

PROJECT DOCUMENT

The People's Republic of Bangladesh

Distribution System Upgrade and Expansion Project

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CURRENCY EQUIVALENTS

(Effective as of 17/05/2016, Central Bank of Bangladesh)

Currency Unit = Taka (Tk)

US\$ 1.00 = Tk 78.40

ABBREVIATIONS

AIIB	–	Asian Infrastructure Investment Bank (the Bank)
BERC	–	Bangladesh Energy Regulatory Commission
BPDB	–	Bangladesh Power Development Board
BREB	–	Bangladesh Rural Electrification Board
DESCO	–	Dhaka Electric Supply Company Limited
EA	–	executing agency
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
GDP	–	gross domestic product
IA	–	implementing agency
IOCT	–	international open competitive tender
km	–	kilometer
kV	–	kilovolt
kWh	–	kilowatt-hour
MPEMR	–	Ministry of Power, Energy, and Mineral Resources
MW	–	megawatt
MVA	–	megavolt-ampere
O&M	–	operating and maintenance
PAM	–	project administration manual
PMU	–	project management unit
WACC	–	weighted average of cost of capital

NOTES

- a. 'the Government' refers to the Government of Bangladesh.
- b. Fiscal year: January 1 – December 31

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PROJECT SUMMARY SHEET

The People's Republic of Bangladesh Distribution System Upgrade and Expansion Project (the Project)

Project No.	000003
Borrower(s)	People's Republic of Bangladesh
Implementation Agency	Bangladesh Rural Electrification Board (BREB) & Dhaka Electric Supply Company Limited (DESCO)
Sector(s)	Energy - Power
Project Objectives/Description	The objectives of the Project are to enhance distribution capacity and to increase the number of rural and urban electricity consumers in Bangladesh. The Project has two components: (i) provision of about 2.5 million service connections to rural consumers; and (ii) upgrade of two grid substations and conversion of 85 km overhead distribution lines into underground cables in north Dhaka.
Project Implementation Period	July 2016 – June 2019
Project cost and Financing Plan	The Project is estimated to cost \$262.29 million, inclusive of taxes, duties, and interest and other charges on the loan during construction.
AIIB Loan (Size and Terms)	\$165 million, with a 25-year term, including a grace period of 5 years, at the Bank's standard interest rate for sovereign-backed loans with this weighted average maturity.
Co-financier(s) (If any)	N/A
Conditions for Effectiveness and Disbursement (If any)	BREB's and DESCO's Subsidiary Loan Agreements with the Government (i.e. the Borrower) have been executed on behalf of, and are binding, on the parties.
Key Covenants	The Borrower, BREB and DESCO shall ensure that the Project is implemented in accordance with the Project Administration Manual, and Environmental and Social Management Plan (Component 2) and Environmental and Social Good Practices (Component 1).
Environmental and Social (Category and Standards Triggered)	The Project is classified in Category B under the Environmental and Social Policy of the Bank, and the provisions of Environmental and Social Standard 1: Environmental and Social Assessment and Management have been applied to both Component 1 and Component 2.
Key Legal Agreements	Loan Agreement with the Borrower; Project Agreement with each of BREB and DESCO.

I. STRATEGIC CONTEXT

A. Country Context

1. Bangladesh is situated in the low-lying Ganges-Brahmaputra delta, with a population of about 160 million. It is widely recognized to be one of the most vulnerable countries to natural disasters and climate change. Despite the numerous challenges that it faces, Bangladesh has maintained an impressive track record, growing at 6% annually in the past decade. According to the International Monetary Fund and International Development Association, Bangladesh has maintained a low risk of external public debt distress. Its macroeconomic performance has been strong despite facing recent global headwinds – inflation has eased, international reserves have risen, and the public debt-to-GDP ratio has remained largely stable, and its medium-term economic outlook is expected to be positive and marked by continuing stability and high growth.¹

2. More than 15 million Bangladeshis have moved out of poverty since 1992. In 2014 Bangladesh's gross domestic product (GDP) per capita reached US \$1,087.² Despite the steady growth, as per the World Bank's estimate, in 2014 approximately 47 million people still live below the poverty line and without access to quality services in the country. Bangladesh aspires to be a middle-income country by 2021. Becoming a middle-income country will require substantial efforts on many fronts, such as maintaining macroeconomic stability, improving economic governance and urban management, adapting to climate change, and particularly, addressing its persistent infrastructure deficits.

