

**Terms of Reference
For
Consulting Services for Engineering and Environmental Study of
Kohalpur-Surkhet-Upper Karnali 400 kV Transmission Line and
Kohalpur-New Butwal 400 kV Transmission Line under Project
Preparatory Facility for Energy (PPFE)**

1. Background and Definitions

- 1.1 This project includes study and detail design of (1) the 400 kV Double circuit New Kohalpur – New Butwal transmission line and 400 kV substations at New Butwal (the design of New Kohalpur substation is covered by Nalsinggad Development Committee in a separate consulting assignment) (2) the 132 kV Double circuit Chinchu (Surkhet)-Subakuna (Surkhet) and 132 kV substation at Subakuna (Surkhet) (3) the 400 kV Double circuit Upper Karnali substation – Chinchu (Surkhet) transmission lines, and 400 kV substation at Upper Karnali (4) New Kohalpur-New Lumki-New Attariya 400 kV Double circuit transmission lines, and associated 400 kV substation at New Lumki and New Attariya.
- 1.2 Nepal is facing chronic power shortages. Currently, only about 70 percent of the country's households have access to grid electricity. The Government of Nepal has set a target of providing electricity to all of the population in the nation by 2027 (90 percent through the national grid and 10 percent from decentralized generation solutions). In support of the Government's energy development goals, The Asian Development Bank (ADB) has provided grant assistance under Project Preparatory Facility for Energy (PPFE) which will support preparation of detail studies of New Butwal-New Kohalpur-New Lumki – New Attariya 400 kV Transmission Line and associated substations and Chhichu (Surkhet) – Upper Karnali 400 kV Double circuit transmission lines and associated substations as well as 132 kV Chhinchu – surkhet 132 kV Double Circuit transmission line and substations. Nepal Electricity Authority (NEA) is the implementing agency for this part of PPFE.
- 1.3 The term “NEA”, “EA” and “the Employer” have the same meaning and may be used interchangeably in this document depending on the context.
- 1.4 Aimed at increasing transfer capacity of the grid and access to grid electricity, the PPFE shall finance the detail studies of the following subprojects:
- a) New Butwal - New Kohalpur & Surkhet-Upper Karnali transmission line project comprising of following subprojects:
 - (i) the 400 kV Double circuit New Kohalpur – New Butwal transmission line and 400 kV substation at New Butwal;
 - (ii) the 132 kV Double circuit Chinchu (Surkhet)- Subakuna (Surkhet) and 132 kV substation at Subakuna (Surkhet)
 - (iii) the 400 kV Double circuit Upper Karnali substation – Chinchu (Surkhet) transmission lines, and 400 kV substation at Upper Karnali.

b) The 400 kV New Kohalpur - New Lumki - New Attariya transmission line with associated 400 kV substations at New Lumki and New Attariya.

1.5. All subprojects listed in 1.4 shall be collectively referred to hereafter in this document as **“the Project”**.

1.6. Under ADB's Project Preparation Facility for Energy Grant, a project preparation support consulting firm (PPS) will be engaged in preparation of :

- (1) Detail route alignment survey of the transmission lines;
- (2) Profiling and tower spotting on PLS CADD of the transmission lines and verification and demarcation of the tower spots in the site of actual construction;
- (3) Check survey, Identification of land plot & Tree counting;
- (4) Geotechnical investigation including soil investigation of angle towers of the transmission lines and substation;
- (5) Review of existing 400 kV Transmission Line Tower design provided by NEA, comment and redesign if necessary including special tower design.
- (6) Complete Tower foundation design and all other associated designs of the transmission lines;
- (7) Detail Design of the Substations including protection system coordination and substation automation;
- (8) Environmental and Social Safeguard studies including IEE/EIA as applicable along with EMP, IPP and RP of the transmission lines;
- (9) Detail Tree cutting plan with marking in the tree and ROW details of the transmission lines;
- (10) Cost Estimates, Procurement/Contract Packages and the Bidding documents following ADB standard bidding documents for construction of the transmission lines & Substations; and
- (11) Design of the required SCADA/Communication system and submission of a report to recommend.

1.7. NEA seeks through this Expression of Interest (EoI) to engage a team of project preparation consultants through a firm in accordance with ADB's Guidelines on the Use of Consultants by Asian Development Bank and Its Borrowers to support in preparation of the Project.

1.8. This document set forth terms of references (TOR) for the Services.

2. Objective of the Services

The prime objective of the services is to procure a project preparation support consulting service from a consulting firm in a lump sum mode. The consulting firm is to prepare detail project design covering route alignment survey, transmission lines and substations design including tower spotting, tree cutting plan, RoW plan, environmental

and social safeguard studies, cost estimates, contract packages and bidding documents in detail enough to provide adequate information & data to ensure that the Project will be ready for construction immediately after the procurement according to the schedule.

3. Scope of the Services

The following scope of work is proposed to achieve the objective of the project, which shall include but not be limited to the tasks and assignments, activities outlined below:

- (a) **Project preparation:** Technical aspects, Surveys, Investigations, Designs, Cost Estimates, Economic and Financial analysis, Procurement planning, Bidding Documents, Environmental examination/assessment, planning and management, Social assessment planning and management.
- (b) **Capacity building of NEA's Staffs:** By conducting trainings covering (i) Project formulation, preparation, planning, management, budgeting (ii) preparation of design (iii) Procurement and Contract management (iv) Project Management Professional (PMP) certification training (v) On the Job training as required.

