ADB

Report and Recommendation of the President to the Board of Directors

Project Number: 44192-016
September 2015

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

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 17 August 2015)

Currency unit	–	taka (Tk)
Tk1.00	=	$0.0128
$1.00	=	Tk77.77

ABBREVIATIONS

ADB	–	Asian Development Bank
BERC	–	Bangladesh Energy Regulatory Commission
BPDB	–	Bangladesh Power Development Board
IEE	–	initial environmental examination
NTPC	–	National Thermal Power Corporation
O&M	–	operation and maintenance
PAM	–	project administration manual
PGCB	–	Power Grid Company of Bangladesh Limited
PGCIL	–	Power Grid Corporation of India Limited
PPA	–	power purchase agreement
SAARC	–	South Asia Association for Regional Cooperation
SASEC	–	South Asia Subregional Economic Cooperation
SDR	–	special drawing right
TA	–	technical assistance

WEIGHTS AND MEASURES

HVDC	–	high-voltage direct current
kV	–	kilovolt
MW	–	megawatt

NOTES

(i) The fiscal year (FY) of the Government of Bangladesh and its agencies ends on 30 June. “FY” before a calendar year denotes the year in which the fiscal year ends, e.g., FY2015 ends on 30 June 2015.

(ii) In this report, “$” refers to US dollars.

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PROJECT AT A GLANCE

1. Basic Data — **Project Number:** 44192-016

Project Name	SASEC Second Bangladesh–India Electrical Grid Interconnection Project	**Department /Division**	SARD/SAEN
Country	Bangladesh	**Executing Agency**	Power Grid Company of Bangladesh, Ltd. (PGCB)
Borrower	Government of Bangladesh		

2. Sector

	Sector	Subsector(s)	ADB Financing ($ million)
✓	**Energy**	Electricity transmission and distribution	120.00
		Total	**120.00**

3. Strategic Agenda

Strategic Agenda	Subcomponents
Inclusive economic growth (IEG)	Pillar 1: Economic opportunities, including jobs, created and expanded
Environmentally sustainable growth (ESG)	Global and regional transboundary environmental concerns
Regional integration (RCI)	Pillar 1: Cross-border infrastructure

Climate Change Information

Adaptation ($ million)	3.36
Climate Change impact on the Project	Medium

4. Drivers of Change

Drivers of Change	Components
Governance and capacity development (GCD)	Institutional development
Knowledge solutions (KNS)	Knowledge sharing activities
Partnerships (PAR)	Implementation Regional organizations South-South partner

Gender Equity and Mainstreaming

No gender elements (NGE) ✓

5. Poverty Targeting

Project directly targets poverty: No

Location Impact

Nation-wide: High

6. Risk Categorization: Low

7. Safeguard Categorization **Environment:** B **Involuntary Resettlement:** B **Indigenous Peoples:** C

8. Financing

Modality and Sources	Amount ($ million)
ADB	**120.00**
Sovereign Project loan: Ordinary capital resources	35.00
Sovereign Project loan: Asian Development Fund	85.00
Cofinancing	**0.00**
None	0.00
Counterpart	**63.22**
Government	63.22
Total	**183.22**

9. Effective Development Cooperation

Use of country procurement systems	No
Use of country public financial management systems	Yes

Source: Asian Development Bank

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on proposed loans to the People's Republic of Bangladesh for the SASEC Second Bangladesh–India Electrical Grid Interconnection Project.[1]

2. The project[2] will upgrade the power transmission capacity of the existing grid interconnection between Bangladesh and India from 500 megawatts (MW) to 1,000 MW.[3] This will allow Bangladesh to increase the import of electricity from India to meet increasing power demand. The power grid of western Bangladesh at Bheramara and the power grid of eastern India at Baharampur were first successfully interconnected in 2013 through the first Bangladesh–India Electrical Grid Interconnection Project, which was financed by the Asian Development Bank (ADB).[4]

