



**ASIAN INFRASTRUCTURE  
INVESTMENT BANK**

July 17, 2024

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**Sovereign-Backed Financing**

**Project Document**

**P000308 - People's Republic of Bangladesh**

**Southern Chattogram and Kaliakoir  
Transmission Infrastructure Development Project**

**Currency Equivalents**

(As of May 30, 2024)

Currency Unit – Bangladesh Taka (BDT)

BDT1.00 = USD0.009

USD1.00 = BDT117.50

**Borrower's Fiscal year**

July 1 - June 30

**Abbreviations**

AIB	Asian Infrastructure Investment Bank	IMF	International Monetary Fund
AIS	Air-insulated Switchgear	IOCT	International Open Competitive Tender
AIT	Advance Income Tax	km	kilometers
BERC	Bangladesh Electricity Regulatory Commission	kWh	kilowatt-hour
BHTC	Bangabandhu Hi-Tech City	LILO	Line-In-Line-Out
BPDB	Bangladesh Power Development Board	LMP	Labor Management Procedures
CO2	Carbon dioxide	MDB	Multilateral Development Bank
DPP	Development Project Proforma	MVA	Megavolt-amperes
EIRR	Economic Internal Rate of Return	NDC	Nationally Determined Contribution
ENPV	Economic Net Present Value	O&M	Operation and Maintenance
EOCC	Economic Opportunity Cost of Capital	OHS	Occupational Health and Safety
ES	Environmental and Social	PA	Paris Agreement
ESEL	Environmental and Social Exclusion List	PAA	Paris Agreement Alignment
ESF	Environmental and Social Framework 2019	PD	Project Director
ESIA	Environmental and Social Impact Assessment	PDS	Project Delivery Strategy
ESMP	Environmental and Social Management Plan	PGCB	Power Grid Company of Bangladesh
ESP	Environmental and Social Policy	PIC	Project Implementation Committee
ESS	Environmental and Social Standards	PIE	Project Implementing Entity
FAPAD	Foreign Aided Project Audit Directorate	PMU	Project Management Unit
FIRR	Financial Internal Rate of Return	PP	Procurement Plan
FM	Financial Management	PPM	Project-affected People's Mechanism
FNPV	Financial Net Present Value	PSC	Project Steering Committee
FY	Fiscal Year	RP	Resettlement Plan
GBV	Gender-based Violence	SCADA	Supervisory Control and Data Acquisition
GDP	Gross Domestic Product	SDG7	Sustainable Development Goal 7
GHG	Greenhouse Gas	SEP	Stakeholders Engagement Plan
GIS	Gas-insulated Switchgear	T&D	Transmission and Distribution
GMD	Grid Maintenance Division	WACC	Weighted Average Cost of Capital
GoB	Government of Bangladesh	WTP	Willingness to pay
GRM	Grievance Redress Mechanism		

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## 1. Summary Sheet

Project No.	P000308
Project Name	Southern Chattogram and Kaliakoir Transmission Infrastructure Development Project
AIIB Member	People's Republic of Bangladesh
Borrower	People's Republic of Bangladesh
Project Implementation Entity	Power Grid Company of Bangladesh Limited (PGCB)
Sector Subsector	Energy Electricity transmission and distribution
Alignment with AIIB's thematic priorities	Green Infrastructure; Technology-enabled Infrastructure
Project Objective	To improve the reliability and capacity of the power transmission network in the Southern Chattogram and Kaliakoir region of Bangladesh.
Project Description	<p>The project comprises the construction of around 180.43 kilometers (km) 132/230kV transmission line, four gas-insulated switchgear (GIS) substations, and two bay extensions in Southern Chattogram region (i.e., Anwara, Cox's Bazar, Teknaf) of Chattogram division, and Kaliakoir region (Bangabandhu Hi-Tech City (BHTC)) in Gazipur district of Dhaka division. The Government of Bangladesh (GoB) has undertaken this project to develop grid interfacing infrastructure to ensure efficient and uninterrupted power transmission in the project areas. Project activities include:</p> <p>(i) Construction of four substations with a total capacity of approximately 1,820 megavolt-amperes (MVA) at BHTC, Anwara, Cox's Bazar (North), Teknaf, and two bay extensions at the existing Kaliakoir Substation; and</p> <p>(ii) Construction of approximately 180.43 km transmission line (in four segments): BHTC to Kaliakoir; Anwara to Cox's Bazar (North); Cox's Bazar (North) to Teknaf; and Line-In-Line-Out (LILO) at Cox's Bazar (North) substation from an existing line.</p>
Implementation Period	September 2024 to December 2029
Expected Loan Closing Date	December 31, 2029
Proposed Amount of AIIB Financing	USD 160.00 million equivalent <sup>1</sup>
Financing Plan	<p>Project Cost: USD 250.72 million (estimated)</p> <p><u>Financial Plan:</u></p> <p>AIIB loan: USD 160.00 million  GoB: USD 55.44 million  PGCB: USD 35.28 million</p>

<sup>1</sup> Consists of three tranches based on different loan currencies - (i) Dollar Tranche of USD 109,782,434, (ii) Euro Tranche of EUR 29,420,294, and (iii) RMB Tranche of RMB 132,489,872. So, total loan amounting to equivalent of USD 160.00 million.

ES Category	A
Risk	Medium
Conditions of Effectiveness	Signing of Subsidiary Loan Agreement between the borrower and PGCB.
Key Covenants	The borrower shall ensure that the implementation of all project activities complies with AIIB's Environmental and Social Policy and Standards, Policy on Prohibited Practices, and Procurement Policy, and its associated Interim Operational Directive on Procurement Instructions for Recipients.
Retroactive Financing	Retroactive financing will be up to 20 percent of the loan amount to finance eligible expenditures incurred not earlier than 12 months before the signing date of the loan agreement.
Policy Waivers Requested	None
Policy Assurance	The Vice President, Policy and Strategy, confirms an overall assurance that AIIB is in compliance with the policies applicable to the Project.
Economic Capital (ECap) Consumption	USD 34.5 million (27.2%)

President	Liqun Jin
Acting Vice President	Rajat Misra
Director General	Rajat Misra
Sector Lead	Hari Bhaskar, Principal Investment Officer
Team Leader	Raqib Ahmed Chowdhury, Investment Officer
Team Members	Abhijit Sen Gupta, Senior Economist David Rollinson, Senior Environment Specialist Partha Protim Nath, Investment Associate Rizal Rivai, Procurement Consultant Susrutha Goonasekera, Senior Social Development Specialist Ting Wang, Senior Counsel Yogesh Malla, Financial Management Specialist Zhixin Yuan, Team Assistant

## 2. Project Description

### A. Project Overview

1. **Background.** Over the last two decades, Bangladesh's economic growth has been accelerated. The country's average Gross Domestic Product (GDP) growth was around 6.4 percent between FY2010 to FY2023, growing by an average of about 6 percent per year since 2000. The economy grew by 4.8 percent in the first half of FY2024 and it is anticipated that the country will graduate from the United Nations Least Developed Countries list in 2026. Therefore, to ensure that economic growth is sustained in the long run, access to electricity and reliability of the electricity network will be fundamental. The Government of Bangladesh's (GoB) goal for universal electricity access has brought around 99 percent of the country's total population under electricity coverage, resulting in increased electricity demand for economic activities. The country's Perspective Plan (2021-2041)<sup>2</sup> predicts that the electricity demand will increase annually by around 9 percent in the period 2021-2041. In the last decade, GoB undertook significant investments in the power generation sector to ensure reliable electricity for its citizens. However, the benefits of these investments could not reach the consumers due to severe stress in existing transmission and distribution (T&D) networks.

2. To overcome this situation, GoB has now prioritized modernizing and upgrading the country's T&D network to reduce the load capacity constraints and to improve the reliability of the electricity grid network. Considering Power Grid Company of Bangladesh's (PGCB) important role in the country's energy sector as the only provider of the transmission network, in the country's latest five-year plan<sup>3</sup> GoB has planned to increase the transmission network coverage to ensure the benefits of power generation investment reach people. As a part of this overall transmission network development plan, GoB has requested AIIB's support in this project<sup>4</sup> to develop grid interfacing infrastructure to meet the growing demand for quality electricity supply and to ensure reliable power transmission in the Southern Chattogram region and Bangabandhu Hi-Tech City (BHTC) in Kaliakoir region.

3. **Project Objective.** To improve the reliability and capacity of the power transmission network in the Southern Chattogram and Kaliakoir region of Bangladesh.

4. **Project Description.** The project comprises the construction of approximately 180.43 kilometers (km) 132/230 kV transmission line, four gas-insulated switchgear (GIS) substations, and two bay extensions in Southern Chattogram region (i.e., Anwara, Cox's Bazar, Teknaf) of Chattogram division, and Kaliakoir region (Bangabandhu Hi-Tech City (BHTC)) in Gazipur district of Dhaka division. GoB has undertaken this project to develop grid interfacing infrastructure to ensure efficient and uninterrupted power transmission in the project areas. Detail project activities include:

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<sup>2</sup> a 20-year policy document of the GoB that aligns with the country's vision to achieve High-Income Country status by 2041,

<sup>3</sup> The eighth five-year plan of GoB for the year 2020-2025.

<sup>4</sup> The corresponding official name in the Development Project Proforma (DPP) of the Government of Bangladesh is "Transmission Infrastructure Development Project for Southern Area of Chattogram Division & Bangabandhu Hi-Tech City at Kaliakoir".

- (i) Construction of four substations with a total capacity of approximately 1,820 megavolt-amperes (MVA) at BHTC, Anwara, Cox's Bazar (North), Teknaf, and two bay extensions at the existing Kaliakoir Substation; and
- (ii) Construction of approximately 180.43 km transmission line (in four segments): BHTC to Kaliakoir; Anwara to Cox's Bazar (North); Cox's Bazar (North) to Teknaf; and Line-In-Line-Out (LILO) at Cox's Bazar (North) substation from an existing line.

5. **Expected Results.** The project is expected to deliver the following results that will be measured and monitored as indicated in the Results Monitoring Framework (Annex 1):

- (i) Total T&D capacity added / updated (MVA)
- (ii) Annual tripping and unscheduled outages in Chattogram and Dhaka (North) Grid Circle<sup>5</sup> (number of incidents)
- (iii) Consumers provided with new or improved electricity supply ('000s)
- (iv) Annual Greenhouse Gas (GHG) emission reduction (after project completion) (tons CO<sub>2</sub>)

These results are expected to be achieved by the following intermediate indicators:

- (i) Length (in km) of transmission lines constructed and commissioned
- (ii) Number of substations constructed and commissioned
- (iii) Number of Bay Extensions constructed and commissioned
- (iv) Length (in km) of LILO constructed and commissioned

6. **Expected Beneficiaries.** The successful completion of the project will ensure better quality electricity supply to around 1.4 million consumers (including both residential and industrial segments) in Southern Chattogram and Kaliakoir region. Moreover, as this network will be part of the country's national electricity grid, the overall reliability of the transmission network in the adjacent areas will also be improved after the successful completion and commissioning of the project.

## B. Rationale

7. **Strategic Fit for AIIB.** The project is aligned with AIIB's latest energy sector strategy – Energy Sector Strategy: Sustainable Energy for Tomorrow. As per the latest strategy, AIIB will support new T&D projects to (i) increase power systems' resilience to natural disasters and (ii) improve the reliability and quality of electricity supply to serve productive uses and modern society needs. This project fits with these two crucial elements of the energy sector strategy. The strategy recognizes that developing power grid infrastructure is a key component of AIIB's mandate to promote connectivity and achieve Sustainable Development Goal 7 (SDG7) targets for access to modern energy for all, which is applicable for this project also.

8. The project is well aligned with AIIB's two thematic priorities - (i) Green infrastructure by way of addressing climate mitigation and adaptation measures in the

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<sup>5</sup> PGCB has countrywide seven Grid Circles for operation and monitoring; the Southern Chattogram region falls within Chattogram Grid Circle, and the Kaliakoir region falls within Dhaka (North) Circle.

project design; and (ii) Technology-enabled infrastructure by way of installing technological components like Supervisory Control and Data Acquisition (SCADA) systems and numerical protection relays in the substations.

