



# Report and Recommendation of the President to the Board of Directors

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Project Number: 36107  
June 2007

## Proposed Sector Development Program Loan People's Republic of Bangladesh: Sustainable Power Sector Development Program

Asian Development Bank

## CURRENCY EQUIVALENTS

(as of 21 August 2006)

|               |   |           |
|---------------|---|-----------|
| Currency Unit | – | taka (Tk) |
| Tk1.00        | = | \$0.0144  |
| \$1.00        | = | Tk69.4750 |

## ABBREVIATIONS

|        |   |   |
|--------|---|---|
| ADB    | – | Asian Development Bank                                  |
| APSC   | – | Ashuganj Power Station Company Limited                  |
| BERC   | – | Bangladesh Energy Regulatory Commission                 |
| BPDB   | – | Bangladesh Power Development Board                      |
| CCL    | – | cash compensation under the law                         |
| DESA   | – | Dhaka Electric Supply Authority                         |
| DESCO  | – | Dhaka Electric Supply Company Limited                   |
| DPDC   | – | Dhaka Power Distribution Company Limited                |
| EA     | – | executing agency  |
| EGCB   | – | Electricity Generation Company of Bangladesh Limited    |
| EIRR   | – | economic internal rate of return                        |
| EMP    | – | environmental management plan                           |
| FIRR   | – | financial internal rate of return                       |
| FY     | – | fiscal year   |
| GRC    | – | grievance redress committee                             |
| IEE    | – | initial environmental examination                       |
| IPP    | – | independent power producer                              |
| LIBOR  | – | London interbank offered rate                           |
| KfW    | – | Kreditanstalt für Wiederaufbau                          |
| MPEMR  | – | Ministry of Power, Energy and Mineral Resources         |
| MOF    | – | Ministry of Finance                                     |
| NGO    | – | nongovernment organization                              |
| NWPGC  | – | Northwest Power Generation Company Limited              |
| NWZPDC | – | North West Zone Power Distribution Company Limited      |
| PBS    | – | <i>palli bidyut samity</i> (rural electric cooperative) |
| PCB    | – | polychlorinated biphenyl                                |
| PGCB   | – | Power Grid Company of Bangladesh Limited                |
| PSDP   | – | power sector development program                        |
| PSMPU  | – | power system master plan update                         |
| PSRB   | – | <i>Power Sector Reforms in Bangladesh</i>               |
| PVAT   | – | Property Value Advisory Team                            |
| REB    | – | Rural Electrification Board                             |
| RP     | – | resettlement plan                                       |
| RPC    | – | Rural Power Company Limited                             |
| TA     | – | technical assistance                                    |
| USAID  | – | United States Agency for International Development      |
| WZPDC  | – | West Zone Power Distribution Company Limited            |

## WEIGHTS AND MEASURES

|     |   |                 |                          |
|-----|---|-----------------|--------------------------|
| GWh | – | gigawatt-hour   | 1,000,000,000 watt-hours |
| kV  | – | kilovolt        | 1,000 volts              |
| kWh | – | kilowatt-hour   | 1,000 watt-hours         |
| MW  | – | megawatt        | 1,000,000 watts          |
| MWh | – | megawatt-hour   | 1,000,000 watt-hours     |
| MVA | – | megavolt-ampere | 1,000,000 volt-ampere    |

## NOTES

- (i) The fiscal year (FY) of the Government ends on 30 June. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2006 ends on 30 June 2006.
- (ii) In this report, “\$” refers to US dollars.

|                         |   |
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## LOAN AND PROGRAM SUMMARY

|                                       |   |
|---------------------------------------|---|
| <b>Borrower</b>                       | People's Republic of Bangladesh   |
| <b>The Proposal</b>                   | The proposed Sustainable Power Sector Development Program (the Program) includes a \$60 million program loan from the Special Funds resources of Asian Development Bank (ADB), a \$400 million project loan from ADB's ordinary capital resources, and a \$5 million project loan from ADB's Special Funds resources.   |
| <b>Classification</b>                 | Targeting classification: General intervention<br>Sector: Energy<br>Subsectors: Conventional energy generation, transmission and distribution, energy sector development<br>Themes: Sustainable economic growth, governance, private sector development<br>Subthemes: Promoting economic efficiency and enabling markets, public governance, public-private partnership   |
| <b>Environment Assessment</b>         | Category B. An initial environment examination for the Program was undertaken and its summary is a core appendix.   |
| <b>Program Description and Impact</b> | <p>Over the past decade, Bangladesh has taken great strides in its economic and social development. Yet, nearly half the population remains poor, and per capita gross domestic product was just \$445 in fiscal year 2005. Only one third of the households have access to electricity and those with access to electricity receive poor, unreliable service characterized by frequent power outages and low voltage. This results from insufficient power generation capacity as well as poor transmission and distribution systems. Inadequate electricity supply has been a major constraint on economic growth and poverty reduction in Bangladesh. Promoting sustainable economic growth by providing reliable power supply is the main strategic pillar for reducing poverty in ADB's country strategy and program for 2006–2010.</p> <p>The Government has issued a 3-year road map in 2006 for power sector reforms through intensive consultations with various stakeholders, including key development partners, setting out detailed time-bound action plans for the reform process and investment program for 2006–2008. The 3-year road map underpins the principal reform components presented in the Government's <i>Vision and Policy Statement on Power Sector Reforms</i> issued in February 2000 to provide reliable electricity supply to the entire population by 2020 at an affordable price. These principal reform components include (i) segregating power generation, transmission, and distribution functions into separate services; (ii) commercializing emerging power sector entities; (iii) effective regulation under the Bangladesh Energy Regulatory Commission (BERC); (iv) promoting private sector participation</p> |

and public-private partnership by establishing an enabling environment; (v) implementing a financial restructuring and recovery plan for the sector entities; (vi) introducing cost-reflective tariff principles to achieve financial viability of the sector entities; (vii) developing the capacity of sector entities; and (viii) boosting operational performance by reducing system losses, improving collections to energy import, and reducing arrears.

Approved in 2003, ADB's first power sector development program (PSDP) for Bangladesh has yielded numerous positive developments. A major breakthrough was the emergence of a new culture of accountability for electricity used by public consumers. This helped substantially to reduce the outstanding dues of the Government and its agencies. The two major companies in the power sector, Power Grid Company of Bangladesh Limited (PGCB) and Dhaka Electric Supply Company Limited (DESCO) have become profitable since 2004. The PSDP also supported the launch of BERC and laid the foundation for restructuring the remaining key power sector entities, Bangladesh Power Development Board (BPDB) and Dhaka Electric Supply Authority (DESA).

Building on the success of the PSDP and consistent with ADB's country and strategy program for Bangladesh, the Program aims to promote sustained economic growth by providing further support and incentives to the Government for continued power sector reform activities through financial and organizational restructuring, improved sector governance, promotion of private sector participation, and capacity development, while assisting in expanding clean fuel generation capacity, enhancing transmission network reliability and efficiency, and improving the quality of supply in Dhaka city and the surrounding areas, the major power market. The Program is linked to the Government's sector reform road map, is a part of the least-cost development plan for the power sector, and is accorded high priority by the Government.

The investment components are also expected to accelerate the reform program by (i) transferring the remaining DESA area to a newly corporatized entity, Dhaka Power Distribution Company Limited (DPDC), and (ii) creating a new generation company in the northwestern region of the country. They will also enhance the operational performance of the sector entities by reducing system losses and generating additional revenues.

## **The Program Loan**

### **Outcome**

The policy actions supported by the program loan will help improve sustainability of the power sector through financial and organizational restructuring and will focus on five key outputs that will (i) develop and implement a national action plan for continuing power sector reforms, (ii) establish a fully functional legal and

regulatory framework, (iii) enhance the financial health of power sector entities, (iv) further restructure the sector entities, and (v) promote private sector participation and public-private partnership.

|  |  |
|--|--|
| <b>Loan Amount and Terms</b>             | A loan in various currencies equivalent to \$60 million will be provided from ADB's Special Fund resources for the program loan. The loan will have a term of 24 years, including a grace period of 8 years. The interest charge will be at a rate of 1% per annum during the grace period and 1.5% per annum thereafter.  |
| <b>Estimated Program Completion Date</b> | 30 June 2008   |
| <b>Tranching</b>                         | The loan will be released in two equal tranches, each of SDR20,225,000 (\$30 million equivalent) upon the Government's and power sector entities' complying with the conditions specified for their release.   |
| <b>Executing Agency</b>                  | The executing agencies (EAs) will be the Finance Division of the Ministry of Finance (MOF) and the Power Division of the Ministry of Power, Energy and Mineral Resources (MPEMR).  |
| <b>Procurement</b>                       | The proceeds of the program loan will finance the costs (excluding local taxes and duties) of eligible items, produced in and procured from ADB's member countries.  |
| <b>Counterpart Funds</b>                 | Counterpart funds generated from the proceeds of the program loan will be used to finance the adjustment costs associated with the program loan, including funding of unfunded pension obligations and gratuities and settlement of the Government's outstanding debts as well as those of its autonomous and semi-autonomous bodies to the power sector entities.   |
| <b>The Project Loan</b>                  |  |
| <b>Outcome</b>                           | The outcome of the project loan is expanded clean-fuel power generation capacity and improved efficiency in transmission and distribution systems. This is to be achieved by (i) increased peak load generation capacity based on clean natural gas, and (ii) augmentation and expansion of power transmission and distribution systems.   |
| <b>Rationale</b>                         | <p><b>Generation</b></p> <p>The ADB-financed power system master plan update (PSMPU) estimates that demand for electricity will grow at an annual rate of about 8.0% for the next 10 years and that about 20% of the additional generation capacity will be required to serve peak load. Even if all presently planned power plants are constructed as scheduled, a shortfall in generating capacity of more than 2,000 megawatt (MW) is expected by 2010 and over 5,500 MW by 2015.</p> |



The PSMPU also estimates that \$5.4 billion of new investment would be required by 2015 for new generation capacity, of which about half would be covered by the private sector, and the rest by the Government and development partners. New peak power generation capacity is urgently needed in the northern and western regions of Bangladesh to help balance loads, while improving voltages, stability, and system efficiency.

### **Transmission**

The rapidly growing demand for electricity requires a corresponding increase in the capability and efficiency of the transmission system to evacuate the power from new power plants and make it available to existing and new substations. The PSMPU's least-cost expansion plan concludes that additional transmission capacity of 4,875 megavolt-ampere (MVA) of 230/132 kilovolt (kV) transformers will be required by 2010 and another 4,650 MVA by 2015. This compares with existing capacity of 3,925 MVA. More than three times the current large transformer capacity will be necessary to meet demand in a reliable manner by 2015. Approximately \$1.0 billion of additional investment would be needed to meet the demand by 2015. Most of that will be funded by the Government and development partners, and partly through local capital mobilized through issuing bonds and equity securities in the local market.

### **Distribution**

Expansion of the distribution systems in Dhaka has struggled to keep up with rapid growth in demand. Several distribution substations are very old, while main equipment and protection systems have deteriorated. The transformers are overloaded, which contributes to faster deterioration. Low voltage is a problem both at the supply side of the substations and at the demand side due to long runs of overloaded distribution lines. Operating under such conditions contributes to high distribution losses as well as faster deterioration of equipment condition and performance. Greater Dhaka Area's distribution systems need urgently to be upgraded to meet the ever-growing demand, which is expected to double by 2015. This will require around \$1.5 billion of new investment to be met by the Government, development partners, and local capital.

### **Capacity Development**

As a result of implementing the reform policy since 1994, a number of new public sector entities have been established and made operational, and more entities are emerging in the sector. The capacity development effort in the Bangladesh power sector has so far been undertaken at the entity level, limiting efficient use

of financial and human resources. To achieve sustained and balanced growth of the power sector, the Government drafted a medium-term, sector-wide capacity development program in July 2006 covering a wide spectrum of power sector operations. This especially addresses corporate and financial management, information and communication technology, long-term system planning and future project preparations, good governance, customer relations, research and development, and human resource development and training. This coordinated capacity development program will ensure balanced capacity development among sector entities.

## Outputs

**Part A: Clean Energy Capacity Expansion.** (i) A new 150 MW natural gas-fired gas turbine peaking power plant in Sirajganj along with its auxiliaries; and (ii) a new 150 MW natural gas-fired gas turbine peaking power plant in Khulna, including its auxiliaries and associated underground connecting transmission line to Khulna central substation.

**Part B: Transmission System Efficiency Improvements.** (i) A new 400 kV overhead transmission line from Meghnaghat to Aminbazar, including bay extensions, (ii) augmentation of 230 kV transmission system improvements in Aminbazar–Old Dhaka Airport, Dhaka Cantonment and Dhaka University areas along with associated substations, and (iii) three new 132 kV transmission lines and associated substations in the country's western and northern regions.

**Part C: Distribution System Efficiency Improvements in DESA Area.** (i) Reinforcement, renovation, and augmentation of 10 existing substations; (ii) construction of new 132/33 kV and 33/11 kV substations; (iii) procurement and installation of 3x50/75 MVA, 132/33 kV transformers and associated equipment in three existing 132/33 kV substations; and (iv) upgrading of Shyampur Bangladesh Small and Cottage Industries Corporation 11 kV switching station.

**Part D: Distribution System Efficiency Improvements in DESCO Area.** (i) Upgrading and expanding distribution system in Gulshan Circle, including Tongi Area; and (ii) upgrading and expanding distribution system in Mirpur Circle.

**Part E: Capacity Development.** In order to improve utility performance and promote sustainable operations, strengthening institutional resources in the power sector for corporate and financial management, information and communication technology, long-term system planning and future project preparation, good governance, customer relations, research and development, and human resource development and training.

**Cost Estimates**

The Project is estimated to cost \$679.9 million, including taxes and duties of \$113.8 million.

**Financing Plan**

| (\$ million)   |              |              |
|--|--------------|--------------|
| Source   | Total        | %            |
| ADB Project Loan (Ordinary Capital Resources) <sup>a</sup> | 400.0        | 58.8         |
| ADB Project Loan (Asian Development Fund)                  | 5.0          | 0.7          |
| Government/Executing Agencies                              | 274.9        | 40.5         |
| <b>Total</b>   | <b>679.9</b> | <b>100.0</b> |

ADB = Asian Development Bank.

<sup>a</sup> Kreditanstalt für Wiederaufbau has expressed its interest in cofinancing part C. Once the cofinancing is committed, The ADB loan will be reduced accordingly.

Source: ADB estimates.

**Loan Amount and Terms**

(i) A loan of \$400.00 million from ADB's ordinary capital resources will help finance procurement and consulting services associated with parts A, B, C, and D. This loan will have a term of 25 years, a grace period of 5 years, an interest rate determined in accordance with ADB's London interbank offered rate-based lending facility, a commitment charge of 0.75% per annum, a front-end fee of 1.0% (the fee will be waived if the loan is approved before June 2008 and the borrower has no arrears); and (ii) a loan in various currencies equivalent to SDR3,371,000 (\$5.0 million equivalent) from ADB's Special Funds resources to help finance part E, with a term of 32 years, grace period of 8 years, and interest charge of 1.0% per annum during the grace period and 1.5% per annum thereafter.

**Relending Terms**

The loan proceeds will be relent to BPDB [and later transferred to its successor company, provisionally called Northwest Power Generation Company Limited (NWPGC)] for part A, PGCB for part B, DPDC for part C, and DESCO for part D pursuant to subsidiary loan agreements with terms and conditions acceptable to ADB. Relending terms to these entities will include a repayment period of 20 years including a 5-year grace period, and interest at the rate of 5.5% per annum. Foreign exchange risk will be assumed by the corresponding entities during the life of the respective subsidiary loan, and thereafter by the Borrower.

The loan proceeds for part E will be provided to MPEMR.

**Period of Utilization**

Until 30 June 2010

**Estimated Project Completion Date**

31 December 2009

**Executing Agencies**

BPDB and the successor company, NWPGC, will be the EA for part A, while PGCB will be the EA for part B, DPDC for part C, and DESCO for part D. The Power Division of MPEMR will be the EA for part E.

## **Implementation Arrangements**

Direct supervision and monitoring of project implementation and operational performance will be the responsibility of the EAs and Government. The EAs will prepare separate progress reports for their respective components and submit these to ADB on a quarterly basis within 20 days from the end of each quarter. ADB will review the implementation and operation of the project based on these reports and meet with the EAs and the Government semiannually to discuss project progress. ADB will also monitor the overall performance of the EAs.

## **Procurement**

Procurement of goods and services to be financed under the project loan will be carried out in accordance with ADB's *Procurement Guidelines* (2007, as amended from time to time). For such procurement, bid packaging and specifications will be prepared in a manner to ensure maximum competition under international competitive bidding. A third-party pre-shipment inspection provision will be adopted to ensure quality of goods and equipment to be procured.

## **Consulting Services**

International consultants associated with national consultants will assist BPDB/NWPGC for part A and PGCB for part B to prepare bidding documents, including basic design, evaluation of bids, final design approval, and project implementation supervision that includes approval of final design. They will also assist the Power Division of MPEMR in capacity development under part E. All consultants will be recruited in accordance with ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time) and the quality- and cost-based selection method will be implemented.

## **Project Benefits and Beneficiaries**

The combined interventions of the proposed project and program loans are strongly interlinked and will further enhance the Government's ongoing reform program, strengthen the financial position of sector entities, enhance public-private partnership, and improve sector and corporate governance. Thereby, they will assure sustained growth in the sector and gradually relieve the Government of providing financial support to the sector.

The project loan is expected to reduce system losses and improve quality of supply, leading to more efficient use of energy and making more power available to support sustained economic growth, while offsetting growth in green house gas emissions. The 300 MW of additional clean-fuel power generation capacity, 900 MVA of additional transmission capacity, and 1,020 MVA of additional distribution capacity under the project loan are expected to result in more efficient and reliable service delivery, particularly benefiting 230,000 new consumers (domestic, commercial, irrigation, industrial and others). It will also directly benefit 820,000 existing consumers in Dhaka area by providing reliable power supply. Reliable power supply will help manufacturing and service industries, including the garment sector that employs several

million poor people, particularly poor women. Poor and vulnerable consumers, including hospitals, schools, and other social facilities, which are often the hardest hit by inadequate power supply, load shedding, and poor quality of power, are likely to benefit directly from the project loan. A positive, direct impact on local labor is expected during implementation of the project loan, and an indirect impact will occur due to the enhanced income-generating opportunities from increased access to electricity.

The program loan will result in better service to the public through improved governance in the sector. The functioning independent sector regulator will provide transparent consultative procedures for issuing tariff rulings that protect consumer interests. Product costs might also decrease due to price rationalization and efficiency gains. Employees will benefit from a new management structure and skills training. Continued sector reforms supported by the program loan will facilitate power sector entities to transition from budget “sinks” to public revenue sources, freeing up government funds for critical social investments.

## **Risks and Assumptions**

The Program faces several risks, and particularly those related to sustaining political commitment to underpin the reform process, regulatory capacity to ensure BERC’s independence and to make timely regulatory decisions, governance and corruption, and implementation delays.

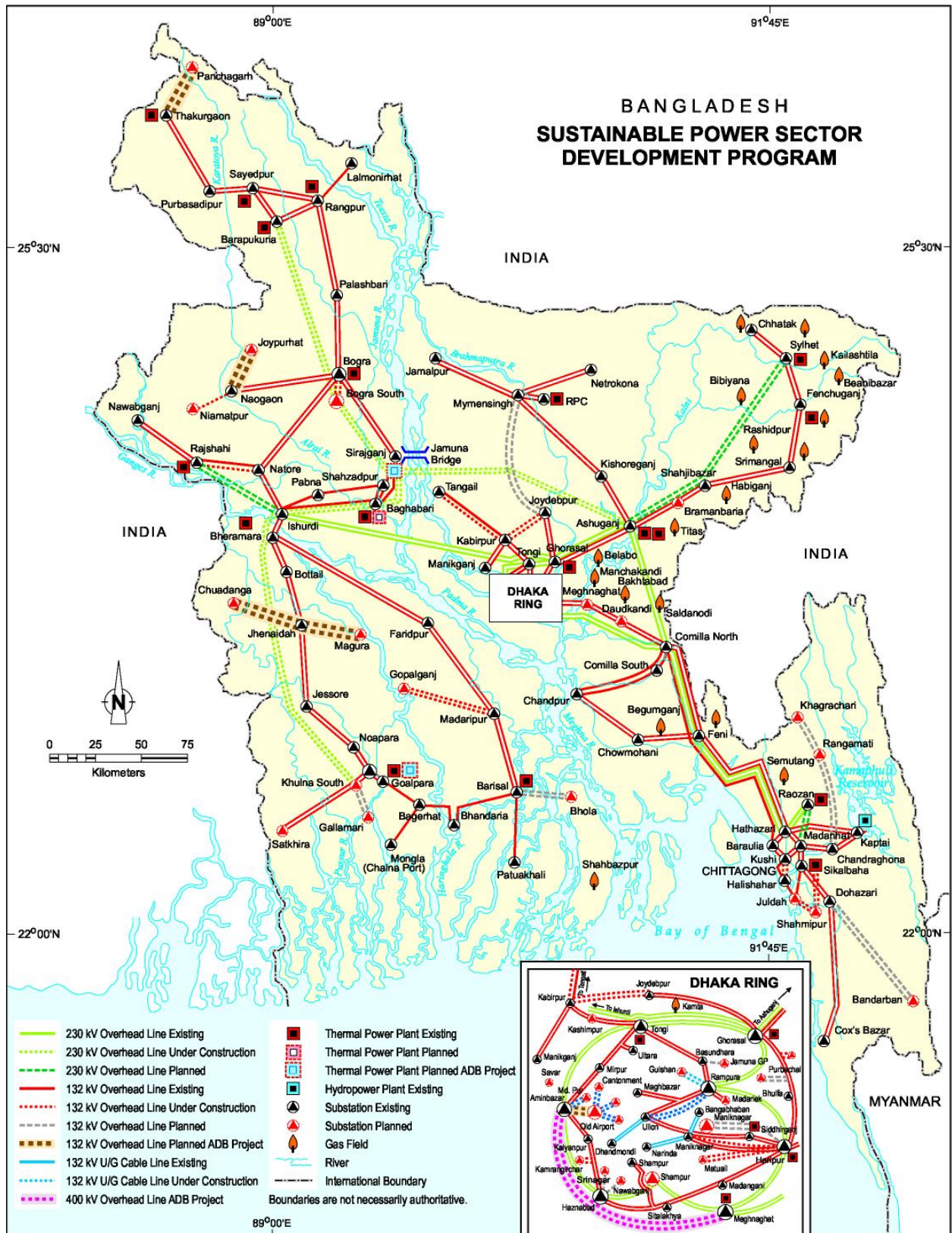
**Political Commitment.** The success of the Program depends on the Government’s strong commitments to power sector reforms and, more specifically, to successfully creating a new power generation company and transferring operational authority for the DESA area to DPDC to implement the project loan. There is a risk that these actions may be affected by future political developments. However, this risk is considered low as the sector has comprehensive experience from previous projects in setting up new companies and transferring operational authorities. The Government has also shown consistent commitments to reforming the sector since adopting a power sector reform policy paper in 1994. Furthermore, the success of corporatized entities clearly indicates the direction of the reform, which is widely recognized by various stakeholders.