II. THE PROJECT

A. Rationale

3. In 1971, when Bangladesh gained independence, only 3% of the population had access to electricity. In 2015, this had risen to over 70%, with per capita electricity consumption reaching 321 kilowatt-hours per annum.[5] The power generation capacity of Bangladesh was 10,817 megawatts (MW) in January 2015. Natural gas is the main source of primary energy for power generation in Bangladesh, and 63% of generation capacity is based on domestic gas.[6] Domestic natural gas supplies in Bangladesh have not kept pace with growing demand, and this has resulted in an increasing dependence on power generation from quickly deployable oil- and diesel-based power plants that have reached an installed capacity of over 2,500 MW. Bangladesh recorded a peak supply of over 7,700 MW in 2014. However, the installation of oil- and diesel-based power plants has cost implications as oil- and diesel-based power is significantly more expensive compared to natural gas.

4. The Government of Bangladesh has an ambitious target to achieve electricity for all by 2021 (i.e., within 50 years from the date of independence), and is working to meet the target of 24,000 MW of generating capacity by 2021.[7] Programs under implementation include improving the efficiency of existing gas-based generation power plants; developing new power plants based on fuel sources including coal, imported gas, and renewable energy; as well as development of cross-border grid interconnections to exchange power within South Asia, starting with India. In addition to investments in generation and the purchase of power over international transmission interconnections, significant investments in transmission and distribution networks are planned in Bangladesh for electricity to reach customers. ADB is supporting efficiency improvements in power generation, renewable energy generation, transmission, and distribution network investments.

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1 The design and monitoring framework is in Appendix 1.
2 The Asian Development Bank (ADB) provided project preparatory technical assistance to Bangladesh for SASEC Second Bangladesh–India Electrical Grid Interconnection Project (TA 8823-BAN).
3 The project is included in Asian Development Bank (ADB). 2014. *Country Operations Business Plan: Bangladesh, 2015–2017*. Manila.
4 ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of Bangladesh for the Bangladesh–India Electrical Grid Interconnection Project*. Manila (Loan 2661-BAN).
5 Government of Bangladesh, Planning Commission. 2015. *Seventh Five Year Plan FY 2016–FY 2020.* Dhaka.
6 The major consumers of natural gas are the power sector at around 40% and captive power at 17%. At current levels of consumption, gas reserves are estimated to meet requirements for about 15 years.
7 Ministry of Power, Energy and Mineral Resources. 2011. *Power System Master Plan.* Dhaka.

5. In 2010, a joint communiqué on electrical grid connectivity was signed between Bangladesh and India, signaling support on cross-border power interconnection and potential for electricity trade between the two countries.[8] In October 2013, the electricity grids of the two neighboring countries were connected for the first time. This first Indian national power grid connection with the Bangladesh national power grid was supported under the ADB-financed Bangladesh–India Electrical Grid Interconnection Project, and 500 MW of power flows were achieved from India to Bangladesh in 2013. Connecting the two national grids resulted in power flows of over 2,000 gigawatt-hours from India to Bangladesh in 2014, resulting in improved power availability, reduced cost of electricity, fewer power interruptions, and improved power quality (particularly in western Bangladesh). Based on the success of the first interconnection, the two countries agreed to expand cooperation in the power sector. Bangladesh will procure an additional 500 MW of power over the upgraded interconnection from India.[9] In addition to the transmission interconnection between the two countries, India and Bangladesh are working to enhance cooperation in rail and road connectivity that are supported by ADB under the South Asia Subregional Economic Cooperation (SASEC) Program.[10]

6. At the regional level, the member countries of the South Asia Association for Regional Cooperation (SAARC) signed a framework agreement for energy cooperation in Kathmandu in November 2014 to identify and implement priority regional energy projects.[11] Analytical studies, including the SAARC Regional Energy Trade Study, have identified the 1,000 MW power transmission connection between India and Bangladesh as an important building block for the regional South Asian power grid enhancement.[12] The regional SAARC transmission grid will result in several benefits, including increased operational efficiency; improved system reliability; and the tapping of new power resources, particularly new hydropower capacity in Bhutan, India, and Nepal.[13] The project meets two of the focus areas of ADB's South Asia regional cooperation strategy: (i) the improvement of cross-border electricity transmission connectivity, and (ii) the boosting of power trade in the region.[14] The project supports the regional cooperation and integration priorities under ADB's Midterm Review of Strategy 2020 and the regional cooperation operations business plan.[15]