9. **Paris Agreement Alignment (PAA).** Electricity transmission network projects are considered Paris Agreement (PA)-aligned, as per the universally aligned list of the Joint Multilateral Development Bank (MDB) Assessment Framework for the PA. This means that the project contributes to climate action that is consistent with the mitigation goals of the PA. This project's scope supports PA's BB1 (mitigation-related) and BB2 (adaptation-related) goals. It will also support Bangladesh in achieving its latest Nationally Determined Contribution (NDC) commitments. By developing the new electricity grid network, the project will improve transmission system efficiency, reducing annual CO<sub>2</sub> emissions during the operational phase. Also, the project will support climate adaptation activities by building climate-resilient infrastructures to deal with increasing climate events (i.e., floods, storms, high temperatures, etc.) in Bangladesh. Detail PAA assessment is shown in Annex 3.

10. **Value Addition by AIIB.** GoB has planned and undertaken countrywide electricity T&D network expansion projects, for which the financing requirement is significant. There needs to be more funding than the country's domestic financing sources to meet this requirement. Therefore, AIIB's financing will help the country secure external funding and build the required electricity grid network to support the country's SDG7 goal and NDC targets. AIIB's involvement in this project will increase PGCB's institutional capacity to build climate-resilient and technology-enabled infrastructure that will ensure the reliability of the grid network. AIIB's support in the project's Environment and Social (ES) impact assessment helped PGCB to increase its understanding of avoiding eco-sensitive areas and ensure sustainable development. Also, involving external implementation consultants for ES monitoring and resettlement activities will deepen PGCB's understanding of following international ES standards and good practices.

11. **Value Addition to AIIB.** Through the project, AIIB will further develop its expertise and understanding of Bangladesh's power sector; and build its capacity to help clients include climate adaptation components and meet international standards of ES management. This will enhance the quality and strength of cooperation between GoB and AIIB in energy sector infrastructure development. Also, this will increase AIIB's practical understanding of how to embed climate-resilient components in T&D sector projects.

12. **Lessons Learnt.** The project design is being built on experiences from two-existing AIIB-financed projects<sup>6</sup> with PGCB and from other sovereign projects within the energy sector. Relevant lessons that are currently being incorporated into project planning include: (i) accelerating project readiness through early engagement with the Project Implementing Entity (PIE) to ensure a project lead is appointed during project preparation; (ii) upstream preparation of bidding documents during project preparation

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<sup>6</sup> (i) Project ID: 000088: Power System Upgrade and Expansion Project (AIIB loan USD 120 million; stand-alone); (ii) Project ID: 000272: Dhaka and Western Zone Transmission Grid Expansion Project (AIIB loan USD 200 million; co-financed with ADB)



and conduct advance procurement actions; and (iii) ensure presence of ES personnel in the PIE to implement the ES activities. These measures are expected to result in timely implementation of the project.

### C. Components

13. **Component A.** Project activities in Southern Chattogram Region include:

- i. Transmission Lines:
  - a. Anwara to Cox's Bazar (North) 230 kV double circuit transmission line, which will initially be charged at 132 kV (approximately 109 km)
  - b. Cox's Bazar (North) to Teknaf 132 kV double circuit transmission line (approximately 65 km)
  - c. 132 kV four circuit Line-In-Line-Out (LILo) at Cox's Bazar (North) substation from Dohazari-Cox's Bazar 132 kV double circuit transmission line (approximately 1.55 km)
- ii. Substations:
  - a. Anwara 230/132/33 kV indoor GIS substation
  - b. Cox's Bazar (North) 132/33 kV indoor GIS substation
  - c. Teknaf 132/33 kV indoor GIS substation

14. **Component B.** Project activities in Kaliakoir Region include:

- i. Transmission Lines:
  - a. BHTC to Kaliakoir 230 kV double circuit transmission line (approximately 4.88 km)
- ii. Substations:
  - a. BHTC 230/33 kV indoor GIS substation
  - b. 230 kV air-insulated switchgear (AIS) Bay Extension at existing Kaliakoir Substation (2 numbers)

### D. Cost and Financing Plan

15. In Table 1, based on the above components, major construction items are segregated into two-line items based on the type of activities – Transmission lines and Substations. USD 160 million is requested from AIIB by the GoB.

Table 1. Project Cost and Financing Plan (USD m)

Item	Project Cost	Financing (Amount & %)		
		AIIB	PGCB	GoB
Transmission Line Construction	106.68	76.34	3.74	26.61
Substation Construction	87.63	54.92	8.91	23.79
General and Administrative Expenses	19.42	-	19.42	-
Front-end Fee	0.37	0.37	-	-
Contingency	36.62	28.37	3.21	5.04
<b>Grand Total</b>	<b>250.72</b> (100%)	<b>160.00</b> (64%)	<b>35.28</b> (14%)	<b>55.44</b> (22%)

16. **Counterpart Funds.** The counterpart funds of this project will come from two sources - GoB financing and PGCB's own financing. The GoB portion for this project is USD 55.44 million (22 percent), which is kept for land acquisition, resettlement and major portion of customs duties. PGCB's own fund allocated for this project is USD 35.28 million (14 percent), which is kept for the administration and general expenses (over the implementation period), partial tax contribution, and other finance charges, including interest during construction.

17. As per the country's public financial management practice, the yearly allocation of GoB financing is incorporated into the Annual Development Plan (ADP)<sup>7</sup> of GoB, which is prepared by the Ministry of Planning. The approved Development Project Proforma (DPP)<sup>8</sup> reflects both the GoB and PGCB contribution amounts. GoB contribution<sup>9</sup> in this project will come through low-cost fixed rate loan in local currency<sup>10</sup>. The PGCB contribution comes from its own balance sheet. The table below shows the proposed year wise GoB and PGCB portions for this project.

Table 2. Year wise GoB and PGCB Financing Plan (USD m)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
GoB	7.92	16.27	7.95	10.95	12.34	55.44
PGCB	1.60	7.03	8.43	6.80	11.41	35.28

## E. Implementation Arrangements

18. **Implementation Period.** The project is expected to be implemented from September 2024 to December 2029.

19. **Implementation Management.** PGCB is the PIE, and the Power Division (within the line ministry, i.e., Ministry of Power, Energy, and Mineral Resources) is the relevant government authority to oversee the project implementation and resolution of implementation issues. The electricity transmission system in Bangladesh is solely owned and operated by PGCB. It is a state-owned enterprise incorporated as a public limited company.

20. During the project planning stage, PGCB's Planning Department, headed by its Chief Engineer (Planning and Development), acted as the focal point to maintain communication with AIIB and the line ministry and prepare the project's DPP. The DPP for the project has been approved by the relevant body of the GoB and the government order has been published in December 2023. PGCB has already appointed Project Director (PD) for this project and is in the process of formally establishing dedicated Project Management Unit (PMU) to carry out day-to-day activities related to implementing the project.

<sup>7</sup> ADP is an organized list of projects in various sectors and the allocations for them for a year for implementation of the government's development policies, programs, and investments in the plan, prepared by the Ministry of Planning

<sup>8</sup> DPP is the official internal document of GoB used by government agencies (e.g., PIE, line ministry, Ministry of Planning, Ministry of Finance) to approve public sector projects. This project's DPP is already approved.

<sup>9</sup> GoB holds around 75 percent stake in PGCB, through Bangladesh power Development Board (BPDB).

<sup>10</sup> Fixed interest rate for this GoB loan is 3 percent, for the entire loan tenor (20 years with 5-year grace period)

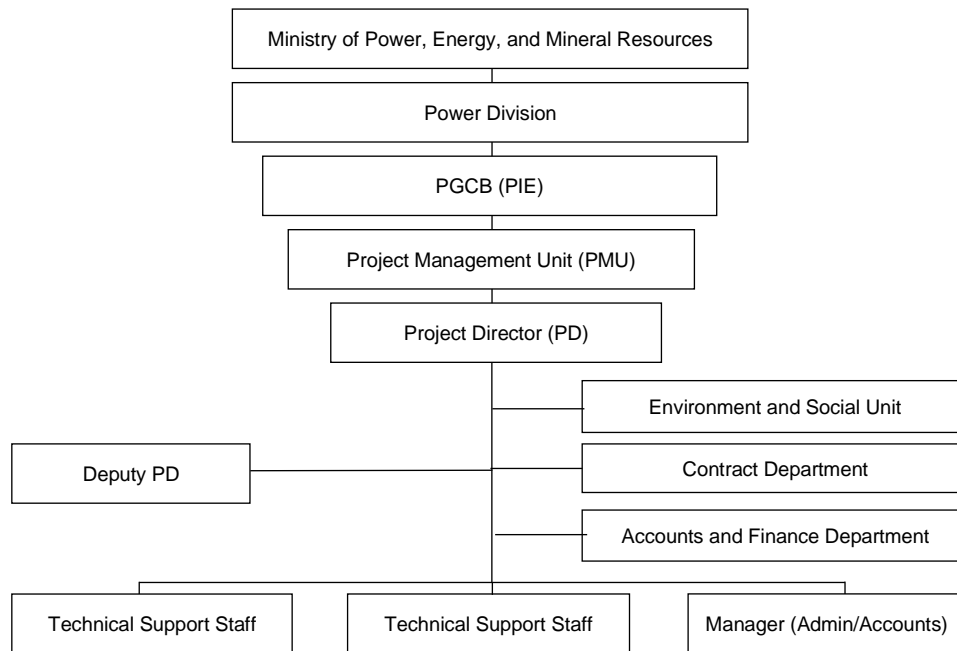


Figure 1: Organization Structure of the PMU

21. PGCB has extensive experience working with MDBs and is familiar with the setup of PMUs for projects funded by development partners. The PMU, headed by a PD, is going to be responsible for project implementation, procurement, financial management (FM), ES compliance, and maintaining liaison with AIIB. The PD will be supported by a Deputy PD, different technical staff, and other support staff. Besides, PGCB’s central ES Unit, Contract Department, and Accounts and Finance Department will designate specific personnel to support the PMU. An organogram of the PMU is provided in Figure 1.

22. For supervision and implementation monitoring, the line ministry has formed (upon approval of DPP) two high-level committees - Project Steering Committee (PSC) and Project Implementation Committee (PIC). The PSC (comprises senior officials from the line ministry, Power Division, and representatives from other related ministries) will oversee the project implementation and guide the settling of all implementation issues from the line ministry level, while the PIC (includes key officials from PGCB) will be responsible for overseeing project implementation at the PIE-level.

23. **Procurement Arrangements.** PGCB, through its Contract Department and dedicated PMU, is responsible for implementing all aspects of the procurement process, from the planning, design, and tendering stages to contract award and supervision of contract implementation. All procurement activities, for the AIIB-funded scopes, are following AIIB Procurement Policy (November 2022) and the Interim Operational Directive on Procurement Instructions for Recipients (dated June 2, 2016).

24. PGCB has prepared the Project Delivery Strategy (PDS) and a Procurement Plan (PP) covering procurement arrangements, including contract packaging, cost estimates, procurement methods, review methods, and procurement timelines, which constitute the basis for the PMU to carry out the project procurement. In this project, all transmission infrastructure will be constructed in two separate turnkey contract

packages, including design, supply, installation, testing, and commissioning. The first package is for substation works, and the second is for transmission line works. Advance Procurement actions for both packages have been initiated for smooth project implementation. Additionally, PGCB has initiated procurement process for onboard ES monitoring consultants.

25. **Financial Management Arrangements.** PGCB will be responsible for the overall project FM. Once established, PMU shall be staffed with dedicated and qualified finance and accounts personnel responsible for maintaining acceptable levels of project FM. It will ensure that all expenditures financed out of the loan proceeds are used exclusively in carrying out the project, and it will exercise its rights in such a manner as to protect its interests and those of AIIB and to accomplish the purposes of the loan. The project will maintain separate books and records by funding source for all expenditures incurred following accrual-based accounting. The project's financial progress will be reported on a semester basis through interim unaudited financial reports within 45 days from the end of each fiscal semester.

