltage class transmission line and substation projects in a range of countries in accordance with international good practice as well as well as the latest ADB or other donor agencies guidelines with regard to environment, health and safety including the IFC environmental, health and safety guidelines. The specialist should be conversant with national laws and international laws Nepal is a signatory to relating to environmental assessment, environmental management, health and safety management, as well as ADB's Safeguard Policy Statement (2009).

vi. **Civil Supervisor** shall have Diploma Degree in Civil Engineering, with preferably more than 7 years of experience or Bachelors in Civil Engineering with 2 years of experience in construction/supervision in transmission line and/or substation projects.

c. Responsibilities of the Experts

International Experts
All international experts indicated in Table 1 are considered as key experts. The main responsibilities of each international experts are highlighted, but not limited to, as follows:

1. Team Leader and Substation Engineer

As the Team Leader, the expert is responsible for:

i. Leading and managing the entire team including both international and national experts and act as the team's point of contact with NEA and ADB.
ii. Taking a lead in developing project performance monitoring system incorporating all subprojects' implementation progress, contract award and disbursement, project performance management system, and compliance with grant covenants to comprehensively monitor all subprojects performances and identify eminent and potential bottlenecks for implementation. These data and findings in the performance monitoring system are migrated into quarterly progress report and project completion report to be submitted to ADB
iii. Preparing or leading the team to prepare all the reports as listed in the Reporting Requirements.
iv. Develop a system to coordinate the input and activities of the international specialists and ensure coordination with the national specialists and contractors.
v. Handling contract administration matters related to the PSC contract.
vi. Assisting PMD/NEA in Contract management & Contract administration of the

Project.

vii. Monitoring project progress against plan, report on progress, and propose remedial measures as necessary.
viii. Reviewing the contractor's claims for extension of time or additional costs; and preparing variation instructions and cost review; certifying invoices/volume of works completed and recommend for payment.
ix. Providing technical support to NEA in settlement of claims and disputes arising from the turn-key contracts.
x. Contribute to capacity building of NEA counterpart staff.

The Team Leader as a Substation Engineer shall be responsible for following works:

i. Make necessary inputs and advice to the project team and to PMU on related subject matters.
ii. Develop and maintain a project quality assurance plan for NEA; and ensuring that works are executed in line with the plan and project requirements.
iii. Checking the drawings and technical designs submitted by the contractors and recommending them to NEA for approval.
iv. Review, check and certify suppliers' equipment design, and approve the technical documents.
v. Witness and certifying main equipment shop inspections; assist NEA with inspections and certifications of manufactured items prior to shipment and upon receipt.
vi. Recommend the acceptability of designs and works carried out by the contractors and suggest corrective measures to be undertaken.
vii. Produce optimized design as required by the Contract or as required by the Client in due course of implementation of the Project/Contract.
viii. Supervise the installation, testing and commissioning of substations and transmission lines.
ix. Review and certify the contractor's testing and commissioning plans.
x. Supervise testing and commissioning in conjunction with NEA and other team members.
xi. Certify substantial completion and/or completion of main project components as defined in the contract documents.
xii. Contribute to capacity building of NEA counterpart staff.

2. Transmission Line Engineer

i. Make necessary inputs and advice to the project team and to NEA on related subject matters.
ii. Assist NEA in review and approval of contractor's drawings and technical information.
iii. Witness and certify main equipment shop inspections and assist NEA with inspections and certifications of manufactured items prior to shipment and upon receipt.
iv. Supervise site construction and installation works in conjunction with NEA and other team members.
v. Review and certify the contractor's testing and commissioning plans.
vi. Supervise testing and commissioning of transmission lines in conjunction with NEA and other team members.
vii. Review, check and certify suppliers' equipment design, and approve the technical documents.
viii. Produce optimized design as required by the Contract or as required by the Client in due course of implementation of the Project/Contract.
ix. Assist with the review of contractor's claims for extension of time or additional costs; and prepare variation instructions and cost review; certify volume of works completed withdrawal applications and issue of monthly and final payment certificates.
x. Assist with the certification of substantial completion and/or completion of main project components as defined in the contract documents.