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

[8] This was signed by the Power Secretaries of Bangladesh and India and helped conclude a process initiated in 1997 when ADB facilitated dialogue between Bangladesh and India to identify possibilities of exchange of power.

[9] The joint steering committee meeting was held in Dhaka on 3 April 2014. It concluded Bangladesh could procure 500 MW from the Indian electricity market, and the enhancement of the interconnection capacity to 1000 MW.

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

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

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

[13] ADB. 2014. *Technical Assistance for the South Asia Subregional Economic Cooperation Cross-Border Power Trade Development*. Manila (TA 8619-REG).

[14] ADB. 2011. *Regional Cooperation Strategy: South Asia, 2011–2015*. Manila.

[15] ADB. 2014. *Midterm Review of Strategy 2020: Meeting the Challenges of a Transforming Asia and Pacific.* Manila; ADB. 2014. *Regional Cooperation Operations Business Plan: South Asia, 2015–2017*. Manila.

the electricity volume traded. The transmission network in India is connected to Bangladesh, Bhutan, and Nepal and bilateral electricity trades between India and these countries occur.

8. **Lessons learned from ongoing projects.** The loan for the first Bangladesh–India Electrical Grid Interconnection Project was approved in August 2010. A power purchase agreement (PPA) for 250 MW was entered into between the trading arm of India's National Thermal Power Corporation (NTPC) and the Bangladesh Power Development Board (BPDB) in 2012. The cost of power was set based on the terms and conditions for the power generation plants determined by the Central Electricity Regulatory Commission of India. The first competitively tendered cross-border PPA for 250 MW was signed in 2013 between PTC India and the BPDB, and was supported with technical assistance (TA) from ADB.[16] The first Bangladesh–India Electrical Grid Interconnection Project has been performing satisfactorily since 2013. During the processing phase for the first project, there had been perceived risk on the likelihood of power transfers not happening between the two countries, and whether suppliers in India would sell power to Bangladesh. In 2015, 500 MW of power flow was taking place, and several power traders in India have submitted bids to sell 250 MW of power to Bangladesh starting from 2016 when the existing short term contract for 250 MW concludes.

B. Impact and Outcome

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

C. Outputs

10. The project comprises two outputs: (i) enhanced Behrampur–Bheramara power transmission link through (a) the installation of an additional asynchronous[17] 400-kilovolt (kV)/230 kV 500 MW high-voltage direct current (HVDC) back-to-back substation in Bheramara, and (b) the construction of 12 kilometers of 230 kV transmission line from the Bheramara substation to the Ishurdi substation and associated facilities; and (ii) improved capacity of the Power Grid Company of Bangladesh (PGCB) on technical, project management, regulatory, trading and financial matters.

D. Investment and Financing Plans

11. The project is estimated to cost $183.2 million (Table 1).

Table 1: Project Investment Plan
($ million)

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

[a] Includes taxes and duties of $34.7 million to be financed from government resources by cash contribution.
[b] In 2015 prices.

[16] ADB. 2010. *Technical Assistance to the People's Republic of Bangladesh for Bangladesh–India Electrical Grid Interconnection Project.* Manila.
[17] The term asynchronous refers to the nature of the interconnection between two electrical grids operating at different frequencies.

