Project Administration Manual

Project Number: 44192-016
Loan Number(s): LXXXX
August 2015

People's Republic of Bangladesh: SASEC Second Bangladesh–India Electrical Grid Interconnection Project

Contents

Project Administration Manual Purpose and Process

The project administration manual (PAM) describes the essential administrative and management requirements to implement the project on time, within budget, and in accordance with Government and Asian Development Bank (ADB) policies and procedures. The PAM should include references to all available templates and instructions either through linkages to relevant URLs or directly incorporated in the PAM.

The Government and Power Grid Company of Bangladesh Limited (PGCB) are wholly responsible for the implementation of ADB financed projects, as agreed jointly between the borrower and ADB, and in accordance with Government and ADB's policies and procedures. ADB staff is responsible to support implementation including compliance by the Government and PGCB of their obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.

At Loan Negotiations the borrower and ADB shall agree to the PAM and ensure consistency with the Loan agreements. Such agreement shall be reflected in the minutes of the Loan Negotiations. In the event of any discrepancy or contradiction between the PAM and the Loan Agreements, the provisions of the Loan Agreements shall prevail.

After ADB Board approval of the project's report and recommendations of the President (RRP) changes in implementation arrangements are subject to agreement and approval pursuant to relevant Government and ADB administrative procedures (including the Project Administration Instructions) and upon such approval they will be subsequently incorporated in the PAM.

Abbreviations

ADB	=	Asian Development Bank
ADF	=	Asian Development Fund
AFS	=	audited financial statements
BERC		Bangladesh Energy Regulatory Commission
DMF	=	design and monitoring framework
DPP	=	Development project proposal
EIA	=	environmental impact assessment
EMP	=	environmental management plan
GACAP	=	governance and anticorruption action plan
GDP	=	gross domestic product
HVDC	=	high voltage direct current
ICB	=	international competitive bidding
IEE	=	initial environmental examination
IPP	=	indigenous people plan
kV	=	kilo volt
LAR	=	land acquisition and resettlement
LIBOR	=	London interbank offered rate
MW	-	mega watt
NCB	=	national competitive bidding
NGOs	=	nongovernment organizations
PAI	=	project administration instructions
PAM	=	project administration manual
PGCB	=	Power Grid Company of Bangladesh Limited
PGCIL	=	Power Grid Corporation of India Limited
PIU	=	Project implementation unit
PMU	=	Project management unit
QCBS	=	quality- and cost based selection
RP	=	Resettlement Plan
RRP	=	Report and Recommendation of the President to the Board
SBD	=	standard bidding documents
SPS	=	Safeguard Policy Statement
SPRSS	=	summary poverty reduction and social strategy
TOR	=	terms of reference

I. PROJECT DESCRIPTION

1. In 1971, when Bangladesh gained independence, only 3% of the population had access to electricity. In 2015, this had risen to over 70% with per-capita electricity consumption reaching 321 kilowatt-hour (kWh) per annum.[1] The power generation capacity of Bangladesh was 10,817 MW in January 2015. Natural gas[2] is the main source of primary energy for power generation in Bangladesh and 63% of generation capacity is based on domestic gas. Domestic natural gas supplies in Bangladesh have not kept pace with growing demand and this has resulted in an increasing dependence on power generation from quickly deployable oil and diesel based power plants that have reached an installed capacity of over 2,500 megawatt (MW). Bangladesh recorded a peak supply of over 7,700 MW in 2014. However, the installation of oil and diesel based power plants has cost implications as oil and diesel based power is significantly more expensive compared to natural gas.

2. The Government of Bangladesh has an ambitious target to achieve electricity for all by 2021 (i.e. within 50 years from the date of independence) and is working to meet the target of 24,000 MW of generating capacity by 2021[3]. Programs under implementation include improving the efficiency of existing gas-based generation power plants; developing new power plants based on fuel sources including coal, imported gas, and renewable energy; as well as development of cross border grid interconnections to exchange power from within the south Asia, starting with India. In addition to investments in generation and the purchase of power over international transmission interconnections, significant investments in transmission and distribution networks are planned in Bangladesh for electricity to reach customers. The Asian Development Bank (ADB) is supporting efficiency improvements in power generation, renewable energy generation, transmission, and distribution network investments.

3. In 2010, a joint communiqué on electrical grid connectivity was signed between Bangladesh and India, signaling support on cross-border power interconnection and potential for electricity trade between the two countries.[4] In October 2013, the electricity grids of the two neighboring countries were connected for the first time. This first Indian national power grid connection with the Bangladesh national power grid was supported under the ADB-financed Bangladesh–India Electrical Grid Interconnection Project, and 500 MW of power flows were achieved from India to Bangladesh in 2013. Connecting the two national grids resulted in power flows of over 2,000 gigawatt-hours from India to Bangladesh in 2014, resulting in improved power availability, reduced cost of electricity, fewer power interruptions, and improved power quality (particularly in western Bangladesh). Based on the success of the first interconnection, the two countries agreed to expand cooperation in the power sector. Bangladesh will procure an additional 500 MW of power over the upgraded interconnection from India.[5] In addition to the transmission interconnection between the two countries, India and Bangladesh are working to

[1] Government of Bangladesh, Planning Commission. *Seventh Five Year Plan FY 2016–FY 2020.* Dhaka.
[2] The major consumers of natural gas are the power sector at around 40% and captive power at 17%. At current levels of consumption, gas reserves are estimated to meet requirements for about 15 years.
[3] Ministry of Power, Energy and Mineral Resources. 2011. *Power Sector Master Plan.* Dhaka.
[4] This was signed by the Power Secretaries of Bangladesh and India and helped conclude a process initiated in 1997 when ADB facilitated dialogue between Bangladesh and India to identify possibilities of exchange of power.
[5] The joint steering committee meeting was held in Dhaka on 3 April 2014. It concluded Bangladesh could procure 500 MW from the Indian electricity market, and the enhancement of the interconnection capacity to 1,000 MW.

enhance cooperation in rail and road connectivity that are supported by ADB under the South Asia Subregional Economic Cooperation Program.[6]

4. At the regional level, the member countries of the South Asia Association for Regional Cooperation (SAARC) signed a framework agreement for energy cooperation in Kathmandu in November 2014 to identify and implement priority regional energy projects.[7] Analytical studies, including the SAARC Regional Energy Trade Study, have identified the 1,000 MW power transmission connection between India and Bangladesh as an important building block for the regional South Asian power grid enhancement.[8] The regional SAARC transmission grid will result in several benefits, including increased operational efficiency; improved system reliability; and the tapping of new power resources, particularly new hydropower capacity in Bhutan, India and Nepal.[9] The project meets two of the focus areas of ADB's South Asia regional cooperation strategy: (i) the improvement of cross-border electricity transmission connectivity, and (ii) the boosting of power trade in the region.[10] The project supports the regional cooperation and integration priorities under ADB's Midterm Review of Strategy 2020 and the regional cooperation operation business plan for 2014–2016.[11]

5. In India, the Central Electricity Authority (CEA) reported a countrywide installed capacity of 274,817 MW as of June 2015 against a peak demand of 143,550 MW. The CEA reported a reduction in the peak deficit from over 10% in 2011 to 2.3% in 2015. India added nearly 55,000 MW of capacity over the Eleventh Five-Year Plan period from 2007 to 2012, and it expects to add over 88,000 MW of conventional power capacity during 2012–2017, of which over 54,000 MW has been completed as of 2015. India is simultaneously embarking on a program that will add 175,000 MW of renewable energy capacity by 2022. Some regions of India have surplus energy, and a competitive market for power trading exists, with about 10% of the electricity volume traded. The transmission network in India is connected to Bangladesh, Bhutan and Nepal and bilateral electricity trades between India and these countries occur.

6. **Lessons learned from ongoing projects.** The loan for the first Bangladesh–India Electrical Grid Interconnection Project was approved in August 2010. A power purchase agreement (PPA) for 250 MW was entered into between the trading arm of India's National Thermal Power Corporation (NTPC) and the Bangladesh Power Development Board (BPDB) in 2012. The cost of power was set based on the terms and conditions for the power generation plants determined by the Central Electricity Regulatory Commission of India. The first competitively bid cross-border PPA for 250 MW was signed in 2013 between Power Trading Corporation (PTC) India and the BPDB, and was supported with technical assistance (TA) from ADB.[12] The first Bangladesh–India Electrical Grid Interconnection Project has been performing satisfactorily since 2013. During the processing phase for the first project, there had been perceived risk on the likelihood of power transfers not happening between the two countries,

[6] SASEC was started in 2001 to bring together Bangladesh, Bhutan, India, Maldives, Nepal and Sri Lanka in a project-based partnership to promote regional prosperity by improving cross-border connectivity, boosting trade among member countries, and strengthening regional economic cooperation. http://www.sasec.asia/

[7] South Asian Association for Regional Cooperation (SAARC), setup in 1985, is an economic and geopolitical organization of eight countries in South Asia with its Secretariat in Kathmandu, Nepal. http://www.saarc-sec.org/

[8] SASEC. 2010. *SAARC Regional Energy Trade Study.* Kathmandu.

[9] ADB. 2014. *Technical Assistance for the South Asia Subregional Economic Cooperation Cross-Border Power Trade Development: Regional Cooperation Strategy (2011–2015)*. Manila (TA 8619-REG).

[10] ADB. 2013. *South Asia: Regional Cooperation Strategy (2011–2015)*. Manila.

[11] ADB. 2014. *Midterm Review of Strategy 2020: Meeting the Challenges of a Transforming Asia and Pacific.* Manila; ADB. 2014. *South Asia: Regional Cooperation Strategy and Program (2014–2016)*. Manila.

[12] ADB. 2010. *Technical Assistance to the People's Republic of Bangladesh for Bangladesh–India Electrical Grid Interconnection Project.* Manila.

and whether suppliers in India would sell power to Bangladesh. In 2015, 500 MW of power flow was taking place, and several power traders in India have submitted bids to sell 250 MW of power to Bangladesh starting from 2016 when the existing short term contract for 250 MW concludes.