3. SCADA/Communications Engineer

i. Make necessary inputs and advice to the project team and to NEA on transmission line and substation communication matters.
ii. Assess NEA's existing SCADA and communications systems and prepare design concepts for interfacing with the transmission line and substations.
iii. Assist NEA in review and approval of contractor's drawings and technical information with regard to communication/SCADA system.
iv. Supervise site construction and installation works in conjunction with NEA and other team members.
v. Produce optimized design as required by the Contract or as required by the Client in due course of implementation of the Project/Contract.
vi. Review and certify the contractor's testing and commissioning plans.
vii. Supervise testing and commissioning in conjunction with NEA and other team members.
viii. Review, check and certify suppliers' equipment design, and assist NEA in approving the technical documents.
ix. Supervise installation, testing and commissioning of the transmission line and substations SCADA and communication systems. Monitor project progress against plan, report on progress, and propose remedial measures as necessary.
x. Perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.

4. Protection Engineer

i. Make necessary inputs and advice to the project team and to NEA on transmission line and transmission substation technical and protection matters.
ii. Contribute to the Inception Report
iii. Assess NEA’s existing protection systems and prepare design concepts for protection of the transmission line and substations.
iv. Contribute to capacity building of NEA counterpart staff.
v. Assist NEA in review and approval of contractor’s designs, drawings and technical information.
vi. Assist NEA with inspections and certifications of manufactured items prior to shipment and upon receipt.
vii. Supervise site construction and installation works in conjunction with NEA and other team members.
viii. Review and certify the contractor’s testing and commissioning plans.
ix. Supervise testing and commissioning in conjunction with NEA and other team members.
x. Review, check and certify suppliers’ equipment design, and assist NEA in approving the technical documents.
xi. Produce optimized design as required by the Contract or as required by the Client in due course of implementation of the Project/Contract.
xii. Witness and certify main equipment shop inspections.
xiii. Supervise the testing and commissioning of the transmission line and substation protection systems. Monitor project progress against plan, report on progress, and propose remedial measures as necessary.
xiv. Perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.

5. Civil Engineer -Transmission and Substation

i. Make necessary inputs and advice to the project team and to NEA on transmission line and transmission substation structural matters.
ii. Prepare civil designs for control buildings (if required) and substation equipment structures.

iii. Produce optimized design as required by the Contract or as required by the Client in due course of implementation of the Project/Contract.
iv. Review and check the civil designs of control buildings, civil layout of substation and other civil structures submitted by the contractors and assist in approval of contractor's designs, drawings and technical information.
v. Perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.

6. Structural Engineer

i. Make necessary inputs and advice to the project team and to NEA on transmission line and transmission substation structural matters.
ii. Prepare structure designs for towers and tower foundations (if required) and substation equipment structures.
iii. Produce optimized design as required by the Contract or as required by the Client in due course of implementation of the Project/Contract.
iv. Review and check the tower, tower foundation, pole foundation and substation structure designs including control buildings and other civil structures submitted by the contractors and assist in approval of contractor's designs, drawings and technical information.
v. Perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.

7. Geotechnical Engineer

i. Perform field sampling and measurements to assist in determination of site soil conditions in conjunction with other team members.
ii. Make necessary inputs and advice to the project team and to NEA on transmission line and transmission substation geotechnical matters.
iii. Contribute to capacity building of NEA counterpart staff.
iv. Perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.

8. Environmental Safeguard Specialist

i. Make necessary inputs and advice to the project team and to NEA on environmental safeguards matters to ensure project compliance with ADB's Safeguard Policy Statement (2009), loan covenants and EMP requirements including those set out in the IFC EHS General and Transmission/Distribution Guidelines.
ii. Develop Environmental Safeguard Risk Management System to identify associated risk in advance.
iii. Prepare guidelines in preparation of EMP for transmission line and substation component of the project.
iv. Develop a system in PMU in ensuring EMP provisions are incorporated into the contract documents for each package before contract awards, to ensure subsequent compliance.
v. Develop grievance handling system within PMU and project level to ensure project complaints relating are addressed with corrective action and adequately documented.
vi. Assist NEA to develop a system to monitor and report compliance during environmental safeguard during implementation.
vii. Develop a guideline to conduct a public consultation and detailed qualitative and quantitative analysis of the anticipated changes to the baseline to determine the direct, indirect, induced and cumulative impacts of the project in construction, phase. These impacts may include, but not limited to, loss of habitat and ecosystems, loss of flora and fauna, impacts on wildlife, food supply chain and migration patterns of wild life, water quality, emission of greenhouse gases, erosion and sedimentation, loss of physical and cultural resources, impacts associated with construction etc.