4. Detailed Tasks

The PPS's detailed tasks are as follows:

(a) The Project Preparation:

- (i) Develop a full understanding of project requirements through discussion with NEA;
- (ii) Review all reports, drawings and plans prepared by or for NEA (if any) and related to the proposed subproject;
- (iii) Determine and suggest the appropriate transfer capacity of Transmission Line and substations with needful calculations based on the Transmission system Master Plan of NEA;
- (iv) Conduct field surveys. Prepare and conduct detail survey of the transmission lines including route alignment, profiling, tower spotting and demarcation in the site, optimization of tower locations, soil resistance measurement, geo-technical investigation, determine substation location, prepare the Right-of-Way plan along the transmission line route covering land plots, title holders, land area to be acquired/ affected as per the NEA prudent practice and submit report with incorporation of suggestions from approving agencies. The transmission line route alignment plans and profiles and tower spotting plans shall be prepared using PLS-CADD with demarcation of tower spot in the site of actual construction. The detail survey of the final route alignment shall be carried out by using state-of-the-art survey techniques and instruments having error within the standard acceptable limit. The three coordinates (latitude, longitude, elevation or Northing, Easting and Elevation) of all tower positions shall be determined. Further, major features (switch yard, substation, angle and all intermediate points, river crossings, line crossings, houses/sheds/other structures, and any major crossings) shall be determined with latest details/features up to 100 m on both sides of the recommended alignment.

- (v) Carrying out sag-tension calculations using PLS-CADD software. Prepare sag template in the scale of plan & profile drawings. Spot towers on the prepared plan & profile drawings optimally and prepare sag curves using PLS-CADD software. The sag curves shall be for both Hot and Cold conditions with all other necessary details prescribed by international standards.
- (vi) Perform detail engineering and develop design of the transmission line including but not limited to (a) development of design criteria, calculations, drawings; (b) Design Manual for design of EHV transmission lines; (c) Specifications for steel towers, conductor, shield wires, OPGW, dampers, disc insulators, line hardware and all other line accessories etc; (d) review of family of self-standing steel lattice tower designs provided by the client and redesign if necessary including special towers design required if any (c) Complete Tower foundation Design (e) Development of construction and installation methods; and (f) other related activities to complete the intended jobs and submit report with incorporation of suggestions from approving agencies. This assignment inter-alia shall include but not limited to the following:
- Collection and analysis of weather/climate including isokeraunic data and develop weather loading for design of transmission line. Based on metrological data determine various loading zones for the transmission line, which shall pass through terrain with varying elevation and climate conditions, to optimize design of various transmission line elements/components.
 - Selection of design parameters/criteria for the transmission line and preparation of design manual as per IEEE standard 1724: Guide for the preparation of a Transmission Line Design Criteria Document. However, other standards such as IEC 60826, ASTM, BS, CSA, VDE IS shall be used for design of specific components and for any aspect not covered by IEEE. The PPS consultant shall perform and document necessary investigations, studies, design, simulation, etc; to support the selection of design parameters, criteria etc.
 - Preparation of Technical Specifications and Engineering Design for transmission line materials and construction.
 - Based on loading zones, line route, ground profile & contours, terrain, spans (ruling, basic and weight span values) and other relevant parameters; review the design families of Towers and determine their suitability, if necessary design special towers for the project, and complete the tower foundation design.
 - Carry out the prototype testing of the newly designed towers for verification of the designs. (if necessary)
- (vii) Perform detail engineering and design of the Substation as per relevant IEEE, IEC standards including but not limited to a) develop design criteria for AIS and GIS substations, calculations, drawings & technical specifications of substations equipment (electrical, mechanical, protection and communication equipment) and related accessories and propose

suitable AIS or GIS substations for each subproject under study (b) Design of Gantry structures, Equipment structures, Structure's foundations, Control Building, Approach and Internal roads, Cable trench and associated civil works. The structural designs shall be developed taking into consideration the seismic factors applicable; (c) Design, drawing and calculation of complete protection system including earthing system (d) Design and drawings of Substation lay outs based on COMS principle, single line diagrams, protection and control schematic diagrams, interlocking schemes etc; (e) Design & drawings of SCADA, substation automation and Communication system and all other related activities to complete the intended jobs and submit report with incorporation of suggestions from approving agencies.

- (viii) Conduct Soil investigation for each substation, angle towers of the transmission lines.
- (ix) Prepare detail cost estimate of the project, viz; each subproject wise as illustrated in clause 1.4. The PPS Consultant shall depict the major assumptions forming the cost estimates in text including the major item wise details of cost estimates. The PPS Consultant shall also provide following information:
 - Reference price level of estimates
 - Currency and Exchange rates and their referenced period
 - Level of Contingencies
 - Level of inventories of materials, spares etc,
 - Scaling factors used for scaling up/down cost of any major equipment/item
 - Status of engineering and design on the basis of which the estimates have been framed
 - Rates and quantity of the items on the basis of value analysis.
 - Insurance, Transportation, Custom Duty and Taxes etc
- (x) Perform Economic and Financial analysis of the Project/subprojects.
- (xi) Prepare a workable and cost effective procurement, construction & execution plan including schedule for the proposed subproject and a detail description of the process and submit report with incorporation of suggestions from NEA.
- (xii) Prepare the contract package for procurement and Bidding documents for each of the transmission lines & Substations contract package for the subprojects along with the technical specifications, schedules and drawings for bidding of the project on a turnkey basis and submit documents with incorporation of suggestions from approving agencies until approved.
- (xiii) Prepare Quality Assurance Plan for implementation during the construction.
- (xiv) Following the Environment Act and Regulation of Nepal, prepare and conduct EIA/IEE (as necessary), Tree cutting plan along the ROW and substations; Forest clearance and submit report with incorporation of suggestions from approving agencies. In addition, the PPS shall also prepare EMP, IPP, RP,

Social Impact Assessment as per ADB's requirement based on Safeguard Policy Statement 2009 (SPS) with regard to environmental protection and resettlement. Also, support Project in clarifying any queries from the responsible authorities until it is approved.

(b) Capacity Building of NEA staff

The PPS shall perform a needs assessment and develop training programs for NEA staff working on the Project as PPS's counterpart staff. The training program shall include (a) Project preparation and formulation (b) Project management, project planning, Expenditure planning and Budgeting (c) Preparation of Basic Design according to International standards (d) Procurement and Contract Management of turnkey projects with special focus on transmission lines and substations (e) Project Management Professional (PMP) Certification Training (f) On the job training as required.

The NEA counterpart staff will assist the consultant to the extent possible during all phases of the project. All international experts of PPS are expected to work closely with the NEA staff and shall ensure that the NEA staff persons achieve higher skill levels as a result of their involvement.

