Project Administration Manual

Project Number: 42378-017
Loan No.: XXXX
November 2015

People's Republic of Bangladesh: Power System Expansion and Efficiency Improvement Investment Program (Project 3)

CONTENTS

Project Administration Manual Purpose and Process

The project administration manual (PAM) describes the essential administrative and management requirements to implement the Tranche 3 on time, within budget, and in accordance with the 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 Ashuganj Power Station Company Limited (APSCL), Bangladesh Rural Electrification Board (BREB), Power Grid Company of Bangladesh (PGCB) are wholly responsible for the implementation of ADB financed Tranche 3, as agreed jointly between the borrower and ADB, and in accordance with the government and ADB's policies and procedures. ADB staff is responsible to support implementation including compliance by executing and implementing agencies of their obligations and responsibilities for Tranche 3 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 Agreement. 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 Agreement, the provisions of the Loan Agreement shall prevail.

After ADB Management approval of the Tranche's Periodic Financing Request Report, 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
APFS	–	Audited Project Financial Statement
APSCL	–	Ashuganj Power Station Company Limited
BREB	–	Bangladesh Rural Electrification Board
CAG	–	Comptroller and Auditor General
CCPP	–	combined cycle power plant
EARF	–	environmental assessment and review framework
EIA	–	environmental impact assessment
EMP	–	environmental management plan
FAPAD	–	Foreign Aided Projects Audit Directorate
FFA	–	framework financing agreement
IDB	–	Islamic Development Bank
IEE	–	initial environmental examination
kV	–	kilovolt
MFF	–	multitranche financing facility
MW	–	megawatt
PAM	–	project administration manual
PGCB	–	Power Grid Company of Bangladesh
PMU	–	project management unit
SOE	–	statement of expenditures

I. PROJECT DESCRIPTION

1. The Government of Bangladesh has prepared an investment program worth of $12 billion for the period of 2012–2015 with the objectives of increasing electrification rate to 68%, by eliminating the supply-demand gap, and resolving the reliability and quality of supply issues. The government's investment program plans to expand generation and undertake matching investments in transmission and distribution improvements. The multitranche financing facility (MFF) with an aggregate facility amounting to $700 million approved on 28 November 2012 supports financing of selected power infrastructure needs from within the government's power investment program.[1] The MFF will fund power sector investments in generation, transmission and distribution systems to improve the efficiency in these systems and to add new capacity for increased power supply and improved reliable energy access to the population. The MFF consists of three tranches to undertake these investments.

2. On 12 December 2012, the Asian Development Bank's (ADB) Management approved Tranche 1 of the MFF in the amount of $185 million for: (i) the upgrading of Khulna gas fired power plant from 150 megawatt (MW) peaking power plant to 225 MW combined cycle power plant (CCPP); (ii) construction of 132 kilovolt (kV) transmission system; and (iii) project implementation supports and preparation of subsequent tranches. The loan and project agreements for Tranche 1 were signed on 3 April 2013 and the loan became effective on 25 June 2013. The loan will be closed on 31 December 2018. The executing agencies are Northwest Power Generation Company Limited (NWPGCL), Power Grid Company of Bangladesh, (PGCB), and the Power Division of the Ministry of Power, Energy and Mineral Resources.

3. On 9 December 2013, ADB's Management approved Tranche 2 of the MFF in the amount of $310 million for: (i) expansion of 230kV/132kV/33kV transmission system; and (ii) augmentation of 132kV/33kV/11kV/400V distribution system in Dhaka City. The loan and project agreements for Tranche 2 were signed on 11 February 2014 and the loan became effective on 14 March 2014. The loan will be closed on 30 June 2019. The executing agencies are PGCB, Dhaka Power Distribution Company (DPDC), and Dhaka Electric Supply Company (DESCO).

4. ADB received the Periodic Financing Request (PFR) for Tranche 3 in the amount of $205 million on 6 August 2015. The government's counterpart financing is proposed to be $105 million. The investments under Tranche 3 will cover part of the government's power sector investment program. The proposed Tranche 3 meets the selection criteria set forth in the Schedule 4 of the framework financing agreement (FFA). It will undertake investments in generation system expansion and efficiency improvement, transmission system enhancement, and demand side energy efficiency improvement. Thus, Tranche 3 will help in achieving the outcome of the MFF—increased access to clean and reliable supply of electricity in Bangladesh.

5. **Impact and outcome.** The proposed Tranche 3 will contribute to the overall impact of the MFF in increasing the energy sector's contribution to low-carbon economic growth in Bangladesh. The impact of Tranche 3 will be increased access to reliable supply of electricity in Bangladesh. The outcome of Tranche 3 will be increased efficiency and capacity of power system in Bangladesh.

6. **Outputs.** Tranche 3 consists of three outputs:

[1] ADB. 2012. *Report and Recommendation of the President to the Board of Directors: Multitranche Financing Facility to Bangladesh for the Power System Expansion and Efficiency Improvement Program.* Manila.

Output 1: Power generation system expanded and upgraded. This comprises replacement of aging steam and gas turbine power plants of equivalent capacity of 220 MW with a more efficient 400 MW combined cycle gas-fired power plant at Ashuganj Power Station complex.

Output 2: Transmission system expanded and upgraded. This comprises:

(i) upgrading approximately 65 kilometer (km) of 132 kV double circuit Comilla (South)-Chandpur transmission line with advanced low loss conductors;
(ii) construction of approximately 7 km of 132 kV double circuit Madunaghat-Kalurghat underground transmission line;
(iii) construction of 132/33 kV air-insulated substation (AIS) at Kachua (Chandpur) and 132/33 kV gas-insulated substation (GIS) at Kalurghat (Chittagong); and
(iv) upgrading of existing 132/33 kV substation at Madunaghat (Chittagong) and 132/33 kV substation at Comilla (South) from AIS to GIS.

Output 3: Demand side energy efficiency improved. This comprises replacement of existing meters with approximately 700,000 pre-payment meters in Dhaka Division.

7. The executing agencies are Ashuganj Power Station Company Limited (APSCL) for Output 1, PGCB for Output 2, and Bangladesh Rural Electrification Board (BREB) for Output 3. Under Output 1, there will be one turnkey package of Ashuganj 400 MW CCPP (East) and one consulting services package to assist APSCL in implementing the turnkey package. Under Output 2, there will be one turnkey package of 132 kV transmission lines and substations in Chittagong Division. Under Output 3, there will be one supply package of pre-payment meters in Dhaka Division. The detailed project description is in **Appendix 1**. APSCL submitted the draft bidding documents to ADB on 14 June 2015. The revised draft bidding documents incorporating ADB's comments was submitted by APSCL on 14 July 2015. BREB submitted its draft bidding documents on 8 June 2015, and submitted the revised bidding documents to ADB on 27 August 2015. PGCB will submit its draft bidding documents in the 4th Quarter of 2015.

II. IMPLEMENTATION PLANS

8. The Tranche will be implemented over five years starting from January 2016. The physical completion is expected by 31 December 2020. Loan closing will be on 30 June 2021, or such other date as agreed between the government and ADB. The MFF will be closed on 31 October 2022. Details on the implementation arrangements are shown in below.

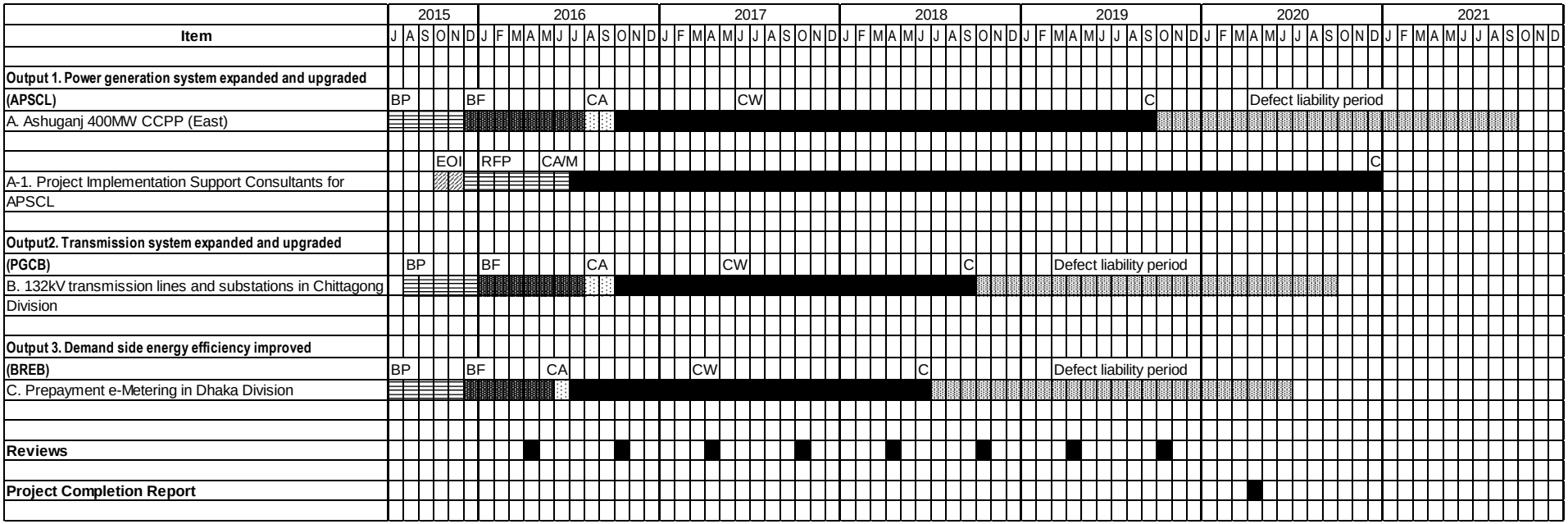
A. Project Readiness Activities

	Month/2015						Month/2016						
Indicative Activities	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**	**4**	**5**	**6**	**Who responsible**
Advance contracting actions	x												APSCL/BREB/ADB
ADB approval						x							ADB
Loan signing							x						ERD/ADB
GoB legal opinion provided								x					Ministry of Law
Government budget inclusion				x									MPEMR/MOF
Loan effectiveness								x					ADB

ADB = Asian Development Bank, BREB = Bangladesh Rural Electrification Board, ERD = Economic Relations Division, MOF = Ministry of Finance, MPEMR = Ministry of Power, Energy and Mineral Resources

B. Overall Project Implementation Plan

Figure 1: Overall Project Implementation Plan



BF = bidding documents float, BP = bidding documents preparation, C = completion/commissioning, CA = contract award, CW = commencement of work; EOI = expression of interest, M = mobilization, RFP = request for proposals.

Sources: Ashuganj Power Station Company Limited; Power Grid Company of Bangladesh; Bangladesh Rural Electrification Board, and Asian Development Bank.

III. PROJECT MANAGEMENT ARRANGEMENTS

A. Project Implementation Organizations – Roles and Responsibilities

Project implementation organizations	Management Roles and Responsibilities
Executing Agencies:	
Ashuganj Power Station Company, (APSCL)	• APSCL will implement generation subproject
Power Grid Company of Bangladesh (PGCB)	• PGCB will implement transmission subproject
Bangladesh Rural Electrification Board (BREB)	• BREB will implement demand side energy efficiency improvement subproject
Project Management Units (PMU)	• PMUs will be established within each EA for implementing, monitoring, and reporting on the progress of project implementation to ADB and the government
Steering Committee:	• Chaired by Secretary, Power Division, Ministry of Power, Energy and Mineral Resource (MPEMR), and consisting of Chairman BPDB, Chairman BREB, Managing Directors of APSCL and PGCB, responsible for coordination among the Executive Agencies.
Asian Development Bank	• Will undertake regular project reviews and facilitate in implementation of the projects

B. Key Persons Involved in Implementation

Executing Agencies

Power Division	Md. Monowar Islam, ndc Secretary Kaikaus Ahmad Additional Secretary Telephone: +880-2-7174094 Fax: +880-2-7164744 Sk Md. Abdul Ahad Joint Chief Telephone: +880-2-9574411 Cell phone: +880-1-712-627216 E-mail: ahadnargish@yahoo.com
APSCL	Mr. AMM Sazzadur Rahman Managing Director (In-Charge) and Executive Director (Engineering) Telephone: +880-8528-74004E-mail: director.tech@apscl.com Md. Anwar Hossain Project Director Ashuganj 400 MW CCPP (East) Cell phone: +88 01 712 001 027

	Email: pd400east@apscl.com
PGCB	Masum-Al-Beruni Managing Director Telephone: +880 2 9560883 Cell: +880 1 711 520408 Fax: +880 2 9582382 E-mail: md@pgcb.org.bd malberuni@hotmail.com
	Arun Kumar Saha Chief Engineer (P&D) Telephone: +880 2 9567012 Cell: +880 1 714 022883 Fax: +880 2 9582382 E-mail: ce-pnd@pgcb.org.bd Arunsaha60@gmail.com
	Mr. Md. Ohiduzzaman Project Director, Tranche 3 Cell: +880 1 711 648109 Email: ce-gndp@pgcb.org.bd
BREB	Brig Gen Moin Uddin Chairman Cell: +880 1 769 400000 E-mail: chairman@reb.gov.bd
	Md. Nurul Islam Bhuiyan Chief Engineer (Planning and Operation) Telephone: +880 2 8900332 Cell: +880 1 769 940007 E-mail: receplanning@gmail.com
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Asian Development Bank	
Energy Division (SAEN) South Asia Department (SARD)	Anthony Jude Director Telephone No.: (63-2) 632 Email address: ajude@adb.org
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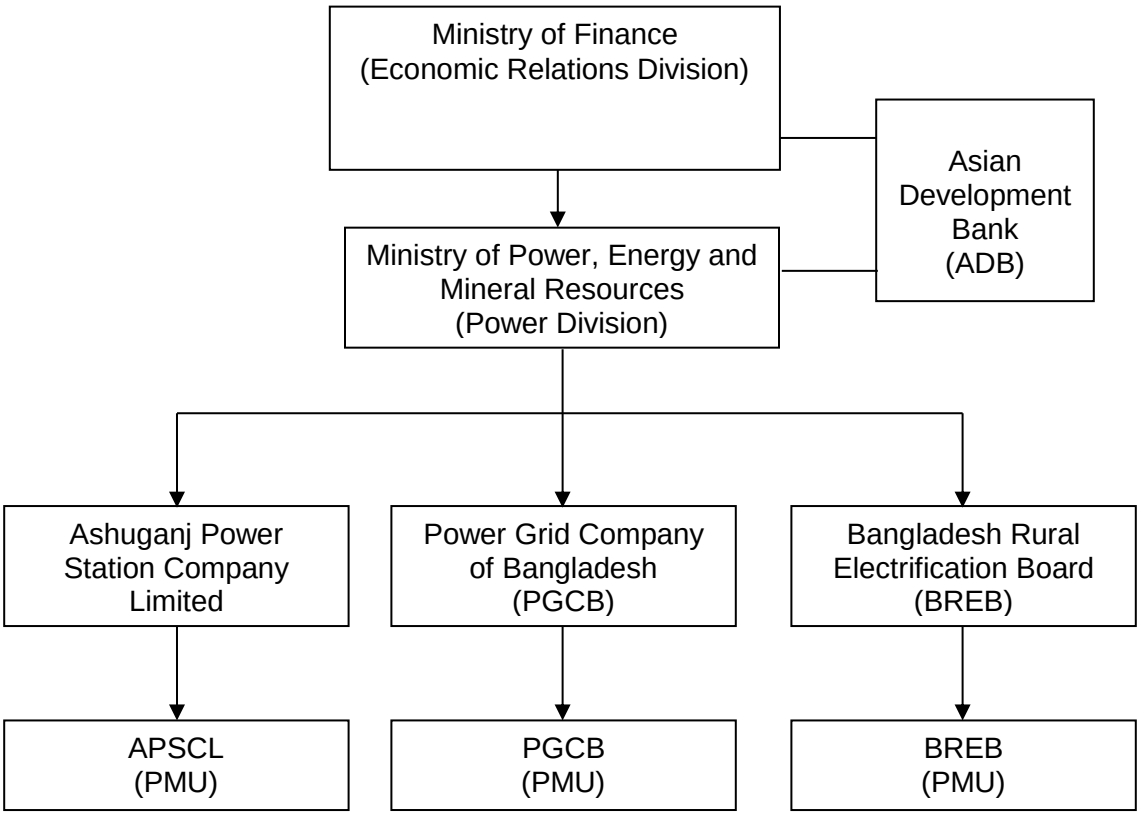
C. Project Organization Structure

