

Terms of Reference of Feasibility and Other Associated Studies for “Modernization with Capacity Enhancement Of 230/132 kV Air Insulated Substation (AIS) To Gas Insulated Substation (GIS) At Ghorashal Power Station Complex” Project

1. Background

In recent years, Bangladesh has made significant progress in its efforts to become a middle-income country. This progress is reflected in the strong growth of its economy over the past decade. One key factor contributing to this growth has been the country's electricity access expansion. In 2009, only 47% of people in Bangladesh had access to electricity, but today, due to the earnest effort and proper planning of the government, that number has increased to 100% of people having access to electricity coverage. As a result, Bangladesh has joined a select group of countries in South Asia that have achieved universal electricity coverage, meaning that 100% of their populations have access to electricity. This is a significant achievement and has likely contributed to the overall economic development of the country.

A sustainable and reliable power supply is a prerequisite for the socio-economic development of a country. The government has therefore given top priority to the development of a sustainable and reliable power transmission and distribution network. The per capita electricity generation is around 602 kWh (including captive & renewable energy) in FY 2022-23. Due to rapid urbanization and industrialization, the present electricity demand growth is expected to rise in the upcoming years. The installed on-grid generation capacity is around 23,482 MW (including renewable & electricity import) and the grid capacity is 58,076 MVA. Due to the rapidly increasing load, Power Grid Bangladesh PLC has planned the implementation of numerous projects. Among these, the Ghorashal 230/132 kV AIS substation will be upgraded to a GIS substation as part of this project.

Ghorashal Power Station (GPS) is one of the key players in the power sector ensuring sustainable power supply in Bangladesh. GPS has the present installed capacity of 1,500 MW from both steam turbine and combined cycle units. BPDB established the Ghorashal Power Station in 1974. The power plant has 7 units at its premises. Apart from these 7 units, an Independent Power Producer (IPP) plant also evacuates power to the substation of GPS. Power from both third & fourth unit Gas Turbine (GT) is evacuated to the nearby Power Grid's 230 kV GIS substation, which is located inside the Ghorashal Power Station complex. The remaining units such as the 3rd & 4th unit Steam Turbine (ST), Unit-5 ST, Unit-7 (Combined Cycle) and the IPP are all connected to the existing Ghorashal 230/132 kV AIS substation.

The existing Ghorashal 230/132 kV AIS substation was first commissioned in 1974 and extended continuously. Due to aging effect the substation needs frequent maintenance and as it is one of the most important substation in our country, the current condition of the existing substation is not reliable for uninterrupted power supply as well as power evacuation of the power plant. In order to ensure smooth and reliable power evacuation from the GPS, the existing 230/132 kV AIS needs to be modernized and its capacity needs to be enhanced. So, Power Grid is going to implement a project to modernize the existing 230/132 kV Air Insulated Switchgear (AIS) Sub-station to Gas Insulated Switchgear (GIS) Sub-Station with the aim to enhance the power handling capacity, reliability and efficiency of power evacuation. The proposed project is expected to provide support for dismantling the existing substation and construction of a new 230/132 kV Gas Insulated Switchgear (GIS) Sub-Station to enhance the power handling capacity, reliability and efficiency of power evacuation and transmission system.



2. Objectives of the study

The objective of the feasibility study is to evaluate the technical, financial, economic, social and environmental viability of upgrading the existing Ghorashal 230/132 kV AIS substation to a GIS substation. This study aims to provide detailed insights, recommendations and a comprehensive roadmap for the implementation of the project.

3.0 Scope of Works:

The Consultant shall undertake investigations to assess the technical, financial, economic, social and environmental justification of the planned project and provide the feasibility study report according to the Government Prescribed format (Attachment-1) which shall also encompass the following services:

3.1 Brief Review and justification of Upgradation of existing Ghorashal Substation in context of power subsector

Analysis of the Ghorashal Power Station related power subsector information with its characteristics including power plants itself, transmission and distribution network expansion, electricity supply and consumption patterns and optimal transmission system expansion plan. Also Review the current condition of the existing Ghorashal 230/132 kV AIS substation and associated infrastructure. Collect and analyze historical data on substation performance and maintenance. That analysis provides a brief justification of the upgradation of existing Ghorashal 230/132 kV AIS substation to a GIS substation.

3.2 Assessment of the power sector in the project areas: Network analysis

The consultant's responsibilities shall include conducting an assessment based on the existing load flow calculations provided by Power Grid. Given the volatility of this information, the steady-state load flow and short circuit analysis shall be updated to reflect the updated generation and transmission network expansion plans in the PSS/E model, extending to the year 2035 for the project area. Power Grid shall provide PSS/E software-related support in coordination with the consultant. The consultant shall prepare comprehensive recommendations based on their observations of the steady-state load flow and short circuit analysis. Additionally, the consultant shall analyze the requirements for potential network arrangements and other technical measures, utilizing software assistance from Power Grid as necessary.

3.3 Finalizing the scopes of the projects and specifications

Identification of the requirements of the components for the modernization and capacity enhancement of the Substation concerning the projected scopes to fulfill the client's requirements. The consultant shall finalize the scope of the project, locations & identify the components along with technical specifications through detailed technical, financial, economic, social and environmental studies. Power Grid shall provide the present standard technical specification of equipment which is being followed in its other bid document. The consultant shall also assess the available space within the Ghorashal Power Station for the proposed GIS substation and recommend a suitable available space consultation with Ghorashal power plant authority and Power Grid. The project scope shall also consider the mobilization of heavy equipment via river and land (road).

3.4 Preliminary survey of substation areas

In coordination with Ghorashal Power Plant authority and Power Grid, the Consultant shall propose substation location with a detailed survey. Therefore, site visits shall be conducted to the existing Ghorashal Substation area inside Ghorashal Power Station (GPS).

A detailed substation survey shall be conducted as per the requirement of **Attachment-2**.



3.5 Preparation of detailed plan for shifting transmission lines

Existing transmission lines shifting from an old grid substation to a new one is a complex and critical process that involves multiple phases and considerations. Consultant shall prepare detailed plan for shifting/modification of transmission lines connected from old grid substation to new grid substation. Consultant shall also prepare the detail plan including shutdown proposal of transmission line shifting. Consultant shall consider the following issues (not limited to):

a) Key Steps identification in Transmission Line Shifting

- **Assessment:** Evaluate the current condition of the transmission lines and the old substation and assess the new substation's capabilities.
- **Route Planning:** Determine the optimal route for the new transmission lines, considering factors such as distance, terrain, environmental impact and land use.
- **Detailed Design:** Develop detailed engineering designs for the new transmission lines, including tower locations, line specifications, transition compound & structures and substation interfaces.
- **Stakeholder Engagement:** Engage with stakeholders, including local communities, landowners and government agencies, to identify issues, address concerns and secure support.
- **Disconnection:** Safely disconnect the transmission lines and equipment from the old substation.
- **Dismantling:** Dismantle the old substation infrastructure as required, following proper environmental and safety protocols including on how to handle used transformer oil from the old transformer.
- **Site Restoration:** Restore the old substation site, addressing any environmental and social concerns and making the land suitable for future use.

b) Methodological solutions to overcome Issues and Challenges

i. Technical Challenges

- **Compatibility:** Ensuring compatibility between new and existing infrastructure, including voltage levels, line ratings and control systems.
- **Reliability:** Maintaining system reliability during the transition, avoiding outages and disruptions.
- **Integration:** Integrating new technologies and systems with existing grid infrastructure.

ii. Logistical Challenges

- **Coordination:** Coordinating activities between utility companies and stakeholders.
- **Timing:** Scheduling work to minimize impact on the power supply and avoid peak demand periods.
- **Accessibility:** Accessing remote or difficult terrain for construction and maintenance activities, including during mobilization of heavy equipments.
- **Phased Implementation:** Implement the project in phases to manage risks and ensure continuous power supply.



iii. **Safety and Security Challenges**

- **Worker Safety:** Ensuring the health and safety of workers during construction and decommissioning activities, including on how to work on heights during transmission line swift, during the disposal of used transformer oil and during mobilization of heavy equipments.
- **Stakeholder Engagement:** Engage stakeholders early and throughout the project to build support and address concerns.

3.6 Layout and design on feasibility level for the construction of proposed substation

Substation Design

Substation design shall involve the following.