7. **Impact and Outcome**. The impact of the project is aligned with the Perspective Plan of Bangladesh, 2012 which aims to increase the availability and sustainability of power supply by 2021. The outcome of the project is increased cross-border power trade between Bangladesh and India.

8. **Outputs**. The project comprises two outputs (i) enhanced Behrampur–Bheramara power transmission link through (a) the installation of an additional asynchronous[13] 400-kilovolt (kV)/230 kV 500 MW high-voltage direct current (HVDC) back-to-back substation in Bheramara, and (b) the construction of 12 kilometers of 230 kV transmission line from the Bheramara substation to the Ishurdi substation and associated facilities; and (ii) improved capacity of the Power Grid Company of Bangladesh (PGCB) on technical, project management, regulatory, trading and financial matters.

II. IMPLEMENTATION PLANS

A. Project Readiness Activities

	Months												
Indicative Activities	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Who responsible**
Advance contracting actions		X											PGCB, ADB
Retroactive financing actions									X				PGCB, ADB
Establish project implementation arrangements		X											PGCB
ADB Board approval									X				ADB
Loan signing										X			ADB, ERD
Government legal opinion provided											X		ERD
Government budget inclusion				X									ERD, PGCB
Loan effectiveness												X	ERD, ADB

ADB = Asian Development Bank; ERD = Economic Relations Division; PGCB = Power Grid Company of Bangladesh Limited

[13] The term asynchronous refers to the nature of the interconnection between two electrical grids operating at different frequencies.

B. Overall Project Implementation Plan

			2013	2014				2015				2016				2017				2018				2019			
		DESCRIPTION	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
INTERCONNECTION BETWEEN ELECTRICAL GRIDS OF INDIA AND BANGLADESH																											
PROJECT FORMULATION																											
		Preparation of Feasibility Report																									
IMPLEMENTATION																											
	Establishment of HVDC substation at Bheramara																										
		Tendering & Award																									
		Preparatory works and mobilization																									
		Civil works, supply & erection of Equipment																									
		Testing and Commissioning (along with the Line)																									
	Bheramara to Ishurdi 230 kilovolt Line - 12 km																										
		Tendering & Award																									
		Mobilization and survey																									
		Foundation, supply and erection of towers, line material and stringing																									
		Testing and ready for commissioning																									
	Consulting contracts																										
		Project Management - Tendering and Award																									
		Project Management - Undertaking the required activities																									
		Technical and Financial Consulting - Tendering and Award																									
		Technical and Financial Consulting - Undertaking the required activities																									
REVIEWS																											
PROJECT CLOSING REPORT																											

III. PROJECT MANAGEMENT ARRANGEMENTS

A. Project Implementation Organizations – Roles and Responsibilities

Project implementation organizations	Management Roles and Responsibilities
Executing Agency Power Grid Company of Bangladesh (PGCB)	➢ Responsible for supervision and monitoring the tendering, construction and operation of the project including consulting studies.
Project Management Unit	➢ PMU headed by a Project Director will implement the project and be responsible for preparation and submission of withdrawal applications and meeting reporting requirements including audit reports and financial statements.
Project Steering Committee	➢ Project Steering Committee headed by Secretary, Power Division, Ministry of Power, Energy and Mineral Resources, Government of Bangladesh and including Managing Director, PGCB, representatives from the Planning Commission, Finance Ministry and Project Director to review the project work plan and provide overall guidance.
Joint Steering Committee	➢ Comprising Secretary, Power Division, Ministry of Power, Energy and Mineral Resources, Government of Bangladesh and the Secretary Power, Government of India on overall sector coordination between the two countries.
Joint Working Group	➢ Comprises senior members of PGCB, PGCIL and other power utilities in both countries to undertake joint technical studies and monitor the project.
Bangladesh Power Development Board	➢ Single buyer procuring power in Bangladesh and through IPP Cell will tender the PPA for 500 MW.
Ministry of Finance Economic Relations Division	➢ Will enter into the loan agreement with ADB and on-lend the ADB loan to PGCB.
Ministry of Power Energy and Mineral Resources	➢ Will provide policy direction to sector entities including BPDB and PGCB and be responsible for coordination between these agencies. Will also assess the consulting study outputs and provide guidance on their implementation.
ADB	➢ Will undertake regular project reviews and facilitate in implementation of the project.

B. Key Persons Involved in Implementation

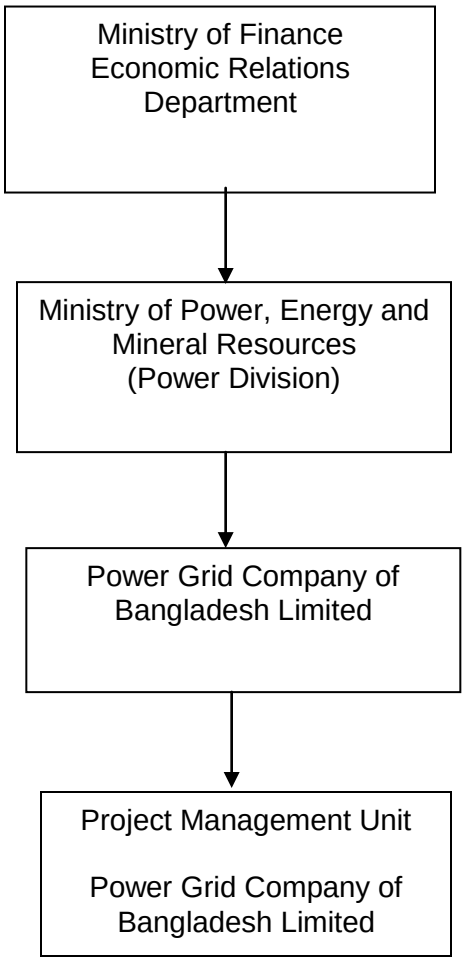
Executing Agency

Power Grid Company of Bangladesh Limited	Q.M. Shafiqul Islam Project Director + 8801 7777 60323 NLDC Complex Bhabhan (8th Floor) Aftab Nagar, Rampura Dhaka-1219

ADB

South Asia Energy Division	Anthony Jude Director Telephone No.: (63-2) 632-6301 Email address: ajude@adb.org
Mission Leader	Len George Energy Specialist Telephone No.: +91 11 2410 7200 Email address: lgeorge@adb.org
Co-Mission Leader	Paul Hattle Senior Climate Change Specialist (Clean Energy) Telephone No.: +880 2 815 6000 Email address: phattle@adb.org

C. Project Organization Structure



IV. COSTS AND FINANCING

9. The total estimated cost of the project will be $183.2 million. The investment plan is summarized in Table 1. The tentative financing plan for the project is summarized in Table 2. The HVDC substation and transmission lines in Bangladesh are proposed to be funded by ADB and the government of Bangladesh. Taxes and duties in Bangladesh, land and resettlement costs (if applicable) will be financed by counterpart funds.

Table 1: Project Investment Plan
($ million)

Item			Amount[a]
A.	**Base Cost**[b]		
	1.	HVDC Sub-station and transmission line	161.6
	2.	Implementation support and capacity building	6.3
		Subtotal (A)	**167.9**
B.	**Contingencies**[c]		**9.5**
C.	**Financing Charges During Implementation**[d]		**5.8**
		Total (A+B+C)	**183.2**

HVDC = high voltage direct current
[a] Includes taxes and duties of $34.7 million to be financed from government resources by cash contribution.
[b] In 2015 prices.
[c] Physical contingencies computed at 2% for sub-station and 15% for transmission lines. Price contingencies computed at 1.5% on foreign exchange costs and 6% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.
[d] Includes interest and commitment charges to be paid by PGCB. Interest during construction for ADB OCR loan has been computed at the 5-year forward London interbank offered rate plus a spread while for ADB ADF loan at 2% per annum. Commitment charges for an ADB OCR loan are 0.15% per year to be charged on the undisbursed loan amount.
Sources: Development project proposal, March 2015 and ADB staff estimates in August 2015.

Table 2: Financing Plan

Source	**Amount** ($ million)	**Share of Total** (%)
Asian Development Bank	120.0	65.5
Ordinary capital resources (loan)	35.0	19.1
Special Funds resources (loan)	85.0	46.4
Government	63.2	34.5
Total	**183.2**	**100.0**

Sources: Development project proposal, March 2015 and ADB staff estimates in August 2015

A. Detailed Cost Estimates by Expenditure Category

Item	$ Million			
	Foreign Exchange	Local Currency	Total Cost	% of Total Base Cost
A. Investment Costs [a]				
1 Civil Works	-	13.04	13.04	7.12
2 Mechanical and Equipment	94.32	16.11	110.44	60.28
3 Environment and Social Mitigation Costs	-	0.47	0.47	0.26
4 Freight and Insurance	-	2.90	2.90	1.58
5 Project Management	-	1.47	1.47	0.80
6 Consultancy	4.85	-	4.85	2.65
7 Taxes and Duties	-	34.69	34.69	18.94
Total Base Cost (A)	**99.17**	**68.69**	**167.86**	**91.62**
B. Contingencies				
1 Physical [b]	3.62	0.89	4.51	2.46
2 Price [c]	6.02	5.78	11.80	6.44
3 Exchange Rate Variation-PPP Adjustment		-6.78	-6.78	-3.70
Subtotal (B)	**9.64**		**9.53**	**5.20**
C. Financing Charges During Implementation [d]				
1 Interest during Construction	-	5.73	5.73	3.13
2 Commitment Charges	-	0.09	0.09	0.05
Subtotal (C)	-	**5.83**	**5.83**	**3.18**
Total Project Cost (A+B+C)	**108.81**	**74.51**	**183.22**	**100.00**

Note: Numbers may not sum precisely due to rounding.

[a] In 2015 prices.

[b] 15% for Transmission line, 2% for substation & other assets

[c] Price contingencies are computed in accordance with ADB. 2005. Financial Management and Analysis of Projects. Manila.

[d] Commitment charges are 0.15% per year on the undisbursed ordinary capital resources loan amount.

Sources: Power Grid Company of Bangladesh Limited and Asian Development Bank estimates.

