



Report and Recommendation of the President to the Board of Directors

Project Number: 44192
September 2013

Proposed Loan for Additional Financing People's Republic of Bangladesh: SASEC Bangladesh–India Electrical Grid Interconnection Project

This document is being disclosed to the public prior to Board consideration in accordance with ADB's Public Communications Policy 2011. Subject to any revisions required following Board consideration, this document is deemed final.

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 1 August 2013)

Currency unit – taka (Tk)

Tk1.00 = \$0.0128

\$1.00 = Tk77.96

ABBREVIATIONS

| | | |
|-------|---|---|
| ADB | – | Asian Development Bank |
| BPDB | – | Bangladesh Power Development Board |
| HVDC | – | high-voltage direct current |
| km | – | kilometer |
| kV | – | kilovolt |
| MW | – | megawatt |
| NTPC | – | National Thermal Power Corporation |
| PGCB | – | Power Grid Company of Bangladesh |
| PGCIL | – | Power Grid Corporation of India Limited |
| PPA | – | power purchase agreement |
| SASEC | – | South Asia Subregional Economic Cooperation |

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., FY2013 ends on 30 June 2013.
- (ii) In this report, "\$" refers to US dollars unless otherwise stated.

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PROJECT AT A GLANCE

| | | | | | |
|--|--|--------------------------------------|--|--|----------------------------|
| 1. Project Name: SASEC Bangladesh - India Electrical Grid Interconnection Project | | | 2. Project Number: 44192-014 | | |
| 3. Country: Bangladesh | | | 4. Department/Division: South Asia Department/Energy Division | | |
| 5. Sector Classification: | | | | | |
| | | Sectors | Primary | Subsectors | |
| | | Energy | ✓ | Electricity transmission and distribution | |
| 6. Thematic Classification: | | | | | |
| | | Themes | Primary | Subthemes | |
| | | Sustainable economic growth | | Promoting economic efficiency and enabling business environment, widening access to markets and economic opportunities | |
| | | Regional Cooperation | ✓ | Cross border infrastructure | |
| | | Capacity Development | | Institutional Development | |
| 6a. Climate Change Impact | | | 6b. Gender Mainstreaming | | |
| Adaptation | | Medium | Effective gender mainstreaming (EGM) | | |
| Mitigation | | Low | Gender equity theme (GEN) | | |
| | | | No gender elements (NGE) | | ✓ |
| | | | Some gender benefits (SGB) | | |
| 7. Targeting Classification: | | | 8. Location Impact: | | |
| General Intervention | Targeted Intervention | | | National | High |
| | Geographic dimensions of inclusive growth | Millennium development goals | Income poverty at household level | Regional | Medium |
| ✓ | | | | | |
| 9. Project Risk Categorization: Low | | | | | |
| 10. Safeguards Categorization: | | | | | |
| | | Environment | B | | |
| | | Involuntary resettlement | A | | |
| | | Indigenous peoples | C | | |
| 11. ADB Financing: | | | | | |
| | | Sovereign/Nonsovereign | Modality | Source | Amount (\$ million) |
| | | Sovereign | Loan | Asian Development Fund | 12.0 |
| | | Total | | | 12.0 |
| 12. Cofinancing: | | | | | |
| | | Sovereign/Nonsovereign | Modality | Source | Amount (\$ million) |
| | | | | | |
| | | | | | |
| | | | | | |
| 13. Counterpart Financing: | | | | | |
| | | Source | Amount (\$ million) | | |
| | | Government | 28.4 | | |
| | | Total | 28.4 | | |
| 14. Aid Effectiveness: | | | | | |
| | | Parallel project implementation unit | No | | |
| | | Program-based approach | No | | |

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to the People's Republic of Bangladesh for the additional financing of the SASEC Bangladesh–India Electrical Grid Interconnection Project.¹ The design and monitoring framework for the project is in Appendix 1.

2. Bangladesh and India are establishing a cross-border link (the interconnection) between the western electrical grid of Bangladesh and the eastern electrical grid of India in 2013 to facilitate the exchange of electric power between the countries. The interconnection includes about 112 kilometers (km) of 400 kilovolt (kV) double-circuit transmission line between the electrical substations at Baharampur in India and Bheramara in Bangladesh, a 400 kV switching station at Baharampur, a 500 megawatt (MW) back-to-back high-voltage direct current (HVDC) substation (400/230 kV) at Bheramara, and associated infrastructure on both sides. The interconnection will enable a power flow of 500 MW into Bangladesh from the Indian electrical grid to partly alleviate the significant power shortages in Bangladesh, with a provision to boost the power flow subsequently to 1,000 MW. The project consists of the Bangladesh portion of the interconnection. The additional financing will cover the cost overruns that have resulted in a funding gap for the project.

