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Project Information Document/ Integrated Safeguards Data Sheet (PID/ISDS)

Concept Stage | Date Prepared/Updated: 24-Feb-2017 | Report No: PIDISDSC20960

Public Disclosure Authorized

BASIC INFORMATION

A. Basic Project Data

Country	Project ID	Parent Project ID (if any)	Project Name
Bangladesh	P159974		Enhancement and Strengthening of Power Transmission Network in Eastern Region (P159974)
Region	**Estimated Appraisal Date**	**Estimated Board Date**	**Practice Area (Lead)**
SOUTH ASIA	Jul 03, 2017	Jan 24, 2018	Energy & Extractives
Lending Instrument	**Borrower(s)**	**Implementing Agency**	
Investment Project Financing	People's Republic of Bangladesh	Power Grid Corporation of Bangladesh (PGCB)	

Proposed Development Objective(s)

The proposed project aims to increase transmission capacity and reliability of the grid network in the eastern region.

Financing (in USD Million)

Financing Source	Amount
Borrower	145.00
International Development Association (IDA)	310.00
Total Project Cost	**455.00**

Environmental Assessment Category	Concept Review Decision
B-Partial Assessment	Track I-The review did authorize the preparation to continue

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Other Decision (as needed)

B. Introduction and Context

Country Context

Bangladesh's economy has performed well over the past decade. Its Gross Domestic Product (GDP) has grown at an average of 6 percent per annum since 2010. In Fiscal Year 2014 (FY 14), the country moved up to a lower-middle income country (LMIC) status as per capita Gross National Income (GNI) of US$1,080 crossed the LMIC threshold of US$1,046. The country's per capita income soared to US$1,430 at the end of FY 16. This sustained growth was achieved despite the adverse impacts of the global recession, oil price rise, unrest in the Middle East and local natural disasters and has largely been dependent on a reliable and affordable supply of electricity. Bangladesh's economy could have performed better if the energy infrastructure had developed in line with the economic demands.

The supply of power in Bangladesh has not been able to keep pace with the rapid growth in demand and consumers experience frequent power outages. Current installed generation capacity in Bangladesh is 13,000 mega-Watt (MW), while available capacity is only 9,000 MW. The highest demand served in the country until November 2016 was 9,036 MW. On average, over 1,000 MW of load shedding occurs in the summer. Electricity demand is projected to grow by more than 10 percent per annum over the medium term. The Power Sector Master Plan 2016 has projected that demand will rise to more than 50,000 MW by 2041.

The shortage of electricity and poor quality of supply (aged and low capacity grid network) not only affect households, but also industry and services, which account for a major share of growth in the economy. According to the 2013 World Bank Enterprise Survey, Bangladeshi businesses on average suffered power outages for 840 hours per year, resulting in an output loss of approximately 3 percent of GDP. The availability and reliability of power is hence a key constraint to job creation and poverty reduction.

Sectoral and Institutional Context

Institutionally, the Ministry of Power, Energy and Mineral Resource (MPEMR) in Bangladesh has the responsibility for the power sector. The vertically integrated Bangladesh Power Development Board (BPDB) under the MPEMR has been partially unbundled, starting in 1978. In 1994, the Government launched a power sector reform program under which the Power Grid Company of Bangladesh (PGCB) was created as the transmission entity along with the separation of generators from distributors. Currently, 58 percent of total grid-connected power is generated by public sector plants run by BPDB and by its subsidiary corporatized generation companies, and 42 percent by independent power producers (IPPs) and rental units (smaller in scale and with different contractual structures than IPPs, many running on liquid fuel although some use gas) in the private sector.

The power sector in Bangladesh has grown rapidly over the last decade; generation capacity has doubled at the same time as peak demand increased from 4,530 MW in 2010 to more than 9,000 MW in 2016 (not taking account of significant suppressed demand). The government has installed 81 power plants with generation capacity of 10,353 MW during the last eight years and brought 78% people of the country under electricity coverage. However, per capita consumption of electricity in Bangladesh is only 407 kilo-Watt hour (kWh)/year, which is one of the lowest in the world and lower than other large South Asian countries. While urban areas have close to complete electricity coverage, only 42 percent of rural households have access to electricity. Thus, demand for electricity in the coming years will continue to grow. About 10 power plants with generation capacity of 1,840 MW, including eight from the public sector with generation capacity of 1,623 MW and two in the private sector with generation capacity of 217 MW are expected to be commissioned in 2017.