B. Allocation and Withdrawal of Loan Proceeds

CATEGORY			ADB FINANCING
Number	**Item**	**Total Amount Allocated for ADF Financing (SDR) Category Subcategory**	**Percentage and Basis for Withdrawal from the Loan Account**
1	Equipment and Installation	55.756 million	100% of total expenditure claimed for ADB financed contract*
2	Consulting	0.724 million	100% of total expenditure claimed for ADB financed contract*
3	Unallocated	4.482 million	
	Total	60.962 million	

* Exclusive of all duties and taxes imposed within the territory of the Borrower.

CATEGORY			ADB FINANCING
Number	**Item**	**Total Amount Allocated for OCR Financing (USD) Category Subcategory**	**Percentage and Basis for Withdrawal from the Loan Account**
1	Equipment	32.00 million	100% of total expenditure claimed for ADB financed contract*
2	Consulting	0.42 million	100% of total expenditure claimed for ADB financed contract*
3	Unallocated	2.58 million	
	Total	35.00 million	

* Exclusive of all duties and taxes imposed within the territory of the Borrower.

C. Detailed Cost Estimates by Financier

($ million)

Item	GOB and PGCB		ADB ADF		ADB OCR		Total Cost
	Amount	% of Cost Category	Amount	% of Cost Category	Amount	% of Cost Category	
A. Investment Costs							
1 Civil Works	13.04	100.00	-	0.00	-	0.00	13.04
2 Mechanical and Equipment	0.00	0.00	78.44	71.02	32.00	28.98	110.44
3 Environment and Social Mitigation Costs	0.47	100.00	-	0.00	-	0.00	0.47
4 Freight and Insurance	2.90	100.00	-	0.00	-	0.00	2.90
5 Project Management [a]	1.47	100.00	-	0.00	-	0.00	1.47
6 Consultancy	3.42	70.53	1.01	20.87	0.42	8.60	4.85
7 Taxes and Duties	34.69	100.00	-	0.00	-	0.00	34.69
Total Base Cost (A)	**55.99**	33.36	**79.45**	47.33	**32.42**	19.31	**167.86**
B. Contingencies							
1 Physical	0.89	19.78	2.44	54.16	1.18	26.06	4.51
2 Price	5.78	49.00	4.17	35.36	1.85	15.64	11.80
3 Exchange Rate Variation - PPP Adjustment	-5.28	77.85	-1.06	15.69	-0.44	6.46	-6.78
Subtotal (B)	**1.39**	14.63	**5.55**	58.27	**2.58**	27.10	**9.53**
C. Financing Charges During Implementation							
1 Interest during Construction	5.73	100.00	-	0.00	-	0.00	5.73
2 Commitment Charges	0.09	100.00	-	0.00	-	0.00	0.09
Subtotal (C)	**5.83**	100.00	**-**	0.00	**-**	0.00	**5.83**
Total Project Cost (A+B+C)	**63.22**	**34.50**	**85.00**	**46.39**	**35.00**	**19.10**	**183.22**

Note: Numbers may not sum precisely due to rounding.

[a] Cost of audits would be financed by PGCB

ADB = Asian Development Bank, PGCB = Power Grid Corporation of Bangladesh Limited, GOB = Government of Bangladesh.

Sources: Power Grid Company of Bangladesh Limited and Asian Development Bank estimates.

D. Detailed Cost Estimates by Outputs

Item		($ million) Output 1		Output 2	
	Total Cost ($ millions)	**Amount**	**% of Cost Category**	**Amount**	**% of Cost Category**
A. Investment Costs					
1 Civil Works	13.04	13.04	100.00	-	0.00
2 Mechanical and Equipment	110.44	110.44	100.00	-	0.00
3 Environment and Social Mitigation Costs	0.47	0.47	100.00	-	0.00
4 Freight and Insurance	2.90	2.90	100.00	-	0.00
5 Project Management	1.47	-	0.00	1.47	100.00
6 Consultancy	4.85	-	0.00	4.85	100.00
7 Taxes and Duties	34.69	34.69	100.00		0.00
Total Base Cost (A)	**167.86**	**161.54**	96.24	**6.32**	3.76
B. Contingencies	**9.53**	**9.27**	97.29	**0.26**	2.71
C. Financing Charges During Implementation	**5.83**	**5.61**	96.24	**0.22**	3.76
Total Project Cost (A+B+C)	**183.22**	**176.42**	96.29	**6.80**	3.71

Note: Numbers may not sum precisely due to rounding.

Sources: Power Grid Company of Bangladesh Limited and Asian Development Bank estimates.

E. Detailed Cost Estimates by Year

Item	($ million)				
	Total Cost	**Year 1**	**Year 2**	**Year 3**	**Year 4**
A. Investment Costs					
1 Civil Works	13.04	-	9.08	3.97	-
2 Mechanical and Equipment	110.44	-	11.08	75.70	23.66
3 Environment and Social Mitigation Costs	0.47	-	0.47	-	-
4 Freight and Insurance	2.90	-	0.29	2.03	0.58
5 Project Management	1.47	0.32	0.48	0.47	0.19
6 Consultancy	4.85	0.90	1.93	2.01	-
7 Taxes and Duties	34.69	0.27	4.82	23.34	6.26
Total Base Cost (A)	**167.86**	**1.49**	**28.15**	**107.53**	**30.69**
B. Contingencies	**9.53**	**0.00**	**0.76**	**6.53**	**2.23**
1 Physical [b]	4.51	0.00	0.62	2.91	0.98
2 Price [c]	11.80	-	0.94	7.61	3.25
3 Exchange Rate Variation-PPP Adjustment	-6.78	0.00	-0.80	-3.98	-2.00
C. Financing Charges During Implementation	**5.83**	**0.00**	**0.41**	**2.72**	**2.69**
1 Interest during Construction	5.73	0.00	0.36	2.69	2.68
2 Commitment Charges	0.09	-	0.05	0.03	0.01
Total Project Cost (A+B+C)	**183.22**	**1.50**	**29.32**	**116.78**	**35.61**
% Total Project Cost	**100.00%**	**0.82%**	**16.00%**	**63.74%**	**19.44%**

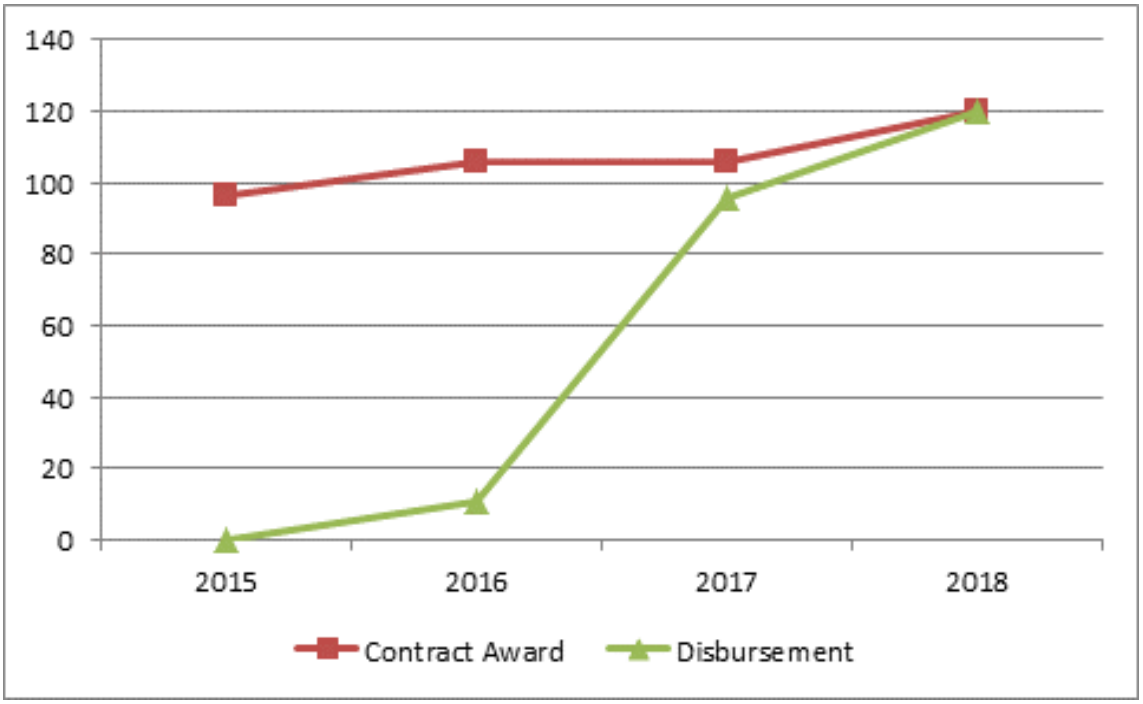
PPP = purchasing power parity

Note: Numbers may not sum precisely due to rounding.

Sources: Power Grid Company of Bangladesh Limited and Asian Development Bank estimates.