- a) Electrical works
- b) Communications and SCADA
- c) Civil, structural, and architectural works
- d) Access to the area,

a) Electrical Works

Based on the confirmation of the suitability of the substation area, basic drawings shall be developed for the substation including but not limited to the following:

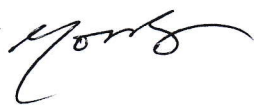
- Single line diagrams indicating the substation arrangement, equipment layout, etc stating the short circuit levels.
- Provide layout drawings including sections and elevations showing considering power plant units and existing AIS Substation. Also provide GIS control room lay out plan.
- Asses the present protection, control and metering system. Accordingly develop a new protection, control and metering drawings for upgraded GIS substation which shall indicate types of protection, zones of protection and timing requirements, re-closing requirements, signaling and communications requirements. Also provide schematic drawings showing the equipment protection to be provided, etc.
- Provision of necessary RTUs to allow integration of the substation into Power Grid's remote control system.

The level of detail to be shown on the drawings shall be sufficient to allow the determination of required equipment for further use during the preparation of Tender Documents.

b) Communications, SCADA and SAS

The Consultant shall review the existing communication, SCADA and SAS system at existing Ghorashal 230/132kV AIS Substation and provide complete solution with necessary specification for new GIS substation regarding communication, SCADA and SAS system. if found inadequate, extend the existing system to cover the new equipment. PLC extension may be more advantageous for the extension of existing substation systems.

In any case, the data transmission shall consider the requirements for the integration network components into the Power Grid's NLDC. System compatibility and a description of all control integration work into the NLDC shall be addressed by the Consultant to safeguard the functionality and compatibility with the existing Power Grid systems on transmission networks.



c) Civil, structural and architectural works

Preliminary and tentative layout drawings shall be prepared for all civil, structural engineering and architectural works and equipment including GIS building, site improvements, access roads, fencing, drainage, grading, water supply, sewage, waste storage (for used transformer oil etc.), disposal and equipment foundations for the proposed substations.

General foundation requirements and structure outlines shall also be indicated on the drawings. Particular attention shall be given to the water drainage system. Due to the prevailing climatic conditions, excessive rainfall or flood water needs to be evacuated. The civil works substation design on a feasibility study level shall take into account that requirement. Rainwater harvesting shall be taken into consideration while preparing the layout. Since the site is within an existing power station facility, sub-surface existing structure (foundation, trench, drain etc.) & facility (cable, pipe, earthing etc.) identification are important work for safe and smooth execution of the construction work.

The level of detail to be shown on the drawings shall be sufficient to allow for the determination of the scope of works by a contractor.

The following information shall be included in the feasibility study report:

- i) Topography survey report of the proposed substation location including line terminations;
- ii) Sub-surface existing structure (foundation, trench, drain etc.) & facility (cable, pipe, earthing etc.) survey layout for the proposed substation location including line terminations;
- iii) Sub-soil investigation report;
- iv) Location of approach road;
- v) Recommendation about culvert requirement in the approach road;
- vi) Pre-section measurement data of existing ground level;
- vii) Nearest public road level;
- viii) Highest flood level (HFL) of that area and
- ix) Recommendation about the surface drainage system (especially the discharge of water from the substation area to the outfall point).
- x) Mobilization route for heavyweight equipment if relevant.

d) Site access

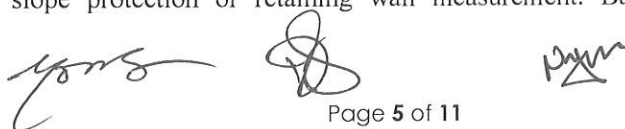
Access roads to the substation site are very important, especially for transportation and installation of heavyweight equipment such as Power transformers and other HV equipment. The Consultant shall bear these aspects in mind with necessary mitigation measures when studying the project, including the mobilization from the manufacturer to the site.

3.7 Cost estimate, economic and financial analysis

Cost estimates

The project cost is classified into revenue expenditures, capital expenditures (electrical material, electrical installation, land development etc.) and contingencies. The consultant shall prepare a detailed cost estimate of the project which shall include the following:

- i. Cost for substation and any other components along with total project cost shall be presented in the report.
- ii. The consultant has to determine the land development depth, filling area, compaction type and slope protection or retaining wall measurement. Based on these determination



- consultants shall prepare the land development cost considering the latest power division or PWD rate schedule and represent it in the report with detailed calculations.
- iii. The consultant shall consider current and future economic and market conditions (inflation, fuel cost, LME index or other metal index etc.) which shall be mentioned in the study report.
 - iv. The consultant shall estimate Customs Duty, AIT and VAT expenditures.
 - v. The consultant shall estimate the price and physical contingencies of the project mentioning the assumptions used.
 - vi. The consultant shall provide manpower and overhead costs for the project considering Power Grid's updated pay scale and Organogram.
 - vii. The consultant shall present a tabular cost estimate of the total project segregated into local and foreign currency mentioning the costs of each component separately.
 - viii. The consultant shall present the total foreign currency cost of the project in both BDT and USD along with the Bangladesh Bank currency conversion rate mentioning date.

3.8 Economic and Financial Analysis

The financial and economic performance of the project shall be assessed over the economic life of the assets. Consultant needs to assess or determine

- Economic Net Present Value (ENPV), Economic Internal Rate of Return (EIRR) and Economic Benefit Cost Ratio (EBCR) considering 12% discount rate.
- Financial Net Present Value (FNPV), Financial Internal Rate of Return (FIRR) and Financial Benefit Cost Ratio (FBCR) considering 12% discount rate.
- Weighted average cost of capital (WACC) calculation of the project.
- To determine income through this project all related transmission infrastructure cost which will be used to transmit power from Ghorashal substation to 33 kV distribution substation
- sensitivity analysis shall be conducted for high or low load growth, a variation in capital costs, changes in wheeling charges and also with other different interference.
- Future operation and maintenance cost of project infrastructure.

In the analysis, year-wise load flow, benefit, investment and maintenance cost in local and foreign currency shall be presented in a tabular format. Border Price Factor, Standard Conversion Factor, Shadow Exchange Rate, Traded & Non-traded inputs/ outputs and Willingness to pay shall be considered and explained in detail in the report with valid reference. All assumptions which are relevant to the analysis shall be included in the report. The consultant shall attach necessary documents if necessary.

3.9 Expected Outcome of Study

The consultancy services shall cover Feasibility Study, Topographic Survey and ESIA and/or other safeguard documents needed according to AIIB's Environmental and Social Framework (ESF) and Environmental and Social Policy (ESP) under this contract. The Consultant shall also maintain all liaisons with the Department of Environment (DOE) and Power Grid for getting necessary clearance(s) of the project.

In that context, the scope of proposed consultancy services include specifically the following:

- i. Feasibility Study shall be submitted as per the attached format (**Attachment-1**) prescribed by the Planning Commission. Services mentioned in ToR shall be included in the report as Additional Chapters if not mentioned in Attachment 1.
- ii. Topographic Survey Report shall be submitted as per the attached format (**Attachment-2**)
- iii. Environmental and Social Impact Assessment (ESIA) report shall be submitted as per the directives mentioned according to national requirements, AIIB's ESF and ESP, and the attached format (**Attachment-3**). Bengali Translation of the Executive Summary of ESIA

Report shall also be submitted. Additional comments to Attachment-3 is provided in a separate document or to be combined with the PDF format provided.

- iv. Carry out consultation with stakeholders/ public consultation in accordance with ECR 2023 for ESIA approval (if needed). Maintain liaison with DoE for necessary ToR approval, NOC collection from relevant local authority, site clearance/ environmental clearance etc. procedures (if needed).
- v. Sub-surface existing structure (foundation, trench, drain etc.) & facility (cable, pipe, earthing etc.) identification (using different methods) for the proposed substation location including line terminations;
- vi. Any other reports (if required) according to national requirements and AIIB's ESF and ES policy and requirements.

3.10 Assessment of expected benefits on the socio-economic situation of the populations in the project areas

Based on the review of the power supply and the load forecasts in the targeted Project Area as well as the network analysis, the Consultant shall assess the beneficiaries of the project and the potential benefits of the program measures to the beneficiary target group in the Project Area. The assessment should be based on a baseline (business as usual scenario) and a scenario in which the program is implemented as planned. By comparison of the scenarios, the Consultant shall assess the effects on economic development in the region, poverty reduction, and improvement of livelihoods via an improved energy supply on a household level and agricultural development via improved operation of irrigation pumps and husking machines.