II. THE PROJECT

A. Rationale

3. **Development problem.** Bangladesh's electrification ratio is still low, providing electricity to less than 50% of the population in 2010. During peak periods, up to 30% of demand is unmet and in 2013, there is daily load shedding for several hours in major cities. This situation affects economic performance, business competitiveness and productivity, quality of life, and basic services. In addition, there is a need for energy diversification given concerns over long-term availability of domestic natural gas, which currently fuels 80% of the power sector in Bangladesh.² To overcome the power supply crisis, the government launched several initiatives to add new generating capacity—e.g., mobilization of rental power plants, rehabilitation of existing power plants, and power procurement from the South Asia region. In 2010, it signed an agreement on electrical grid connectivity with India.³ Connecting the two grids provides a platform for more regional cooperation and a means to alleviate the prevailing energy shortfalls in Bangladesh.⁴ The project is in accordance with the 2010 South Asian Association for Regional Cooperation Regional Energy Trade Study to promote South Asian regional power trading and is included in the regional cooperation operations business plan, 2013–2015 for South Asia of the Asian Development Bank (ADB). The project would contribute to ADB's regional cooperation and integration objectives under Strategy 2020.⁵

4. **Performance of original project.** The project was approved in August 2010 and made effective in 2011. All contract packages under the project were awarded by early 2011. During

¹ 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. The project was renamed SASEC Bangladesh–India Electrical Grid Interconnection Project to highlight its regional cooperation dimension.

² ADB. 2009. *Energy Outlook for Asia and the Pacific*. Manila.

³ In 1997, ADB facilitated dialogue between Bangladesh and India to assess options for exchange of power.

⁴ ADB. 2011. *Regional Cooperation Strategy for South Asia, 2011–2015*. Manila.

⁵ ADB. 2008. *Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank, 2008–2020*. Manila.

appraisal of the original project, non- or underutilization of the interconnection was identified as a key risk. The original loan agreement for the project therefore provided that disbursements by ADB would start only after conclusion of a memorandum of understanding for a long-term supply of 250 MW, followed by a power purchase agreement (PPA), acceptable to ADB, 6 months later. In March 2012, India's National Thermal Power Corporation (NTPC), through its wholly owned subsidiary NTPC Vidyut Vyapar Nigam, and the Bangladesh Power Development Board (BPDB) signed a PPA for the sale of 250 MW of power from India to Bangladesh for 25 years.⁶ While the PPA reduces the key risk of non- or underutilization of the interconnection, it was also found that the PPA does not meet the strict standards originally contemplated in the loan agreement. Most importantly, the PPA includes a clause that the PPA may be terminated if either country does not agree to extend the power sector cooperation agreement (signed in 2010) beyond the initial period of 5 years, i.e., by 2015. Nevertheless, ADB eventually accepted the request from the government to allow disbursements under the ADB loan on the basis that economically viable, alternative sources of power would be available from the market in the unlikely event that the countries discontinued their cooperation in the power sector.⁷ The project has been performing satisfactorily since the removal of the disbursement condition in 2012. The present project performance rating is *on track*.

5. Physical progress is now at an advanced stage with the transmission line commissioning nearly completed and the substation in pre-commissioning mode as of July 2013. A link has been established from the substation in Bangladesh to the Indian border in May 2013. All contracts have been awarded. Disbursements crossed 80% of the approved loan amount in July 2013. The substation in Bangladesh will be ready to accept power flows in September 2013. The components of the project were prepared and implemented based on agreed environmental and social safeguards, including periodic updates on the safeguard implementation and external review of safeguard compliance.

6. **Risk management.** Risks identified at due diligence of the project were adequately dealt with. As discussed in para. 4, the conclusion of the PPA in March 2012 helped mitigate the key risk of nonutilization of the interconnection. A two-stage bidding process was used for the first HVDC substation to be developed in Bangladesh. The project's executing agency, Power Grid Company of Bangladesh (PGCB), has executed several ADB projects and received technical support from Power Grid Corporation of India Limited (PGCIL), the central transmission utility of India. Approval for advance procurement facilitated the two-stage procurement process and engagement with potential contractors. PGCIL, the executing agency on the Indian side of the interconnection, has shared the safeguard reporting as requested by PGCB and ADB. An additional PPA for 250 MW will be in place in 2013 through competitive procurement.

7. **Additional financing.** Cost escalation is primarily attributed to the inclusion of spare transformers during the two-stage bid process, foreign exchange rate fluctuations and tax increases that have resulted in a funding gap. The Government has requested about \$12 million of additional financing from ADB to cover the foreign exchange part of the total cost over-run of about \$40.4 million. The project remains a key priority for the government and this additional financing is included in ADB's country operations business plan for 2013. The additional financing meets the eligibility criteria in ADB's additional financing policy and the overall project

⁶ BPDB is the bulk supplier of electricity in Bangladesh. NTPC Vidyut Vyapar Nigam is the trading arm of NTPC, the largest power generation utility in India.

