

Terms of Reference

Bangladesh-China Power Company (Pvt.) Limited (BCPCL), a Joint Venture Company of North-West Power Generation Company Limited (NWPGL), Bangladesh and China National Machinery Import & Export Corporation (CMC), China, is implementing Payra-Gopalganj-Aminbazar 400kV Double Circuit Transmission Line (2nd phase) Project on Turnkey Basis. This transmission line is to facilitate transmission of power from Payra 1320MW Thermal Power Plant (Phase II), 3600MW LNG based Combined Cycle Power Plant and other planned power plants in Payra area to the load center.

The total length of the overhead transmission line is approximately 256.318 km using Quad Bundle ACSR Finch Conductor per phase for overland portion and Quad Bundle ACCC Conductor per phase for river crossing portion with one ACSR Dorking earthwire and one equivalent OPGW. This includes five (5) river crossings namely, Payra River (\approx 1566m), Sugangha River (\approx 730m), Shondha River (\approx 440m), Arialkha (\approx 400m), Padma River (\approx 6777m) and other tributaries.

Gopalganj and Aminbazar sub-stations which are currently under construction will need to be extended to accommodate these transmission lines.

Feasibility Study and Initial Environmental Examinations (IEE) Study has been completed by Power Grid Company of Bangladesh (PGCB). BCPCL has already signed contract with EPC Contractor for Payra-Gopalganj-Aminbazar 400kV Double Circuit Transmission Line (2nd phase) Project on Turnkey Basis.

Now, BCPCL intends to appoint a national consulting firm to carry out Field Engineering & Site Supervision services and witness of Testing and Commissioning for Engineering Consultancy Services for Payra-Gopalganj-Aminbazar 400kV Double Circuit Transmission Line (2nd Phase).

The Consultant will be selected under Quality and Cost Based Selection (QCBS) Method, National. The cost of the said services will be borne by BCPCL.

2.0 Scope of Services:

The Consultant will provide Field Engineering & Site Supervision and witness of Testing and Commissioning for Engineering Consultancy Services for Payra-Gopalganj-Aminbazar 400kV Double Circuit Transmission Line (2nd Phase).

The detailed scope of works during each stage is described below:

2.1 Field Engineering & Site Supervision and witness of Testing and Commissioning (Transmission line and substation)

2.1.1 Field Engineering & Site Supervision:

The EPC Contractor's scope includes construction of the transmission line from Payra Thermal Power Plant to Aminbazar Sub-Station via Gopalganj Sub-Station including five (5) river crossings and extension of sub-stations in Gopalganj and Aminbazar. There will also be line re-routing works

of existing 400kV line in Gopalganj Sub-Station and Payra Thermal Power Plant to avoid line crossings.

The Consultant shall provide oversight of all aspect of the construction to assure that the construction is carried out as per approved documents. This includes reviewing the EPC Contractor's quality assurance program for construction, review and approval of HSE program, monitoring of the EPC Contractor's compliance to environmental mitigation plan and project procedures. The Consultant shall review and monitor the EPC Contractor's project schedule, carry out inspection of materials upon arrival and upon erection, review of documents to assure quality of delivered goods, comparison of as-built drawings to design and addressing shortcomings in any of these areas.

The Consultant shall also maintain a register of Final BOQ versus actual quantities installed and shall submit the same to BCPCL as and when required.

The Consultant shall also prepare and issue Non-Conformance Reports (NCR) and Punch Points as required and shall maintain an updated status of all NCRs and Punch list.

After erection and pre-commissioning activities are completed as per specification and Contract requirements, the Consultant shall recommend for issuance of Mechanical/Work Completion Certificate.

2.1.2 Testing and Commissioning

Most of the main components of the facility will be subjected to an acceptance test to demonstrate their capability to meet warranty design criteria. For each component subject to testing, the Consultant shall review the EPC Contractor's test procedures for compliance with manufacturer's requirements and design criteria.

The Consultant shall witness Factory Acceptance Tests (if required) and Site Acceptance Tests including providing their recommendation for energizing of line and equipment after all tests as per the EPC Contract are completed.

After the line and sub-station equipment are energized, BCPCL will initiate operational activities. The Consultant shall assist BCPCL in this phase of the project and coordinate with the EPC Contractor in addressing any issues with the facilities that affect operation adversely. At the end of this period, and when all acceptance tests have been completed to the Consultant's and Employer's satisfaction, the Consultant shall advise Employer that the construction is completed and the facility is ready to be declared fully operational.