26. The project financial statements shall be audited annually by the Foreign Aided Project Audit Directorate (FAPAD) of GoB's Office of Comptroller and Auditor General. The project's audited financial statements, including the audit opinion and management letter, shall be submitted within 9 months of the end of each fiscal year. The project shall adopt advance payment, direct payment, special commitment, and reimbursement methods of disbursement, as required. The disbursement letter shall detail the authorized signatories, advance ceiling, the process of submitting claims, and other project disbursement terms and conditions.

27. **Monitoring and Evaluation.** The PMU will be fully responsible for monitoring the implementation of the project and is expected to prepare progress reports semi-annually highlighting progress on various fronts, including procurement, construction, and the implementation of ES plans. These reports, which will be shared with AIIB, will highlight the status of achievement of agreed targets for monitoring indicators and detail project implementation progress.

28. **Project-Financing Agreements.** AIIB will enter into a Loan Agreement with the borrower and a Project Agreement with PGCB. These agreements will set out the implementation responsibility (i.e., FM, procurement, ES, reporting obligations) of PGCB as the PIE. In addition, the borrower and PIE will sign a Subsidiary Loan Agreement between themselves.

29. **AIIB's Implementation Support.** During the implementation, the Bank will carry out missions to monitor progress and may conduct additional field visits as required during the initial years. The project team will also have virtual and in-person interactions with PGCB and may engage Bank's local consultants to conduct more frequent supervision if required.

### 3. Project Assessment

#### A. Technical

30. **Project Design.** The project consists of building new transmission lines, indoor GIS substations, and bay extensions in two regions of the country – Southern Chattogram (covering Anwara, Cox's Bazar, and Teknaf region) and Kaliakoir region (for BHTC). PGCB completed a feasibility study for this project. After construction completion and successful commissioning, enhanced transmission capacity will improve system reliability in the project areas and relieve existing nearest substations and transmission lines from overloading. As a result, the transmission system outages will be reduced gradually, and quality electricity supply can be ensured to the load centers.

31. The Chattogram region has traditionally been recognized as the country's central industrial hub due to its proximity to Chattogram port and better connectivity with the capital. PGCB has planned to improve the transmission grid connectivity of the entire Chattogram region to meet incremental loads in the coming days from this region and to ensure a reliable electricity supply. According to PGCB planning studies, it has been forecasted that in the long term, there will be an expected demand of 1,008 MW, which is currently 314 MW (at the consumer end) in the Southern Chattogram area (that covers Anwara, Cox's Bazar, and Teknaf region).

32. Anwara is located in an optimal location due to its proximity to the major load centers in the industrial area of Chattogram city. This area has also been identified as a prime location for setting up two new economic zones by the Bangladesh Economic Zone Authority, which are expected to be fully operational by 2030. Considering the growing demand for quality power of industrial loads in Anwara and its adjacent areas and to ensure supply reliability, new grid substations, and transmission lines are being planned for the Anwara and other areas in the Southern Chattogram area. This project will construct a 230/132/33 kV GIS substation (future 400 kV) at Anwara (940 MVA) and provide grid connectivity with the 230 kV transmission line system.

33. Cox's Bazar is another prospective economic hub of the country. Currently, major activities in the area are directly or indirectly related to tourist activities due to having the country's largest beachside in this area. Because of its strategic location from the seaside, GoB is considering setting up an economic zone in the district, prior to which a reliable power supply needs to be ensured. At present, Cox's Bazar area is connected by only one 132 kV transmission line, and due to an overloading problem, it is not possible to deliver reliable and adequate power to Cox's Bazar area to meet extended future demand. The project will construct a 132/33 kV indoor GIS substation at Cox's Bazar (North) area (360 MVA). In addition, around 109 km of 230 kV double-circuit transmission line (initially charged at 132 kV) from Anwara substation to Cox's Bazar (North) substation will be constructed to connect these two substations. The project will also build an approximate 1.55 km LILO to connect the existing transmission line with the new Cox's Bazar (North) substation.

34. Teknaf is the southernmost part of the country. Currently, the area is served by a 33 kV distribution line, which has been experiencing voltage drop and load-shedding issues due to its length and capacity constraints. To address these problems and ensure

a reliable power supply for the area, approximately 65 km of 132 kV double-circuit transmission line from Cox's Bazar (North) to Teknaf will be constructed. Also, the project will construct a new 132/33 kV indoor GIS substation (240 MVA) to support the future power demand in the Teknaf area. The substation will receive power from Cox's Bazar (North) substation through the newly constructed 132 kV line.

35. On the other hand, BHTC, at Kaliakoir region, is a well-planned special economic area designed for setting up industries for machinery and hi-tech products, as well as providing information technology-related services. At present, the area is served by a 33 kV line. PGCB anticipates that the future demand from the Kaliakoir region will be 215 MW (whereas the current demand is 120 MW); out of this, around 134 MW demand is expected to come from BHTC. To meet the future electricity demand and ensure uninterrupted quality power, a 230/33 kV indoor GIS substation (280 MVA) at BHTC, along with an approximately 4.88 km long Kaliakoir-BHTC 230 kV double circuit transmission line and two 230 kV AIS bay extensions at the existing Kaliakoir substation will be constructed.

36. All four substations, with a total capacity of around 1,820 MVA, will be equipped with SCADA systems and numerical protection relays. The selected voltage levels, technology, and equipment under the project are compatible with PGCB's existing system assets and international good practices. PGCB will engage two turnkey contractors to implement the project scopes within the defined implementation period.

37. **Operational Sustainability.** PGCB is responsible for planning and developing future work plans, project preparation and approval, project implementation, monitoring system operation and protection activities, and training its staff. It has an experienced team (under Operation and Maintenance (O&M) wing), proven systems, and adequate facilities to operate and maintain the assets financed under the project.

38. The O&M wing is led by a senior official (Executive Director rank), with two Chief Engineers responsible for transmission line and system operation. The overall PGCB's countrywide O&M operation is segregated under seven Grid Circles, with several Grid Maintenance Divisions (GMD) under each circle.

39. After the project's construction and commission, the concerned GMD of PGCB will be responsible for operating and maintaining the infrastructure. As per the regular practice of PGCB, the System Protection Department, SCADA Department, and Load Dispatch Centers provide necessary logistic support to GMD for properly functioning the substations and transmission lines. For all these O&M activities, PGCB allocates a budget in its balance sheet and performs the O&M function smoothly.

## **B. Economic and Financial Analysis**

40. **Economic Analysis.** A project-level cost-benefit analysis is carried out to assess the project's economic viability on a with and without-project basis. Economic costs and benefits are measured in constant April-2024 prices, excluding transfer payments, financing charges, and adjustments for market distortions. The project's economic costs include capital investments in land and the transmission system to be supported by the project, including O&M, consulting services, and physical

contingencies (excluding any price contingencies, taxes, debt service charges, and other financial charges). On the other hand, economic benefits include incremental and non-incremental benefits from enhanced transmission capacity, incremental benefits from reduction in system outages, and resource cost savings from reduction in transmission losses. Also, the project will benefit the environment with a decrease in CO<sub>2</sub> emissions from avoided power generation due to transmission loss savings. The analysis indicates that the project is economically viable with an Economic Internal Rate of Return (EIRR) of 19.56 percent (base case scenario), well above the economic opportunity cost of capital of 9 percent. The project also yields an economic net present value (ENPV) of USD 195.4 million at this discount rate. Sensitivity analysis involving potential cost increase and decline in benefits indicates that the project remains viable despite increased costs and reduced benefits. Details of the economic analysis are presented in Annex 2.

41. **Financial Analysis.** Project's financial analysis is carried out from the perspective of PGCB, based on the forecasted project cashflows. Project costs include investment and O&M costs of the transmission system, taxes, duties, and physical contingencies but exclude price contingencies and financing costs. All investment costs are expressed in constant prices. Project benefit is measured in terms of revenue from incremental wheeling charges. The current wheeling tariff is considered as the base and escalated by 2 percent every four years (in real terms). Based on these assumptions, the weighted average cost of capital (WACC) is computed as 2.52 percent (expressed in post-tax real terms). The analysis shows that the project is financially viable with a Financial Internal Rate of Return (FIRR) of 3.38 percent (expressed in post-tax real terms), exceeding the WACC. The project investment yields a financial net present value (FNPV) of USD 25.9 million at the WACC. A sensitivity analysis is also carried out to assess the financial viability of the project. Results are shown in Annex 2.

42. **Historical Financial Assessment of PGCB.** Historical financial performance analyses of PGCB are carried out based on its audited financial statements from 2019-20 to 2023-24(Q3). A summary is shown in Table 2.

Table 3: PGCB's Financial Performance (in USD m)

Particulars	2019-20	2020-21	2021-22	2022-23	2023-24 (till Q3)
<b>Revenue</b>	<b>159</b>	<b>186</b>	<b>199</b>	<b>208</b>	<b>167</b>
Operating Expenses	89	118	111	127	95
<i>of which O&amp;M Expense</i>	6	8	11	8	5
Operating Profit	248	304	310	335	262
<b>Operating Profit Margin</b>	<b>44%</b>	<b>36%</b>	<b>44%</b>	<b>39%</b>	<b>43%</b>
<b>Profit After Tax</b>	<b>21</b>	<b>29</b>	<b>10</b>	<b>(53)</b>	<b>17</b>
<b>Total Assets</b>	<b>2,431</b>	<b>3,072</b>	<b>3,673</b>	<b>4,655</b>	<b>5,228</b>
<i>of which Property, Plant, Equipment</i>	1,168	1,163	1,306	1,651	1,623
<i>of which Capital works-in-progress</i>	940	1,411	1,853	2,393	2,935
<b>Total Liabilities</b>	<b>1,826</b>	<b>2,335</b>	<b>2,865</b>	<b>3,687</b>	<b>4,175</b>
<i>of which Long-term Borrowing</i>	1,578	2,066	2,605	3,419	3,808
<b>Total Equity</b>	<b>605</b>	<b>737</b>	<b>808</b>	<b>967</b>	<b>1,052</b>
<i>of which GOB Fund</i>	546	657	730	943	1,008
Total Equity and Liabilities	2,431	3,072	3,673	4,655	5,228

43. PGCB's revenue grew from USD 159 million to USD 208 million from 2019-20 to 2022-23, with a compounded annual growth rate of 9.2 percent. For the year 2022-23, revenue of USD 208 million comprised of USD 201 million from transmission/wheeling charges (around 97 percent) and USD 7 million (around 3 percent) from renting income from optical fiber assets.

44. The company has posted healthy operating profits over the years, its operating profit margin remains stable over the last five year, ranges between 36% to 44%. However, its net profit turned into negative in 2022-23, primarily driven by depreciation local currency<sup>11</sup> and low wheeling charge. In 2022-23, PGCB incurred a loss of USD 53 million, as it got affected from foreign exchange rate variation loss of USD 108 million in that year. However, in 2023-24 (till Q3) its profit after tax has increased to USD 17 million.

45. PGCB has substantial and increasing levels of debt, which is understandable as PGCB is expanding its asset base at a fast pace. Total long-term borrowings for 2023-24(Q3) amounted to USD 3,808 million (excluding the current portion of the long-term loan).

46. Being a public listed state-owned entity, PGCB regularly receives strong support from the government through deposit of shares for various infrastructure development projects. As of 2023-24 (Q3), GOB contribution stands at USD 1 billion. Here, it is to be noted that PGCB's primary source of revenue is transmission wheeling charge tariffs, which is regulated by the regulator and the line ministry. As such, its revenue is highly influenced by the decision taken by the regulator or the ministry from time to time. Recently, in February 2024<sup>12</sup>, the line ministry has raised the wheeling charge of PGCB (by 7 percent) to ensure improvement of company's financial solvency. The frequency of the change of wheeling charge is at the discretion of the line ministry and there is no fixed interval, as per the historical trend.