Benefits of the program shall be quantified where feasible and reasonable such as the number of connections that are facilitated by the increased transmission capacity, the number of households benefitting from the improved supply, and the percentage of households in rural areas benefitting from the improved supply.

The consultant shall include findings on the following aspects concerning the project in the submitted report- Population coverage, Population disaggregated data by women, senior citizens, children, physically and mentally challenged, ethnic minorities etc.

The effect/ impact, adaptation, and specific mitigation measures thereof if any on 1) Gender, women, children, persons with special needs, excluded groups, ethnic minorities etc. 2) Employment, 3) Poverty Situation, 4) Regional Disparities, 5) Gender-Related issues shall be included in the report.

3.11 Consultant needs to Incorporate 'Green and Climate Resilient Development (GCRD)' Related Chapter in Feasibility Study and ESIA Report (highlighting project scope and associated areas)

The Green and Climate Resilient (GCR) in public investment shall aim at an affordable, realistic and adaptable framework to make quantifiable progress in targeted sectors to simultaneously ensure sustainability, efficiency and resilience throughout the development pathway. Additionally, the GCR solutions shall ensure that nobody is left behind, creating opportunities to reduce disparities and help excluded groups realize a fair share of benefits. It implies that natural resources and environmental services can sustainably fulfill their full economic potential. The fundamental pillars of the GCR are stated below:



i) Green-

- Sustainability- Environmental, socioeconomic, and financial sustainability hinge on promoting development through initiatives that eliminate/reduce the adverse effects of activities that threaten growth. This also implies that countries must become better stewards of their renewable and non-renewable resources to prevent overuse, pollution, and irreversible climate consequences.
- Efficiency- To spend better and use better, there is a need to maximize output (in terms of returns to society) per unit of cost, including those that are financial, social, and environmental. Better spending can deliver the infrastructure and services that countries need, creating more competitive cities. The productive use of agricultural lands, fisheries, forests, and other natural resources is key to achieving prosperity and improving lives.

ii) Climate resilience- Public and private sectors need to prepare for, mitigate, and adapt to a wide range of risks and uncertainties associated with climate change. Resilience allows countries to continue to grow instead of diverting resources to multiple recovery efforts.

The following issues/scopes shall be addressed (if required) regarding incorporating GCR for the particular project (justification as per project scopes) with proper relevancy (not limited to):

- Transmission and distribution extension and upgrades for fortifying grid infrastructure (e.g., substations, transformers, high voltage lines, medium or low voltage lines, metering, and associated components).
- Implementation of Montreal Protocol targets for phasing down fluorinated gases (F-gases).
- Ecological Restoration of natural reservoirs and water bodies (natural habitats) with their biodiversity conservation.
- Excavation of local water reservoirs (canals, ponds, and baors) for enhanced water storage
- Smart dredging activities for all rivers and wetlands to maintain flow and transport as well as accommodate and smooth drainage of excess floods during climate-induced extreme events.
- Community-based afforestation and reforestation, wetland & watershed management, and agricultural landscape management, for biodiversity conservation, enhancement of ecosystem resilience, and increasing carbon sequestration.
- Develop a proper tree plantation plan for the associated project.
- Identification of scope for establishment of climate resilient health care facilities in urban areas (project areas).
- Sustainable waste management and reduction of pollution (e.g., air-water pollution) in urban and rural areas (project areas).
- Highlighting scopes for ecological restoration associated with project areas and during project implementation following 3R (reuse, reduce, recycle) based waste management also.
- Scopes for addressing spatial planning and flood hazard zoning-based issues for project area identification and implementation.
- Construction and rehabilitation of gender, elderly, and disability-sensitive multi-purpose and climate-resilient accessible cyclone and flood shelters with safe drinking water, sanitation, and livestock shelter facilities.
- Expand coverage of social protection to support women with childcare services and support services for gender-based violence (GBV) survivors.
- Climate inclusive planning and budgeting (integration of climate finance into DPP format).

3.12 Assistance from Power Grid

Power Grid shall provide all existing information, data, reports and maps as available and shall offer the consultant administrative support in obtaining any other relevant information and materials from governmental institutions and other authorities based on practical situations.



Power Grid shall provide necessary support in performing load flow and short circuit analysis. This includes providing the required load flow diagram from PSS/E software-based analysis and other relevant study outputs in a tabular format, as well as other relevant E&S information and reports. The consultant shall analyze the load flow diagram and other software outputs and incorporate their findings to prepare comprehensive recommendations based on study results. The consultant shall provide the necessary input information for the analysis as per the requirements of the simulation software in the appropriate format. Additionally, the consultant shall collect demand forecasts for new and neighboring substations from distribution utilities.

However, the consultant must verify the availability, quality, and suitability of this information. The information, data, reports, etc. as mentioned above, shall be available for the consultant's unlimited use during the execution of the proposed services. Adequate provision shall be made in the consultant's bid to enable the procurement of maps, meteorological, geological data & geographical data and any other information necessary for the proper completion of this assignment at the consultant's own cost.

Power Grid shall nominate a member of its staff as Project Director or Liaison Officer for the feasibility study. It shall be the consultant's duty to maintain close contact with this officer on all aspects of the work. All formal communications relating to the work shall be directed to the attention of the Liaison Officer.

It is to be noted that Consultant has to provide all necessary other information according to the Government Prescribed format (Attachment-1). Tentative project components are attached (Attachment-4)

4.0 Draft project execution and time frame, draft procurement plan

4.1 Tentative Implementation and Procurement Plan

A detailed implementation and procurement plan need to be presented in the report. Consultant shall assess the project time line and accordingly prepare an implementation schedule.

4.2 Identification of potential risks during project implementation

Procurement risk analysis is the process of identifying and minimizing the likelihood of a risk occurring and minimizing the impact on the Client's Project Objective if the risk does occur. The Consultant shall create the Risk Management Plan by summarizing and recording the overall risk management analysis. To make the identification and analysis of procurement risk manageable, the Consultant should structure the assessment around eight (8) key areas, which are:

- i. Market complexity and competitiveness;
- ii. Delivery and supply security;
- iii. Suppliers and supplier relationships;
- iv. Borrower experience, capacity and capability;
- v. Cost trends;
- vi. Technical innovation – the degree and rate of change;
- vii. Sustainability (environmental, economic, social); and
- viii. Business and operating environment.



4.3 Duration:

The engineering consulting services and safeguard documentation shall be completed within 6 months from the signing of the contract.

4.4 Preparation and Submission of Report and Documentation

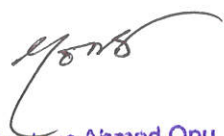
The Consultant has to prepare the following reports/documents:

- i. Consultant shall generate a separate report for Feasibility Study, Topographic Survey, ESIA, and any other E&S reports (if required) and conduct public consultations, NOC collection and/or any other relevant requirements according to the Environment Conservation Rules (ECR) 2023 and guidelines of Department of Environment, Bangladesh; GoB rules, regulations and AIIB's Environmental and Social Framework (ESF) and E&S Policy.
- ii. **Inception Report:** It should describe detailing the work plan, expected problems in the implementation of the study. The firm shall submit the Inception Report in hard Copy (Three copies) and soft copy / Digital format (One copy) within 01(one) month after the commencement of services.
- iii. **Draft Feasibility Study:** The firm shall submit a draft feasibility study report including draft ESIA and/or additional E&S reports according to the updated AIIB Environmental & Social Framework (ESF) and draft Topographic survey in hard Copy (Five copies) and soft copy/ Digital format (One copy) within 05 (five) months from the effectiveness of the contract. The firm shall also deliver a presentation on Draft Feasibility Report and all other submitted Draft Reports. The draft Topographic survey drawings shall be made in standard sizes such as A3.
- iv. **Final Feasibility Study:** The firm shall submit the final feasibility Study report including final ESIA and/or additional E&S reports according to the updated AIIB Environmental & Social Framework (ESF) and final Topographic survey in hard Copy (five copies) and soft copy/ Digital format (One copy) within 06 (six) months from the effectiveness of the contract. This final report shall accommodate necessary refinement to incorporate comments/ observations from Power Grid. Topographic survey drawings shall be made in standard sizes such as A3.