The Consultant shall prepare and recommend an Operational Acceptance Certificate (OAC) whenever due for the works of the EPC Contractor and alert BCPCL of work deficiencies, if any. The Consultant shall also confirm the remedial measures taken by the EPC Contractor and recommend a Final Acceptance Certificate (FAC) after expiry of the warrantee period.

2.2 Project Management

The Consultant shall oversee the entire project progress including EPC's procurement, erection, testing and commissioning. The Consultant shall report to BCPCL regarding EPC's work progress.

The Consultant shall organize Monthly Progress Meetings as and when necessary, Site Meetings and other meetings to ensure proper performance of the EPC Contract.

The Consultant shall also review EPC Contractor's invoices and issue payment certification for BCPCL's approval.

The Consultant shall review and assist BCPCL in determining the EPC Contractor's proposal for variation orders and claims including extension of time (if any).

For effective coordination, the Team Leader shall be stationed in Project Site as required.

2.3 Construction Supervision and Allied Activities

The monitoring and supervision of works at sites shall be carried out by the Consultant. They shall supervise the quality of works executed by the EPC Contractor at sites to ensure that the works are being executed as per Technical Specifications (Employer's requirements) and as per the standards laid down in the Contract Document. The Consultant shall be responsible for the supervision of construction and installation services. The Consultant shall represent interest of BCPCL with regard to the Contract in all manners related to proper execution of the works at sites.

The main activities to be checked and monitored by the consultant to ensure that the works are executed as per Technical Specifications and Quality Assurance plan of the contract shall be as under:

2.3.1 Supervision of the Civil Construction Work for Transmission Lines and Sub-station

Supervision of civil construction works shall be as per the Quality Assurance Plan for the contract approved by BCPCL, contractual provisions, drawing and designs prepared by the EPC Contractor and approved by the Consultant, and BCPCL's practices as advised by the Project Authority. The following shall in any case be specifically checked and reported:

- (i) Check subsoil investigation, morphological & other study of the EPC Contractor;
- (ii) Check the line and position given by the EPC Contractor for the construction of tower foundation as per the already approved drawing.
- (iii) Analyse the site conditions/requirements and suggest with proper justification, any change in approved tower foundation and its types and other civil structures according to site requirements.
- (iv) Check the reinforcement as per the approved drawing.
- (v) Supervise and check the stub setting as per the approved drawings.
- (vi) Supervise the concreting works for the foundation as per the technical specification.
- (vii) Supervise the construction works for different other civil works as per approved design
- (viii) Supervise the back filling of towers with proper compaction of earth.
- (ix) Contribute to capacity building of BCPCL counterpart staff.
- (x) Foundation for substation equipment and SPR room.
- (xi) Perform other relevant functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.
- (xii) All other related works, not mentioned herein above, but reasonably required for satisfactory completion of work

Note: Construction Supervision and Testing of the substructure of Padma River Crossing Portion will be excluded from the said consultancy service.



2.3.2 Supervision of Erection of the Tower Structures, Installation of Substation Equipment and Installation of Hardware

The scope of Supervision of erection of the tower structures and Installation of Substation Equipment shall consist of the following:

- (i) Check the supplied steel structure for compliance to the approved drawing and for any damage during transportation.
- (ii) Supervise the erection of steel structure of the tower as per technical specification and approved drawing.
- (iii) Check the connection of joints of the structures as per approved drawing.
- (iv) Check the supplied hardware and related fittings and its installation for compliance with the technical specification and approved drawing.
- (v) Installation of Substation Equipment on its Foundation.
- (vi) Contribute to capacity building of BCPCL counterpart staff.
- (vii) Perform other relevant functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.
- (viii) All other related works, not mentioned herein above, but reasonably required for satisfactory completion of work.

2.3.3 Supervise the Stringing Works

The scope of Supervision of stringing works shall consist of the following:

- (i) Check the supplied hardware and related fittings are in compliance with the technical specification and approved drawings and also report BCPCL.
- (ii) Check the supplied conductor/OPGW for any damages before stringing.
- (iii) Supervise the placement of devices, tools and tackles for stringing.
- (iv) Supervise the stringing works of the conductor/OPGW (including Padma and other river crossing) and ensure that stringing is carried out through tension-controlled method.
- (v) Contribute to capacity building of BCPCL counterpart staff.
- (vi) Perform other relevant functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.
- (vii) All other related works, not mentioned herein above, but reasonably required for satisfactory completion of work.