9. The executing agencies are APSCL for Output 1, PGCB for Output 2, and BREB for Output 3. Power Division of the Ministry of Power, Energy and Mineral Resources (MPEMR) provides overall coordination and liaise with ADB on policy, MFF, and overall project related issues. Project management units (PMU) will be established within each executing agency for implementation, monitoring, and reporting on the progress of project implementation to ADB and the government. The PMUs' responsibilities will include (i) overall coordination, macro level project management and monitoring; (ii) annual budget preparation, monitoring utilization of loan proceeds, and project financial management; (iii) progress reporting, including reports on cost management and project impact; and (iv) ensuring compliance with loan covenants. The PMUs will also be responsible for administration, and financial and technical supervision of the subprojects, including procurement of goods and services, engagement of consultants, engineering and construction contractors, and monitoring subproject operation performance.

Figure 1: Organization Structure



IV. COSTS AND FINANCING

10. Tranche 3 is estimated to cost $530 million. The cost estimate is inclusive of taxes, duties, interest and other charges on the loan during construction. The government has requested a loan of $205 million from ADB's ordinary capital resources (OCR) to finance the project. The loan will have a 25–year term including a grace period of five years, and annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)–based lending facility, a commitment charge of 0.15%, a maturity premium of 0.1% and such other terms and conditions as agreed in the draft loan and project agreements. The government has provided ADB with (i) the reasons for its decision to borrow under ADB's LIBOR-based lending facility based on these terms and conditions, and (ii) an undertaking that these choices were its own independent decisions and not made in reliance on any communications or advice from ADB.

11. ADB's loan will finance Outputs 1, 2 and 3. The Islamic Development Bank (IDB) will provide $220 million to jointly cofinance Output 1. The cofinancing will be provided on terms and conditions agreed between the government and IDB, and acceptable to ADB. Counterpart funding will also be provided by the executing agencies and the government in the form of equity and loan for each output. The investment plan and financing plan are summarized in Table 1 and 2.

Table 1: Tranche Investment Plan ($ million)

Item		Amount[a]
A.	**Base Cost**[b]	
	1. Power generation system expanded and upgraded	339.23
	2. Transmission system expanded and upgraded	57.71
	3. Demand side energy efficiency improved	54.29
	Subtotal (A)	**451.23**
B.	**Contingencies**[c]	**45.16**
C.	**Financing Charges During Implementation**[d]	**33.61**
	Total (A+B+C)	**530.00**

[a] Includes taxes and duties of $61.43 million to be financed by government through cash contribution.
[b] In mid-2015 prices.
[c] Physical contingencies computed at 5% for works and equipment. Price contingencies computed using ADB's forecasts of international and domestic inflation includes a provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.
[d] Includes interest and commitment charges. Interest during construction for ADB loan(s) has been computed at the 5–year fixed swap London interbank offered rate plus a spread of 0.6% inclusive of maturity premium of 0.1%. Commitment charges for an ADB loan are 0.15% per year to be charged on the undisbursed loan amount.

Source: The Asian Development Bank assessment.

Table 2: Financing Plan ($ million)

Source	**Amount** ($ million)	Share of Total (%)
Asian Development Bank	205.00	**38.68**
Islamic Development Bank	220.00	**41.51**
Government	81.00	**15.28**
APSCL	12.50	**2.36**
PGCB	11.00	**2.08**
BREB	0.50	**0.09**
Total	**530.00**	**100.00**

APSCL = Ashuganj Power Station Company Limited, BREB = Bangladesh Rural Electrification Board, PGCB = Power Grid Company of Bangladesh.
Source: Asian Development Bank assessment.

A. Detailed Cost Estimates by Expenditures Category

	Item	Tk million Foreign Currency	Tk million Local Currency	Tk million Total	USD million Foreign Currency	USD million Local Currency	USD million Total	% of Total Base Cost
A.	**Investment Cost**[a]							
	1. Power generation system expansion and improvement (APSCL)							
	1.1 Turnkey Contract of Ashuganj 400 MW CCPP (East)	21,007.38	1,528.00	22,535.38	270.02	19.64	289.66	64.00
	1.2 Project Supervision Services for APSCL	160.27	80.00	240.27	2.06	1.03	3.09	1.00
	2. Transmission system expansion and upgrade (PGCB)							
	2.1 Turnkey Contract of 132 kV lines and related SS in Chittagong Division	3,336.89	44.50	3,381.39	42.89	0.57	43.46	10.00
	3 Demand side energy efficiency improvement (BREB)							
	3.1 Supply Contract of Pre-payment meters in Dhaka Division	3,183.90	69.82	3,253.72	40.92	0.90	41.82	9.00
	4. Land Acquisition and Safeguards Mitigation Cost	0.00	255.17	255.17	0.00	3.28	3.28	1.00
	5. Taxes and duties	0.00	4,779.52	4,779.52	0.00	61.43	61.43	14.00
B.	**Recurrent Costs**	**0.00**	**660.39**	**660.39**	**0.00**	**8.49**	**8.49**	2.00
	1. Salaries	0.00	138.44	138.44	0.00	1.78	1.78	0.00
	2. Accommodation	0.00	126.66	126.66	0.00	1.63	1.63	0.00
	3. Equipment Operation and Maintenance	0.00	395.29	395.29	0.00	5.08	5.08	0.00
	Total Base Cost	**27,688.44**	**7,417.39**	**35,105.82**	**355.89**	**95.34**	**451.23**	**100.00**
C.	**Contingencies**[b]							
	1. Physical Contingency	1,384.42	370.87	1,755.29	17.79	4.77	22.56	5.00
	2. Price Contingency	892.09	977.01	1,869.11	11.47	11.14	22.60	5.00
D.	**Financing Charges during Implementation**							
	1. Interest During Implementation	2,106.90	472.07	2,578.97	27.08	6.07	33.15	7.00
	2. Commitment Charges	35.52	0.20	35.72	0.46	0.00	0.46	0.00
	Total Project Cost (A+B+C+D)	**32,107.37**	**9,237.54**	**41,344.91**	**412.69**	**117.31**	**530.00**	**117.00**

APSCL = Ashuganj Power Station Company Limited, BREB = Bangladesh Rural Electrification Board, CCPP = combined cycle power plant, PGCB = Power Grid Company of Bangladesh, SS = substation.

Assumptions:

[a] Mid-2015 Prices.

[b] Physical contingencies computed at 5% for works and equipment. Price contingencies computed using ADB's forecasts of international and domestic inflation includes a provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

Source: Tranche 3 Preparation Consultants' Assessment. Cost estimate of APSCL, BREB and PGCB.

B. Allocation and Withdrawal of Loan Proceeds

CATEGORY		ADB FINANCING BASIS
Item	Amount Allocated for ADB Financing (US$ million) Category	Percentage and Basis for Withdrawal from the Loan Account
1. APSCL's Power Plant	104.48	100% of total expenditure claimed[a]
2. PGCB's transmission line and substations	43.46	100% of total expenditure claimed[a]
3. BREB's pre-payment meters	41.82	100% of total expenditure claimed[a]
4. Consulting Services	3.09	100% of total expenditure claimed
5. Interests and Commitment Charges	9.16	100% of total amount due
6. Unallocated	2.99	
7. Total	205.00	

APSCL = Ashuganj Power Station Company Limited, BREB = Bangladesh Rural Electrification Board, PGCB = Power Grid Company of Bangladesh.

[a] Exclusive of all duties and taxes imposed within the territory of the Borrower.

Disbursement conditions:

Item 1: The APSCL Subsidiary Loan Agreement shall have been duly executed and delivered between the Borrower and APSCL and shall have become binding on the parties thereto in accordance with its terms.

Item 2: The PGCB Subsidiary Loan Agreement shall have been duly executed and delivered between the Borrower and PGCB and shall have become binding on the parties thereto in accordance with its terms.

Item 3: The BREB Subsidiary Loan Agreement shall have been duly executed and delivered between the Borrower and BREB and shall have become binding on the parties thereto in accordance with its terms.

C. Detailed Cost Estimates by Financiers

	Item	(US $million) ADB Loan	% of Cost Category	IDB Fund	% of Cost Category	GOB/EAs Fund[a]	% of Cost Category	Total Cost
A.	**Investment Cost**[b]							
	1. Power generation system expansion and improvement (APSCL)	**107.57**	**0.00**	**185.17**	0.00	0.00	0.00	**292.75**
	1.1 Turnkey Contract of Ashuganj 400 MW CCPP (East)[c]	104.48	36.00	185.17	64.00	0.00	0.00	289.66
	1.2 Project Supervision Services for APSCL	3.09	100.00	0.00	0.00	0.00	0.00	3.09
	2. Transmission system expansion and upgrade (PGCB)							
	2.1 Turnkey Contract of 132 kV lines and related SS in Chittagong Division	43.46	100.00	0.00	0.00	0.00	0.00	43.46
	3. Demand side energy efficiency improvement (BREB)							
	3.1 Supply Contract of Pre-payment meters in Dhaka Division	41.82	100.00	0.00	0.00	0.00	0.00	41.82
	4. Land Acquisition and Safeguards Mitigation Cost	0.00	0.00	0.00	0.00	3.28	100.00	3.28
	5. Taxes and duties[d]	0.00	0.00	0.00	0.00	61.43	100.00	61.43
B.	**Recurrent Costs**	**0.00**	**0.00**	**0.00**	**0.00**	**8.49**	**100.00**	**8.49**
	1. Salaries	0.00	0.00	0.00	0.00	1.78	100.00	1.78
	2. Accommodation	0.00	0.00	0.00	0.00	1.63	100.00	1.63
	3. Equipment Operation and Maintenance	0.00	0.00	0.00	0.00	5.08	100.00	5.08
	Total Base Cost	**192.86**	**43.00**	**185.17**	**41.00**	**73.20**	**16.00**	**451.23**
C.	**Contingencies**[e]	**2.99**	**7.00**	**16.44**	**36.00**	**25.72**	**57.00**	**45.16**
	1. Physical Contingency	2.26	10.00	11.13	49.00	9.17	41 .00	22.56
	2. Price Contingency	0.72	3.00	5.31	24.00	16.56	73.00	22.59
D.	**Financing Charges during Implementation**[f]	**9.16**	**27.00**	**18.38**	**55.00**	**6.07**	**18.00**	**33.61**
	1. Interest During Implementation	8.70	26.00	18.38	55.00	6.07	18.00	33.15
	2. Commitment Charges	0.46	100.00	0.00	0.00	0.00	0.00	0.46
	Total Project Cost (A+B+C+D)	**205.00**	**38.68**	**220.00**	**41.51**	**105.00**	**19.81**	**530.00**
	% Total Project Cost							

ADB = Asian Development Bank, APSCL = Ashuganj Power Station Company Limited, BREB = Bangladesh Rural Electrification Board, CCPP = combined cycle power plant, EA = executing agency, GOB = Government of Bangladesh.

Assumptions:

[a] GOB contribution will include debt (40%) and equity (60%) according the Ministry of Finance lending terms for local currency loans.

[b] Mid-2015 prices.

[c] Though 36% for ADB loan and 64% for IDB fund are shown here, it will be 100% for ADB loan and IDB fund during disbursement. ADB and IDB will jointly finance this turnkey contract in which ADB and IDB will fund different equipment or works. ADB will finance equipment supply of gas turbine and generator. IDB will finance supply of balance equipment of the plant, design, installation and other services for the whole power plant.

[d] Local taxes and duties ($38.8 mil for Output 1, $10.5 mil for Output 2, and $12.1 mil for Output 3) will be funded by GOB through cash contribution.

[e] Physical contingencies computed at 5% for works and equipment. Price contingencies computed using ADB's forecasts of international and domestic inflation includes a provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

[f] IDC for ADB loan has been computed at the 5-year fixed swap London interbank offered rate plus a spread of 0.6% inclusive of maturity premium of 0.1%. Commitment charges for an ADB loan are 0.15% per year to be charged on the undisbursed loan amount. IDC for IDB is subject to negotiation.

Source: Tranche 3 Preparation Consultants' Assessment. Cost estimate of APSCL, BREB and PGCB.