viii. Review existing IEEs and/or EIAs prepared by NEA and suggest for improvement for future IEEs and EIAs.
ix. Coordinate with individual consultants and support the team to prepare consolidated high quality environment safeguard monitoring report as and when required by NEA and ADB.
x. Perform other functions as may be assigned or delegated by Team Leader from time to time.

9. Social Safeguard Specialist

i. Make necessary inputs and advice to the project team and to NEA on social safeguard issues as required by the national laws, regulations and ADB's SPS 2009.
ii. Prepare guidelines to undertake public consultation, qualitative and quantitative analysis to determine the direct, indirect, induced and cumulative impacts of the project in construction.
iii. Develop Social Safeguard Risk Management System to identify associated risks in advance.
i. Prepare a guideline for preparation of entitlement matrix for transmission line and substation components of the project listing all likely effects, such as permanent and or temporary land acquisition, and a study to determine the replacement costs of all categories of losses based on the asset valuation process, with particular attention to vulnerable groups including indigenous peoples, women, children and the poor and socially excluded.
ii. Develop a system in PMU in ensuring social safeguard provisions are incorporated into the contract documents for each package before contract awards, to ensure subsequent compliance.
iii. Develop grievance handling system within PMU and project level to ensure project complaints relating are addressed with corrective action and adequately documented.
iv. Support national experts in updating/preparing the implementation schedule consistent with all the resettlement plan requirements, making sure that major components are carried out before the civil works.
v. Coordinate with individual consultants and support the team to prepare consolidated high quality social safeguard monitoring report as and when required by NEA and ADB.
vi. Perform other functions as assigned or delegated by Team Leader from time to time during the time of assignment.

10. Biodiversity Expert

i. Develop a guideline to perform detailed biodiversity assessment for the overall project, with particular attention to threatened species and critical habitat potential for project components located inside or close to protected areas and key biodiversity areas (Chure Hill Conservation Area, Parsa National Park, Koshi Tappu Wildlife Reserve and Ramsar site). Support national experts in the implementation of the guidelines in related to the project.
ii. Support PMU, national experts in updating IEE; identify all mitigation measures needed to preserve wildlife and flora biodiversity in the project area and update EMP accordingly.
iii. Support PMU and national experts in ensuring works within Parsa National Park will be confined to the existing right of way from Pathlaiya substation, works within the Lake Cluster of the Pokhara Valley Ramsar site will be confined to the existing road, and works in the Koshi Tappu Wildlife Reserve buffer zone will not encroach into this site; and that site-specific measures for these protected areas and buffer zone as set out in the EMP are to be implemented, including site specific construction biodiversity management plans to be prepared and cleared before any works in these areas take place.
iv. Develop a system to ensure protected area management is consulted, and

enhancement measures to be delivered or funded by NEA jointly agreed upon.

v. Support PMU and local experts in obtaining necessary permits and clearances from government agencies including the Department of National Park and Wildlife Conservation and the Chure Conservation Program Office for implementation of the project; ensuring these agencies confirmed works are in accordance with protected area management plans and enhancement measures are agreed; and incorporating any comments from approving agencies until the necessary environment related approvals are obtained, prior to the commencement of works.

vi. Support NEA in ensuring no other works for project components (in particular the Keraun 33 kV distribution lines and restringing of 132/66 kV transmission lines in the Kathmandu Valley) take place within the boundaries or buffer zones of any (a) World Heritage Sites, (b) Ramsar sites, (c) National Parks, (d) Wildlife Reserves, and (e) Conservation Areas or other key biodiversity area; identify from the results of the safeguard screening forms - the accuracy of which should be checked by the consultant - all residential and sensitive receptors in the project area of influence (30m corridor for TL) and all legally protected areas and internationally and nationally important biodiversity areas and physical cultural resources in the wider study area (up to 10km).