Bangladesh's transmission system mainly consists of 230 kilo-Volt (kV) and 132kV system, while one 400kV High Voltage Direct Current (HVDC) system has recently been implemented. The country has about 9,909 circuit km of transmission lines and about 40,060 million kWh of power was wheeled through the transmission network during the FY 2014-15. Transmission loss of the network has come down to 2.79 percent in 2014-15 from 4.24 percent in 2000-01. The country is vertically divided by the rivers Jamuna and Padma. The western and eastern part of Bangladesh network is interconnected by two 230kV Direct Current (DC) lines. The summary of the length of existing transmission lines and number of substations (S/S) at different voltage levels are shown below:

Table 1: Transmission Lines and Substations by Voltage, Length/Quantity (as of Nov 2016)

Transmission Lines		**Substations**	
Voltage level	**Circuit Km**	**Voltage Level**	**No of S/S**
400kV	220	400kV HVDC	1
230kV	3185	400/230kV	1
132kV	6504	230/132kV	23
		132/33kV	115

Bangladesh's growing power system has room for improvement in the reliability and quality of supply. The transmission network is significantly under pressure due to rapid growth of system demand. A considerable numbers of grid substations and transmission lines are presently overloaded contributing to unreliable electricity supply in major load centers. The system also faces growing physical constraints to expand the network due to lack of Right of Way (ROW) for the lines and land for S/S in densely populated areas. PGCB, the sole authority of the transmission network in the country, undertook several development projects to improve the network condition. However, the government targets to increase power generation to 24 giga-Watt (GW) by 2021; and therefore, further investment of about US$5.1 billion in enhancing and strengthening the network is currently under consideration. The proposed project is a step towards achieving that target and will specifically address the need for network improvement in the important economic and industrial hubs in the eastern region of the country.

Relationship to CPF

The proposed project directly contributes to the priorities set under the Country Partnership Framework (CPF) for FY 2016-2020 which identifies shortage of grid-connected electricity as a key constraint. The CPF is anchored in Bangladesh's 7th Five Year Plan and recognizes the need for additions to generation capacity while ensuring adequate supply of electricity through the development of infrastructures. Enhancing transmission capacity to limit congestion and ensure efficient evacuation of power, and improving the operation of the grid are key priorities for Bank support.

C. Proposed Development Objective(s)

Note to Task Teams: The PDO has been pre-populated from the datasheet for the first time for your convenience. Please keep it up to date whenever it is changed in the datasheet.

The proposed project aims to increase transmission capacity and reliability of the grid network in the eastern region.

Key Results (From PCN)

Progress toward achieving the PDO is proposed to be measured by the following indicators:

(a) Increase in transformation capacity (MVA)
(b) Number of electricity outages in the project area (number of outages per year)

The proposed intermediate indicators are:

(a) Number of new substations installed and rehabilitated
(b) Transmission lines constructed (ckm)
(c) Development of strategy and implementation plan for maintenance practice of the agency completed (Y/N)
(d) Project-supported organization publish annual reports on inputs and effect of consultation on project/program/policies (Yes/No)

D. Concept Description

The proposed project is targeted to expand the 230kV transmission system and strengthen the 132kV transmission systems in the grid network of Greater Comilla, Noakhali and partly Greater Chittagong region. The project aims to eliminate the operational bottlenecks identified by the Load Flow calculations undertaken by PGCB as well as to finance required infrastructure for the future power sector development. Greater Comilla and Noakhali areas together are the second largest load centers of Bangladesh after the capital city of Dhaka. Greater Chittagong area is a major commercial and industrial hub with the Government taking initiatives to set up multiple economic zones, upgrade port facility and transportation network. One of the major problems PGCB is facing is aged and low capacity grid network of this region. Reinforcement of the power network is expected to support the economic growth potential of these areas.

Project Components:

The proposed project will have three components with the following estimated cost: 1) Enhancement and strengthening of power network (US$440 million); 2) Technical assistance for institutional development and implementation support (US$5 million); and 3) Equipment and tools for improved maintenance practice (US$10 million).

Component 1: Enhancement and Strengthening of Power Network (US$440 million, IDA US$295 million):

This component will cover the following activities:

(i) Two (2) nos. of 230/132kV substations and nine (9) nos. of 132/33kV substations will be built. 230/133kV substations are Chowmuhoni and Kachua. 132/33 kV substations are Kosba, Muradnagar, Chandina, Laksham, Laxmipur, Bashurhat, Maijdee, Patiya and New Mooring. Keeping in mind the scarcity of land in the project areas (due to high population density), all these substations are planned with GIS configuration. The 132/33kV New Mooring substation to be built on the western side of Chittagong City will become a 400/230/132/33kV power hub in future. The 132/33kV part will be built by this project but the land acquisition and layout planning will incorporate the future 400/230/132kV design. Some other 132/33kV substations will also be designed keeping provisions for upgradation to 230kV in future.