⁷ It appears unlikely that the active sub-regional cooperation between the two countries in several sectors, including power, would be discontinued. For example, NTPC is managing the operations of a power plant in Bangladesh. Furthermore, BPDB and NTPC have established a joint venture to set up a thermal power plant in Bangladesh. Also, paras. 29–30 discuss further measures to mitigate the risk of non- or underutilization of the interconnection.

is expected to remain technically, economically, and financially viable despite the cost overrun. Additional financing is assessed as a better option than restructuring, scaling down, or canceling the project. It would support timely completion of the project and contribute to the outcome of cross-border power flows by up to 500 MW starting in 2013.

B. Impact and Outcome

8. The project impact and outcome remain as they are defined in the original project design. The impact will be greater regional cooperation in the power sector contributing to economic growth in Bangladesh. The outcome is the successful development and operation of a power transmission link between Bangladesh and India. The project is expected to alleviate the power crisis in Bangladesh by making available up to 500 MW of additional power starting in 2013.

C. Outputs

9. The physical outputs of the project are 27 kilometers km of 400 kV double-circuit transmission line in Bangladesh, a 500 MW back-to-back HVDC substation (400kV/230kV) at Bheramara, a 4 km 230 kV double-circuit loop-in loop-out and 230kV switching station at Bheramara to link to the transmission network in Bangladesh.⁸ Under separate technical assistance, ADB is facilitating capacity building and information sharing on cross-border electricity trading and the development of interconnection agreements between the two countries.⁹

D. Investment and Financing Plans

10. The revised investment for the project is \$199.0 million, an increase of \$40.4 million in the overall cost for the packages in Bangladesh (para. 7). Infrastructure on the Indian side of the interconnection—i.e., switching station and loop-in loop-out at Baharampur, and 85 km of the 400 kV double-circuit transmission line—are being funded, developed, and operated by India within budget.¹⁰

Table 1: Project Investment Plan
(\$ million)

| Item | Current Amount ^a | Additional Financing ^b | Total Amount |
|---|-----------------------------|-----------------------------------|--------------|
| A. Base Cost | | | |
| Substation and power transmission line in Bangladesh | 153.0 | 38.5 | 191.5 |
| Subtotal (A) | 153.0 | 38.5 | 191.5 |
| B. Contingencies^c | 0.0 | 1.6 | 1.6 |
| C. Financing Charges During Implementation^d | 5.6 | 0.3 | 5.9 |
| Total (A+B+C) | 158.6 | 40.4 | 199.0 |

^a Refers to the original amount. Includes taxes and duties of \$15.5 million financed from government resources.

^b In mid-2013 prices. Includes taxes and duties of \$19.9 million to be financed from government resources.

^c Price contingencies computed at 1.9% on foreign exchange costs and 7.8% on local currency costs. Physical

⁸ Transmission line length reflects the final right-of-way alignment adopted for the project.

⁹ ADB. 2010. *Technical Assistance to Bangladesh for Bangladesh-India Electrical Grid Interconnection Project*. Manila.

¹⁰ The investment on the Indian side of the interconnection is within budget of \$38.2 million based on the project report prepared by the joint technical team of representatives from both countries.

contingencies were not considered given the advanced stage of the project.

^d Includes interest during construction charges to be paid by Power Grid Company of Bangladesh.

Sources: Revised development project proposal, 2013 and ADB estimates in mid-2013.

11. The Government of Bangladesh has requested a loan in various currencies equivalent to SDR7,904,000 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 as set forth in the draft loan and project agreements.

12. The financing plan is in Table 2. ADB financing will be used to meet the foreign currency requirements under the contracts. The government and the executing agency will cover the escalations in local currency, and funds have been allocated for this purpose. Further cost escalations, if any, would be covered by the government from its own resources.

Table 2: Financing Plan

| Source | Current ^a | | Additional Financing | | Total | |
|--|----------------------|--------------------|----------------------|--------------------|---------------------|--------------------|
| | Amount (\$ million) | Share of Total (%) | Amount (\$ million) | Share of Total (%) | Amount (\$ million) | Share of Total (%) |
| Asian Development Bank Special Funds resources | 100.0 | 63.1 | 12.0 ^b | 29.7 | 112.0 | 56.3 |
| Government | 58.6 | 36.9 | 28.4 | 70.3 | 87.0 | 43.7 |
| Total | 158.6 | 100.0 | 40.4 | 100.0 | 199.0 | 100.0 |

^a Refers to the original amount.

^b \$8.0 million from the subregional Asian Development Fund resources, \$4.0 million from Bangladesh's Asian Development Fund allocation.

Sources: Detailed project report, January 2010, revised development project pro-forma 2013, and ADB estimates in mid-2013.

E. Implementation Arrangements

13. PGCB continues to be the executing agency as well as the implementing agency for the project and will also manage its operation. To ensure effective implementation, PGCB set up a project management unit in 2010, headed by a project director. PGCIL, the central transmission utility of India and the executing agency on the Indian side of the interconnection, provides technical consulting services to PGCB. A joint working group comprising senior power sector officials from both Bangladesh and India meet regularly for coordination purposes. A joint steering committee, co-chaired by the power secretaries of both countries, reviews progress and ensures high-level coordination.