F. Contract and Disbursement S-curve

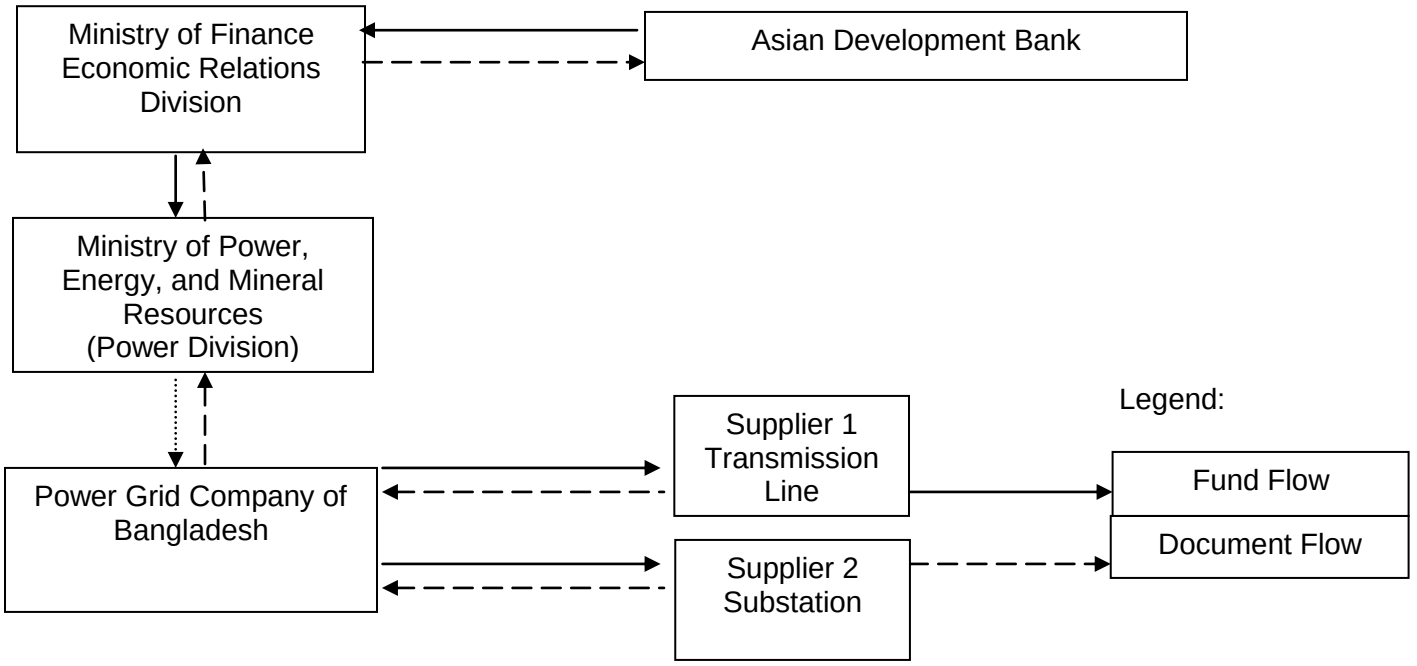
10. The graph show contract awards and disbursement over the life of the project, and annually based on the contract awards and disbursement projections.



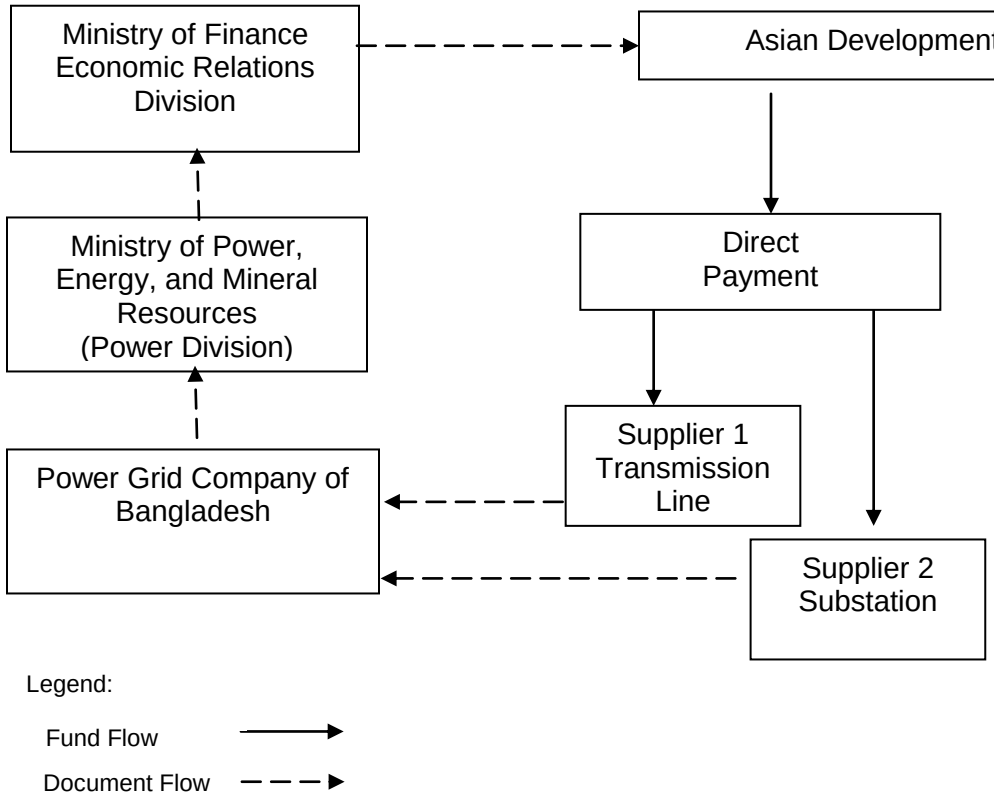
G. Fund Flow Diagram

11. The following fund flow arrangements are proposed.

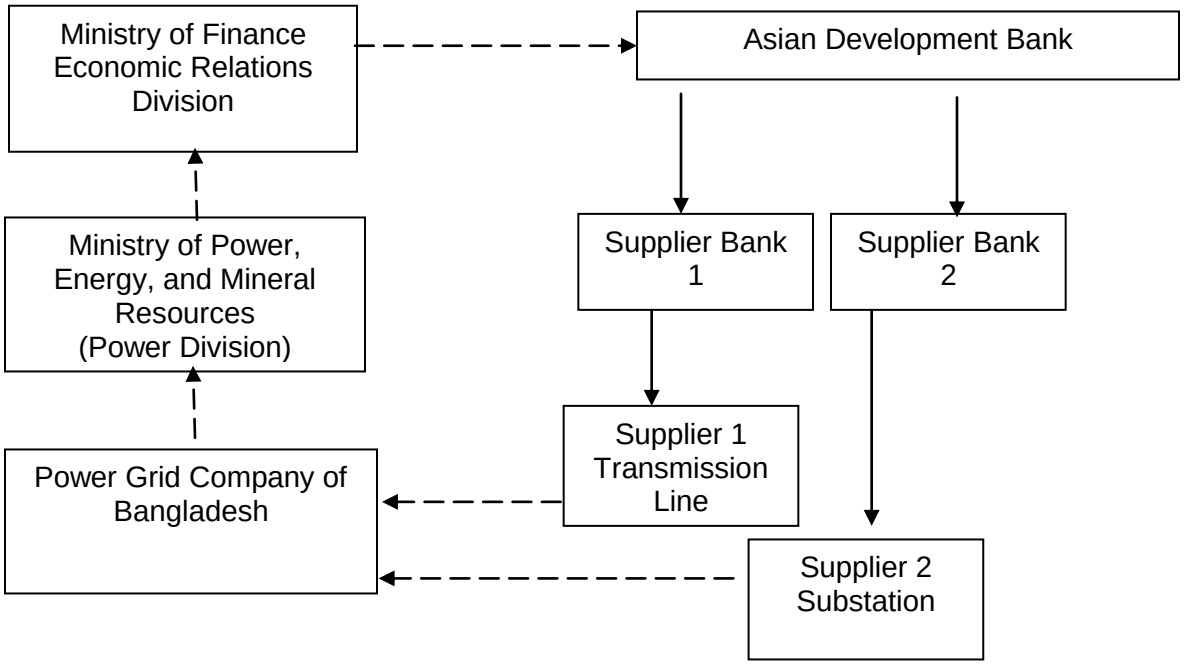
For Reimbursement Procedures



For Direct Payment Procedure



For Commitment Letter Procedure



Legend:

Fund Flow ——→

Document Flow - - - →

V. FINANCIAL MANAGEMENT

12. A financial management assessment of PGCB was undertaken after administration of a financial management assessment questionnaire in 2015 during the preparation of the project.

A. Financial Management Assessment

13. PGCB was incorporated in 1996 under the Companies Act (1913, amended in 1994) as part of the government's restructuring of the power sector. PGCB is responsible for the construction, operation, and maintenance of high voltage transmission system in the country. Bangladesh Power Development Board (BPDB), a wholly owned Government of Bangladesh entity, owns 76.25% of the share capital of PGCB, with the balance held by various institutions and individual shareholders. The financial management assessment (FMA) was conducted in accordance with ADB's *Financial Management and Analysis of Projects* during Project preparation and was found to be acceptable. PGCB is a recipient of ADB loans including Loan 2039: BAN Power Sector Development Project, Loan 2332: BAN Sustainable Power Sector Development Project and Loan 2661 and 3031: SASEC Bangladesh India Electrical Grid Interconnection Project and is therefore familiar with ADB's procedures and reporting requirements. PGCB is listed on the Dhaka and Chittagong Stock Exchanges and its financial parameters are disclosed on a quarterly basis. PGCB has been rotating its external auditors on a periodic basis.

14. For the financial year 2013–14, PGCB's financial performance deteriorated and the company reported a loss (BDT29 million) for the first time in several years. PGCB's transmission tariff has not been increased since 2004. PGCB application to the Bangladesh Energy Regulatory Commission in 2014 for increase in transmission tariff is under review. While PGCB reported a profit during the past few years, non-increase of tariff and the resultant cash flow inadequacy will impact the company's debt service commitments if not addressed. As of June 30, 2014, a sum of BDT13,810 million is overdue to Government of Bangladesh towards interest and principal repayments.

15. The Financial Management risk is rated as substantial as PGCB's tariff regulations have not been notified. The government has confirmed that the tariff regulations would be notified and made effective in August 2015. Support is proposed under the loan for PGCB to build capacity to file appropriate tariff petitions to the Bangladesh Energy Regulatory Commission including for computation of transmission charges and filing of regulatory reporting information as well as capital cost to support its proposal for a cost reflective tariff in a timely manner.

16. PGCB's accounting system allows for the proper recording of transactions, and the allocation of all relevant expenditures as required by the respective components, disbursement categories and sources of funds. The accounts of PGCB are prepared on the basis of accrual accounting. The Company prepares its accounts in line with Bangladesh Accounting Standards (BAS) and other applicable Accounting standards of the Institute of Chartered Accountants' of Bangladesh. These accounts are audited annually by a firm of Chartered Accountants.