5. Implementation Arrangement

5.1 The PPS will work closely with the office of New Butwal-New Kohalpur-Surkhet-Upper Karnali 400 kV Transmission Line Project (the Project or Client) at Project Management Directorate (PMD) of NEA and coordinate with Nalsinggad Hydropower Development Board, NEA's specialized Departments, Local administration, Relevant ministries & agencies, Consultant of Nalsinggad Hydropower Development Board, Project Supervision Consultant (PSC) for this subproject as and when required. The PPS's team leader will be the principal contact and will be expected to be readily available at the Project office with a notice of seven days from the Project during the assignment period. The PPS will be responsible for all aspects of performance of services set forth in the TOR. The Client will be responsible for providing the existing data and information and supporting arrangement for the necessary field investigations.

5.2 **Method Statements.** Prior to commencing any section of the work, the PPS shall submit method statement to the project in accordance with the requirement of the Consulting Services with the allocated input of days from both national and international experts and expected input from counterpart staff of NEA. When requested by the Client, the PPS shall provide additional method statements related to specific item of work.

5.3 **Design Progress Meetings.** The PPS shall hold periodic progress meetings with the Client at least once a month. Additional meetings shall be scheduled as required by the PPS's design. The intent of these meetings will be for the Client to provide input and to discuss options for addressing the Client's comments. The PPS shall fully cooperate with the Client in scheduling and attending such meetings as requested by the Client. These meetings shall be held at PMD office in Kathmandu. The Client will be responsible to prepare meeting minutes during each of these meetings. Minutes will be distributed to participants for review and comment.

- 5.4 **Monthly Progress Reports.** The PPS shall furnish the Client with a written Monthly Progress Report that summarizes all aspects of the completed month and cumulative work progress. The objectives of the Monthly Progress Report are to:
- (i) Provide a reliable and readily accessible summary record of the project activities with daily activities performed by each individual at the site and progress of work during the just completed month with verification of daily task in the site signed by the Project's representative.
 - (ii) Provide a detailed description of all work actually completed to date and revision to the project schedule required, which shall reflect changes in the critical path since the date of the last revision.
 - (iii) Identify issues and problems requiring action by the Client or PPS, including issues of conflicting priorities.
 - (iv) Provide a forecast of the work to be accomplished in the next month.
 - (v) Provide information to help substantiate PPS's pay request.
- 5.5 **Submittal Protocol.** No later than thirty (30) days after the Contract Date, the PPS shall submit a submittal protocol for the Consulting Services. The submittal protocol shall identify the submittal packages to be prepared by the PPS including but not limited as specified in clause 10, including a detailed listing of the content, the expected dates of the submittals, number of copies, and distribution of the submittals by the PPS based on distribution information provided by the Client. The submittal protocol shall include the time allowed for the Client's review, which at a minimum shall be twenty (20) days. For large or complex submittals, the Client may require a submittal review period longer and the PPS shall coordinate with the Client inclusion of these review periods in the submittal protocol. The submittal protocol shall avoid the simultaneous submittal of a large number of submittals for the concurrent Client review.
- 5.6 **PPS's Obligations.** The PPS shall provide submittals for review consistent with the submittal dates. The PPS acknowledges that the Client's review will often involve input from, or consultation with, a number of individuals. Therefore, should submittal dates to the Client be delayed, the PPS shall provide prompt notice to the Client of the delay. In no case shall this notice be given less than ten (10) calendar days prior to the scheduled submittal date for that submittal. The submittals shall identify any proposed change to the requirements, or the design concept, project delivery approach, or the project schedule provided in the consultant's proposal, accompanied by the rationale behind the proposed change. No changes shall be implemented without Client's acceptance. Such acceptance shall not, however, relieve the PPS of any of its obligations under the contract.
- 5.7 **Form of Submittals.** Each submittal shall be transmitted electronically and in hard copy, unless otherwise required by other sections of the TOR, with a cover letter to the Client (New Butwal- New Kohalpur-Surkhet-Upper Karnali 400 kV Transmission Line) at the office of Project Management Directorate. Unless otherwise specified in the contract, the PPS shall prepare up to eight (08) hard copies of each submittal for distribution. The Client is responsible for distribution of submittals to reviewers. Electronic submittals shall be in the original file format. The PPS is responsible for the accuracy and completeness of the information submitted.

5.8 The PPS shall make submittals far enough in advance of subsequent activities to allow time for reviews, consultations with other entities, for securing necessary acceptance, for possible revisions and re-submittals. The Client intends to process PPS's submittals as quickly as practical.

5.9 **Client's Review.** The Client will review submittals for consistency with the design concept presented in the PPS's proposal. The primary purpose of the Client's review is to satisfy itself that the submittals generally conform to the intent of the contract. The Client's review shall not relieve the PPS of the sole risk and responsibility for all defects, errors or omissions, or of sole responsibility for meeting all requirements of the contract. The PPS shall not proceed with implementation of any work affected by a submittal until review by the Client is complete and the submittal is returned with review comments as below:

Approved: Indicates submittal has been reviewed and appears to be in conformance with requirements of the contract. The PPS may proceed.

Approved as Noted: Indicates submittal appears to be in conformance with requirements of the contract, with the exception of noted corrections. The PPS shall incorporate the corrections noted but does not need to resubmit. The PPS may proceed.

Returned for Correction: Indicates submittal does not appear to be in conformance with the Contract. The PPS shall make necessary revisions and resubmit. The PPS shall not proceed.

Rejected: Indicates submittal is incomplete or insufficient information has been provided to conduct a review. The PPS shall provide the missing information. The PPS shall not proceed.

Not Reviewed: Indicates that the submittal is not called for by the contract and that no action was taken by the Client. The PPS may proceed.

5.10 The PPS is expected to commence the service by September 2017, and the duration of the service will be Fifteen (15) months from September 2017 - November 2018.

5. Expertise and Person Month Requirements

5.1. It is estimated that in total 135 person-months of Services are required with 62 person months from international experts and 73 person months by national experts. Details on expertise and person month requirements are in Table 1. The international expertise should be provided by a consulting firm specializing in designing and preparing the construction of EHV transmission lines and substations in partnership with national firm(s) and/or individual national consultants in Nepal.