14. Goods, equipment, and civil works financed under the project were procured in accordance with ADB's Procurement Guidelines (2013, as amended from time to time). International competitive bidding was followed for both the transmission line and substation packages. Approval for advance procurement action and retroactive financing was provided in 2010, which supported early completion of the procurement process. Retroactive financing approval is sought, not exceeding 20% of the additional loan amount, for expenditures incurred before effectiveness of the relevant loan agreement but not earlier than 12 months prior to the signing date of the loan agreement. The implementation period is until 30 June 2014 and the loan closing date would be 31 December 2014.

15. The implementation arrangements are summarized in Table 3 and described in detail in the project administration manual.¹¹ The first PPA for sale of power from India to Bangladesh was signed for 250 MW in March 2012. The bid process for a PPA for another 250 MW from the electricity market in India will be concluded in the second half of 2013.

Table 3: Implementation Arrangements

| Aspects | | Arrangements |
|---|---|---|
| Implementation period | | February 2010–June 2014 (Overall project) |
| Estimated completion date | | 30 June 2014 |
| Management | | |
| (i) Oversight | | Steering Committee chaired by Secretary, Power Division, Ministry of Power, Energy, and Mineral Resources, Government of Bangladesh |
| (ii) Executing agency | | Power Grid Company of Bangladesh |
| (iii) Key implementing agency | | Power Grid Company of Bangladesh |
| (iv) Project management unit | | Bheramara in Kushtia District with 20 staff of PGCB |
| (v) Project Safeguard measures | | Independent monitoring mechanism |
| Procurement | International competitive bidding ADB financed | Completed |
| Consulting services (Project management) | Government financing | Completed |
| Retroactive financing and advance contracting | No advance contracting is needed, as all goods and services required for the project have been procured. Retroactive financing of eligible expenditures is requested, subject to ADB policies and procedures. | |
| Disbursement | The loan proceeds will be disbursed in accordance with ADB's <i>Loan Disbursement Handbook</i> (2012, as amended from time to time) and detailed arrangements agreed upon between ADB and the borrower. | |

ADB = Asian Development Bank, PGCB = Power Grid Company of Bangladesh.

Source: Asian Development Bank.

III. DUE DILIGENCE

A. Technical

16. The project was designed in 2009 by a joint technical team comprising representatives from the power utilities of Bangladesh and India. The team concluded that the interconnection between the eastern region of India and the western part of Bangladesh based on an asynchronous mode of interconnection at 400 kV was preferred, to facilitate careful regulation and management of the power flows, maintain complete control on the exchange of power between the two countries, and allow independent operation of the two grids. Based on technical, operational, and economic considerations, an HVDC back-to-back substation terminal and a 400 kV double-circuit transmission interconnection line between the two countries were designed. PGCIL has been providing support in technical bid evaluation during the two-stage bid process, detailed design review, and implementation advisory services.

¹¹ Project Administration Manual (accessible from the list of linked documents in Appendix 2).

B. Economic and Financial

17. Bangladesh continues to face a power deficit, and direct tangible economic benefits from the project arise from prevented power outages. Economic analysis considered the tangible benefits of resource cost savings of power generation based on alternative sources. The energy source for resource cost savings was determined based on the least-cost analysis, which shows that power import is one of the least-cost solutions to the current power crisis in Bangladesh. The project's economic feasibility was assessed from a Bangladesh-specific and regional perspective. The base case provided an economic internal rate of return of 24% compared to an economic internal rate of return of 27% for the original project. These estimates are based on conservative assumptions on resource cost savings. Evaluation based on prevented outage costs or resource cost savings on fuel oil or diesel (used for rental power plants) yields a much higher economic return. The project returns are stable against the relevant risk factors, and the analysis demonstrates the economic feasibility of the project in different scenarios. The project also provides larger intangible benefits of building mutual trust and will pave the way for similar projects in South Asia in the future, allowing optimization of the regional energy resources among South Asian countries. This will contribute to the energy security and economic development of the region.

18. Financial analysis of the project with additional financing was carried out in accordance with ADB's Guidelines on the Financial Management and Analysis of Projects (2005). All financial costs and benefits were expressed in constant 2013 prices. Financial viability was assessed by comparing the incremental costs and benefits of the project over a period of 30 years. 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, operation and maintenance costs, and taxes to install and operate the project. Revenues were calculated based on existing transmission tariffs and the Bangladesh Energy Regulatory Commission's transmission tariff regulations were considered applicable once adopted. The financial internal rate of return of the project is 4.0%, which compares favorably with the estimated weighted average cost of capital of 1.8%, indicating that the project remains financially viable.

C. Governance

19. The executing and implementing agencies meet ADB's procurement management and financial management requirements.¹² 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) were included in the loan regulations and the bidding documents for the project. Both contracts financed by ADB were 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. Table 4 summarizes major project-specific governance measures. No further procurement is required under additional financing. 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.