17. All projects under implementation are under the overall supervision of PGCB Head Office. Reports are prepared giving details of physical progress and financial expenditures, comparing actual results with the project's budgets. These reports are reviewed on a monthly basis by the company's senior management consisting of the Managing Director, Executive Directors, all officers of the level of Chief Engineer or General Manager. Budgets are prepared which include both physical and financial targets. The budgets include all significant activities in

sufficient details, so as to facilitate meaningful comparisons with actual results. Approvals of all expenditures in excess of the Budget must be obtained on a prior basis. All actual results are compared with budgets, and major variances explained. PGCB's budgets are prepared by the Director Finance and approved by Company's Board of Directors.

18. Controls are in place concerning the preparation and approval of all transactions related to expenditure and ensuring that transactions are correctly made and adequately explained. The execution of a transaction and its subsequent recording is carried out as per delegation of powers defined and approved by the PGCB management. All accounting documents are duly signed and authorized by delegated personnel. PGCB bank accounts are reconciled each month. The outstanding items of bank reconciliation are reviewed and appropriate action is taken within reasonable time, with final reconciliation done at the end of the financial period.

19. The present chart of accounts is adequate to properly account for and report on PGCB's program. PGCB has prepared a number of manuals for the guidance of its staff with a view to enable them to perform their duties efficiently. Some of these manuals include Accounts manual, Manual for Delegation Administrative and Financial Authority, Procedure for financial affairs etc.

20. The Company's Accounts and Finance Department records and reports all transactions incurred by the Company. They are well set out guidelines outlining authorization to execute a transaction and its recording. Clear lines of functional responsibilities are present in the system to ensure that the functions mentioned are carried out by different persons.

21. PGCB's internal audit is conducted by a separate unit headed by Deputy General Manager (Audit) reporting to the Managing Director. This unit which has a staff of nine is responsible for internal audit of about 70 offices of PGCB. Consequently, it is able to execute its work only partially every year. Since establishment in 2005, Internal Audit department has raised 2,560 audit objections till date, out of which 1,722 objections have been resolved, leaving 838 audit objections (of estimated value of BDT1,700 million) still unresolved. Comptroller and Auditor General (CAG) also has raised a number of audit observations on project related accounts as also works related. As of date, 199 audit observations of the CAG (value of BDT17,140 million) yet remain unresolved.

22. PCGB's external audit (as required by the Companies Act, 1994) is conducted by a Chartered Accountant firm appointed for that purpose. The Comptroller & Auditor General of Bangladesh also conducts works audit of PGCB's offices. PGCB's externally aided projects are audited by the Foreign Aided Projects Audit Directorate of the CAG, Bangladesh. Auditors have provided qualified opinions relating to the non-maintenance of fixed assets and inventory registers. Auditors have also observed on the treatment of exchange rate fluctuations.

23. PGCB presently maintains its Fixed Assets Recording System manually. Subsidiary records of Fixed Assets and Stocks are reconciled and updated regularly with the relevant general ledger accounts. There are safeguards in the system to protect assets from fraud, waste and misuse. However, PGCB has not been able to complete creation of fixed assets register for assets transferred from other organization like BPDB (from 2002) due to which the Fixed Asset register of PGCB is incomplete. PGCB is undertaking the required studies to complete the fixed asset register. PGCB also does not insure its assets which have been put to use. However, project assets which are under implementation do have insurance cover taken by the Contractor during the construction period.

24. PCGB does not have a fully integrated computerized MIS and Accounting system. PCGB's transmission information system is online. However, in the area of MIS relating to financial reporting, significant manual intervention is seen. Also, the accounting information flow between the project/operations offices and the Head office (Trial Balance, Bank reconciliation) is manual. For a company of the size of PGCB, it is essential to have a fully integrated financial MIS and accounting system in place to capitalize on the benefits of technology.

25. The Finance & Accounts department has a number of well qualified staff and it has developed a number of manuals for the guidance of employees in the performance of their duties. A detailed budget preparation exercise is also carried out every year as also variance analysis and review.

B. Disbursement

26. The Loan proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2015, as amended from time to time),[14] and detailed arrangements agreed upon between the Government and ADB. The EA will decide on the basis for allocation between OCR and ADF after the financial bids are opened.

27. PGCB will be responsible for preparing disbursement projections, requesting budgetary allocations for counterpart funds, collecting supporting documents and preparing and sending withdrawal applications to ADB.

28. Before the submission of the first withdrawal application, the Borrower should submit to ADB sufficient evidence of the authority of the person(s) who will sign the withdrawal applications on behalf of the borrower, together with the authenticated specimen signatures of each authorized person. The minimum value per withdrawal application is US$100,000 equivalent. Individual payments below this amount should be paid by the executing agency and subsequently claimed to ADB through reimbursement unless otherwise accepted by ADB.

C. Accounting

29. PGCB will maintain separate project accounts and records by funding source for all expenditures incurred on the project. Project accounts will follow international accounting principles and practices or those prescribed by the government's accounting laws and regulations.[15]

D. Auditing

30. PGCB will cause the detailed consolidated project accounts to be audited in accordance with International Standards on Auditing and in accordance with the government's audit regulations by an auditor acceptable to ADB. The audited accounts will be submitted in the English language to ADB within 6 months of the end of the fiscal year by the executing agency. The government and PGCB have been made aware of ADB's policy on delayed submission, and the requirements for satisfactory and acceptable quality of the audited accounts. ADB reserves the right to verify the project's financial accounts to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures. For revenue generating projects only, ADB requires audited financial statements (AFS) for each executing and/or

[14] Available at: http://www.adb.org/Documents/Handbooks/Loan_Disbursement/loan-disbursement-final.pdf
[15] Available at: http://www.adb.org/Documents/Guidelines/loan-disbursement-handbook.pdf

implementation agency associated with the project.

VI. PROCUREMENT AND CONSULTING SERVICES

A. Advance Contracting and Retroactive Financing

31. All advance contracting and retroactive financing will be undertaken in conformity with ADB's *Procurement Guidelines* (April 2015, as amended from time to time) (ADB's *Procurement Guidelines)*[16] and ADB's *Guidelines on the Use of Consultants* (2013, as amended from time to time) (ADB's *Guidelines on the Use of Consultants).*[17] The issuance of invitations to bid under advance contracting and retroactive financing will be subject to ADB approval. The borrower and PGCB have been advised that approval of advance contracting and retroactive financing does not commit ADB to finance the project. PGCB has implemented several ADB financed projects including the similar first interconnection between India and Bangladesh starting in 2010 and is familiar with ADB's guidelines and procedures. Additionally, PGCB has recruited Power Grid Corporation of India (PGCIL) to assist on procurement and project management in 2014. PGCIL has extensive experience in ADB and World Bank–financed projects and for HVDC interconnections. Based on this, it is assessed that PGCB and PGCIL are capable of undertaking the procurement under the project.

32. **Advance contracting.** In order to expedite project implementation, the Borrower has requested and ADB has approved advance contracting actions for the procurement of the two turnkey packages. The steps to be concluded in advance include tendering and bid evaluation of the turnkey equipment packages under the project to be financed by ADB. Recruitment of consultants would also be taken forward under advance contracting.

33. **Retroactive financing**. The Borrower has requested approval for retroactive financing. Retroactive financing will be limited to $24 million which is 20% of the loan amount provided that the expenditures are made in accordance with ADB's Procurement Guidelines and safeguard policies and were incurred before loan effectiveness but not more than 12 months before the signing of the loan agreement.

B. Procurement of Goods, Works and Consulting Services

34. All procurement of goods and works financed by ADB will be undertaken in accordance with ADB's *Procurement Guidelines.*

35. International competitive bidding procedures will be followed for the procurement of the HVDC sub-station and transmission line packages.

36. National competitive bidding (NCB) is not proposed to be utilized under the project.

37. An 18-month procurement plan indicating threshold and review procedures, goods, works, and consulting service contract packages and national competitive bidding guidelines is in Section C.

38. All consultants will be recruited according to ADB's *Guidelines on the Use of*

[16] Available at: http://www.adb.org/Documents/Guidelines/Procurement/Guidelines-Procurement.pdf
[17] Available at: http://www.adb.org/Documents/Guidelines/Consulting/Guidelines-Consultants.pdf

Consultants.[18] The terms of reference for all consulting services are detailed in Section D.

39. The consulting services would comprise an estimated 48 person-months of consulting services required to (i) strengthen the institutional and operational capacity of the executing agency for HVDC and control center operations, and (ii) support PGCB on tariff filing, regulatory and financial restructuring issues. Two consulting firms will be engaged using the quality- and cost-based selection (QCBS) method with a standard quality:cost ratio of 90:10.

C. PROCUREMENT PLAN

Basic Data

Project Name: : Second Bangladesh-India Electrical Grid Interconnection Project	
Project Number: 44192-016	**Approval Number**:
Country: BANGLADESH	**Executing Agency**: Power Grid Company of Bangladesh (PGCB)
Project Procurement Classification: B	**Implementing Agency:** Power Grid Company of Bangladesh Limited (PGCB)
Procurement Risk: Moderate	
Project Financing Amount: $ 183.2 **ADB Financing:** $ 120.0 million **Non-ADB Financing:** $ 63.2 million	**Project Closing Date: 30 June 2018**
Date of First Procurement Plan 06 May 2015	**Date of this Procurement Plan**: 06 August 2015

I. Methods, Thresholds, Review and 18-Month Procurement Plan

1. Procurement and Consulting Methods and Thresholds

Except as the Asian Development Bank (ADB) may otherwise agree, the following process thresholds shall apply to procurement of goods and works.

Procurement of Goods and Works		
Method	**Threshold**	**Comments**
International Competitive Bidding (ICB) for Works	$15,000,000	
International Competitive Bidding for Goods	$2,000,000	
National Competitive Bidding (NCB) for Works	Beneath that stated for ICB, Works	
National Competitive Bidding for Goods	Beneath that stated for ICB, Goods	
Shopping for Works	Below $100,000	
Shopping for Goods	Below $100,000	

Consulting Services	
Method	**Comments**
Quality and Cost Based Selection (QCBS)	90:10

[18] Checklists for actions required to contract consultants by method available in e-Handbook on Project Implementation at: http://www.adb.org/documents/handbooks/project-implementation/

2. Goods and Works Contracts Estimated to Cost $1 Million or More

The following table lists goods and works contracts for which the procurement activity is either ongoing or expected to commence within the next 18 months.