D. Detailed Cost Estimates by Outputs

(US $million)

	Item	Total Cost	Output 1	% of Cost Category	Output 2	% of Cost Category	Output 3	% of Cost Category
A.	**Investment Cost**[a]							
	1. Power generation system expansion and improvement (APSCL)							
	1.1 Turnkey Contract of Ashuganj 400 MW CCPP (East)	289.66	289.66	100.0	0.00	0.0	0.00	0.0
	1.2 Project Supervision Services for APSCL	3.09	3.09	100.0	0.00	0.0	0.00	0.0
	2. Transmission system expansion and upgrade (PGCB)							
	2.1 Turnkey Contract of 132 kV lines and related SS in Chittagong Division	43.46	0.00	0.0	43.46	100 .0	0.00	0.0
	3. Demand side energy efficiency improvement (BREB)							
	3.1 Supply Contract of Pre-payment meters in Dhaka Division	41.82	0.00	0.00	0.00	0.0	41.82	100.0
	4. Land Acquisition and Safeguards Mitigation Cost	3.28	0.12	0.00	3.16	96.0	0.00	0.0
	5. Taxes and duties[b]	61.43	38.83	63.0	10.53	17.0	12.07	20.0
B.	**Recurrent Costs**	8.49	7.53	89.0	0.56	7.0	0.40	5.0
	1. Salaries	1.78	0.96	0.00	0.53	0.0	0.29	0.0
	2. Accommodation	1.63	1.56	0.00	0.01	0.0	0.07	0.0
	3. Equipment Operation and Maintenance	5.08	5.01	0.00	0.03	0.0	0.05	0.0
	Total Base Cost	**451.23**	**339.23**	**75.0**	**57.71**	**13.0**	**54.29**	**12.0**
C.	**Contingencies**	45.16	36.69	81.0	4.57	10.0	3.89	9.0
	1. Physical Contingency[b]	22.56	16.96	75.0	2.89	13.0	2.71	12.0
	2. Price Contingency	22.59	19.73	87.0	1.69	7.0	1.18	5.0
D.	Financing Charges during Implementation	33.61	30.17	90.0	2.68	8.0	0.76	2.0
	1. Interest During Implementation	33.15	29.81	90.0	2.63	8.0	0.71	2.0
	2. Commitment Charges	0.46	0.36	78.0	0.05	0.0	0.05	0.0
	Total Project Cost (A+B+C+D)	**530.00**	**406.09**	**77.0**	**64.97**	**12.0**	**58.94**	**11.0**

APSCL = Ashuganj Power Station Company Limited, BREB = Bangladesh Rural Electrification Board, PGCB = Power Grid Company of Bangladesh.
Assumptions:
[a] Cost updated as in mid- 2015 prices.
[b] Local taxes and duties will be funded by Government of Bangladesh.
Source: Tranche 3 Preparation Consultants' Assessment. Cost estimate of APSCL, BREB and PGCB.

E. Detailed Cost Estimates by Year

	Item	(US $million) Total Cost[a]	2016	2017	2018	2019	2020
A.	**Investment Cost[b]**						
	1. Power generation system expansion and improvement (APSCL)						
	1.1 Turnkey Contract of Ashuganj 400 MW CCPP (East)	104.48	0.00	10.45	31.35	41.79	20.90
	1.2 Project Supervision Services for APSCL	3.09	0.31	0.62	0.62	0.93	0.62
	2. Transmission system expansion and upgrade (PGCB)	0.00	10	50	40	0.00	0.00
	2.1 Turnkey Contract of 132 kV lines and related SS in Chittagong Division	43.46	4.35	21.73	17.39	0.00	0.00
	3. Demand side energy efficiency improvement (BREB)	0.00	10	50	40	0.00	0.00
	3.1 Supply Contract of Pre-payment meters in Dhaka Division	41.82	4.18	20.91	16.73	0.00	0.00
	4. Land Acquisition and Safeguards Mitigation Cost	0.00	0.00	0.00	0.0	0.00	0.00
	5. Taxes and duties	0.00	0.00	0.00	0.00	0.00	0.00
B.	**Recurrent Costs**	0.00	0.00	0.00	0.00	0.00	0.00
	Total Base Cost	**192.86**	**9.04**	**54.71**	**66.88**	**42.72**	**21.51**
C.	**Contingencies**	2.99	0.00	0.00	1.00	1.17	1.00
D.	**Financing Charges during Implementation**	9.16	0.14	1.05	2.38	2.13	2.73
	1. Interest During Implementation	8.70	0.12	0.83	2.25	2.08	2.72
	2. Commitment Charges	0.46	0.02	0.23	0.13	0.05	0.01
	Total Project Cost (A+B+C+D)	**205.00**	**8.98**	**54.76**	**69.46**	**46.02**	**25.24**
	% Total Project Cost	**100.00**	**4.00**	**27.00**	**34.00**	**22.00**	**12.00**

APSCL = Ashuganj Power Station Company Limited, BREB = Bangladesh Rural Electrification Board, PGCB = Power Grid Company of Bangladesh, SS = substation.

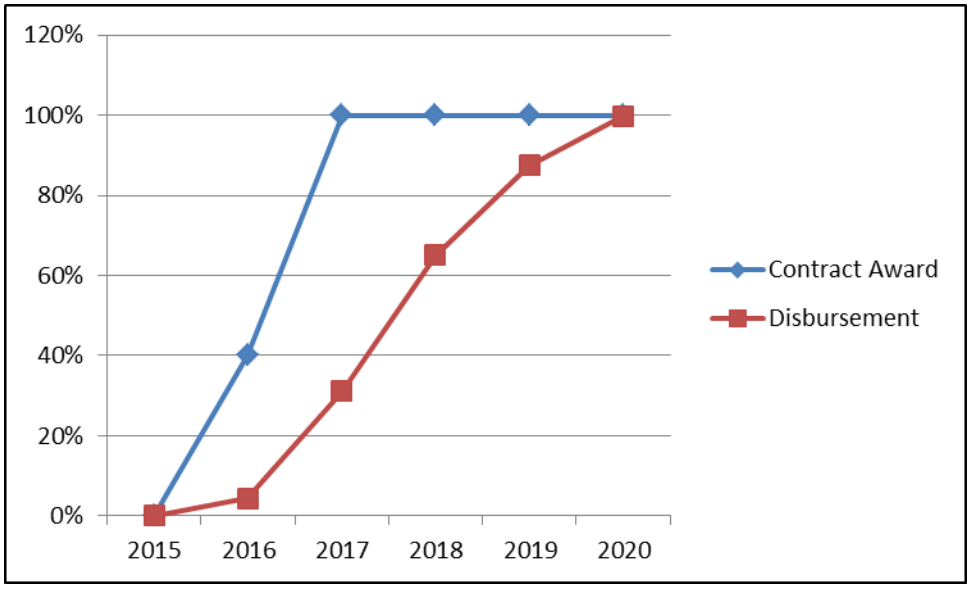
Assumptions:

[a] ADB and ADB administered funds.

[b] Cost updated in mid-2015 prices.

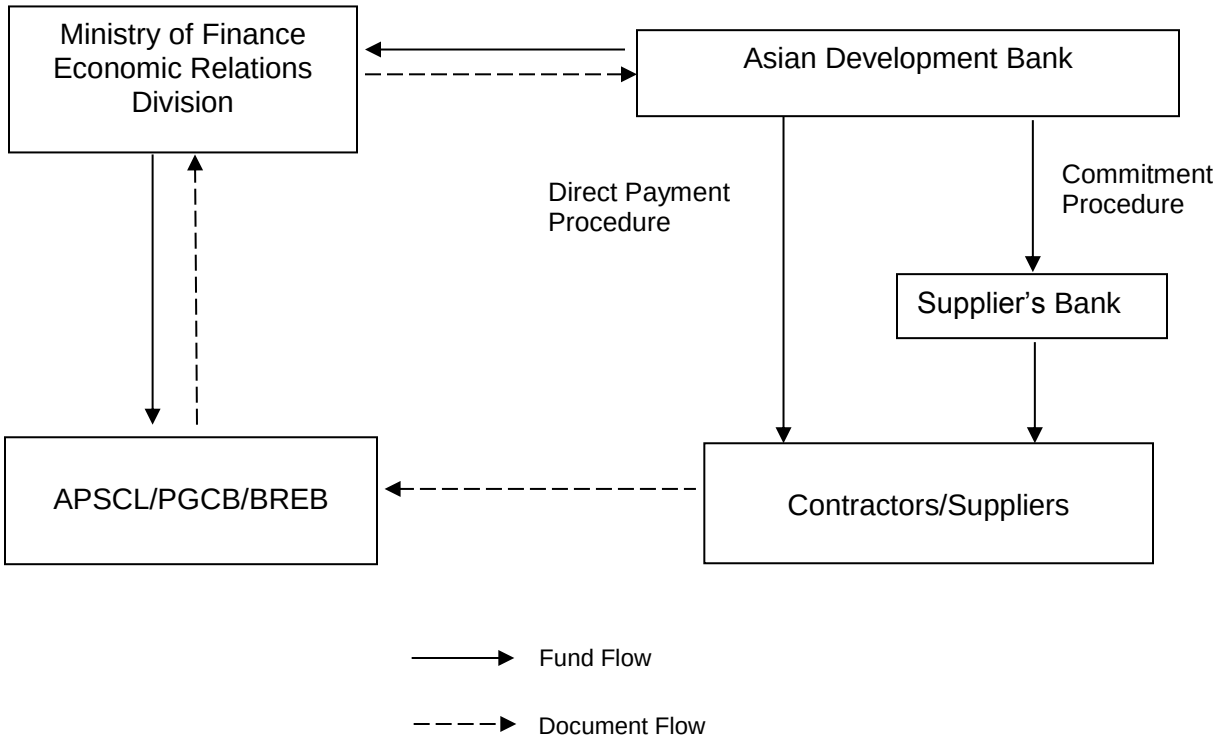
Source: Tranche 3 Preparation Consultants' Assessment. Cost estimate of APSCL, BREB and PGCB.

F. Contract Award and Disbursement S-curve



G. Fund Flow

Figure 2: Fund Flow Diagram



V. FINANCIAL MANAGEMENT

A. Financial Management Assessment

12. The financial management assessment (FMA) was conducted in accordance with ADB's Guidelines for the Financial Management and Analysis of Projects[2] and Financial Due Diligence,[3] and Financial Management Technical Guidance Notes. The FMA assessed the capacity of the APSCL, PGCB and BREB, including funds-flow arrangements, governance, staffing, budgeting, accounting and financial reporting systems, internal control procedures, financial information systems, and internal and external auditing arrangements.[4] Based on the analysis, the existing organizational structures are generally well designed and appropriate for the entities and the project. The fund flow arrangements for all the executing agencies are clearly defined. The current accounting standards, policies, accounting and invoice procedures, asset management, budget, internal and external audits, and financial reports are effective for the agencies and appropriate for the Project. The assessment for each executing agency is in below paragraphs.

13. Several material financial management weaknesses have been identified at the entity level, specifically lack of fixed assets insurance (APSCL and PGCB), lack of BREB's recent experience in donor funded projects, significant unresolved audit issues at PGCB, and lack of a fixed assets register at APSCL. In all cases, the level of automation and computerization is not commensurate with the level of activities at the agencies, and integrated fixed asset and financial reporting modules are recommended. Risk action plans have been developed accordingly and financial management covenants suggested. The overall inherent risk rating is Substantial, and the entity level risk rating for APSCL is moderate, for PGCB is Substantial, and for BREB is also substantial. The consolidated risk rating for the Tranche is Substantial.

14. APSCL was incorporated in 2000 under the Companies Act, 1994 with business of power generation. APSCL follows the accrual basis of accounting. The accounts are computerized. In preparing its accounting records and financial statements, APSCL follows the requirements of Bangladesh Accounting Standards (BAS) and Bangladesh Financial Reporting Standards (BFRS). It is also in compliance with the relevant sections of Company's Act 1994 for the purpose.

15. APSCL follows the incremental basis of budgeting, incorporating both physical and financial items. APSCL has an internal audit department, staffed by professional accountants, as well as Audit Committee oversight. The external audits are carried out by a firm of reputed Chartered Accountants. In addition to this, the Comptroller and Auditor General (CAG) of Bangladesh also conducts works audit. APSCL's externally aided projects are also audited by the Foreign Aided Projects Audit Directorate (FAPAD) of the CAG, Bangladesh. The latest audited financial statements for the fiscal year (FY) 2014 were unqualified.

16. APSCL's financial management practice is good but it can be improved on further. APSCL is experienced in implementing externally financed projects from ADB, Islamic Development Bank, and bilateral agencies. While APSCL has required qualified accounting and finance personnel who are recruited on contractual basis; it also considers training as an important way to upgrade staff efficiency and effectiveness of its manpower. Nonetheless, there

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[2] ADB. 2005. *Financial Management and Analysis of Projects*. Manila.
[3] ADB. 2009. *Financial Due Diligence: A Methodology Note*. Manila.
[4] A detailed financial management assessment was carried out, and is available upon request.

are several weaknesses in its financial management such as (i) not having a fully computerized integrated financial and accounting system; and (ii) its operation assets need to be covered by insurance.

17. PGCB was incorporated in 1996 in accordance with Companies Act 1994 with its main business in power transmission. PGCB has over 2,000 employees and is listed on the Dhaka Stock exchange and the Chittagong Stock Exchange. PGCB follows the accruals basis of accounting. It has an accounting system that is adequate for the recording of all relevant financial transactions of the projects being implemented. The Chart of Accounts of PGCB is adequate to properly record and report on project activities and disbursement categories. The accounts of PGCB are prepared in accordance with the requirements of BFRS and audited annually by a firm of Chartered Accountants. The Financial Statements of PGCB are audited by a firm of Chartered Accountants. The Audit is carried out in accordance with the International Standards of Auditing (ISA), as adopted by the Institute of Chartered Accountants of Bangladesh (ICAB). PGCB is also subject to annual statutory audits of the Commercial Audit Directorate of the Office of the CAG of Bangladesh, the Supreme Audit Institution (SAI), for its non-development operations and its development projects are annually audited by the FAPAD of the OCAG. PGCB's internal audit is conducted by a separate unit headed by Deputy General Manager (Audit) reporting to the Managing Director. This unit with 9 staff is responsible for internal audit of about 70 offices of PGCB.

18. PGCB's financial management exhibits some strengths such as: (i) years of experience of implementing projects financed by ADB and other donors; (ii) adequately trained personnel to look after all aspects of a foreign-funded project; (iii) a number of qualified professional accountants heading various accounting/finance offices; (iv) personnel who are conversant with all aspects of ADB procedures; and (v) a system whereby detailed budget preparation exercise is carried out every year including variance analysis and review. Some weaknesses are noted such as PGCB: (i) not have a fully computerized integrated financial and accounting system; (ii) not having insurance on its fixed assets (which are operational) against natural calamities, accidents, etc. leading to a significant risk of arranging for funds to replace such damaged assets; (iii) long outstanding audit observations, and (iv) not having its transmission tariff revised since 2004 leading to funding constraints, resulting in non-payment of debt service due to government.

19. BREB was established by a Presidential Ordinance, in 1977. It works under the Power Division of the MPENR. BREB is entrusted with the task of providing electricity in rural areas of the country. This is done through 72 operating rural electricity cooperatives known as "Palli Biddyut Samity" (PBS), serving a total consumer base of about 12 million, covering over 52,000 villages. BREB is responsible for planning and installation of the electrification networks in the countryside. Once constructed, it is handed over to PBS for operation, maintenance and retail services to consumers. BREB is dependent on the government for its financial requirements. It borrows from the government at a rate of 2% and then lends it to the PBS for 3%. BREB does not pay any taxes.

20. BREB follows the accrual basis of accounting. The accounts are prepared in line with BAS and other relevant accounting standards as issued by the ICAB. These accounts are audited annually by a firm of Chartered Accountants. Latest annual audited financial statements for FY 2014 have an unqualified audit report. BREB has its own internal audit department. The qualifications of the internal auditors comply with BREB personnel regulations. All BREB programs as well as the PBSs fall under the purview of internal audit. BREB's external Audit is conducted by a firm of Chartered Accountants. The CAG of Bangladesh also carries out audits

of the organization. All externally funded projects are audited by the FAPAD of the CAG, Bangladesh.