¹² Financial Management Assessment (accessible from the list of linked documents in Appendix 2).

20. Due to delays in notification of the electricity transmission and distribution tariff regulations, these were not adopted as contemplated under the original project. It has now been agreed with the government that the regulations must be adopted and announced no later than 30 June 2014. Adoption of the regulations will improve transparency of electricity tariff setting and PGCB's financial sustainability.

Table 4: Governance Measures

| Area | Measure |
|--|---|
| Procurement | <ul style="list-style-type: none"> (i) Project management unit headed by senior officers reporting directly to the managing director of PGCB. Procurement was completed by March 2011. (ii) Bid specifications and packaging were prepared to ensure maximum competition under international competitive bidding procedures. (iii) Information on procurement was disclosed on PGCB website. (iv) Procurement capacity provided by the ADB resident mission for expedited action. (v) Periodic training provided to PGCB and other executing agencies in Bangladesh. |
| Financial management and audit | <ul style="list-style-type: none"> (i) Measurable financial performance indicators for PGCB regularly monitored. (ii) Regular monitoring of expenditures, other financial transactions, and safe custody of project-financed assets by the accounting and control systems of PGCB. (iii) Financial statements to be audited by external auditors acceptable to ADB and regularly published and reported to the shareholders. |
| Institutional and corporate governance | PGCB to file tariff petitions with energy regulator to recover costs. |
| Anticorruption | ADB to review and examine any alleged corrupt, fraudulent, collusive, or coercive practices relating to the project. |
| Grievance review | Grievance redress mechanism established by PGCB in 2010 to solve issues relating to project implementation. |

ADB = Asian Development Bank, PGCB = Power Grid Company of Bangladesh.

Source: Asian Development Bank.

21. ADB's Anticorruption Policy was explained to and discussed with the Government of Bangladesh and PGCB. The specific policy requirements and supplementary measures are described in the project administration manual.

D. Poverty and Social

22. Bangladesh ranks seventh on the list of most populous countries in the world. Its population in 2010 was 148.7 million, of which 106.9 million lived in rural areas.¹³ The services and industry sectors which are highly dependent on electricity, have been growing and in 2010 contributed 53% and 29% respectively to the gross domestic product (footnote 12).

23. Despite its recent economic growth, Bangladesh remains one of the poorest countries in the world with nearly half of its population living below the \$1.25 per day poverty line. Natural calamities like floods and cyclones, institutional and governance factors, and inadequate availability of energy sources have affected growth and development. The consumption of electricity in Bangladesh is one of the lowest at 198 kilowatt-hours per capita.¹⁴ Slightly less

¹³ International Fund for Agricultural Development. 2010.

<http://www.ruralpovertyportal.org/web/guest/country/statistics/tags/bangladesh>

¹⁴ Bangladesh Power Development Board. 2012. *Annual Report*. Dhaka.

than 50% of the population had access to electricity in 2010.¹⁵ Even with access to electricity, problems continue due to power cuts and irregular supply. All these factors have severely hampered economic growth and the delivery of essential services like health and education, and contributed to the high poverty levels. The project is important to improve access to electricity and economic growth, particularly in western Bangladesh, which is disproportionately affected by electricity shortages.

24. The jobs generated during construction directly benefit local communities. Other impacts of the project include greater production capacity of existing industries and the creation of new ones. More reliable power supply will strengthen the sectors most dependent on it and help generate significant employment.

E. Safeguards

25. From the environmental standpoint, the project with additional financing is category B, as it is not likely to lead to irreversible adverse impacts. The initial environmental examination based on the analyzed data collected through reviews of available reports, satellite photographs, discussion with stakeholders, and field visits to the project area was uploaded on the ADB website in May 2010. The initial environmental examination was prepared following ADB's Safeguard Policy Statement (2009), the government's environmental impact assessment guidelines, and related national policies and legislation. The environmental management plan under the initial environmental examination is being implemented. Potential impacts will mostly be temporary. The Department of Environment environmental clearance for the project was renewed. The budgetary provisions for implementation of the environmental management plan are being utilized. The implementation is being supervised by PGCB and progress reports are being submitted to ADB. In the event of any change of alignment or identification of any unanticipated environmental impact during the course of project implementation, PGCB will suitably revise the environmental management plan. A monitoring consultant has been appointed to review progress.

26. The project with additional financing is Category C under indigenous people, and Category A under involuntary resettlement. No additional land is required for the additional financing. There will also be no additional resettlement impacts. The resettlement plan for the original project was uploaded on ADB's website in August 2010. 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 were made in accordance with the resettlement plan at the substation site and along the transmission line right of way. A grievance redress mechanism was created by PGCB in 2010 and is operational. A monitoring consultant has been appointed to review progress.

27. Although the risk of spreading HIV/AIDS was not clearly identified, steps were taken for information dissemination campaigns in the project areas during project implementation.