[c] Physical contingencies computed at 2% for the substation and 15% for the transmission line. Price contingencies are computed at 1.5% on foreign exchange costs and 6.0% on local currency costs, and include a provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.
[d] Includes interest and commitment charges to be paid by the Power Grid Company of Bangladesh. Interest during construction for the Asian Development Bank loan has been computed based on the relending rate to the project. Commitment charges for an Asian Development Bank ordinary capital resources loan are 0.15% per year, to be charged on the undisbursed loan amount.
Sources: Asian Development Bank estimates in August 2015 and development project proposal approved by the Government of Bangladesh in March 2015.

12. The government has requested a loan of $35 million from ADB's ordinary capital resources to help finance the project. The loan will have a 25-year term, including a grace period of 5 years; an annual interest rate determined in accordance with ADB's London interbank offered rate-based lending facility; a commitment charge of 0.15% per year; and such other terms and conditions set forth in the draft loan and project agreements. Based on this, the average loan maturity is 15.25 years and the maturity premium payable to ADB is 0.10% per annum. The government has also requested a loan in various currencies equivalent to SDR 60.962 million from ADB's Special Funds resources to help finance the project. The loan will have a 25-year term, including a grace period of 5 years, an interest rate of 2.0% per annum during the grace period and thereafter, and such other terms and conditions set forth in the draft loan and project agreements.

13. The financing plan is in Table 2. The government has indicated that any shortfall in the finances required would be covered by the government. The project proposal was prepared by PGCB and has been reviewed by the Planning Commission and the Executive Committee of the National Economic Council. A small-scale project preparatory TA of $200,000 from the Technical Assistance Special Fund (TASF-other sources) was provided in December 2014 to support preparatory activities, including due diligence.[18]

Table 2: Financing Plan

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

Sources: Asian Development Bank estimates in August 2015 and development project proposal approved by Government of Bangladesh in 2015.

E. Implementation Arrangements

14. As the executing agency for the project, PGCB will be responsible for the construction and operation of the HVDC substation and transmission line in Bangladesh. To ensure effective implementation, PGCB set up a project management unit in December 2014, headed by a project director. The Power Grid Corporation of India (PGCIL), the central transmission utility of India, has been contracted by the government to provide technical consulting and project management services to PGCB. For review and coordination, the joint working group, set up in 2010 and comprising senior officials from both governments and electricity utilities of Bangladesh and India, meets regularly. The joint steering committee, also set up in 2010, and comprising the power secretaries of both countries, provides guidance and ensures high-level coordination.

[18] ADB. 2014. *Technical Assistance to the People's Republic of Bangladesh for the Second Bangladesh–India Electrical Grid Interconnection Project.* Manila.

15. The implementation period is until 30 June 2018, and the loan closing date will be 31 December 2018. Procurement of two turnkey contracts for transmission line and the substation using ADB financing will be through international competitive bidding in accordance with ADB's Procurement Guidelines (2015, as amended from time to time). Procurement of the HVDC back-to-back substation is underway using ADB's two-stage bidding, while procurement for the transmission line will commence in 2015. Recruitment of consultants using ADB financing will commence in 2015 in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time) and following quality- and cost-based selection, with a 90:10 selection criteria for firms.

16. The implementation arrangements are summarized in Table 3 and described in detail in the project administration manual (PAM).[19] The joint steering committee and joint working group met in 2014 and agreed that Bangladesh could procure an additional 500 MW of power from the power market in India. The Ministry of Power, Energy and Mineral Resources is reviewing the BPDB's request to initiate the power procurement, and expects to start the tender in 2015. The existing bulk power transmission agreement for usage of transmission facilities from Baharampur in India to the border will cover the increased power flow of 500 MW.

Table 3: Implementation Arrangements

Aspects		**Arrangements**
Implementation period		February 2015–June 2018
Estimated completion date		30 June 2018
Management		
(i)	Oversight body	Steering committee Secretary; Power Division; MPEMR; Government of Bangladesh (chair) Managing director, PGCB; Representatives from the Planning Commission and Ministry of Finance; Government of Bangladesh (members)
(ii)	Executing agency	PGCB
(iii)	Key implementing agency	PGCB
(iv)	Project management unit	Formed in 2014 with 23 staff of PGCB, headed by project directorate substation site in Bheramara, Kusthia District
(v)	Project safeguard measures	Internal monitoring at PGCB
(vi)	Coordination with India on construction of interconnection facilities and power purchase agreements	Joint steering committee Secretary; Power Division; MPEMR; Government of Bangladesh (member) Secretary, Ministry of Power, India (member) Joint working group Senior officials from the governments of Bangladesh and India, and electricity utilities of Bangladesh and India (members)

[19] Project Administration Manual (accessible from the list of linked documents in Appendix 2).