3. **Government Plan.** The Government of Bangladesh (the Government) has identified electricity supply as a major constraint on GDP growth, and overall economic development. To address these challenges, it has adopted a multipronged plan involving substantial sector investments, regional power trade, and sector reforms. The Government has an ambitious target to achieve affordable electricity for all by 2021.³ Programs under implementation include: (i) improving the efficiency of existing gas-fired power plants; (ii) developing new generation capacity based on diversified fuel sources such as coal, imported gas, and renewable energy; (iii) adopting grid and off-grid electrification approaches to extend electricity services; and (iv) constructing cross-border high voltage direct-current interconnections to exchange power with other South Asian countries.⁴ Installed generating capacity increased from about 4,900 megawatt (MW) to around 13,800 MW between 2009 and 2015.⁵ Correspondingly, electricity availability has expanded and the number of consumers has also grown steadily. However, despite recent investments, the development of transmission and distribution networks has not kept pace with the growth of generation capacity and demand. Sizeable investments still need to be made to relieve the transmission and distribution bottlenecks in Bangladesh.

B. Sectoral and Institutional Context

4. Sustained growth in Bangladesh has generated higher demand for electricity, transport, and telecommunication services, and contributed to the widening of infrastructure deficits. With assistance

¹ IMF, 2016. Country Report No. 16/27: Press Release (No. 16/34) -Executive Board Concludes 2015 Article IV Consultation with Bangladesh. February 1, 2016.

² World Bank, 2014, World Development Indicators.

³ Ministry of Power, Energy and Mineral Resources, 2011. Power System Master Plan. Dhaka, Bangladesh.

⁴ ADB, 2013. Bangladesh: SASEC Bangladesh-India Electrical Grid Interconnection Project.

⁵ Power Division of the Government of Bangladesh, 2015. Bangladesh Power Sector: An Overview.

from international partners, Bangladesh's electricity sector has made remarkable achievements during the recent years. For example, in 2009 its electrification rate was only around 47% and power consumption per capita was about 220 kilowatt-hours (kWh) per annum. In 2015 this rate rose to approximately 65% and annual power consumption per capita increased to 321 kWh.⁶ During this period the total number of electricity consumers increased from 10.8 million to 17.5 million in the country.⁷ However, Bangladesh still suffers from serious power shortages and its annual electricity consumption per capita is still one of the lowest among all developing countries in Asia. The quality of electricity supply in the country remains poor and unreliable, further exacerbating the situation. In Dhaka City load shedding of several hours within a day is customary, and in other cities and most rural areas the situation is even worse.

5. Poor and unreliable power supply impedes Bangladesh's economic performance, reduces its business competitiveness and productivity, and seriously affects the quality of life of Bangladesh citizens. Out of 140 countries, it is ranked 124th on quality of overall infrastructure and 120th on quality of electricity supply in 2015.⁸ The main challenges in electricity sector include: (i) providing universal access to electricity; (ii) providing quality and reliable electricity supply; (iii) ensuring long-term energy security and fuel diversity; (iv) strengthening transmission and distribution networks; (v) ensuring cost-recovery and financial sustainability of electricity sector investments; and (vi) strengthening technical and institutional capacity of sector entities.

6. **The Ministry of Power, Energy and Mineral Resources (MPEMR)** is the apex governmental organ responsible for overall energy sector operation in Bangladesh. Its primary mandates include: (i) formulation of sector policy and development plan; (ii) approval of sector investment; (iii) promotion of renewable energy and energy conservation; (iv) promotion of private sector investment; and (v) monitoring of sector entities' operation and revenue collection. The Ministry comprises two divisions: the Power Division which oversees electricity administration, and the Energy Division that oversees administration of hydrocarbon resources. The Power Division has been actively seeking investments from the private sector and international development partners to supplement domestic resources.

7. **The Bangladesh Energy Regulatory Commission (BERC)** is an independent energy regulator in Bangladesh, which was set up in March 2003 and became operational in April 2004. Its mission includes: (i) enforcement of fiscal discipline in energy sector; (ii) the introduction of performance targets and incentive-based regulation; (iii) the introduction of uniform operational standards and help ensure quality of supply; (iv) power and gas sector cost rationalization and tariff determination; (v) the promotion of equal opportunities for public and private investment; and (vi) the development of competitive energy markets. Since 2008 BERC has raised the bulk supply tariff seven times from around 3.0 to 7.2 US cents/kWh. Nevertheless, to uplift the sector to a higher level of cost recovery, BERC is expected to continue to adjust tariffs to reflect the real generation costs in the sector.

8. Until mid-1990s, **Bangladesh Power Development Board (BPDB)** had been the sole vertically-integrated power entity in the country, responsible for planning, constructing, and operating generation, transmission, and distribution facilities in urban areas other than Dhaka City. **Dhaka Electric Supply Authority (DESA)** was in charge of power distribution in Dhaka City, and the **Bangladesh Rural Electrification Board (BREB)** managed power distribution in rural areas. As a part of a broad power sector reform to enhance power sector performance, four generation companies, one transmission company, and one urban distribution company were separated from BPDB in 1996. The **Dhaka**

⁶ Planning Commission of the Government of Bangladesh, 2015. *Seventh Five Year Plan (2016-2020)*. Dhaka, Bangladesh.