21. BREB's financial management strengths are: (i) a well-structured organizational chart showing clearly the lines of authority, and it has an adequate Chart of Accounts and relevant policies and procedures in place; and (ii) an efficient accounting/finance staff. Several weaknesses are evident such as: (i) not having a fully computerized integrated accounting and management system; (ii) insufficient internal audit staff, (iii) its financial statements are not disclosed on their website, and (iv) not having implemented any ADB funded projects in recent years.

22. All implementing agencies under Tranche 2 (L-3087), including PGCB, have submitted their audited project financial statements for the fiscal year ended June 30, 2014. The auditor issued an unqualified audit opinion. Under Tranche 1 (L-2966), Audited Project Financial Statement (APFS) have been submitted by NWGCL, but as there were no disbursements to PGCB up to the FY June 30, 2014, no APFS was submitted by PGCB. A memo requesting waiver is in the process of being finalized. APFS under previous loans to PGCB (L-2332) and Ashuganj (L-2679) for the FY 2014 have also been submitted on time, with unqualified audit opinions.

23. Table 3 summarizes the financial management risk assessment, and proposes risk mitigation and management measures.

Table 3: Financial Management Inherent and Control Risk Assessment

Risk Description	Risk Assessment			Mitigation Measures / Management Plan
	APSCL	**PGCB**	**BREB**	
Inherent Risk				
Country-Specific – The weakest PFM area is external scrutiny and audit.	M	S	M	Through dialogue between the government, ADB and the Institute of Chartered Accountants of Bangladesh (ICAB), aimed at: a. Capacity building of the CAG auditors. b. Strengthening of statutory/regulatory requirements to ensure that audits look beyond transactions and concentrate on the systems of audited entities. This dialogue needs to commence within 2016. For the EAs, this risk is mitigated by private audit firms conducting audits, although at PGCB audit issues remain unresolved.
Country-Specific – There have been instances of delay in release of counterpart funds by the government.	M	M	M	PGCB's proposal for accessing ADB funding for PGCB to be reviewed and cleared by the Ministries of Power and Finance (of GOB) after an assessment of its fiscal situation (including borrowing headroom) and ability to provide counterpart funds.

Risk Description	Risk Assessment			Mitigation Measures / Management Plan
				Since the project addresses the key need for power in Bangladesh, GOB is expected to make adequate provision for counterpart funds in its budget.
Overall Inherent Risk	**Substantial**			
Control Risk				
Internal Audit – APSCL's and BREB's internal audit require additional staffing and capacity building. BREB does not have enough staff to cover their wide geographical scope, and APSCL internal audit function, despite having an Audit Committee, does not have defined terms of reference and have not prepared any audit reports in recent years. Although PGCB does have a functioning Internal Audit unit, the long outstanding internal audit observations remain a concern.	S	M	S	a. Capacity building of existing personnel and hiring of auditors with experience are required. APSCL and BREB need to request ADB for support on capacity building, which can be organized with the assistance of ICAB. ICAB is already represented on the BREB's Board. b. Personnel with experience in public sector auditing need to be recruited. For this, a proper plan of action needs to be prepared by the organizations' human resources departments.
Information Systems – The MIS is place is not commensurate to the size and scale of operations. In particular, a computerized financial reporting and fixed assets management module is recommended to be integrated into the existing accounting software's in use.	M	M	M	APSCL, BREB and PGCB will prepare TOR to engage consultants to prepare MIS scoping documents, budgetary estimates, and indicative timeframe for staged MIS enhancements. The TOR are to be approved by respective boards by March, 2016 with an aim for full implementation by June 2017.
Insurance of Fixed Assets – Neither APSCL nor PGCB insure fixed assets. This poses a risk to continuity of operations and thus financial sustainability.	S	S	M	Insure all fixed assets by June 2016.
Fixed Asset Recording – APSCL's records all new fixed asset purchase manually without proper classification or coding of the assets. This presents a risk of inaccurate accounting records and	S	M	L	APSCL will create a spreadsheet-based fixed asset register, and will undertake physical verification and numbering of fixed assets by December 2016. PGCB shall complete the fixed assets valuation and verification exercise, as

Risk Description	Risk Assessment			Mitigation Measures / Management Plan
impropriety.				recommended by its external auditors.
PMU Experience – BREB's PMU is inexperienced in ADB financial management and disbursement procedures, presenting a risk of incorrectly executed and/or slow disbursement and financial management procedures.	L	L	S	Training of PMU of BREB in ADB project financial management processes and procedures will be conducted by December 2016.
External Audit – For PGCB, a number of audit observations remain unresolved, many of them for a number of years. This presents a significant risk to the organization in areas relating to procurement of fixed assets and their safeguards and the maintenance of records relating to them.	L	S	L	PGCB Board of Directors to commit to final resolution of outstanding audit issues by December 2016.
Financial Sustainability - PGCB has recently received a tariff adjustment from the Bangladesh Energy Regulatory Commission (BERC). The overall increase is about 20%. In addition to receiving this increase of its 132 and 33 KV wheeling charges, it has also received a new category of charge for its 230 KV stations. The tariffs are applicable from 1st Sept. 2015. This will help improve the company's current financial position.	M	S	M	Although this 20% increase in the wheeling charges will improve PGCB's financial position, further measures will be required, and a financial restructuring plan is envisaged under previously approved loan to PGCB. (It is recognized that this is an issue of financial sustainability rather than financial management. However, the proposed risk mitigation measure will encapsulate a broader review of PGCB's financial management issues.)
Overall Control Risk	**M**	**S**	**S**	
Overall (Combined) Risk	**Substantial**			

APSCL= Ashuganj Power Station Company Limited, BREB = Bangladesh Rural Electrification Board, EA = executing agency, H = high, L = low, M = moderate, PGCB = Power Grid Company of Bangladesh, S = substantial.

24. To address the weakness observed above, the executing agencies agreed to adopt the financial management action plan as follows.

Table 4: Financial Management Action Plan for each executing agency

Action	Responsibility	Resources	Timing
Insure operational fixed assets	APSCL and PGCB	APSCL and PGCB's own fund	By June 2016
Conduct actuarial valuation	PGCB	Capacity development component of Tranche 1 co-financed by EU grant	By June 2016
Exercise for fixed asset/ inventory reconciliation	PGCB	Capacity development component of Tranche 1 co-financed by EU grant	By June 2017
Fully staff internal audit unit	BREB/APSCL	EA's own fund	By June 2016
Training of PMU of BREB in ADB project financial management processes and procedures.	ADB, PMU of BREB	Capacity development component of Tranche 1 co-financed by EU grant	By December 2016
Enhance computerized accounting and management system to a reporting and fixed assets management processes	APSCL, PGCB, and BREB	Capacity development component of Tranche 1 co-financed by EU grant	By June 2017
Create spreadsheet based fixed asset register, and physical verification and numbering of fixed assets	APSCL	APSCL	By December 2016.
Implement financial restructuring plan for PGCB	GOB and PGCB	SASEC Second Bangladesh India Electrical Grid Interconnection Project	By December 2017
Disclose Annual audited financial statements on their website	BREB	BREB's own fund	By December 31 annually
Appoint Director Finance	PGCB	PGCBs own fund	By June 2016

ADB = Asian Development Bank, APSCL = Ashuganj Power Station Company Limited, BREB = Bangladesh Rural Electrification Board, EA = executing agency, EU = European Union, GOB = Government of Bangladesh, PGCB = Power Grid Company of Bangladesh, PMU = project management unit, SASEC = South Asia Subregional Economic Cooperation.

B. Disbursement

25. The loan proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2015, as amended from time to time), and detailed arrangements agreed upon between the government and ADB. Online training for project staff on disbursement policies and procedures is available at: http://wpqr4.adb.org/disbursement_elearning. Project staff are encouraged to avail of this training to help ensure efficient disbursement and fiduciary control.

26. ADB's direct payment and commitment procedures will be followed.

27. 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 $100,000 equivalent..

28. Each executing agency will be responsible for (i) preparing disbursement projections for each year, (ii) requesting budgetary allocations for counterpart funds, (iii) collecting supporting documents, and (iv) preparing and sending withdrawal applications.

29. Government counterpart funds will be used to finance the remaining miscellaneous works, services, taxes and duties.

C. Accounting

30. Each executing agency will maintain, or cause to be maintained, separate books and records by funding source for all expenditures incurred on the project following accrual-based accounting following the equivalent national accounting standards. Each executing agency will prepare consolidated project financial statements in accordance with the government's accounting laws and regulations which are consistent with international accounting principles and practices.

D. Auditing and Public Disclosure

31. Each executing agency will cause the detailed consolidated project financial statements to be audited in accordance with International Standards on Auditing, by an independent auditor acceptable to ADB. The audited project financial statements together with the auditors' opinion will be submitted in the English language to ADB within six months of the end of the fiscal year by each executing agency.

32. Each executing agency will also cause the entity-level financial statements to be audited in accordance with International Standards on Auditing and with the government's audit regulations, by an independent auditor acceptable to ADB. The audited entity-level financial statements, together with the auditors' report and management letter, will be submitted in the English language to ADB within one month after their approval by the relevant authority.

33. The annual audit report for the project accounts will include an audit management letter and audit opinions which cover (i) whether the project financial statements present a true and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting framework; (ii) whether loan and grant proceeds were used only for the purposes of the project or not; and (iii) the level of compliance for each financial covenant contained in the legal agreements for the project.

34. Compliance with financial reporting and auditing requirements will be monitored by review missions and during normal program supervision, and followed up regularly with all concerned, including the external auditor.

35. The government and the executing agencies have been made aware of ADB's policy on delayed submission, and the requirements for a satisfactory and acceptable quality of the audited project financial statements.[5] ADB reserves the right to require a change in the auditor (in a manner consistent with the constitution of the borrower), or for additional support to be provided to the auditor, if the audits required are not conducted in a manner satisfactory to ADB, or if the audits are substantially delayed. 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.

36. Public disclosure of the project financial statements, including the audit report on the project financial statements, will be guided by ADB's Public Communications Policy (2011).[6] After review, ADB will disclose the project financial statements for the project and the opinion of the auditors on the financial statements within 30 days of the date of their receipt by posting them on ADB's website. The Audit Management Letter will not be disclosed.

VI. PROCUREMENT AND CONSULTING SERVICES

A. Advance Contracting

37. In order to expedite project implementation, ADB has approved advance contracting actions for the procurement and consulting service. All advance contracting will be undertaken in conformity with ADB's *Procurement Guidelines* (2015, as amended from time to time). The issuance of invitations to bid under advance contracting will be subject to ADB's prior approval. The Borrower and the executing agencies have been advised that approval of advance contracting does not commit ADB to finance the Project.

B. Procurement of Goods, Works and Consulting Services

38. Consultants to be financed by ADB will be recruited in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time). All procurements to be funded by ADB will be procured following *ADB's Procurement Guidelines* (2015, as amended from time to time). For the procurement under Output 1, Ashuganj 400 MW CCPP (East), which is jointly co-financed by IDB, list of eligible countries will be expanded to allow participation by firms and entities from countries eligible under ADB Procurement Guidelines and IDB Procurement Guidelines (2009). To facilitate the bidding process, ADB's standard

[5] ADB Policy on delayed submission of audited project financial statements:
(i) When audited project financial statements are not received by the due date, ADB will write to the executing agency advising that (a) the audit documents are overdue; and (b) if they are not received within the next six months, requests for new contract awards and disbursement such as new replenishment of imprest accounts, processing of new reimbursement, and issuance of new commitment letters will not be processed.
(ii) When audited project financial statements have not been received within 6 months after the due date, ADB will withhold processing of requests for new contract awards and disbursement such as new replenishment of imprest accounts, processing of new reimbursement, and issuance of new commitment letters. ADB will (a) inform the executing agency of ADB's actions; and (b) advise that the loan may be suspended if the audit documents are not received within the next six months.
(iii) When audited project financial statements have not been received within 12 months after the due date, ADB may suspend the loan.

[6] Available from http://www.adb.org/documents/pcp-2011?ref=site/disclosure/publications.

bidding documents Plant (Design, Supply and Installation) using Two-Stage bidding procedure are adopted. The bidding documents clearly reflect that the contract is being jointly financed by ADB and IDB. ADB and IDB will independently review documents relating to the procurement process, while maintaining due confidentiality in the process, with the aim of forming a joint, mutually acceptable view on the manner in which each procurement process is carried out, including, without limitation, in relation to (a) any request for no-objection to (i) draft bidding documents and any subsequent amendments thereof, (ii) bid and technical evaluation reports and recommendations for contract award, and (iii) contract modifications; (b) responses to bidder communications and complaints; and (c) the exercise of remedies including declaration of misprocurement. Formal decisions on procurement matters shall be communicated to the APSCL through ADB via letter jointly signed by ADB and IDB.

39. An 18–month procurement plan indicating threshold and review procedures is in **Appendix 2**. An Outline Terms of Reference (TOR) for project implementation support consultant for APSCL presented in **Appendix 3.**

VII. SAFEGUARDS

40. **Environment**. An environmental assessment and review framework (EARF) for the MFF was prepared in September 2012 to ensure that project outputs in succeeding tranches comply with ADB's Safeguard Policy Statement (2009). Subproject selection for Tranche 3 was guided by the environmental criteria outlined in the EARF and Schedule 4 of the FFA.

41. Tranche 3 is classified as category A for Output 1, category B for Output 2, and category C for Output 3. Overall, Tranche 3 is classified as Category A. Given the potential environmental impacts, e.g. cooling water discharge to the Meghna River and nitrogen oxides (NOx) emissions, Output 1 is classified as environmental category A. Even if Output 1 is classified as environmental category A, it is not expected to cause significant adverse environmental impacts. Output 1 focuses on generation efficiency improvement that will reduce pollutant intensity and offset pollution emission growth without consuming more natural gas by adopting more efficient power plant. Potential environmental impacts are mostly predictable and reversible. Sensitive ecosystems will not be impacted. The impacts such as NOx emissions and cooling water discharge to the Meghna River during operation will be mitigated through best available technology built-in to the power plant design that includes low NOx burners with NOx reduction system. Potential environmental impacts of Output 2 will occur in construction stage, and will be mostly temporary, predictable and reversible. There will be no impacts on forests, sanctuaries or protected areas, and historical and cultural monuments. Output 3 will have minimal environmental impacts. The replaced meters which are functional will be re-used in other locations. Any final disposal should occur at existing approved waste management facilities in Bangladesh.

42. In compliance with ADB's Safeguard Policy Statement, EARF for the MFF, and Bangladesh environmental regulations, the draft EIA including environmental mitigation plan (EMP) for Output 1 was prepared and disclosed on the ADB website on 3 June 2015. A draft IEE including EMP was prepared for Output 2, and the draft IEE will be disclosed on the ADB website prior to ADB's approval of the project. Ministry of Power, Energy and Mineral Resources has requested the EIA/IEE exemption for Output 3 from Ministry of Environment and Forests. Any update in the EIA and IEE resulting from a change in project scope will be similarly disclosed.