**Regulatory Capacity.** Parliament passed the Bangladesh Energy Regulatory Commission Act 2003 to give the regulatory body a wider mandate and independence. This Act provides the legal framework for an independent sector regulator. With the framework in place for BERC to operate, it is now up to the Government to ensure that regulatory actions are taken based on commercial principles and without outside interference. Given its central role in various sector reform activities, BERC should be able to undertake its mandate with adequate human resources and an operating budget. Recent preparation of the Government’s

3-year power sector reform road map is a good move forward, as it provides a specific target for a fully functional BERC. The Program supports the road map's implementation by underpinning the Government's initial actions to make BERC fully operational.

**Governance.** Good governance is an essential precondition for sustainable development in Bangladesh's power sector. The Government has put good governance at the center of power sector reform policies. Various measures have been included in the Program's design to promote good governance and mitigate the risk of corruption by enhancing predictability, transparency, and accountability in doing business. These measures include, among others, continued corporatization and commercialization of sector entities, strengthening the sector regulator, and instituting a strengthened financial management and procurement system.

**Project Readiness.** Previous ADB-financed projects in the power sector in Bangladesh have experienced repeated delays in project implementation, frequently caused by the EAs' inadequate project readiness. This has resulted in delayed government approvals for projects' component proposals, slow progress in land acquisition, and cumbersome procurement procedures. Taking into account these lessons learned, the EAs and Government have undertaken various actions with regard to this project. The EAs have appointed the required project teams, including the project directors, for implementing the project components. In addition, all the development project proposals have already been prepared by the EAs and approved by the Government. Land acquisitions for constructing the project components have also been completed or are in advanced stages. As all the project loan components will be implemented by the corporatized entities, accelerated procurement processes are anticipated since the decisions can be made by the respective board of directors without referring them to the Government. Apart from these, draft bidding documents for procuring goods, works, and services and draft requests for proposals for recruiting implementation consultants have already been submitted to ADB by the EAs, and several bidding documents have been issued to accelerate the front-end activities.



## I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on three proposed loans to the People's Republic of Bangladesh for the Sustainable Power Sector Development Program (the Program). The design and monitoring framework of the Program is presented in Appendix 1.

## II. THE SECTOR: PERFORMANCE, PROBLEMS, AND OPPORTUNITIES

### A. Performance Indicators and Analysis

2. Although Bangladesh has performed generally well on the macroeconomic front over the past decade, inadequate electricity supply has been a major constraint on economic growth and poverty reduction. The electrification ratio is still very low, as only a third of the population has access to electricity. At just about 158 kilowatt-hours (kWh) annually, per capita generation is among the lowest in the world. The country's current dependable generating capacity is about 4,120 megawatts (MW), while peak demand is about 4,700 MW. In fiscal year (FY) 2005, load shedding in the range of 7–770 MW was required on 287 days for a total of 1,433 hours. In FY2004, this was in a range of 2–694 MW on 232 days and totaled 951 hours. As shown in Table 1, load shedding increased in frequency and intensity until the late 1990s and the situation improved somewhat in the early 2000s. Over the past 3 years, however, the situation has worsened as load growth has expanded faster than supply capacity. This trend is expected to continue in the near future. Erratic power supply tends to increase consumers' unwillingness to pay their bills, which leads to shortages of funds for maintenance. This, in turn, causes supply interruptions to industry and residences, hampers commercial activity, and jeopardizes public safety. Furthermore, this situation encourages development of costly backup self-generation. The Government's highest priorities are to minimize the number, duration, and impact of load-shedding events.

**Table 1: Trend in Power Supply and Demand in Bangladesh**  
(megawatts)

| Item               | FY1994 | FY1999 | FY2002 | FY2003 | FY2004 | FY2005 |
|--------------------|--------|--------|--------|--------|--------|--------|
| Installed Capacity | 2,608  | 3,603  | 4,230  | 4,680  | 4,680  | 4,995  |
| Peak Demand        | —      | 2,881  | 3,659  | 3,947  | 4,259  | 4,597  |
| Served Generation  | 1,875  | 2,449  | 3,217  | 3,428  | 3,592  | 3,720  |
| Load Shedding      | 23–500 | 16–774 | 5–367  | 5–468  | 2–694  | 7–770  |

— = not available, FY = fiscal year.

Source: Bangladesh Power Development Board.

3. The power sector in Bangladesh performed poorly until the early 1990s. The major constraints in the sector were (i) lack of institutional capability, (ii) unavailability of long-term domestic capital for financing investments, (iii) limited foreign exchange availability, (iv) poor management systems and procedures, (v) low employee commitment, and (vi) institutional weaknesses in governance. To improve the sector's performance, the Government adopted a policy paper in 1994 entitled *Power Sector Reforms in Bangladesh* (PSRB) in consultation with major development partners.<sup>1</sup> With initiation of these reforms, the sector's organization has changed. Until FY1998, Bangladesh Power Development Board (BPDB) was responsible for all

<sup>1</sup> ADB, World Bank, Department of International Development of the United Kingdom, Japan Bank for International Cooperation, Kreditanstalt für Wiederaufbau of Germany, and United States Agency for International Development.



generation and most transmission in the country, as well as for distribution in district towns, municipalities, and some rural areas, while Dhaka Electric Supply Authority (DESA) was responsible for distribution in the greater Dhaka area, including the capital city. Today, several public-private and private sector entities are licensed to construct and operate generating facilities. Power Grid Company of Bangladesh Limited (PGCB) has taken over all of BPDB's transmission assets and most of DESA's transmission assets, and Dhaka Electric Supply Company Limited (DESCO) has taken over distribution assets in some part of Dhaka city. Electricity distribution in most rural areas of Bangladesh is the responsibility of the 70 rural electricity cooperatives (PBSs), which are organized, initially funded, and monitored by Rural Electrification Board (REB). Dhaka Power Distribution Company Limited (DPDC) was established in 2005 to take over DESA's distribution assets.

4. The changes in the business environment and organization resulting from adoption of the PSRB have yielded notable improvements in the power sector entities' operational and financial performance. In particular, the sector's overall system losses against gross generation have been reduced significantly—from 37.2% in FY1994 to 25.0% in FY 2005. For the same period, the sector's ratio of average collection to import has been improved from about 66% to over 80%, as shown in Table 2 below. Further sector analysis is presented in Appendix 2.

**Table 2: Performance of Distribution Entities**  
(%)

| Item                        | FY1994 | FY1999 | FY2002 | FY2003 | FY2004 | FY2005 |
|-----------------------------|--------|--------|--------|--------|--------|--------|
| <b>System Losses</b>        |        |        |        |        |        |        |
| BPDB                        | 30.3   | 29.7   | 23.2   | 20.7   | 21.3   | 20.0   |
| DESA                        | 32.8   | 29.9   | 35.6   | 30.9   | 33.7   | 30.0   |
| DESCO                       | —      | 40.5   | 26.7   | 21.2   | 19.2   | 16.7   |
| REB                         | 15.6   | 18.6   | 16.7   | 17.3   | 15.6   | 13.8   |
| WZPDC                       | —      | —      | —      | —      | —      | 21.4   |
| Overall Power System        | 37.2   | 35.8   | 32.0   | 28.5   | 27.2   | 25.0   |
| <b>Collection to Import</b> |        |        |        |        |        |        |
| BPDB <sup>a</sup>           | 62.5   | 55.3   | 74.6   | 76.8   | 78.5   | 80.1   |
| DESA                        | 54.6   | 57.2   | 72.7   | 72.8   | 77.4   | 70.0   |
| DESCO                       | —      | 35.2   | 65.3   | 69.5   | 70.9   | 80.9   |
| REB                         | 83.5   | 76.5   | 84.4   | 82.8   | 83.5   | 85.8   |
| WZPDC                       | —      | —      | —      | —      | —      | 87.8   |

— = not available, BPDB = Bangladesh Power Development Board, DESA = Dhaka Electric Supply Authority, DESCO = Dhaka Electric Supply Company Limited, FY = fiscal year, REB = Rural Electrification Board, WZPDC = West Zone Power Distribution Company Limited.

<sup>a</sup> Collection to generation.

Sources: Power sector entities' reports.

## **B. Issues and Opportunities**

### **1. Load Restrictions and System Constraints**

5. Over the past 10 years, electricity consumption in Bangladesh grew at an average annual rate of 8.1%. The ADB-financed power system master plan update (PSMPU)<sup>2</sup> estimates that demand for electricity will grow at an annual rate of about 8.0% for the next 10 years, and

<sup>2</sup> ADB. 2004. *Technical Assistance to the People's Republic of Bangladesh for Preparing the Power Sector Development Program II*. Manila.

about 20% of the additional capacity by 2025 will be required to serve peak load. Even if all presently planned power plants are constructed as scheduled, a shortfall of generation capacity of over 2,000 MW is expected by 2010 and over 5,500 MW by 2015, of which 750 MW would be peaking capacity. To meet the Government's goal of providing reliable and quality electricity at affordable prices to all the population by 2020, an additional 12,000 MW of generation capacity will be required.

6. Limitations in the existing transmission system also require immediate attention. The rapidly growing demand requires a corresponding increase in the capability of the transmission system to evacuate the power from new plants and make it available to existing and new substations. Some areas in the country are presently served through weak 33-kilovolt (kV) distribution links that face frequent outages, provide low voltages, and create maintenance problems. The PSMPU's least-cost expansion plan concludes that additional transmission capacity of 4,875 megavolt-ampere (MVA) of 230/132 kV transformers will be required by 2010 and another 4,650 MVA by 2015. Existing capacity is 3,925 MVA. More than three times the current large transformer capacity will be necessary to meet demand reliably by 2015.

7. Expansion of the distribution systems in Dhaka has struggled to keep up with the rapid growth in demand. Several 33/11 kV substations are more than 30 years old. The main equipment and circuit breaker protection systems have deteriorated and the transformers are overloaded, contributing to even faster deterioration. Load shedding remains the only tool to control system overload. Few substations have backup transformers to provide reliable and stable power supply to feed the load of the substation in the event of an outage. As a result of long runs of low-voltage lines that are often overloaded, low voltage is a problem both at the supply side of the substations and at the demand side. Lower power factors exacerbate voltage problems, but many of the capacitors installed to help control power factor are not functional, and most of the power factor meters are defective. Operating under such conditions contributes to high losses as well as faster deterioration of equipment condition and performance. Dhaka's distribution systems face the challenge of rehabilitating the existing system while meeting demand that is expected to double by 2015.

8. The PSMPU estimates that the total investment required for generation and transmission by 2025 will be about \$10.5 billion and \$1.2 billion, respectively. It is also estimated that about \$6.3 billion will be required for distribution to serve the generation and transmission expansions. Details of the total estimated investment requirements are shown in Table 3.

**Table 3: Estimated Investment Requirements through 2025**  
(\$ million)

| <b>Fiscal Year</b> | <b>Generation</b> | <b>Transmission</b> | <b>Distribution</b> | <b>Total</b>  |
|--------------------|-------------------|---------------------|---------------------|---------------|
| 2006–2010          | 3,227             | 563                 | 2,041               | 5,831         |
| 2011–2015          | 2,232             | 175                 | 1,296               | 3,703         |
| 2016–2020          | 2,871             | 315                 | 1,715               | 4,901         |
| 2021–2025          | 2,172             | 145                 | 1,248               | 3,565         |
| <b>Total</b>       | <b>10,502</b>     | <b>1,198</b>        | <b>6,300</b>        | <b>18,000</b> |

Sources: power system master plan update and Asian Development Bank estimates.

## **2. Regulatory Framework**

9. Effective regulation of the sector is crucial to ensuring sustainability of the sector entities, establishing a level playing field for all entities, and providing confidence to potential investors.

To achieve this, Bangladesh Energy Regulatory Commission (BERC) was established in April 2004 as an independent energy sector regulator under the Energy Regulatory Commission Act 2003 to (i) set electricity tariffs and determine the corresponding performance norms; (ii) collect, verify, and disseminate power statistics; (iii) review and approve long-term power planning; (iv) create and maintain a nondiscriminatory and commercial business environment in the sector; and (v) adjudicate disputes between sector entities. The United States Agency for International Development (USAID) has provided technical assistance (TA) to establish BERC and to provide institutional capacity building and training by identifying problems and introducing relevant experience from other countries. With this support from USAID and temporary staff deputed from the Government, BERC has finalized its licensing regulations and drafted tariff regulations. Mainly due to the absence of an approved organogram,<sup>3</sup> however, BERC is unable to recruit suitable staff, and that impedes its full functioning.

### **3. Financial Performance and Electricity Tariff**

10. The Government and power sector entities in Bangladesh have taken tangible steps to enhance the financial performance of the sector entities. In parallel with the Government's effort to instill a new corporate culture in the sector through corporatization and commercialization, the two major companies of the power sector, PGCB and DESCO, have undertaken a number of reform measures to improve their operational efficiency and financial positions. These include (i) a change in PGCB billing procedures for wheeling charges from asset-based billing to energy-based billing at the distribution end, (ii) load balancing among different transformers, (iii) expansion of computerized billing and ledger updating systems, (iv) upgrading of their power supply systems, (v) expanded use of prepaid meters and capacitor banks, and (vi) time-of-use tariffs for consumers connected at 33 kV and 11 kV. PGCB and DESCO have become financially self-reliant since FY2004. They reported net profit before tax of Tk422 million and Tk551 million, respectively, in FY2005.

11. In contrast to PGCB and DESCO, BPDB and DESA have continuously made large losses, with a damaging impact on Government finances. These entities are technically insolvent, as their current liabilities exceed realizable current assets and they have accumulated large unmet debt service liabilities to the Government. As of 30 June 2005, BPDB had debt service arrears to the Government of Tk57.55 billion (equivalent to about \$820 million). DESA has accumulated significant liabilities that include unpaid import bills from BPDB and wheeling charges from PGCB. As of 30 June 2005, these liabilities were equivalent to 1,049 days (34 months) of DESA's average energy import bill. There is no likelihood of these amounts being repaid. Rather, these liabilities will continue to grow under the present policies.

12. There are three types of tariffs in the power sector in Bangladesh, namely, (i) wholesale tariffs, (ii) transmission wheeling charges, and (iii) retail distribution tariffs charged to end-use consumers. Up until 2003, the Government had a semiannual automatic power tariff adjustment formula to reflect fuel price changes and local currency fluctuations. With establishment of BERC in April 2004, the responsibility for power tariff setting was delegated to BERC. Especially because BERC has not yet been fully functional, however, there has been no tariff adjustment since September 2003, despite significant fuel price hikes and local currency depreciations. That exacerbates the financial difficulties of the sector entities. A detailed tariff analysis has been undertaken. It is provided in Supplementary Appendix A, and its summary is in Appendix 3.

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<sup>3</sup> In Bangladesh, an organogram generally includes the organizational chart, pay structure, conditions of services, recruitment procedures, and job descriptions.

13. The tariff analysis reveals that BPDB, in particular, is facing a serious financial hardship, as it has to absorb the losses arising from the difference between the wholesale tariffs and its pooled generation cost. While its pooled average cost of generation is Tk2.26 per kWh, BPDB sells electricity to distribution entities at Tk1.84–Tk1.94 per kWh, aggregating to losses of about Tk9.30 billion per annum. The tariff analysis shows that PGCB has a tariff that enables it to earn a profit, with wheeling charges of Tk0.23 per kWh for bulk delivery to distribution entities and that the existing transmission wheeling tariff may be retained until FY2007. Similarly to wholesale generation tariffs, retail tariffs are not structured for cost recovery and are essentially inflexible to such external price fluctuations as increases in fuel costs, local currency depreciation, and inflation. The tariff analysis concludes that sizeable tariff increases will be needed to restore balance between tariffs and the underlying cost of service. Increases should be spread over a number of years, however, to minimize the adverse impact downstream. If bulk supply tariff and retail tariffs are raised by 10% on average now and there will be further real increases of 5% in FY2009 and FY2010, the tariffs would be brought into line with underlying cost of service by 2010. In view of the urgency to address the tariff issues, the Government has initiated a proposal to increase the wholesale tariff by about 10% and the retail tariff by some 5%. Pursuant to the BERC Act, a public hearing was held by BERC in early October 2006 for the proposed tariff increase. The tariff increase became effective on 1 March 2007.

14. Given the high cost of generation, which is partly due to supply shortages that force BPDB to purchase power from all available generation units regardless of cost and operational efficiency, the Government is now pursuing several less-costly natural gas-fired independent power producer (IPP) projects totaling about 1,400 MW of new generation capacity. These are in contract-awarding stage or bidding stages. In parallel, the Government is pursuing 1,000 MW of gas-fired plants through public sector investments on the basis of the least-cost option. Apart from the effort for tariff increase and measures to construct less-costly natural gas-fired power plants to bring down the overall generation cost, the Government is taking a multifaceted approach to achieve a sustainable power sector through a combination of various measures, including (i) putting BERC into full operation to gradually implement the cost recovery principle in tariff settings pursuant to the Government's policy, (ii) further restructuring the power sector entities to improve their operational performance as envisaged in the Government's reform program, (iii) implementing various system loss reduction programs, and (iv) preparing and implementing a financial restructuring plan for the sector entities, in particular BPDB and DESA.

15. As autonomous corporate governance is a precondition for achieving financial health, the Cabinet Committee on Economic Affairs of the Government approved proposals for corporatizing BPDB and DESA in June and July 2004, respectively. On 25 October 2005, DESA was incorporated as DPDC to take over DESA's distribution systems. To allow corporatization of BPDB, a draft memorandum and articles of association have been prepared for review by the Government. Corporatization of BPDB and DESA, including human resource issues such as the employee retrenchment plan is being assisted by ADB TA4626-BAN<sup>4</sup> and TA3978-BAN,<sup>5</sup> respectively. In parallel with the corporatization process, ADB TA4379-BAN (footnote 2) has assisted the Government by preparing a draft financial restructuring plan for BPDB and DESA.

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<sup>4</sup> ADB. 2005. *Technical Assistance to the People's Republic of Bangladesh for the Corporatization of the Bangladesh Power Development Board*. Manila.

<sup>5</sup> ADB. 2002. *Technical Assistance to the People's Republic of Bangladesh for the Corporatization of the Dhaka Electric Supply Authority*. Manila.

#### 4. Good Governance

16. Bangladesh's economy is widely perceived to suffer from weak governance. Despite good progress in many social indicators, perceived corruption adds to the costs of doing business and reduces the nation's competitiveness and attractiveness for foreign direct investment. Significant governance challenges in Bangladesh occur at three levels: national, sector, and corporate. At the national level, ADB has attempted to support anticorruption measures through TA 4140-BAN<sup>6</sup> by promoting medium- to long-term development of collective anticorruption efforts at various institutions, including in the power sector. This TA has built on enactment of the Anticorruption Commission Act and the establishment in 2004 of the Anticorruption Commission. ADB has launched TA4734-BAN<sup>7</sup> to support capacity building to make the commission operational. In parallel, ADB is assisting the Government in preparing a comprehensive national integrity strategy under TA4744-BAN.<sup>8</sup> Public procurement procedures that are universally associated with high levels of corruption are addressed in a major reform program supported by ADB, World Bank, and other development partners, and the Public Procurement Act was passed by Parliament in 2006. The Government has recently demonstrated strong commitment to pursuing critical governance reforms with focus on combating corruption, ensuring the effectiveness and independence of the judiciary, and depoliticizing the civil service. It has already reconstituted the Anticorruption Commission with new commissioners, framed new laws to tackle corruption; taken tough legal and prosecutorial actions; and ratified the United Nations Convention Against Corruption.