### C. Fiduciary and Governance

47. **Procurement.** The project's procurement capacity and risk assessment were carried out during project preparation to identify procurement-related risks, and suitable risk mitigation measures have been proposed to strengthen the procurement capacity of the PMU. Based on the assessment, the project procurement risk is rated as Medium.

48. PGCB is well experienced in implementing other projects of similar size and nature funded by MDBs, including AIIB. It has sufficient capacity and is familiar with the procurement policies of MDBs. It is currently implementing two AIIB-financed projects (one stand-alone and another one co-financed with Asian Development Bank), and its procurement staff are familiar with the procurement policies of the Bank.

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<sup>11</sup> Bangladesh Taka/ US Dollar exchange rate depreciated by 16 percent from June 2022 to June 2023, and further depreciated by 9 percent from June 2023 to June 2024. Overall, in last 2 years exchange rate depreciated by 26 percent.

<sup>12</sup> Government's latest notification on wheeling charge increase can be accessed here: [https://powerdivision.portal.gov.bd/sites/default/files/files/powerdivision.portal.gov.bd/page/aecbebc\\_a\\_cce\\_0\\_4234\\_b68b\\_ef509a6a0702/52599\\_58803\\_merged%20\(1\).pdf](https://powerdivision.portal.gov.bd/sites/default/files/files/powerdivision.portal.gov.bd/page/aecbebc_a_cce_0_4234_b68b_ef509a6a0702/52599_58803_merged%20(1).pdf)



49. Before formal set up of the PMU, PGCB's Planning department with the help of the Contract department is responsible for the overall coordination of procurement-related documents (i.e., PDS, PP) and communication with AIIB and approving authorities. The contract department is leading the tendering process as the central unit for all projects at PGCB. This department prepares the commercial part of the tender documents and receives support from the Design and Quality Control department for preparing the technical specifications of any tender. During implementation phase, the Contract department will work closely with the PMU. The PMU will establish a document record management mechanism to keep all procurement-related documents in its office for the Bank's future review and auditing by the government authority.

50. PGCB has a multi-layer committee for the tender operation process. There is a standing tender opening committee and tender evaluation committee for international tenders. In this project, AIIB is carrying out procurement prior review of all the packages.

51. **Advance Contracting and Retroactive Financing.** Advance Procurement actions for all packages referred to in Table 4 below have been initiated following International Open Competitive Tender (IOCT) procedures. If needed by PGCB, retroactive financing can be used up to 20 percent of the loan amount to finance eligible expenditures incurred not earlier than 12 months before the signing date of the loan agreement.

Table 4: Procurement Plan

SI.	Description	Review	Status
Package 1	Design, Supply and Installation of indoor GIS substations, and Bay Extensions	Prior	No objection for technical and financial evaluation has been issued by AIIB (for both packages)
Package 2	Design, Supply, and Installation of transmission line and LILO		

52. **Financial Management.** As mentioned earlier, PGCB has prior experience implementing MDB-financed projects, and this project is expected to use the existing FM systems of PGCB. Based on the FM assessment, capacity is considered adequate, and the FM risk is Medium.

53. **Budgeting.** The project shall follow PGCB's planning and budgeting procedures. Based on the procurement plan, the PMU shall provide estimated budgetary requirements on an annual basis to PGCB for review and approval. The approved project work plan shall be included in the yearly national budget under a separate budget head.

54. **Project Accounting and Reporting.** PGCB follows a double-entry and accrual accounting system. The financial transactions are posted in the accounting software, which is used for financial reporting. For project accounting, the PMU shall follow an accrual basis. All the payments for project activities are centralized at PMU. The PMU shall maintain a separate account and have custody of project-related supporting documents.

55. **Staffing.** PGCB has a centralized Accounts and Finance department. It is headed by the Finance Chief and has experienced and qualified finance and accounting staff. For the PMU, dedicated finance and accounting staff shall be deputed, and there is minimal impact on staff transfer issues.

56. **Internal Controls and Audit.** PGCB has its regulations and procedures laid out for internal control. PGCB has an in-house internal audit team, and it carries out internal audits on a regular basis. The internal audit department of PGCB shall carry out the internal audit of the project. For the entity-level external or statutory audit, private audit firms are engaged by PGCB. The auditors have issued qualified audit opinions for the last three years, primarily because of having some long-standing legacy issues at the entity-level since long. Some of these issues relate to non-compliance with revenue recognition, hybrid accounting practices followed in select areas, forex exchange fluctuations incorrectly capitalized, no physical verification of fixed assets, a mismatch between the stock ledger and the accounts ledger, etc. It is suggested that PGCB make better efforts and action plans to address these legacy fiduciary matters raised by the auditors. AIIB's FM specialist will monitor the corrective actions to be taken by PGCB.

57. FAPAD, a specialized arm of the Comptroller and Auditor General of Bangladesh, provides independent assurance on the proper use and accounting of resources for foreign-funded projects. FAPAD shall carry out an audit of project financial statements, including an audit opinion and management letter. The audited project financial statements shall be submitted to AIIB within nine months of the end of each fiscal year.

58. **Funds Flow and Disbursement Arrangements.** The project shall follow its lending and funds flow procedures standard for sovereign operations. GoB and PGCB shall finance all taxes and duties except advance income tax (AIT). The AIT shall be funded through loan proceeds. The loan proceeds will be disbursed using reimbursement, direct payment, special commitment, and advance methods. Based on previous disbursement experiences in other sovereign projects, there have been some delays in direct local currency payments due to some local regulatory provisions. To minimize this risk, it is suggested to use the advance method of disbursement for direct local currency payments, excluding foreign currency payments. However, the suitable disbursement method will be decided by PGCB as per the project's requirements. A disbursement letter will detail the authorized signatories, advance ceiling, the process of submitting claims, and other terms and conditions of disbursements related to the project.

59. **Governance and Anti-corruption.** AIIB is committed to preventing fraud and corruption in the projects it finances. It places the highest priority on ensuring that projects AIIB finances are implemented in strict compliance with AIIB's Policy on Prohibited Practices (2016). The Bank reserves the right to investigate, directly or indirectly through its agents, any alleged corrupt, fraudulent, collusive, coercive, or obstructive practices, and misuse of resources and theft relating to the project and to take necessary measures to prevent and address any issues in a timely manner, as appropriate.

## D. Environmental and Social

60. **Environmental and Social Policy (including Standards).** AIIB's Environmental and Social Policy (ESP), including the Environmental and Social Standards (ESSs) and the Environmental and Social Exclusion List (ESEL), applies to this project. ESS1 (Environmental and Social Assessment and Management) and ESS2 (Land Acquisition and Involuntary Resettlement) apply to this project, while ESS3 (Indigenous Peoples) is not applicable.

61. **Categorization and instruments.** The project has been classified as category A, in accordance with the Environmental and Social Framework (ESF) (2019), because of anticipated environmental and social risks and impacts due to project locations. The Environmental and Social Impact Assessment (ESIA) and Resettlement Plan (RP) have been prepared for the project. In addition, a Labor Management Procedures (LMP), a Stakeholders Engagement Plan (SEP), and a Gender-based Violence (GBV) prevention plan are also prepared for this project.

62. **Environmental Aspects.** Typical construction phase impacts that have been assessed in the ESIA and included in the ESMP with respective mitigation measures for the Contractor to follow include but are not limited to: soil erosion from excavation works and site clearance; dust emissions from constructions works and Powered Mechanical Machinery; Water quality impacts stemming from surface runoff during construction works, effluent discharge from workers camps and general on-site poor housekeeping; Vegetation clearance; and Occupational Health and Safety (OHS) hazards for the construction staff and other project site personnel.

63. Key project specific impacts that have been identified in the ESIA include Electro and Magnetic Field (EMF) in the operational phase and potential flow regime impacts to the five (5) identified rivers in the project area. In terms of EMF the ESIA has identified the potential risk and concluded that the impacts are anticipated to be negligible in terms of community health and safety. Nonetheless, provisions have been made in the ESIA and encapsulated in the ESMP to ensure that there is adequate monitoring, with engineering intervention as required. Given that a few river-crossing towers will be in proximity to water courses at select locations, provisions have been included in the ESMP for the proponent to conduct a hydro-morphological study before implementation.

64. During the preparation of the ESIA, biodiversity was considered as key issue to be further assessed in the project. This was addressed through realignment to avoid a wildlife sanctuary. Initially, around 9 km of the overhead transmission line alignment was proposed to pass through Chunati wildlife sanctuary. Considering the potential ecological impacts, the project team worked with PGCB management to develop an alternative alignment, avoiding direct ecological impacts to the sanctuary. However, whilst all possible alternatives have been considered during the alignment option process, it is anticipated that at least two IUCN-identified known elephant corridors may pass between the transmission line alignment from Cox's Bazar (North) substation to Teknaf substation. The existing highway from Cox's Bazar and Teknaf has multiple signage for elephant crossings, and as such, this is not a project-specific issue. However, as part of the project's Environmental and Social Management Plan (ESMP), the

contractor will develop a Biodiversity Management Plan during the implementation phase before start of construction to manage any potential impacts.

65. The ESMP includes the reporting mechanisms for the responsible agencies and the monitoring plans during the implementation phase. The estimated budget for implementing the ESMP is also included in the project budget. The OHS management, and management plans for labor camps, construction sites, traffic, and solid waste, are included in the ESMP. PGCB has ensure the integration of ES requirements in all tender documents and supervise the preparation and implementation of ESMP for this project. To assist PGCB in implementing the ESMP, an external ES monitoring consultant will be onboarded by PGCB after PMU formation.

66. **Climate Change.** Considering the climate risks the project area faces, the project is primarily sensitive to floods, storms, cyclones, and rising temperatures. Besides these major risks, riverbank erosion and landslides have also been identified as climate risks during the climate and geological risk screening. Based on the findings of the screening and subsequent assessment, several climate adaptation measures have been designed into the projects, i.e., using special foundation designs for river crossing towers, considering higher flood levels (around 3-meter taller towers) than conventional towers to safeguard against the impact of flooding, constructing GIS substations instead of the AIS ones, landfilling, and land compaction, etc. Also, the climate change mitigation measures incorporated in the project include constructing high-voltage transmission lines and designing the transmission system with adequate capacity to reduce losses from transmission. Thus, in addition to meeting electricity supply capacity requirements and improving the system's reliability, the investments will also help reduce GHG emissions by around 20,000 tons of CO<sub>2</sub> in the first year of operation and over 2 million tons of CO<sub>2</sub> over the loan life period. Based on the Joint MDB methodologies for climate finance tracking, USD 29 million (18.12 percent) of AIIB's financing will be considered as climate adaptation finance, and USD 61 million (38.12 percent) will be considered as climate mitigation finance.

67. **Social Aspects.** The most significant social impacts of the project pertain to the resettlement issues, including land acquisition, devaluation of land, and damage to crops, trees, and structures that exist in the right of way. The project requires approximately 73 acres of land, comprising 40 acres for the four substations and 33 acres for transmission tower footing. Of the 40 acres required for the substations, 35 acres will be acquired from owners of private agricultural land, following the legal framework of GoB (Acquisition and Requisition of Immovable Property Act of 2017) and AIIB's ESS2, resulting in a permanent economic displacement of 233 households (744 persons) as well as affecting the income of 17 sharecroppers and 69 wage earners as identified parcels of land are used for agricultural purposes. The remaining 5 acres of land, which BHTC currently owns, is unutilized and unencumbered.

68. The total length of the transmission lines is approximately 180.43 km. Per the Electricity Rules of 2020, land acquisition for transmission lines along the right of way is not required except for tower footings. As such, compensation is required to be paid to landowners affected by the tower footprint. There are 15 households (95 persons) expected to be affected during the construction of transmission lines. This includes the

removal of trees and temporary impact on their residential and auxiliary structures during stringing.