⁷ Power Division of the Government of Bangladesh, 2015. *Bangladesh Power Sector: An Overview*.

⁸ World Economic Forum, 2015. *The Global Competitiveness Report 2015-2016*.

Electric Supply Company Limited (DESCO) was set up to take over DESA's distribution assets in northern part of Dhaka in November 1996.

9. BREB has been responsible for planning, financing, and construction of the rural electricity network in the country since 1978. Once constructed, the rural distribution facilities are transferred to the Pally Bidyut Samities (PBSs, or rural electric cooperatives), which are responsible for retail service provision and operation and maintenance (O&M) of the rural systems in their own areas. The performance of PBSs is overseen by their own boards consisting of consumer representatives and also BREB through performance target agreements. With the support of international development partners, BREB has recently conducted some capacity-strengthening reforms, such as appointing professionals to its Board and top management, delegating more authority to the PBSs, and establishing regional offices to better interface with the PBSs. These reforms helped BREB obtain the ISO 9001:2008 certification of quality management in 2013.

10. BREB's rural electrification programs have had a significant impact on economic development and improvement of standard of living in rural areas. Currently around 50% of power demand in the country comes from the PBS systems, and electricity sales in rural areas have been growing at a rate of 11.7% over the last decade. In 2015 BREB/PBSs owned and operated 286,438 km of distribution lines, 695 substations, and served approximately 13.2 million consumers. However, even those households with access to electricity often experience supply disruptions given the limited power supply in rural areas. To realize its target to provide electricity for all by 2021, the Government has decided to accelerate the pace of its electrification program. BREB has been actively working with international development partners, and implemented several rural electrification projects similar to this proposed project in the last several years.⁹

11. Since 1996 DESCO has been operating on a commercial basis, purchasing power from BPDB (the single buyer for generation currently in the country) and selling it to electricity consumers. Its service area now covers around 250 square kilometers in northern part of Dhaka City. By 30 June 2015, the total number of its consumers reached 705,234, and the load demand peaked at 845 MW. Its financial performance has been sound and stable. To balance its output against cost and manpower, DESCO outsourced many of its non-core business activities to experienced contractors through competitive bidding processes. As per its audited annual report, DESCO has been profitable over the last 6 years, with gross profit of 1,635 million taka in FY2015.¹⁰ In 2015 DESCO's distribution loss was around 8.4%, making it the most efficient distributor in the country.

12. DESCO has been striving to catch up with the rapidly growing load demand in its service areas. A recent study ascertained that the load demand in DESCO's service area will increase to 1,964 MW by 2021, 3,108 MW by 2025, and 4,827 MW by 2030.¹¹ To cater to this increasing demand, DESCO has planned to construct 72 new 33/11 kV substations and 17 new 132/33 kV grid substations, along with an upgrade of some existing substations. Two new townships, namely Purbachal Model Town and Uttara Model Town (3rd phase), were recently added into DESCO's service areas. Their load demands are expected to be around 500 MW and 350 MW by 2025, respectively. This will bring additional pressure to DESCO's already constrained power supply capacity. Under an investment program for 2013-2017, DESCO has secured financial support from other development partners to construct 14 new and rehabilitate 10 old 33/11 kV substations, and to construct 5 new 132/33/11 kV grid

⁹ Two projects are listed as examples. World Bank, 2014. Rural Electricity Transmission and Distribution Project. JICA, 2010. Rural Electrification Upgradation Project.

¹⁰ Dhaka Electric Supply Company Limited, 2015, Annual Report (FY2015). As of 05 January 2016, 1 USD = 78.82 Tk.

¹¹ DESCO, 2013. Review of Existing Feasibility Study to Ascertain Load Demand & Consumer Growth in DESCO Area Up to Year 2030.

substations.¹² This will, to some extent, relieve DESCO's distribution capacity constraint once completed in 2017, but further investments will still be needed.

C. Rationale for the Project

13. Access to affordable and reliable electricity is critical for economic development and poverty reduction. In addition to adding generation and transmission capacity, in order to realize the Government's target to provide affordable electricity for all by 2021, Bangladesh needs to also provide new service connections and upgrade existing distribution facilities to reduce system losses. Despite considerable improvements since the 1990s when the sectoral reforms were first initiated, insufficient maintenance, aged facilities, and poor meter reading are contributing to distribution losses, which remain relatively high in Bangladesh at around 13.5% in 2015. Thus there is significant scope to further improve the distribution efficiency, especially in rural systems. The proposed Project will help address the issue of high distribution losses by replacing old inefficient transformers with new efficient ones, and installing electricity meters. Bangladesh has a serious power supply shortage. The significant electricity saved as a result of reduced distribution loss will greatly benefit the population.