43. Public consultations were conducted with local communities including fishermen. The

communities welcomed the project with expectation of improved reliability of power supply. Community concerns were identified in the EIA and IEE, and mitigation measures have been incorporated into the EMP. Consultations with project stakeholders will continue through the pre-construction, construction and operation stages. Corrective actions will be taken for any unanticipated impacts and inadequate safeguards implementation.

44. Each executing agency will obtain all the required environmental clearances from the Department of Environment prior to construction and submit copies to ADB. A project brief in Bangla will be prepared by each executing agency, and will be made available to the public at their field offices.

45. PMU of each executing agency has dedicated staff responsible for monitoring environmental issues and implementing the EMP. Corrective actions will be taken for any unanticipated impacts and inadequate safeguards implementation. Contractors are required to comply with the EMP during pre-construction and construction stage and the PMUs of the executing agencies will monitor compliance. For Output 1, a project supervision consulting firm will support the executing agency in implementation. The contractor will submit monthly environmental monitoring reports to the project supervision consultant, who will prepare and submit quarterly environmental monitoring reports to the executing agency. All the executing agencies will submit semiannual environmental monitoring reports to ADB.

46. Grievance redress committee (GRC) will be set up by each executing agency as soon as the project commences. GRC will convene twice a month and will keep the record of the grievances, and provide the solution(s) within 30 days from the date of the complaint. All related complaints will be documented 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.

47. The environmental and social monitoring reports will be disclosed on the ADB website as required by Safeguard Policy Statement and Public Communications Policy. Any update in the EIA, IEE and resettlement plan resulting from a change in project scope will be similarly disclosed. The executing agencies will prepare environmental and social monitoring reports and provide these reports to ADB on a semi-annual bases.

48. **Involuntary resettlement.** In line with ADB Safeguard Policy Statement, Tranche 3 is classified as category B for involuntary resettlement and category C for Indigenous Peoples. The resettlement plan describes the extent of involuntary resettlement impact and spells out provisions of compensation and assistance to the affected persons. The resettlement plan was endorsed by the executing agencies, and disclosed on the ADB website on 29 June 2015.

49. Subproject of Output 1 locates inside APSCL's power station premises, and no land needs be acquired. No land acquisition is involved in subproject of Output 3. For Output 2 with PGCB as the executing agency, land acquisition is needed for only one substation. The private land from 17 title holders of accumulated 2.02 hectares has been acquired by PGCB. There will be no physical displacement of people under any subproject of Tranche 3.

50. For Output 2, compensation rates for the loss of land and structures, shifting assistance, income restoration assistance and additional support for vulnerable groups are provided in the resettlement plan. The compensation entitlements are endorsed by PGCB and adequate budget are allocated. Meaningful consultation and information disclosure were undertaken with (i) project stakeholders, and (ii) the general public through the ADB website. If any changes or

additional land requirements or involuntary resettlement impacts are identified, a new or updated resettlement plan will be prepared according to the applicable laws referred to in the resettlement plan. ADB's approval will be obtained before further implementation of the subprojects. PGCB has set up PMU, which will be responsible for resettlement plan implementation, monitoring and reporting. PGCB's PMU has experience of implementation of the resettlement plans from Tranche 1 and 2 and in previous ADB projects. PGCB will monitor the implementation of the resettlement plan with inputs from the external experts and submit semiannual monitoring reports to ADB.

51. **Indigenous people.** Tranche 3 is classified as category C for Indigenous Peoples in accordance with the ADB Safeguard Policy Statement. None of the subprojects would impact communities of indigenous populations or interfere with the territories of the indigenous populations or ethnic minorities, their livelihood systems, customary properties or their natural or cultural resources. However, if there are any unanticipated impacts on indigenous people during project implementation, an indigenous peoples plan will be prepared in accordance with the indigenous peoples planning framework and submitted to ADB for review. Executing agencies will obtain the approval of such a plan before award of related civil works contract and implemented before commencement of the civil works of the relevant subproject, as applicable.

VIII. GENDER AND SOCIAL DIMENSIONS

52. The poverty and social assessment brought forth that the power sector has significant potential to contribute to economic development and social well–being, and is both directly and indirectly linked to poverty reduction. Reliable and adequate electricity supply improves living conditions, promotes the business expansion, and increases employment opportunities, which will have a positive impact on poverty reduction. A good quality, reliable electricity supply is also a key to meeting the basic human needs of health and education. Poor and vulnerable consumers, as well as public institutions such as public hospitals and schools, are often particularly disadvantaged by an inadequate power supply, load shedding, and poor power quality, and will therefore benefit directly from the project.

53. **Gender.** Given the nature of the outputs it is not amenable to add explicit gender designs**.** Tranche 3 is classified as having no gender elements.

54. The loan agreement includes a standard assurance related to compliance with labor standards for contractors, including provisions to ensure equal pay for work of equal value, and the provision of awareness training on sexually transmitted infections (including HIV), forced/bonded labor and human trafficking. Dialogue and communication (both written and verbal) with stakeholders will be carried out in a gender-specific and culturally sensitive manner and in local languages, as required during resettlement plan implementation. There are special provisions for the vulnerable households including the women headed households in the resettlement framework and the resettlement plans.

55. **Health.** The executing agencies will ensure that contractors provide adequately for the health and safety of construction workers and further ensure that bidding documents include measures on how contractors will address this, including an information and awareness raising campaign for construction workers on sexually transmitted diseases including HIV/AIDS, and human trafficking.

56. **Labor.** The executing agencies will ensure that civil works contractors comply with all applicable labor laws and regulations, do not employ child labor for construction and

maintenance activities, and provide appropriate facilities for women and children in construction campsites; contractors do not differentiate wages between men and women for work of equal value; and specific clauses ensuring these will be included in bidding documents.

IX. PERFORMANCE MONITORING, EVALUATION, REPORTING AND COMMUNICATION

A. Project Design and Monitoring Framework

Impacts the Project is aligned with: Increased access to reliable supply of electricity in Bangladesh. (Power System Master Plan 2010)[a]			
Project Results Chain	**Performance Indicators with Targets and Baselines**	**Data Sources and Reporting**	**Risks**
Outcome Increased efficiency and capacity of power system in Bangladesh.	a. Annual electricity generation in Ashuganj Power Station increased by 1,000 GWh (Baseline: 3,709 GWh in 2014)	APSCL annual report	Gas supply is decreased, reducing annual power generation output
	b. Power transmission capacity in project area increased by 341 MVA (Baseline: 82 MVA in 2014)	PGCB annual reports.	
	c. System loss of BREB's distribution system in Dhaka Division reduced by 0.5% (Baseline: 10% in 2014)	BREB annual reports	
	d. CO_2 emissions reduced by 800,000 tons per year in Ashuganj Power Station (Baseline: 0 ton in 2014)	APSCL annual report	
Outputs 1. Power generation system expanded and upgraded.	By 2020: Power generation capacity at Ashuganj Power Station complex increased by 180MW (to be jointly co-financed by IDB) (Baseline: 777 MW in 2014)	APSCL annual reports; Quarterly progress reports from APSCL	Unexpected increase in prices of equipment and raw materials, and construction delays impact the work.
	By 2018:		
2.Transmission system expanded and upgraded.	2a. 65 km of 132 kV lines upgraded in Chittagong Division between Comilla (South) and Chandpur (Baseline: 0 km in 2014)	PGCB annual reports; Quarterly progress reports from PGCB	
	2b. 7 km of 132 kV underground transmission line constructed in Chittagong Division between Madunaghat and Kalurghat (Baseline: 0 km in 2014)	PGCB annual reports; Quarterly progress reports from PGCB PGCB annual reports;	

Project Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
	2c. 4 substations (132/33 kV) constructed or upgraded in Chittagong Division (Baseline: 0 nos in 2014)	Quarterly progress reports from PGCB	
3. Demand side energy efficiency improved	700,000 of post-paid meters in Dhaka Division replaced with prepayment meters by 2018	BREB annual reports; Quarterly progress reports from BREB	

Key Activities with Milestones

1. Power generation system expanded and upgraded
1.1 Issue bidding documents (December 2015) and award the turnkey contract (August 2016).
1.2 Construct the Ashuganj 400 MW combined cycle gas-turbine power plant (East) (October 2016 – September 2019)
1.3 Commission the power plant (October 2019 - December 2019).
2. Transmission system expanded and upgraded
2.1 Issue bidding documents (January 2016) and award contracts (August 2016).
2.2 Construct 2 new 132/33 kV substations, upgrade 2 existing 132/33 kV substations, and upgrade and/or build 132 kV transmission lines, in Chittagong Division (October 2016 – September 2018).
2.3 Commission the substations and transmission lines (October 2018 – November 2018)
3. Demand side energy efficiency improved
3.1 Issue bidding documents (December 2015) and award contracts (June 2016).
3.2 Procure, install and commission prepayment meters to replace the existing analog post-paid meters in Dhaka Division (July 2016 – June 2018).

Inputs

ADB:	$205,000,000
Government:	$105,000,000
IDB:	$220,000,000

Assumptions for Partner Financing

Government counterpart funds and IDB fund are available timely.

ADB = Asian Development Bank, APSCL = Ashuganj Power Station Company, BREB = Bangladesh Rural Electrification Board, CO_2 = carbon dioxide, GWh = gigawatt-hour, IDB = Islamic Development Bank, km = kilometer, kV= kilovolt, MW = megawatt, MVA = megavolt-ampere, PGCB = Power Grid Corporation of Bangladesh.
[a] Power System Master Plan, Ministry of Power, Energy and Mineral Resources, 2010.
Source: Asian Development Bank.

B. Monitoring

57. **Project performance monitoring**. Executing agencies will undertake overall monitoring of the project in terms of progress. ADB, the government and executing agencies will conduct semiannual reviews throughout the implementation of the project. The review will monitor the (i) project output quality, (ii) implementation arrangements, (iii) implementation progress, and (iv) disbursements. Performance will be monitored based on indicators and targets stipulated in the design and monitoring framework.

58. **Compliance monitoring**. In addition to the standard assurances, compliance with the specific assurances will be monitored. They will be based on the Loan Agreement and Project Agreement as well as include Consulting Services, Procurement and Disbursement Guidelines.

All consultants will be recruited according to ADB's *Guidelines on the Use of Consultants* (2013, as amended from time to time). The procurement of goods, related services, and works financed by the loan will follow procedures outlined in the ADB's *Procurement Guidelines* (2015 as amended from time to time). The loan proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2015, as amended from time to time).

59. **Environment monitoring**. The contractors, subcontractors, and PMUs must adhere to the EMP and resettlement plan during contract implementation as prepared in accordance with ADB's *Safeguard Policy Statement 2009* and as agreed/endorsed by the government. The contractors and subcontractors shall prepare and submit the monthly progress report in conformance with executing agencies' requirements and shall indicate when, how, and at what cost the contractors' plans to satisfy the requirements as per detailed specifications. For each package, these programs shall detail the resources to be provided or utilized and any related subcontracting proposed. Each executing agency will be responsible for processing and implementing the subprojects. It will be assisted by technical staff/experts who will evaluate the technical reports, feasibility studies, preliminary design reports, environmental assessment reports (including the EMP with budget), resettlement and indigenous people's development plans, and detailed design reports to ensure compliance with ADB and government requirements. Summary appraisal reports will be submitted to ADB subsequent to executing agencies' approval and the required government clearances. Each executing agency will prepare progress reports and submit them to ADB on a quarterly basis and will submit other required performance and monitoring reports twice a year.

60. **Involuntary Resettlement Monitoring**. The implementation of the resettlement plan for the subproject of Output 2 will be monitored by the PGCB with inputs from external experts and PGCG will submit semiannual monitoring reports to ADB. The external experts will advise on safeguard compliance issues, and if any significant involuntary resettlement issues are identified, a corrective action plan will be prepared.

61. Compliance with safeguard requirements will include the need to ensure that project contractors and sub-contractors adhere to ADB safeguard policy requirements, particularly with respect to compliance with core labor standards, occupational health and safety, and acceptable and fair working standards and conditions, in line with host country requirements. To avoid the risk of spreading preventable transmissible illnesses and diseases like HIV/AIDs as a result of an influx of workers into the project area during construction works, each executing agency will be expected to inform and educate project workers about the risks of HIV/AIDs, how it is spread and how it can be prevented.

C. Evaluation

62. 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 six months of physical completion of the project, each executing agency will submit the project completion report (PCR)[1] to ADB. Subsequently, ADB will field a mission to finalize the PCR.

[1] Project completion report format available at: http://www.adb.org/Consulting/consultants-toolkits/PCR-Public-Sector-Landscape.rar.

Table 4: Evaluation Methodology

Evaluation Activity	Purpose	Methodology	Who responsible and involved
Review Mission	Review the progress of the project and provide guidance to facilitate implementation. Corrective measures to be taken if there are implementation delays, and issues with safeguards.	Site visits and meetings with EA officials, contractors, consultants at least twice a year.	ADB/ EAs
Mid Term Review	Comprehensive review of the project	Site visit and meetings with EAs officials, contractors, and consultants, two years from the loan effective date.	
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/EAs

ADB = Asian Development Bank, EA = executing agency.

D. Reporting

63. Executing agencies 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 six months of physical completion of the project. To ensure projects continue to be both viable and sustainable, project accounts and the APFS, together with the associated auditor's report, should be adequately reviewed.

E. Stakeholder Communication Strategy

64. The Stakeholder Communications Strategy is described in the following table. Executing agencies will post all relevant information on their websites. The website will include at minimum information: (i) bidding procedures, bidders, and contract awards; (ii) use of the funds disbursed under the project; and (iii) physical progress.

Table 5: Stakeholder Communication Strategy

Project information to be communicated	Means of Communication	Responsibility	Audience	Frequency
Report and Recommendation of the President (RRP) with linked documents	ADB website	ADB	ADB, Government of Bangladesh, Development Partners, Civil Society, Individuals	Once

Project information to be communicated	Means of Communication	Responsibility	Audience	Frequency
Project information while planning/ designing	Discussions and stakeholder consultations	EAs	Project beneficiaries	Regular intervals during planning and design
Status of implementation during construction	Boards at site	EA/Contractors	Project beneficiaries and affected people	All the time at construction sites
Project Performance Reports and Project Information Documents	ADB website	ADB	ADB, Government of Bangladesh, Development Partners, Civil Society, Individuals	Every quarter
Safeguards Monitoring during Implementation (i.e., environmental and social monitoring report)	ADB website	ADB	ADB, Government of Bangladesh, Development Partners, Civil Society, Individuals	Semiannual during construction, and annually during operation
Monthly progress reports	Website of EAs,	EAs	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.