Package Number	General Description	Estimated Value	Procure-ment Method	Review	Bidding Procedure	Advertise-ment Date	Comments
1	Turnkey contract for the transmis-sion line	8.5	ICB	Prior	1S2E	3rd Quarter 2015	Financed by ADB and Government of Bangladesh
2	Turnkey contract for the HVDC sub-station	96.2	ICB	Prior	2S	1st Quarter 2015	Financed by ADB and Government of Bangladesh

3. Consulting Services Contracts Estimated to Cost $100,000 or More

The following table lists consulting services contracts for which the recruitment activity is either ongoing or expected to commence within the next 18 months.

Package Number	General Description	Estimated Value	Recruit-ment Method	Review (Prior / Post)	Advertise-ment Date (quarter/year)	Type of Propo-sal	Comments
1	Technical support to PGCB	0.8	QCBS	Prior	Q3/2015	FTP	International 90:10
2	Regulatory and Financial Support	0.5	QCBS	Prior	Q3/2015	STP	International 90:10

4. Non-ADB Financing

The following table lists goods, works and consulting services contracts over the life of the project, financed by Non-ADB sources.

Consulting Services				
General Description	**Estimated Value (cumulative)**	**Estimated Number of Contracts**	**Recruitment Method**	**Comments**
Engineering and Design Services, Construction Supervision, Testing	3.6	1	QCBS	Recruitment by PGCB following Government of Bangladesh procurement norms

D. Consultant's Terms of Reference

40. The detailed Terms of Reference (TOR) of the Consultants are presented in Appendix 1.

VII. SAFEGUARDS

41. The project is classified as category B on environment, category B on involuntary resettlement, and category C on indigenous peoples according to ADB's Safeguard Policy Statement (SPS) 2009. PGCB will have the responsibility to implement environmental and social safeguards requirements defined in the Initial Environmental Examination (IEE) including the environmental management plan (EMP) and Resettlement Plan (RP). A Project Management Unit (PMU) headed by a Project Director (PD) from PGCB will be established for the management and general supervision of project implementation. An environmental staff or a firm, who will be primarily responsible for ensuring that the EMP is properly implemented, will be recruited for the project prior to award of the civil works contract. The PMU will have a dedicated Resettlement Implementation Officer (RIO) for the implementation of RP. PGCB is responsible for EMP and RP implementation, monitoring, and any scope or design changes which may require an update of the IEE and RP, ongoing stakeholder consultation, and grievance redress mechanism. PGCB will ensure that bidding and contract documents incorporate the resettlement plan.

42. No significant air, water, noise or soil pollution will result from the project. The potential adverse environmental impacts are envisaged to be temporary, predictable, minimal and reversible and can be readily mitigated through standard construction engineering practices and adherence with EMP. Corrective actions will be taken for any unanticipated impacts and inadequate safeguards implementation. Engineering, Procurement and Construction contractor(s) are required to comply with the EMP during pre-construction and construction stage and the PMU of PGCB will monitor compliance. Consultations with project stakeholders will continue through the pre-construction, construction and operation stages.

43. Resettlement impacts have been minimized at the design stage by selecting substation site at government land and existing substation site which does not require any resettlement and scheduling construction of transmission lines during crop off-season.

44. A grievance redress mechanism (GRC) at the union level will be set up by PGCB. GRC will keep the record of the grievances, and provide the solution(s) within 15 days from the date of the complaint. All complaint related documentation such as minutes of the meeting and decisions will be summarized and become part of the semi-annual monitoring report submitted to ADB. If the grievance is not addressed, the complainant can seek legal redress of the grievance in the appropriate courts.

45. To monitor all activities enumerated in the environment management plan and resettlement plan and report the same, an internal monitoring system would be operationalized. The internal monitoring would be the responsibility of the environmental staff and Resettlement Officer assisted by local consultants. The reports of the internal monitoring would be prepared quarterly and submitted to the Project Director for review and approval. Besides, a semi-annual report stipulating all efforts and outcomes will be sought by the ADB from the PGCB. The IEE, RP, environmental and social monitoring reports will be disclosed on the ADB website as required by SPS 2009 and Public Communications Policy 2011. Any update in the IEE and RP resulting from a change in project scope will be similarly disclosed.

46. Pursuant to ADB's Safeguard Policy Statement (2009) (SPS),[19] ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at Appendix 5 of the SPS.

47. If the transmission line alignment changes during preparation of final RP, based on the Detailed Measurement Survey (DMS), then such losses will be included in the entitlement matrix and the final RP will be revised accordingly. The date of the census along the new alignment will be the cut-off date for resettlement benefits. If any of the safeguard requirements that are found not to be satisfactorily met, the borrower should develop and implement an appropriate corrective action plan (CAP).

48. The EA will continue to engage in consultations with the displaced communities and the civil society organizations to disclose information included in the RP such as compensation payment procedures, progress of resettlement related activities, safeguard plans etc. Accordingly, the contribution of APs and beneficiary groups will be included in the updated RP. Transparent disclosure of all project related information, including all RP implementation related events will be ensured by PGCB.

VIII. GENDER AND SOCIAL DIMENSIONS

49. The nature of the project to bring in high voltage power from the Indian grid to Bangladesh The project is classified as no gender elements (NGE). Citizens in Bangladesh will benefit from the timely implementation of the project and flow of power. Men and women would have more time to pursue economic activities and participation through community-based organizations. A regular supply of power would boost the local economy through the establishment of industries, small enterprises and shops and local people, especially the youth, will be employed in civil works, increasing sources of income. The project will boost the production capacity of existing industries and facilitate new ones, especially in manufacturing in the Western parts of Bangladesh generating employment opportunities. With reference to the summary poverty reduction and social strategy (SPRSS), gender-related efforts would be to ensure the representation and participation of women in meaningful consultations and decision-making bodies (including the Grievance Redress Committee). GRC reports would be part of the semi-annual monitoring to ADB.

[19] Available at: http://www.adb.org/Documents/Policies/Safeguards/Safeguard-Policy-Statement-June2009.pdf

IX. PERFORMANCE MONITORING, EVALUATION, REPORTING AND COMMUNICATION

A. Project Design and Monitoring Framework

50. The DMF for the Project is as indicated

Impacts the Project is aligned with: Availability and sustainability of power supply in Bangladesh increased by 2021 (Perspective Plan of Bangladesh,2012)[a]

Project Results Chain	**Performance Indicators with Targets and Baselines**	**Data Sources and Reporting**	**Risks**
Outcome Increased capacity for cross-border power trade between Bangladesh and India	By 2018: Over 5,000 GWh will flow over the interconnection to Bangladesh (2013–14 baseline: About 2,000 GWh power flow from India)	BPDB annual reports	Delay in initiating bidding from power traders in the Indian electricity market could impact timing and cost of power in Bangladesh
Outputs 1. Bahrampur–Bheramara power transmission link enhanced	By 2017: 1a. One additional HVDC back-to-back substation of 400 kV/230 kV at Bheramara (Bangladesh) constructed by PGCB (2014 baseline: One existing HVDC back-to-back substation of 400 kV/230 kV at Bheramara) 1b. 12 km of 230 kV transmission line from the Bheramara substation to the Ishurdi substation and associated facilities constructed by PGCB (2014 baseline: 5 km of existing 230 kV transmission line)	PGCB annual reports PGCB annual reports	Increase in the prices of raw materials exceeds contingency and inflation forecasts Counterpart funds are not available in a timely manner or are inadequate for project implementation from the Government of Bangladesh and PGCB
2. Capacity of PGCB on technical, project management, regulatory, trading and financial matters improved.	2a. Agreements for power transfer from India signed by agencies in Bangladesh by 2016 2b. Project management for HVDC enhanced at PGCB with the project	BPDB annual reports PGCB annual report	Timely initiation and conclusion of the bidding process after receipt of approvals from the government. Adequate interest for

Project Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
	commissioned on time by 2018 2c. Regulatory cell set up at PGCB and at least five staff trained on meeting regulatory requirements by 2018 2d. At least 10 personnel in PGCB, Power Division and BPDB in Bangladesh trained on Indian power market, load dispatch, power procurement, and financial issues by 2017	PGCB annual report MPEMR annual reports	electricity market bidders for supply of power to Bangladesh.

Key Activities with Milestones
Output 1: Bahrampur–Bheramara power transmission link enhanced

1.1 Issue bidding documents for substation (Q1 2015) and transmission line (Q3 2015)
1.2 Award contracts for substation (Q4 2015) and transmission line (Q1 2016)
1.3 Start construction on substation (Q4 2015) and transmission line (Q1 2016)
1.4 Completion of line and substation (Q4 2017)

Output 2: Capacity of PGCB on technical, project management, regulatory, trading and financial matters improved.

2.1 Select HVDC substation implementation consultant (funded by the Government of Bangladesh) (February 2015)
2.2 Select other consultants (funded under ADB loan) (Q4 2015)
2.3 Mobilize consultant (funded under ADB loan) (Q1 2016)
2.4 Complete consulting services (Q4 2017)

Inputs
Loan

ADB Asian Development Fund loan:	$85.0 million
ADB ordinary capital resources loan:	$35.0 million
Government of Bangladesh:	$63.2 million
Total:	**$183.2 million**

Assumptions for Partner Financing
Not applicable.

[a] Government of Bangladesh, Ministry of Planning, Planning Commission. 2012. *Perspective Plan for Bangladesh 2010–2021, Making Vision 2021 a Reality*. Dhaka.
ADB = Asian Development Bank; BPDB = Bangladesh Power Development Board; GWh = gigawatt-hour; HVDC = high-voltage direct current; km = kilometer; kV = kilovolt; MPEMR = Ministry of Power, Energy and Mineral Resources; PGCB = Power Grid Company of Bangladesh.
Source: Asian Development Bank estimates.