2.3.4 Testing & Commissioning for Transmission Lines

The scope of testing & commissioning will include the following:

- (i) Review and approve the EPC Contractor's procedure of commissioning and acceptance tests.
- (ii) Supervise testing and commissioning of the plant supplied by the EPC Contractor for the project and ensure that quality and credibility of the outputs is as stipulated in the bidding document.
- (iii) Contribute to capacity building of BCPCL counterpart staff.
- (iv) All other related works, not mentioned herein above, but reasonably required for satisfactory completion of work.

2.3.5 Testing & Commissioning for Substations

The scope of testing & commissioning will include the following:

- (i) Review and approve the contractor's procedure of commissioning and acceptance tests (to be submitted by the contractor).
- (ii) Supervise testing and commissioning of the substation equipment supplied by the contractor(s) for the project and ensure that quality and credibility of the outputs is as stipulated in the Contract Document.
- (iii) Contribute to capacity building of BCPCL counterpart staff.



- (iv) All other related works, not mentioned herein above, but reasonably required for satisfactory completion of work.

2.3.6 Other Allied Activities

These allied activities are supposed to include the following:

- (i) Assess the adequacy of all inputs such as materials, plant, equipment and labour provided by the contractor and his method of work in relation to the required rate of progress, and when required to take appropriate action in order to expedite progress. Keep and regularly update a list of the contractor's equipment (and its condition) to ensure compliance with date of completion provided in his contract.
- (ii) Extend timely assistance to BCPCL in all matters related to interpretation of the contract documents, plans, quality control testing, and other matters relating to contract compliance and progress.
- (iii) Check construction drawings for any alteration with proper justification in the same according to site requirements. Ensure the "as-built drawings" are prepared for all works as the work progresses are finalized.
- (iv) Perform any and all other items of work not specifically mentioned above, but which are necessary and essential to successfully supervise and control the construction activities in accordance with the plans, specifications and terms of Contract.

2.3.7 Project Management, Quality Control and Safety

- (i) Check and make recommendations on quality assurance, quality control plan and submitted by contractors.
- (ii) For determining that the construction works and the material conform to the specification and standards, the Consultant shall require the EPC Contractor to carry out or cause to be carried out all necessary tests as per the Employer's Requirements (Contract) and in accordance with Good Industry practice for quality assurance. The Consultant shall issue necessary directions to the EPC Contractor for ensuring that the tests are conducted in a fair and efficient manner and shall monitor and review the results thereof.
- (iii) In the event that the EPC Contractor carries out any remedial works for removal or rectification of any defects or deficiencies, the Consultant shall require the EPC Contractor to carry out, or cause to be carried out, tests to determine that such remedial works have brought the Construction Works into conformity with the Specifications and Standards.
- (iv) Monitor schedules for material procurement offered by the contractors/suppliers to ensure timely completion of the project.
- (v) Monitor the progress of delivery for installation and check/review the status of installation as per detailed design and provide feedback to the project Authority and the Engineer on weekly/monthly basis.
- (vi) Maintain record of the material utilized & Reconciliation of material for the project.

3.0 Consultant's Personnel and Proposed Man-Months

For the above services, the Consultant shall depute suitable specialist as per BCPCL's requirements as detailed below. The Consultant is requested to submit the proposed manning schedule for all stages in his proposal for the positions listed in the table below.

The Experts / Engineers must be qualified according to the Qualification and Experience Requirements set forth in this ToR.

The Consulting firm shall consist of the following national personnel:

Sl. No.	Position	Total (Man-Month)
1.	Team Leader	18
2.	Transmission Line Engineer-1	12
3.	Transmission Line Engineer-2	12
4.	Substation Engineer	06
5.	Civil Engineer-1	18
6.	Civil Engineer- 2	18
Total Man Month (National)		84

4.0 Documentation

The Consultant shall establish a cloud-based document management system to store, track and retrieve design drawings and documents and shall be accessible to BCPCL, Consultant and EPC Contractor with appropriate security and controls to maintain confidentiality.

The Consultant shall prepare monthly progress reports as applicable in a format and detail acceptable to BCPCL. The Consultant shall be responsible for preparation and submission of reports and documents that shall include but not limited to the following:

- Report on list of all certified documents;
- Reports on EPC Contractor's work progress;
- Report on test results and report on commissioning;
- Reports on safety measures/issues;
- The Consultant shall maintain records documenting decisions made at meetings, progress, project implementation, financial records and changes to the contract plans;
- Witnessing commissioning guarantee and acceptance tests and issue OAC for taking over;
- Check list of materials / spares to be handed over to BCPCL by the EPC Contractor;
- Prepare punch list (list of unfulfilled contractual obligations); and
- Prepare and submit Project Completion Report (PCR).
- Inception report (including schedule).
- Engineering report (including basic as build design report).
- Monthly progress report.
- Quarterly progress report.
- Project completion report.
- Power Point Presentations on the project on demand basis.