17. Good governance, at both sector and corporate levels, is invariably emphasized in the Government's various power sector reform policy papers, including the PSRB, the *Vision and Policy Statement for Power Sector Reforms* issued in 2000, and, most recently, the 3-year sector reform road map. Among the ways sector- and corporate-level governance is addressed in Bangladesh's power sector are by continuing to corporatize and commercialize sector entities and strengthening regulatory functions. It is widely recognized that this experience to date has yielded positive results, and continued restructuring of the sector entities through corporatization and commercialization is a crucial step in promoting good governance. The amendment of the Electricity Act in 2006, moreover, introduced severe penalties, including imprisonment, for theft, pilfering electricity, meter tempering, and other crimes. Specific governance risk mitigation measures taken in designing the proposed program are described in paras. 60–61.

#### 5. Private Sector Participation

18. As the Government realized that the investment requirements for the power sector would exceed the resources available in the public sector and could crowd out investment in other key sectors, it took a policy decision in 1994 to invite private sector participation in generation, and it introduced a private power generation policy in 1996. The Government made efforts to streamline its administrative and commercial procedures, and the private sector responded favorably. Since introduction of this policy, new capacity of 1,290 MW (in a total of seven plants) has so far been established by IPPs. Additional capacity of about 1,400 MW is planned to be established in the near future. In FY2005, IPPs<sup>9</sup> produced 8,185 MWh of electricity, which

<sup>6</sup> ADB. 2003. *Technical Assistance to the People's Republic of Bangladesh for Supporting Good Governance Initiatives*. Manila.

<sup>7</sup> ADB. 2005. *Technical Assistance to the People's Republic of Bangladesh for Supporting Good Governance Initiatives II*. Manila.

<sup>8</sup> ADB. 2005. *Technical Assistance to the People's Republic of Bangladesh for Preparing the Good Governance*. Manila.

<sup>9</sup> This includes Rural Power Company Limited.

represents about 38% of the total national net generation of 21,408 MWh. ADB has consistently supported the Government in promoting private sector participation in the power sector, including TA for soliciting private sector implementation of the Meghnaghat Power Station.<sup>10</sup>

19. Despite past success, Bangladesh, like many other developing countries, has recently faced difficulties in mobilizing further private capital for expanding power generating capacity. A worldwide trend shows that private investors' interest for IPPs in developing countries has fallen off, and the number and value of transactions involving these investors are well below their peaks in the late 1990s. Several factors are generally considered to have contributed to the falloff: (i) a financial crisis in 1997 that steeply devalued local currencies and undermined the sustainability of investments, (ii) conditions in international capital markets and a drop in the market capitalizations of investors' assets that affected their ability to raise capital for new investments, and (iii) concerns about the stability and enforceability of legal and regulatory frameworks under power sector reform. To promote further private sector participation and public-private partnership in the power sector in Bangladesh, ADB has approved a TA project,<sup>11</sup> which aims to review and analyze current hindrances to private sector participation, recommend measures to remove those impediments, and provide several public-private partnership models that may be adopted in the power sector in Bangladesh.

20. To tap local private capital for developing the power sector, the Government gave its approval in March 2004 for PGCB to issue, in one or more tranches, tax-free bonds with maturities of 7–10 years and in total amount up to Tk2.0 billion to finance the local currency cost of constructing the national load dispatch center. PGCB appointed an issue manager in February 2004, then decided to issue the bonds in several tranches. PGCB is now ready to issue the bonds when markets are favorable. Furthermore, in a first for the Bangladesh public sector, DESCO shares were directly listed on the local stock exchange in June 2006 with a very favorable market response, and PGCB shares were listed in October 2006.

## **6. External Assistance and Development Partner Coordination**

21. The major sources of external funding for the Bangladesh power sector are ADB, World Bank, Japan Bank for International Cooperation, United Kingdom Department for International Development, Kreditanstalt für Wiederaufbau (KfW), and USAID. ADB has assisted generation, transmission, and distribution of power in urban and semi-urban areas. Japan Bank for International Cooperation has concentrated its assistance on power generation and rural electrification projects, and it is now considering to finance a 360 MW power plant in Haripur, augment transmission systems, and promote renewable energy. Department for International Development has financed transmission and distribution in the Dhaka area and is currently engaged in expanding REB. USAID has been instrumental in establishing and funding REB and the first PBSs, as well as in establishing and capacity building at BERC. USAID continues to provide technical support to REB and for making BERC fully functional, as well as to provide assistance for regional cooperation and renewable energy. While KfW has assisted in augmenting generating capacity and reinforcing transmission projects; it will emphasize transmission, renewable energy, and energy efficiency. World Bank had earlier financed power generation and distribution projects in smaller towns and rural areas. Since 2002, World Bank has been supporting REB in expanding its operation, and it has a plan to finance peaking power

<sup>10</sup> ADB. 1995. *Technical Assistance to the People's Republic of Bangladesh for Solicitation for Private Sector Implementation of the Meghnaghat Power*. Manila.

<sup>11</sup> ADB. 2006. *Technical Assistance to Bangladesh for the Promotion of Private Sector Participation in the Power Sector*. Manila.

generation plants in Siddhirganj. It also is considering financing corporatization of BPDB's southern zone distribution network, rural electrification, and renewable energy. External assistance to the power sector is summarized in Appendix 4.

22. There is an active energy sector local consultative group in Bangladesh comprising representatives from the development partners and Government. They meet regularly in Dhaka to discuss various sector issues as well as assistance strategies and programs. ADB has, as the lead coordinator of this consultative group, organized coordination meetings since 1992, thereby contributing to the formulation of reforms and identification of reform-linked projects in the sector. Most recently, in November 2005, ADB organized a coordination meeting in Dhaka to review the Government's reform process, provide feedback on the Government's draft 3-year power sector reform road map, and help the Government finalize the road map. Considering the power sector's vast investment requirements and the complexity of power sector reforms, the proposed program has been formulated in close collaboration with other development partners.

## **7. Lessons Learned**

23. Since Bangladesh joined ADB in 1973, the power sector has received 18 public sector loans and one private sector investment, totaling about \$1.3 billion, to improve the capacity and quality of power supply. ADB has also provided 22 TA grants, totaling about \$14.0 million. ADB recently evaluated its power sector assistance program<sup>12</sup> in Bangladesh. It found that ADB's assistance has been relevant, as it has addressed the sector's changing needs over time, and that ADB's consistent support through reform-linked projects has been a key factor behind the sector's ongoing drive for commercialization, thereby helping to maintain the country's macroeconomic stability. The evaluation also recognizes that ADB's gradual approach for sector reform has facilitated change, and it goes on to recommend sustained support. Still needed, however, are continuing and more rapid reforms in creating an independent regulator, corporatization of BPDB and DESA, mutual independence of sector entities whose transactions are governed by commercial contracts, reform of wholesale and retail tariffs to reflect costs of supply, sector recapitalization, and a sound financial policy for the sector. The evaluation report also concludes that, given the success of the individual projects and new sector entities, ADB's approach clearly indicates the direction that future reform programs should take. Another finding is that the pace of privatization in an environment such as that in Bangladesh, especially in transmission and distribution, is likely to be slow. As such, it is important to prioritize reform initiatives in these key areas.

24. In December 2003, ADB approved two loans for the Power Sector Development Program (PSDP),<sup>13</sup> one program loan of \$100 million, and one project loan of \$186 million. The program loan was to provide support and incentives to the Government for power sector reform activities through financial stabilization of two major transmission and distribution companies, namely PGCB and DESCO, launching of BERC, optimizing generation costs on a national basis, and restructuring of power sector entities. The project loan was to provide financial assistance to expand peak load generation capacity at Siddhirganj, construct a new national load dispatch center, and strengthen distribution systems in northwestern Bangladesh. Under the program loan, two tranches of \$50 million each were linked to sequenced policy reform targets. The first tranche was released in August 2004 and the second in December 2005 upon compliance by

<sup>12</sup> ADB. 2004. *Sector Assistance Program Evaluation of Asian Development Bank Assistance to Bangladesh Power Sector*. Manila.

<sup>13</sup> ADB. 2003. *Report and Recommendations of the President to the Board of Directors on Proposed Loans to the People's Republic of Bangladesh for the Power Sector Development Program*. Manila.

the Government and the sector entities with the conditions for their release. The PSDP has brought about numerous positive developments. A major breakthrough was the emergence of a new culture of accountability for electricity used by the Government and its agencies. This helped to substantially reduce the outstanding dues owed by the Government and its agencies.<sup>14</sup> The power sector's two major companies, PGCB and DESCO, have become profitable organizations since 2004. The PSDP also supported launching of BERC and laid a foundation for restructuring the remaining key power sector entities, BPDB and DESA. While the Government has made substantial progress in meeting the overall objectives of the PSDP and has complied with major loan covenants, implementation of the project loan is experiencing slow progress, particularly in procuring Siddhirganj power station, mainly because of delays in recruiting the implementation consultant.<sup>15</sup>

## 8. Government Development Strategy

25. In 2000, building on the PSRB, the Government issued its *Vision and Policy Statement for Power Sector Reforms*. This clarified specific details of the structural arrangements for power generation, transmission and distribution along with the principles of corporatization, commercialization, cost-reflective and equitable tariffs, and greater private sector participation in generation as follows:

- (i) **Generation.** Separation of all existing units through a corporatized national power generation entity; power stations under construction and all new power stations to be profit centers and incorporated as independent companies; new generation to reflect a least-cost expansion plan based on the supply of private and public resources.
- (ii) **Transmission.** To be expanded in tandem with generation capacity; the transmission grid to be owned and operated by a corporatized entity in the public sector (i.e., PGCB).
- (iii) **Distribution.** Creation of a number of separate distribution entities to be incorporated under the Companies Act of 1994; private capital and management participation; REB to continue functioning.
- (iv) **Tariffs.** To be set at progressively cost-reflective levels that improve efficiency in generation, transmission, and distribution while promoting commercial returns.
- (v) **Regulation.** Regulatory commission to be established.
- (vi) **Financial.** Restructured entities to be given the opportunity to start operations with clean balance sheets; fiscal regime to be made neutral irrespective of the ownership structure of power entities.

26. As a result of these initiatives, the Government has achieved (i) creation of a competitive, diverse market with independent public and private generation companies; (ii) restructuring of the sector by transferring all transmission assets and operations to a new transmission company; (iii) creation of a competitive environment by establishing several sector entities; and (iv) establishment of the energy regulatory commission, BERC.

27. Subsequently, in 2006, the Government issued its 3-year reform road map through intensive consultations with various stakeholders and key development partners. This road map

<sup>14</sup> The outstanding debts of the Government ministries and divisions were reduced by 58% from about Tk3.3 billion in June 2002 to about Tk1.4 billion in December 2005. In the same period, the outstanding debts of the Government's autonomous and semi-autonomous bodies were reduced by 49% from about Tk6.8 billion to some Tk3.5 billion. In March 2007, these have been further reduced to Tk0.7 billion and Tk2.9 billion, respectively.

<sup>15</sup> Nevertheless, construction work of Siddhirganj power station has started in early 2007.



sets out the detailed reform and investment program for 2006–2008 with a detailed implementation plan for the Government’s vision statements. The 3-year road map is based on the lessons learned in establishing sector entities, particularly the need to introduce new management structures and a commercial culture, resolve employee issues, and provide sufficient autonomy and improved governance. The main results to be achieved over the next 3 years include further unbundling of electricity supply into commercially viable generation and distribution companies. The sector road map is summarized in Appendix 5.

## **9. ADB’s Sector Strategy**

28. ADB has developed its strategy for the power sector in consultation with the Government and other key development partners involved in the sector. In parallel with its continued support for expanding and upgrading power supply systems in Bangladesh as part of a least-cost expansion plan, the strategy consists of (i) changes in the business environment through continued corporatization and commercialization of sector entities as well as increasing private sector participation, (ii) institutional improvements in power sector entities, (iii) creation of new power sector companies to serve as role models for the sector, (iv) enlarging the scope of PBSs, (v) strengthening the long-term planning and regulatory processes, and (vi) promotion of good governance at the sector and corporate levels. The proposed program addresses items (i), (ii), (iii), (v), and (vi) of this strategy. Item (iv) has been addressed through ADB’s earlier projects and World Bank’s ongoing project for rural electrification.

## **III. THE PROPOSED SECTOR DEVELOPMENT PROGRAM**

### **A. Impact and Outcome**

29. The proposed Sustainable Power Sector Development Program (the Program) is expected to promote sustained economic growth in Bangladesh by providing improved capacity in the nation’s power sector and reliable power supply to its people. The Program supports the Government’s goal of providing reliable electricity to the entire country by 2020. Building on the success of the first power sector development program, approved in 2003 (footnote 13), and consistent with ADB’s country strategy and program,<sup>16</sup> the proposed program aims to provide further support and incentives to the Government for power sector reform through financially stabilizing sector entities and improving their governance while assisting to expand clean-fuel power generation capacity, enhancing transmission network reliability and efficiency, and improving quality of supply in Dhaka city and surrounding areas (the major power market). The Program which is a high priority for the Government, is linked to the Government’s sector reform road map and is part of the least-cost development plan for the power sector.

### **B. Important Features**

30. **Sustainable Sector Development.** The Program, comprised of a program loan and project loan, is designed to promote sustained development of the power sector in Bangladesh by pursuing (i) improved sector and corporate governance through further corporatization and commercialization of the sector entities and other good governance measures; (ii) enhanced financial health of sector entities to be achieved by implementing a financial restructuring plan and reducing accounts receivable; (iii) improved operational efficiency of the sector entities by reducing overall system losses with investments in generation, transmission, and distribution

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<sup>16</sup> ADB. 2005. *Country Strategy and Program (2006–2010): Bangladesh*. Manila.

systems; (iv) promotion of private sector participation and public-private partnership; and (v) implementation of a sector-wide capacity development program.

## **C. The Program Loan**

### **1. Outcome**

31. The policy actions supported by this program loan will be improved power sector sustainability through financial and organizational restructuring and will focus on five key outputs that will (i) develop and implement a national action plan for sector reforms, (ii) establish a fully functional legal and regulatory framework, (iii) enhance the financial health of power sector entities, (iv) further restructure the sector entities, and (v) promote private sector participation and public-private partnerships in the sector. Appendix 6 presents the development policy letter and policy matrix of the program loan along with strategic goals, key targets, and progress to date for each output.

### **2. Outputs**

32. The policy matrix for the program loan consists of series of specific policy actions grouped under the five outputs outlined above.

#### **a. National Action Plan for Power Sector Reforms**

33. By implementing various reform actions over the years, the Bangladesh power sector has gained numerous institutional and operational improvements. The Government intends to accelerate the reform process by implementing a time-bound power sector reform action plan to help achieve sustained economic growth and poverty reduction. Towards this goal, the proposed program will assist the Government to (i) develop and implement a time-bound sector reform action plan by preparing a detailed reform road map and engaging a regular monitoring system for the reform process, (ii) develop a long-term power system master plan for transmission and distribution as well as a strategy paper for a rural electrification program, and (iii) develop a sector-wide, medium-term capacity development program.

#### **b. Fully Functioning Legal and Regulatory Framework**

34. Establishing a fully functioning legal and regulatory framework is crucial to successful reform, and the Government has taken the most fundamental step by establishing BERC in 2004. BERC will need to address a number of complicated issues during the reform process to ensure sustained sector growth. The proposed program seeks to assist the Government and BERC in this effort by setting out specific policy actions: (i) appointment of the remaining commission member of BERC, (ii) approval of a BERC organogram by the relevant authorities of the Government to enable staff recruitment (footnote 3), and (iii) gazette notification of various rules and regulations to build a firm platform for BERC businesses.

#### **c. Financial Health of Power Sector Entities**

35. The financial position of the power sector entities has been enhanced in recent years, except for BPDB and DESA, owing to various reform processes supported by ADB and other development partners. PGCB and DESCO, in particular, became profitable organizations. To help improve the financial position of BPDB and DESA, a financial restructuring plan was prepared under ADB TA4379-BAN. It called for cleaning up their balance sheets by writing off

unrecoverable cross-debts between sector entities and converting to equity unsustainable overdue debt service and long-term loans payable to the Government. The Government has recently drafted a time-bound financial restructuring plan for these entities. The proposed program supports this effort by specifying policy actions needed to facilitate approval of the financial restructuring plan by the relevant authorities by the Government.

36. So far, BPDB and DESA have been meeting the liabilities for terminal benefits including pension and gratuities of its employees from revenues, rather than on the basis of a funded trust or scheme. As a result, a significant part of the terminal benefit liabilities are unfunded. Although a few new companies have recently emerged in the power sector, the corporatization process is being halted due to unfunded pension obligations and gratuities, which are estimated at about \$163 million. It is inevitable that this issue must be addressed to accelerate the reform process.

37. As a result of extensive policy dialogue between the Government and development partners, and especially owing to the support of ADB's PSDP, the accounts receivable of the power sector entities as of December 2005 have been reduced to a level of 3.8 times the monthly average billing. However, the accounts receivable owed by the Government and its autonomous and semiautonomous bodies are still high. As of December 2005, the outstanding dues owed by the Government ministries and divisions were Tk1.4 billion, or 6.0 times the monthly average billing to them, while the amount owed by the Government's autonomous and semiautonomous bodies was Tk3.5 billion or 12.7 times the monthly average bills. There is a need to further reduce the accounts receivable owed by the Government and its bodies.

#### **d. Further Restructuring of Power Sector Entities**

38. ADB's PSDP (footnote 13) laid a foundation for further restructuring of the power sector by establishing several new entities under the Companies Act, such as Electricity Generation Company of Bangladesh Limited (EGCB), DPDC, and North West Zone Power Distribution Company Limited (NWZPDC). The program loan will facilitate downstream activities for corporatizing these entities by helping constitute the board of directors, appoint management, and transfer operations to the new companies.

#### **e. Promoting Private Sector Partnership and Public-Private Partnership**

39. Since adoption of its policy in 1996 to promote private sector participation in power generation, the Government has succeeded in attracting foreign private capital. At present, the private sector supplies about 38% of the nation's total generation, which is the most successful case in the region. As discussed above (para. 19), however, Bangladesh has recently encountered difficulties in attracting private capital. While ADB provides TA to promote private sector participation and public-private partnerships in the sector, the program loan will address the issue by helping the Government establish an enabling environment through fully operationalizing the BERC, further corporatizing and commercializing the sector entities, and listing PGCB and DESCO shares in the local stock market. This will instill private sector confidence and encourage its gradual participation in the power sector.

### **3. Financing Plan**

40. The Government has requested a loan in various currencies equivalent to \$60 million from ADB's Special Fund resources (Asian Development Fund) to help finance the Program. The loan will have a term of 24 years, including a grace period of 8 years, and an interest rate of 1% per annum during the grace period and 1.5% per annum thereafter.

#### 4. Counterpart Funds

41. The counterpart funds to be generated from the proceeds of the program loan will be used to finance the adjustment costs associated with the Program, including funding unfunded pension obligations and gratuities as well as to settle outstanding dues of the Government and its autonomous and semiautonomous bodies. The Government is expected to incur adjustment costs over the reform period of about \$183 million, which are detailed in Table 4.

**Table 4: Financial Implications on Costs of Adjustment**  
(\$ million)

| <b>Cost of Adjustments</b>                                    | <b>FY2007</b> | <b>FY2008</b> | <b>FY2009</b> | <b>FY2010</b> | <b>Total</b> |
|---|---------------|---------------|---------------|---------------|--------------|
| Funding unfunded pension obligations and gratuities           | 25            | 25            | 50            | 63            | 163          |
| Settling outstanding debts of the Government and its agencies | 10            | 10            | 0             | 0             | 20           |
| <b>Total</b>  | <b>35</b>     | <b>35</b>     | <b>50</b>     | <b>63</b>     | <b>183</b>   |
| <b>Source of Funds</b>  |               |               |               |               |              |
| Government  | 5             | 5             | 50            | 63            | 123          |
| Asian Development Bank  | 30            | 30            | 0             | 0             | 60           |
| <b>Total</b>  | <b>35</b>     | <b>35</b>     | <b>50</b>     | <b>63</b>     | <b>183</b>   |

Source: Asian Development Bank estimates.

#### 5. Implementation Arrangements

##### a. Program Management

42. For the program loan, the Borrower will be the People's Republic of Bangladesh. The executing agencies (EAs) will be the Finance Division of the Ministry of Finance (MOF) and the Power Division of the Ministry of Power, Energy and Mineral Resources (MPEMR), which will be responsible for the overall coordination of the program loan during the implementation period.

##### b. Period of Implementation

43. The reform supported under the program loan is to be completed by June 2008.

##### c. Procurement and Disbursement

44. The proceeds of the policy loan will be used to finance the costs (excluding local taxes and duties) of items produced in and procured from ADB's member countries, preferably procured for the power sector, other than those specified in the negative list in Appendix 7 and imports financed by other bilateral and multilateral sources.