B. Monitoring

51. **Project performance monitoring.** Overall monitoring of the project in terms of progress will be undertaken by the Steering Committee, which will review monthly progress reports submitted by PGCB. The Projects Department of PGCB will monitor progress, procurement, quality, contract management, and fiduciary management. In addition, the Projects Department will undertake regular field visits and provide guidance to the Project Director and the Project Consultants.

52. **Compliance monitoring**: Financial covenants and compliance will be monitored by an external auditor.

53. **Safeguards monitoring**: The SEU of PGCB will be responsible to coordinate and implement the entire social, environment, and resettlement activities including the implementation of the resettlement plan efficiently. The SEU will have a dedicated Resettlement Implementation Officer and environmental staff for the same. To monitor all activities enumerated in the environment management plan and resettlement plan and report the same, an internal monitoring system would be operationalized and would be the .responsibility of the Resettlement Officer. The reports of the internal monitoring would be prepared quarterly and updates included in the quarterly progress reports submitted to PGCB and ADB for review and approval.

54. All the activities detailed out in the poverty and social action plans, would be closely monitored, and reported as enumerated in the previous paragraphs. These would be carried out in line with the principle of ADB by way of which, in case of involuntary resettlement, all efforts would be made to improve or at least restore the quality of life of all displaced persons.

C. Evaluation

55. ADB will field regular review missions every six months at the minimum to review status of contract awards, disbursements, physical progress, and implementation of the environmental management plan and resettlement plans. Within 6 months of physical completion of the project, PGCB will submit a project completion report (PCR) to ADB. Subsequently, ADB will field a mission to finalize the PCR.

Table 1: Evaluation Methodology

Evaluation Activity	Purpose	Methodology	Who responsible and involved
Review Mission	Review the progress of the project and provide guidance to facilitate implementation	Site visits and meetings with EA officials, contractors, consultants at least twice a year	ADB/ PGCB
Mid Term Review	Comprehensive review of the project	Not needed as review missions will be conducted regularly and the project implementation is only 3 years	
Project completion report	Evaluate the overall output of the project and its relevance and suitability	Site visit and meetings with EA officials, contractors, consultants	ADB/ PGCB

ADB = Asian Development Bank; EA = executing agency; PGCB = Power Grid Company of Bangladesh.

D. Reporting

56. PGCB will provide ADB with (i) quarterly progress reports in a format consistent with ADB's project performance reporting system; (ii) consolidated annual reports including (a) progress achieved by output as measured through the indicator's performance targets, (b) key implementation issues and solutions; (c) updated procurement plan and (d) updated implementation plan for next 12 months; and (iii) a project completion report within 6 months of physical completion of the project. To ensure projects continue to be both viable and sustainable, project accounts and the executing agency AFSs, together with the associated auditor's report, should be adequately reviewed.

E. Stakeholder Communication Strategy

57. The Stakeholder Communications Strategy is described in the following table. PGCB will post all relevant information on its website. The website will include at minimum information regarding the bidding process, bidders, contract awards, use of funds disbursed under the project and physical progress.

Stakeholder Communication Strategy

Project information to be communicated	Means of Communication	Responsibility	Audience	Frequency
Report and Recommendation of the President with linked documents	ADB website	ADB	ADB, GOB, Development Partners, Civil Society, Individuals	Once
Project information while planning/ designing	Discussions and stakeholder consultations	PGCB	Project beneficiaries	Regular intervals during planning and design
Status of implementation during construction	Boards at site	EA/ Contractors	Project beneficiaries	All the time at construction sites
Project Performance	ADB website	ADB	ADB, Government of	Every quarter

Project information to be communicated	Means of Communication	Responsibility	Audience	Frequency
Reports and Project Information Documents			Bangladesh, Development Partners, Civil Society, Individuals	
Monthly progress reports	Website of PGCB, Reports to the Joint Working Groups and Joint Steering Committees	PGCB	ADB, Government of Bangladesh, Development Partners, Civil Society, Individuals	Monthly
Project completion report	ADB website	ADB	ADB, Government of Bangladesh, Development Partners, Civil Society, Individuals	Once

ADB = Asian Development Bank; EA = executing agency; GOB =Government of Banglaedsh; PGCB = Power Grid Company of Bangladesh.

X. ANTICORRUPTION POLICY

58. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the Project.[20] All contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and all Project contractors, suppliers, consultants and other service providers. Individuals/entities on ADB's anticorruption debarment list are ineligible to participate in ADB-financed activity and may not be awarded any contracts under the Project.[21]

59. To support these efforts, relevant provisions are included in the loan agreements and the bidding documents for the project.

XI. ACCOUNTABILITY MECHANISM

60. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make a good faith effort to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.[22]

XII. RECORD OF PAM CHANGES

61. All revisions/updates during course of implementation should retained in this Section to provide a chronological history of changes to implemented arrangements recorded in the PAM.

[20] Available at: http://www.adb.org/Documents/Policies/Anticorruption-Integrity/Policies-Strategies.pdf
[21] ADB's Integrity Office web site is available at: http://www.adb.org/integrity/unit.asp
[22] For further information see: http://www.adb.org/Accountability-Mechanism/default.asp.

CONSULTANTS TERMS OF REFERENCE

1. Two firms would be recruited under the loan. One firm would be recruited to undertake technical studies and support on capacity building on high voltage direct current (HVDC) and National Load Dispatch Center (NLDC) on the grid code so that Power Grid Company of Bangladesh (PGCB) can improve its capabilities as it seeks to expand the power network to cater to national targets of electricity for all by 2021. Another firm would be recruited to support PGCB on regulatory tariff filing and for preparation of a financial restructuring plan for PGCB.

2. PGCB will designate a counterpart team, which will work closely with the consultants, and provide onsite coordination and data gathering, as well as the necessary assistance in liaising with other relevant stakeholders.

3. It is expected that the study will involve a significant capacity building effort. Therefore, a significant part of this study will be developed in Bangladesh, working alongside with the assigned counterpart.

I. TECHNICAL SUPPORT TO PGCB

A. Introduction

4. The proposed consultancy services will focus on the areas of (i) power system analysis focusing on operational dispatch, steady state security, transient and dynamic stability (ii) long term system planning and (iii) system operation and control. These involve examining the policy, legal and regulatory, economic and technical aspects relating to these areas to ensure smooth operation of the Bangladesh power system.

B. Scope of Work

5. The proposed consultancy services will cover the following.

1. Static and Dynamic Studies

6. The Consultant will review the Bangladesh power system characteristics and develop a power system model to perform static and dynamic studies. The consultant will perform the necessary studies to determine the system performance after generation or network incidents, which may (or may not) require load shedding in order to stabilize the system. In particular following scenarios should be evaluated –

(i) Short term (2016-2017) taking the existing power system and the eventual additions which will be in service by such dates;
(ii) Medium term (2020) considering the new developments included in the decided investment plans; and long term (2025).
(iii) Summer and Winter
(iv) Peak, shoulder and base load conditions;
(v) Different levels of spinning reserve and frequency regulation schemes.

2. Power Plants Assessment

7. The Consultant will perform an assessment of the technical characteristics and condition of a subset of most important power plants (about 15 power plants, to be selected in agreement with PGCB). The assessment will be focused on

(i) The capabilities of the power plant's units to operate in droop mode (exercising primary frequency regulation);
(ii) The capabilities of the power plant (or some units within the power plant) to perform secondary frequency regulation: Receiving up/down or set point commands from the NLDC to adjust their generation output;
(iii) Identification of the adaptations required in order the power plant (or some units within the power plant) will be able to exercise primary and/or secondary frequency control:
(iv) The feasibility and associated cost of such adaptations / modifications.

3. Frequency Control Scheme, Required Level of Reserves and Security Plan

8. The Consultant will perform technical and economic studies to recommend the most suitable frequency control scheme and appropriate level of reserve for different operational conditions. The consultant will also identify the investment and operational costs associated with the introduction of such method, including the costs associated with operating the system with different levels of primary and secondary reserves. The consultant should also establish the "most severe credible contingency" that the system should be capable to support without load disconnection and issue recommendations on the most appropriate option taking into account costs and associated benefits.

9. Taking into account the results of the studies and the recommendations issued in relation with the frequency control scheme and level of reserves, the Consultant will design an appropriate defence plan, based on under-frequency schemes (U/F) and special protection systems (SPS) to minimize disconnected load in case of severe incidents (beyond the "most severe credible contingency" criteria; guarantee the survival of the main system after disturbances; and eventually produce system separations in self-supported islands in case of important disturbances.

10. The consultant will also determine the necessary adaptations in the PGCB substations in order to implement the suggested defence plan and estimate the costs of such adaptations. The Consultant will identify any required change to the existing regulation necessary to improve economic operations and enhance system security. In particular, the Consultant will review the Grid Code and propose the necessary adaptations to implement the issued recommendations.

4. Improvements at NLDC

11. In collaboration with NLDC, the Consultant will evaluate options for an IT tool for short term (day ahead and on-line) economic dispatch. The tools should be capable to properly model security and reliability constraints and the particular characteristics of the Bangladesh system. The Consultant should also identify improvements at the NLDC in order to:

(i) Enhance the observability of the system at the NLDC (reception at the NLDC of all the relevant information to properly control the power system and assess system security at all times);
(ii) Install, commit and test the IT tools and data required for secure operation of the system;

(iii) Monitor the performance of the system (in normal operation and after contingencies) assuring compliance with the prescriptions of the Grid Code; and
(iv) Implement the recommendations issued in relation with the defence plans.

5. Road Map and Implementation Plan

12. The Consultant will evaluate the feasibility of the proposed actions comparing the current operation performance vs. the proposed one. This feasibility will be evaluated through a comprehensive cost-benefit analysis. After such evaluation, a road map to improve grid security including making required investments, system planning and system operation procedures, institutional, regulatory and commercial changes and implementation plan will be developed. This implementation plan should include (at least):

(i) Detailed costs for each of the proposed actions;
(ii) The sequence of tasks to be performed;
(iii) Detailed time-schedule for implementation, indicating most relevant milestones and outcomes for each specific task.