69. An RP has been prepared based on surveys, social assessments, and consultations with project-affected persons. The entitlement matrix summarizes the main types of losses and the corresponding entitlements following the legal framework of GoB and AIIB's ESS2. An RP implementing consultant will be engaged by PGCB during the implementation period.

70. **Gender Aspects.** During the construction phase, the project anticipates a modest influx of labor, including both skilled and unskilled laborers. Additional labor may be required at specific sites, particularly substations in peri-urban or urban areas, with construction camps strategically positioned to ensure effective oversight and management. The influx of construction workers poses inherent risks related to gender dynamics, potentially giving rise to issues such as gender-based violence (GBV), sex exploitation (SE) and sexual harassment (SH), which could significantly impact the safety and well-being of women and children residing in the project vicinity. Given these circumstances, it is imperative to implement a detailed GBV prevention plan that will serve as a guiding framework throughout project implementation. The plan emphasizes a zero-tolerance policy towards GBV, SE, and SH.

71. The contractor will integrate the GBV Prevention Plan, encompassing comprehensive codes of conduct that address gender-related issues. Training sessions, awareness campaigns, and orientation programs for workers will also focus on gender aspects, promoting a respectful and inclusive work environment. Furthermore, recognizing the cultural and religious barriers that hinder women's participation in consultations and focus group discussions, the project will require the RP implementing consultant to recruit a Gender Specialist proficient in the local language. This specialist will actively engage with women, ensuring their meaningful participation in the consultation processes.

72. A Labor-Management Plan has been prepared to manage the impacts and risks of labor influx, GBV, OHS, and other prohibited labor and working conditions. Other impacts, such as traffic and public utility management, etc., will be addressed in the ESMP.

73. **Stakeholder Engagement, Consultation, and Information Disclosure.** Public consultations have been carried out with project-affected households and key project stakeholders and will be continued during project implementation. A SEP has been prepared to provide for consultations with stakeholders during the entire project cycle, procedures for disclosing information about the project, mechanisms for addressing and responding to grievances, and reporting back to the stakeholders. The final ESIA and RP are disclosed on the client's and AIIB's websites. The Bangla version of the executive summaries of the ES documents are posted on the AIIB website before approval.

74. **Project Grievance Redress Mechanism.** A two-tier Grievance Redress Mechanism (GRM) will be constituted for the project in line with the prescriptions of the Project-affected People's Mechanism (PPM) Policy of the Bank, building on the existing complaint mechanisms of PGCB. First tier will be at the local level (headed by PGCB

field office representative), and second tier at the PMU-level (headed by PD). Communities and individuals who believe they are adversely affected by the project will be able to submit complaints to the project-level GRM for resolution. Any issues that are not resolved at the local level can be escalated to the PMU level. In addition to the above GRM for addressing complaints from the local community, a commensurate mechanism will be made available at the contractor level for workers' grievances.

75. **AIIB's Project-Affected People's Mechanism (PPM).** AIIB's PPM will be used for the project. The PPM has been established by AIIB to provide an opportunity for an independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by AIIB's failure to implement its ESP in situations when their concerns cannot be addressed satisfactorily through the Project-level GRM or the processes of AIIB's management. For information on AIIB's PPM, please visit <https://www.aiib.org/en/about-aiib/who-we-are/project-affected-peoples-mechanism/how-we-assist-you/index.html>.

76. **Monitoring and Supervision Arrangements.** The project's ES issues, including ESMP implementation, will be monitored by PGCB with assistance from an external ES monitoring consultant. PGCB will prepare semi-annual ES monitoring reports per the agreed format and submit them to AIIB at regular intervals. Also, AIIB will supervise the project's ES aspects with support from local ES consultants and conduct onsite supervision missions regularly.

## E. Risks and Mitigation Measures

77. Based on a project assessment, the project team has assigned an overall 'Medium' risk rating to the project. The possible risks and the mitigation measures are presented in Table 4 below.

Table 5: Summary of Risks and Mitigating Measures

Risk Description	Assessment (H/M/L)	Mitigation Measures
<b>Technical:</b> PGCB's institutional capacity to implement the project	Low	PGCB has successfully implemented similar projects, including those financed by MDBs. PGCB will set up a PMU to lead the project implementation, headed by a senior engineer. Furthermore, AIIB will monitor the progress through its implementation support missions.
<b>Procurement:</b> Cost overrun due to increase in price of goods and materials.	Medium	Cost estimates of major items are benchmarked to similar ongoing projects in Bangladesh, and contingency provisions have been made.

Risk Description	Assessment (H/M/L)	Mitigation Measures
Delay in the procurement process and signing of the contracts		Conducting advance procurement actions before loan signing
<b>ES:</b> ES implementation capacity at PGCB (especially for a category A project)	Medium	PGCB will engage an external ES consultant to monitor the implementation of ES activities and another consultant for RP implementation.
<b>FM Risk:</b> Delay in approval of budget or release of funds.  Delay in submission of financial and audit reports.	Medium	PMU to proactively engage with relevant stakeholders to ensure timely approval and fund release.  PMU shall coordinate within its team and with FAPAD for the timely submission of audit reports.

## Annex 1: Results Monitoring Framework

<b>Project Objective:</b>	To improve the reliability and capacity of the power transmission network in the Southern Chattogram and Kaliakoir region of Bangladesh.									
Indicator	Unit of measure	Baseline	Cumulative Target Values					End Target 2029	Frequency	Responsibility
			2024	2025	2026	2027	2028			
<b>Project Objective Indicators:</b>										
a. Total T&D capacity added / updated	MVA	0	0	0	0	280	1,820	1,820	Annual	PGCB
b. Annual tripping and unscheduled outages in Chattogram and Dhaka (North) Grid Circle	no. of incidents	517	517	517	517	489	373	373	Annual	PGCB
c. Consumers are provided with new or improved electricity supply	'000s	1,230	1,230	1,230	1,230	1,250	1,429	1,429	Annual	PGCB
d. Annual GHG emission reduction (after project completion)	tons CO2	0	0	0	0	0	20,000	20,000	Annual	PGCB
<b>Intermediate Result Indicators:</b>										
a. Length of transmission lines constructed and commissioned	km	0	0	0	0	4.5	180.43	180.43	Semi-annual	PGCB
b. Number of substations constructed and commissioned	no.	0	0	0	0	1	4	4	Semi-annual	PGCB
c. Number of Bay Extensions constructed and commissioned	no.	0	0	0	0	2	2	2	Semi-annual	PGCB
d. Length of LILO constructed and commissioned	km	0	0	0	0	0	2	2	Semi-annual	PGCB
e. Hiring of ES Monitoring Consultant and RP Consultant	No.	0	2	2	2	2	2	2	Semi-annual	PGCB



## Annex 2: Economic and Financial Analysis

1. **Economic Analysis.** An economic evaluation of the project is carried out following the Guidance Note on Cost-Benefit Analysis of Projects of AIIB and internationally accepted principles and methodology for economic analysis of infrastructure projects. The analysis is conducted using a "with-project" and "without-project" framework to compute the project's economic internal rate of return (EIRR) against an assumed economic opportunity cost of capital (EOCC) (the hurdle rate) of 9 percent.

2. **Assumptions.** An economic cost-benefit analysis is collectively carried out for the entire project using the following assumptions:

- (i) The capital investment expenditure (financial) consists of all incremental expenditures related to the project, including consulting services and physical contingencies, excluding price contingencies, debt service charges, and any other financial charges.
- (ii) No taxes and depreciation are considered for the economic analysis of the project.
- (iii) The operating expenditures include all annual incremental expenditures incurred by the PGCB related to the project and are considered as 1 percent of the total investments, in line with standard international practices and similar investment projects.<sup>13,14</sup> A real increase of 2 percent every four years is also considered for these expenses.
- (iv) The implementation period is from 2024 to 2028, and a 25-year benefits period spans from 2029 to 2053.
- (v) The residual value of the project-financed assets is considered as 10 percent of the initial capital investment expenditure after 25 years of operations.

3. **Methodology.** To evaluate the project's economic viability, two mutually exclusive and alternative scenarios are hypothesized: 1) without-project scenario; and 2) with-project scenario.

4. To assess the incremental benefits arising from the proposed project's construction, a plausible alternative "without-project" scenario is hypothesized where it is assumed that the proposed investments are not undertaken. In the "without-project" scenario, O&M expenses are expected to increase as the system would require higher repairs and maintenance due to the higher loading of the power systems. However, this incremental cost is excluded from the present analysis for simplicity and conservatism. If these costs had been included, the project's economic viability would have been enhanced further.

5. The second scenario, or the "with-project" scenario, considered that all the investments are carried out timely and as planned. The scenario also considered that the benefits over the evaluation period materialized in the same manner as envisaged

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<sup>13</sup> Similar 1 percent normative operating and maintenance expenses were considered for AIIB and ADB co-financed - Dhaka and Western Zone Transmission Grid Expansion Project.

<sup>14</sup> Operating and maintenance expenses are considered 1 percent of the eligible investment cost (total cost less land and financial charges).

during the project planning phase. The additional benefits under the with-project scenario over the without-project scenario are classified into two categories: 1) direct consumer benefits and 2) environmental benefits. Direct consumer benefits are further categorized into incremental and non-incremental benefits.

6. This analysis is carried out by estimating economic costs and economic benefits for the project and then evaluating the economic viability of the project. Economic benefits and economic costs are expressed in real terms at April-2024 prices. This EIRR is compared against the assumed EOCC to assess the project's economic viability. An EIRR higher than the EOCC indicates the project is economically viable, whereas an EIRR lower than EOCC indicates the project is economically non-viable with the assumed set of economic benefits. Further, the economic net present value (ENPV) of the economic cashflows (net benefits), valued at constant April-2024 prices, is computed at the assumed EOCC. A positive ENPV indicates the phase is economically viable, whereas a negative ENPV means an economically non-viable investment. A sensitivity analysis has been carried out to check the robustness of the project's economic viability, where key variables are changed (in an unfavorable direction) by reasonable increments, and the impact on EIRR and ENPV are tabulated for each independent change and the combined changes.

7. **Economic Benefits.** The economic benefits of the projects are assessed for the forecast period (2029-2053). Project benefits are assumed to accrue from mid-year 2028. The direct consumer benefits include a) additional electricity demand met from the grid electricity, b) reduction in grid outages c) reduction in transmission losses as a direct consequence of the project. These direct consumer benefits are divided into incremental and non-incremental benefits owing to the nature of the benefits. The broad assumptions for quantifying incremental and non-incremental benefits are as follows:

- (i) The demand is assumed to rise gradually from 2028 to 2035. Hence, the project transmission capacity utilization is expected to grow from one-third (33 percent) in 2028 to 90 percent in 2035. It is assumed that PGCB would undertake future investments to cater to any additional load beyond this<sup>15</sup>.
- (ii) A power factor of 95 percent, as used by PGCB in its project benefit estimates, is considered.
- (iii) System load factor of 60 percent is considered in line with the system load factor of 60.75 percent in FY2019 and 62.41 percent in FY2020 for Bangladesh.<sup>16</sup>
- (iv) Post-project consumer mix (proportion of domestic, industrial, commercial, and others) provided by PGCB is considered for the purpose of demand utilization in the project area. Accordingly, economic benefits are valued. The post-project consumer mix is considered from 2031 onwards. Till 2030, the current consumer mix for Bangladesh, gradually adopting the post-project mix is considered.<sup>17</sup>

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<sup>15</sup> The analysis considered the total demand catered as 364MW (at consumer end) in 2028, growing steadily to 987 MW in 2035 in the Southern Chattogram region, and 79 MW (at consumer end) in 2028, growing steadily to 214 MW in 2035, in Gazipur region.

<sup>16</sup> Annual report of BPDB for FY2021.

<sup>17</sup> Statistical Yearbook, Bangladesh 2021.