Table 1: Indicative PPS Expertise and Person Months Requirements

Position	Person-month(pm)				National
	International				
	Home	Field (KTM)	Field (Site)	Total	
Team Leader/Transmission Electrical Engineer	1	4	5	10.0	
Substation Electrical Engineer		1	4	5.0	
Line Survey Engineer (at least 2 nos for National)		2	6	8.0	12.0
Structural Engineer-Transmission/SS	1	2	1	4.0	
Electrical Engineer- T/SS (at least 2 nos for National)					10.0
Civil Engineer -T/SS (at least 2 nos for National)		4	6	10.0	14.0
SCADA/Communications Engineer		0.5	0.5	1.0	
Protection Engineer		2	1	3.0	
Environmental Safeguard Specialist (at least 2 nos for National)	1	2	4	7.0	12.0
Social Safeguards Specialist (at least 2 nos for National)	1	2	4	7.0	12.0
Geotechnical Engineer		1	4	5.0	5.0
Procurement Expert	1			1.0	
Financial Expert	1			1.0	
Forest Conservation Expert (at least 2 nos for National)					8.0
Total	6.0	20.5	35.5	62.0	73.0

6. Responsibilities of the International Experts

6.1. 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:

a) Team Leader and Transmission Electrical Engineer

(1) As the Team Leader, the expert is responsible for but not limited to:

- (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) Make necessary inputs and advice to the project team and to NEA on transmission line and transmission substation technical matters.

- (iii) Develop a full understanding of project requirements through discussion with NEA.
 - (iv) Coordinate field surveys, necessary additional studies for the subproject to ensure that the line and substations meet NEA's overall requirements of the projects
 - (v) Coordinate to review all reports, drawings and plans prepared by or for NEA and related to the proposed subproject until bid preparation.
 - (vi) Contribute to capacity building of NEA counterpart staff.
 - (vii) Prepare regular reports in accordance with ADB's requirements.
 - (viii) Prepare or lead the team to prepare all the reports as listed in the Reporting Requirements in 10.
 - (ix) Handling contract administration matters related to the PPS contract.
 - (x) Support PMD/NEA in administration of the preparation of all turn-key contracts for the Project.
 - (xi) Provide complete services or coordinate with appropriate expert or experts to fulfill the outlined tasks on clause 4 "Detailed Task" in this TOR
 - (xii) Prepare project designs, documentation and bidding documents; including and not limited to the technical specifications, performance specifications, schedules and drawings; with assistance of other consultants of the Transmission lines & Substations for the subprojects on a turnkey basis and submit report with incorporation of the comments by ADB & NEA on the draft bidding documents and finalize the draft bidding documents until approved by ADB & NEA.
 - (xiii) Prepare Quality Assurance Plan for implementation during the construction.
 - (xiv) Monitoring project progress against plan, report on progress, and propose remedial measures as necessary.
 - (xv) Lead the consultant team to prepare detail cost estimate for subprojects
 - (xvi) Conduct other duties as reasonably requested by NEA-Project Management Directorate.
- (2) The Team Leader must also be an expert of transmission electrical engineering. As an transmission electrical engineer, he/she is responsible for:
- (i) Provide inputs and advice to the project team and to NEA on transmission line technical matters and bid document preparation.
 - (ii) Define transmission line design technical parameters, conductor configurations, insulator and tower types, taking account of NEA's requirements and Nepal-specific conditions including wind velocity, terrain type and altitude.
 - (iii) With support from other key and non-key experts complete assignments as demanded by this consulting works.

The Team Leader will lead the capacity building and be responsible for:

- (i) Perform a training needs assessment for NEA staff and prepare a training program with the assistance of the consultant team.
- (ii) Contribute to capacity building of NEA counterpart staff.

b. Substation Electrical Engineer

- (i) Provide inputs and advice to the project team and to NEA on substation related technical matters and bid document preparation.
- (ii) Define substation design technical parameters, taking account of NEA's requirements and Nepal-specific conditions including wind velocity, terrain type and altitude.
- (iii) Provide support to the Team Leader in completing substation related assignments as demanded by this consulting works.

c. Line Survey Engineer

- (i) Make necessary inputs and advice to the project team and to NEA on transmission line and substation survey and location matters.
- (ii) Contribute to the reports.
- (iii) Prepare and conduct on site detail route survey of the transmission lines and submit report with incorporation of suggestions from approving agencies.
- (iv) Work to support NEA for the preparation of project designs, documentation, bidding documents.
- (v) Provide support to the Team Leader in completing line survey related assignments as demanded by this consulting works.
- (vi) Perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.

d. Structural Engineer (Transmission/Substation)

- (i) Make necessary inputs and advice to the project team and to NEA on transmission line and transmission substation structural matters including foundation for towers and substation equipment.
- (ii) Contribute to capacity building of NEA counterpart staff.
- (iii) Prepare designs and layouts for the substations, transmission line tower foundations & substation equipment foundations and submit report with incorporation of suggestions from NEA taking into consideration seismic factors.
- (iv) Review of existing 400 kV Transmission Line Tower design provided by NEA, comment and redesign if necessary.
- (v) Work to support and advise NEA for the preparation of project design criteria for towers and substation structures, documentation, bidding documents.
- (vi) Carry out complete design of self-supporting steel lattice transmission line towers, Gantry structures and equipment structures of Substations. Prepare the Design Manual of Towers.
- (vii) Witness the prototype tower tests (if required)
- (viii) Perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.
- (ix) Prepare detail cost estimate of transmission line.
- (x) Perform a training needs assessment for counterpart staff and prepare a training program in consultation with the Team Leader.
- (xi) Provide support to the Team Leader in completing structural engineering related assignments as demanded by this consulting works.

e. Civil Engineer (Transmission/Substations)