45. In accordance with the provisions of ADB's *Simplification of Disbursement Procedures and Related Requirements for Program Loans*, the proceeds of the program loan will be disbursed to the People's Republic of Bangladesh as the Borrower. No supporting import documentation will be required. Loan proceeds will be disbursed on the basis of certification provided by the Borrower confirming that in each year which policy loan proceeds are expected to be disbursed the value of total imports minus (i) imports from nonmember countries, (ii)

ineligible imports, and (iii) imports financed under other official development assistance are equal to or greater than the amount expected to be disbursed during such year. The Government will certify that each withdrawal request complies with this formula. Otherwise, import documentation under existing procedures will be required.

**d. Accounting, Auditing, and Reporting**

46. ADB retains the right to audit the use of loan proceeds and to verify the accuracy of the Government's certification for each withdrawal application. Prior to withdrawal, the Government will open a deposit account at Bangladesh Bank into which the proceeds of the loans will be deposited and from which all withdrawals will be made. The accounts will be managed, operated, and liquidated in accordance with terms satisfactory to ADB. MPEMR, in collaboration with MOF, will send quarterly progress reports to ADB.

**e. Tranching**

47. The loan will be released in two tranches, each of \$30 million equivalent, and these will be made available upon fulfillment of the actions enumerated in Table 5.

**Table 5: Required Actions for Tranche Release**

| <b>Output</b>   | <b>First Tranche (\$30 million)</b>   | <b>Second Tranche (\$30 million)</b>  |
|---|---|---|
| 1. A National Action Plan for Power Sector Reform     | <ul style="list-style-type: none"> <li>Government approval of 3-year Road Map for Power Sector Reforms (2006–2008), as agreed between the Government and ADB.</li> <li>Establishment and implementation of a regular monitoring and reporting mechanism to oversee the power sector reform process.</li> <li>Submission of a technical project proposal satisfactory to ADB for a sector-wide, medium-term capacity building program by the Power Division of MPEMR to the Planning Commission.</li> </ul>  |   |
| 2. A Fully Functioning Legal and Regulatory Framework | <ul style="list-style-type: none"> <li>Approval of the BERC Organogram by the Secretaries Committee on Administrative Developments.</li> <li>Gazette notification of the Licensing Regulations as finalized by BERC.</li> <li>Submission of the Electricity Generation Tariff Regulations with the tariff-setting mechanism to the Energy and Mineral Resources Division of MPEMR.</li> </ul>   | <ul style="list-style-type: none"> <li>Appointment of the remaining one BERC commissioner.</li> <li>Gazette notification of the Electricity Generation Tariff Regulations along with the tariff-setting mechanism as finalized by BERC.</li> </ul>  |
| 3. Enhanced Financial Health of Power Sector Entities | <ul style="list-style-type: none"> <li>Preparation of a draft financial restructuring plan for BPDB and DESA by the Power Division of MPEMR in a manner satisfactory to ADB.</li> <li>Budget allocation of at least Tk1.8 billion by MOF for unfunded pension and gratuities for entities already corporatized, including WZPDC, APSC, and NWZPDC.</li> <li>Reduction of the Government's outstanding debts to power sector entities for electricity to less than Tk1.2 billion and the Government's autonomous and semiautonomous bodies' outstanding debts to less than Tk3.0 billion.</li> </ul> | <ul style="list-style-type: none"> <li>Approval by the Government of the financial restructuring plan for BPDB and DESA.</li> <li>Budget allocation of at least another Tk1.8 billion by MOF for provision of unfunded pension and gratuities for newly corporatized entities, including EGCB and DPDC.</li> <li>Reduction of the Government's outstanding debts to power entities for electricity to less than Tk1.0 billion and the Government's autonomous and semiautonomous bodies' outstanding debts to less than Tk2.5 billion.</li> </ul> |

| Output  | First Tranche (\$30 million)  | Second Tranche (\$30 million)   |
|---|---|---|
| 4. Continued Restructuring of Sector Entities | <ul style="list-style-type: none"> <li>Constitution of board of directors of DPDC, EGCB, and NWZPDC in a manner satisfactory to ADB, and advertisement for the recruitment of the management of DPDC and NWZPDC.</li> </ul> |   |
| 5. Increased Public-Private Partnership       | <ul style="list-style-type: none"> <li>Formal approval by the Power Division of MPEMR for PGCB and DESCO to off-load up to 25% of their shares in the stock market in one or more tranches.</li> </ul>                      | <ul style="list-style-type: none"> <li>Subject to favorable market conditions, initial off-loading of PGCB and DESCO shares in the stock market.</li> </ul> |

ADB = Asian Development Bank; APSC = Ashuganj Power Station Company Limited; BERC = Bangladesh Energy Regulatory Commission; DESA = Dhaka Electric Supply Authority; DESCO = Dhaka Electric Supply Company Limited; DPDC = Dhaka Power Distribution Company Limited; EGCB = Electricity Generation Company of Bangladesh Limited; MOF = Ministry of Finance, MPEMR = Ministry of Power, Energy and Mineral Resources; NWZPDC = North West Zone Power Distribution Company Limited; PGCB = Power Grid Company of Bangladesh, Limited; WZPDC = West Zone Power Distribution Company Limited.

Sources: Government of Bangladesh and Asian Development Bank.

## D. The Project Loan

### 1. Outcome

48. The outcome of the project loan is expanded capacity for clean-fuel power generation and improved efficiency in transmission and distribution systems to be achieved by (i) increased peak load generation capacity using clean natural gas, and (ii) augmented and expanded transmission and distribution systems to improve network efficiency and reliability. This support will also further accelerate the sector's restructuring by transferring the entire DESA distribution systems to DPDC and creating a new generation company in the country's northwest.

### 2. Outputs

49. The outputs of the project comprise four investment components and one capacity development component as summarized below. The specific activities and rationale for the investment components are provided in Supplementary Appendix B.

- (i) **Part A: Clean energy capacity expansion.** This component will involve expansion of clean power generation capacity by construction of (a) a new 150 MW natural gas-fired simple cycle gas turbine peaking power plant in Sirajganj along with its auxiliaries, and (b) a new 150 MW natural gas-fired simple cycle gas turbine peaking power plant in Khulna including its auxiliaries and associated underground connecting transmission line to Khulna central substation.
- (ii) **Part B: Transmission system efficiency improvements.** To improve transmission efficiency, this component will involve (a) construction of a new 400 kV overhead transmission line from Meghnaghat to Aminbazar including bay extensions, (b) augmentation of 230 kV transmission system improvements in Aminbazar–Old Dhaka Airport, Dhaka Cantonment and Dhaka University areas along with associated substations, and (c) construction of three new 132 kV transmission lines and associated substations in western and northwestern regions of the country.
- (iii) **Part C: Distribution system efficiency improvements in DESA area.** This component will improve Dhaka distribution systems currently operated by DESA through (a) reinforcing, renovating, and augmenting 10 existing 33/11 kV

substations; (b) developing new 132/33 kV and 33/11 kV substations; procuring and installing 3x50/75 MVA, 132/33 kV transformers and associated equipment in three existing 132/33 kV substations; and (d) upgrading Shyampur Bangladesh Small and Cottage Industries Corporation's 11 kV switching station.

- (iv) **Part D: Distribution system efficiency improvements in DESCO area.** This component will improve Dhaka distribution systems by (a) upgrading and expanding the distribution system in Gulshan Circle including Tongi area, and (b) upgrading and expanding the distribution system in Mirpur Circle.
- (v) **Part E: Capacity development.** This component is to enhance institutional resources of the power sector to improve utility performance and promote sustainable operations. Subject to refinement based on the detailed needs assessment, the indicative priority areas for capacity development include corporate and financial management, information and communication technology, enhancement of technical expertise, long-term system planning and preparation of future projects, good governance, customer relations, research and development, and human resource development and training. The outline scope of this component is given in Supplementary Appendix C.

### 3. Project Investment Plan

50. The project investment cost is estimated at \$679.9 million, including taxes and duties of \$113.8 million as given in Table 6 below. The cost estimates are further presented in Appendix 8, while the detailed cost estimates are given in Supplementary Appendix D.

**Table 6: Project Investment Plan**  
(\$ million)

| Item  | Amounts      |
|---|--------------|
| <b>A. Base Cost<sup>a</sup></b>                                   |              |
| Part A: Clean Energy Capacity Expansion                           | 200.0        |
| Part B: Transmission System Efficiency Improvements               | 156.0        |
| Part C: Distribution System Efficiency Improvements in DESA Area  | 71.7         |
| Part D: Distribution System Efficiency Improvements in DESCO Area | 135.3        |
| Part E: Capacity Development                                      | 7.8          |
| <b>Subtotal (A)</b>   | <b>570.8</b> |
| <b>B. Contingencies<sup>b</sup></b>                               | <b>50.5</b>  |
| <b>C. Financing Charges During Implementation<sup>c</sup></b>     | <b>58.6</b>  |
| <b>Total</b>  | <b>679.9</b> |

DESA = Dhaka Electric Supply Authority, DESCO = Dhaka Electric Supply Company Limited.

<sup>a</sup> In mid-2006 prices. Includes taxes and duties of \$113.8 million for parts A to D. Includes land acquisition and resettlement cost under preconstruction heading in the detailed cost estimates.

<sup>b</sup> Physical contingencies computed at 5% for total material costs for parts A to D. Price contingencies for parts A to D computed at 2.0% on foreign exchange costs and 6.0% on local currency costs.

<sup>c</sup> Includes interest during construction and commitment charges for parts A to D. Interest during construction on foreign exchange cost has been computed at London interbank offered rate plus a spread, total estimated at 6.0%. Commitment charges of 0.75% are levied on unutilized portion of ADB's loan against ADB's staggered disbursement schedule. Front-end fee of 1% is currently waived. Interest during construction on local currency cost for parts A to D has been computed at 5.0% per annum.

Source: Asian Development Bank estimates.

#### 4. Financing Plan

51. The Government has requested ADB to provide two loans under the project loan, one of \$400 million from ADB's ordinary capital resources to help finance procurement and consulting services for parts A, B, C, and D, and one of \$5 million equivalent from its Special Funds resources (Asian Development Fund) for part E. The Government will meet the balance of the cost through loans, grants, and equity contributions to the EAs or the EA's internal resources including all taxes and duties.

52. The ordinary capital resources loan will be provided to the People's Republic of Bangladesh with a 25-year term, including a 5-year grace period, an interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.75% per annum, a front-end fee<sup>17</sup> of 1.0% (to be capitalized in the loan), and such other terms and conditions as set forth in the loan and program agreements. The Government has provided ADB with (i) the reasons for its decision to borrow under ADB's LIBOR-based lending facility based on these terms and conditions, and (ii) an undertaking that these choices were its own independent decision and not made in reliance on any communication or advice from ADB. The loan proceeds will be relent to BPDB (and later transferred to its successor company) for part A, PGCB for part B, DPDC for part C, and DESCO for part D pursuant to subsidiary loan agreements with terms and conditions acceptable to ADB. Relending terms to these entities will include a repayment period of 20 years including a 5-year grace period, and interest of 5.5% per annum. Foreign exchange risk will be assumed by the corresponding entities during the life of the respective subsidiary loan and thereafter by the Borrower.

53. The Special Funds resources loan will have a term of 32 years, including a grace period of 8 years and an interest charge of 1.0% per annum during the grace period and 1.5% per annum thereafter. The Borrower will be the People's Republic of Bangladesh, and the proceeds will be provided to MPEMR. A summary financing plan is provided in Table 7 below and the detailed financing plan is provided in Appendix 8.

**Table 7: Financing Plan**  
(\$ million)

| Source   | Foreign Exchange | Local Currency | Total Cost   | Percent      |
|--|------------------|----------------|--------------|--------------|
| Asian Development Bank (OCR)                         | 400.0            | 0.0            | 400.0        | 58.8         |
| Asian Development Bank (ADF)                         | 5.0              | 0.0            | 5.0          | 0.7          |
| Government Long-Term Loans                           | 0.0              | 108.6          | 108.6        | 16.0         |
| Government Equity Injections/EA's Internal Resources | 0.0              | 162.5          | 162.5        | 23.9         |
| Government Budget Support to MPEMR                   | 0.0              | 3.8            | 3.8          | 0.6          |
| <b>Total</b>   | <b>405.0</b>     | <b>274.9</b>   | <b>679.9</b> | <b>100.0</b> |

ADF = Asian Development Fund, EA = executing agency, MPEMR = Ministry of Power, Energy and Mineral Resources, OCR = ordinary capital resources.

Sources: Government of Bangladesh and Asian Development Bank estimates.

54. Further financing from commercial sources during the project implementation period will be encouraged for additional investments into the power sector to complement ADB financing.

<sup>17</sup> The front-end fee will be waived if the loan is approved before June 2008 and the borrower has no arrears.



Such cofinancing may benefit from ADB credit enhancements, including ADB guarantee instruments, and will be presented separately for consideration by ADB's Board of Directors as and when it arises. KfW has expressed its interest in cofinancing part C. Once the cofinancing is committed, ADB loan will be reduced accordingly.

## **5. Implementation Arrangements**

### **a. Project Management**

55. The EA for part A will be BPDB and its successor company, tentatively called Northwest Power Generation Company Limited (NWPGC).<sup>18</sup> PGCB, DPDC, and DESCO will be the EAs for parts B, C, and D, respectively. The Power Division of MPEMR will execute part E. Until such time as NWPGC and DPDC can take over project implementation, BPDB and DESA will assist and carry out all necessary steps and actions to prepare for and facilitate implementation of their respective components. The EAs and Power Division of MPEMR will be responsible for supervising project implementation and monitoring of project operational performance.

### **b. Implementation Period**

56. The project will be implemented over a 42-month period. Implementation has commenced in July 2006 with preparation of requests for proposals for recruitment of implementation consultants and draft bidding documents by the EAs, and it will be completed by December 2009. The implementation schedule of the project loan is presented in Appendix 9.

### **c. Procurement**

57. Procurement of goods and services to be financed under the investment components will be carried out in accordance with ADB's *Procurement Guidelines* (2007, as amended from time to time). For such procurement, bid specifications will be prepared in a manner to ensure maximum competition under international competitive bidding. A third-party pre-shipment inspection provision will be adopted to ensure quality of goods and equipments. In order to encourage local industry, contracts estimated to cost less than \$500,000 for equipment and related services, and less than \$1,000,000 for works, may be procured following national competitive bidding (NCB) procedures while allowing foreign firms also to participate. Before commencement of NCB procurement, ADB and the Borrower will review the Borrower's procurement procedures to ensure consistency with ADB requirements. Any necessary modifications or clarifications to the Borrower's procedures will be documented in the procurement plan. ADB's domestic preference scheme may be utilized. A detailed procurement plan is in Appendix 10.

### **d. Consulting Services**

58. International and national consultants will assist BPDB and its successor generation company (NWPGC) for part A and PGCB for part B in preparing bidding documents, including basic design, evaluating bids, and project implementation supervision that includes approval of final design, as well as the Power Division of MPEMR in capacity development.<sup>19</sup> All of these

<sup>18</sup> Before loan effectiveness, the Government will establish this new company under the Companies Act 1994, as amended.

<sup>19</sup> While there are some consulting services budgeted for parts C and D, these will be funded by the EAs and are not directly connected to the components funded by ADB.

consultants will be recruited in accordance with ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time). For parts A and B, the simplified technical proposals and quality- and cost-based selection method will be used. For Part E, the quality- and cost-based selection method and the simplified technical proposals or biodata technical proposals will be used.

59. Consulting services required for part A are estimated at 34 person-months of international and 72 person-months of national consultants with expertise in design, construction, testing, and commissioning of gas-fired power generating plants. Consulting services for part B are estimated at 38 person-months of international and 60 person-months of national consultants with expertise in design, construction, testing, and commissioning of 400-kV transmission line and gas-insulated switchyard substations. Consulting services for part E are estimated at 150 person-months of international and 200 person-months of national consultants with expertise in various areas including corporate and financial management, information and communication technology, long-term system planning, governance, research and development, and human resource development. The outline terms of reference for the consulting services are provided in Supplementary Appendix E.

#### **e. Good Governance**

60. The Program is designed to improve sector-level good governance by improving predictability (long-term planning, codification of rules and regulations, and independence of regulatory processes), transparency (systematic dissemination of relevant sector information and discussions on issues before decisions are made), and accountability (establishing the cause-effect structure of incentives). It is expected that the governance at the sector level will be improved when the sector is fully reorganized as corporate entities and BERC is fully functional, as this will ensure predictability, transparency, and accountability in the business process. At the corporate level, governance will be enhanced by the continued introduction of a new corporate culture through corporatization; independence of each entity's board of directors from the Government; introduction of market-oriented incentive packages for staff of corporatized entities; defined delegation of powers to staff; expansion of computerized billing, accounting and management information systems; use of prepaid meters; and commercialization of activities. Furthermore, the Government has implemented an operational risk mitigation action plan, which was jointly prepared jointly by the World Bank, ADB, and other development partners to address key governance risks and weaknesses. Moreover, since 1 January 2007, the Government and ADB are undertaking a joint operational risk assessment in coordination with other development partners in such high risk sectors as the power sector. Table 8 lists the specific governance risk mitigation measures that have been taken into consideration in designing the Program.

**Table 8: Governance Risk Mitigation Measures**

| <b>Area</b>        | <b>Measures</b>  |
|--------------------|--|
| <b>Procurement</b> | <ul style="list-style-type: none"> <li>▪ Use of Asian Development Bank (ADB) guidelines on procurement and consulting services.</li> <li>▪ Use of ADB's standard bidding documents and standard request for proposal documents for procurement and recruitment of consultants.</li> <li>▪ Bid specifications and packaging to be prepared to ensure maximum competition under international competitive bidding procedures.</li> <li>▪ A third-party pre-shipment inspection provision to be adopted to ensure quality of goods and equipment.</li> <li>▪ Capacity development of sector entities on e-procurement to increase transparency, accountability, and efficiency in procurement.</li> <li>▪ Expansion of performance-based contracting for outsourced tasks.</li> </ul> |

| Area                                  | Measures   |
|---------------------------------------|--|
| <b>Financial Management and Audit</b> | <ul style="list-style-type: none"> <li>▪ Regular access to the Executing Agency's accounting and control systems to monitor expenditures and other financial transactions and safe custody of project-financed assets.</li> <li>▪ Capacity development of the sector entities in accounting and internal control systems, financial management, and audit capabilities.</li> <li>▪ Expanded use of advanced information and communication technology based financial management systems to ensure efficient and accountable financial management systems.</li> <li>▪ Financial statements to be audited by external auditors acceptable to ADB and regularly published and reported to the shareholders.</li> <li>▪ Measurable financial performance indicators for each company to be established, evaluated, and benchmarked.</li> <li>▪ Introduction of an appropriate internal audit system through the capacity building program.</li> <li>▪ Implementation of an operational risk mitigation action plan and undertaking a joint operational risk assessment with development partners.</li> </ul> |
| <b>Institutional Mechanisms</b>       | <ul style="list-style-type: none"> <li>▪ Public disclosure of operational and financial performance of the sector entities to improve transparency: <a href="http://www.powercell.gov.bd">www.powercell.gov.bd</a>.</li> <li>▪ Establishment of a fully functional sector regulator to ensure a level playing field among sector entities and to improve sector governance.</li> <li>▪ Continued introduction of a new corporate culture through further corporatization and commercialization, independence of the board of directors from the Government, and defined delegation of powers to staff.</li> <li>▪ Promotion of private sector participation and public-private partnership.</li> <li>▪ Expansion of computerized billing system and prepaid meters.</li> <li>▪ Enforcement of Electricity (Amendment) Act, 2006 to help prevent corruption in the power sector business.</li> </ul>  |

Sources: The Government of Bangladesh and Asian Development Bank.

61. ADB's policy on *Anticorruption* (1998, as amended to date) was explained to and discussed with the Government and EAs. Consistent with its commitment to good governance, accountability, and transparency, ADB reserves the right to investigate, directly or through its agents, any allegedly corrupt, fraudulent, collusive, or coercive practices relating to the Program. To support these efforts, relevant provisions of ADB's policy on *Anticorruption* are included in the loan regulations and bidding documents. In particular, all contracts financed by ADB in connection with the investment components shall include provisions specifying the right of ADB to audit and examine the records and accounts of the EAs and all contractors, suppliers, consultants, and other service providers as they relate to the Program.

#### **f. Advance Procurement**

62. All the EAs have sufficient experience in procuring materials for the works entrusted to them under previous investment loans and were allowed to initiate advance action in July 2006. All the EAs have commenced advance action by preparing draft requests for proposals for recruiting implementation consultants and draft bidding documents for procurement. The Government has been advised that ADB's approval of advance action on procurement and recruitment of consultants does not commit ADB to subsequently approve the project or to finance the recruitment and procurement costs. Retroactive financing is not permitted.

### **g. Disbursement Arrangements**

63. Disbursement procedures will be in accordance with ADB's disbursement handbook,<sup>20</sup> as amended from time to time, and detailed arrangements agreed upon by the Government and ADB. Since the disbursements under both project loans will be mainly for procuring goods and services, ADB's commitment letter and direct payment procedures will be utilized.