- (v) Distribution loss of 8.5 percent and project area-wise transmission losses of 2.443 percent for the Southern Chattogram region and 2.048 percent for the Kaliakoir region is considered. Transmission losses are assumed to rise marginally with higher loading of the substations in the future, in line with the expectations to value the benefits.<sup>18,19</sup>

8. **Non-incremental Benefits.** The primary aim of the project is to relieve the existing transmission system, improve reliability and provide capacity for future load growth. Hence, a portion of the existing demand will be shifted from the existing substations relieving them from the current state of overloading and tripping. As all this demand is currently served either by the overloaded grid and diesel generation in case of outages, these benefits are valued at the weighted average of the unit price of diesel generation (5 percent) of BDT 24.22/kWh and 33 kV bulk supply tariff of BPDB (95 percent) of BDT 6.79/kWh less with-project scenario cost of 100 percent bulk supply tariff of BPDB<sup>20</sup>. These rates are appropriately adjusted for distribution and transmission losses to maintain accuracy.

9. **Incremental Benefits.** These benefits result from increased transmission capacity and improved system reliability, resulting in fewer outages.

- (i) **Increased Transmission Capacity.** PGCB has estimated that around 14 percent of the demand in the project areas will be incremental in nature. This is valued at the consumer category-wise willingness to pay (WTP). In the absence of any available willingness to pay study for Bangladesh and electricity being a traded good, category-wise retail supply tariffs are considered as a conservative proxy of the WTP. Considering retail supply tariffs as a conservative proxy for WTP is appropriate in this case, as most of these consumers are grid-connected and use grid electricity to support their current consumption, and their marginal electricity consumption will be well-served by the grid electricity. For domestic consumers, the WTP of BDT 6.44/kWh; for industrial consumers, the WTP of BDT 10.29/kWh, and for commercial consumers, the WTP of BDT 11.46/kWh is considered. For other consumer categories, the average of the above three WTPs is considered as WTP.<sup>21,22</sup>

- (ii) **Reduced Outages.** A conservative estimate of a 20 percent reduction in existing outages in the Southern Chattogram area and a 10 percent reduction in existing outages in the Kaliakoir region are considered incremental benefits. These benefits are again valued using the WTP approach mentioned above.

10. **Resource Cost Savings (Non-Incremental Benefits).** These benefits correspond to the resource cost savings from reduced transmission losses and avoided

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<sup>18</sup> Distribution losses correspond to the losses for BPDB in FY2021 from Statistical Yearbook Bangladesh 2021. June 2022.

<sup>19</sup> Post-project transmission losses are provided by the PGCB.

<sup>20</sup> Tariff order for BPDB for FY2020-21.

<sup>21</sup> For industrial (and commercial) consumers, this tariff corresponds to the average industrial (and commercial) tariff for consumers connected at 11 kV, 33 kV, and lifetime (LT). For domestic consumers, it represents the average LT tariff for low to medium-end consumption (0-400 units per month).

<sup>22</sup> The tariff corresponds to the retail supply tariffs applicable since March 2023.

generation. These benefits considered avoided power purchase costs to maintain the same level of energy sales. They are valued at the per unit fuel cost of thermal plants of BPDB at BDT 2.03/kWh.<sup>23,24</sup> It is expected that the existing generation or generation already planned (and under execution) will be sufficient for the project benefits to be realized, and no additional project-specific generation investments will be required.

11. **Environmental Benefits.** Reduced power purchases due to lower transmission losses are considered to reduce GHG emissions. The analysis assumed that investment would result in a reduction of transmission losses from 5.90 percent to 2.44 percent in the Southern Chattogram area and from 2.051 percent to 2.047 percent in the Kaliakoir region for the year-wise area-specific projected non-incremental load.<sup>25</sup> Total savings for these benefits would accrue to 189 GWh annually from 2035 onwards, with 38 GWh in 2028 and 91 GWh in 2029. Reduction in CO<sub>2</sub> emissions is estimated using Bangladesh grid emission factor of 528-tons equivalent of CO<sub>2</sub> per gigawatt-hour based on the operating margin approach up to 2034.<sup>26,27,28</sup> The grid emission factor is expected to improve with a higher proportion of clean energy in future installations of generation capacity. Therefore, the factor is assumed to come down to 484-tonne equivalent of CO<sub>2</sub> per gigawatt-hour between 2035-2038—current grid emission factor based on combined margin approach for the intermittent energy. After 2038, further improvement (linear) for this factor is envisaged.

12. Annual average CO<sub>2</sub> emission reductions are computed as 20,119 tons of CO<sub>2</sub> equivalents in 2028, 48,127 tons of CO<sub>2</sub> equivalents in 2029, and 97,520 tons of CO<sub>2</sub> equivalents in 2035. To calculate the monetary value of these environmental benefits, year-wise shadow carbon prices (in USD per ton of CO<sub>2</sub> equivalent), following the Guidance Note on Cost-Benefit Analysis of Projects of AIIB, are considered.<sup>29</sup>

13. **Economic Costs.** The financial costs, including physical contingencies, excluding taxes, price contingencies, and financial charges during implementation, are converted into economic costs using the domestic price numeraire in Bangladesh. Tradable inputs (goods and services) are adjusted by a shadow exchange rate factor of 1.06, while unskilled labor is adjusted by a shadow wage rate factor of 0.87 for Bangladesh, considering the level of underemployment and unemployment in

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<sup>23</sup> The per unit fuel cost of thermal power plants of BDT1.79/kWh in 2021 is escalated for two years of inflation to arrive at the January-2024 price.

<sup>24</sup> Ideally, the fuel cost of marginal or avoided generation should be considered to evaluate these benefits. However, due to the unavailability of the data, the average fuel cost is considered, which is a more conservative estimate of these benefits.

<sup>25</sup> Transmission losses are assumed to rise marginally with higher loading of the substations in the future for both with-project and without-project scenarios.

<sup>26</sup> IFC Default Grid Factors 2021 v3.1 | UNFCCC

<sup>27</sup> The project envisages avoidance of power purchase from existing grid-connected plants, and the operating margin (OM) corresponds to the average GHG emissions of the existing grid-connected plants. Whereas the combined margin (CM) is more suitable for new capacity addition as it includes build margin (BM), which corresponds to the construction and operation of future plants.

<sup>28</sup> The grid emission factor measures the amount of carbon emissions per unit of electricity generated.

<sup>29</sup> As a conservative estimate, midpoint values of the year-wise shadow price of carbon are considered.

Bangladesh<sup>30</sup>. Further, it is assumed that total financial investment costs would include 20 percent of labor costs (skilled and unskilled in the proportion of 70:30), and traded goods and services would form 70 percent of total goods and services. No adjustment for the land cost is considered.

14. Further, annual operation and maintenance costs are assumed to be 1 percent of investment costs, with a 2 percent increase every four years in the operation period. The total economic costs of investments are valued at USD 185.4 million. Total economic costs during the construction and evaluation period are summarized in Table 3.1.

**Table 3.1: Economic costs**

<b>Economic costs</b>	<b>Amount (USD m)</b>
Investment costs (other than land)	169.7
Land costs	15.8
<b>Sub-total</b>	<b>185.4</b>
O&M costs	62.9
<b>Total economic costs</b>	<b>248.3</b>

15. **Economic Internal Rate of Return (EIRR).** The economic analysis confirms that the proposed project is economically viable. The analysis, summarized in Table 3.2, yields an overall EIRR of 19.56 percent against an EOCC or hurdle rate of 9 percent. ENPV at the EOCC or hurdle rate of 9 percent is estimated at USD 195.4 million, confirming the robust economic viability of the project.

**Table 3.2: Economic Internal Rate of Return Calculation (USD m)**

<b>Year</b>	<b>Economic benefits</b>			<b>Economic costs</b>		<b>Net economic cash flow</b>	
	<b>Incremental</b>	<b>Non-incremental</b>	<b>Environmental</b>	<b>Investments</b>	<b>Operating</b>		
2024	-	-	-	13.2	-	(13.2)	
2025	-	-	-	31.8	-	(31.8)	
2026	-	-	-	54.1	-	(54.1)	
2027	-	-	-	52.5	-	(52.5)	
2028	0.6	9.7	1.4	33.9	0.8	(23.0)	
2029	1.9	23.2	3.5	-	2.3	26.2	
2030	3.2	28.4	4.4	-	2.3	33.7	
2035	9.1	48.4	8.1	-	2.4	63.2	
2040	9.1	48.4	8.4	-	2.5	63.3	
2045	9.1	48.4	8.8	-	2.5	63.8	
2050	9.1	48.4	9.3	-	2.6	64.2	
2053	9.1	48.4	9.8	-	2.6	81.6	
-	-	-	-	Terminal value		17.0	
						<b>EIRR (real)</b>	<b>19.56%</b>
						<b>ENPV:</b>	<b>195.4</b>

(-) = negative, EIRR = financial internal rate of return, ENPV = economic net present value  
Source: Asian Infrastructure Investment Bank estimates.

<sup>30</sup>. The shadow exchange rate factor is estimated based on trade statistics using the formula of shadow exchange rate factor = 1+ (customs duties) / (exports + imports) from used in a recently approved ADB-financed project in Bangladesh using data from Statistical Year Book, Bangladesh. The shadow wage rate factor of 0.87 is estimated by dividing USD 2.9 per day (unskilled labor cost, using the practiced labor wage rate paid by contractors to unskilled laborers) into USD 3.7 per day (the state government's suggested minimum wage for unskilled labor in 2021). To calculate the shadow wage rate, 20 percent underemployment with 50 percent of minimum wage is considered.

16. **Sensitivity Analysis.** As presented in Table 3.3, the sensitivity analysis demonstrates that the project's expected economic performance is robust and not particularly exposed to any specific risks.

**Table 3.3: Sensitivity Analysis (EIRR and ENPV)**

	<b>Sensitivity Parameter</b>	<b>Variation</b>	<b>EIRR</b>
	Base case		19.56%
1	Project capital costs	+ 10%	18.27%
2	Incremental benefits	- 10%	19.38%
3	Non-incremental benefits	- 10%	18.44%
4	Delays in commissioning	+1 Year	17.37%
5	All combined		15.21%

Source: Asian Infrastructure Investment Bank estimates.

17. **Financial Analysis.** The project's financial evaluation is carried out per internationally accepted principles and methodology for financial analysis of infrastructure projects. Project's financial viability is evaluated while analyzing the incremental costs and revenues. A financial discounted cash flow analysis is conducted on an after-tax basis in real terms to determine the weighted average cost of capital (WACC), the financial internal rate of return (FIRR), and the financial net present value (FNPV). A sensitivity analysis is also conducted to assess the impact of adverse movements on the underlying assumptions of FIRR.

18. Project costs include both investment costs and O&M costs, including taxes, duties, and physical contingencies but excluding price contingencies and financing costs.<sup>31</sup> All investment costs are expressed in constant prices. A 25-year benefit period (2029-2053) is adopted for analysis, with investment assumed to occur over 2024-2028. The realization of a terminal value of 10 percent of the total investment is considered at the end of the benefit period.

19. Project benefit is measured in terms of incremental revenue from the wheeling of electricity through the project assets. The wheeling tariff for the transmission system is approved voltage-wise by the BERC. A real increase in tariff of 2 percent every four years is considered in line with past trends.<sup>32</sup>

20. **Weighted Average Cost of Capital (WACC).** To calculate the WACC, it is assumed that the financing sources will consist of AIIB loans constituting 64 percent of the total capital requirement and equity contributions from PGCB, and loans from the Government of Bangladesh will constitute 14 percent and 22 percent of the total project costs, respectively. The current yield on a 10-year government bond in Bangladesh plus an equity risk premium of 1.5 percent is considered as the cost of equity of PGCB. The equity risk premium is commensurate with the company's risk profile - PGCB is a listed transmission utility owned by GoB through BPDB, with regulated tariff revenue, and has moderate business risk. The cost of the GoB loan is considered 3 percent based on the

<sup>31</sup> Operating and maintenance expenses are considered as 1 percent of the eligible investment cost (total cost less land and financial charges) and are increased by 2 percent every four years in the project operation period.