14. **Benefits and Impact.** The Project is designed to increase availability and sustainability of the power supply in Bangladesh and bring expanded and more reliable service to rural consumers. It is estimated that approximately 12.5 million rural people will directly benefit from Component 1 of the Project. Upon completion, Component 1 will also facilitate social service delivery (e.g. medical, education) in the rural areas. The expanded electricity coverage under Component 1 will therefore create a significant and sustained impact on many economic and social dimensions of rural development in Bangladesh. Under Component 2, efficiency gains from replacing old inefficient substation systems and reduction of distribution losses jointly represent 21.9 million kWh in energy savings annually, equivalent to reduction of CO₂ by 16,400 tons per annum. Besides, the Project will create employment opportunities for both skilled and unskilled workers during construction and beyond, such as engineers, technicians, wiring inspectors, linemen, meter readers, and so on.

II. THE PROJECT

A. Project Objectives

15. The objectives of the Project are to enhance distribution capacity and to increase the number of rural and urban electricity consumers in Bangladesh. The Project will supplement other development partner efforts by providing additional financial resources to connect more rural and urban consumers and to further reduce distribution losses.¹³ The Project is designed to: (i) provide a large number of new service connections; (ii) upgrade distribution systems to reduce technical losses and enhance distribution efficiency; (iii) help remove system bottlenecks by expanding distribution capacity; and (iv) improve the quality and reliability of power supply.

¹² ADB, 2013. Power System Expansion and Efficiency Improvement Investment Program (Tranche 2).

¹³ Several development partners have provided substantial financing support for Bangladesh power sector in recent years, focusing on adding new generating capacity, strengthening transmission grid (ADB, 2012-2015. Bangladesh: Power System Expansion and Efficiency Improvement Investment Program (Tranches 1-3)), and/or building new medium-voltage transmission and distribution lines in rural areas (World Bank, 2014. Bangladesh: Rural Electricity Transmission and Distribution Project).

B. Project Design, Components and Key Indicators

16. The Project has two components.

Component 1: Rural Electrification Consumer Enhancement.

17. Despite its great success in rural electrification, Bangladesh still has about 13 million rural households without access to electricity, and its rural electrification rate was only about 40%. This component will provide about 65,000 small low-voltage (6.35/0.23 kV) transformers and install about 75,000 km of service drops and about 2.5 million electricity meters to 77 PBSs in rural areas, where distribution lines have already been constructed.

Component 2: Upgrade of grid substations and conversion of overhead distribution lines.

18. This component will upgrade two 132/33/11 kV grid substations at Basundhara and Uttara from 250 megavolt-ampere (MVA) to 480 MVA, and also install, upgrade and convert existing 33 kV overhead distribution lines into underground cables in DESCO's service area. As the upstream hub substations, the 132/33/11 kV grid substations at Bashundhara and Uttara have been operating close to their full capacity with frequent system overloading leading to high technical losses and service interruptions. The existing outdated 33 kV overhead lines often cause accidents during the rainy season, sometimes even inducing tripping operation of substations and equipment failures at substations and consumer residences.

19. The Project's key performance indicators include:

- for Component 1, (i) number of service connections installed (unit: million) and (ii) number of small low-voltage (6.35/0.23 kV) transformers installed (unit: 1000); and
- for Component 2, (i) upgrade of two grid substations from 250 MVA to 480 MVA (unit: MVA) and (ii) length of 33 kV underground cables installed (unit: km).

C. Project Cost and Financing Plan

20. The Project is estimated to cost \$262.29 million, inclusive of taxes, duties, and interest and other charges on the loan during construction (Table1).

Table 1: Project Investment Plan (\$ million)

Item	Amount ^a
A. Base Cost	
1. Component 1: Provision of 2.5 million service connections	148.50
2. Component 2: Upgrade of grid substations and conversion of 33 kV overhead lines into underground cables	98.31
Subtotal (A)	246.81
B. Contingencies^b	8.06
C. Financing Charges during Construction^c	7.42
Total (A+B+C)	262.29

^a In 2016 prices, including taxes and duties to be financed from government resources.

^b Including estimates on physical and price contingencies.

^c Including estimates on interest during construction, commitment charge, and front-end fee based on approved Bank policies.

Sources: AIIB and Executing Agency estimates.

21. The Government has requested a loan of \$165 million to help finance the Project. The loan will have a 25-year term, including a grace period of 5 years, at the Bank’s standard interest rate for sovereign-backed loans for this weighted average maturity. The financing plan is outlined in Table 2. Financing shortfalls would be covered by either the Government or the respective Executing Agencies (EAs).