X. ANTICORRUPTION POLICY

65. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the project.[2] 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.[3]

66. To support these efforts, relevant provisions are included in the loan agreement/regulations and the bidding documents for the project. The project incorporates several specific anticorruption measures, including (i) strict financial management with full adherence to monitoring and reporting systems; (ii) implementation of a robust code of conduct, acceptable to ADB, for the staff involved in the project, ensuring that the staff members working with the PMU do not have any conflict of interest with any activities under the project; and (iii)

[2] Available at: http://www.adb.org/Documents/Policies/Anticorruption-Integrity/Policies-Strategies.pdf
[3] ADB's Integrity Office web site is available at: http://www.adb.org/integrity/unit.asp

enforcement of all applicable anticorruption laws of the Borrower applying to public officers. Furthermore, the executing agencies will each maintain a project website that will be updated regularly and will include (i) bidding procedures, bidders, and contract awards; (ii) use of the funds disbursed under the project; and (iii) physical progress

67. Bid evaluations and contract negotiations for the ADB–funded packages will be facilitated by ADB, supported by expert consultants. Once the evaluations are undertaken, the evaluation report will be submitted to executing agencies' Board by the evaluation team. ADB and its consultants will facilitate the meetings, assist in their administration, and have full access to all relevant documents. Evaluation and negotiation meetings can be held on a retreat basis to allow related administrative issues within the government to still be addressed expediently.

XI. ACCOUNTABILITY MECHANISM

68. 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.

XII. RECORD OF PAM CHANGES

To be inserted as and when any changes are necessary and agreed by both sides.

SIGNED IN DHAKA, BANGLADESH ON _____

On behalf of APSCL

On behalf of PGCB

On behalf of BREB

On behalf of Asian Development Bank

Appendices:

1. Project Description
2. Procurement Plan
3. Outline TOR for Project Implementation Support Consultant for APSCL

PROJECT DESCRIPTION

A. The Background

1. In fiscal year (FY) 2014,[1] the Bangladesh power generating system served a peak demand of 9,268 megawatt (MW), and delivered 40,300 gigawatt-hour (GWh) to the Power Grid Company of Bangladesh (PGCB) transmission network. Bangladesh Power Development Board (BPDB) as the single buyer, purchased generated electricity from all generating facilities including independent power producers, BPDB's subsidiary generating companies, BPDB's own power plants, including power imports from India through the cross border transmission link, and delivered the electricity to Dhaka Electric Supply Company (DESCO), and Dhaka Power Distribution Company (DPDC), and Bangladesh Rural Electrification Board (BREB). BPDB also serves as a distribution utility in urban areas of Bangladesh except in Dhaka. Sales by distribution utilities to end-use customers in FY2014 were 36,200 GWh, indicating that the country's transmission and distribution loss is about 10.2% of generation. In FY 2014, the per capita electricity consumption was 321 kilowatt-hour (kWh) and access to power is about 62% of the population, which is low compared with other countries in South Asia,[2] indicating that the power generation, transmission and distribution facilities require significant capacity additions. Furthermore, the transmission and distribution system requires rehabilitation and upgrades to serve the growing demand in existing service areas and to replace ageing assets.

B. Project Activities

2. A summary of project activities is provided in Table 1.

Table 1: Summary of Project Activities

Project Output and Description		Length/Capacity	Units
Output 1: Power generation system expanded and upgraded			
1.1	Replacement of aging steam and gas turbine power plants of equivalent 220 MW with a more efficient 400 MW gas-fired CCPP at Ashugang Power Station	400	MW
Output 2: Transmission system expanded and upgraded			
2.1	Upgrading of 132 kV Comilla - Chadpur double circuit transmission line	65	km
2.2	Construction of 132 kV double circuit Madunaghat-Kalurghat underground transmission line	7	km
2.3	Construction of 132/33 kV GIS substation at Kalurghat (Chittagong)	2 x 50/75	MVA
2.4	Construction of 132/33 kV AIS substation at Kachua (Chandpur)	2 x 25/41	MVA
2.5	Upgrading of existing 132/33 kV substation at Madunaghat (Chittagong) from AIS to GIS.	From 25/41 to 2 x 50/75	MVA
2.6	Upgrading of existing 132/33 kV substation at Comilla(South) from AIS to GIS.	No capacity increase	MVA
Component 3: Prepayment e-Metering in Dhaka Division			
3.1	Replacement of existing meters in Dhaka Division with pre-payment meters	700,000	customers

AIS = air insulated substation, CCPP = combined cycle power plant, GIS = gas insulated substation, km = kilometers, kv = kilovolt, MW = megawatt, MVA = megavolt-ampere.

[1] The fiscal year (FY) of the Government of Bangladesh ends on 30 June. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY 2014 ends on 30 June 2014.

[2] By 2012, electrification rate is 75% and 89% for India and Sri Lanka, and it is almost 100% for Bhutan and Maldives. Nepal is 65%. Electricity consumption per capita is 527 kWh and 760 kWh for India and Sri Lanka, more than 2,500 kWh and 1,500 kWh for Bhutan and Maldives. It is 119 kWh for Nepal.

3. **Output 1- Power generation system expanded and upgraded**: The executing agency is Ashuganj Power Station Company Limited (APSCL). Ashuganj Power Station, is an existing power generating facility, situated on the bank of river Meghna, about 90 kilometer (km) north–east to Dhaka. The generating facility consists of many types of power plants commissioned since 1970. By end 2012, there were nine gas-fired generating units. The total installed generating capacity by end 2012 was 777 MW (de-rated to 731 MW owing to ageing).[3] The site is supplied with natural gas allocated by Bangladesh Oil, Gas and Mineral Corporation (Petrobangla), to serve the Ashugang power station, while there are other power plants in the vicinity that share the gas supply and transmission substation capacity with Ashuganj Power Station. Power generated at Ashuganj Power Station is delivered to the grid through a 132 kilovolt (kV) substation to which six APSCL's power generating units are connected and a 230 kV substation that serves other power plants of APSCL. A new 400 kV gas-insulated substation has been installed to serve the on-going and planned upgrades of power plants at Ashugang Power Station.

4. From 2013–2015, APSCL has taken measures to install new generating capacity at Ashuganj Power Station, namely (i) 225 MW gas-fired combined cycle power plant (CCPP), (ii) 450 MW CCPP power plant (South), and (iii) 450 MW CCPP power (North). The new power plants (i) and (ii) are expected to be commissioned over 2015–2016, and (iii) is expected to be commissioned by 2017. The power plant (iii) is funded by the Asian Development Bank (ADB) through its loan in 2011[4] and by the Islamic Development Bank (IDB).

5. The proposed Ashuganj 400 MW CCPP (East) will be built within the existing Ashuganj Power Station premises. The space earmarked for the new power plant presently holds two open cycle gas turbines (GT) each of capacity 56 MW (GT-1, commissioned in 1982 and GT-2, commissioned in 1986), and one 34 MW steam turbine (ST) (ST, commissioned in 1984). GT-1, GT-2 and ST are no longer operational. These three generating units will be demolished, to make way for the proposed Ashuganj 400 MW CCPP (East). The proposed configuration for this new power plant is 1:1:1 (1 GT+ 1 HRSG[5] + 1 ST), due to the limited space available on site to accommodate the proposed power plant.

6. The proposed power plant would use an average of 50 million standard cubic feet per day (mmscfd) gas, of which 35 mmscfd would be sourced by decommissioning the existing 150 MW Unit #3 ST power plant. The remaining 15 million mmscfd would come through reduced dispatches of 150 MW Unit #4 ST power plant, 150 MW Unit #5 ST power plant, and 53 MW Gas Engine unit, by reducing their combined average output by an equivalent of 70 MW. Thus, APSCL's overall gas allocation of 230 mmscfd from Petrobangla need not be increased. The Unit #3 ST power plant was commissioned in 1986, and the capacity has been already derated from 150 MW to 105 MW, and operates with an efficiency of only 32%. The proposed power plant will operate at an efficiency of 57%. The output of the proposed power plant will be transmitted to the grid at 400 kV through the existing gas-insulated substation.

7. **Output 2- Transmission system expanded and upgraded.** The executing agency is PGCB. The transmission investments comprise two 132 kV double circuit transmission lines each of which has an existing substation to be upgraded and a new substation to be constructed. One of the two transmission lines is an upgrade of the existing 65 km line from

[3] Power Generation Development Plan-2012, Ashuganj Power Station Company.
[4] ADB. 2011. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of Bangladesh for the Power System Efficiency Improvement Project.* Manila.
[5] Heat recovery steam generator.

Comilla (South)-Kachua-Chadpur, replacing the existing conductors with advanced low loss conductors. The other transmission line will be a 132 kV double circuit underground transmission line of 7 km from Madunaghat to Kalurghat.

8. The two existing 132/33 kV air insulated substations (AIS) at Madunaghat and Comilla (South) will be upgraded to gas insulated substations (GIS) with an additional capacity of 109 megavolt-ampere (MVA) to serve customers through 33 kV lines. A new 132/33 kV GIS substation with capacity of 150 MVA will be built at Kalurghat (Chittagong), and a new AIS substation with a capacity of 82 MVA will be built at Kachua (Chandpur), to further enhance services to existing customers and to connect new customers.

9. **Output 3: Demand side energy efficiency improved.** The executing agency is the BREB. BREB serves about 2.3 million customers in Dhaka Division, and 12 million customers cross the rural area of the country. Conventional induction disc type analog meters are being used, and meter readers visit customers once a month to record electricity used. Large customers have been provided with digital meters with the remote meter reading facility. Distribution utilities in Bangladesh have embarked on establishing pre-payment meters for retail customers, following a government policy initiative. The government's policy initiative has been supported by establishing a common software and communication infrastructure for all distribution utilities. BREB proposes to replace about 700,000 analog meters with pre-payment meters in 10 Palli Bidyut Samities (PBS)[6] within the Dhaka Division. The pre-payment metering system will be implemented with a smart card and/or keypad that can be re-charged at designated point of sale. BREB has already initiated a pilot project on pre-payment metering and is in the process of procuring 5,000 pre-payment meters. Pilot projects conducted by other distribution utilities to install similar metering systems have indicated good customer response and trouble-free operation of the pre-payment meters. In addition to receiving the income upfront, the pre-payment meter reduces metering costs, metering errors and meter tampering.

10. As the executing agency, BREB is responsible for project implementation. After the prepayment meters are installed and commissioned, the PBS will take the ownership and be responsible for operation and maintenance of the facility.

11. Project management, procurement, monitoring and evaluation, and social and environment safeguards management are included in the investment activities.

C. Technical Justification and Selection Criteria

12. All selected investment subprojects have been subject to a rigorous and strict scrutiny processes and met all the criteria listed in the Schedule 4 to the framework financing agreement. These subprojects have been examined by APSCL, PGCB, and BREB for their technical, economic and financial feasibility, and requested for ADB's financing by the Economic Relations Division, Ministry of Finance of the Government of Bangladesh. The ADB staff and consultants reviewed all aspects of the proposed subprojects, and undertook a comprehensive due diligence assessment including safeguard aspects of the subprojects.

13. The expected project benefits are substantial. Tranche 3 of the MFF is to replace aging low efficient generation units with a state-of-the-art CCPP which will improve generation

[6] BREB established Palli Bidyut Samities (PBS) which means Rural Electric Societies in English based on the model of Rural Electric Co-operatives in USA under the universal principle of co-operative, democratic decentralization and ownership of consumers. A PBS is an autonomous organization registered with BREB.

efficiency. Available generation capacity in Bangladesh will increase by an equivalent of 180 MW, serving at least 1,000 GWh per year. The economic benefits will accrue primarily as a consequence of reducing pollutant emissions intensity as well as offsetting and/or reducing greenhouse gas emissions from back-up diesel generation and coal-fired generation by around 0.7 million tons carbon dioxide equivalent per year. The PGCB's 132 kV transmission network in the Chittagong Division will be enhanced by increasing substation capacity by 341 MVA. Replacement of old analog meters with modern digital pre-paid meters will reduce inaccuracies, costs of metering and revenue collection, and eliminate the costs of meter reading and billing. The commercial loss of BREB's distribution system in Dhaka Division will be reduced by around 0.5%. Pre-paid metering has been successful in other pilot programs around the world with respect to raising consumer awareness and empowering consumers to manage their electricity consumption.

PROCUREMENT PLAN

Basic Data

Project Name: Bangladesh Power System Expansion and Efficiency Improvement Investment Program (Tranche 3)	
Project Number:42378	**Approval Number**:
Country: BANGLADESH	**Executing Agency**: Ashuganj Power Station Company Limited (APSCL); Power Grid Company of Bangladesh (PGCB); Bangladesh Rural Electrification Board (BREB)
Project Procurement Classification: B	
Procurement Risk: Moderate	
Project Financing Amount: $ 500 million **ADB Financing:**$205 million **Cofinancing (ADB Administered):**N.A. **Non-ADB Financing:** $220 million from IDB	**Project Closing Date:** 31 December 2020
Date of First Procurement Plan: 02/07/2015	**Date of this Procurement Plan**: 21/10/2015

A. 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 Completive Bidding for Goods	Beneath that stated for ICB, Goods	
Shopping for Goods	Below $100,000	

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

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	Procurement Method	Review	Bidding Procedure	Advert. Date (Q/Y)	Comments
A	Ashuganj 400MW CCPP (East)	$290 mil	ICB	Prior	2S	Q4/2015	No Prequalification Domestic Preference Plant applied
B	Lot 1: 132 kV transmission lines in Chittagong Division	$14.0 mil	ICB	Prior	1S2E	Q1/2016	No Prequalification Domestic Preference Plant applied
	Lot 2: 132/33 kV substations in Chittagong	$29.5 mil					

Package Number	General Description	Estimated Value	Procurement Method	Review	Bidding Procedure	Advert. Date (Q/Y)	Comments
	Division						
C	Prepayment e-Metering in Dhaka Division	$39.9 mil	ICB	Prior	1S2E	Q4/2015	No Prequalification Domestic Preference Goods Applied

CCPP = combined cycle power plant, ICB = international competitive bidding, kV = kilovolt, MW = megawatt.

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	Recruitment Method	Review	Advertisement Date	Type of Proposal	Comments
D	Project Implementation Support Consultants for APSCL	$ 3 mil	**QCBS**	Prior	Q3/2015	FTP	90:10

APSCL = Ashuganj Power Station Company Limited, FTP = full technical proposal, QCBS = quality cost-based selection.

4. Goods and Works Contracts Estimated to Cost Less than $1 Million and Consulting Services Contracts Less than $100,000 (Smaller Value Contracts)

The following table groups smaller-value goods, works and consulting services contracts for which the activity is either ongoing or expected to commence within the next 18 months.

Goods and Works

Package Number	General Description	Estimated Value	Number of Contracts	Procurement Method	Review [Prior / Post/Post (Sample)]	Bidding Procedure	Advertisement Date (quarter/ year)	Comments
C1	Procurement of Vehicles	$180,000	2	Shopping/NCB	Prior		Q1/2016	

Consulting Services

Package Number	General Description	Estimated Value	Number of Contracts	Recruitment Method	Review (Prior / Post)	Advertise-ment Date (quarter/ year)	Type of Proposal	Comments
None								

B. Indicative List of Packages Required Under the Project

The following table provides an indicative list of goods, works and consulting services contracts over the life of the project, other than those mentioned in previous sections (i.e., those expected beyond the current period).