### **h. Accounting, Auditing, and Reporting**

64. The accounting, auditing, and reporting systems and procedures for the project loans will be established in accordance with accounting principles and practices satisfactory to ADB. The EAs will maintain separate accounts for the project components. Independent auditors whose qualifications, experience, and terms of reference are acceptable to ADB will audit the project accounts and related financial statements annually. Certified copies in English of such audited accounts and financial statements of each EA will be submitted to ADB not later than 6 months after the end of the financial year to which they relate. All EAs were informed about ADB's policy on submitting audited financial statements and possible penalties for delayed submission.

### **i. Project Performance Monitoring and Evaluation**

65. Each EA will prepare separate progress reports for its respective component and submit these to ADB on a quarterly basis within 20 days from the end of each quarter. Each report will provide a narrative description of progress made during the period, changes in the implementation schedule, problems or difficulties encountered, the performance of the project implementation consultants, and the work to be carried out in the next period. A progress report will also include a summary financial account for the project loan components, consisting of project expenditures for the year to date and total expenditure to date. Performance will be evaluated based on indicators and targets stipulated in the design and monitoring framework.

### **j. Project Review**

66. ADB will field an inception mission within 3 months of the Program approval. ADB will review the implementation and operation of the Program based on the quarterly progress reports and meet with the EAs and the Government semiannually to discuss implementation progress. A midterm review will be carried out 2 years after the loan effectiveness, focusing on the engineering, resettlement, and environmental aspects of the ADB supported investments and reviewing the financial status of the EAs. A project completion report will be submitted to ADB within 3 months following completion of the individual parts of the investment loan.

## **IV. PROGRAM BENEFITS, IMPACTS, ASSUMPTIONS, AND RISKS**

### **A. Expected Benefits**

#### **1. Program Loan**

67. The program loan will help improve sustainability of the power sector by implementing national action plans for power sector reforms; financially stabilizing BPDB and DESA; strengthening the policy, legal, and regulatory framework; and promoting private sector participation. The power sector is expected to contribute positively to Bangladesh's economic

<sup>20</sup> ADB. 2001. *Loan Disbursement Handbook*. Manila.

development through enhanced capacity and quality of power supply. A major portion of the Program is also geared towards establishing the financial soundness of BPDB's and DESA's successor companies so that they can commence operations on a sound financial base. As the program loan component is mainly related to financial and organizational restructuring of power sector entities, it has not been considered in the economic or financial analysis.

## **2. Project Loan**

### **a. Economic Analysis**

68. The economic internal rates of return (EIRRs) were calculated for each part of the project loan. These range from 14.4% to 42.4% and compare favorably with the opportunity cost of capital of 12% per annum. The combined EIRR for all the project components was estimated at 28.9%. The EIRRs were also subjected to a sensitivity analysis of key variables. The key variables tested were (i) a 10% increase in capital costs, (ii) a fuel price rise of 10%, (iii) a 10% increase in operation and maintenance costs, (iv) a benefits decrease of 10%, and (v) a combination of all variables. Sensitivity analysis indicates that the EIRRs for each part of the project loan and the project overall are robust under most conditions. The detailed economic evaluation and sensitivity analysis are given in Supplementary Appendix F.

### **b. Financial Management**

69. Using financial management assessment questionnaires and field interview, financial management assessments were undertaken for each EA to evaluate its ability to undertake and fulfill ADB's fiduciary requirements for the project components. The EAs' financial management was found to be acceptable. Project implementation delays are expected to be minimized since these entities are already exposed to and familiar with ADB procedures and requirements.

### **c. Financial Sustainability**

70. Financial projections were prepared for each EA under the assumption that the new entities will take over operation of BPDB in part and of DESA in its entirety during the construction phase. Financial projections, including projected operating and financial ratios, have been prepared in nominal terms. Estimates of operation and maintenance costs consider improvements in efficiency from optimally sized systems compared with the existing system. Financial projections also assume better cash flow management, including improved collection ratios to be achieved under the Program. From FY2009, all EAs are expected to meet cash flow as well as operating requirements, meet full debt service obligations, and maintain a minimum 1.2 debt service ratio. Detailed financial performance and projections for the EAs are provided in Supplementary Appendix G.

71. Financial evaluation was completed for parts A through D of the project loan in real terms using constant 2006 prices. The project cost estimates and financial projections in nominal terms were converted to real terms by adjusting for the projected effects of foreign and domestic inflation and currency fluctuation. Incremental costs and benefits were derived by evaluating the financial position of the EAs under with- and without-project scenarios. The average financial internal rate of return (FIRR), computed on an after-tax basis, ranges from 6.1% to 12.4%. This compares favorably with the weighted average cost of capital, also computed on an after-tax basis, of 2.9% on an aggregate basis. All parts of the project loan are considered both financially viable and sustainable. Sensitivity and risk analysis indicates that the

FIRR for each subproject and the project overall are robust under most conditions. Detailed financial analysis is provided in Supplementary Appendix H.

#### **d. Social Assessment**

##### **(i) Social and Poverty Issues**

72. As the Program seeks to improve efficiencies in power sector operations and lower electricity supply costs, all electricity consumers will benefit from it. The combined interventions of the proposed program loan and project loan are strongly interlinked and will result in various indirect social benefits. Improved financial management from corporatizing and commercializing sector entities, along with independent tariff rulings, will benefit all consumer categories. Commercialization will improve corporate governance, decrease corruption, reduce system losses, and allow the Government to realize savings that can be directed to social sectors.

73. The Program will bring about numerous benefits in the project areas. These include that (i) all consumers will be supplied power reliably and with improved quality, (ii) commercial and industrial operations will run more smoothly owing to reduced load shedding, (iii) low voltage problems will diminish, (iv) replacing old lines with insulated ones will improve public safety. Electricity will be supplied to any group that requests new connection or increased supply. New consumers to be connected under the Program are estimated to be about 230,000 in Dhaka area comprising domestic, commercial, irrigation, industrial and other consumer categories, and the incremental power supplies from the Program will be sufficient to serve at least 6 million consumers at current per capita generation rates. The Program will also directly benefit 820,000 existing consumers in Dhaka area by providing improved quality of power supply.

74. The improvement in the power distribution system will benefit all, including the poor, women, and children. A reliable and improved quality power supply will increase employment opportunities and incomes. Many businesses in the country have been affected by frequent power outages, including garment factories, which employ several million poor people, particularly poor women. A stable power supply will increase stability in manufacturing and services processes and boost enterprises' productivity. A large part of the available labor in urban areas like Dhaka are poor migrant workers from rural areas; the increased employment opportunities for these laborers will add to the remittances they make to their homes, helping to reduce poverty in the rural areas and increase their welfare.

75. The poor, and especially women, are disproportionately affected by power losses and unstable power supply leading to low income and long working hours. Health clinics and diagnostic services are also seriously disrupted, as many units become nonoperational due to low voltage or have shortened service lives because of constant power outages. Water supply and streetlights are of poor quality due to power disruption. Better power supply provided by the Program is expected to improve facilities and services. The Program will reduce waiting times due to power outages, equipment loss through low voltage, and the constant potential for impairment of emergency services through load shedding. An indirect, but significant positive development impact is envisaged through availability of light for education, improved water supply, diagnostic and health services etc. Children and students will benefit from longer study hours, information technology-based learning, and communications opportunities. The summary poverty reduction and social strategy for the Program is presented in Appendix 11.

## (ii) Involuntary Resettlement and Indigenous Peoples

76. All project components have been sited and designed to minimize land acquisition and resettlement impacts. Part A of the project loan will have no resettlement impact because the sites have already been developed by the EA, including associated auxiliaries, switchyards, and connections to the national transmission grid. Part B will have some resettlement impacts related to right-of-way clearance and land acquisition for new substations. Parts C and D will have minor impacts related to land acquisition for new substations, expansion of existing substations, and new 33 kV lines in the Dhaka area. The impacts of parts C and D will be minimized to the extent possible by installing power cables underground beneath medians of existing roads. Substations under parts C and D will be built on government land wherever possible. Attached plots are walled or fenced, and therefore no risk of encroachments is anticipated. A summary resettlement plan (RP) is given in Appendix 12, while the full resettlement plan is provided in Supplementary Appendix I.

77. No impact is foreseen on indigenous peoples, although special provisions have been made in the RP to ensure they are not discriminated against, particularly in land compensation. Indigenous groups in Bangladesh are not usually subject to discrimination based on ethnicity, religion, or other grounds. Vulnerability relates to groups other than indigenous peoples, particularly those living in extreme poverty and women. The RP has provisions for these groups.

### e. Environmental Analysis

78. All parts of the project loan are assigned to category B under ADB's *Environmental Guidelines*. Rapid environmental assessments were conducted for all proposed components. Field visits and initial environmental examinations (IEEs), including an environmental management plan, were conducted. A summary IEE for the overall Program is in Appendix 13. Environmental and social benefits will occur due to use of clean natural gas for power generation (replacing diesel generating sets, traditional wood fuel, and agricultural biomass energy), improved power system efficiency via peak-shaving and new transmission and distribution capacity, and reduced aggregate technical and commercial losses via system upgrades. Environmental benefits include improved air quality, reduced regional pollutant loads, and offsetting growth in greenhouse gas emissions. Negative environmental impacts have been minimized through careful project design and can be mitigated cost-effectively. Overall project benefits outweigh negative impacts.

## B. Risks and Safeguards

79. **Political Commitment.** The Program's success depends on the Government's strong commitment to power sector reforms in general and, more specifically, to successfully creating a new power generation company to implement part A and transferring operational authority for DESA area to DPDC to implement part C. There is risk these actions may be affected by future political developments. However, this risk is considered low and may be mitigated by continued policy dialogue, as the Government has shown consistent commitment to power sector reforms since adopting the PSRB in 1994. Moreover, the sector has comprehensive experience from previous projects in setting up new companies and transferring operational authority. The success of the sector's corporatized entities clearly indicates the direction of reform, which is widely recognized by various stakeholders.

80. **Regulatory Capacity.** The Bangladesh Energy Regulatory Commission Act, 2003 was passed by Parliament to give the regulatory body a wider mandate and independence. Since

this Act provides the legal framework for an independent BERC to operate, it is now the Government's responsibility to ensure that regulatory actions are taken based on commercial principles and without outside interference. Given its central role in various sector reform activities, BERC should be able to undertake its mandate with adequate human resources and an operating budget. The proposed program will facilitate the Government's action in making BERC fully operational. The Program also complements USAID activities in preparing detailed rules and regulations for licensing and tariff settings based on commercial principles.

81. **Good Governance.** Good governance is an essential precondition for sustainable power sector development in Bangladesh. The Government has placed good governance at the center of power sector reform policies. The Program design includes specific measures to reduce risk of corruption and improve governance (paras. 60–61).

82. **Project Readiness.** Previous ADB-financed projects in the power sector in Bangladesh have experienced frequent delays in project implementation, largely due to poor front-end project preparation by the EAs, particularly in obtaining government approvals for projects' components proposals, slow progress in land acquisition, and cumbersome procurement procedures, coupled with delays in formulating project teams. The EAs and Government have undertaken various actions to accelerate project implementation. The EAs already have appointed all the project teams including project directors; the development project proposals for all the investment components have been approved by the Government. Land acquisition for construction of the project components has also been completed or is in an advanced stage. As all the project components will be implemented by corporatized entities, an accelerated procurement process is anticipated since the decisions can be made by the respective boards of directors without referring them to the Government. Moreover, a number of draft bidding documents for procuring goods and services and draft requests for proposals for recruiting implementation consultants have already been submitted to ADB by the EAs, and several bidding documents have been issued to accelerate the front-end activities. Supplementary Appendix J presents the status on the project readiness.

## V. ASSURANCES

83. In addition to the standard assurances, the Government has given the following assurances, which are incorporated in the legal documents.

### A. Specific Assurances

#### 1. Administrative

84. The Government will ensure that the policies adopted and actions taken, as described in the development policy letter and the policy matrix, continue in effect during the program period and subsequently. The Government will also ensure that throughout the Program implementation, adequate allocation of the required counterpart funds are made, approved and released in a timely manner to ensure proper implementation of the Program.

85. The Government will ensure that the sector entities, including but not limited to BPDB and its successor company (NWPGC), PGCB, DPDC, DESCO and such other entities which will be incorporated under the applicable laws, are autonomous and operating independently in advancing their commercial and administrative interests. Specifically, the Government will not intervene, directly or indirectly, in the conduct of policies or actions of the sector entities, including their organizational structure, recruitment of personnel, procurement decisions, or



actions regarding their respective management, operational, financial, and commercial activities. The Government will further refrain from taking any action, directly or indirectly, that inhibits, curbs, or otherwise limits the independence of such entities.

86. Within 6 months of loan effectiveness, the Government will ensure that (i) the Board of Directors of NWPGC is constituted in accordance with principles and procedures acceptable to ADB provided that at least 50% of members of the board of directors shall be persons who are neither current employees nor have been employees in the preceding 3 years of the Government and that at least 25% of the board members shall be representatives of independent consumer or professional interests, and (ii) the management and key officers of NWPGC have been recruited through an open competitive selection process to implement part A of the project loan.

87. Within 6 months of loan effectiveness, the Government will ensure that key officers of DPDC have been recruited through an open competitive selection process to implement part C of the project loan.

88. Within 4 months of loan effectiveness, the Government will cause the Power Division of MPEMR to prepare and submit to ADB the needs assessment for part E of the project loan.

## **2. Financial**

89. The Government will cause each of BPDB and its successor company established for the Program (NWPGC), PGCB, DPDC, and DESCO to comply at all times with the following financial covenants: (i) ratio of total operating expenses to total operating revenue not higher than 85%, (ii) debt-equity ratio not exceeding 70:30, (iii) accounts receivable not more than 2 months billing for PGCB and 3 months billing for BPDB/NWPGC, DPDC and DESCO, and (iv) debt service coverage ratio of not less than 1.2.

## **3. Land Acquisition and Resettlement**

90. The Government will cause the EAs to ensure that all land acquisition, compensation, relocation, and resettlement activities under the Program will be carried out in accordance with (i) all applicable laws and regulations governing land acquisition in Bangladesh, (ii) ADB's *Policy on Involuntary Resettlement* (1995), and (iii) the agreed-upon RP. In case of discrepancies between the Government's laws, regulations, and procedures and ADB's requirements, ADB's requirements shall prevail. The Government will cause the EAs (i) to ensure that payment of compensation and other entitlements to the affected persons will be made prior to possession of land and assets on the basis of replacement cost and prior to the relocation of affected persons and commencement of civil works; (ii) to acquire or make available the land and rights to land free from any encumbrances required for commencement of construction activities in accordance with the schedule agreed under the related civil works contract; (iii) to ensure timely provision of budget for land acquisition and other activities outlined in the related RP; (iv) to meet any unforeseen obligations in excess of budget estimates; and (v) to ensure that resettlement funds disbursements are audited annually by an independent auditor.

91. The Government will cause the EAs to update the RP upon finalization of alignment and detailed design. In the event of any unanticipated or unforeseen involuntary resettlement during project implementation in other than part B of the project loan, the Government will cause the EAs to update the RP. The updated RP shall be reviewed and approved by ADB prior to award of the works contract. The updated RP shall contain all final information related to affected

households and related compensation packages. The Government will cause the EAs to disclose the updated RP and ensure that the information will be available to all affected persons, in a form and manner acceptable to ADB.

92. Within 3 months of loan effectiveness, the Government will cause the EAs to engage an independent expert or agency acceptable to ADB for monitoring and verification of the RP implementation. The independent expert or agency will submit quarterly external monitoring and evaluation reports simultaneously to each EA and to ADB. The Government will cause the EAs to submit quarterly progress reports and completion reports acceptable to ADB on land acquisition and resettlement, on implementation of the RP, or updated RP.

93. Within 3 months of loan effectiveness, the Government will cause the EAs to establish an independent grievance redress committee to hear any grievances or any complaints related to resettlement for the project, with the exception of ownership rights to land. Such committee should include representation from the EAs, affected persons, women and vulnerable groups, local government agencies and NGOs. The EAs will provide administrative support as may be required by the committee.

#### **4. Tribal People**

94. The Government will cause the EAs to ensure that the project loan will not cause any negative impact on tribal people. In the event of any unanticipated or unforeseen negative impact on tribal people, the Government will cause the EAs to ensure that the project loan is implemented in accordance with ADB's *Policy on Indigenous Peoples* (1998) and the applicable laws and regulations of the Government. In the event of any discrepancy between the Government's laws and regulations and ADB's policy, then ADB's policy shall prevail.

#### **5. Social Protection**

95. The Government, through the EAs, will ensure that the works contractors under the project loan comply with all applicable labor laws and regulations and incorporate provisions that contractors (i) will not use children as labor; (ii) provide equal opportunity to women and men; and (iii) will follow legally mandated provisions of labor including equal pay for work of equal value, health, safety, sanitation, and working conditions. The contracts will include termination clauses in case of breach of any of the stated provisions by the contractors. Compliance with these provisions will be strictly monitored during implementation.

96. The Government will cause the EAs to ensure that works contracts include a requirement on the part of the contractors to conduct an information and education campaign on communicable diseases, including but not limited to sexually transmitted diseases and HIV/AIDS for construction workers as a part of the health and safety program at campsites during the construction period.

97. For part E of the project loan, the Government will cause the EA to ensure participation of women in the training courses.

#### **6. Environment**

98. The Government will cause the EAs to ensure that the project loan is undertaken and all project facilities are operated and maintained in accordance with all applicable laws, rules and regulations of the Government, and ADB's *Environment Policy* (2002). The Government will

cause the EAs to prepare and implement for each component, the IEE (including related environmental management plan with budget) in accordance with said Government regulations and ADB's *Environment Policy*.

99. The Government will cause the EAs to ensure that (i) all necessary environmental clearances are obtained from the relevant statutory authorities of the Government and all environmental mitigation measures set forth in the IEEs for each component are incorporated in detailed designs (including any amendments on account of detailed designs with prior ADB approval) and followed during construction and operation of the components, (ii) environmentally-friendly procurement guidelines of ADB are followed, (iii) all environmental mitigation measures set forth in the IEE and environmental clearance will be implemented, (iv) all facilities renovated and/or established under the project loan will only use transformers that are free of polychlorinated biphenyls (PCB), and (v) any PCB waste generated during renovation and upgrade of project facilities will be managed in accordance with international best practices. The Government will cause the EAs to submit reports on the monitoring results, permits, licenses, and clearances obtained for the project loan. In case of any violation of laws and standards, the report will also include certification from the relevant authority that such violation has been remedied or an acceptable plan for its correction has been approved.

## **7. Good Governance**

100. The Government will ensure that the project funds are utilized effectively and efficiently to implement the project and to achieve the project objectives. ADB shall have the right to conduct spot audits at any time during the project implementation to determine the degree to which project funds have been effectively and efficiently utilized to implement the project and achieve its objectives, outputs and performance indicators. ADB shall also have the right to investigate any possible financial or management impropriety in conducting the project. The Government and each EA will fully cooperate with any such investigation and extend all necessary assistance, including access to all relevant books and records as well as engagement by the EAs of independent auditors and experts that may be needed for satisfactory completion of such investigations. All costs related to such investigation will be borne by the project.

101. The Government will cause the EAs to appoint auditors in accordance with the Companies Act 1994, as amended, which must be also auditors acceptable to ADB to conduct annual review of all disbursements made by the EAs. In addition, ADB may conduct project procurement audits during implementation as part of its regular review.

102. The Government will cause the EAs to take proactive steps to ensure good governance and prevent corruption, by among other things (i) expanding the use of computerized billing systems and prepaid meters, and (ii) including pre-ship inspection by an independent third party to ensure the quality of the goods and the equipment procured.

## **B. Conditions for Loan Effectiveness**

103. Loan effectiveness will be subject to the following conditions:

- (i) The Government will ensure that the new Northwest Power Generation Company Limited (NWPGC) is registered with the Registrar of the Joint Stock Companies of Bangladesh under the Companies Act 1994, as amended, to implement part A of the project loan.

- (ii) The Government will cause BPDB to ensure its Board of Directors' approval for the transfer of all management, operational and fiscal authority of BPDB's Sirajganj Peaking Power Station and Khulna Peaking Power Station to NWPGC.
- (iii) Subsidiary loan agreements satisfactory to ADB will be signed between the Government and each of BPDB/NWPGC, DESCO, DPDC and PGCB. Each of the subsidiary loan agreements, in a form and substance satisfactory to ADB, shall have been duly executed and delivered on behalf of the Government and the relevant party and shall have become fully effective and binding on the parties thereto in accordance with its terms, subject only to the effectiveness of the loan agreements.

## **VI. RECOMMENDATION**

104. I am satisfied that the proposed loans would comply with the Articles of Agreement of ADB and recommend that the Board approve

- (i) the loan of \$400,000,000 to the People's Republic of Bangladesh for the Sustainable Power Sector Development 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; 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;
- (ii) the loan in various currencies equivalent to Special Drawing Rights 3,371,000 to the People's Republic of Bangladesh for the Sustainable Power Sector Development Project from ADB's Special Funds resources with an interest charge at the rate of 1.0% per annum during the grace period and 1.5% per annum thereafter; a term of 32 years, including a grace period of 8 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan Agreement presented to the Board; and
- (iii) the loan in various currencies equivalent to Special Drawing Rights 40,450,000 to the People's Republic of Bangladesh for the Sustainable Power Sector Development Program from ADB's Special Funds resources with an interest charge at the rate of 1.0% per annum during the grace period and 1.5% per annum thereafter; a term of 24 years, including a grace period of 8 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan Agreement presented to the Board.