Table 2: Financing Plan

Source	Amount (\$ million)			Share of Total (%)
	Component 1	Component 2	Total	
AIIB	98.89	66.11	165.00	62.91
Government	58.86	20.54	79.40	30.27
EA	0	17.89	17.89	6.82
Total	157.75	104.54	262.29	100.0

Sources: EAs and AIIB estimates

D. Institutional and Implementation Arrangements

22. The Project will be implemented over 3 years, beginning July 1, 2016 through June 30, 2019. The Loan Closing Date will be December 31, 2019.

(a) Implementation Management

23. The implementation arrangements are summarized in Table 3 and detailed in the Project Administration Manual (PAM). The two EAs are BREB for Component 1 and DESCO for Component 2. To ensure effective implementation, both EAs have already set up project management units (PMUs) to lead the preparation and implementation of their respective project components. PMUs, which are headed by senior officials and staffed by adequate personnel, are responsible for (i) overall project management and monitoring; (ii) annual budget preparation and monitoring of utilization of loan proceeds; (iii) progress reporting, including reports on cost management and project outputs; and (iv) compliance with loan covenants. The PMUs will also be responsible for procurement of goods and services, recruitment of consultants, and engineering and construction contractors. The Power Division will designate a senior officer to oversee the project implementation and settlement of implementation issues.

(b) Procurement

24. Goods and works financed under the loan will be procured in accordance with the Bank’s procurement policy and procedures. Procurement arrangements will be centralized. International open competitive tender will be followed for all goods and services procured under Bank financing. The EAs are responsible for implementing the Project, including all aspects of the procurement process from the planning, design, and tendering stages through to contract award and supervision of contract implementation. The tender document preparation and evaluation of tenders/proposals will be carried out by EAs. The Bank is satisfied that the EA’s proposed procurement arrangements are fit for purpose and will ensure a value for money outcome, and that the procurement risk mitigation measures are appropriate. A Project Delivery Strategy agreed by both sides is included in PAM (see PAM annex 2). The Bank will play an active facilitation role, covering the process, timeline, and quality of procurement activities, and will take necessary measures to ensure that the procurement process, including procurement procedures, documents, evaluations, award recommendations and contracts, is carried out in accordance with the provisions of the Bank’s Procurement Policy and the legal agreements. Both EAs have received numerous loans in the past from various development partners. Their recent track records in terms of

procurement has been good. Nevertheless, as a matter of caution, the Bank reserves the right to appoint observers, at its own cost, to facilitate and audit procurement processes under the Bank’s loan.

(c) Fund Flow Arrangements and Disbursements

25. The Government will relend the proceeds of the loan to both EAs through separate Subsidiary Loan Agreements (SLAs) as per the amounts defined in the Project’s financing plan. The Government and EAs will ensure that all items of expenditures financed out of the proceeds of the loan to be used exclusively in carrying out the Project. The Government will exercise its rights under the SLAs in such manner as to protect its interests and those of the Bank and to accomplish the purposes of the Loan.

26. **SLA Terms.** The terms and conditions of the SLAs shall include the following:

(a) Under the BREB’s SLA, the principal amount of the Subsidiary Loan shall be: (a) denominated and repayable in the local currency (with the Government bearing the foreign exchange risk); (b) repaid within a period of 33 (thirty-three years) including a grace period of 8 (eight) years in 50 (fifty) semi-annual, equal and consecutive installments on the dates decided; and (c) charged interest at the rate of three-fourth of one percent (0.75%) per annum during the grace period and at the rate of two percent (2%) per annum thereafter.

(b) Under the DESCO’s SLA, the principal amount of the Subsidiary Loan shall be: (a) repayable in the local currency; (b) repaid within a period of 25 (twenty-five years) including a grace period of 5 (five) years in 40 (forty) semi-annual, equal and consecutive installments on the dates decided; and (c) charged interest at the rate of four percent (4%) per annum.

27. **Disbursement.** The loan proceeds will be disbursed in accordance with the Bank’s loan disbursement instructions. Disbursement of funds will be transaction-based requiring submission of evidence of expenditures for prior review. During the project implementation, the Bank may consider report based disbursement if sufficient financial management capacity and practice are demonstrated. Before the submission of the first withdrawal application, the Government should submit to the Bank sufficient evidence of the authority of the person(s) who will sign the withdrawal applications on behalf of the Government, together with the authenticated specimen signatures of each authorized person.

Table 3: Implementation Arrangements

Aspects	Arrangements
Project implementation period	July 2016 – June 2019
Loan closing date	December 31, 2019
Management	
(i) Oversight body	Power Division, MPEMR
(ii) Executing agency	BREB for Component 1, DESCO for Component 2.
(iii) Project Management Unit	PMUs established in two EAs with sufficient professional and support staff
Procurement: goods and works	All works and goods to be financed by the loan will be procured in accordance with the Bank’s Procurement Policy and guidelines.
Retroactive financing and/or advance contracting	Retroactive financing is available for up to 3 million dollars for eligible expenditures paid after June 1 2016 and before the date of signing of the Loan Agreement. Advance contracting is provided for preparing bidding

Aspects	Arrangements
	documents, and inviting and receiving bids for contracts.
Disbursement	The loan proceeds will be disbursed in accordance with the Bank's loan disbursement instructions and detailed arrangements agreed upon between the Government and the Bank.