- (i) Make necessary inputs and advice to the project team and to NEA on transmission line and substation on civil engineering related matters.
- (ii) Perform Foundation Design of Towers, Gantry, Equipment structure and design of Control Building, Trenches and Civil structures to complete the specified scope of works taking into consideration seismic factors.
- (iii) Contribute to capacity building of NEA counterpart staff.
- (iv) Contribute to the preparation of project designs, documentation, bidding documents.
- (v) Perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.
- (vi) Conduct and Prepare as necessary, line routing and tower spotting plans and survey information using PLS-CADD with demarcation of tower pad in the site of actual construction.
- (xii) Conduct and prepare; Right of Way (ROW) detail report of the transmission lines with support from the National Experts and submit report with incorporation of suggestions from approving agencies. Also, support Project in clarifying any queries from the responsible authorities until it is approved.
- (xiii) Perform a training needs assessment for counterpart staff and prepare a training program in consultation with the Team Leader.
- (xiv) Provide support to the Team Leader in completing civil engineering related assignments as demanded by this consulting works.

f. SCADA/Communications Engineer

- (i) Assess NEA's existing SCADA and communications systems and prepare design concepts for interfacing with the transmission line and substations.
- (ii) Contribute in the preparation of project designs, documentation, bidding documents.
- (iii) Perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.
- (iv) Contribute in preparation of the conceptual designs and layouts for the substations, transmission line, tower foundations, substation equipment foundations, SCADA, communications, protection etc.
- (v) Conduct field visit and recommend SCADA/Communication system for the transmission line and substation communication matters of the subprojects with justification.
- (vi) Contribute to capacity building of NEA counterpart staff.
- (vii) Provide support to the Team Leader in completing SCADA/Communication related assignments as demanded by this consulting works.

g. Protection Engineer

- (i) Make necessary inputs and advice to the project team and to NEA on transmission line and transmission substation protection system.

- (ii) Assess NEA's existing protection systems and prepare design concepts for protection of the transmission line and substations.
- (iii) Contribute to capacity building of NEA counterpart staff.
- (iv) Conduct field visit and recommend protection system for the subprojects with justification.
- (v) Study the system, determine the protection requirement for T/L and substation and perform necessary calculation and suggest the Protection settings.
- (vi) Perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.
- (viii) Provide support to the Team Leader in completing Protection related assignments as demanded by this consulting works.

h. Environmental Safeguard Specialist

- (i) Conduct and Prepare Environmental Impact Assessment (EIA) or Initial Environmental Examination (IEE) as required with support of National Consultants for the individual subprojects in accordance with the practice and law of Nepal. In addition, support NEA in incorporating comments from approving agencies until it is approved.
- (ii) Conduct a 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.
- (iii) Conduct and Prepare EMP for the individual subprojects.
- (iv) Perform other functions as may be assigned or delegated by Team Leader from time to time.
- (v) Provide inputs to clarify concerns of IEE/EIA approving agencies and help NEA in getting it approved.
- (vi) Provide support to the Team Leader in completing environmental safeguard related assignments as demanded by this consulting works.

i. Social Safeguard Specialist

- (i) Conduct and Prepare Resettlement Plan (RP) with support from the National Social Safeguard Expert for detail census surveys of affected people based on the selected transmission route alignment and substations in accordance with the national laws, regulations and ADB's SPS 2009.
- (ii) 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.

- (iii) Prepare detail reports of land and plots to be acquired / purchased along the ROW of Transmission Lines and for Substation.
- (iv) Prepare land acquisition and resettlement impact assessment based on selected route alignment and substation details.
- (v) Prepare the entitlement matrix for each subproject 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.
- (vi) Prepare and/or update detail cost estimate of land acquisition, RoW acquisition and resettlement for each subproject. Update the implementation schedule of RP.
- (vii) Update the implementation schedule consistent with all the resettlement plan requirements, making sure that major components are carried out before the construction works.
- (viii) Provide guidance to the national social safeguard specialist for social safeguard in data collection and census surveys of affected persons.
- (ix) Establish dialogue with affected peoples for incorporating their suggestions.
- (x) Ensure compliance with all government rules and regulations and ensure that the RPs are in compliance with ADB's SPS 2009.
- (xi) Submit all finalized/updated RPs to ADB for review and clearance for ADB's review and clearance.
- (xii) Perform other functions as assigned or delegated by the Team Leader from time to time during the time of assignment.
- (xiii) Prepare and Conduct IPP; Social Impact Assessment for all the subprojects individually and submit report with incorporation of suggestions from approving agencies. Also, support Project in clarifying any queries from the responsible authorities until it is approved.
- (xiv) Provide support to the Team Leader in completing social safeguard related assignments as demanded by this consulting works.

j. Geotechnical Engineer

- (i) Perform field sampling and measurements to determine the site soil conditions in conjunction with other team members.
- (ii) Make necessary inputs and advice to the project teams and to NEA on transmission line and transmission substation geotechnical matters.
- (iii) Contribute to the preparation of project designs, documentation, bidding documents.
- (iv) Perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.
- (v) Conduct Soil investigation of substation, angle towers of the transmission lines and submit report with incorporation of suggestions from approving agencies.

- (vi) Provide support to the Team Leader in completing geotechnical related assignments as demanded by this consulting works.

k. Procurement Expert

- i) Contribute to the preparation of bidding documents in line with ADB standard bidding documents.
- ii) Perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.
- iii) Make necessary inputs and advice to the project teams and to NEA on transmission line and transmission substation procurement related matters.
- iv) Provide support to the Team Leader in completing procurement related assignments as demanded by this consulting works.

l. Financial Expert

- (i) Perform Economic and Financial analysis of the Project/subprojects.
- (ii) Make necessary inputs and advice to the project teams and to NEA on transmission line and transmission substation financial related matters.
- (iii) Provide support to the Team Leader in completing finance related assignments as demanded by this consulting works.

7. Responsibilities of the National Experts

7.1. Although national consultants are classified as non-key in the proposal evaluation, they play important role in the PPS 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. In addition, National Forest Conservation Expert shall work under the consultant team to coordinate and execute clearance and permission of forest and conservation area for tree cutting and Right of Way related issues of the subprojects.