Goods and Works							
Package Number	**General Description**	**Estimated Value (cumulative)**	**Estimated Number of Contracts**	**Procurement Method**	**Review** [Prior / Post/Post (Sample)]	**Bidding Procedure**	**Comments**
None							

Consulting Services							
Package Number	**General Description**	**Estimated Value (cumulative)**	**Estimated Number of Contracts**	**Recruitment Method**	**Review** (Prior / Post)	**Type of Proposal**	**Comments**
None							

C. List of Awarded and On-going, and Completed Contracts

The following tables list the awarded and on-going contracts, and completed contracts.

1. Awarded and On-going Contracts

Goods and Works							
Package Number	**General Description**	**Estimated Value**	**Awarded Contract Value**	**Procurement Method**	**Advertise-ment Date** (quarter/ year)	**Date of ADB Approval of Contract Award**	**Comments**
None							

Consulting Services							
Package Number	**General Description**	**Estimated Value**	**Awarded Contract Value**	**Recruitment Method**	**Advertisement Date** (quarter/year)	**Date of ADB Approval of Contract Award**	**Comments**
None							

2. Completed Contracts

Goods and Works								
Package Number	**General Description**	**Estimated Value**	**Contract Value**	**Procurement Method**	**Advertise-ment Date** (quarter/ year)	**Date of ADB Approval of Contract Award**	**Date of Completion**	**Comments**
None								

Consulting Services

Package Number	General Description	Estimated Value	Contract Value	Recruitment Method	Advertisement Date (quarter/ year)	Date of ADB Approval of Contract Award	Date of Completion	Comments

D. Non-ADB Financing

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

Goods and Works				
General Description	**Estimated Value (cumulative)**	**Estimated Number of Contracts**	**Procurement Method**	**Comments**

Consulting Services				
General Description	**Estimated Value (cumulative)**	**Estimated Number of Contracts**	**Recruitment Method**	**Comments**

National Competitive Bidding

A. Regulation and Reference Documents

1. The procedures to be followed for national competitive bidding shall be those set forth for the National Open Tendering Method in *The Public Procurement Rules, 2008* (as updated and pursuant to *The Public Procurement Act, 2006* issued by the Government of Bangladesh) with the clarifications and modifications described in the following paragraphs required for compliance with the provisions of the Procurement Guidelines.

B. Procurement Procedures

1. Eligibility

2. The eligibility of bidders shall be as defined under section I of the Procurement Guidelines; accordingly, no bidder or potential bidder should be declared ineligible for reasons other than those provided in section I of the Guidelines, **as amended from time to time**.

2. Advertising

3. The posting of NCB specific notices for contracts valued at less than $1 million on ADB's website is not required but is highly recommended.

3. Location of Bid Submission

4. Submission of bids to 'primary' and 'secondary' locations, or 'multiple droppings' of bids, shall not be required or allowed. Advertisements and bidding documents shall specify only one location for delivery of bids.

4. Bid Price as Percentage of Estimate

5. Bids shall not be invited on the basis of percentage above or below the estimated cost, and contract award shall be based on the lowest evaluated bid price of responsive bid from eligible and qualified bidder.

5. Lottery

6. A lottery system shall not be used to determine a successful bidder, including for the purpose of resolving deadlocks.

6. Rejection of All Bids and Rebidding

7. Bids shall not be rejected and new bids solicited without ADB's prior concurrence.

C. Bidding Documents

7. Anti-Corruption

8. Definitions of corrupt, fraudulent, collusive and coercive practices shall reflect the latest ADB Board-approved Anti-Corruption Policy definitions of these terms and related additional provisions (such as conflict of interest, etc.).

8. Qualification Requirements

9. Qualification criteria and specific requirements must be explicitly stated in the bidding documents and applied consistently during bid evaluation.

9. Rejection of Bids

10. A bid shall not be rejected on the grounds that its bid price is not within a percentage range above or below the contract estimate.

10. ADB Policy Clauses

11. A provision shall be included in all NCB works and goods contracts financed by ADB requiring suppliers and contractors to permit ADB to inspect their accounts and records and other documents relating to the bid submission and the performance of the contract, and to have them audited by auditors appointed by ADB.

12. A provision shall be included in all bidding documents for NCB works and goods contracts financed by ADB stating that the Borrower shall reject a proposal for award if it determines that the bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question.

13. A provision shall be included in all bidding documents for NCB works and goods contracts financed by ADB stating that ADB will declare a firm or individual ineligible, either indefinitely or for a stated period, to be awarded a contract financed by ADB, if it at any time determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices or any integrity violation in competing for, or in executing, ADB-financed contract.

OUTLINE TERMS OF REFERENCE FOR CONSULTING SERVICES

Project Implementation Support for APSCL

I. Scope of Work

1. Under Tranche 3 of the Bangladesh Power System Expansion and Efficiency Improvement Investment Program, the Ashuganj Power Station Company Limited (APSCL) will construct a 400 megawatt (MW) combined cycle power plant (CCPP) base load power plant (Power Plant) within the APSCL complex.

2. APSCL intends to procure the power plant on a turnkey basis, with the contractor to be responsible for the design, supply, delivery, erection, testing, and commissioning of the plants. The role of the consultant in this process will be to assist APSCL in assuring that all steps are undertaken properly, so that the completed plant will deliver the performance, reliability, and operational flexibility specified. The service of the consultant covers supervision of construction from the owner's perspective; attending and supervision of the testing and commissioning of the power plant from the owner's perspective; and handing over the power plant including issuance of completion certificate and operational acceptance certificate.

II. Terms of Reference (TOR)

A. Construction Supervision

3. The main turnkey contract would cover construction of the power plant. The Consultant will provide oversight of all aspects of the construction in order to assure that it is conducted properly. This includes assisting in developing and implementing a quality assurance program for construction, review and approval of design, monitoring schedule, inspection of materials upon arrival and upon erection, review of documents to assure quality of delivered goods, comparison of as-built drawings to design, and addressing shortcomings in any of these areas.

B. Testing and Commissioning

4. Nearly all of the main components of the power plant will be subject to an acceptance test results to demonstrate their capability to meet warranted design criteria. For each component subject to test, the Consultant will review the contractor's test procedures for compliance with manufacturers' requirements and design criteria. The Consultant will witness the tests and review the test results. If test results are not satisfactory, the Consultant will require that the problem causing failure is addressed and that the equipment be re-tested.

5. When the power plant is ready to generate power, APSCL will initiate operational activities. The contractor will provide training on the operation of the power plant and all its systems. The Consultant will assist APSCL in this phase and coordinate with the contractors in addressing any issue with the Power Plant that affects operation adversely. At the end of this period, and when all acceptance tests have been completed to the Consultant's satisfaction, the Consultant will advise APSCL that the construction is complete and the Power Plant is ready to be declared fully operational.

6. The Consultant will also prepare and recommend an operational acceptance certificate whenever due for the works of the contractor and alert APSCL of work deficiencies, if any. The

Consultant will also confirm the remedial measures taken by the contractor, and recommend a performance certificate after expiry of the warrantee period.

C. Expertise and Person-Months

7. It is expected that about 64 person–months of international consulting services will be needed from a firm specializing in construction supervision from technical specification through commissioning. The international consultants will be supported by about 98 person–months of national consulting services. Table 1 shows the indicative positions and their person-months.

Table 1: Indicative Expertise and Person-Months:

Experts	International Experts		National Experts	
	Home (PM)	Field (PM)	Home (PM)	Field (PM)
Team Leader	2	18		
Deputy Team Leader				30
Mechanical Engineer	1	8		15
Electrical Engineer	1	9		20
Instrumentation Engineer	1	6		10
Civil Engineer	5	6		15
Environmental Engineer	0.5	1.5		2
Social Safeguards Expert	0.5	0.5		2
Test/Commissioning Engineer	0	4		4
TOTAL	**11 PM**	**53 PM**		**98 PM**

PM = person–months.

D. Qualification/Experience of the Experts

8. **Team Leader (International):** With at least Bachelor's degree in mechanical engineering, the expert shall have minimum 10 years of international work experience in project management, design, engineering, procurement, installation, testing and commissioning similar (in size and scope) contracts of CCPP projects. The aggregate duration of` the assignment, during which he/she held the position of solely responsible manager must not be less than six years.

9. **Deputy Team Leader (National):** With at least Bachelor's degree in mechanical engineering, the expert shall have minimum 10 years of international work experience in project management, design, engineering, procurement, installation, testing and commissioning similar (in size and scope) contracts of CCPP projects. The aggregate duration of` the assignment, during which he/she held the position of solely responsible manager must not be less than six years.

10. **Mechanical Engineer (International):** With at least Bachelor's degree in mechanical engineering, the expert shall have minimum eight years of work experience in project design, engineering, procurement, installation, testing and commissioning similar (in size and scope) contracts of CCPP projects.

11. **Mechanical Engineer (National):** With at least Bachelor's degree in mechanical engineering, the expert shall have minimum eight years of work experience in project design, engineering, procurement, installation, testing and commissioning similar (in size and scope) contracts of CCPP projects.

12. **Electrical Engineers (International):** With at least Bachelor's degree in electrical/mechanical engineering, the experts shall have minimum of eight years of international experience in design and drawing, witnessing factory tests and supervising installation including testing and commissioning of similar (in size and scope) CCPP projects.

13. **Electrical Engineers (National):** With at least Bachelor's degree in electrical/mechanical engineering, the national experts shall have minimum of eight years experience in design and drawing, witnessing factory tests and supervising installation including testing and commissioning of similar (in size and scope) CCPP projects.

14. **Instrumentation Engineers (International):** With at least Bachelor's degree in electrical/mechanical engineering, the experts shall have minimum of eight years of international experience in design and drawing, witnessing factory tests and supervising installation including testing and commissioning of similar (in size and scope) CCPP projects.

15. **Instrumentation Engineers (National):** With at least Bachelor's degree in electrical/mechanical engineering, the national experts shall have minimum of eight years experience in design and drawing, witnessing factory tests and supervising installation including testing and commissioning of similar (in size and scope) CCPP projects.

16. **Test/Commissioning Engineers (International):** With at least Bachelor's degree in electrical/mechanical engineering, the experts shall have minimum of eight years of international experience in design and drawing, witnessing factory tests and supervising installation including testing and commissioning of similar (in size and scope) CCPP projects.

17. **Test/Commissioning Engineers (National):** With at least Bachelor's degree in electrical/mechanical engineering, the national experts shall have minimum of eight years experience in design and drawing, witnessing factory tests and supervising installation including testing and commissioning of similar (in size and scope) CCPP projects.

18. **Civil Engineers (International):** With at least Bachelor's degree in in civil engineering, the experts shall each have shall have minimum of eight years of international experiences in positions in gas power plant projects.

19. **Civil Engineers (National):** With at least Bachelor's degree in civil engineering, the national experts shall each have shall have minimum of eight years of experiences in positions in gas power plant projects.

20. **Environmental Engineers (International):** With at least Bachelor's degree in relevant educational background, the experts shall each have shall have minimum of eight years of international experiences in positions in gas power plant projects.

21. **Environmental Engineers (National):** With at least Bachelor's degree in relevant educational background, the national experts shall each have shall have minimum of eight years of experiences in positions in gas power plant projects.

22. **Social Safeguards Experts (International):** With at least Bachelor's degree in relevant educational background, the experts shall each have shall have minimum of eight years of international experiences in positions in gas power plant projects.

23. **Social Safeguards Experts (National):** With at least Bachelor's degree in relevant educational background, the national experts shall each have shall have minimum of eight years of experiences in positions in gas power plant projects.

E. Tasks for Each Expert

24. **Team Leader (International) will:**

(i) Oversee the assignment and the consultant team, and act as the team's point of contact with APSCL and other stakeholders;

(ii) Review the project management (including administration) procedures of the executing agency for the implementation of the project and, as appropriate recommend changes and or new procedures in keeping with the Asian Development Bank (ADB) and modern international practices;

(iii) Review, check and certify suppliers' equipment design, and assist APSCL in approving the technical documents;

(iv) Witness and certify main equipment shop inspections;

(v) Advice and assist APSCL to develop and maintain a project quality assurance plan, and monitor contractor's designs and works are executed in line with the plan and project requirements. As and when referred by APSCL, speedily advise on acceptability of such designs and works, and suggest corrective measures to be undertaken;

(vi) Assist APSCL in supervising the installation, testing and commissioning of the main and ancillary equipment, plant and utilities. Monitor project progress against plan, report on progress, and propose remedial measures as necessary.

(vii) Review Methods of Statements/Test Procedures;

(viii) Review Contractor's claims for extension of time or additional costs; and undertake variation instructions and cost review; certify volume of works completed withdrawal applications and issue of monthly and final payment certificates;

(ix) Assist in management of operation and maintenance activities;

(x) Review of hazard evaluation and contractor safety procedure;

(xi) Prepare Non Compliance Report (Defective Works);

(xii) Prepare Preliminary Punch List (List of Incomplete Works);

(xiii) Witnessing Commissioning Guarantee and Acceptance Tests and Issue Operational Acceptance Certificate for Taking Over;

(xiv) Prepare Check List of Materials/Spares to be handled over to the Client by Turnkey Contractor;

(xv) Prepare Punch List (List of Unfulfilled contractual obligations);

(xvi) Review and certification of Testing and Commissioning Plan;

(xvii) Review of Operation Manuals;

(xviii) Report on findings during the implementation of the power plant;

(xix) Assist APSCL in ensuring that its personnel receives adequate on-the-job training by the contractor on all relevant aspects of CCPP so that APSCL's personnel can independently perform the operation and maintenance functions;

(xx) Delivering the required reports including final reports;

(xxi) Prepare and submit Final Project Completion Report; and

(xxii) Conduct other duties as reasonably requested by executing agency by the TOR.

25. **Deputy Team Leader (National) will:**

(i) Assist the Team Leader in various assignments as determined by the Team Leader;

(ii) Review the project management (including administration) procedures of the executing agency for the implementation of the project and, as appropriate recommend changes and or new procedures in keeping with ADB and modern international practices;

(iii) Review, check and certify suppliers' equipment design, and assist APSCL in approving the technical documents;

(iv) Advice and assist APSCL to develop and maintain a project quality assurance plan, and monitor contractor's designs and works are executed in line with the plan and project requirements. As and when referred by APSCL, speedily advise on acceptability of such designs and works, and suggest corrective measures to be undertaken;

(v) Assist APSCL in supervising the installation, testing and commissioning of the main and ancillary equipment, plant and utilities. Monitor project progress against plan, report on progress, and propose remedial measures as necessary;

(vi) Review contractor's claims for extension of time or additional costs; and undertake variation instructions and cost review; certify volume of works completed withdrawal applications and issue of monthly and final payment certificates;

(vii) Review, check and certify suppliers' equipment design, and assist APSCL in approving the technical documents;

(viii) Assist in management of operation and maintenance activities;

(ix) Prepare Non Compliance Report (Defective Works);

(x) Witnessing Commissioning Guarantee and Acceptance Tests and Issue Operational Acceptance Certificate for Taking Over;

(xi) Prepare Check List of Materials/Spares to be handled over to the Client by Turnkey Contractor;

(xii) Prepare Punch List (List of Unfulfilled contractual obligations);

(xiii) Review of Operation Manuals;

(xiv) Assist in preparation and submission of Final Project Completion Report;

(xv) Assist in the development of a comprehensive project work program and implementation schedule; and

(xvi) Perform other functions as may be assigned or delegated by Team Leader from time to time during the tenure of assignment and as required by the TOR.