Bank = Asian Infrastructure Investment Bank, BREB = Bangladesh Rural Electrification Board, DESCO = Dhaka Electric Supply Company Limited, EA = executing agency, MPEMR = Ministry of Power, Energy, and Mineral Resources, PMU = project management units
Source: EAs and Bank

E. Monitoring and Evaluation of Project Results

28. Both EAs have prior experience in implementing projects funded by international development partners. The EAs are required to keep detailed records on project implementation for future verification. Project implementation will be monitored by the Bank's review missions on a regular basis. To ensure the achievement of Component 1 objectives, an independent expert will be recruited by the Bank to audit at least 2,500 records of service connections and low-voltage transformers installed in three randomly selected PBSs. Detailed monitoring and evaluation arrangements are provided in the PAM.

F. Loan Conditions and Covenants

29. *Conditions of Effectiveness.* Each of BREB's and DESCO's SLA with the Government shall have been duly signed and executed, and shall have become binding on the parties thereto in accordance with its terms.

30. *Legal Covenants.* The Recipient and both EAs shall ensure that the Project is implemented in accordance with the PAM and the Environmental and Social Management Plan (Component 2) and Environmental and Social Good Practices (Component 1).

III. PROJECT ASSESSMENT

A. Technical

31. The main interventions supported under the Project are well-established and the Project faces no significant technical risk. A review of Project technical details was based on and included: (i) Project proposal and feasibility study; (ii) studies on load demand and consumer growth including with- and without-Project scenarios conducted by the EAs; (iii) discussions with EA engineers; and (iv) findings from project site visits.

32. Component 1 will provide small low-voltage 6.35/0.23 kV transformers, service drops, and electric meters to the PBSs by BREB. The BREB/PBSs have over 30 years of proven track records and demonstrated technical capacity in this kind of simple installation work. For Component 2, DESCO also has significant experience in both replacing the old air-insulated systems with the new gas-insulated ones at grid substations, and in installing the underground cable along the sides of public roads as part of its routine investment programs.

B. Financial Analysis

33. Financial analysis was carried out to assess the viability of the Project according to the Bank's Operational Policy on Financing. Cost streams used to determine the financial internal rate of return (FIRR) include capital investment costs during construction, and operating costs thereafter. Capital investment costs are mainly comprised of purchases of equipment and material, payment and allowances of employees, maintenance and rehabilitation costs, and associated taxes and duties. The operating costs consist of expenses of power purchases, overhead expenses, operating and maintenance (O&M) expenses, and other relevant costs, such as depreciation and interest charges. The key financial benefits include: the revenues from electricity sales, O&M cost savings, and the salvage value of re-selling the dismantled transformers and related equipment.

34. The FIRRs are 15.5% and 12.9% for Component 1 and Component 2, respectively, much higher than the weighted average cost of capital (WACC), which is calculated based on the anticipated capital mix of debt and equity. The sensitivity of the FIRRs to adverse changes was also conducted. The values of the FIRRs are quite stable in sensitivity analysis, demonstrating the financial viability of both components.

C. Economic Analysis

35. All benefits and costs are expressed in economic prices. Costs have been categorized into traded goods, non-traded goods, skilled labor, unskilled labor, and transfer payments, and have been adjusted with appropriate conversion factors. The shadow exchange rate factor is used to convert the costs of traded goods while the shadow wage rate factor is used for unskilled labor. Transfer payments and price contingencies are excluded from the analysis. The two components exhibit different degrees of incremental and non-incremental effects. Incremental benefits are valued using the willing-to-pay (WTP) methodology, while non-incremental benefits are valued at resource cost savings. The WTP of electricity consumers is assumed to be the electricity selling tariff with adjustments made for distribution losses. The WTPs are 7.22 US cents/kWh (or 5.69 Tk/kWh) and 9.08 US cents/kWh (or 7.16 Tk/kWh) for Component 1 and Component 2, respectively.¹⁴ Compared with the WTP of 19.03 US cents/kWh (or 15 Tk/kWh) used by other development partners in similar projects in Bangladesh, this is a conservative estimate.¹⁵ The key areas of resource cost savings are from saved expenditures on liquid fuel (i.e. kerosene used by rural consumers for domestic lighting, and diesel for water pumps of irrigation). Intangible benefits (such as increased industrial productivity, income growth of rural households, savings of rural consumers garnered from reductions in illegal connections, etc.) are not included due to lack of reliable data.