(ii) The only substation that will be replaced under this project is the Halishahar 132/33kV air insulated substation (AIS). This substation is one of the oldest substations of PGCB and will be replaced by advanced gas insulated substation (GIS) after the commissioning of the New Mooring substation. This will require modification and

extension of local 33kV and 11 kV network so that load at Halishahar can be fed from New Mooring S/S during replacement works at Halishahar.

(iii) A 230kV high capacity four circuit backbone transmission line (with twin Finch conductor per phase and only two circuits will be stringing now) has been planned through greater Comilla region (Korerhat– Chowmuhoni – Kachua-Gazaria) to make it the primary transmission backbone of this area for future. This line will supplement the existing 230kV double circuit line which is a low capacity (300 MW per circuit) line currently acting as the main transmission backbone between Comilla and Chittagong. Four (4) short distance 132kV double circuit lines are planned to be built to connect the new 132/33kV substations to the existing ones in Comilla and Noakhali area. Summary of the proposed scope of works under this project is given below:

Table 2: Summary of Proposed Scope of Works[1]

Transmission Lines		**Substations**	
Voltage level	**Circuit Km**	**Voltage Level**	**No of S/S**
230kV	386	230/132kV	2
132kV	266	132/33kV	10

Component 2: Technical Assistance for Institutional Development and Implementation Support (IDA US$5 million): Bank plans to maintain a long term engagement with PGCB through other investment support moving forward and therefore some technical assistance for institutional strengthening and project supervision will be provided through this component. Institutional strengthening will cover improvement in different aspects of operational and maintenance standard of PGCB and facilitate required training to improve human capacity. The following aspects are currently under discussion with PGCB and will be firmed up during preparation:

- **Review of operations and maintenance practices and development of standard documentation/procedure:** As the system size in Bangladesh will double in the medium term, there is a need for introducing risk-based management approach progressively in addition to the current time-based maintenance in order to reduce maintenance costs and increase the reliability and availability of the network. This will require i) standard documentation on the maintenance procedure; ii) introduction of asset–monitoring technologies in particular online monitoring[2] of high value assets like large and high capacity power transformers and AIS/GIS systems, fault on which can cause large scale power outage and iii) a strategy and implementation plan for “live line” maintenance practices to address the challenges posed by the increasing number of multiple circuit lines built to minimize ROW issues.

- **Development of protection philosophies and relay setting criteria:** In Bangladesh, parts of the transmission system often operate close to their maximum loading limit creating increasing vulnerabilities in the event of severe disturbances and faults. These vulnerabilities can result in potential cascading failures leading to large-scale blackouts. In addition, there are no defined/standardized criteria for protective relay settings; making it difficult to ensure proper coordination throughout the national transmission grid. Current practices will be revisited and a new philosophy will be proposed to cope with the network vulnerabilities.

[1] The scope of works may increase based on the further assessment of the rehabilitation need for few S/S in the region. The extent of works and the cost implications would be finalized during the preparation mission or prior to Appraisal.
[2] To detect abnormal stresses and ageing of a component, before a failure occurs, and to provide data needed for the planning of suitable maintenance/ replacement operations.

- **Support for project supervision**: Despite good implementation record with other IDA financed projects, PGCB's staff are overwhelmed by the increasing number of projects from different financing partners. To ensure adequate supervision and timely implementation of the activities under the proposed project, additional supervision resources will be funded. A firm or individual consultants will be hired to support the Project Management Unit (PMU) on review of design, procurement, contract management, and field supervision of different contractors and reporting.

- Other activities (including training on technical, procurement, contract management, maintenance management, health and safety, financial management, etc.) maybe identified and added as necessary, during project preparation.

Component 3: Equipment and tools for improved maintenance practice (IDA US$10 million):

Based on the maintenance strategy and procedures developed through the TA support as mentioned above, set of 'live line' maintenance equipment will be procured for a pilot area and adequate tools (software, database) will be procured for online monitoring under this component.

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SAFEGUARDS

A. Project location and salient physical characteristics relevant to the safeguard analysis (if known)

The proposed project is expected to finance the augmentation and rehabilitation of transmission network and substations of the Power Grid Company of Bangladesh (PGCB) in the commercially important eastern region of the country. The project area comprises the Greater Comilla, Noakhali and Chittagong areas. The rationale behind the project is to expand the 230kV transmission system and to strengthen the 132kV transmission systems in the project area. It is assumed that the Project activities are not expected to cause any long term or irreversible environmental impact. The project is classified as a Category B project and the Environment Assessment (OP/BP 4.01) safeguard policy has been triggered to ensure that the project investment are environmentally sound, sustainable and thus help to improve decision making. Since the line routes, locations of substation, size and extent of the sub-projects will be finalized by the project appraisal stage, sub-project specific environment assessment will be required for the Project. The Environmental Assessment (EA) meets the requirements of Environment Conservation Rules 1997 of Bangladesh, the Safeguard Policies of the World Bank and the Environmental, Health and Safety Guidelines of the World Bank Group/International Finance Corporation (IFC).