5.0 Payment Schedule

Sl. no	Milestones (Submission and acceptance of reports under Scope of Services)	Payment (% of the contract price) *	Cumulative (% of the of respective item price)	Remarks
i.	Contract Signing	-	-	-
ii.	Inception Report (Feasibility Study Reports)	10%	10%	Payments against the draft reports shall be paid after comments on the draft reports are provided by Power Grid. All reports should be approved by Power Grid and AIIB. The final bill shall be paid after reports are accepted by Power Grid.
iii.	Draft Feasibility Study Report including ESIA and other associated reports as per AIIB's ESF and Presentation on Draft Feasibility Report and Other Draft Reports	40%	10%+40%=50%	
iv.	Final Feasibility Study Report including ESIA and other associated reports as per ESF of AIIB.	40%	10%+40%+40% = 90%	
v.	DoE Clearance	10%	10%+40%+40% +10% = 100%	


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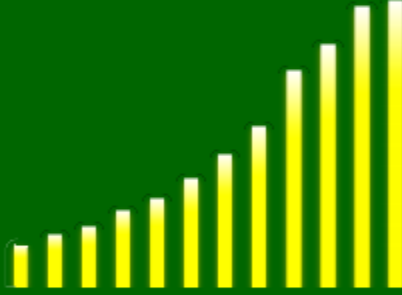

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Attachment:-1



সরকারি খাতে উন্নয়ন প্রকল্প প্রণয়ন, প্রক্রিয়াকরণ, অনুমোদন ও সংশোধন নির্দেশিকা



পরিকল্পনা বিভাগ
পরিকল্পনা মন্ত্রণালয়
গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
জুন ২০২২

সংযোজনী খ



Ministry of -----
Government of the People's Republic of Bangladesh

Feasibility Study for -- (Name of the Project/Projects)

----- (Month) 20--

Executive Summary

Summarise the key findings of the Feasibility Study and recommendations.

Project Feasibility Study Report

Section 1: Basic Information

1.	Name of the Project	:	
2.	(a) Sponsoring Ministry/Division (b) Implementing Agency	:	
3.	Project Objectives (Project to be taken based on the study)	:	
4.	Estimated Project Cost (Taka in Crore)	:	
5.	Sector & Sub-Sector	:	
6.	Project Category (Based on Environment Conservation Rules 1997)	:	
7.	Project Geographic Location (a) Countrywide (b) Division (c) District (d) Upazila (e) Others (City Corporation/Pourashva)		
8.	Project Duration	:	

Section 2: Introduction

Describe the following:

- (a) Project Background: Rationale and genesis (Mention the sources of information through reviewing the relevant documents);
- (b) Objectives of the feasibility study;
- (c) Approach and methodology of the feasibility study; and
- (d) Organization of the feasibility study.

Section 3: Market/Demand Analysis

This section assesses the need for public investments and involves the elements listed below:

- (a) **Problem Statement:** Provide an explicit definition of the problem to be addressed, identify the likely causes (both direct and indirect) of the problem and give a brief insight of the likely consequences if no intervention in public sector is made.

- (b) **Relevance of the Project Idea:** Justify the need for the proposed project by linking the project(s) goals, outcomes and outputs to Global/National Development Plans/Policies and Sector Strategic objectives.
- (c) **Proposed Project Interventions:** Describe the interventions (project inputs & outputs) that need to be undertaken by the government through the proposed project to address the problem, describe the interventions undertaken earlier to solve this problem by this organization or other organizations (if any).
- (d) **Stakeholders:** Identify the key stakeholders that are likely to be associated with the project interventions.
- (e) **Demand Analysis:** Identify the need for public investments by assessing:
 - (i) Current demand (based on statistics provided by service providers/regulators/ ministries/national & regional statistical offices for the various types of users);
 - (ii) Future demand (based on reliable demand forecasting models) in both the scenarios with and without the project; and
 - (iii) Various constraints and means to meet the demand including government regulations, technological developments etc.
- (f) **SWOT Analysis:** Identify the Strengths, Weaknesses, Opportunities and Threats to the project.

Section 4: Technical/Technological & Engineering analysis

A summary of the proposed project shall be presented with the following headings:

- (a) **Location:** description of the location of the project including a geographical illustration (map and/or geo-coordinates) with justification. Availability of land is a key aspect; evidence should be provided that the land is owned (or can be accessed) by the organization, which has the full title to use it, or has to be purchased (or rented) through acquisition/requisition process. Besides, it should address if any kind of utility shifting is required. Identify the issues of disaster risks (existing and future) in the proposed location along with project site on hazard map.
- (b) **Technical design:** description of the main components, technology adopted, design, standards and specifications. Key output indicators should be defined as the key physical quantities produced (e.g. meters, sq. meters, kilometers, numbers, manmonths, etc.). If the project is in disaster prone areas and has the probability of climate change impact, disaster and climate change risks related information should be integrated in technical design in order to address the impact of hazards on the project.

- (c) **Output plan:** description of the output and the expected utilization rate. These elements describe the service provision from the supply side in the context of the forecasted demand.
- (d) **Costs estimates:** estimation of the financial needs for project design, implementation and operations, componentwise cost estimates should be provided based on evidence.
- (e) **Implementation timeline:** considering the volume of works, capacity of implementing agency, budget flow (MTBF ceiling), project priority etc. a realistic project timeline along with the implementation schedule should be provided (for example, a Gantt chart with the work plan).

Section 5: Environmental Sustainability, Climate Resilience and Disaster Risk Analysis

5.1 Environmental, Climate Change and Disaster Risk Analysis

Specify and describe the economic effects/impacts of environmental, disaster and climate change and possible compensations for ecological damages. Key issues to be addressed:

- (a) What are the likely environmental, disaster and climate change impacts or risks from the project (any impact of project to increase the existing disaster and climate change related risks and/or contribute to create new risks)?
- (b) What counter measures should be taken to reduce these impacts?
- (c) What is the cost for reducing/mitigating the negative impacts?
- (d) Are there alternative ways of delivering the required services or goods without incurring these environmental costs? What are the costs of these alternatives?
- (e) What types of assessments are required for the project (e.g. EIA/DIA)?
- (f) Is there any resettlements issue to be addressed? If yes, provide resettlement modality in details.

5.2 Assessment of Disaster Resilience of the Project

This section assesses the resilience and address about uncertainties. Key indicators need to be discussed:

- (a) **Contingency Plan for Emergency Disaster Management:** Describe the evacuation plan if required, institutional arrangement for shutting down of utility services, and general procedures to be followed by individuals during disasters (Fire, Earthquake, Flood, Cyclone etc.);
- (b) **Business Continuity Plan:** Outline the key response and recovery priorities. This plan will detail out how different utility services will be rendered to support the overall Emergency Management Plan;
- (c) **Time of Recovery:** Required time for rehabilitation after a disaster; and

- (d) Reporting of residual risks: Reporting of remaining risks after recognition and put in place adequate risk reduction measures.

Section 6: Cost-Benefit Analysis

6.1 Financial Analysis

Describe the components of costs and benefits at market prices including option analysis.

- (a) Identify the components of cost & benefit;
- (b) Transfer them in monetary value;
- (c) Construct cash flow;
- (d) Identify the Key Assumptions considered in exercises; then
- (e) Compute the following indicators and interpret the results:
 - (i) Financial Net Present Value (FNPV)
 - (ii) Financial Benefit Cost Ratio (FBCR)
 - (iii) Financial Internal Rate of Return (FIRR)

6.2 Economic Analysis

Economic adjustments from financial data using standard conversion factor; after that costs and benefits are appraised from the point of view of the entire economy.

- (a) Identify the direct, indirect and associated cost and benefit components;
- (b) Adjust them where necessary;
- (c) Convert the value of cost and benefit components into economic price by using Standard Conversion Factor (SCF) determined by the Government;
- (d) Construct the cash flow;
- (e) Mention the Assumption;
- (f) Compute the following indicators and interpret the results:
 - (i) Economic Net Present Value (ENPV)
 - (ii) Economic Benefit Cost Ratio (EBCR)
 - (iii) Economic Internal Rate of Return (EIRR)

Section 7: Human Resources and Administrative Support Analysis (During Implementation and Post Implementation of the project)

Point out the functional structure and institutional capacity of the Agency (in terms of both Technical & Financial) required for implementation and operational stages of the project(s), sources of the workforce & financing are needed to be identified. Key issues to be addressed:

- (a) What types of managerial and skilled workforces are needed during implementation and operational phases of the project?