6. Capacity Building Plan

13. Based on the findings obtained during the execution of the project, the Consultant will develop and recommend a Capacity Building program to strengthen the capability of PGCB in following areas:

(i) Power System Operation (in particular taking into account the particularities of HVDC systems);
(ii) Power System Economics;
(iii) Power System Planning.

14. During the execution of the Project, at least two training courses of about one week duration will be carried out. The scope and contents of each course will be agreed between the Consultant and PGCB counterpart, and it shall be approved by the ADB.

C. Proposed Consultancy Services

15. A consulting firm will be engaged under the Asian Development Bank guidelines using full technical proposal and quality and cost based criteria (QCBS) of 90:10. The firm should demonstrate key expertise (i) economic security constrained dispatch, (ii) power system analysis focusing on transient and dynamic stability as well as design of security plans; (iii) long term system planning and (iv) system operation and control including the design/implementation of defense plans in case of severe incidents. The proposed intermittent consultancy services are presented below:

International Specialists	Person-months
1 Power Transmission Specialist HVAC/HVDC (project team leader)	8
1 Power Transmission Specialist (Analysis and Software)	8
1 Power Engineer (Dispatch)	2
1 Power Engineer (Operations)	4
1 Power Generation Specialist (Thermal Generation)	4
1 Power Economist (Energy Markets and Regulation)	2
Total	**28**

16. **Power Transmission Specialist with expertise in HVAC and HVDC.** With expertise in grid design; analysis; simulation; and grid control/protection/monitoring systems. The specialist with an Electrical Power Engineering degree preferably at postgraduate level and at least 10 years of relevant experience will represent the firm and act as Team Leader, assisted by the team of experts and guided by the ADB project team. With proven capacity to develop on a step- by-step basis the proposed review of grid design and operations; frequency regulation and control; grid mapping; including power flow simulations, while recommending the action plan and roadmap for improving operations. The services must include preparing a comprehensive training plan for PGCB staff on the topics he/she considers appropriate and comments to the existing grid code.

17. **Power Transmission Specialist with expertise in power system analysis and related software systems.** With expertise in grid design; analysis; and simulation. The specialist with Electrical Power Engineering degree preferably at postgraduate level and at least 10 years of relevant experience act as Deputy Team Leader. Will lead the grid simulation and prepare the draft action plan and roadmap to : (i) Improve frequency regulation and control; (ii) propose an integrated defense plan for preserving system integrity in case of important contingencies; and (iii) repairing/improving the existing grid structure in Bangladesh. He/she will assist the team in all relevant described items of the consultancy services. It is expected that an important part of his/her tasks will be developed working alongside with PGCB staff assuring effective capacity building and on the job training.

18. **Power Engineer with expertise in Day Ahead and On-line Dispatch.** With expertise in economic dispatch models (at operational level), solving of operational and security constraints, and implementation of dispatch results. The specialist with an Electrical Power Engineering degree (or similar) preferably at postgraduate level and at least 10 years of relevant experience, will lead the evaluation of appropriate tools for short term –day ahead and on line- economic dispatch, taking into account security and reliability constraints and the particular characteristics of the Bangladesh system.

19. **Power Engineer with expertise in system operations.** With expertise in on-line system operations, security analysis and implementation of defense plans. The specialist should have an Electrical Power Engineering degree preferably at postgraduate level and at least 10 years of practical experience in operation of large power systems. Working closely with the Power Transmission Specialist, he/she will develop a detailed road-map for: (i) improving the observability of the system at the NLDC (reception at the NLDC of all the relevant information to properly control the power system and assess system security at all times); (ii) committing and testing the IT tools and data required for secure operation of the system; (iii) monitor the performance of the system (in normal operation and after contingencies) assuring compliance with the prescriptions of the Grid Code; and (iv) implement the recommendations issued in relation with the defense plans.

20. **Power Generation Specialist with expertise in thermal power plants.** With expertise in power generation design, control and management (highly desirable with expertise managing large power plants). The specialist with Electrical Power/Mechanical Engineering degree preferably at postgraduate level and at least 10 years of relevant experience will lead the preparation of all recommendations related to operation and control of the thermal generation system in order to implement (at the power plant level) the recommendations issued. Special emphasis should be put in (i) actual implementation of dispatch order, received either through telephone and/or electronically (i.e. through an AGC system); (ii) frequency control and regulation; and (iii) appropriate monitoring and control. The specialist will determine the

minimum control requirements for new plants (to be incorporated into the Grid Code), the tests to be performed before commissioning or after a major overhaul, the required improvements/adaptations on at least 6 existing power plants, cost estimations of such improvements and a tentative time-schedule for implementation. He/she will assist the team in all relevant described items of the consultancy services.

21. **Energy Economist with expertise in energy markets and regulation.** With expertise in energy market and regulatory analysis. The specialist with a degree in electrical engineering and a background in power system economics and regulation and with at least 10 years of relevant experience will lead the preparation of all recommendations related to economic operation of the power system, regulations and market development. Will assist the team in all relevant described items of the consultancy services with special emphasis in the potential changes to the existing regulation required to improve economic operations and enhance system security. In close coordination with the Team Leader, review the Grid Code and propose the necessary adaptations to implement the issued recommendations.

22. PGCB will assist the consultant through:

(i) Provision of relevant reports, databases, engineering diagrams, etc.;
(ii) Facilitation of data collection from different stakeholders, in particular the most important power plants;
(iii) Ensuring the participation of key stakeholders in workshops, seminars and training programs; and
(iv) Designating contact persons/representatives from PGCB who will be act as focal person /coordinator.

II. FINANCIAL RESTRUCTURING, MARKETS AND REGULATORY SUPPORT TO PGCB

A. Introduction

1. PGCB has not had a tariff increase for several years as the Bangladesh Energy Regulatory Commission (BERC) tariff regulations are not yet notified and the company's financial position is impacted as its costs continue to increase without matching increases in revenue. The consultancy would review options to improve PGCB's financial position through a financial restructuring plan and also provide assistance to support compliance with BERC reporting requirements.

B. Proposed Consultancy Services

2. A consulting firm will be engaged under ADB guidelines using simplified technical proposal and quality and cost based criteria (QCBS) of 90:10. The firm should demonstrate key expertise in (i) preparing and implementing financial restructuring for electricity sector utilities, (ii) support utilities on tariff design, commercial arrangements, capital expenditure review and regulatory interface. The proposed intermittent consultancy services are presented below:

International Specialists	Person-months
1 Financial Restructuring Specialist (project team leader)	6
1 Regulatory Support Specialist	4
1 Capital Expenditure Review Specialist	3
1 Tariff and Commercial Specialist	3
1 cross border trading specialist	4
Total	**20**

3. **Financial Restructuring Specialist.** The specialist with a postgraduate degree in accounting (CA, CPA or CFA) and at least 15 years of relevant experience will represent the firm and act as Team Leader, assisted by the team of experts and guided by ADB' project team. He/she will work with PGCB, Power Division and Ministry of Finance to review BERC tariff approved for PGCB and develop options to improve PGCB's financial sustainability through a restructuring of PGCB's existing debt, infusion of equity and/or other alternatives. The consultant will also review the issues identified during the financial management assessment of PGCB and how these may be resolved in a time-bound manner. The output would be a financial restructuring plan for PGCB with time-bound periodic targets. In addition, the consultant would be required to support PGCB management to present and seek approvals for the plan from the Government and other key stakeholders. The consultant would also support PGCB management in reviewing the implementation of the plan and providing support on a periodic basis. The consultant should have proven capacity to develop and support implementation of a financial restructuring plan for electricity sector utilities, with capacity to interact and work with multiple stakeholders including the government, regulator and other sector utilities in a leadership role.

4. **Regulatory Support Specialist.** The specialist with a postgraduate level and at least 15 years of relevant experience would be the Deputy Team Leader. He/she will lead an assessment of PGCB's capacity to respond to BERC requirements as required under the Act, codes and licence conditions. Subsequently, the specialist would support PGCB in the recruitment/training/ capacity building of staff in a regulatory interface unit at PGCB that would be responsible for responding to regulatory reporting requirements. The Specialist may also be required to organize joint training programs and capacity building workshops for PGCB staff on issues such as implementation of the grid code, tariff design, commercial agreements and performance monitoring to which other stakeholders including the BERC would be invited to participate.

5. **Capital Expenditure Review Specialist.** The Specialist would have expertise in supporting utilities or regulatory commissions on cost benefit analysis of capital expenditure plans. The specialist with a post graduate degree and at least 20 years of relevant experience will work with PGCB to prepare an update on the planned and actual capital expenditure incurred by PGCB over the last five years, a post investment cost benefit analysis and comparison of the benefits achieved against pre investment information. The Specialist will also support in engaging with stakeholders including BERC, Power Division and other utilities on reviewing reporting requirements for capital expenditure for PGCB's project and mitigating common risks that impact timely and within cost implementation of projects.

6. **Tariff and Commercial Specialist.** The Specialist would have expertise in tariff setting for transmission utilities and preparation of commercial arrangements between transmission utilities and other utilities. The specialist with a post graduate degree in finance/accounts/economics/other relevant fields will have a background in working with transmission utilities and regulators and with at least 15 years of relevant experience. He/she

will assist PGCB in preparing alternate tariff design proposals for review by BERC as well as the review commercial arrangements between PGCB, public and private generators and distribution companies and propose adaptations to existing agreements. The Specialist would also work with the Financial Restructuring Specialist to support PGCB on tariff related elements of the financial restructuring plan.

7. **Trading Specialist.** The Specialist would have expertise in cross-border power purchase agreements and bulk power transmission agreements. The specialist with a post graduate degree and a background in working on power trading with at least 15 years of relevant experience. PGCB currently recovers the cost of the cross-border line based on the actual power flows over the line from India to Bangladesh. The consultant would assist PGCB and other stakeholders including the IPP Cell to support the maximum utilization of the interconnection with India and reducing the impact on PGCB of reduced or no flow of electricity from the Indian side. The Specialist would conduct workshops and capacity building on power trading under different scenarios with India including through power exchanges.