vii. Guide national Environmental Safeguards Specialists in ensuring that environmental safeguards will be guaranteed throughout project implementation in and close to protected areas, including buffer zones as well as forested areas; national environmental specialists are to carry out full-time in-person monitoring at project site within protected areas (Chure, Koshi Tappu, Parsa) and twice-monthly monitoring within forested areas outside of protected areas. If travel restrictions are lift, international biodiversity consultant is to carry out monthly site visit to construction activities in or close to protected areas and quarterly site visits to forested areas outside of protected areas; all site visits must be documented by field visit note including photographs.

viii. Assist PMU and national experts in reviewing detailed designs prepared by contractors as well as contractor's preconstruction documentation to ensure they comply with EMP biodiversity conservation requirements, IFC EHS General and Transmission/Distribution Line Guidelines requirements prior to their approval as required under the EMP for approval; identify any further site-specific construction measures or environmental mitigation measures needed and update EMP accordingly.

ix. Assist PMU and national experts to implement all necessary measures to protect wildlife, as detailed in the EMP, including but not limited to compensatory afforestation, installing bird diverters where lines run in or close to sensitive wetland and forest habitat, and, awareness raising for biodiversity conservation; assist NEA to monitor and supervise strict implementation of these EMP measures by contractors and any subcontractors.

x. Advise NEA to develop a system for effective implement afforestation activities and prepare quarterly/semi-annual report on afforestation, including tree nursery, plantation and dead sapling replacement after one year.

xi. Assist NEA to develop and implement corrective action plan for any non-compliance during implementation.

xii. Assist NEA as necessary to update the IEE and EMP as necessary during implementation.

National Experts

Although national consultants are classified as non-key in the proposal evaluation, they play important role in the PSC team with local knowledge of dealing with social, technical and geographical issues arising from the Project. Each national expert will perform the same or similar duties as his/her counterpart in the international team in his/her respective field.

1. Health and Safety Safeguard Expert

i. Review the turn-key contractors' health and safety plans.

ii. Make necessary inputs and advice to the project team and to NEA on health and safety requirements and best practice to ensure project compliance with ADB's Safeguard Policy Statement (2009), loan covenants and EMP requirements including those set out in the IFC EHS General and Transmission/Distribution Guidelines.
iii. Support NEA in ensuring EMP provisions are incorporated into the contract documents for each package before contract awards, to ensure subsequent compliance.
iv. Develop Detailed Monitoring Framework (checklists) for use by on-site NEA environmental officers to effectively supervise and monitor the implementation of the EMP and the contractor's health and safety management plans during preconstruction, construction, operation and maintenance phase,
v. Monitor and supervise implementation of the health and safety components of the EMP by their contractors and any subcontractors.
vi. Update the IEE and EMP on health and safety concerns if necessary due to unanticipated impact or alterations in scope or design.
vii. Develop a system and support PMU to confirm that all corrective actions for existing facilities (substations) have been adequately implemented prior to a contractor being given access; if travel restrictions still apply, the national health and safety specialist will carry site visits while the international consultant will provide guidance on best practices; all site visits must be documented by field visit note including photographs.
viii. Develop a system for regular inspections of construction/installation activities including construction site, camps sites, equipment storage areas, waste disposal areas, oil and fuel storage areas, sanitation and welfare facilities, and prepare inspection reports including copies of documentary evidence and photographs and recommend corrective action where non-compliance with ADB's Safeguard Policy Statement (2009) and EMP requirements including those set out in the IFC EHS General and Transmission/Distribution Guidelines are observed. If travel restrictions still apply, the national health and safety specialist will carry site visits while the international consultant will provide guidance on best practices. All site visits must be documented by field visit note including photographs.
ix. Support team leader and PMU to establish and implement the grievance redress mechanism, including raising awareness of its existence with workers and affected communities, resolving grievances related to health and safety issues that have been submitted, appropriately responding to health and safety incidents including through an effective emergency preparedness and response plan, and keeping adequate documentation of grievances and incidents.
x. Develop a system to undertake quantitative monitoring required by the EMP and provide advise (e.g. templates) for adequate record keeping for health and safety monitoring purposes, including documentation of any accidents or disease such as COVID-19 cases, and to prepare quarterly combined environment and social monitoring reports up until the completion of construction, and semi-annual environment monitoring report during operation, in coordination with environmental and social safeguards specialists.
xi. Assist NEA to develop and implement corrective action plan for any non-compliance during implementation.
xii. Develop and deliver health and safety training materials for NEA and their contractor to develop capacity in relation to understanding of the ADB's Safeguard Policy Statement (2009), IFC EHS General and Transmission/Distribution Line Guidelines and EMP requirements, related to occupational and community health and safety risk assessment and management including emergency preparedness and response; document trainings including participants lists and photographs.
xiii. Perform other functions as may be assigned or delegated by Team Leader from time to time.