8. Capacity Building

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

8.2. NEA's eight (8) engineers will visit the PPS's home office for one month each to gain valuable experience and familiarity with the project and contract management issues. The PPS shall arrange a training session in its home office for a total of eight (8) engineers. The duration of the session shall be one month. The cost of such training including the cost of travel, boarding, lodging and subsistence allowance in connection with the Engineer's training on PPS's offices will be quoted under Provisional Sum. The training shall be conducted in the in following disciplines:

- (a) Project preparation and formulation
- (b) Project management, project planning, Expenditure planning and budgeting
- (c) Preparation of Basic Design according to International standards

- (d) Procurement and Contract Management of turnkey projects with special focus on transmission lines and substations
- (e) Project Management Professional (PMP) Certification Training

8.3. The PPS shall provide hands on training on the latest version of internationally recognized contract management of turnkey projects with special focus on transmission lines and substations and Project Management Professional (PMP) Certification Training from an institute accredited by Project Management Institute. PPS shall provide with its proposal the details of proposed training.

9. Reporting requirements

9.1. The PPS shall prepare the various reports and maintain records documenting decisions made at meetings, progress on project preparation, financial records and changes to the contract plans. The reporting shall, in general, comprise of the following:

- (i) Detail survey of the transmission lines with incorporation of suggestions from approving agencies.
- (ii) Report on revision of Tower Design of NEA and design of towers not covered by the existing tower design of NEA and Report on the Foundation Design of the transmission lines.
- (iii) Transmission Line Tower Design Manual.
- (iv) Report on Substation Design including design of gantry structure & their foundations, equipment structure and their foundation, equipment foundation, Earthing design, Communication design, Protection design, Control Building & cable trenches etc and all associated single line and schematic drawings with incorporation of suggestions from approving agencies.
- (v) Report on Soil investigation of substation, angle towers of the transmission lines with incorporation of suggestions from NEA.
- (vi) Bidding documents for each procurement package of the transmission lines & Substations for the subprojects with incorporation of suggestions from NEA.
- (vii) Report on recommendation of SCADA/Communication and protection system for the subprojects
- (viii) Report on EIA/IEE (as necessary); EMP, IPP, RP; Tree cutting plan with numbering in the trees; ROW detail report of the transmission lines; Social Impact Assessment; Forest clearance with incorporation of suggestions from approving agencies.
- (ix) Report on review of all reports, drawings and plans prepared by or for NEA and related to the proposed subproject
- (x) Report on line routing and tower spotting plans and survey information using PLS-CADD with demarcation of tower spot in the field of actual construction.
- (xi) Report on definition of transmission line and substation design technical parameters, conductor configurations, insulator and tower types, taking account of NEA's requirements and Nepal- specific conditions including wind velocity, terrain type and altitude.
- (xii) Report on detail cost estimate for subprojects
- (xiii) Report on designs and layouts for the substations, transmission line, tower foundations, substation equipment foundations, SCADA, communications, protection etc.

- (xiv) Report on technical specifications, performance specifications, schedules and drawings for bidding of the project on a turnkey basis.
- (xv) Report on Economic and Financial analysis of the Project/subprojects.
- (xvi) Prepare Manual for checking drawings of towers and foundations.
- (xvii) Other reports in accordance with the detailed task of PPS.

9.2. All documents and reports would be made available on hard copy as well as electronic format. All reports will be in English language.

10. Counterpart Support and Inputs Provided by NEA

10.1. **NEA Project Team:** The office of New Butwal- New Kohalpur-Surkhet-Upper Karnali 400 kV Transmission Line Project, Project Management Directorate- NEA 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.

10.2. **Project Preparation:** NEA engineers and technicians will support in preparation activities at different site locations of the subprojects and the Consultant shall report to and work in tandem with the Project Management Directorate- NEA. NEA will provide in total 9 and 6 man months of inputs of NEA electrical engineer and civil engineer respectively to support the International Expert during project preparation.

10.3. **Administrative support for PPS Team:** If required by local regulations, NEA will provide PPS 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 PPS.

10.4. **Office Space, Office Equipment, Transportation and Accommodation:** NEA will provide office space, necessary furniture and office equipment (computers, fax, telephone etc.) in Kathmandu. However, the PPS shall make his own arrangements for transportation in Kathmandu and local transportation and accommodation for its personnel in the project sites outside of Kathmandu. The PPS shall arrange itself any other equipment required during execution of works. PPS shall be responsible for international telephone bills, maintenance of office equipment and consumables necessary for its own use.

11. Qualification/Experience of Experts

11.1. International Experts

- a) **Team Leader and Transmission Line & Substation Electrical Engineer** shall have preferably Master's Degree in Electrical Engineering/High Voltage Engineering and preferably more than 15 years of consulting experience in transmission line projects and substantial experiences in developing countries other than his/her own country. The expert shall have previous team leader experience in detail design and project preparation of 400 kV or above voltage level transmission line projects. Experience shall cover 400 kV or higher voltage class transmission line detail design and bid document preparation.
- b) **Line Survey Engineer** shall have preferably Master's Degree in Survey/Civil Engineering and preferably more than 10 years of consulting experience, with previous experience in detail survey of 400 kV or above transmission lines in countries other than

the expert's home country. Experience shall include route definition, detail survey and tower spotting in mountainous terrain and environmentally and socially sensitive situations. The expert shall have an understanding of line clearances and safety considerations. The knowledge on AutoCAD or similar software is highly preferred.