- (b) Does the project entity have ability to provide the managerial and skilled workforces needed for implementation of the project? If not, provide suggestions specifically.
- (c) Does the implementing agency have institutional capacity (financial & technical) to retain the project output functional? If not, provide specific suggestions.
- (d) Is the project entity equipped with skilled & experienced workforces to operate the project output? If not, provide specific suggestions.
- (e) Does the entity have adequate fund under its recurring budget to incur the operational expenditure of the project output? If not, provide specific suggestions.
- (f) Is timing of project consistent with organizational capacity (in terms of quantity and other)? A comparative statement should be provided in light of experience of the entity in project implementation.

Section 8: Institutional and Legal Analysis

Illustrate the legal restrictions (if any) that may obstruct or impede the project during its implementation and functional stage of the project outputs, key issues are:

- (a) Does the project match with the legal boundary (allocation of business or mandate) of the project entity?
- (b) Are the capabilities and physical facilities of the agency being properly utilized?
- (c) Is there any need for adjustment (reforms) in the policy and/or institutional setup?
- (d) What adjustments may be required before the project is implemented?
- (e) Do the institutions have suitable skills and capacity in line with the project requirements?
- (f) Are there any incentives or penalties in place to ensure the project delivery on time and within the budget?
- (g) Are there any critical governance issues that may affect implementation? If yes, state briefly.
- (h) Are there any challenges related to cross-cutting issues to be addressed? If yes, a mitigation strategy would be suggested.
- (i) Others (if any).

Section 9: Risk (Uncertainty) and Sensitivity Analysis

Issues regarding uncertainty in flow of costs and benefits through out the project period should be taken into considerations. Guideline has to be formulated to stimulate different scenario and to reduce the risks in light of the relevant contractual clauses. The questions that need to be answered are:

- (a) What are the major risks that may affect project?
- (b) How will the project be affected if the risk event materialized?

- (c) What are the possible mitigation measures needed?
- (d) How sensitive are the assumptions used in the financial and economic models in an environment that differs significantly?
- (e) Are there any risks, legal and regulatory obligations that could increase costs or decrease the benefits? If there any, how much project implementation may be hampered or benefit of the project may be reduced?

Section 10: Alternative/Options Analysis

Option Analysis with recommendations & justifications. Technology and strategy recommended to achieve the goals and objectives of the proposed project should be described along with advantages and disadvantages considering various technologies and strategies applicable.

Section 11: Recommendation and Conclusion

Illustrate the solutions specifically to overcome the critical issues that may hinder the project implementation and that would be supported by different sections of analysis.

Section 12: Annexes

Attach detailed technical and engineering designs, plant prototypes designs etc. Financial & Economic models and any supporting documents.

Attachment: -2

Topographic Survey

TECHNICAL SPECIFICATIONS

The work shall consist of the following:

1. A detailed Topographic survey has to be conducted using any methods or combination of methods like Electronic Total Station, DGPS, High precision Laser Distometer etc. to achieve the required accuracy showing the correct shape of land, adjacent roads, boundaries, drains, overhead lines, all structures including foundations, pipes, and cable trenched, etc. with GPS co-ordinate.
2. Plot All data on Mouza map indicating Dag and khatian and Land Owner Information details.
3. The data from topographic survey shall be available in (x,y,z) format in 3 m intervals for use in a sophisticated digital terrain model (DTM)
4. Survey shall be conducted systematically and sequentially from one end covering details of all features such as structures, buildings, utilities, existing roads, electric and telephone installations (both overhead and underground), post & pipelines open drains, artificial/natural ponds, culverts, canals, fencing, tress (with type & girth). Oil and gas lines, boundary lines, wells, slushy areas, survey stones etc fall within the extent of survey with height and depth.
5. The features covered during survey shall be well-defined by proper descriptions.
6. The details of tress with reference number, type, girth, etc. shall be furnished in excel format in soft copy. The girths of tress are to be measured at 1'm above ground level.
7. The survey output shall be accurate and shall be compatible with developing a digital terrain model of the ground using latest software and the DTM so developed should give a true replica of the ground.
8. All physical features such as buildings, monuments, burial grounds, places of worship posts, pipelines and their supports and clearance from ground level, existing roads and railway lines open nallahs, waterways, bridges, culverts, canals, OH lines and their clearance above ground level, fences, tress, cultivation, boundary lines, wells slushy areas, survey stones, etc. are to be located legibly and accurately in the map.
9. Transferring and establishing necessary benchmarks from nearby available benchmarks shall be under the scope of the consultant. Average depth of the proposed site from both highest flood level and nearby national highway shall be separately reported in the survey.
10. The scale to be adopted for preparing the map shall be 1:250 or as directed by the Engineer-in-Charge and the survey map is to be prepared in one or more sheets as required.

11. Equipment required for the work such as total stations and all accessories to complete the work within the specified time are to be arranged by the consultant.
12. The entire manpower required, both technical and non-technical for carrying out the fieldwork and preparations of drawings are arranged by the consultant.
13. The fieldwork and the plotting work are to be carried out strictly in accordance with the instructions of the Engineer-in-charge.
14. All stationery required for the work is to be arranged by the consultant.
15. Latest Auto cad version of topographical survey along with other relevant digital information shall be provided to the client.
16. A latest (collected during survey) time-stamped high resolution (at least 1 meter per pixel) aerial image (From satellite or unmanned aerial vehicle/UAV) of each of the proposed substation sites with site boundary & important feature marking shall be provided to the client.

Table of Content of Environmental and Social Impact Assessment (ESIA)

***** Please follow the detailed guidelines & scope of works provided in the ToR and as per AIIB ESF and ECR 2023 and include all information accordingly in the ESIA report.***

Executive Summary

This section describes concisely the critical facts, significant findings, and recommended actions.

1. Introduction

This section describes the background, objective, scope of project, methodology of ESIA study, study area, study timeline, and structure of the report.

1.1 Project Background

1.2 Information of Project Proponent (*Proponent's Name and Contact address to be included*)

1.3 ESIA Study Team

(This section should include every member's name and details with the following information:

<i>SL No.</i>	<i>Team Member's Name</i>	<i>Educational Qualification</i>	<i>Experience</i>	<i>Area of Study</i>	<i>Declaration with signature)</i>

1.4 Statement of Need

(The statement of need should be clearly established during the initial planning stage of the Project. This chapter will focus on the objective and concept of the Project. It will also emphasize on the expected benefits to be received due to the Project.)

1.4.1 Project Overview

1.4.2 Objective and Scope

1.5 Methodology of ESIA Study

2. Review of Policy and Regulatory Frameworks

This section discusses the Project's legal obligations under national law (including international agreements adopted by the member) applicable to the Project.

2.1 Overview

2.2 Procedure for Obtaining Site/Environmental Clearance

2.3 Organization Related with Enforcement of Environmental Standards

2.4 National Legislation Relevant to Environment

2.5 Policy Related with Energy Development

2.6 Building Construction (Amendment) Act (1990) and Rules (1996)

2.7 Compliance with International Requirements

2.8 Compliance with AIIB Environmental and Social Framework (ESF)

2.9 Compliance with PGCB Health Environment and Safety Requirements

2.10 Comparison of Environmental Safeguard Principles between AIIB and Bangladesh

3. Project Description

Proposed Project will not This section describes the proposed project; its major components; and its geographic, ecological, social, and temporal context, including any associated facility required by and for the project (for example, access roads, power plants, water supply, quarries and borrow pits, and spoil disposal). It normally includes drawings and maps showing the project's layout and components, the project site, and the project's area of influence.

- 3.1 Background
- 3.2 Major Components of the Project
- 3.3 Project Location
- 3.4 Salient Features of Substations (if any)
- 3.5 Proposed Substations and Bay Extension Works
 - 3.6 Salient Features of Transmission Lines
 - 3.6.1 List of TLs
- 3.7 Construction
 - 3.7.1 Construction Activities Related Works for Transmission Lines (*including transfer of transmission lines connected from old grid substation to new grid substation Transmission lines*)
 - 3.7.2 Construction Activities Related Works for Substations
 - 3.7.3 Construction Equipment and Materials
 - 3.7.4 Construction Waste and Hazardous Materials Disposal (*Focusing on handling the used transformed oil that might contain PCB and SF6 leakage to environment during GIS installation as this chemical has a very strong GWP as compared to CO2 (22,000 times)*)
 - 3.7.5 Construction Manpower and Work Schedule
- 3.8 Temporary Facilities and Associated Facilities
- 3.9 O&M Activities for Substations and Transmission Lines

4. Analysis of Alternatives

This chapter shall analyze alternatives while including details of impact on biodiversity within the proposed routes, location details, disturbance of wild life, generic environmental and social risks, introduction of invasive species, risks of bat, tree trimming, habitat damage for site access, inventory of impact on biodiversity etc. on the proposed routes.