Haruhiko Kuroda  
President

4 June 2007

## DESIGN AND MONITORING FRAMEWORK

**Table A1.1: Sector Development Program**

| Design Summary   | Performance Targets/Indicators   | Data Sources/Reporting Mechanisms   | Assumptions and Risks  |
|--|--|---|--|
| <b>Impact</b><br><br>Increased capacity and reliable power supply for sustained economic growth  | <ul style="list-style-type: none"> <li>Access to electricity from present 38% to 60% of national population by 2015</li> <li>No load shedding by 2015</li> <li>Gross domestic product increases maintained on a sustainable basis</li> </ul>   | <ul style="list-style-type: none"> <li>Government economic statistics and reports</li> <li>National statistics on power supply</li> <li>Program and project completion reports</li> </ul>   | <b>Assumptions</b> <ul style="list-style-type: none"> <li>Political and socioeconomic conditions remain stable</li> <li>Stable economic growth in the region</li> <li>Stable supply of imported energy resources at appropriate prices</li> </ul>  |
| <b>Outcome</b><br><br><b>Reforms:</b><br>Improved power sector sustainability through financial and organizational restructuring<br><br><b>Clean Energy Power Supply Capacity Expansion and Efficiency Improvements:</b><br>Expanded peak generation capacity and reduction of load shedding<br><br>Improved Power Transmission Capacity and Reduction of Transmission System Losses | <ul style="list-style-type: none"> <li>Issuance of a detailed medium-term road map for power sector reforms</li> <li>Establishment by 2007 of a long-term planning mechanism for power sector operations based on a detailed sector reform road map, a long-term power system master plan, and a sector-wide capacity building program</li> <li>Fully staffed BERC and licensing and tariff regulations in place by 2007</li> <li>Financial self-reliance of power sector entities by 2010</li> <li>BPDB and DESA converted to corporatized entities by 2007</li> <li>Initiation of fund raising from local capital market by 2006 for power sector development, and 50% of new generation capacity from private sector by 2008</li> <li>Additional peak load generating capacity of 300 MW by 2009</li> <li>Load shedding reduced from 770 MW in 2005 to less than 470 MW in 2009</li> <li>Addition of power transmission capacity by 900 MVA by 2009</li> <li>Transmission system losses reduced from 3.4% in 2005 to 3.2% in 2009.</li> </ul> | <ul style="list-style-type: none"> <li>Quarterly program progress reports</li> <li>Reports from power sector entities and regulatory commission</li> <li>National statistics on power supply</li> <li>Power sector entities' annual reports</li> <li>Program completion report</li> <li>Quarterly project progress reports</li> <li>National statistics on power supply</li> <li>BPDB's annual report</li> <li>Project completion report</li> <li>Quarterly project progress reports</li> <li>National statistics on power supply</li> <li>PGCB's annual report</li> <li>Project completion report</li> </ul> | <b>Assumptions</b> <ul style="list-style-type: none"> <li>Continued government commitment for evolution of an enabling policy and regulatory framework to facilitate commercialization of utility company operations</li> <li>Level playing field through BERC for corporatized sector entities, and independent power producers</li> </ul> <b>Risks</b> <ul style="list-style-type: none"> <li>Tariffs kept below cost-recovery level</li> <li>Delays in approval of BERC organogram, recruitment of staff, and appointment of the remaining commissioners.</li> </ul> <b>Assumptions</b> <ul style="list-style-type: none"> <li>Stable economic growth</li> <li>Timely establishment of NWPGC</li> </ul> <b>Risks</b> <ul style="list-style-type: none"> <li>Mismatch between generation and network upgrades</li> <li>Delays in project implementation</li> </ul> <b>Assumption</b> <ul style="list-style-type: none"> <li>Stable economic growth</li> </ul> <b>Risk</b> <ul style="list-style-type: none"> <li>Delays in project implementation</li> </ul> |

| Design Summary  | Performance Targets/Indicators  | Data Sources/Reporting Mechanisms  | Assumptions and Risks   |
|---|---|--|---|
| <p>Dhaka area distribution system efficiency improvements</p> <p><b>Institutional Capacity Development:</b></p>   | <ul style="list-style-type: none"> <li>Reduction of distribution losses of DESCO from 16.7% in 2005 to 12.0% by 2009</li> <li>Reduction of distribution losses of DESA from 30.0% in 2005 to 20.0% by 2009</li> <li>Improved reliability and quality of power supply for 820,000 existing and 230,000 new consumers</li> <li>Enhanced competitiveness of power sector entities in corporate and financial management, information and communication technology, long-term planning, governance, customer relations, and research and development</li> </ul>   | <ul style="list-style-type: none"> <li>Quarterly project progress reports</li> <li>National statistics on power supply</li> <li>Distribution entities' annual reports</li> <li>Project completion report</li> <li>Quarterly project progress reports</li> <li>Project completion report</li> </ul>   | <p><b>Assumptions</b></p> <ul style="list-style-type: none"> <li>Stable economic growth</li> <li>Transfer of DESA operations to DPDC</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>Delays in project implementation</li> </ul> <p><b>Assumption</b></p> <ul style="list-style-type: none"> <li>Continued support of Government for capacity development</li> </ul> |
| <p><b>Outputs</b></p> <p><b>Reforms:</b></p> <p>(i) National action plan for power sector reform</p> <p>(ii) Fully functional legal and regulatory framework</p> <p>(iii) Financial restructuring of power sector entities</p> <p>(iv) Continued restructuring of power sector entities</p> <p>(v) Increased public-private partnership</p> | <ul style="list-style-type: none"> <li>3-year road map for power sector reforms and implementation of a regular monitoring system by December 2006</li> <li>Power system master plan for generation and transmission for 2006–2025 by December 2006</li> <li>Preparation of technical project proposal for a sector-wide capacity development program by December 2006</li> <li>Government approval of BERC organogram by December 2006</li> <li>Gazette notification of licensing regulations by December 2006 and gazette notification of tariff regulations by December 2007</li> <li>Appointment of BERC's remaining commissioner by December 2007</li> <li>Preparation of a draft financial restructuring plan for BPDB and DESA by December 2006, and Government approval of the financial restructuring plan by December 2007</li> <li>Settlement of unfunded pension liabilities for the newly corporatized entities by June 2008</li> <li>Reduction of Government's and its autonomous and semiautonomous agencies' outstanding electricity dues to less than Tk1.0 billion and Tk2.5 billion, respectively, by December 2007</li> <li>Constitution of boards of directors and appointment of managements for the newly corporatized entities by December 2006</li> <li>Partial off-loading of PGCB and DESCO shares by December 2007</li> </ul> | <ul style="list-style-type: none"> <li>Quarterly program progress reports</li> <li>Review mission reports</li> <li>Quarterly program progress reports</li> <li>Review mission reports</li> <li>Quarterly program progress reports</li> <li>Review mission reports</li> <li>Quarterly program progress reports</li> <li>Review mission reports</li> </ul> | <p><b>Assumptions</b></p> <ul style="list-style-type: none"> <li>Continued commitment of Government for sector reforms</li> <li>Timely program implementation</li> <li>Counterpart funds made available.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>Unwillingness of power sector companies to reform</li> </ul>  |

| Design Summary  | Performance Targets/Indicators  | Data Sources/Reporting Mechanisms   | Assumptions and Risks   |
|---|---|---|---|
| <b>Power Supply Capacity Expansion and Efficiency Improvements</b><br><br>Construction of clean natural gas-fired power plants<br><br>Construction and augmentation of transmission systems<br><br>Distribution system upgrade in DESA area<br><br>Distribution system upgrade in DESCO area<br><br><b>Institutional Capacity Development</b> | <ul style="list-style-type: none"> <li>• A 150-MW peaking power plant in Sirajganj and another 150-MW peaking power plant in Khulna by 2009</li> <li>• A 50-km, 400-kV double-circuit transmission line from Meghaghat to Aminbazar and associated bay extensions by 2009</li> <li>• A 10-km, 230-kV double-circuit transmission line from Aminbazar to Old Dhaka Airport and associated substations in Old Dhaka Airport and Dhaka University Areas by 2009</li> <li>• A total of 158 km in three 132-kV single-circuit transmission lines and associated substations in western and northwestern parts of the country by 2009</li> <li>• About 570 MVA of additional distribution capacity to connect about 120,000 new consumers (domestic, commercial, irrigation, industrial, and others) by 2009</li> <li>• About 450 MVA of additional distribution capacity to connect about 110,000 new consumers (domestic, commercial, irrigation, industrial and others) by 2009</li> </ul> <p>See Table A1.2 for detailed performance targets.</p> | <ul style="list-style-type: none"> <li>• Quarterly progress reports</li> <li>• Power sector entities' annual reports</li> <li>• Review mission reports</li> <li>• Field visits</li> <li>• Quarterly progress reports</li> <li>• Power sector entities' annual reports</li> <li>• Review mission reports</li> <li>• Field visits</li> <li>• Quarterly progress reports</li> <li>• Power sector entities' annual report</li> <li>• Review mission reports</li> <li>• Field visits</li> <li>• Quarterly progress reports</li> <li>• Power sector entities' annual reports</li> <li>• Review mission reports</li> <li>• Field visits</li> <li>• Quarterly progress reports</li> <li>• Reports from power sector entities and regulatory commission</li> <li>• National statistics on power supply</li> <li>• Power sector entities' annual reports</li> <li>• Review mission reports</li> <li>• Field visits</li> </ul> | <p><b>Assumptions</b></p> <ul style="list-style-type: none"> <li>• Timely project implementation</li> <li>• Counterpart funds of project components made available.</li> </ul> <p><b>Risks</b></p> <ul style="list-style-type: none"> <li>• Approval for construction of project components is not obtained in a timely manner.</li> <li>• Increase in prices of raw materials exceeds contingency and inflation forecasts.</li> </ul> <p><b>Assumptions</b></p> <ul style="list-style-type: none"> <li>• Timely project implementation</li> <li>• Counterpart funds of project components made available.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Approval for technical assistance project proposal is not obtained in a timely manner.</li> </ul> |

|   |  |
|---|--|
| <p><b>Activities with Milestones</b></p> <p><b>Reforms</b></p> <ol style="list-style-type: none"> <li>1.1 3-year Road Map for Power Sector Reforms approved by September 2006</li> <li>1.2 BERC organizational chart approved by the Government by October 2006</li> <li>1.3 Gazette notification of the licensing regulations by September 2006</li> <li>1.4 BERC's submission of draft electricity generation tariff regulations with tariff-setting mechanism to the Energy, and Mineral Resources Division of MPEMR by August 2006</li> <li>1.5 Government approval of a financial restructuring plan of BPDB and DESA by December 2007</li> <li>1.6 Budget allocation of Tk1.8 billion by June 2007 and another Tk1.8 billion by June 2008 to settle unfunded pension and gratuities for the newly corporatized sector entities</li> <li>1.7 Initial off-loading of PGCB and DESCO shares in the stock market by December 2007</li> </ol> <p><b>Power Supply Capacity Expansion and Efficiency Improvements</b></p> <ol style="list-style-type: none"> <li>2.1 Field surveys for all project components completed by June 2006.</li> <li>2.2 Completion of acquisition of land and resettlement by December 2007</li> <li>2.3 Recruitment of consultants for preparation of bidding documents, bidding, construction supervision, and commissioning and testing for Sirajganj peaking power plant, Khulna peaking power plant, and 400 kV transmission line by September 2007</li> <li>2.4 Design engineering, procurement and construction: starts July 2006, and construction completion by December 2009</li> </ol> <p><b>Institutional Capacity Development</b></p> <ol style="list-style-type: none"> <li>3.1 Submission of technical project proposal for a medium-term, sector-wide capacity building program by the Power Division of MPEMR to the Planning Commission by October 2006</li> <li>3.2 Detailed needs assessment completed by October 2007.</li> <li>3.3 Key training started from January 2008.</li> </ol> | <p><b>Inputs</b></p> <p>Program Loan:</p> <ul style="list-style-type: none"> <li>• ADB: \$60.00 million</li> <li>• Government: \$123.00 million</li> </ul> <p>Project Loan:</p> <ul style="list-style-type: none"> <li>• Consultancy services for project management, design, implementation of safeguards, and construction supervision</li> <li>• ADB: \$405.0 million</li> <li>• Government: \$274.9 million</li> </ul> |
|---|--|

ADB = Asian Development Bank, BERC = Bangladesh Energy Regulatory Commission, BPDB = Bangladesh Power Development Board, DESA = Dhaka Electric Supply Authority, DESCO = Dhaka Electric Supply Company Limited, km = kilometer, kV = kilovolt, MPEMR = Ministry of Power, Energy and Mineral Resources, MVA = megavolt-ampere, MW = megawatt, NWPGC = Northwest Power Generation Company Limited, PGCB = Power Grid Company of Bangladesh Limited.



**Table A1.2: Sector Road Map and Capacity Building**

| Objective  | Impact  | Performance Target  | Measurement  |
|--|---|---|--|
| <b>Sector Road Map</b> <ul style="list-style-type: none"> <li>Bringing the entire country under electricity service by 2020 in phases</li> <li>Increased private sector participation</li> <li>Making the power sector financially viable by 2010 with increased efficiency</li> </ul> | <p><b>Generation</b></p> <ul style="list-style-type: none"> <li>Corporatization of the existing power stations under BPDB on an individual or cluster basis</li> <li>Development of captive power policy</li> </ul> <p><b>Transmission</b></p> <ul style="list-style-type: none"> <li>Completion of system metering installation</li> </ul> <p><b>Distribution</b></p> <ul style="list-style-type: none"> <li>BPDB distribution segment to be converted into a number of distribution companies</li> <li>DESA to be corporatized</li> <li>REB's graduation policy to be implemented for balance development of all PBSs</li> <li>Completion of asset transfer to corporatized distribution entities</li> </ul> <p><b>Sector Regulation</b></p> <ul style="list-style-type: none"> <li>BERC to be fully functional</li> </ul> <p><b>Private Sector Participation</b></p> <ul style="list-style-type: none"> <li>Promotion of private sector participation</li> <li>Mobilization of domestic capital</li> </ul> <p><b>Operational Performance</b></p> <ul style="list-style-type: none"> <li>Improved operational and financial performance of the power sector entities</li> </ul> | <p><b>Generation</b></p> <ul style="list-style-type: none"> <li>Completion of study for conversion of BPDB as a holding company by December 2007</li> <li>Corporatization of BPDB holding company by June 2008</li> <li>Preparation of captive power generation policy by 2006</li> </ul> <p><b>Transmission</b></p> <ul style="list-style-type: none"> <li>Completion of system metering installation by 2007</li> </ul> <p><b>Distribution</b></p> <ul style="list-style-type: none"> <li>WZPDC fully functional by 2006</li> <li>Implementation of REB's graduation policy from 2007</li> <li>Completion of DESA corporatization by 2007</li> <li>NWZPDC to be fully functional by 2007</li> <li>Corporatization of BPDB's south zone power distribution network by 2007</li> <li>Corporatization of BPDB's central zone power distribution network by 2008</li> </ul> <p><b>Sector Regulation</b></p> <ul style="list-style-type: none"> <li>Approval of BERC organogram by 2006</li> <li>Appointment of the remaining commissioner by December 2007</li> <li>Gazette notification of tariff regulations by December 2007</li> </ul> <p><b>Private Sector Participation</b></p> <ul style="list-style-type: none"> <li>Completion of a study for promotion of private sector participation by June 2008</li> <li>Direct listing of PGCB and DESCO shares in local stock market by December 2007</li> <li>Issue of PGCB's local bonds by June 2007</li> </ul> <p><b>Operational Performance</b></p> <p>By December 2007</p> <ul style="list-style-type: none"> <li>Distribution losses: 17.4%</li> <li>Collection to import: 78.9%</li> <li>Accounts receivable less than 3.5 months, debt service coverage ratio not less than 1.4</li> </ul> <p>By December 2008</p> <ul style="list-style-type: none"> <li>Distribution losses: 17.1%</li> <li>Collection to import: 79.2%</li> <li>Accounts receivable less than 3 months, debt service coverage ratio not less than 1.2.</li> </ul> | <ul style="list-style-type: none"> <li>Quarterly program and project progress reports</li> <li>Reports from power sector entities and regulatory commission</li> <li>National statistics on power supply</li> <li>Power sector entities' annual reports</li> </ul> |

| Objective   | Impact  | Performance Target  | Measurement  |
|---|---|---|--|
| <b>Capacity Development</b><br><br>Sector-wide capacity development to sustain reforms and restructuring, covering: <ul style="list-style-type: none"> <li>• Corporate and financial management</li> <li>• Information and communication technology</li> <li>• Long-term system planning</li> <li>• Good governance</li> <li>• Customer relations</li> <li>• Research and development</li> <li>• Human resource development and training</li> </ul> | <ul style="list-style-type: none"> <li>• Improved corporate and financial management of power sector entities</li> <li>• Operational efficiency and transparency</li> <li>• Updated least-cost development plans</li> <li>• Future investment projects</li> <li>• Improved sector and corporate governance</li> <li>• Enhanced customer satisfaction</li> <li>• Application of latest energy efficiency and clean development mechanisms</li> <li>• Safe and efficient operation of power business</li> </ul> | <ul style="list-style-type: none"> <li>• Enhanced corporate management mechanism in business plan, investment and financial plan, funds mobilization, and commercialization</li> <li>• Introduction of such advance information and communication technology systems as e-procurement and management information system</li> <li>• Regular updates of demand forecasts; preparation of power system master plan for generation, transmission, and distribution</li> <li>• Preparation of future investment projects based on the least-cost development plan</li> <li>• Enhanced predictability, accountability, transparency, and stakeholder participation in the business process</li> <li>• Improved quality of service and customer relations</li> <li>• Improvements in operational efficiency and reliability of power supply</li> <li>• Optimally skilled human resources in the power sector with adequate capacity for planning, engineering, procurement, construction supervision, and operation and maintenance of power supply systems</li> </ul> | <ul style="list-style-type: none"> <li>• Quarterly program and project progress reports</li> <li>• Reports from power sector entities and regulatory commission</li> <li>• National statistics on power supply</li> <li>• Power sector entities' annual reports</li> </ul> |

BERC = Bangladesh Energy Regulatory Commission, BPDB = Bangladesh Power Development Board, DESA = Dhaka Electric Supply Authority, DESCO = Dhaka Electric Supply Company Limited, NWZPDC = North West Zone Power Distribution Company Limited, PBS = *palli bidyut samity* (rural electric cooperatives), PGCB = Power Grid Company of Bangladesh Limited, REB = Rural Electrification Board, WZPDC = West Zone Power Distribution Company Limited.