- c) **Structural Engineer (Transmission/Substations)** shall have preferably Master's Degree in Structural Engineering, with preferably more than 15 years of consulting experience in design of 400 kV or above voltage level transmission line towers and substation structures. The expert shall have previous experience in design of 400 kV or above voltage level transmission line projects with at least 100 km in length. The knowledge on AutoCAD or similar software is highly preferred.
- d) **Civil Engineer (Transmission/Substations)** shall have preferably Master's Degree in Civil Engineering with preferably more than 15 years of consulting experience in the design of foundations for transmission line towers and substation structures for 400 kV or above voltage level. The expert shall have previous experience in design and project preparation of transmission line and substation projects of 400 kV or above voltage level. The knowledge on AutoCAD or similar software is highly preferred.
- e) **SCADA/Communications Engineer** shall have preferably Master's Degree in Electrical/Communications Engineering or other relevant discipline with preferably over 10 years of consulting experience in the design, selection and preparation of specification of SCADA and communication systems for 400 kV or above voltage level 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. The knowledge on AutoCAD or similar software is highly preferred.
- f) **Protection Engineer** shall have preferably Master's Degree in Electrical Engineering with specialization in protection system and/or further qualifications and training in protection system engineering with preferably over 15 years of consulting experience in design, selection and preparation of specifications of interconnected electrical power system. Previous experience of the expert shall cover design of protection system for 400 kV transmission systems and substations.
- g) **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 consulting experience in the field. The expert shall have experience in conducting environmental impact analysis (EIA), initial environmental examinations (IEE) of 400 kV or above voltage class transmission line projects as per international standard and practice 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.
- h) **Social Safeguard Specialist** shall have preferably Master's Degree in Sociology/Social Science/Anthropological Science with more than 10 years of consulting experience in the field. The Specialist shall have experience in preparation of Resettlement Plan and Indigenous Peoples Plan (IWS2AQ1QAPP), etc., in 400 kV or above voltage class

transmission line 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 and resettlement and ADB's Safeguard policy Statement 2009.

- i) **Geotechnical Engineer** shall have preferably Master's Degree in Geotechnical/ Civil Engineering and preferably more than 10 years of consulting experience, with previous experience in developing countries other than the expert's home country. The experience shall be in geotechnical investigation, test and design of tower foundations of 400 kV or above voltage level transmission lines and substation structures.
- j) **Procurement Expert** shall have preferably Master's Degree in Law, contract management, engineering or procurement related studies and preferably more than 10 years of consulting experience. The experience shall be in bid document preparation of transmission line and substation related projects of 400 kV or above voltage level.
- k) **Financial Expert** shall have preferably Master's Degree in Business Administration, Finance or related studies and preferably more than 10 years of consulting experience. The experience shall be in Financial evaluation of 400 kV or above voltage level transmission lines and substation projects.

12.2. National Experts

- a) **Line Survey Engineer** shall have at least Bachelor's Degree in Survey/Civil Engineering and 10 years of experience in detail survey of 132 kV or above transmission lines. Experience shall include route definition, detail survey and tower spotting in mountainous terrain and environmentally and socially sensitive situations. The expert shall have an understanding of line clearances and safety considerations and knowledge on AutoCAD or similar software.
- b) **Electrical Engineer (Transmission/Substation)** shall have at least Bachelor's Degree in Electrical Engineering/High Voltage Engineering and 10 years of experience in transmission line and substation design, specification, testing and commissioning of 132 kV or above voltage class. The expert shall have an understanding of High Voltage Transmission line clearances and safety considerations and knowledge on AutoCAD or similar software.
- c) **Civil Engineer (Transmission/Substations)** shall have at least Bachelor's Degree in Structure/Civil Engineering with preferably 10 years of experience in the design of foundations for transmission line towers and substation structures for 132 kV and above voltage level. The expert shall have previous experience in design and project preparation of transmission line and substation projects of 132 kV and above voltage level. The expert shall have knowledge on AutoCAD or similar software.
- d) **Environmental Safeguard Specialist** shall have preferably Master's Degree in Environmental Science, Environment Management, Environmental Engineering or closely related discipline with more than ten (10) years of professional experience in the related field. The expert shall have experience in conducting environmental impact analysis (EIA), initial environmental examinations (IEE) of transmission line 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.

- e) **Social Safeguard Specialist** shall have preferably Master's Degree in Sociology/Social Science/Anthropological Science with more than ten (10) years of professional experience in related field. The Specialist shall have experience in preparation of resettlement plan; indigenous peoples plan (IPP) etc. of transmission line 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 and resettlement and ADB's Safeguard policy Statement 2009.
- f) **Geotechnical Engineer** shall have preferably Master's Degree in Geotechnical/Civil Engineering and preferably 10 years of experience. The experience shall be in geotechnical investigation, test and design of tower foundations of 132 kV or above voltage level transmission lines and substation structures.
- g) **Forest Conservation Expert** shall have preferably Master's Degree in Forestry or Forest related studies and at least 5 years of experience in works related to the forest clearance, tree cutting plan & tree cutting approval from the Forest Office, Community Forest Groups or National Parks in according to national laws and norms.

13. Milestones and Payment:

Consulting Firm will be paid upon completion of the Milestones. Details of the Milestones and Mode of payment are described below:

Advance Payment - 10% against unconditional Bank Guarantee.

Milestone 1: Inception Report- 10 %

- (i) Develop a full understanding of project requirements through discussion with NEA;
- (ii) Review all reports, drawings and plans prepared by or for NEA and related to the proposed subproject;
- (iii) Determine and suggest the appropriate capacity of Transmission Line and substations with needful calculations based on the transmission master plan of NEA;
- (iv) Walk over survey to propose three different alternative routes for each Transmission line.
- (v) Submission and approval of Report on walk over survey and review of all reports, drawings and plans prepared by or for NEA and related to the proposed subproject

Milestone 2: Detail Survey of Transmission Lines- 20%

Prepare and conduct detail survey of the transmission lines including route alignment, profiling, tower spotting and demarcation in the site, optimization of tower locations, soil resistance measurement, geo-technical investigation, determine substation location, prepare the Right-of-Way plan along the transmission line route covering land plots, title holders, land area to be acquired/ affected as per the NEA prudent practice and submit report with incorporation of suggestions from approving agencies. The transmission line route alignment plans and profiles and tower spotting plans shall be prepared using PLS-CADD with demarcation of tower spot in the site of actual construction. The detail survey of the final route alignment shall be carried out by using state-of-the-art survey techniques and instruments having error within the standard acceptable limit. The three coordinates (latitude, longitude, elevation or Northing, Easting and Elevation) of all tower positions shall be determined. Further, major features (switch yard, substation, angle and all intermediate points, river crossings, line crossings, houses/sheds/other structures, and any major crossings) shall be determined with latest details/features up to 100 m on both sides of the recommended alignment.

Carrying out sag-tension calculations using PLS-CADD software. Prepare sag template in the scale of plan & profile drawings. Spot towers on the prepared plan & profile drawings optimally and prepare sag curves using PLS-CADD software. The sag curves shall be for both Hot and Cold conditions with all other necessary details prescribed by international standards.