- 4.1 Environmental and Social Criteria for Site Selection
- 4.2 Study of Alternatives
 - 4.2.1 Substation Technology and Siting Alternatives
 - 4.2.2 Evaluation of Alternative Transmission Line Routes (*including transfer of transmission lines connected from old grid substation to new grid substation Transmission lines*)

5. Description of the Existing Environmental Condition

This section describes relevant physical, and biological conditions within the study area. It also looks at current and proposed development activities within the project's area of influence, including those not directly connected to the project. It indicates the accuracy, reliability, and sources of the Primary and Secondary data.

- 5.1 Physical Environmental base line data (primary climate data, secondary isokeraunic data, secondary seismic zone coefficient data, combined natural hazard map, flood inundation data and map, primary wind rose map & risk level coefficient factor for the structures of the project etc.)
 - 5.1.1 Meteorology
 - 5.1.2 Geology
 - 5.1.3 Topography
 - 5.1.4 River Morphology
 - 5.1.5 Environmental Quality air, water (resource and quality), acoustic, soil
 - 5.1.6 Natural Disaster
 - 5.1.6.1 Seismicity
 - 5.1.6.2 Storms
 - 5.1.6.3 Cyclones
 - 5.1.6.4 Landslide
 - 5.1.6.5 Floods
 - 5.1.6.6 Droughts
- 5.2 Ecological Resources
 - 5.2.1 Bio-ecological Zone
 - 5.2.2 Flora
 - 5.2.3 Fauna
 - 5.2.4 Ecologically Sensitive Areas (NP, Protected Areas, IBAs etc.)
 - 5.2.4.1 Sensitive Locations and project boundaries
 - 5.2.5 Detail Integrated Bio-Diversity Assessment Tool (IBAT) Analysis
 - 5.2.6 Detail Morphological Study (If there is any river crossing, morphological data, vertical & horizontal navigation clearance, navigation draft, hydrological data, river bed sedimentation and soil data, sediment transport data, river bank erosion data etc.)
 - 5.2.7 Cropping Patterns and Intensity
- 5.3 Critical Habitat Assessment (*This section is required if IBAT results pick-up critical habitats in the project area of influence*)

6. Description of the Existing Socioeconomic Condition

This section describes socioeconomic conditions within the study area. It also looks at current and proposed development activities within the project's area of influence, including those not directly connected to the project. It indicates the accuracy, reliability, and sources of the data.

- 6.1 Socio-Economic Resources
 - 6.1.1 Administrative Bounding of Study Area
 - 6.1.2 Demography
 - 6.1.3 Household Size
 - 6.1.4 Age Structure
 - 6.1.5 Dependency Ratio
 - 6.1.6 Ethnic Community
 - 6.1.7 Literacy Rate
 - 6.1.8 Access to Health Facilities
 - 6.1.9 Employment Opportunities and Unemployment
 - 6.1.10 Availability of Labor and Wage Rate
 - 6.1.11 Migration
 - 6.1.12 Housing Conditions
 - 6.1.13 Drinking Water Facilities
 - 6.1.14 Sanitation Facilities

- 6.1.15 Access to Electricity
- 6.1.16 Land Ownership and Price (For substation and tower footing area for TL route)
- 6.1.17 Income and Expenditure
- 6.1.18 Self-Assessed Poverty and Indebtedness
- 6.1.19 Government Assistance
- 6.1.20 Role of Women and Gender Issues
- 6.1.21 Indigenous Peoples
- 6.2 Project Related Information
 - 6.2.1 Public Utilities
 - 6.2.2 Cultural Resources
 - 6.2.3 Land required for project Intervention
- 6.3 Baseline Condition of Project Affected People

7. Baseline Information

This section describes and assesses the sampling process of the baseline condition (i.e., physical, chemical, natural, social etc. resources) of the proposed Project. The baseline parameters need to be sampled (for every two seasons each year) according to the ECR 2023 and AIIB policy.

- 7.1 Sampling Methodologies
- 7.2 Sampling Locations
- 7.3 Monitoring Stations
- 7.4 Parameters (according to ECR 2023)

8. Project Location and Existing Land Use

This section describes the project location and existing land use of the proposed locations using relevant maps and figures.

- 8.1 Site Location
- 8.2 Existing Land Use and Constraints
- 8.3 Project Distance from the Ecologically Critical Area
- 8.4 Macroscale Map Indicating Location of Proposed Project
(The scale should be 1: 50,000 or 1: 25,000. Plan, diagrams and satellite image can be added)
- 8.5 Map of Land Use
(The map should be clear, legible and colorful. The map will be used to analyze the recent existing environmental condition, hence updated satellite images should be used to prepare the map. Radially 5 km area needs to be included in this map.)
- 8.6 Maps Depicting Existing Environmental Condition
(This section can include topographic map, geological map, hydrological map etc.)

9. Potential Significant Environmental and Social Impacts

This section predicts and assesses the project's likely positive and negative direct and indirect impacts to physical and biological (including occupational health and safety, community health and safety in the project's area of influence) and socioeconomic (vulnerable groups and gender issues, and impacts on livelihoods through environmental media, and physical cultural resources in the project's area of influence) in quantitative terms to the extent possible.

- 9.1 Summary of Potential Impacts
- 9.2 Environmental Impacts from Project Siting

- 9.2.1 Important Environmental Components
- 9.2.2 Improvement of Electricity Grid in surrounding Area
- 9.2.3 Impact Matrix
- 9.3 Impacts during Construction Phase
 - 9.3.1 Soil Contamination and Erosion
 - 9.3.2 Water Contamination
 - 9.3.3 Damage to Khals and Tube-wells
 - 9.3.4 Dust and Air Pollution
 - 9.3.5 Noise and Vibration
 - 9.3.6 Solid Waste Management
 - 9.3.7 Impacts on Wildlife
 - 9.3.8 Impacts on Crop Area and Production
 - 9.3.9 Community Health and Safety (including overview of SEAH situation)
 - 9.3.10 Occupational Health and Safety (including dam safety and safe use of pesticides)
 - 9.3.11 Traffic Congestion
 - 9.3.12 Additional Load on Local Resources
 - 9.3.13 Site Clearance and Restoration
 - 9.3.14 Climate change
 - 9.3.15 Transboundary/Global Risks
 - 9.3.16 Hydrological Distributaries
 - 9.3.17 Hazardous Wastes (*Focusing on handling the used transformed oil that might contain PCB and SF6 leakage to environment during GIS installation as this chemical has a very strong GWP as compared to CO2 (22,000 times))*)
- 9.4 Impacts during O&M Phase
 - 9.4.1 Public Health Impacts from Electro Magnetic Fields (Detail EMF simulation for TL, Possible impacts according to ICNIRP etc.)
 - 9.4.2 Audible Noise and Radio Interference
 - 9.4.3 Diminution of Land Value in Right of Way Corridor
 - 9.4.4 Tree Cutting during Maintenance Activities
 - 9.4.5 Tree Plantation Plan
 - 9.4.6 Risk of Bird Collision and Electrocution
 - 9.4.7 Occupational Health and Safety during Operation and Maintenance
- 9.5 Impacts on Socioeconomic Condition
 - 9.5.1 Employment Opportunities
 - 9.5.2 Access Restrictions
 - 9.5.2.1 Impacts from Access Roads and Damages to Local Infrastructure
 - 9.5.2.2 Blockage of Access Routes
 - 9.5.3 Impact on Livelihood
 - 9.5.4 Impacts on Land Use
 - 9.5.4.1 Agricultural Land
 - 9.5.4.2 Commercial Land
 - 9.5.4.3 Residential Land
 - 9.5.5 Affected Residential Structures in the RoW (if required)
 - 9.5.6 Affected Commercial Structures in the RoW (if required)
 - 9.5.7 Temporary Loss of Crops in the RoW (if required)
 - 9.5.8 Loss of Trees in the RoW (if required)
 - 9.5.9 Other Impacts in RoW (if required)
 - 9.5.10 Damage to Cultural Resources