Aspects	Arrangements		
Procurement	International competitive bidding	Two contracts	About $110 million
Consulting services (project management, procurement and implementation support)	Financed by Government	72 person-months	$ 3.6 million
Consulting services (technical, financial, trading and regulatory support)	Financed by ADB (QCBS)	48 person-months	$ 1.4 million
Retroactive financing and advance contracting	Advance contracting has been approved. Retroactive financing is available for up to 20% of the loan amount for expenditures incurred up to 12 months before loan signing.		
Disbursement	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.		

ADB = Asian Development Bank, MPEMR = Ministry of Power, Energy and Mineral Resources, PGCB = Power Grid Company of Bangladesh, QCBS = quality and cost-based selection.
Source: Asian Development Bank.

III. DUE DILIGENCE

A. Technical

17. The project was designed by a joint team from PGCB and PGCIL. The team concluded that the upgrade of the existing interconnection between the eastern region of India and western Bangladesh was feasible, and the asynchronous mode of interconnection was preferred to facilitate careful regulation and management of the power flows between the electrical grids of the two countries, and to permit independent operation of these grids. Based on technical, operational, and economic considerations, the preliminary design of the second HVDC back-to-back substation terminal and the 230 kV transmission line in Bangladesh was completed in 2014. Feasibility studies also confirmed that the transmission capacity of the existing 400 kV double-circuit line from Baharampur in India to Bheramara in Bangladesh is adequate for power evacuation of 1,000 MW. PGCIL has been appointed as a consultant to PGCB to provide support for the technical bid evaluation during the bid process, detailed design review, implementation, and testing phases. Studies by PGCB and under the S-PPTA (footnote 2) indicate the need for support to the National Load Dispatch Center and PGCB on aspects of system planning, operation, and adherence to the grid code and these would be covered by consulting assistance under the proposed loan.[20] The project has been rated medium risk on climate change and vulnerability.

B. Economic and Financial

18. The economic analysis was carried out in accordance with ADB's Guidelines for the Economic Analysis of Projects.[21] The project's economic feasibility was assessed from a regional as well as a Bangladesh-specific perspective. The economic analysis for the project considered the benefits of resource cost savings of power generation based on alternative sources and, to a lesser extent, the incremental benefit during certain time periods. Power imports from India are part of the least-cost solution to meet increasing power requirements in

[20] A blackout occurred on 1 November 2014. PGCB identified and subsequently implemented several short-term measures in the transmission grid to minimize the possibility of a recurrence. Medium and long-term measures include implementation of the grid code, changes in system planning and system operation as well as requirement for investments in the power system.
[21] ADB.1997. *Guidelines for the Economic Analysis of Projects.* Manila.

Bangladesh. All costs and benefits have been expressed in constant 2015 prices. Capital costs and operation and maintenance (O&M) costs were taken from the financial data, with appropriate adjustments to remove taxes and price contingencies. The project provided an economic internal rate of return of 22% based on conservative assumptions of resource cost savings using imported coal-based power plants as an alternative. Evaluation based either on prevented outage costs or resource cost savings on furnace oil or diesel (the fuels used for rental power plants) would provide a significantly higher economic return. The project is resilient to changes in the parameters, including an increase in capital and O&M costs, a reduction in the resource cost savings, delays in project commissioning, and a reduction in utilization of the interconnection. The project returns are stable against the relevant risk factors, and the analysis clearly demonstrates the economic feasibility of the project. An assessment of the regional benefits leads to an economic internal rate of return of 27%. The project also adds to larger intangible benefits of building mutual trust. The successful operation of the first interconnection has already spurred similar projects in other South Asian countries and will lead to short-term operational optimization and support medium-term to long-term planning and development of regional energy resources. This will contribute to the energy security and economic development of the region.