Submission and approval of Report on line routing and tower spotting plans and survey information using PLS-CADD with demarcation of tower spot in the site of actual construction with GPS coordinates.

Milestone 3: Soil Investigation -5%

Conduct Soil investigation including soil resistance measurement for each substation, angle towers of the transmission lines to complete the specified scope of work

Submission and approval of Report on Soil investigation of each substation, angle towers of the transmission lines with incorporation of suggestions from approving agencies.

Milestone 4: Detail Design of transmission line-15%

Perform detail engineering and develop design of the transmission line including but not limited to (a) development of design criteria, calculations, drawings; (b) Design Manual for design of EHV transmission lines; (c) Specifications for steel towers, conductor, shield wires, OPGW, dampers, disc insulators, line hardware and all other line accessories etc; (d) review of family of self-standing steel lattice tower designs and redesign if necessary (e) Design of special towers required if any (f) Complete Tower foundation Design (g) Development of construction and installation methods; and (h) other related activities to complete the intended jobs and submit report with incorporation of suggestions from approving agencies. This assignment inter-alia shall include but not limited to the following:

- Collection and analysis of weather/climate including isokeraunic data and develop weather loading for design of transmission line. Based on metrological data determine various loading zones for the transmission line, which shall pass through terrain with varying elevation and climate conditions, to optimize design of various transmission line elements/components.

- Selection of design parameters/criteria for the transmission line and preparation of design manual as per IEEE standard 1724: Guide for the preparation of a Transmission Line Design Criteria Document. However, other standards such as IEC 60826, ASTM, BS, CSA, VDE IS shall be used for design of specific components and for any aspect not covered by IEEE. The PPS consultant shall perform and document necessary investigations, studies, design, simulation, etc; to support the selection of design parameters, criteria etc.
- Preparation of Technical Specifications and Engineering Design for transmission line materials and construction.
- Based on loading zones, line route, ground profile & contours, terrain, spans (ruling, basic and weight span values) and other relevant parameters; review the design of Towers provided by clients and determine their suitability for the project and design foundation, re-design the Towers if required.
- Carry out the prototype testing of the towers for verification of the designs. (if necessary)
- Report preparation of prototype testing including prototype testing of towers, if required.

Milestone 5: Detail Design of substation-15%

Perform detail engineering and design of the Substation as per relevant IEEE, IEC standards including but not limited to a) develop design criteria for AIS and GIS substations, calculations, drawings & technical specifications of substations equipment (electrical, mechanical, protection and communication equipment) and related accessories and propose suitable AIS or GIS substations for each subproject under study (b) Design of Gantry structures, Equipment structures, Structure's foundations, Control Building, Approach and Internal roads, Cable trench and associated civil works. The structural designs shall be developed taking into consideration the seismic factors applicable; (c) Design, drawing and calculation of complete protection system including earthing system (d) Design and drawings of Substation lay outs based on COMS principle, single line diagrams, protection and control schematic diagrams, interlocking schemes etc; (e) Design & drawings of SCADA, substation automation and Communication system and all other related activities to complete the intended jobs and submit report with incorporation of suggestions from approving agencies.

Submission and approval of Report on Substation Design technical parameters, taking account of NEA's requirements, terrain type and altitude, design of gantry structure & their foundations, equipment structure and their foundation, equipment foundation, earthing design, Communication design, Protection design, Control Building & cable trenches etc and all associated single line and schematic drawings with incorporation of suggestions from approving agencies.

Milestone 6: Preparation of Construction Plan, Bidding Documents & Cost Estimates - 5%

Submission and approval of detail cost estimate of the project, viz; each subproject wise as illustrated in clause 1.4. The PPS Consultant shall depict the major assumptions forming the cost estimates in text including the major item wise details of cost estimates. The PPS Consultant shall also provide following information:

- Reference price level of estimates
- Currency and Exchange rates and their referenced period
- Level of Contingencies
- Level of inventories of materials, spares etc,
- Scaling factors used for scaling up/down cost of any major equipment/item
- Status of engineering and design on the basis of which the estimates have been framed
- Rates and quantity of the items on the basis of value analysis.
- Insurance, Transportation, Custom Duty and Taxes etc

Submission and approval of the contract package for procurement and Bidding documents for each of the transmission lines & Substations contract package for the subprojects along with the technical specifications, schedules and drawings for bidding of the project on a turnkey basis and submit documents with incorporation of suggestions from approving agencies until approved.

Submission and approval of a workable and cost effective procurement, construction & execution plan including schedule for the proposed subproject, Quality Assurance Plan for implementation during the construction and a detail description of the process and submit report with incorporation of suggestions from NEA.

Milestone 7: Environment and Social Assessment: 10%

Following the Environment Act and Regulation of Nepal, prepare and conduct EIA/IEE (as necessary), Tree cutting plan along the ROW and substations; Forest clearance and submit report with incorporation of suggestions from approving agencies. In addition, the PPS shall also prepare EMP, IPP, RP, Social Impact Assessment as per ADB's requirement based on Safeguard Policy Statement 2009 (SPS) with regard to environmental protection and resettlement. Also, support Project in clarifying any queries from the responsible authorities until it is approved.

Submission and approval of EIA/IEE (as necessary); EMP, IPP, RP; Tree cutting plan; ROW detail report of the transmission lines; Social Impact Assessment; Forest clearance with incorporation of suggestions from approving agencies.

Milestone 8: Perform Economic and Financial analysis of the Project/subprojects- 5%

Submission and approval of Report on Economic and Financial analysis of the Project/subprojects.

Other reports (if any) in accordance with the detailed task of PPS but not covered above.

Milestone 9: Retention for the validity of the works performed by the consultant - 5%

The 5% amount will be retained for the validation of the whole Designs and Demarcation works produced by the Consultants where the Consultant may require to provide further justifications and clarifications to the Concerned Contractor or Employer during the Construction phase of the above project. The amount shall be retained for maximum 2 (two) years from the Completion of PPS contract. However, the retained 5% amount may be released against the unconditional Bank Guarantee.