26. **Mechanical Engineer (International) will:**

(i) Assist the Team Leader in various assignments as determined by the Team Leader;

(ii) Review, check and certify suppliers' equipment design, and assist APSCL in approving the technical documents;

(iii) Review Methods of Statements/Test Procedures;

(iv) Witnessing Commissioning Guarantee and Acceptance Tests and Issue Operational Acceptance Certificate for Taking Over;

(v) Prepare Check List of Materials/Spares to be handled over to the Client by Turnkey Contractor;

(vi) Prepare Punch List (List of Unfulfilled contractual obligations);

(vii) Assist in preparation and submission of Final Project Completion Report;

(viii) Assist in the development of a comprehensive project work program and implementation schedule; and

(ix) Perform other functions as may be assigned or delegated by Team Leader from time to time during the tenure of assignment and as required by the TOR.

27. **Mechanical Engineer (National):**

(i) Assist the Team Leader in various assignments as determined by the Team Leader;

(ii) Prepare Non Compliance Report (Defective Works);

(iii) Prepare Preliminary Punch List (List of Incomplete Works);

(iv) Witnessing Commissioning Guarantee and Acceptance Tests and Issue Operational Acceptance Certificate for Taking Over;

(v) Prepare Check List of Materials/Spares to be handled over to the Client by Turnkey Contractor;

(vi) Prepare Punch List (List of Unfulfilled contractual obligations);

(i) Assist in preparation and submission of Final Project Completion Report;

(vii) Assist in the development of a comprehensive project work program and implementation schedule; and

(viii) Perform other functions as may be assigned or delegated by Team Leader from time to time during the tenure of assignment and as required by the TOR.

28. **Electrical Engineer (International):**

(i) Review the existing design work on the transmission and distribution network and control system completed to date;

(ii) Finalize system design and technical requirements with APSCL such as equipment ratings, type of equipment to be used, areas to be supplied, spares required, and maintenance requirements;

(iii) Provide technical design information to APSCL to enable them to obtain the necessary way leaves and construction permits for the new lines and substations;

(iv) Perform feasibility studies, and determine the adequacy of pre-/post-payment metering system;

(v) Prepare specifications for equipment and services required for the transmission and distribution network and control system;

(vi) Monitor tests on completion, pre-commissioning and commissioning procedures; provide commissioning assistance; and monitor rectification of detail and outstanding works for issue of taking-over certificate;

(vii) Prepare Non Compliance Report (Defective Works);

(viii) Prepare Preliminary Punch List (List of Incomplete Works);

(ix) Prepare Check List of Materials/Spares to be handled over to the Client by Turnkey Contractor;

(x) Prepare Punch List (List of Unfulfilled contractual obligations);

(xi) Assist in preparation and submission of Final Project Completion Report;

(xii) Assist in training of APSCL staff through on-the-job training and classroom training programs, covering the installation techniques required for high voltage lines, low voltage connections, high voltage switchgear installation and in associated maintenance and repair procedures; and

(xiii) Perform other functions as may be assigned or delegated by Team Leader from time to time during the tenure of assignment and as required by the TOR.

29. **Electrical Engineer (National):**

(i) Assist in the review the existing design work on the transmission and distribution network and control system completed to date;

(ii) Assist in the completion of system design and technical requirements such as equipment ratings, type of equipment to be used, areas to be supplied, spares required, and maintenance requirements;

(iii) Develop technical design information required to obtain the necessary way leaves and construction permits for the new lines and substations.

(iv) Participate in the development of feasibility studies, and determine the adequacy of the design and work scope;

(v) Prepare specifications for equipment and services required for the transmission and distribution network and control system;

(vi) Monitor tests on completion, pre-commissioning and commissioning procedures; provide commissioning assistance; and monitor rectification of detail and outstanding works for issue of taking-over certificate;

(vii) Prepare Non Compliance Report (Defective Works);

(viii) Prepare Preliminary Punch List (List of Incomplete Works);

(ix) Prepare Check List of Materials/Spares to be handled over to the Client by Turnkey Contractor;

(x) Prepare Punch List (List of Unfulfilled contractual obligations);

(xi) Assist in preparation and submission of Final Project Completion Report; and

(xii) Perform other functions as may be assigned or delegated by Team Leader from time to time during the tenure of assignment and as required by the TOR.

30. **Instrumentation Engineer (International):**

(i) Review the existing design work on the transmission and distribution network and control system completed to date;

(ii) Finalize system design and technical requirements with APSCL such as equipment ratings, type of equipment to be used, areas to be supplied, spares required, and maintenance requirements;

(iii) Provide technical design information to APSCL to enable them to obtain the necessary way leaves and construction permits for the new lines and substations;

(iv) Perform feasibility studies, and determine the adequacy of pre-/post-payment metering system;

(v) Prepare specifications for equipment and services required for the transmission and distribution network and control system;

(vi) Monitor tests on completion, pre-commissioning and commissioning procedures; provide commissioning assistance; and monitor rectification of detail and outstanding works for issue of taking-over certificate;

(vii) Prepare Non Compliance Report (Defective Works);

(viii) Prepare Preliminary Punch List (List of Incomplete Works);

(ix) Prepare Check List of Materials/Spares to be handled over to the Client by Turnkey Contractor;

(x) Prepare Punch List (List of Unfulfilled contractual obligations);

(xi) Assist in preparation and submission of Final Project Completion Report;

(xii) Assist in training of APSCL staff through on-the-job training and classroom training programs, covering the installation techniques required for high voltage lines, low voltage connections, high voltage switchgear installation and in associated maintenance and repair procedures; and

(xiii) Perform other functions as may be assigned or delegated by Team Leader from time to time during the tenure of assignment and as required by the TOR.

31. **Instrumentation Engineer (National):**

(i) Assist in the review the existing design work on the transmission and distribution network and control system completed to date;

(ii) Assist in the completion of system design and technical requirements such as equipment ratings, type of equipment to be used, areas to be supplied, spares required, and maintenance requirements;

(iii) Develop technical design information required to obtain the necessary way leaves and construction permits for the new lines and substations.

(iv) Participate in the development of feasibility studies, and determine the adequacy of the design and work scope;

(v) Prepare specifications for equipment and services required for the transmission and distribution network and control system;

(vi) Monitor tests on completion, pre-commissioning and commissioning procedures; provide commissioning assistance; and monitor rectification of detail and outstanding works for issue of taking-over certificate;

(vii) Prepare Non Compliance Report (Defective Works);

(viii) Prepare Preliminary Punch List (List of Incomplete Works);

(ix) Prepare Check List of Materials/Spares to be handled over to the Client by Turnkey Contractor;

(x) Prepare Punch List (List of Unfulfilled contractual obligations);

(xi) Assist in preparation and submission of Final Project Completion Report; and

(xii) Perform other functions as may be assigned or delegated by Team Leader from time to time during the tenure of assignment and as required by the TOR.

32. **Civil Engineer (International):**

(i) Review the existing civil work design, identify key technical challenges and risks, and prepare remedial measures;

(ii) Monitor and ensure turnkey contractor's work on repair of earthworks and concrete along the existing waterways and general civil works related to the rehabilitation of the intake area and power house;

(iii) Assess the waterways conditions and assist in developing options for protecting the waterways as necessary;

(iv) Prepare Non Compliance Report (Defective Works);

(v) Prepare Preliminary Punch List (List of Incomplete Works);

(vi) Prepare Punch List (List of Unfulfilled contractual obligations);

(vii) Assist in preparation and submission of Final Project Completion Report; and

(viii) Perform other functions as may be assigned or delegated by Team Leader from time to time during the tenure of assignment and as required by the TOR.

33. **Civil Engineer (National):**

(i) Assist in the review of all civil work design, identify key technical challenges and risks, and prepare remedial measures;

(ii) Monitor and ensure turnkey contractor's work on repair of earthworks and concrete along the existing waterways and general civil works related to the rehabilitation of the intake area and power house;

(iii) Assist in the assessment of waterways conditions and assist in developing options for protecting the waterways as necessary;

(iv) Prepare Non Compliance Report (Defective Works);

(v) Prepare Preliminary Punch List (List of Incomplete Works);

(vi) Prepare Punch List (List of Unfulfilled contractual obligations);

(vii) Assist in preparation and submission of Final Project Completion Report; and

(viii) Perform other functions as may be assigned or delegated by Team Leader from time to time during the tenure of assignment and as required by the TOR.

34. **Environmental Engineer (International):**

(i) Undertake a cumulative assessment of the potential environmental impact of the Project, including conducting consultation with groups to be affected by the Project;

(ii) Update the environmental management and monitoring plan (EMP) detailing environmental mitigation measures to address each identified impact, and recommend appropriate environmental mitigation measures;

(iii) Assess the cost, responsibilities, schedule, location, and monitoring framework associated with the implementation of the mitigation measures and the EMP;

(iv) Assist APSCL in monitoring the implementation of the EMP;

(v) Prepare Punch List (List of Unfulfilled contractual obligations);

(vi) Assist in preparation and submission of Final Project Completion Report; and

(vii) Perform other functions as may be assigned or delegated by Team Leader from time to time during the tenure of assignment and as required by the TOR.

35. **Environmental Engineer (National):**

(i) Assist the International Environmental Expert in the assessment of the potential environmental impact of the Project, coordinate and conduct site visits to consult with groups to be affected by the Project;

(ii) Provide input to the environmental management and monitoring plan (EMP) detailing environmental mitigation measures to address each identified impact, and recommend appropriate environmental mitigation measures;

(iii) Assist in determining the cost, responsibilities, schedule, location, and monitoring framework associated with the implementation of the mitigation measures and the EMP;

(iv) Assist in the monitoring the implementation of the EMP;

(v) Prepare Punch List (List of Unfulfilled contractual obligations);

(vi) Assist in preparation and submission of Final Project Completion Report; and

(vii) Perform other functions as may be assigned or delegated by Team Leader from time to time during the tenure of assignment and as required by the TOR.

36. **Social Safeguards Expert (International):**

(i) Assess land acquisition and resettlement issues associated with the Project, and help APSCL prepare the land acquisition and resettlement plan in accordance with ADB's Safeguard Policy Statement 2009;

(ii) Help APSCL follow the principles of the ADB's policy on gender and development during the Project implementation;

(iii) Maximize community participation in technical design, institutional building, procurement, installation, operation, and monitoring and evaluation;

(iv) Assist in monitoring the relevant Project effects on women through gender-disaggregated data collected through the monitoring and evaluation system referred to in the project performance monitoring system;

(v) Prepare Punch List (List of Unfulfilled contractual obligations);

(vi) Assist in preparation and submission of Final Project Completion Report; and

(vii) Perform other functions as may be assigned or delegated by Team Leader from time to time during the tenure of assignment and as required by the TOR.

37. **Social Safeguards Expert (National):**

(i) Assist in the work related to land acquisition and resettlement issues associated with the Project, and help prepare the land acquisition and resettlement plan in accordance with ADB's Safeguard Policy Statement 2009;

(ii) Help the International Social Safeguards Expert to follow the principles of the ADB's policy on gender and development during the Project implementation;

(iii) Assist in monitoring the relevant Project effects on women through gender-disaggregated data collected through the monitoring and evaluation system referred to in the project performance monitoring system;

(iv) Prepare Punch List (List of Unfulfilled contractual obligations);

(v) Assist in preparation and submission of Final Project Completion Report; and

(vi) Perform other functions as may be assigned or delegated by Team Leader from time to time during the tenure of assignment and as required by the TOR.

38. **Test/Commissioning Engineer (International):**

(i) Coordinate and witness functional and operational performance, quality of work, and acceptance tests, with a view to issuing the contractual provisional and final operational acceptance, and/for completion certificates, as per the General Conditions of the supply and installation contract;

(ii) Verify quality, content, and completeness of Contractor's as-built drawings, manuals, operation and maintenance instructions, and similar contractual documentation for all work;

(iii) Assist Team Leader in checking and certifying all testing and commissioning plans and procedures, and preparation of reports;

(iv) Assist APSCL in supervising and monitoring all stages of testing and commissioning;

(v) Prepare Non Compliance Report (Defective Works);

(vi) Prepare Punch List (List of Unfulfilled contractual obligations);

(vii) Witnessing Commissioning Guarantee and Acceptance Tests and Issue PAC for Taking Over;

(viii) Assist in preparation and submission of Final Project Completion Report; and

(ix) Perform other functions as may be assigned or delegated by Team Leader from time to time during the tenure of assignment and as required by the TOR.

39. **Test/Commissioning Engineer (National):**

(i) Assist in the coordination and witnessing of functional and operational performance, quality of work, and acceptance tests, with a view to issuing the contractual provisional and final operational acceptance, and/for completion certificates, as per the General Conditions of the supply and installation contract;

(ii) Conduct reviews of quality, content, and completeness of Contractor's as-built drawings, manuals, operation and maintenance instructions, and similar contractual documentation for all work;

(iii) Prepare Non Compliance Report (Defective Works);

(iv) Prepare Punch List (List of Unfulfilled contractual obligations);

(v) Witnessing Commissioning Guarantee and Acceptance Tests and Issue PAC for Taking Over;

(vi) Assist in preparation and submission of Final Project Completion Report; and

(vii) Perform other functions as may be assigned or delegated by Team Leader from time to time during the tenure of assignment and as required by the TOR.

F. Output

40. The Consultant will prepare weekly, monthly and quarterly progress reports as applicable based on field data and preparation of progress reports in a format and detail acceptable to APSCL and ADB. The Consultant will be responsible for preparation and submission of reports and documents that will include but not be limited to the following:

(i) Inception report (including schedule);
(ii) Report on list of all certified documents;
(iii) Engineering report (including basic design report);
(iv) Construction schedule and cost estimate;
(v) Weekly and monthly review reports on installation of CCPP;
(vi) Reports on TURNKEY contractor's work progress and payment progress;
(vii) Reports on test results and report on commissioning;
(viii) Report on spare parts requirement and maintenance program;
(ix) Reports on safety measures/issues;
(x) Reports on performance of gas turbine generating set, steam turbine generating set, HRSG, other major equipment and ancillary facilities; and
(xi) Final project report describing the services performed details of all recommendations proposed and guidelines for operation and maintenance during the economic life of the power plant.

41. The consultant will maintain records documenting decisions made at meetings, progress on project implementation, financial records and changes to the contract plans. The consultant will assist ADB in preparing a project completion report and monitoring and evaluation reports as required.

42. All documents and reports would be made available on electronic format to APSCL and ADB.

43. All reports will be in English language.