F. Reporting Requirements, Time Schedule for Deliverables and Implementation Arrangement

The Consultant shall prepare various reports and maintain records documenting decisions made at meetings, progress on project implementation, financial records and changes to the contract

plans. All documents and reports would be in electronic format to ADB and hard copies to NEA. The reporting shall, in general, comprise of the following:

i. Inception report
ii. Manual for checking drawings of towers and foundations, substation structures
iii. Report on shop inspection and test witnessing
iv. Formats/guidelines related to institutionalization of safeguards system within PMU as explained in the ToR of international environmental and social specialists.
v. Formats/guidelines for site supervision and site supervision reports related to social, environmental and technical matters.
vi. At NEA's request, all necessary reports concerning special matters related to the project (installation, work methodology, safety, claims, checklist for equipment testing and commissioning etc.)
vii. Monthly reports of category 1 sub-projects under EGMP concerning physical progress/status of works, expenditures, delivery of materials etc. in the formats acceptable to NEA and ADB.
viii. Consolidated quarterly progress report including all sub-projects of category 1 and 2 under EGMP giving the progress status, schedules, costs, budgets etc. in the formats acceptable to NEA and ADB.
ix. Consolidated semi-annual and annual environment and social safeguard reports including all sub-projects of category 1 and 2 under EGMP.
x. Consolidated Project Completion Report (PCR) including all sub-projects under EGMP as per requirement of NEA and ADB.
xi. Interim report
xii. Final report

All documents and reports would be made available on electronic format to ADB. All reports will be in English language.

The PSC shall report to the Project Management Directorate (PMD) of NEA headed by the Deputy Managing Director who reports directly to the Managing Director of NEA. The PSC shall work closely with subproject managers, their engineers and NEA's specialized departments if necessary.

The Consultant is expected to commence the service in April 2021 and the duration of the service will be forty-eight (48) months.

G. Client's Input and Counterpart Personnel

i. Administrative support for Consultant Team: If required by local regulations, NEA will provide Consultant with necessary support letters for obtaining visas and permits for its experts. The cost and timing of obtaining the above is entirely the responsibility of the consultants.

ii. Office Space, Office Equipment, Transportation and Accommodation: NEA will provide office space, necessary furniture and office equipment (computers, printers etc.) in Kathmandu. The Consultant shall make his own arrangements for transportation and accommodation for its personnel in Nepal. The Consultant shall arrange itself any other equipment and planning software required during execution of works. Consultant shall be responsible for international telephone bills, maintenance of office equipment and consumables necessary for its own use.

iii. Support Staff for Team Leader: Support staffs required by the Team Leader shall be provided by PSC.

iv. NEA Project Team: The subprojects shall have its own contract management team comprising of project manager, engineer and other support staff. The subproject team shall assist the consultant in collecting data required for study. The subproject team shall work in close collaboration with the Consultant's team and be fully involved in all aspects of the consulting services. Both NEA and Consultant's teams shall work together as one

single team in all matters related to the Project.

v. Client will provide the following inputs, project data and reports to facilitate preparation of the Proposals:

NEA will facilitate access of the consultant to other government agencies for communications, collecting of relevant information, data documents, etc. and other activities related to the consultant's assignment.

Necessary inputs required to facilitate the preparation of the Proposals can be downloaded from web site of Nepal Electricity Authority (https://nea.org.np), Ministry of Energy, Water Resources and Irrigation (https://www.moewri.gov.np), Department of Electricity Development (https://www.doed.gov.np) and Water and Energy Commission Secretariat (https://www.wecs.gov.np).