36. The economic internal rates of return (EIRRs) are estimated at 64.1% and 18.5% for Component 1 and Component 2, respectively. Both are favorably higher than the assumed economic opportunity cost of capital of 12.0%. The sensitivity analysis reinforces this finding by showing that the EIRRs are robust under various adverse conditions, demonstrating the economic viability of the Project.

D. Fiduciary and Governance

(a) *Anti-corruption*

37. The Bank is committed to preventing fraud and corruption in the projects that it finances. It places the highest priority on ensuring that Projects that it finances are implemented in strict compliance

¹⁴ As of 05 January 2016, \$ 1.00 = Tk 78.82.

¹⁵ World Bank, 2014. Bangladesh: Rural Electricity Transmission and Distribution Project (Report No.: PAD748).

with Bank policies and guidelines. Implementation will be monitored rigorously and regularly by Bank staff. The Bank reserves the right to investigate, directly or indirectly through its agents, any alleged corrupt, fraudulent, collusive, or coercive practices relating to the Project and to take necessary measures to prevent and redress any issues in a timely manner, as appropriate. Detailed requirements and supplementary measures are described in the PAM and specified in the Loan Agreement and the Project tender documents. The Bank will facilitate and monitor the work related to tender document preparation and tender/proposal evaluation under Bank financing.

(b) ***Financial Management***

38. Both EAs have extensive experience working with international development partners, and are currently implementing projects financed by the World Bank and the Asian Development Bank.¹⁶ Based on the Project team's assessment, the financial management capacity of both EAs' is satisfactory, including provisions and systems for funds-flow arrangements, governance, staffing, budgeting, accounting and financial reporting systems, internal control procedures, and external auditing arrangements. Disbursements will be made in accordance with Bank instructions. The Government and the EAs will ensure that proper accounts and records of use of loan proceeds are maintained and audited in a timely manner.

E. Environmental and Social

39. The Project is classified in Category B under the Environmental and Social Policy (ESP) of the Bank and the provisions of Environmental and Social Standard 1: Environmental and Social Assessment and Management (ESS1) have been applied to both Component 1 and Component 2. Consistent with the ESP, the Bank conducted field based environmental and social due diligence, using a qualified independent specialist, as an integral element of its Project preparation. This process confirmed that: the Project can be implemented in accordance with the ESP and ESS 1; the potential reputational risks to the Bank can be managed through the use of Environmental and Social Management Plans; and, provided that the Project is properly supervised and monitored, these measures can be effectively implemented by the EAs and its consultants and contractors.

40. The Policy provides for the undertaking of environmental and social due diligence in a manner that is appropriate to the nature and scale of the Project, and proportional to the level of the Project's potential environmental and social risks and impacts. On this basis, following review, it was determined by the Bank that: (a) Component 1 requires a focused Environmental and Social Review given the very limited potential risks and impacts; and (b) in the case of Component 2, the environmental and social risks and impacts are moderate and concentrate during construction, and an Initial Environmental Examination (IEE) is an appropriate instrument that is aligned with the Government's requirements.

41. **Component 1: Provision of 2.5 million service connections to rural consumers.** An Environmental and Social Review has been developed by BREB that provides a focused overview of the limited potential environmental and social risks and impacts of activities to be supported under Component 1. The Review includes a summary of the Environmental and Social Good Practices that have been developed by BREB to be used in implementation of Component 1, and provisions for complaint centers that serve as a local level grievance mechanism.

42. Component 1 will support the provision of service drops, upgrade of small low-voltage

¹⁶ World Bank, 2014. Bangladesh: Rural Electricity Transmission and Distribution Project (Report No.: PAD748); ADB, 2015. Power System Expansion and Efficiency Improvement Investment Program (Tranche 3).

6.35/0.23 kV transformers, and installation of electric meters. This work will be conducted only in the areas covered by existing distribution networks and the service drops are on average 20–30 meters in length. The provision of service connections will not require construction of any substations, distribution lines or large civil structures since service drops and small low-voltage transformers will be provided to rural electric cooperatives and installed on existing poles in their own areas under the supervision of BREB. Environmental and social issues are limited to the use of good health and safety practices by installation crews, outreach and consumer safety support for new users of electricity, management of materials that are to be recycled or disposed of as waste, and provision of information to users on the environmental benefits of electricity.

43. Component 1 does not require involuntary resettlement, land acquisition or economic displacement. Indigenous Peoples and ethnic minorities are not expected to be affected by the Project; they may participate voluntarily for their own benefit but would not otherwise be affected by the Project in any way differently from other beneficiaries or suffer adverse impact.

44. Implementation of Component 1 will contribute to the following environmental benefits: reduction of indoor air pollution by replacing liquid fuel such as kerosene for lighting; and (ii) improvement of energy efficiency and mitigation of carbon emissions by reducing diesel consumption for irrigation, agricultural processing, light industry, commerce and service delivery.