28. In accordance with the provisions in the Safeguard Policy Statement, the associated transmission component that PGCIL is installing in India is also subject to due diligence. PGCIL's environmental and social safeguard policy requires it to conduct due diligence and ensure implementation of all necessary mitigation measures. Safeguard documents for the interconnection in India were prepared by PGCIL and provided to PGCB and to ADB.

¹⁵ Government of Bangladesh, Planning Commission. 2010. *Sixth Five Year Plan, FY2011–FY2015*. Dhaka.

F. Risks and Mitigating Measures

29. The signing of the first PPA for 250 MW in 2012 between power agencies of the two countries for a period of 25 years at regulator determined tariffs has reduced project risk. A residual risk is non-extension of the power sector cooperation agreement between the two countries beyond the initial period of 5 years, which could result in the termination of this PPA. In such an event, BPDB could undertake competitive procurement from the Indian power market. Power market reports and training workshops under technical assistance (footnote 9) help impart familiarity with the Indian power market.

30. Another key risk is that the procurement of additional 250 MW of power through a competitive bidding PPA is delayed. Support is provided to the Government of Bangladesh under the same technical assistance to develop PPA and bidding documents for competitive procurement, and to conclude the bidding process in the second half of 2013. Other risks such as the limited capacity of PGCB in project coordination and implementation, and operation of the HVDC substation, have been mitigated by the government's recruitment of consultants. Major risks and mitigating measures are summarized in Table 5. The overall assessment of risk is low and the integrated benefits and impacts are expected to outweigh the costs of the risk mitigating measures.

Table 5: Summary of Risks and Mitigating Measures

| Risks | Mitigating Measures |
|--|---|
| Limited HVDC technology implementation capacity | The executing agency recruited PGCIL as consultants to assist in project design, bidding, and implementation in Bangladesh. PGCIL has experience from installing six HVDC projects in the region. It supported PGCB in the design of the project in 2009 and has been assisting it during implementation—bid process, review of contractor designs, and implementation using on-site resources. Under the HVDC contract, PGCB engineers are being trained for the operation of the substation. PGCIL's role as the executing agency on the Indian side of the interconnection has resulted in successful coordination and timely construction of interconnection infrastructure on both sides. |
| Either or both countries do not agree to extend the agreement on cooperation in the power sector | Both countries have been participating in regional cooperation initiatives in energy, transport, and other sectors. In the unlikely event of non-extension or termination of the PPA, or reduction in the service quality under the signed PPA, BPDB can procure power from alternative sources in the Indian electricity market. Bidding is in the final stages for another 250 MW to be procured by BPDB through a competitive arrangement supported under ADB technical assistance (footnote 9, main text). |
| Increase in prices of raw materials | Contracts were awarded in 2010 and 2011. Commodity price variations will be settled at the end of the contract. Costs of the project approved by the Planning Commission in 2013 are expected to be included in the transmission rate base and tariff determined by BERC. |
| Limited capacity in negotiating cross-border electricity trading contracts | Technical assistance supported a review of the power market in India and design of the draft PPA for an additional 250 MW of electricity flow. Support to BPDB for concluding the PPA is being provided in 2013. |
| Cost of power from India not competitive compared with options in Bangladesh | The first PPA for 250 MW is based on regulated tariffs in India, which are lower than the marginal cost of power in Bangladesh. Alternative options including new power plants in Bangladesh using dual fuel technology and imported coal power are more expensive. Power from India under the second PPA is expected to be competitively priced compared with sources in Bangladesh. ADB is assisting the Government of Bangladesh in reviewing its gas pricing policy that has an impact on the electricity |

| Risks | Mitigating Measures |
|--|--|
| | sector since domestic natural gas is the primary source of power generation in Bangladesh. |
| Inadequate power availability in the eastern region of India | India installs about 17,000 MW annually. The eastern region of India is surplus and is expected to add significant generation capacity over the next 5 years to meet the growth in demand. The Government of India has identified the sources for the first 250 MW, and competitive bidding is in the final stages for an additional 250 MW. |
| Delays in or failure to enter into agreements for power supply and transmission | NVVN, a subsidiary of NTPC and the nodal agency appointed by the Government of India, entered into a PPA for 250 MW in 2012 prior to loan disbursement, indicating the specific stations from where power will be supplied and the tariff-setting parameters. BPDB and PGCIL have entered into a bulk power transmission agreement. |
| Delay in notification of BERC electricity tariff regulations adversely affecting PGCB's financial sustainability | PGCB is earning a profit in 2012 and financial parameters are within acceptable limits. Early implementation of BERC's transmission tariff regulations would improve PGCB's financial position. This is expected by 30 June 2014. |

ADB = Asian Development Bank, BERC = Bangladesh Energy Regulatory Commission, BPDB = Bangladesh Power Development Board, HVDC = high-voltage direct current, MW = megawatt, NTPC = National Thermal Power Generation, NVVN = NTPC Vidyut Vyapar Nigam, PGCB = Power Grid Company of Bangladesh, PGCIL = Power Grid Corporation of India Limited, PPA = power purchase agreement.