## SECTOR ANALYSIS

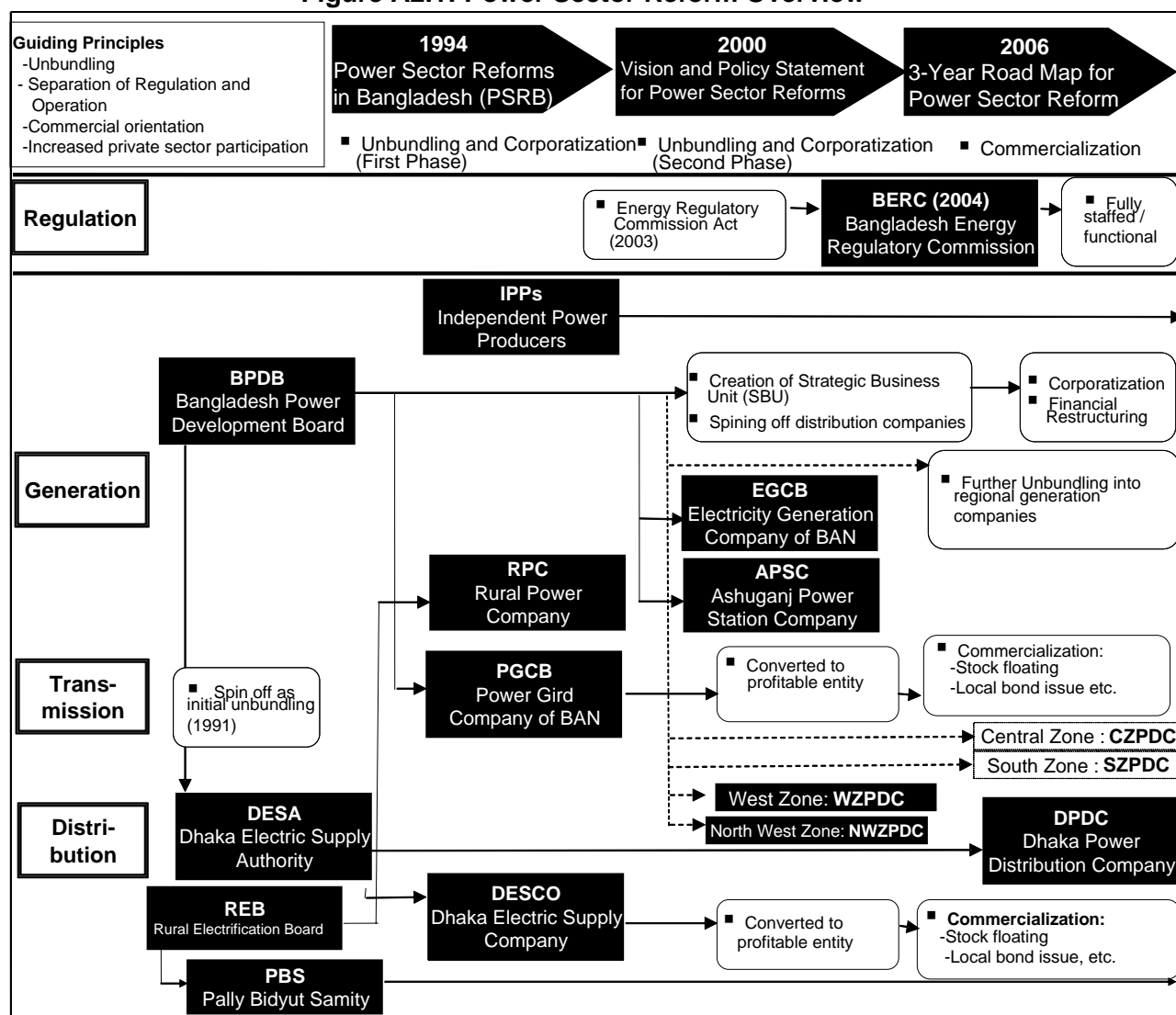
### A. Institutional Framework and Reform Overview

1. The power sector in Bangladesh began operations immediately after independence in 1972 with creation of the Bangladesh Power Development Board (BPDB), upon restructuring of East Pakistan Water and Power Development Authority, as the sole utility responsible for all generation, transmission, and distribution. In 1977, the Rural Electrification Board (REB) was created to undertake electrification in rural Bangladesh. Since its creation, BPDB's commercial performance has been weak. In 1991, to address this situation, the Government split up BPDB's operations and created a new distribution entity, the Dhaka Electric Supply Authority (DESA). DESA was given responsibility for power distribution in the Greater Dhaka area. However, as all of DESA's assets and personnel were transferred over from BPDB without any changes in business culture, the power sector faced continuing commercial failure. Recognizing the need to improve the sector's performance the Government, in consultation with the major development partners,<sup>1</sup> adopted a policy paper in 1994 entitled *Power Sector Reforms in Bangladesh* (PSRB). The PSRB outlined the reform process to gradually remove constraints in the sector through (i) separating sector regulation and operation; (ii) creating autonomy and commercial orientation among the sector entities; (iii) unbundling generation, transmission, and distribution; and (iv) increasing private sector participation. Subsequently, in 2000, the Government issued its *Vision and Policy Statement for Power Sector Reforms* that further clarified specific details of the structural changes in generation, transmission, and distribution along with the principles of corporatization and commercialization. In 2006, the Government issued a 3-year road map for power sector reforms to undertake further organizational restructuring toward improving corporate governance and promoting commercialization.

2. As a result of implementing the reform policy, several new public sector entities have been established and made operational. These include the Power Grid Company of Bangladesh Limited (PGCB), the Dhaka Electric Supply Company Limited (DESCO), the West Zone Power Distribution Company Limited (WZPDC), the Ashuganj Power Station Company Limited (APSC), and the Electricity Generation Company of Bangladesh Limited (EGCB). In addition, private sector independent power producers (IPPs), including the Rural Power Company Limited (RPC), have been established and started operation. PGCB has taken over all BPDB's transmission assets and most of DESA's transmission assets. DESCO has secured DESA's distribution assets in the Mirpur and Gulshan Circles of Dhaka. WZPDC and APSC have taken over BPDB's distribution assets in the west and generation assets in the Ashuganj Power Station, respectively. Moreover, 70 rural electric cooperatives (PBSs)—organized, initially funded, and monitored by REB—are in charge of power distribution in most rural areas. DESA's area outside Dhaka city was transferred to eight PBSs. In 2005, the Dhaka Power Distribution Company Limited (DPDC) and North West Zone Power Distribution Company Limited (NWZPDC), respectively, were established to take over the distribution assets of DESA's and BPDB's northwest zone power distribution network, respectively. The Bangladesh Energy Regulatory Commission (BERC) was established in April 2004 as an independent regulatory body under the Bangladesh Energy Regulatory Commission Act, 2003 to regulate energy businesses including the power sector. The Government, through the Power Division of the Ministry of Power, Energy and Mineral Resources (MPEMR), wholly owns and supervises BPDB, DESA, and REB. Figure A2.1 illustrates the power sector reform overview.

<sup>1</sup> ADB, World Bank, Department of International Development of the United Kingdom, Japan Bank for International Cooperation, Kreditanstalt für Wiederaufbau of Germany, and United States Agency for International Development.

Figure A2.1: Power Sector Reform Overview



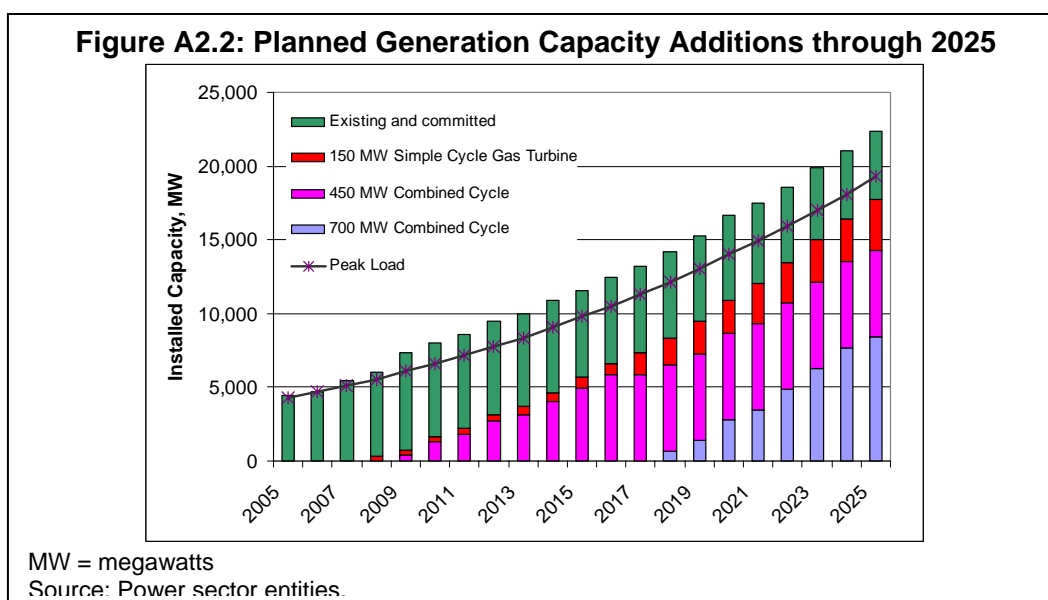
CZPDC = Central Zone Power Distribution Company, NWZPDC = North West Zone Power Distribution Company, SZPDC = South Zone Power Distribution Company, WZPDC = West Zone Power Distribution Company.  
Sources: Power sector entities.

## B. Generation Potential and Expansion Plans

3. While abundant water flows in the Jamuna-Padma-Meghna river system, hydropower potential is limited because of the flat terrain. Coal reserves, which are located in the northwest, are deep beneath the surface and difficult to develop. One potential mine with a limited output of about 1 million tons per annum is being developed with external assistance to feed 2x125 megawatt (MW) power plants, and a study is being undertaken to review feasibility for development of another coalmine in the northwest. The country's entire proven recoverable reserves of oil (including condensate) are estimated at 59 million barrels. Although Bangladesh has had some successes in small-scale development of renewable resources, these are peripheral to the issue of generating bulk electricity for the main grid. Bangladesh is, however, well endowed with natural gas. In fact, natural gas is the only significant source of commercial energy in Bangladesh. At present, about 85% of the power generation capacity in the country is gas based, 10% is based on imported fuel, and 5% is hydro. In terms of energy generated,

about 90% of the total in fiscal year (FY) 2005 is from gas-fired power plants. Present gas reserves and production are considered adequate to serve the existing power plants, and it is highly probable that additional reserves could be developed to serve the needs of those power plants projected until 2025.

4. Over the last 10 years, consumption of electricity in Bangladesh grew at an average compound annual rate of 8.1%, and it is expected that demand for electricity will grow at an annual rate of about 8.0% for the next 10 years. The ADB funded power system master plan update projected that a total capacity expansion of 17,900 MW would be necessary through 2025, of which 3,500 MW would be needed by 2010.<sup>2</sup> Figure A2.2 shows the projected annual and cumulative capacity additions from 2005 through 2025.



### C. Transmission System Expansion

5. The transmission system within Bangladesh is the responsibility of PGCB, which was established by separating BPDB's transmission assets and commenced operations in 1996. The highest voltage level of PGCB's transmission system is 230 kilovolt (kV), with transmission lines structured as a 230 kV loop around Dhaka with radial extension to the western part of Bangladesh and the southern region in the Chittagong area. The 132 kV system extends radially from Dhaka to the central and southern regions. Similarly, the northern and western regions in the western part of the country are interconnected through 132 kV lines. Currently, PGCB owns 1,436 circuit-km of 230 kV transmission lines and 4,868 circuit-km of 132 kV transmission lines, with transmission capacity of 3,925 megavolt-amperes (MVA).

6. The power system master plan update's least-cost expansion plan concluded that additional transmission capacity of 4,875 MVA of 230/132 kV transformers will be required by 2010 and another 4,650 MVA by 2015, along with corresponding transmission lines. While PGCB has undertaken to mobilize investment capital through various measures, including issuing corporate bonds and off-loading its stock, as approved by the Government, the proposed investment support from the Asian Development Bank will be critical to this goal.

<sup>2</sup> ADB. 2004. *Technical Assistance to the People's Republic of Bangladesh for Preparing the Power Sector Development Program II*. Manila (TA 4379-BAN, approved on 23 September).

## D. Distribution Operations

7. Power distribution systems need to be expanded in tandem with the generation and transmission capacity expansions to enable delivery of power to end consumers. At present, several entities are involved in the power distribution business in Bangladesh. DESA<sup>3</sup> and DESCO are covering Dhaka areas, while PBSs cover most rural areas and BPDB primarily covers urban areas outside Dhaka. WZPDC and NWZPDC, respectively, are taking over BPDB's distribution networks in the western and northwestern parts of the country.

## E. Share and Performance of Power Sector Entities

8. While BPDB in FY2000 produced more than 90% of the total net generation, in FY2005 it accounted for 47.8%. Over the same period, the share of IPPs (including RPC) in total net generation increased from 8.4% to 38.2%. As for distribution, REB represents the largest share of distribution with 34.3% in FY2005, followed by BPDB with 29.5%, DESA with 25.2%, and DESCO with 9.1%. PGCB is wholly responsible for transmission. Table A2.1 indicates the shares of the different power sector entities in generation and distribution.

**Table A2.1: Shares of Power Sector Entities**

| Item                      |       | FY 2000 |        | FY 2005            |                   |
|---------------------------|-------|---------|--------|--------------------|-------------------|
|                           |       | GWh     | %      | GWh                | %                 |
| Generation                | BPDB  | 13,495  | 91.54  | 10,234             | 47.80             |
|                           | ASPC  | 0       | 0.00   | 2,989              | 13.96             |
|                           | EGCB  | 0       | 0.00   | 0                  | 0.00              |
|                           | RPC   | 161     | 1.09   | 608                | 2.84              |
|                           | IPPs  | 1,087   | 7.37   | 7,577 <sup>a</sup> | 35.40             |
|                           | Total | 14,743  | 100.00 | 21,408             | 100.00            |
| Distribution <sup>b</sup> | BPDB  | 5,592   | 39.92  | 5,993              | 29.46             |
|                           | REB   | 3,162   | 22.52  | 6,985              | 34.33             |
|                           | DESA  | 4,075   | 33.59  | 5,135              | 25.24             |
|                           | DESCO | 550     | 3.93   | 1,843              | 9.06              |
|                           | WZPDC | 0       | 0.00   | 389                | 1.91 <sup>c</sup> |
|                           | Total | 14,099  | 100.00 | 20,345             | 100.00            |

ASPC = Ashuganj Power Station Company Limited, BPDB = Bangladesh Power Development Board, EGCB = Electricity Generation Company Limited, DESA = Dhaka Electric Supply Authority, DESCO = Dhaka Electric Supply Company Limited, FY = fiscal year, IPPs = independent power producers, REB = Rural Electrification Board, RPC = Rural Power Company Limited, WZPDC = West Zone Power Distribution Company Limited.

<sup>a</sup> Includes 246 GWh generated by small private power plants sold to REB grid directly.

<sup>b</sup> Based on import by entities.

<sup>c</sup> Based on 3 months' imports (April–June 2005).

Sources: Power sector entities reports.

9. The changes in business environment and organization resulting from implementation of various reform actions have led to a significant improvement in operational performance of power sector entities. Operational performance of the power sector since the start of reforms in 1994 is summarized in Table A2.2.

<sup>3</sup> Dhaka Power Distribution Company Limited will take over DESA's operations.

**Table A2.2: Operational Performance of the Power Sector, FY1994–FY2005**

| Item   | 1994   | 2000   | 2002   | 2004   | 2005   |
|--|--------|--------|--------|--------|--------|
| <b>Generation (MkWh)</b>                                 |        |        |        |        |        |
| BPDB+ IPP (Gross)  | 9,784  | 15,563 | 18,433 | 21,068 | 22,252 |
| IPP  | -      | 824    | 3,984  | 7,718  | 8,185  |
| Net  | 9,221  | 14,739 | 17,672 | 20,316 | 21,411 |
| <b>Energy Import and Sales (MkWh)</b>                    |        |        |        |        |        |
| Gross BPDB Sales   | 7,441  | 12,469 | 15,321 | 18,023 | 19,187 |
| Import by BPDB Zones                                     | 5,082  | 7,515  | 8,935  | 12,292 | 12,732 |
| Sales by BPDB Zones                                      | 3,745  | 5,965  | 7,398  | 10,952 | 11,534 |
| Import by DESA   | 3,696  | 6,504  | 7,833  | 6,209  | 5,126  |
| Sales by DESA  | 2,538  | 4,831  | 5,862  | 4,534  | 3,590  |
| Import by DESCO  | -      | 550    | 673    | 1,733  | 1,843  |
| Sales by DESCO   | -      | 369    | 494    | 1,400  | 1,536  |
| Import by REB  | 906    | 3,172  | 4,712  | 6,728  | 7,489  |
| Sales by REB   | 765    | 2,546  | 3,927  | 5,805  | 6,457  |
| Import by WZPDCL   | -      | -      | -      | -      | 389    |
| Sales by WZPDCL  | -      | -      | -      | -      | 306    |
| Total sales  | 6,142  | 9,989  | 12,541 | 15,332 | 16,679 |
| <b>System Loss (%)</b>                                   |        |        |        |        |        |
| BPDB <sup>a</sup>  | 23.95  | 19.88  | 16.41  | 13.47  | 12.81  |
| BPDB Zones <sup>b</sup>                                  | 26.32  | 20.63  | 17.20  | 10.90  | 9.41   |
| BPDB Zones (Net of sales to REB)                         | 30.26  | 27.73  | 23.20  | 21.33  | 20.01  |
| DESA <sup>b</sup>  | 31.34  | 25.72  | 25.16  | 26.98  | 29.96  |
| DESA (Net of Sales to REB and DESCO)                     | 32.77  | 34.56  | 35.61  | 33.72  | 29.96  |
| DESCO <sup>b</sup>                                       | -      | 32.86  | 26.67  | 19.24  | 16.63  |
| REB <sup>b</sup>   | 15.61  | 19.74  | 16.67  | 15.59  | 13.78  |
| WZPDCL   | -      | -      | -      | -      | 21.38  |
| Overall Power System <sup>a</sup>                        | 37.23  | 35.82  | 31.97  | 27.23  | 25.04  |
| <b>Billing and Collection (Tk million)</b>               |        |        |        |        |        |
| BPDB Bills   | 14,067 | 27,359 | 35,653 | 43,998 | 43,949 |
| BPDB Collection  | 11,551 | 22,515 | 31,808 | 39,887 | 40,372 |
| DESA Bills   | 5,962  | 11,423 | 14,700 | 13,647 | 12,543 |
| DESA Collection  | 4,742  | 10,007 | 14,274 | 14,458 | 12,530 |
| DESCO Bills  | -      | 1,067  | 1,470  | 4,902  | 5,466  |
| DESCO Collection   | -      | 836    | 1,309  | 4,306  | 5,306  |
| REB Bills  | 2,101  | 7,837  | 12,857 | 20,139 | 22,520 |
| REB Collection   | 2,079  | 7,596  | 13,020 | 19,918 | 22,417 |
| WZPDCL Bills   | -      | -      | -      | -      | 1,098  |
| WZPDCL Collection  | -      | -      | -      | -      | 1,227  |
| <b>Collection (as % of billing)</b>                      |        |        |        |        |        |
| BPDB   | 82.11  | 82.29  | 89.21  | 90.66  | 91.86  |
| DESA   | 79.54  | 87.60  | 97.10  | 105.95 | 99.90  |
| DESCO  | -      | 78.35  | 89.04  | 87.84  | 97.07  |
| REB  | 98.95  | 96.92  | 101.27 | 98.91  | 99.54  |
| WZPDCL   | -      | -      | -      | -      | 111.69 |
| <b>Collection-Generation/Collection-Import Ratio (%)</b> |        |        |        |        |        |
| BPDB Collection-Generation                               | 62.45  | 65.93  | 74.57  | 78.45  | 80.09  |
| DESA Collection- Import                                  | 54.61  | 65.07  | 72.67  | 77.36  | 69.97  |
| DESCO Collection- Import                                 | -      | 52.60  | 65.30  | 70.94  | 80.93  |
| REB Collection- Import                                   | 83.51  | 77.79  | 84.39  | 83.49  | 85.82  |
| WZPDCL Collection-Import                                 | -      | -      | -      | -      | 87.81  |

BPDB = Bangladesh Power Development Board, FY = fiscal year, IPP = independent power producer, DESA = Dhaka Electric Supply Authority, DESCO = Dhaka Electric Power Supply Company, MWh = megawatt-hour, REB = Rural Electrification Board, WZPDCL = West Zone Power Distribution Company Limited, MW = megawatt.

<sup>a</sup> As % of gross generation.

<sup>b</sup> As % of import.

- Notes: 1. For comparison of distribution loss of BPDB, DESA, DESCO, and REB, use BPDB and DESA's distribution losses net of interorganization sales.
2. Since October 1999, DESA has started reflecting real loss figures in some zones, which has increased DESA's system loss. Latest REB figures include losses encountered but not reported by PBSs.
3. IPP generation includes small units (3 x 10 MW) selling directly to REB.

Sources: Monthly management reports from the various sector entities.

## SUMMARY TARIFF ANALYSIS

### A. Introduction

1. The Bangladesh power sector has experienced numerous institutional and operational improvements during the past several years, but huge disparities remain between the various sector entities as measured by their financial performances. While the two key sector entities, the Power Grid Company of Bangladesh Limited (PGCB) and the Dhaka Electric Supply Company Limited (DESCO) outperformed other entities, the Bangladesh Power Development Board (BPDB) and Dhaka Electric Supply Authority (DESA) continue to make financial losses. This tariff analysis<sup>1</sup> intends to (i) explore the reasons behind these financial and operational performance disparities, (ii) identify core weaknesses at the sector and corporate levels, (iii) assess various scenarios, and (iv) recommend a feasible solution to address the issues.

### B. Analysis

2. The current tariff system includes (i) wholesale tariffs, (ii) transmission wheeling charges, and (iii) retail distribution tariffs charged to end-use consumers.

#### 1. Wholesale Tariff

3. Independent power producer tariffs are set in long-term power purchase agreements specifying both capacity and energy payments, and these are related to an expected plant load factor for each power station. Plant load factors range from 59% for the Rural Power Company Limited plant at Mymensingh to 81% at the AES Haripur power plant. In comparison, BPDB generation units (hydro, gas, diesel, coal, and isolated diesel) have load factors ranging from 2% to 49%. Independent power producer tariffs charged to BPDB average Tk2.54 per kilowatt-hour (kWh). BPDB units, including Ashuganj Power Station Company Limited, charge an average Tk2.10 per kWh. BPDB pooled generation (buying) cost is Tk2.26 per kWh. The weighted average cost at the end of 132 kV after technical losses is estimated at Tk2.35 per kWh, while the average cost at the end of 33 kV is estimated at Tk2.47 per kWh.

4. BPDB bulk power sales create losses of Tk0.46 per kWh to Tk0.63 per kWh, aggregating to losses of about Tk9.3 billion per year. BPDB has absorbed the increasing costs of bulk power supply and will continue to absorb financial losses unless tariffs are rationalized. Provisional fiscal year (FY) 2006 performance confirms a continued gap between BPDB's average selling price of Tk1.87 per kWh and average supply cost of Tk2.35 per kWh.