All documents and reports shall be made available on electronic format. All reports shall be in English language.

5.0 Duration of Service

The Consultancy service for all the activities listed above are expected to commence from the date of signing of Contract and duration of the Contract will be 36 months.



6.0 Work Scope Implementation Methodology

The Work Scope implementation methodology shall include but not limited to the following:

6.1 Project Management

- (i) The Consultant shall establish a Project Office in Dhaka to carry out coordination with BCPCL / EPC Contractor and to perform the Project Management.
- (ii) The Consultant shall organize monthly progress meetings as and when necessary and site meetings and other meeting and other meetings to ensure proper performance of the EPC Contract.
- (iii) The Consultant shall review EPC Contractor's invoices and issue payment certificates for BCPCL's approval.
- (iv) The Consultant shall assist BCPCL to review EPC Contractor's claims for variations orders, extension of time and other contractual matters.

6.2 Field Engineering & Site Supervision and witness of testing & commissioning

- (i) During this phase, the Consultant's Personnel shall be based at the Project Site to carry out site supervision and witness testing and commissioning.
- (ii) The Consultant's Site Personnel shall interact / coordinate with BCPCL's / EPC Contractor's Site Personnel.
- (iii) The Consultant shall provide Field Office Support on site related design issues / design changes.

7.0 Experience Required by the Firm

- i. The firm shall have at least one (1) successfully completed project experience of extra high voltage transmission line and substation having capacity 230 kV or above in the field of construction supervision and witnessing of testing & commissioning works (experience having capacity of 400kV or above will get additional preference).
- ii. The firm shall have at least one (1) successfully completed river crossing project experience of high voltage transmission line having capacity 230 kV or above in the field of construction supervision and witnessing of testing & commissioning works (experience having capacity of 400kV or above will get additional preference).
- iii. The firm shall have experience in construction supervision and witnessing of testing & commissioning works of transmission line utilizing ACCC/ACSR conductor (experience using ACCC conductor will have additional preference).
- iv. The firm shall have a minimum liquid asset amounting BDT 1,00,00,000.00 (one crore) only.
- v. The firm shall have a minimum average annual turnover amounting BDT 2,00,00,000.00 (two crore) only in last 3 years.

Note: The above-mentioned experience criteria will be taken into consideration if the firm has the experience individually/as a joint venture/subconsultant.

8.0 Qualification and Experience Requirements for Consultant's Experts

Sl.	Field of Expertise	Qualifications and Experience
1.	Team Leader	<ol style="list-style-type: none">a. Shall have at least Bachelor's degree in Electrical / Mechanical / Civil Engineering. Additional higher degree in the relevant field will be given preference.b. Shall have at least 20 years overall experience.c. Shall have at least one (1) successfully completed project experience of extra high voltage transmission line having capacity 230 kV or above in the field of construction

Sl.	Field of Expertise	Qualifications and Experience
		<p>supervision and witnessing of testing & commissioning (experience having capacity of 400kV or above will get additional preference).</p> <p>d. Shall have excellent English Proficiency.</p>
2.	Transmission Line Engineer-1	<p>a. Shall have at least Bachelor's degree in Electrical / Mechanical Engineering. Additional higher degree in the relevant field will be given preference.</p> <p>b. Shall have at least 15 years overall experience.</p> <p>c. Shall have at least one (1) successfully completed project experience of high voltage transmission line having capacity 230 kV or above in the field of construction supervision and witnessing of testing & commissioning (experience having capacity of 400kV or above will get additional preference).</p> <p>d. Shall have excellent English Proficiency.</p>
3.	Transmission Line Engineer-2	<p>a. Shall have at least Bachelor's degree in Electrical / Mechanical Engineering. Additional higher degree in the relevant field will be given preference.</p> <p>b. Shall have at least 15 years overall experience.</p> <p>c. Shall have at least one (1) successfully completed project experience of high voltage transmission line having capacity 230 kV or above in the field of construction supervision and witnessing of testing & commissioning (experience having capacity of 400kV or above will get additional preference).</p> <p>d. Shall have excellent English Proficiency.</p>
4.	Substation Engineer	<p>a. Shall have at least Bachelor's degree in Electrical Engineering. Additional higher degree in the relevant field will be given preference.</p> <p>b. Shall have at least 15 years overall experience.</p> <p>c. Shall have at least one (1) successfully completed project experience of high voltage sub-station having capacity 230 kV or above in the field of construction supervision and witnessing of testing & commissioning (experience having capacity of 400kV or above will get additional preference).</p> <p>d. Shall have Experience in protection, control, communication including LDC integration, SAS in substation having capacity 220kV or Above in the field of installation, witnessing of testing & commissioning works.</p> <p>e. Shall have excellent English Proficiency.</p>
5.	Civil Engineer- 1	<p>a. Shall have at least Bachelor's degree in Civil Engineering. Additional higher degree in the relevant field will be given preference.</p> <p>b. Shall have at least 15 years overall experience.</p> <p>c. Shall have at least one (1) successfully completed transmission line project experience in the field of foundation, construction supervision and witnessing of testing & commissioning of transmission line towers for 230 kV or</p>