Source: Asian Development Bank.

IV. ASSURANCES

31. 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 project administration manual and loan documents.

32. The government and the PGCB have agreed with ADB on certain covenants for the project, which are set forth in the loan agreement and project agreements.

V. RECOMMENDATION

33. 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 the loan in various currencies equivalent to SDR7,904,000 to the People's Republic of Bangladesh for the additional financing of the SASEC 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.

3 September 2013

Takehiko Nakao
President

REVISED DESIGN AND MONITORING FRAMEWORK

| Design Summary | Performance Targets and Indicators with Baselines | Data Sources and Reporting Mechanisms | Assumptions and Risks |
|--|---|---|--|
| <p>Impact Current project</p> <p>Greater regional cooperation in the power sector, contributing to economic growth in Bangladesh</p> | <p>Current project</p> <p>Improvement in annual gross domestic product per capita in Bangladesh by more than 4% by 2015 (2008 baseline: \$574 per capita at current prices)</p> <p>Power consumption in Bangladesh to improve by 2012 (2008 baseline: 159 kWh per capita in Bangladesh compared with about 300 kWh per capita in South Asia)</p> <p>Access to power sources in the South Asia region (2009 baseline: no exchange with any other country)</p> | <p>Current project</p> <p>Country economic outlook</p> <p>ADB Energy Outlook for Asia and the Pacific</p> <p>BPDB and annual energy sector reports for Bhutan, India, Maldives, Nepal, and Sri Lanka</p> | <p>Current project Assumptions</p> <p>Successful development of the eastern electrical grid of India prepares the foundation for regional electricity interconnections and optimal power sourcing.</p> <p>Political and operational agreements arrived at between South Asian countries on regional electricity trading</p> |
| <p>With additional financing</p> <p>Unchanged</p> | <p>With additional financing</p> <p>Unchanged</p> <p>Power consumption in Bangladesh to improve to 390 kWh per capita by 2015 (2012 baseline: 198 kWh per capita)</p> <p>Power trading within South Asian region doubles by 2016 (2009 baseline: About 1,000 MW between India and Bhutan)</p> | <p>With additional financing</p> <p>Unchanged</p> <p>BPDB annual report</p> <p>Annual energy sector reports for Bangladesh, Bhutan, India, Maldives, Nepal, and Sri Lanka</p> | <p>With additional financing Assumption</p> <p>Additional investments in transmission capacity to facilitate such power flows</p> |

| Design Summary | Performance Targets and Indicators with Baselines | Data Sources and Reporting Mechanisms | Assumptions and Risks |
|--|---|--|--|
| Outcome Current project Successful development and operation of a transmission link between Bangladesh and India | Current project 250–500MW of power (1,152-3456 GWh) available over the interconnection to Bangladesh from 2012 (2009 baseline: no transfer or power) | Current project BPDB annual reports | Current project Assumptions Availability of 250-500 MW of power from India to Bangladesh on long term basis Power interconnection infrastructure and capacity building are successfully completed by 2012 Risks Cost of delivered power is not competitive compared with options in Bangladesh. Delay in entering into power purchase agreements Inadequate power generation capacity in the eastern region of India |
| With additional financing Unchanged | With additional financing 250–500 MW of power (about 1,152–3,456 GWh annually) available over the interconnection to Bangladesh from late 2013 (2009 baseline: 0 MW, 0 GWh) | With additional financing Unchanged | With additional financing Assumptions Power interconnection infrastructure and capacity building successfully completed by end of 2014 Risks Unchanged |
| Outputs Physical Investment Current project 1. Bahrampur–Bheramara power transmission link constructed | Current project 1. Creation of one new HVDC back-to-back substation of 400/230 kV at Bheramara (Bangladesh) by 2012 by PGCB 2. Creation of 40 km | Current project PGCB annual report PGCB annual report | Current project Assumptions Counterpart funds for timely project implementation are made available by the government and PGCB. Approval of contract awards by the relevant authorities is timely. |