19. Financial analysis of the project was carried out in accordance with ADB's Guidelines on the Financial Management and Analysis of Projects.[22] All financial costs and benefits were expressed in constant 2015 prices. Financial viability was assessed by comparing the incremental costs and benefits of the project over the life of the project. The incremental benefits were calculated based on PGCB's revenue stream. Costs used to determine the financial internal rate of return included the capital investment, O&M costs, and taxes to install and operate the project. Revenues were calculated based on existing transmission tariffs until 2016 when the applicable transmission tariff regulations of the Bangladesh Energy Regulatory Commission (BERC) are considered.[23] The financial internal rate of return of the project is 5%, which compares favorably with the estimated weighted average cost of capital of 2%, indicating that the project is financially viable.

C. Governance

20. The executing agency was assessed on ADB's procurement and financial management requirements. Consistent with its commitment to good governance, accountability, and transparency, ADB reserves the right to investigate, directly or through its agents, any alleged corrupt, fraudulent, collusive, or coercive practices relating to the project. To support these efforts, relevant provisions of ADB's Anticorruption Policy (1998, as amended to date) have been included in the bidding documents for the project. Both procurement contracts financed by ADB are subject to prior ADB review and included provisions specifying the right of ADB to audit and examine the records and accounts of the executing agencies and all contractors, suppliers, consultants, and other service providers as they relate to the project. ADB's Anticorruption Policy was explained to and discussed with the government and PGCB. The specific policy requirements and supplementary measures are described in the PAM (footnote 19).

21. The delay in the notification of the electricity transmission tariff regulations is a concern. The process for notification of transmission tariff regulations has started in June 2015 and would be completed in 2015 before disbursements commence. This is needed for better transparency, to link tariffs to cost of electricity and to improve PGCB's financial sustainability. PGCB is listed on the Dhaka Stock Exchange and its financial parameters are disclosed quarterly. PGCB has been rotating its external auditors periodically. PGCB is capable of managing funds flow, disbursement procedures, accounting, and financial reporting under the project. Counterpart

[22] ADB. 2005. *Guidelines on the Financial Management and Analysis of Projects.* Manila.
[23] Tariff regulations are expected to be publicly announced by BERC in 2015.

funds and their terms and conditions from the government to PGCB have been approved. The specific policy requirements and supplementary measures are described in the PAM (footnote 19).

D. Poverty and Social

22. Bangladesh is the eighth most populated country in the world with a population of around 160 million. Nearly 47% of the labor force is engaged in agriculture.

23. Despite several challenges, including natural calamities like floods and cyclones, Bangladesh has made steady progress towards poverty reduction and is on track to achieve the Millennium Development Goal target of (i) reducing income poverty and infant and child mortality by half, and (ii) achieving gender parity in primary and secondary schooling by 2015. The rate of poverty reduction accelerated. Extreme poverty has declined significantly in both urban and rural areas with the proportion of rural population living in extreme poverty halving from 44% in 1992 to 21% in 2010. This can be attributed to more rapid gross domestic product growth, faster rate of urbanization, rising labor productivity and wages, a shift from low-return agricultural labor to nonfarm employment, and growth in export industries.

24. The Perspective Plan 2012 outlines a target of per-capita electricity consumption of 600 kilowatt-hours per annum by 2021. The Sixth Five-Year Plan, FY2011–FY2015 focused on poverty reduction as a key theme and this will be carried forward in the Seventh Five-Year Plan (footnote 5) that focusses on accelerating growth and empowering citizens.[24] To achieve this, sufficient electrical power at affordable prices is a key prerequisite and is enunciated in the goals for 100% electricity access. The project is important to improve availability of electricity and economic growth, particularly in western Bangladesh, which is disproportionally affected by electricity shortages.