B. Borrower's Institutional Capacity for Safeguard Policies

PGCB has prior experiences in implementing IDA funded projects. They have implemented "Siddhirganj and Maniknagar 230kV Transmission Line Project" with IDA support. Also, they are implementing similar nature of several sub-projects under another IDA supported Transmission and Distribution project with satisfactory compliance on safeguard management. PGCB has already established an Environment and Social management Unit (ESMU) in their regular

organogram. The safeguard staff of this unit will be appointed by April, 2017. The agency has also kept the provision of short and long-term training courses for their concerned officials on environmental management for the institutional capacity building.

C. Environmental and Social Safeguards Specialists on the Team

Sabah Moyeen, Iqbal Ahmed

D. Policies that might apply

Safeguard Policies	Triggered?	Explanation (Optional)
Environmental Assessment OP/BP 4.01	Yes	The proposed project aims to enhance and strengthen the grid network in the eastern region. The Project is classified as Environmental Category B in accordance with OP 4.01 due to the nature and scale of the planned civil works and assessed impacts. The expected environmental and social impacts can be mitigated through implementation of appropriate environmental code of practice and environmental management plan, social management plans. The environmental screening/assessment with environmental management plan (EMP) for each sub-project (based on exact routes and locations of the transmission/distribution lines and substations) will be carried out. The general Environmental, Health, and Safety (EHS) Guidelines of the World Bank Group along with the industry sector EHSG for Electric Power Transmission are applicable. Also necessary mitigation measures for overhead transmission lines against accidental fall from elevated height during work (e.g. using body harness, waist belts, secured climbing devices, etc.) shall be addressed. Only the local labor will be involved in the construction work. However, the potential risks and impacts from project induced labor influx will be addressed. Rationale for EA Category Key environmental issue would be the health and safety during the line installation. The impacts on environment are normally restricted to rights of way (ROW). The effect of the construction of transmission line is temporary and limited during construction. The preliminary survey along the proposed transmission line routes revealed that some tall-growing trees will be cut in the entire right-of-way (ROW) width. Also,

		due to movement of heavy construction vehicles, the agricultural areas within the ROW will be temporarily suspended to use the land for crop production. Even the project will involve land acquisition and resettlement activities associated with the sub-stations and TLs, RAPs will be prepared to mitigate for all impacts identified through the SIA. Displacement of people and interventions in densely populated areas will be minimized. None of the impacts are expected to be irreversible in nature, and are expected to be mitigable via appropriate assessments and safeguards plans.
Natural Habitats OP/BP 4.04	Yes	As a precautionary approach, it is triggered though it is highly unlikely that any natural habitat formed largely by native plant and animal species will be affected or modified due to the Project activities.
Forests OP/BP 4.36	No	The Project doesn't expect that there would be any impact on the management, protection, or utilization of natural forests or plantations. As such, the policy has not been triggered.
Pest Management OP 4.09	No	The Project is not expected to finance any synthetic chemical pesticides activities and the policy has not been triggered.
Physical Cultural Resources OP/BP 4.11	No	No Physical Cultural Resources will be affected. Special precautions will be taken to avoid cultural heritage sites and property.
Indigenous Peoples OP/BP 4.10	No	The project areas are pre-identified; No IP policy is triggered according to the preliminary screening.
Involuntary Resettlement OP/BP 4.12	Yes	The routes are pre-identified. The ESIA is being conducted and site specific Resettlement Action Plan (RAPs) will be prepared, approved and disclosed where necessary. Gender and grievance redress issues will be included in the preparation of the above mentioned documents.The project expects that there will be land acquisition required in areas where appropriate GOB lands are not available and where direct purchase is not possible. A feasibility study is underway to determine the exact locations of the substations and the exact route for the TLs, though the project area is roughly known.
Safety of Dams OP/BP 4.37	No	The Project will not finance any dams, nor do project activities depend on any existing dams.
Projects on International Waterways OP/BP 7.50	No	The Project activities will not take place along international waterways which are shared with Riparian countries.

Projects in Disputed Areas OP/BP 7.60	No	There are no disputed areas in the Project area of influence.

E. Safeguard Preparation Plan

Tentative target date for preparing the Appraisal Stage PID/ISDS

Aug 15, 2017

Time frame for launching and completing the safeguard-related studies that may be needed. The specific studies and their timing should be specified in the Appraisal Stage PID/ISDS

15-Aug-2017

CONTACT POINT

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APPROVAL

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