- 9.5.11 Vulnerable Households
- 9.5.12 Gender Issues
- 9.5.13 Potential Gender Based Violence Issues
- 9.5.14 Social Conflict and Influx of Workers
- 9.5.15 Security Risks

9.6 Cumulative Impact Assessment (*Considering that the project is connected to an existing substation and will involve evacuation of power and upgrading of capacity of electricity generation, identification of project-related risks and impacts shall include any cumulative impacts that may be contributed by the project. As applicable, the Cumulative Impact Assessment section shall present the methodology, process and the findings of the Cumulative Impact Assessment. This section shall identify current and proposed activities and potentially induced changes from upgrading within the power station facility, other foreseeable developments, changes and its effects to surrounding environment and community. The scope and depth of the CIA is proportionate to the nature, scale of the projects and potential risk and impacts.*)

10. Environmental and Social Mitigation and Abatement Measures

This section predicts and assesses the project's likely positive and negative direct and indirect impacts to socioeconomic (vulnerable groups and gender issues, and impacts on livelihoods through environmental media, and physical cultural resources in the project's area of influence) in quantitative terms to the extent possible. Apply a mitigation hierarchy in the environmental and social assessment, by: (i) anticipating and avoiding risks and impacts; (ii) where avoidance is not possible, minimizing or reducing risks and impacts to acceptable levels; (iii) once risks and impacts have been minimized or reduced, mitigating; and (iv) where residual risks or impacts remain, compensating for or offsetting them, where technically and financially feasible.

- 10.1 Mitigation Hierarchy
- 10.2 Mitigation and Abatement Measures
- 10.3 Alternative Traffic Plan

11. Residual Impacts

This section deals with the methodology of the significant residual impacts (long-term) that may remain after the mitigation measures have been taken.

12. Environmental and Social Management Plan

This section deals with the set of mitigation and management measures to be taken during project implementation to avoid, reduce, mitigate, or compensate for adverse environmental and social impacts (in that order of priority). It may include multiple management plans and actions. It includes the following key components (with the level of detail commensurate with the project's impacts and risks): (a) mitigation measures; (b) environmental and social monitoring and reporting requirements; (c) related institutional or organizational arrangements; (d) provisions for disclosure and consultation; (e) capacity development and training measures; (f) implementation schedule; (g) cost estimates; and (h) performance indicators. Key considerations for ESMP preparation include mitigation of potentially adverse impacts to acceptable levels, and the polluter pays principle.

This chapter shall also focus on handling the used transformed oil that might contains as a part of hazardous waste management plan (including collection/emptying, storage, transport and final disposal of the same). It shall also include how to prevent SF6 leakage to environment

during GIS installation as this chemical has a very strong GWP as compared to CO₂ (22,000 times). Since the Pre-FS study stipulates that there will be heavy equipment/engine mobilization via river or land (road), the chapter shall also cover this activity in the assessment including its necessary mitigation and management measures during mobilization, traffic management, OHS etc.

- 12.1 Project Background
- 12.2 ESMP Structure
- 12.3 Potential Impacts and Risks
- 12.4 Existing Facility Corrective Action Plan
- 12.5 Construction Environmental and Social Management Plans (CESMPs)
- 12.6 Environmental Code of Practices for Construction
- 12.7 Mitigation Plan
- 12.8 Environmental Monitoring Plan (EMoP)
- 12.9 Supervision, Monitoring and Reporting Arrangements
- 12.10 Contingency Planning
- 12.11 Implementation Arrangements
 - 12.11.1 Government of Bangladesh
 - 12.11.2 PGCB's Management, PMU, PIU and O&M Staff
 - 12.11.3 PGCB's Environment and Social Unit (ESU)
 - 12.11.4 Safeguards Implementation Consultant (SIC)
 - 12.11.5 Contractor and Subcontractors (if any)
 - 12.11.6 Institutional Structure and Responsibilities
- 12.12 Capacity Building and Training Requirements
- 12.13 Implementation Schedule
- 12.14 Cost Estimate / ESMP Budget
- 12.15 Inclusion of Relevant Components of ESMP in Contract Documents
 - 12.15.1 BoQs in Bid Documents
 - 12.15.2 Payment Milestones

13. Monitoring and Follow-up Plan

This section includes the brief description of the topics that would be included in the Monitoring and Follow-up plan.

14. Information Disclosure, Stakeholder Consultations and Participations

This section: (i) describes the process undertaken during project design and preparation for engaging stakeholders, including information disclosure and consultation with affected people and other stakeholders; (ii) summarizes comments and concerns received from affected people and other stakeholders and how these comments have been addressed in project design and mitigation measures, with special attention paid to the needs and concerns of vulnerable groups, including women, the poor, and Indigenous Peoples; and (iii) describes the planned information disclosure measures (including the type of information to be disseminated and the method of dissemination) and the process for carrying out consultation with affected people and facilitating their participation during project implementation.

- 14.1 Objectives of Stakeholder Consultations
- 14.2 Identification of Stakeholders
 - 14.2.1 Primary Stakeholders
 - 14.2.2 Secondary Stakeholders
- 14.3 Consultation Process
- 14.4 Issues Identified through Consultations

- 14.4.1 Environment
- 14.4.2 Social
- 14.5 Future Consultation Plan for Employer and Contractor
- 14.6 Information Disclosure

15. Grievance Redress Mechanism

This section describes the grievance redress framework (both informal and formal channels), setting out the time frame and mechanisms for resolving complaints about environmental and social performance.

- 15.1 Objectives of Grievance Redress Mechanism
- 15.2 Grievance Redress Mechanism
- 15.3 Composition of GRC
- 15.4 Processes for Filing GRC Cases and Role of GRC

16. Conclusion and Recommendation

This section provides the conclusions drawn from the assessment and provides recommendations.

- 16.1 Conclusion
- 16.2 Recommendations

List of Annexures of ESIA (not limited to)

Annex A: Tree Plantation Plan

The tree plantation plan should address the fact that endemic/native species of fruit-bearing/medicinal/forestry trees must be planted instead of invasive/exotic species. The plan shall include the following sections but not limited to:

- Identification of indigenous/native/endemic species and invasive/exotic species of trees;
- Number and species of trees required to be cut for the construction of the substation and transmission lines (if required);
- Suggested location, number and species of trees required to be planted as per mitigation measures [it should be noted that 1:3 tree plantation ratio should be followed (i.e., three trees should be planted if one tree is cut down), whereas fruit-bearing/medicinal/forestry trees should be planted instead of exotic species];
- Review the institutional arrangements for plantation;
- Tree plantation management plan. Initiatives regarding preparation of pits and sapling transplantation, spacing between the saplings, time of plantation, protection and maintenance of the saplings etc. should be considered;
- Budget allocation for the tree plantation plan including future management guidelines.

Annex B: Stakeholder Engagement Plan (SEP):

The consultant shall conduct a Stakeholder Engagement during ESIA reporting. The feedback received shall be analyzed, and the consultations shall determine how it can be addressed in the updated ESIA and project designs. The SEP Development should ensure that the entire project-affected parties and other interested parties (including NGOs, Civil Society Organizations- CSOs and women representatives) are identified and included in any ongoing engagement plans. A robust stakeholder mapping shall be provided. The overall engagement process will be gender-inclusive. The consultant will specifically identify those project-affected parties (individual or groups) who, because of their circumstances, may be disadvantaged, marginalized or vulnerable. Specific measures to maximize participation of vulnerable persons/groups to the consultation activities will be presented.

Stakeholder engagement should not be treated as a project information dissemination session but should be used to take into account the main interest and influence of the stakeholders and improve the plan and design of the project shall continue throughout the project life. The updated ESIA should reflect the comments and responses to various consultations. The data collected will be disaggregated by gender in order to provide an understanding of specific women concerns. Project information shall be disclosed as early as possible and, in a way, and timeframe that allows the stakeholders to understand the risk and impacts of the project, and potential opportunities have meaningful consultations with the stakeholders on project design. Information will be disclosed in relevant local languages and in a manner that is accessible and culturally appropriate. A grievance mechanism will be included in the SEP.

SEP will be disclosed as early as possible to seek the views of the stakeholders on the SEP and update the document accordingly.