25. The project will generate jobs for the local communities during construction as a direct benefit. Other impacts of the project include greater production capacity of existing industries, and the creation of new industries, particularly in western Bangladesh that would generate employment. The project is classified as having no gender element, given the nature of the proposed investments in transmission infrastructure.

E. Safeguards

26. From an environmental standpoint, the environmental categorization of the project is category B in accordance with ADB's Safeguard Policy Statement (2009), as potential negative environmental impacts, including dust and noise, are mostly temporary and reversible, and can be managed through good engineering measures, design, and health and safety measures. The initial environmental examination (IEE) is based on the analyzed data collected through sampling, reviews of available reports, satellite photographs, discussion with stakeholders, and field visits to the project area.[25] The IEE was uploaded on the ADB website in July 2015. The IEE was prepared following ADB's Safeguard Policy Statement, the government's environmental impact assessment guidelines, and related national policies and legislation. The environmental management plan under the IEE is sufficient to mitigate potential impacts. The Department of Environment in Bangladesh is expected to accord the required environmental clearances for the project before start of construction activities in 2016. The implementation of the environmental management plan will be supervised by PGCB, and environmental monitoring reports will be submitted to ADB semiannually. Budgets for the environmental management plan have been approved by the government. In the event of any change in the

[24] Government of Bangladesh, Planning Commission. 2011. *6th Five Year Plan.* Dhaka.
[25] Initial Environmental Examination (accessible from the list of linked documents in Appendix 2).

alignment of the transmission line or identification of any unanticipated environmental impacts during the course of project implementation, PGCB will update the IEE and suitably revise the environmental management plan.

27. The project is categorized as category B for involuntary resettlement and as category C for indigenous people impacts. Due diligence has confirmed that the substation site is owned and in the possession of PGCB since 2010, and there will be no resettlement impacts on the substation site. For the transmission line, a feasible route affecting the fewest number of people has been chosen, and the transmission towers are expected to be placed on agricultural and fallow land. The resettlement plan was uploaded to ADB's website in July 2015. Relevant information regarding the project and the views and opinions of all affected groups were taken into consideration in developing the entitlement matrix. Compensation payments will be made in accordance with the resettlement plan along the transmission line right of way. A grievance redress mechanism will be used by PGCB. The borrower has the capacity and commitment to manage the social and environmental risks.

F. Risks and Mitigating Measures

28. A key risk is the availability of power in India and the limited capacity in Bangladesh to participate and purchase power from the power market in India. The government has agreed to initiate the tendering process for purchase of 500 MW of power from India in 2015. The past experience of signing two PPA for 250 MW each in 2012 and 2013 for the first interconnection and the timely delivery of power from agencies in India have contributed to reduced risk perceptions for power supply for the project. Bid process support under previous TA (footnote 16) as well as training programs and capacity development in Bangladesh on power trading helped improve familiarity within BPDB on procuring power from the Indian power market.[26]

29. Another key risk is that transmission tariffs for PGCB might continue to be non-cost-reflective. Draft tariff regulations prepared by BERC have not been officially announced. PGCB filed a petition with BERC in October 2014 to increase tariffs. BERC will announce the final regulations and tariff for PGCB in 2015. Other risks, such as the limited capacity of PGCB for project coordination and implementation will be suitably mitigated by the recruitment of consultants. Major risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.[27] The overall assessment of risk is low and the integrated benefits and impacts of the project are expected to outweigh the costs.

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigating Measures
Limited HVDC technology implementation capacity	The executing agency retained PGCIL to assist on HVDC project design, bidding, and implementation in Bangladesh. The first interconnection is operational and PGCB employees have taken over operation and maintenance of the station. Requirement for assistance at the national load center and key nodes has been identified and will be supported under the project.
Limited capacity to participate and purchase power from the power market	Two cross-border commercial PPA were signed in 2012 and 2013. The Asian Development Bank is supporting (i) capacity development for power trading in Bangladesh, and (ii) tendering for 500 MW. Initiation of the bidding for 500 MW will take place before disbursements commence.