<sup>32</sup> Starting from 2025.

information provided by PGCB. The corporate tax rate of 20.00 percent is considered. The overall real, post-tax WACC for the investment is 2.52 percent, as presented in Table 3.4.

**Table 3.4: Weighted Average Cost of Capital (%)**

Item	AIIB	PGCB	GOB
A. Amount (USD m)	<b>160.00</b>	<b>35.29</b>	<b>55.44</b>
B. Weightage (%)	63.81%	14.07%	22.11%
C. Nominal cost (%)	6.73%	14.05%	3.00%
D. Tax rate (%)	20.00%	20.00%	20.00%
E. Tax-adjusted nominal cost [C*(1-D)]	5.38%	14.05%	2.40%
F. Inflation rate (%)	2.90%	6.60%	6.60%
G. Real cost [(1+E)/(1+F)-1] (%)	2.41%	6.99%	-3.94%
H. Minimum rate test (I = 0%)	2.41%	6.99%	0.00%
I. Weighted component of WACC	1.54%	0.98%	0.00%
WACC (Real terms)		2.52%	

Source: Asian Infrastructure Investment Bank staff estimates

21. **Financial Internal Rate of Return (FIRR).** Incremental cash flows consequential to the investment are estimated based on the methodology and assumptions described earlier. FIRR of the project is estimated at 3.38 percent, higher than the WACC of 2.52 percent, and the FNPV of the project is estimated at USD 25.9 million<sup>33</sup>. Therefore, the project is considered financially viable. Summarized results are presented in Table 3.5.

**Table 3.5: Financial Internal Rate of Return (FIRR) (USD m)**

Year	Revenue		Costs		Net Cash Flow
	Tariff	Capital	Operating	Tax	
2024	-	15.0	-	-	(15.0)
2025	-	37.1	-	-	(37.1)
2026	-	64.7	-	-	(64.7)
2027	-	63.2	-	-	(63.2)
2028	3.2	41.1	0.8	0.5	(39.1)
2029	8.0	-	2.3	-	5.7
2030	10.0	-	2.3	-	7.7
2035	18.4	-	2.4	1.6	14.4
2040	18.8	-	2.5	1.7	14.6
2045	19.5	-	2.5	1.8	15.2
2050	19.9	-	2.6	1.9	15.4
2053	20.3	-	2.6	1.9	37.8
			Terminal value:		22.1
			<b>FIRR (Post-tax real):</b>		<b>3.38%</b>
			<b>FNPV:</b>		<b>25.9</b>

(-) = negative; FIRR = financial internal rate of return; FNPV = financial net present value  
Source: Asian Infrastructure Investment Bank staff estimates

<sup>33</sup> FNPV is computed at the project post-tax and real WACC of 2.52 percent.

22. **Sensitivity Analysis.** Sensitivity analysis of the FIRR for key variables indicates that the project is financially viable and offers acceptable returns under various scenarios. Adverse scenarios with a 10 percent increase in capital costs and a 10 percent decrease in tariff revenues are considered. A 1-year implementation delay and combined downside scenarios are also considered. The analysis is illustrated in Table 3.6.

**Table 3.6: Sensitivity Analysis (FIRR and FNPV)**

<b>Sensitivity Parameter</b>	<b>Variation</b>	<b>FIRR (%)</b>
Base case		3.38%
1 Capital cost increase	+10%	2.71%
2 Decrease in revenue	-10%	2.47%
3 Delays in commissioning	+1 Year	2.96%
4 Combined (1-3)		1.50%

Source: Asian Infrastructure Investment Bank staff estimates



### Annex 3: Paris Agreement Alignment Assessment

1. Paris Agreement Alignment (PAA) assessment for the project has been completed following the Joint MDB Methodological Principles for Assessment of PAA, covering BB1 (alignment with mitigation goals) and BB2 (alignment with climate adaptation and resilience goals).

#### PAA in Climate Mitigation Goals (BB1)

2. The project, being an electricity transmission network infrastructure development project, is categorized under the 'universally aligned' list. Hence, no further assessment is needed. The climate change mitigation measures incorporated in the project include constructing high-voltage transmission lines and designing the transmission system with adequate capacity to reduce losses. Thus, in addition to meeting electricity supply capacity requirements and improving the system's reliability, the investments will also help reduce GHG emissions by around 20,000 tons of CO<sub>2</sub> in the first year of operation and over 2 million tons of CO<sub>2</sub> over the loan life period. Based on the Joint MDB methodologies for climate finance tracking, USD 61 million of AIIB's loan amount will be considered as climate mitigation finance.

#### PAA in Climate Adaptation and Resilience Goals (BB2)

3. A climate and geological risk screening has been conducted to identify the climate risks and vulnerabilities for the project area. The screening and subsequent assessment have revealed three significant hazards that can impact the project: Floods, Storms and Cyclones, and Temperature Increase. PGCB has considered these impacts in its project design and budget.

4. Based on the identified climate risks identified, climate change adaptation features envisioned in the project design are mentioned in Table 4.1 below. The project's total climate adaptation finance budget amounts to USD 29 million, which is included in the project cost. As such, this amount is considered as climate adaptation finance in this project.

**Table 4.1: Estimated Adaptation Budget**

Activity	Target Climate Risk	Amount (USD m)	Adaptation Measures
Strengthening of transmission line towers	Floods, Storms and Cyclones, Landslides, Riverbank erosion  Floods, riverbank erosion, landslides, and tidal surge may cause damage to the towers and foundation of towers. Also, strong winds and cyclones can cause the	15	Using more robust transmission tower designs in the transmission lines traversing cyclone-prone areas of the project area can reduce the associated risks.

Activity	Target Climate Risk	Amount (USD m)	Adaptation Measures
	transmission towers to tilt or collapse.		Increase the height of the tower to safeguard against the impact of flooding in the future. Also, use anti-corrosive painting in the lower parts of the towers to ensure the resilience of the infrastructures.
Consideration of indoor substations	Storms and Cyclones, Temperature Increase, Flood  Outdoor components of the transmission network are sensitive to heat and humidity.	12	Installing devices indoors will reduce the number of ambient factors affecting the equipment and improve the power system's resilience against natural and climatic hazards.
Landfilling of substation land	Flood, Landslides  Floods can inundate substation equipment and lead to permanent damage and faults.	2	Damage to substations from floods and land erosion is to be minimized by landfilling and land compaction.
<b>Total – Adaptation Budget</b>		<b>29</b>	

5. The project is consistent with national policies and strategies for climate mitigation and adaptation. The climate adaptation measures integrated into the project's design are also aligned with the National Adaptation Plan of Bangladesh (2023-2050). The project contributes to Bangladesh's NDC goals by removing the transmission infrastructure bottlenecks to ensure reduction of system loss and GHG emissions and by incorporating adaptation measures into its project design.

## Annex 4: Member and Sector Context

### A. Member Context

1. Prior to the pandemic, Bangladesh experienced robust economic performance growing at an average annual rate of 6.6 percent between FY2010 and FY2019. The growth has been propelled by strong macroeconomic fundamentals, a rise in agricultural productivity, robust growth of exports and remittances and insulated financial markets<sup>34</sup>.

2. The textile and the ready-made garment (RMG) sectors have played a vital role in the improved economic performance with the sectors accounting for 12.4 percent of GDP and more than 80 percent of exports while providing direct employment to 4 million workers, including many women workers. Bangladesh emerged as a crucial player in the textile and RMG global value chain. The success of the textile and RMG sectors is driven by low labor cost and a supportive policy environment. Remittances have also played a significant role in fostering growth and sustaining macroeconomic stability.

3. The strong growth was associated with healthy creation of wage employment and poverty reduction. Overall employment grew at an average annual rate of 2.4 percent between 2000 and 2016, with female employment growing at nearly twice the rate. Wage employment experienced an average annual growth of 5.7 percent during this period. The increase in women's labor force participation was associated with narrowing of gender wage differentials. The robust growth also aided in poverty reduction, which halved from 48.9 percent in 2000 to 24.3 percent in 2016. However, poverty reduction did not occur in a uniform pattern across the country. Between 2010 and 2016, the pace of poverty reduction slowed down despite the economy growing at a higher rate. The slowdown was largely a result of very little poverty reduction in urban areas, even as rural poverty fell. Bangladesh has also made significant human development gains during the last three decades, especially in the areas of child and maternal health, access to primary education and gender equity at primary and secondary education levels.

4. Growth weakened during the pandemic, owing to lockdowns and a decline in export orders. Given the high informality in Bangladesh's labor force, COVID-19 led to job losses, mainly in relatively impoverished areas of Dhaka, Chittagong, and Cox's Bazaar<sup>35</sup>. The loss in income and unemployment was unequal across gender with women being mostly employed in directedly affected sectors, especially RMG manufacturing.

5. Growth recovered to 6.9 percent and 7.1 percent in FY2021 and FY2022, respectively aided by the stimulus package and resumption of economic activity as lockdown measures were eased. However, the recovery was interrupted by the war in Ukraine as rising commodity prices and slowing external demand resulted in (a) high inflation, (b) widening of the current account deficit, (c) depreciation of the domestic

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<sup>34</sup> Bangladesh - Country Partnership Framework for the period FY16-20. Washington, D.C.: World Bank Group.

<sup>35</sup> South Asia Economic Focus, Fall 2020: Beaten or Broken? Informality and COVID-19. Washington, DC: World Bank Group

currency and (iv) decline in reserves. As a result, growth slowed down to 6.0 percent in FY2023.

6. Apart from overcoming the immediate challenges, Bangladesh needs to address long-standing structural issues. The policymakers' request for International Monetary Fund's (IMF) Extended Credit Facility (ECF) and Extended Fund Facility (EFF) program, indicates their willingness to undertake long pending economic reforms, apart from restoring macroeconomic stability in the short-term. The reforms under ECF/EFF include (a) creating fiscal space by raising revenue and rationalizing expenditure, (b) developing a monetary policy that will be guided by inflation outlook, (c) ensuring greater exchange rate flexibility to accumulate reserves, (d) strengthening monitoring and supervision of the financial sector and developing domestic capital market and (e) creating an enabling environment to diversify and expand trade and attract foreign direct investment.

7. Although these reforms are expected to strengthen Bangladesh's economic potential, Bangladesh will continue to face other development challenges in the medium term. These include generating new sources of growth, making growth more inclusive by creating jobs, easing the infrastructure constraints, and reducing vulnerabilities to climate change. These challenges will have to be overcome to achieve the Government of Bangladesh's vision to eradicate poverty on way to becoming a developed nation by 2041<sup>36</sup>.

## B. Sector and Institutional Context

1. The GoB has prioritized electricity generation, transmission, and distribution over the last 15 years to sustain rapid social and economic progress. This priority is being reflected in different national development policies. The strategies highlighted in the country's 8th five-year plan (2020-2025) included shifting to an efficient least-cost power production structure, continuing to enhance the generation capacity to match the expansion of demand, and improving energy efficiency and conservation, among other strategies. This plan has also illustrated the need for maintaining proper coordination of T&D investments to ensure that the benefits of generation investments reach the people.<sup>37</sup>

**Table 5.1: Mapping of the Energy Sector of Bangladesh**

<b>Line Ministry</b>	Ministry of Power, Energy, and Mineral Resources			
<b>Regulator</b>	Line Ministry / BERC <sup>38</sup>			
<b>Generation</b>	Public Sector	Private Sector	Electricity Import	Off-grid RE
<b>Off-taker</b>	BPDB <sup>39</sup>			
<b>Transmission</b>	PGCB			
<b>Distribution</b>	BPDB	DESCO <sup>40</sup>	NESCO <sup>41</sup>	

<sup>36</sup> Making Vision 2041 a Reality Perspective Plan of Bangladesh 2021-2041, General Economics Division, Bangladesh Planning Commission, Ministry of Planning, Government of the People's Republic of Bangladesh

<sup>37</sup> Bangladesh 8th Five-Year Plan (2020-2025) – Chapter 5

<sup>38</sup> BERC - Bangladesh Energy Regulatory Commission

<sup>39</sup> BPDB - Bangladesh Power Development Board

<sup>40</sup> DESCO - Dhaka Electric Supply Company Limited

<sup>41</sup> NESCO - Northern Electricity Supply Company Limited

	BREB <sup>42</sup>	DPDC <sup>43</sup>	WZPDC <sup>44</sup>
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2. The Ministry of Power, Energy, and Mineral Resources is responsible for all policies and matters relating to electricity generation, transmission and distribution, and conventional and non-conventional energy resources. BERC is the regulator and has authority over consumer protection, approval of tariffs and pricing, issuance of generation and distribution licenses, and promotion of competition. BPDB is the power off-taker; it acts as a single buyer, purchasing from public and private power generators and selling to electricity distributors.