| Design Summary | Performance Targets and Indicators with Baselines | Data Sources and Reporting Mechanisms | Assumptions and Risks |
|--|---|---|---|
| | <p>of 400 kV double-circuit transmission line from Bheramara to the Indian border by 2012</p> <p>3. Creation of 5 km of 230 kV double-circuit LILO and 230 kV switching station at Bheramara substation by 2012 by PGCB</p> | PGCB annual report | <p>Land acquisition and approvals for construction of substation and transmission lines are timely.</p> <p>Risks Limited implementation capacity of the BPDB</p> <p>Increase in the prices of raw materials exceeds contingency and inflation forecasts.</p> |
| <p>With additional financing</p> <p>1. Unchanged</p> | <p>With additional financing^a</p> <p>1. Creation of one new HVDC back-to-back substation of 400/230 kV at Bheramara (Bangladesh) by 2013 by PGCB</p> <p>2. Creation of 27 km of 400 kV double-circuit transmission line from Bheramara to the Indian border by 2013</p> <p>3. Creation of 4 km of 230 kV double-circuit LILO and 230 kV switching station at Bheramara substation by 2013 by PGCB</p> | <p>With additional financing</p> <p>Unchanged</p> | <p>With additional financing</p> <p>Unchanged</p> |
| <p>Nonphysical Investment</p> <p>Current Project</p> <p>1. Built capacity and improved information sharing on power exchange and planning,</p> | <p>Current project</p> <p>1. Number of BPDB, PGCB, BERC, and Power Division personnel</p> | <p>Current project</p> <p>Workshop attendance and participant feedback</p> | <p>Current project Assumption</p> <p>Information sharing and capacity building in other Asian examples are relevant to the development of interconnection</p> |

| Design Summary | Performance Targets and Indicators with Baselines | Data Sources and Reporting Mechanisms | Assumptions and Risks |
|--|--|--|--|
| development, operation, maintenance, and regulation of the interconnection. | attending cross-border power trading workshop | | agreements between the two countries. |
| With additional financing | With additional financing | With additional financing | With additional financing |
| Unchanged | 1. At least 10 BPDB, PGCB, BERC and Power Division personnel attending cross-border power trading workshop in 2013 | Unchanged | Unchanged |
| Current project | Current project | Current project | Current project Risk |
| 2. Concluded transmission interconnection, operation, and power exchange agreements between the two countries. | 2. Long-term agreements for power transfer signed between Bangladesh and India | Signed transmission interconnection, operation, and power exchange agreements between Bangladesh and India | Consultants with adequate experience in similar cross-border transfers are not available in the proposed time frame. |
| With additional financing | With additional financing | With additional financing | With additional financing |
| Unchanged | 2. Long-term agreements for power transfer signed between Bangladesh and India starting 2012 | Unchanged | Risk Removed |

| Activities with Milestones (Overall Project) | Inputs |
|---|--|
| <p>1. (a) 400/230 kV Substation</p> <p>1.1 Procurement of major equipment: Issue bidding documents by March 2010 (unchanged, completed)</p> <p>1.2 Award contracts by March 2011 (changed, completed)</p> <p>1.3 Start construction of substation by April 2011 (changed, completed)</p> <p>1.4 Commission substation by Q3 of 2013 (changed)</p> <p>1.5 Issue provisional completion certificate by Q4 of 2013 (added)</p> <p>1.6 Issue final completion certificate by Q2 of 2014 (added)</p> <p>(b) Transmission Lines</p> <p>1.7 Issue bidding documents by March 2010 (unchanged, completed)</p> <p>1.8 Award contracts by November 2010 (changed, completed)</p> <p>1.9 Start construction of transmission lines by December 2010 (changed, completed)</p> <p>1.10 Commission transmission lines by Q2 of 2013 (changed)</p> <p>1.11 Issue provisional completion certificate milestone by Q2 of 2013 (added)</p> <p>1.12 Issue final completion certificate by Q1 of 2014 (added)</p> <p>2. Consulting Services (S-CDTA to review agreements)^b</p> <p>2.1 Start consultant selection in April 2012 (changed, completed)</p> <p>2.2 Mobilize consultant from May 2012 (changed, completed)</p> <p>2.3 Complete services by December 2013 (changed)</p> <p>3. Capacity building and information sharing</p> <p>3.1 Prepare power market report in 2012</p> <p>3.2 Conduct workshop on cross-border power trading by Q3 2013</p> | <p>Loan</p> <p>ADB:</p> <p>\$100.0 million from ADF (current)</p> <p>\$12.0 million from ADF (additional)</p> <p>\$112.0 million from ADF (overall)</p> <p>Government of Bangladesh:</p> <p>\$58.6 million (current)</p> <p>\$28.4 million (additional)</p> <p>\$87.0 million (overall)</p> |

ADB = Asian Development Bank, ADF = Asian Development Fund, BERC = Bangladesh Energy Regulatory Commission, BPDB = Bangladesh Power Development Board, GWh = gigawatt-hour, HVDC = high-voltage direct current, km = kilometer, kV = kilovolt, kWh = kilowatt-hour, LILO = loop in loop out, MW = megawatt, PGCB = Power Grid Company of Bangladesh, Q = quarter, S-CDTA = small-scale capacity development technical assistance.

^a Based on the final right of way adopted for the transmission lines.

^b ADB. 2010. Technical Assistance to Bangladesh for *Bangladesh-India Electrical Grid Interconnection Project*. Manila.

Sources: Power Grid Company of Bangladesh and revised development project proposal.

LIST OF LINKED DOCUMENTS

<http://www.adb.org/Documents/RRPs/?id=44192-014-3>

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

Supplementary Documents

14. Financial Management Assessment