[26] ADB. 2014. *South Asia Economic Integration Partnership: Subproject on Power Trading in Bangladesh and Nepal.* Manila (TA 8658-REG).
[27] Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

Risks	Mitigating Measures
Inadequate power availability in India	The eastern region of India has surplus power supply and expects to add additional generation capacity by 2022. Based on interest received from bidders in July 2015, 500 MW of long-term power supply is expected to be available to Bangladesh.
Non-cost-reflective tariff impacts financial sustainability of transmission utility	Timely notification of BERC's transmission tariff regulations in 2015 before disbursements commence will reduce regulatory uncertainty for the utility and improve PGCB's financial position. The tariff announcement for PGCB is also expected in 2015 from BERC. To ensure PGCB's debt servicing capacity improves, the government will undertake a financial restructuring of PGCB from 2016. Support on regulatory reporting will improve financial management at PGCB.

BERC = Bangladesh Energy Regulatory Commission, HVDC = high-voltage direct current, MW = megawatt, PGCB = Power Grid Company of Bangladesh, PGCIL = Power Grid Corporation of India, PPA = power purchase agreement.
Source: Asian Development Bank.

IV. ASSURANCES

30. The government and PGCB have assured ADB that implementation of the project shall conform to all applicable ADB policies including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, and disbursement as described in detail in the PAM and loan documents.

31. The government and PGCB have agreed on certain covenants, which are set forth in the loan agreements and project agreement. The government and PGCB have agreed that the following conditions will be satisfied prior to disbursement of funds under the project (a) the Bangladesh Energy Regulatory Commission Electricity Transmission Tariff Regulations have been published, in final form, in the Official Gazette of Bangladesh; and (b) BPDB has issued the bidding documents for the purchase of an additional 500 MW of power to be transmitted through the project facilities.

V. RECOMMENDATION

32. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve

(i) the loan of $35,000,000 to the People's Republic of Bangladesh for the SASEC Second Bangladesh–India Electrical Grid Interconnection Project, from ADB's ordinary capital resources, with interest to be determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; for a term of 25 years, including a grace period of 5 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan and project agreements presented to the Board; and

(ii) the loan in various currencies equivalent to SDR60,962,000 million to the People's Republic of Bangladesh for the SASEC Second Bangladesh–India Electrical Grid Interconnection Project, from ADB's Special Funds resources, with an interest charge at the rate of 2.0% per annum during the grace period and thereafter; for a term of 25 years, including a grace period of 5 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan and project agreements presented to the Board.

Takehiko Nakao
President

7 September 2015

DESIGN AND MONITORING FRAMEWORK

Impacts the Project is aligned with:

Availability and sustainability of power supply in Bangladesh increased by 2021 (Perspective Plan of Bangladesh,2012)[a]

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

Project Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
	regulatory requirements by 2018 2d. At least 10 personnel in PGCB, Power Division and BPDB in Bangladesh trained on Indian power market, load dispatch, power procurement, and financial issues by 2017	MPEMR annual reports	

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

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

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

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

Inputs
Loan

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

Assumptions for Partner Financing
Not applicable.

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

LIST OF LINKED DOCUMENTS

http://adb.org/Documents/RRPs/?id=44192-016-3

1. Loan Agreement: Asian Development Fund
2. Loan Agreement: Ordinary Capital Resources
3. Project Agreement
4. Sector Assessment (Summary): Energy (Power)
5. Project Administration Manual
6. Contribution to the ADB Results Framework
7. Development Coordination
8. Financial Analysis
9. Economic Analysis
10. Country Economic Indicators
11. Summary Poverty Reduction and Social Strategy
12. Initial Environmental Examination
13. Resettlement Plan
14. Risk Assessment and Risk Management Plan

Supplementary Document

15. Project Climate Risk Assessment and Management Report