Annex C: Gender Action Plan (GAP)

The GAP shall include the following section:

- An over view of the Gender situation and risks faced by women including GBV risks in investment projects involving major civil works of substation in PGCB;
- Key regulatory framework on gender, rights of women, gender-based violence, sexual exploitation, abuse, and sexual harassment (SEAH);
- Review of formal and informal institutional structures and process that affect gender outcomes in the project and under the project setup (including but not limited to gender norms, role of women in households and communities, rights to land, women in the workplace etc.);
- Review of setup, capacity and constraints within relevant institutions to address gender concerns and considerations;
- The results of the SEAH risk assessment tool;
- GBV/SEAH prevention and mitigation measures to address potential risks (including staff resources roles and responsibilities, indicators, timeline, estimated budget);
- Mapping of SEAH/ GBV service providers;
- Measures to ensure access to women to employment opportunities and other project benefits;
- Grievance mechanism (including grievances reporting protocol, roles and responsibilities, service providers of GBV etc.);
- Monitoring and supervision (frequency, indicators, roles and responsibilities);
- Estimated budget for the implementation of the GAP;
- The development of the Gender Action Plan should be informed by the relevant Good Practice Note on Gender and GBV.

Annex D: Labor Management Procedures

Labor management procedures should include the following topics:

- Terms and conditions of employment, such as rights to regular payment, hours of work, overtime, adequate rest, benefits such as annual, sick, maternity and family leave, and timely notice of termination.
- Non-discrimination and equal opportunity provisions for all aspects of employment, and including measures to prevent and address harassment, intimidation and/or exploitation.
- The right to organize for collective bargaining in accordance with national law. Where workers' organizations are restricted by law, the project will not restrict workers from developing alternative mechanisms to express grievances and protect their rights.
- Prohibitions against child labor and forced labor.
- Access to a grievance mechanism provisions specifically for direct and contracted workers.

Annex E: Occupational Health and Safety Plan

In addition to the labor management procedures, the Contractor should prepare and implement this plan addressing the following issues:

- Hazards in the workplace
- Organization and staffing
- Protective measures for hazardous conditions or substances (such as protective gear, fire control)
- Worker training
- Accident or incident reporting procedures
- Health screening and monitoring where appropriate

- Emergency response procedures
- Remedies for adverse environmental and social impacts

Implementation of this plan will be required under the contract.

Annex F: Community Health and Safety Plan

Identify and assess a wide range of potential risks and impacts on health and safety of affected communities including the vulnerable, as part of the ESIA. For projects having the potential to cause emergency events, and/or when traffic and road safety issues are likely to be significant, Government will conduct respectively,

- A Risk/Hazard Assessment and/or
- A Road Safety Assessment as part of the ESIA.

Examples of Risk:

- Dangers of electrical shock from wiring;
- Un-authorized access to quarries, excavation works, open water, or irrigation canals that can result in injury or death

The framework should include but not limited to:

- Avoidance or minimizing community exposure to project related traffic and road safety risks, diseases and hazardous materials. For examples: including safe road crossings into the project design, groundwater for potential pollution seepage, including measures to counter service provider risks (e.g., marking utility rights of way to prevent accidents from digging in the wrong place).
- Identifying and assessing the risks and impacts in regulating and provisioning ecosystem services including those that may be exacerbated by climate change as part of the environmental and social assessment. For example: regulating services include flood management and soil stability and provisioning services are fresh water, food and fuelwood.
- Anticipation or avoidance of adverse impacts on the health and safety of project-affected communities during project life-cycle from routine and non-routine circumstances.
- Promoting quality, safety, and climate change considerations in infrastructure design and construction.
- Identifying and assessing risks and impacts posed by security provided by Government's direct or contracted workers on the Project's personnel, facilities, assets, operation and the local community.

Annex G: Biodiversity Management Plan

The plan should be prepared if the project has significant risk of adverse impacts on biodiversity. It should be definitely required if the project may affect "Critical Habitat." It is needed where mitigating risks and impacts to biodiversity requires taking multiple actions over time, with defined responsibilities and budget, rather than a single one-time action. Biodiversity Management Plan will typically include:

- Creation, expansion or improved management of Protected Areas
- Site-specific habitat restoration
- Species-specific protection or management interventions
- Benefit-sharing and/or alternative livelihood measures for resource-dependent communities
- Monitoring the implementation and outcomes of the Biodiversity Management Plan

Annex H: Climate Change Assessment

The assessment should deal with the identification and assessment of options to maximize cost-effective climate change adaptation benefits and promote the transition to green growth. Particular focus will be given to the following:

- Analysis of carbon count/ carbon footprint of the project and climate risk assessment in line with the Paris Agreement.
- Proposition of possible adaptation measures with detailed local assessments on the projected changes in climate conditions, the impacts of these changes on variables of interest to the power sector (e.g., projected changes in rainfall having an impact on water availability), and the nature and feasibility of adaptation options.
- Fostering sustainable infrastructure through ecosystem-friendly approaches. Considerations will include natural capital sensitivities, resource use efficiency, and issues relating to air and water quality and waste management.
- To protect, maintain, and improve the productive potential and performance of land, forests, and water resources so that the project yields multiple benefits such as climate change mitigation and adaptation and livelihood preservation for the poor who mostly depend on natural resources.

Attachment-4

Project Name: Modernization with Capacity Enhancement Of 230/132 kV Air Insulated Substation (AIS) To Gas Insulated Substation (GIS) At Ghorashal Power Station Complex Project

SL No	Scope
1	Transformation of Ghorashal 230/132 kV Air insulated Switchgear (AIS) Substation to Gas insulated Switchgear (GIS) Substation with all necessary Capacity Enhancement and 02 (two) numbers of additional bay extension.

Expertise requirement:

Engineering consulting services will include, but are not limited to the following expertise:

Key Experts	Qualification	Minimum Experience
Team Leader/ Project Manager	M.Sc. in Electrical Engineering	Team Leader shall at least have twenty (20) years of professional experience in the related field. Must have experience in a multidisciplinary team conducting Feasibility Studies, Topographic surveys, Route Survey, IEE/ESIA & RP in power sector projects. Experience in leading a consultants' team as Project Manager or Deputy Project Manager: 5 projects (at least two as PM).
Power System Analyst	B. Sc. in Electrical Engineering	Must have at least 10 years of experience in the relevant Field out of which at least two (2) years of experience as a consultant engineer for 132kV or above voltage level in power system planning and analysis. Proven experience and proficiency in using power system transmission planning simulation software and preferably PSS/E are mandatory.
Electrical Engineer (Substation)	B. Sc. in Electrical Engineering	Must have at least 10 years of experience in the relevant field out of which at least five (5) years of experience as a consultant engineer/ implementing engineer for 132kV or above voltage GIS and AIS substation projects.
Civil Engineer (Substation)	B. Sc. in Civil Engineering	Must have at least 10 years of experience in the relevant field out of which at least five (5) years of experience as a consultant engineer/ implementing engineer for 132kV or above voltage GIS and AIS substation projects.
Environmental Expert	Master's Degree in Environmental Science or Equivalent	He/ She must have a Master's Degree in Environment Science/ Environmental Engineering / Environmental Management / Natural Resource Management / Ecology with a Total of 15 years of Experience in related areas and shall have additional experience in OHS management in Projects. He /She shall have practical experience in conducting feasibility Study and IEE/ESIA in at least 5 nos. Projects in the power sector of which at least two High Voltage Transmission Line Projects as an Environmental Expert. Certification in Health & Safety and experience of working in AIIB funded Projects and familiarity with AIIB's latest policies and other international safeguard standards is desirable.

Key Experts	Qualification	Minimum Experience
Socio-Economic, Development and Gender Expert	Master's Degree in social science or gender studies or Economics or related studies	He/ She must have more than ten (10) years of professional experience in the related field. The expert shall have intensive experience in preparation of GAP, SEA/SH prevention plan, LMP, RPF, resettlement, SEP, GRM or other related documents. The professional shall have experience in similar studies of the Power Sector related projects (preferably in high voltage transmission line projects). Experience of working in AIIB funded Projects and familiarity with AIIB's latest policies and other international safeguard standards is desirable.
Financial Expert	MBA/ Master's Degree in Finance Major	10 years of professional experience. He /She shall have practical experience in conducting at least 5 nos. Projects in the power sector /High Voltage Projects as Financial Expert.

- The Consultant may add personnel to their required staffing pool to accomplish the assignments, but they will not be accounted for evaluation.

The consulting firms are requested to submit end-user certificates as evidence of experience as per requirement. The method of selection of consulting firms is "Quality and Cost Based Selection (QCBS)" (80:20).