45. The provisions of the Environmental and Social Good Practices for Component 1, prepared by BREB, will be implemented as an integral element of the Project.

46. **Component 2: Upgrade of grid substations and conversion of overhead distribution lines.** An Initial Environmental Examination (IEE) has been developed by DESCO; it provides an overview of the potential environmental and social risks and impacts of activities to be supported under Component 2, as well as mitigation activities to address these. The IEE contains an Environmental and Social Management Plan, and provisions for monitoring as well as use of a Project level grievance mechanism. Procedures for disclosure of Project information and consultation with local communities during the construction phase are provided.

47. **Grid Substation Element.** The installation of new transformers and gas-insulated switchgear systems under Component 2 will be conducted within the premises of two existing grid substations. As the new gas-insulated systems are much more compact than the old air-insulated systems, more than 50 percent of the land area previously occupied by the replaced equipment can be used for other purposes by DESCO. The most likely adverse impacts, such as dust and noise, are temporary and can be effectively mitigated by making use of well tested measures included in the Environmental and Social Management Plan.

48. **Underground Cable Element.** The installation of the underground cables under Component 2 will be conducted along the sides of public roads and no private land will be affected. The potential impacts of installing underground 33 kV cables are limited to the construction period and arise from trenching and cable installation for the distribution lines. During installation, there will be a need to manage noise, dust, excavated material, local drainage and safety. The anticipated impacts on transportation and road access are localized, minimal, temporary, and reversible, and can be readily mitigated using well known methods.

49. The equipment at the existing substations and about 80 percent of the existing overhead distribution lines will be redeployed in other installations. Residual equipment and materials that cannot be reused will be disposed of following established DESCO procedures. Compensation to Dhaka City Corporation to repave the affected roads after construction has been incorporated in the Project's cost

estimates and its approved Development Project Proposal.

50. The Project has been designed to avoid and minimize potential environmental and social impacts. While there will be localized short-term social risks and impacts during the construction phase of the component, it will not involve involuntary resettlement, land acquisition, or economic displacement. Thus, aside from the local, temporary, and reversible disruptions during construction, this activity will not have a significant negative impact. Practical mitigation and monitoring measures have been identified and included in the Environmental and Social Management Plan, the most important of which is scheduling to minimize the time required for construction. The proposed activities will have no residual adverse impact on the environment. After construction is completed, the underground cables will generate environmental and social benefits accruing from improved electricity supplies and removal of overhead distribution lines.

51. Provisions of the Environmental and Social Management Plan for Component 2, prepared by DESCO, will be implemented as an integral element of the Project.

F. Risks and Mitigation Measures

52. Based on technical assessments, due diligence results and observations on site visits, no major technical or environmental risks or land acquisition issues have been identified. The Project area does not involve any international waterway or disputed areas. Implementation risks and proposed mitigation measures are summarized in Table 4.

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigating Measures
Price increase in goods and materials resulting in project costs overrun	Costs of major items benchmarked to similar ongoing projects in the country, and provision of sufficient amount for contingencies. Government and EAs have confirmed that any financing shortfalls will be covered.
Inadequate measures to mitigate the local transportation disruption during installation of underground cables	Mitigating measures reviewed and refined by experienced engineers/consultants, and assurance on full implementation of safeguard measures included in loan documents.
Procurement failure, improper tendering procedures and/or inadequate record keeping	Fewer and larger procurement packages to strengthen, facilitate and enhance due diligence and control; agreed systems put in place for procurement record keeping and documentation preservation for audit and post-review. Both EAs are experienced, and the agreed procurement arrangements are provided in PAM.
Misuse of loan proceeds	Agreed systems and procedures put in place within the EAs to ensure that proper accounts and records will be maintained and audited in a timely manner to adequately identify the use of loan proceeds; independent expert to be recruited by the Bank to verify the implementation results.

APPENDIX 1: MONITORING AND EVALUATION FRAMEWORK

Project Outcome Indicators	Baseline 2016	Target Values			Data Collection and Reporting		
		2017	2018	2019	Frequency	Data Collection Instruments	Responsibility for Data Collection
Component 1:							
Number of service connections installed (unit: million)	0	0.8	1.2	0.5	Semi-annually	Project Implementation Report BREB Annual Report	BREB
Number of small low-voltage (6.35/0.23 kV) transformers installed (unit: 1000)	0	20	32	13	Semi-annually	Project Implementation Report BREB Annual Report	BREB
Component 2:							
Upgrade of two grid substations from 250 MVA to 480 MVA (unit: MVA)	250	250	400	480	Semi-annually	Project Implementation Report DESCO Annual Report	DESCO
Length of 33 kV underground cable installed (unit: km)	0	25	45	15	Semi-annually	Project Implementation Report DESCO Annual Report	DESCO