3. The power transmission segment is wholly owned and managed by PGCB. The primary operating function of this entity is wheeling of energy from BPDB power stations and other generation companies to distribution entities utilizing the transmission network. The entity gets its energy wheeling charge from its clients (distribution entities) at a rate fixed by regulator/ line ministry. As of June 2023, the transmission system had reached 14,717 circuit kilometers (ckm) with a substation capacity of 61,525 MVA<sup>45</sup>. Over the last decade, PGCB has taken numerous development projects to increase its network coverage and strengthen its capacity. Year-on-year growth for transmission line and substation capacity in 2022-23 was about 6 percent and 29 percent, respectively. In Bangladesh, consumers are served by six different distribution agencies: BREB, DESCO, DPDC, BPDB, WZPDC, and NESCO, among which BREB distributes more than 50 percent of the consumed energy throughout the country. The distribution network has grown at an annual growth rate of around 7 percent between 2009 and 2023, reaching 643,167 km in June 2023.

4. Notable improvements have taken place in the power sector over the past two decades. Electrification rates have increased from 35 percent in FY2003 to 99 percent in FY2023 while transmission and distribution losses reduced from 14.73 percent in FY2011 to 9.3 percent in FY2023. Installed generation capacity has increased more than fourfold to 26.7 GW in FY2023 compared to 6 GW in FY2010. However, there has not been a similar improvement in the reliability of electricity supply, due to inadequate investment in the transmission and distribution network. This has adversely affected the economic competitiveness and the business environment.

5. Bangladesh needs large investments urgently to rehabilitate, expand and modernize Bangladesh's electricity networks. According to Government's own estimates Bangladesh would need an investment of USD 31 billion to construct and upgrade its transmission facilities, while an additional USD 35 billion is needed for the development of distribution lines, substations, and related facilities<sup>46</sup>. The expansion and upgrading of electricity networks also present an opportunity to strengthen the resilience of electricity system to climate change and extreme weather events, while smart grid investments will help increase reliability and security and reduce the cost of generating,

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<sup>42</sup> BREB - Bangladesh Rural Electrification Board

<sup>43</sup> DESCO - Dhaka Power Distribution Company Limited

<sup>44</sup> WZPDC - West Zone Power Distribution Company Limited

<sup>45</sup> BPDB Annual Report FY 2023, BPDB

<sup>46</sup> Revisiting Power Sector Master Plan 2016, Ministry of Power, Energy and Mineral resources, Government of the People's Republic of Bangladesh.

transmitting, and distributing electricity and increase the penetration of variable renewable energy.

6. This project will improve the quality, capacity, and reliability of electricity supply in selected areas covered in the scope. The project will increase PGCB's transmission capacity by about 1,820 MVA by constructing four GIS substations in project areas that ultimately can serve electricity supply to large industries in the near future. The project will contribute to the reduction in the system loss in the project area and the reduction of outages. Presently, the project area is experiencing unscheduled and tripping outages of approximately 517 per year, which is expected to come down to approximately 373 per year, i.e., around 27 percent improvement, after commissioning the new infrastructure as this will reduce the capacity constraints. Also, due to the usage of high-voltage transmission line systems, the loss is expected to decrease gradually in the project area resulting in a reduction in annual GHG emissions.

## Annex 5: Sovereign Credit Fact Sheet

### A. Recent Economic Development

1. Bangladesh is a lower-middle income country with GDP per capita at USD 2,621 and a population of 170 million in 2023<sup>47</sup>. Despite growing at a healthy rate of 7.1 percent between FY2016 and FY2019, various global shocks hit Bangladesh's economy in the recent years<sup>48</sup>. Growth declined to 3.4 percent in FY2020, as the COVID-19 pandemic led to a sharp fall in domestic economic activity and a reduction in exports of ready-made garments. A strong stimulus package and the easing of lockdown measures helped growth recover to 6.9 and 7.1 percent in FY2021 and FY2022. However, growth slowed down to 6.0 percent in FY2023 due to high commodity prices, supply disruptions and slowing external demand. This forced the government to undertake demand management measures like curtailing energy demand and curbing import of non-essential items. Increasing prices eroded purchasing power constraining consumption while investment remained muted as the need to preserve foreign exchange reduced capital spending. The economy grew by 4.8 percent in the first half of FY2024.

2. Fiscal deficit, after being contained to around 4.0 percent of GDP in FY2021 and FY2022 rose to 4.6 percent of GDP in FY2023 primarily due to a shortfall in tax collection, resulting from import compression and sluggish aggregate demand. Under-execution of capital spending, including the Annual Development Program, resulted in containing the fiscal deficit. Current expenditure grew at a strong pace aided by a sharp increase in subsidies. Bangladesh remains at low risk of debt distress with majority of the debt being domestic and denominated in local currency. External debt is primarily owed to multilateral and bilateral creditors.

3. Weak agricultural production, limited passthrough of high global commodity prices including fuel and energy and sizeable depreciation of the domestic currency resulted in inflation averaging 9.0 percent in FY2023, up from 6.1 percent in FY2022. Inflation increased to an average of 9.7 percent between July 2023 and February 2024 driven by higher prices of vegetables, utilities, and transportation. To contain inflationary pressures, the central bank raised the key policy rate by 300 basis points since May 2022 which currently stands at 8.00 percent. Bangladesh is in the process of modernizing its monetary policy framework that would help in improving monetary policy transmission and building central bank credibility.

4. After rising to a record 4.1 percent of GDP in FY2022, the current account deficit moderated to 0.7 percent of GDP in FY2023 because of the sharp import compression measures introduced by the government and relatively resilient exports. Remittances remained weak in FY2023 as foreign workers chose to send funds through informal channels that were offering better exchange rates. The trade deficit has moderated in the first half of FY2024 primarily due to a reduction in import bill. Remittances have

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<sup>47</sup> The income group classification for fiscal year 2021 is based on World Bank criteria. The data sourced from World Economic Outlook October 2023 Database.

<sup>48</sup> In Bangladesh, the fiscal year starts on 1 July ending on 30 June. FY2023 started on 1 July 2022 and ended on 30 June 2023.

picked up in recent months as the government increased the incentive to route remittances through official channels. Despite an improvement in the current account balance, a sharp reversal in the financial account resulted in reserves declining to less than USD 26 billion in November 2023, compared to the peak of USD 48 billion in August 2021<sup>49</sup>.

5. Macroeconomic stress in the form of a rapid slowing economy, rising inflation, widening of the current account deficit, depreciation of the Bangladeshi Taka and significant decline in foreign exchange reserves have resulted in Bangladesh signing up for a 42-month SDR 2.5 billion (USD 3.3 billion) under IMF's ECF and EFF arrangements. Concurrently, Bangladesh has also signed for a SDR 1.0 billion (USD 1.4 billion) under the newly created Resilience Sustainability Facility (RSF). Despite challenging circumstances, the IMF, in its first review in December 2023, assessed the program to be broadly on track with few exceptions.

6. In May 2023, Moody's downgraded Bangladesh's rating to B1 from Ba3 due to deteriorating external position and government liquidity risks. In July 2023, S&P affirmed a BB- for Bangladesh's sovereign long-term rating but revised the outlook to negative from stable. Fitch ratings in November 2022 also retained BB- and B for long-term and short-term ratings respectively, but also revised the outlook to negative.

## B. Economic Indicators

Table: Selected Macroeconomic Indicators - Bangladesh (FY2021-FY2025)

Economic Indicators	FY2021	FY2022	FY2023	FY2024*	FY2025*
Real GDP growth	6.9	7.1	6.0	6.0	6.6
CPI Inflation (average, % change)	5.6	6.1	9.0	9.3	6.1
Current account balance (% of GDP)	-1.1	-4.1	-0.7	-0.8	-2.7
General government overall balance (% of GDP)	-3.6	-4.1	-4.6	-4.6	-4.6
General government gross debt (% of GDP)	35.6	39.8	41.4	41.8	42.4
External public debt (% of GDP)	15.1	15.4	17.7	18.1	18.1
Gross international reserves (USD bil.)**	46.4	33.4	31.2	20.8	
Exchange rate (BDT/USD, EOP)**	84.8	86.20	104.5	110	

Note: FY2023 ran from July 2022 to June 2023.

\* denotes projected figures.

\*\* FY2024 reserves, and exchange rate are from Bangladesh Bank and are as of February 2024. The reserves are as per BPM6 definition.

An upward revision in nominal GDP with a new base year has resulted in lower current account and fiscal deficit ratios than previous years.

Source: IMF Report 23/409, IMF World Economic Outlook Database October 2023, and Bangladesh Bank

## C. Economic Outlook and Risks

7. According to IMF's estimates, the economy is expected to grow by 6.0 percent in FY2024, similar to FY2023. Domestic consumption is expected to remain subdued as high inflation erodes purchasing power and continued monetary policy tightening. Some recovery in investment can be expected as foreign exchange pressures abate. A recovery in key export destinations, especially in the Euro Area, is expected to provide

<sup>49</sup> Traditionally, Bangladesh reported reserves that include funds allocated to Export Development Fund and other schemes. According to the standard BPM6 definition reserves were USD 20.8 billion in January 2024.



some momentum for exports but part of this is likely to be offset by a rise in imports as restrictions are eased. A normal monsoon and various government initiatives like improved seed quality and training for farmers would help bolster agricultural growth. Similarly, an improvement in the power supply and easing of access to imports would augment the recovery in the industrial sector. Growth will rise further in FY2025 driven by a rebound in exports, an easing in energy costs, and reduced import restrictions as external pressures ease.

8. The fiscal stance is expected to remain neutral in FY2024 with both revenue and expenditure increasing by 0.5 percent of GDP compared to the previous year. Tax revenue is expected to grow strongly with the new Income Tax Act 2023 aiming for greater tax compliance, ease of self-assessment and a better return process. Capital expenditure is targeted to grow at a faster pace than current expenditure to speed up the execution of projects. However, the subsidy bill is expected to remain high due to significant outlay on fuel and energy subsidies. Incentives for exports and remittances would also have a strong outlay. Bangladesh's debt profile is expected to remain favorable with majority of the public debt is denominated in domestic currency and held by residents. External public debt is also expected to remain around the current levels.

9. After averaging 9.7 percent in the first nine months of FY2024, inflation is expected to decline modestly in the remaining months FY2024 aided by normalization of global commodity prices and lagged effect of monetary policy tightening. The monetary policy is expected to remain tight as Bangladesh switches from a monetary aggregate framework to interest rate targeting framework. The replacement of capped lending rates with market-driven rates comprising of a reference rate and margin is also expected to keep interest rates high. A tight monetary policy and improved transmission mechanism is expected to aid inflation declining in FY2025.

10. The current account deficit is expected to remain stable at around 0.8 percent of the GDP in FY2024. Export growth is likely to recover as demand picks up in advanced economies. However, relaxation of import concession measures may lead to an increase in imports. Greater exchange rate flexibility and lower volatility and a rebound in workers going abroad are expected to improve remittance flow through formal channels. A relaxation in import compression measures will release a pent-up demand resulting in the current account deficit widening in FY2025.