Sl.	Field of Expertise	Qualifications and Experience
		<p>higher (experience having capacity of 400kV or above will get additional preference).</p> <p>d. Shall have at least one (1) successfully completed substation project experience in the field of piling, foundation and construction supervision of substation equipment having voltage level 230kV or above (experience having capacity of 400kV or above will get additional preference).</p> <p>e. Shall have excellent English Proficiency.</p>
6.	Civil Engineer- 2	<p>a. Shall have at least Bachelor's degree in Civil Engineering. Additional higher degree in the relevant field will be given preference.</p> <p>b. Shall have at least 15 years overall experience.</p> <p>c. Shall have at least one (1) successfully completed transmission line project experience in the field of foundation, construction supervision and witnessing of testing & commissioning of transmission line towers for 230 kV or higher (experience having capacity of 400kV or above will get additional preference).</p> <p>d. Shall have at least one (1) successfully completed substation project experience in the field of piling, foundation and construction supervision of substation equipment having voltage level 230kV or above (experience having capacity of 400kV or above will get additional preference).</p> <p>e. Shall have excellent English Proficiency.</p>

9.0 Support Services and Facilities from BCPCL

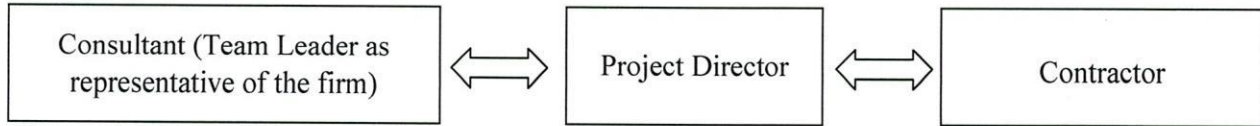
- i) Coordination with PGCB/BPDB for review / approval of EPC Contractor's design, drawings and documents as and when necessary.
- ii) All pre-EPC related documents, data and information necessary will be provided to the Consultant to the extent possible.
- iii) Assistance in obtaining Employment Permit / Visa for the Consultant's Expatriate Staff.

10.0 Ownership of the Data, Documents, and Equipment

- BCPCL shall be the owner of all the data collected, data sets, reports, documents, etc. prepared by the consultant and any equipment procured under the assignment.
- All the documents collected and software procured, if any, must be handed over to BCPCL before final payment.
- All documents, reports and information from this assignment will be regarded as BCPCL's property, so the mentioned outputs or part of it cannot be sold or used in any case without the prior permission of BCPCL.

11.0 Accountability and reporting:

The team leader as a representative of the firm will communicate with and report only to the Employer's representative which is either Project Director or the person assigned by Project Director of the project.



The Terms of Reference (ToR) is the key document in the RFP. It explains the objectives, scope of work, activities, tasks to be performed, respective responsibilities of the Client and the Consultant, and expected results and deliverables. Adequate and clear ToR is essential for the understanding of the assignment and its correct execution by the Consultant. It also helps reducing the risk of ambiguities during the preparation of Proposals by the Consultant, contract negotiation, and delivery of the Services.

Terms of Reference normally contain the following sections:

- *Background of the project;*
- *Objectives of the assignment;*
- *Scope of Services;*
- *Transfer of Knowledge (training), when appropriate;*
- *List of reports, Schedule of deliveries, period of performance;*
- *Data, facilities and local services to be provided by the Client, and*
- *Institutional arrangements*

[Handwritten signatures and initials in blue ink]