#### 2. Wheeling Charges

5. PGCB has a tariff that enables it to earn a profit, with wheeling charges of Tk0.2268 per kWh and Tk0.2291 per kWh, respectively, for bulk delivery to distribution entities at 132 kV and 33 kV. This type of rate structure has advantages in that it is easily understood by the users of the grid, it is simple to meter, and the billing is simple to render and to manage. PGCB's financial performance has significantly improved over the years and its current financial position is strong. Electricity wheeled through the transmission network has been increasing steadily, with growth of 9.2% in FY2004 and 5.9% in FY2005. Transmission system losses declined from 3.81% in FY2002 to 3.42% in FY2005. Gross revenue has also increased with the present wheeling tariff. It is estimated that PGCB's ongoing and pending investments in transmission

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<sup>1</sup> This tariff analysis was undertaken in August 2006 based on the information and data available at that time.



and auxiliary equipment will require an increase in wheeling charge to above Tk0.25 per kWh in order to maintain profitability in the short run and Tk0.33 per kWh by 2012.

### 3. Retail Tariff

6. Electricity tariffs have remained unchanged since September 2003. There are separate tariffs for the categories residential, irrigation, small industrial, nonresidential, commercial, low voltage (11 kV), medium voltage (33 kV), high voltage (132 kV), and street lighting. As in many countries, cross-subsidies exist between customer categories. Currently, BPDB, DESA, and DESCO charge identical retail tariffs. Nevertheless, the average effective retail income points to varying performance levels among distribution entities, with DESCO earning Tk3.56 per kWh, BPDB earning Tk3.45 per kWh, and DESA earning Tk3.32 per kWh in FY2005. The weighted average retail tariff in taka terms has increased over the past several years, but it is lower today in US dollar terms than it was in FY2000: the average retail tariff is \$0.052 per kWh today compared with \$0.054 per kWh in FY2000.

7. Rural electric cooperative (PBS) retail tariffs are structured similarly, but the co-ops are allowed to set their own tariffs based on their costs of supply. In general, their tariffs are slightly higher than those of BPDB, DESA, and DESCO and reflect higher distribution costs. Residential lifeline tariffs (< 100 kWh per month consumption) range from Tk2.53 per kWh to Tk2.90 per kWh compared with Tk2.50 per kWh charged by BPDB, DESA, and DESCO. PBS commercial tariffs range from Tk5.11 to Tk5.15 per kWh compared with the BPDB flat rate of Tk5.04 per kWh.

8. The combined market share of BPDB and DESA in terms of bulk supply, sales, and retail revenue is more than 50% in the retail distribution sector, while PBSs serve about two thirds of the total consumption base. DESCO earns 10% of the total retail revenue from only 3% of the customer base, reflecting the best customer mix (the Gulshan area of Dhaka). Under the current retail tariff structure, DESA's gross margin was about Tk0.51 per kWh in FY2005. However, DESA's collected revenues have been below cost of service<sup>2</sup> since FY2002, except that they were marginally higher in FY2005. After meeting bulk power purchase costs, the remaining revenues collected in FY2006 will not be sufficient to cover interest and depreciation. DESA's collection-to-purchase-cost ratio in FY2005 was only 70.0%. DESA fails to collect some Tk2.3 billion annually from its customers. DESA operated at a negative gross margin until December 2003, when bulk supply to DESCO and PBSs was discontinued. DESA has accumulated significant liabilities in unpaid bills to BPDB and PGCB. DESCO maintains relatively strong financial performance and has been undertaking various measures to improve it, including to outsource its network maintenance, meter reading, and billing functions. As a result, its collection-to-purchase ratio improved to 80.9% in FY2005. At Tk3.56 per kWh, DESCO's present weighted average electricity revenue is the highest among all power utilities.

9. Similarly to wholesale tariffs, retail tariffs are not structured for cost recovery and are essentially inflexible to such external price fluctuations as increases in fuel costs, local currency depreciation, and inflation. Industrial tariffs cover most of the cross-subsidy. Until the Bangladesh Energy Regulatory Commission's complete independence and full authority is established, the existing situation will persist and likely deteriorate. In conclusion, it is imperative to rationalize tariffs in order to adequately meet revenue requirements, and to undertake financial and operational restructuring of sector entities to ensure the overall health of the sector.

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<sup>2</sup> Cost of service includes depreciation based on historical fixed asset values and excludes returns on equity.

#### 4. Financial Restructuring and Impacts on Government's Budget

10. The financial restructuring entails cleaning up cross-debts and dues among and between sector entities, the Government, and quasi-governmental entities that cannot be recovered and will not directly translate into profitability for sector entities. This is highly relevant to DESA, and BPDB will also be at the center of financial restructuring since the power sector remains geared towards a single-buyer principle.

11. The Government's budget is much affected by this sector's chronic problems. The weak sector entities do not service their debts from foreign and government loans and continue to rely on government budget transfers for capital investment. It is not realistic to expect from them tax and dividend revenues. A majority of any tax revenues will be redirected to subsidizing the ailing power sector. By undertaking tariff reforms in parallel with financial restructuring, government will be able to lay a stable foundation for sector entities.

#### 5. Scenario Analysis

12. BPDB's current high generation cost reflects poor operational efficiency and high cost of power plants using diesel and furnace oil. Operational efficiency improvements that reduce overall system losses and improve collections will, to a degree, also reduce the cost of supply. According to an assessment by the Government's Power Cell, when the gas pipeline to Khulna is completed in FY2010, BPDB will be able to save Tk5 billion solely through fuel cost savings by converting from diesel and oil to gas. Currently, generation cost at BPDB's Khulna plants is about Tk8.00/kWh, reflecting high oil costs. The Power Cell has calculated that a 10% per year rise in wholesale tariff would allow BPDB to incur Tk4,260 million losses in FY2007, Tk450 million losses in FY2008 and a Tk5,270 million profit in FY2009.

13. Three scenario analyses have been undertaken: (i) business as usual (0% increase for future years), (ii) wholesale cost recovery (a realistic and phased approach to increases in wholesale tariffs where the real increase is based on BPDB's cost of service per kWh sold), and (iii) full rationalization (wholesale cost recovery plus increase in retail tariffs).

##### a. Scenario 1: Business as Usual

14. Tariffs are held steady with projected net increase in generation. As shown in Table A3.1, BPDB's percentage of funding gap (the shortfall generated by deducting cost of service from projected average electricity revenue) will be 13% in FY2006 and increase to 42% in FY2011. In this scenario, BPDB will not be financially sustainable unless heavily subsidized by the Government.

**Table A3.1: Projected BPDB Performance**  
(Tk per kWh)

| Fiscal Year                  | 2006   | 2007   | 2008   | 2009   | 2010   | 2011   |
|------------------------------|--------|--------|--------|--------|--------|--------|
| Average Electricity Revenue  | 2.31   | 2.31   | 2.31   | 2.31   | 2.31   | 2.32   |
| Cost of Service per kWh Sold | 2.60   | 2.73   | 2.83   | 2.92   | 3.26   | 3.30   |
| Surplus/(Shortfall)          | (0.29) | (0.42) | (0.52) | (0.61) | (0.95) | (0.98) |
| % of Funding Gap             | -13    | -18    | -23    | -26    | -41    | -42    |

kWh = kilowatt-hour.

Sources: Bangladesh Power Development Board and Asian Development Bank estimates.

### b. Scenario 2: Wholesale Cost Recovery

15. A 10% real increase is introduced in January 2007, followed by 5% real raises in FY2009 and FY2010, with implementation of automatic tariff adjustment starting from FY2008. Indexation for inflation and exchange rate fluctuations results in rises averaging about 6% per annum. In this scenario, BPDB will reach break even in FY2009, as shown in Table A3.2.

**Table A3.2: Projected BPDB Performance**  
(Tk per kWh)

| Fiscal Year                  | 2006   | 2007   | 2008   | 2009 | 2010 | 2011 |
|------------------------------|--------|--------|--------|------|------|------|
| Average Electricity Revenue  | 2.31   | 2.42   | 2.69   | 3.00 | 3.34 | 3.54 |
| Cost of Service per kWh Sold | 2.60   | 2.73   | 2.85   | 2.96 | 3.33 | 3.39 |
| Surplus/(Shortfall)          | (0.29) | (0.31) | (0.16) | 0.04 | 0.01 | 0.15 |
| % of Funding Gap             | -13    | -13    | -6     | 1    | 0    | 4    |

kWh = kilowatt-hour.

Sources: Bangladesh Power Development Board and Asian Development Bank estimates.

### c. Scenario 3: Full Rationalization

16. The same increases in the bulk supply tariff (scenario 2) are also applied to retail tariffs. In view of the existing Government policy of national uniform tariffs, the same percentage changes are applied across the board to BPDB, DESA, and DESCO. If the generation cost is passed through to retail distributors, DESA and DESCO will no longer avail themselves of the existing artificially low power purchase price (tables A3.3 and A3.4). Provided that DESCO is allowed to set its own retail tariffs, DESCO would only need to increase real tariffs by 2% in FY2009 and 5% in FY2010 to support its investment needs with inflation adjustments.

**Table A3.3: Projected DESA Performance**  
(Tk per kWh)

| Fiscal Year                  | 2006   | 2007   | 2008   | 2009   | 2010 | 2011 |
|------------------------------|--------|--------|--------|--------|------|------|
| Projected Average Revenue    | 3.32   | 3.49   | 3.87   | 4.31   | 4.80 | 5.08 |
| % Increase                   |        | 5      | 11     | 11     | 11   | 6    |
| Cost of Service per kWh Sold | 3.67   | 3.79   | 4.18   | 4.34   | 4.52 | 4.65 |
| Surplus/(Shortfall)          | (0.35) | (0.30) | (0.31) | (0.03) | 0.28 | 0.43 |
| % of Funding Gap             | -11    | -9     | -8     | 1      | 6    | 9    |

kWh = kilowatt-hour.

Sources: Dhaka Electric Supply Authority and Asian Development Bank estimates.

**Table A3.4: Projected DESCO Performance**  
(Tk per kWh)

| Fiscal Year                  | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|------------------------------|------|------|------|------|------|------|
| Projected Average Revenue    | 3.56 | 3.74 | 4.15 | 4.62 | 5.14 | 5.44 |
| % Increase                   |      | 5    | 11   | 11   | 11   | 6    |
| Cost of Service per kWh Sold | 3.18 | 3.38 | 3.65 | 4.00 | 4.55 | 4.75 |
| Surplus/(Shortfall)          | 0.38 | 0.35 | 0.50 | 0.62 | 0.59 | 0.69 |
| % of Funding Gap             | 11   | 9    | 12   | 13   | 12   | 13   |

kWh = kilowatt-hour.

Source: Dhaka Electric Supply Company Limited and Asian Development Bank estimates.

## C. Conclusions

17. Sizable tariff increases are needed initially to restore some balance between tariffs and the underlying cost of service. Increases should be spread over a number of years to minimize the downstream adverse impact. Wholesale tariffs need to be raised by 10% on average with effect from January 2007. Further real increases of 5% are assumed in FY2009 and FY2010. By 2010, tariffs would thereby be brought into line with the underlying cost of service for BPDB. The cumulative impact of efficiency improvements and increasing base load generating capacity will make it possible to reduce tariffs in real terms in later years. The analysis also confirms that (i) the existing PGCB tariffs can be retained until FY2007, (ii) indexation adjustments will be needed from FY2008, and (iii) tariffs can be reduced in real terms in later years.

18. To make the sector self-sufficient and reduce pressure on the budget, the issues of high losses, poor collection, and low tariffs must be resolved. The Power Division of MPEMR has proposed to increase the bulk supply tariff by 10% and raise retail tariffs by 5% for DESA, DESCO, BPDB, and REB. In October 2006, a hearing was held on the proposed tariff increase by the Bangladesh Energy Regulatory Commission. If this proposal is accepted and implemented immediately,<sup>3</sup> and if an automatic adjustment mechanism is applied and faithfully implemented from FY2008, the sector entities—particularly BPDB—will be in the black from FY2009 with minimum real increases needed in later years. It is also necessary to clean up the balance sheets of BPDB and DESA by undertaking financial restructuring that involves write-off of unrecoverable cross-debts and customer receivables and conversion into equity of overdue debt service and long-term loans payable to the Government. In order to continue power sector commercialization and system loss reductions, the key challenge is to restructure the power sector's long-term debt to deliver tariffs that are affordable and also permit Government and incoming private investors to recover the costs of new investments. ADB-assisted sector reforms, together with investment projects are expected to provide a stable fiscal environment and an opportunity to achieve long-term sustainability of the power sector.

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<sup>3</sup> The proposal was accepted and implemented from 1 March 2007.

## EXTERNAL ASSISTANCE TO THE POWER SECTOR

Table A4.1: ADB Lending and Technical Assistance to Bangladesh Power Sector

| Loan No.        | Amount<br>(\$ million) | Date of Approval   | Name of Project  |
|-----------------|------------------------|--------------------|--|
| 141-BAN(SF)     | 9.25                   | 17 Oct 1973        | Bangladesh West Zone Power   |
| 142-BAN         | 1.20                   | 17 Oct 1974        | Bangladesh West Zone Power   |
| 212-BAN(SF)     | 4.55                   | 19 Dec 1987        | Bangladesh West Zone Power – Supplementary                             |
| 325-BAN(SF)     | 27.75                  | 9 Dec 1977         | Chittagong Power Distribution  |
| 523-BAN(SF)     | 26.50                  | 22 Sep 1981        | Power System Rehabilitation and Expansion                              |
| 587-BAN(SF)     | 35.00                  | 21 Oct 1982        | Ashuganj Thermal Power   |
| 636-BAN(SF)     | 82.00                  | 13 Sep 1983        | Power Transmission and Distribution                                    |
| 683-BAN(SF)     | 120.00                 | 14 Jun 1984        | Sixth Power (Sector Loan)  |
| 751-BAN(SF)     | 40.50                  | 31 Oct 1985        | Seventh Power  |
| 963-BAN(SF)     | 165.00                 | 11 Jul 1989        | Eighth Power   |
| 1356-BAN(SF)    | 50.00                  | 30 May 1995        | Rural Electrification  |
| 1505-BAN(SF)    | 134.40                 | 18 Dec 1996        | Ninth Power  |
| 1730-BAN(SF)    | 75.00                  | 21 Dec 1999        | Dhaka Power System Upgrade   |
| 1731-BAN        | 82.00                  | 21 Dec 1999        | Dhaka Power System Upgrade   |
| 7165/1793-BAN   | 70.00                  | 5 Dec 2000         | Meghnaghat Power   |
| 1884-BAN(SF)    | 60.20                  | 17 Dec 2001        | West Zone Power System Development                                     |
| 1885-BAN        | 138.70                 | 17 Dec 2001        | West Zone Power System Development                                     |
| 2038-BAN        | 100.00                 | 10 Dec 2003        | Power Sector Development Program                                       |
| 2039-BAN        | 186.00                 | 10 Dec 2003        | Power Sector Development Project                                       |
| <b>Total</b>    | <b>1,338.05</b>        |                    |  |
| <b>TA No</b>    | <b>(\$'000)</b>        |                    |  |
| 095-BAN         | 250                    | 17 Oct 1973        | Bangladesh West Zone Power   |
| 111-BAN         | 50                     | 9 May 1974         | Bangladesh Energy Policy Study   |
| 130-BAN         | 1,250                  | 31 Oct 1974        | Bangladesh Energy Study  |
| 218-BAN         | 150                    | 9 Dec 1977         | Power Systems Rehabilitation   |
| 456-BAN         | 2,100                  | 15 Apr 1982        | Energy Planning  |
| 460-BAN         | 50                     | 07 Jun 1982        | Power System Rehabilitation and Expansion Study                        |
| 487-BAN         | 650                    | 21 Oct 1982        | Power System Master Plan Study   |
| 672-BAN         | 75                     | 15 Feb 1985        | Seventh Power  |
| 714-BAN         | 1,355                  | 31 Oct 1985        | East Zone Thermal Power  |
| 1743-BAN        | 90                     | 18 Aug 1992        | Review of Electricity Legislation and Regulations                      |
| 1962-BAN        | 600                    | 11 Oct 1993        | Preparation of Power System Master Plan                                |
| 2004-BAN        | 1,000                  | 26 Nov 1993        | Financial Management Upgrade of BPDB and DESA                          |
| 2338-BAN        | 211                    | 30 May 1995        | Solicitation for Private Sector Implementation of the Meghnaghat Power |
| 2715-BAN        | 175                    | 18 Dec 1996        | Valuation of Assets of DESCO   |
| 3129-BAN        | 900                    | 16 Dec 1998        | Support for the Energy Regulatory Authority                            |
| 3244-BAN        | 90                     | 20 Aug 1999        | Capacity Building of DESCO   |
| 3343-BAN        | 1,000                  | 17 Dec 1999        | Corporatization of the Ashuganj Power Station                          |
| 3801-BAN        | 900                    | 17 Dec 2001        | Corporatization of the West Zone Distribution Operations of BPDB       |
| 3978-BAN        | 850                    | 07 Nov 2002        | Corporatization of DESA  |
| 4379-BAN        | 840                    | 23 Aug 2004        | Power Sector Development Program II                                    |
| 4626-BAN        | 800                    | 02 Aug 2005        | Corporatization of BPDB  |
| <b>4898-BAN</b> | <b>600</b>             | <b>22 Dec 2006</b> | <b>Promotion of Private Sector Participation in the Power Sector</b>   |
| <b>Total</b>    | <b>13,986</b>          |                    |  |

BPDB = Bangladesh Power Development Board, DESA = Dhaka Electric Supply Authority, DESCO = Dhaka Electric Supply Company Limited.

Source: Asian Development Bank files.

**Table A4.2: Bangladesh Power Sector  
External Assistance, 1972–2005**  
(\$ million)<sup>a</sup>

| <b>Source</b>              | <b>Total</b> |
|----------------------------|--------------|
| <b>A. Multilateral</b>     |              |
| Asian Development Bank     | 1,351        |
| World Bank                 | 710          |
| Islamic Development Bank   | 32           |
| OPEC                       | 57           |
| <b>Subtotal (A)</b>        | <b>2,150</b> |
| <b>B. Bilateral</b>        |              |
| France                     | 164          |
| Germany                    | 222          |
| Japan                      | 731          |
| KFAED/Kuwait               | 226          |
| People's Republic of China | 66           |
| Russian Federation         | 411          |
| SFD/Saudi Arabia           | 23           |
| United Kingdom             | 230          |
| US/USAID                   | 46           |
| <b>Subtotal (B)</b>        | <b>2,119</b> |
| <b>Total</b>               | <b>4,269</b> |

KFAED = Kuwait Fund for Arab and Economic Development, OPEC = Organization of Petroleum Exporting Countries, SFD = The Saudi Fund for Development, USAID = United States Agency for International Development.

<sup>a</sup> Foreign currencies were converted to US dollars using the current foreign exchange rates.

Source: Asian Development Bank files.

## SECTOR ROAD MAP

| Preparatory Phase<br>1994–2005  | Intermediate Phase<br>2006–2008  | Long-Term Phase<br>2009–2020  |
|---|--|---|
| <b>A. Sector Restructuring</b>  |  |   |
| <ul style="list-style-type: none"> <li>1994: Power Sector Reform in Bangladesh approved to enhance sector performance.</li> <li>1995: Power Cell created in MPEMR to drive power sector reform and promote private power participation.</li> <li>1996: Unbundling of power sector entities started with creation of PGCB and DESCO.</li> <li>2000: Vision and Policy Statement for Power Sector Reforms approved to set long-term targets.</li> </ul> | <ul style="list-style-type: none"> <li>3-year Road Map for Power Sector Reforms (2006–2008) approved and implemented.</li> <li>A strengthened monitoring mechanism to oversee the power sector reform process established and implemented.</li> <li>Power system master plan updated for generation and transmission for 2006–2025.</li> <li>Continued restructuring of power sector entities through corporatization and commercialization.</li> <li>Operation and maintenance contracts for power plants awarded to improve operation and maintenance capacity.</li> </ul> | <ul style="list-style-type: none"> <li>Multi-buyer and competitive pool model examined.</li> <li>Privatization of sector entities considered.</li> <li>More renewable energy developed.</li> <li>Environmental enhancement initiatives implemented.</li> <li>Energy efficiency initiatives strengthened.</li> <li>Policy framework for utilization of captive power potential established.</li> </ul> |
| <b>B. Legal and Regulatory Framework</b>  |  |   |
| <ul style="list-style-type: none"> <li>1996: Private Sector Power Generation Policy adopted to promote IPP operations.</li> <li>2003: Energy Regulatory Commission Act legislated.</li> <li>2004: BERC established.</li> <li>2005: Power pricing framework approved by the Government.</li> </ul>   | <ul style="list-style-type: none"> <li>BERC fully operationalized.</li> <li>Licensing and tariff regulations effective.</li> <li>Captive power generation policy prepared.</li> </ul>  |   |
| <b>C. Capacity Building</b>   |  |   |
| <ul style="list-style-type: none"> <li>2005: Institutional development and capacity building study incorporated in the draft 3-year Road Map for Power Sector Reforms.</li> </ul>   | <p>A sector-wide capacity building program prepared through a comprehensive needs assessments study to enhance competitiveness of power sector entities in corporate and financial management, information and communication technology, technical expertise, long-term system planning, good governance, customer relations, research and development, and human resource development and training.</p>   | <ul style="list-style-type: none"> <li>A sector-wide 3-year capacity building program fully implemented.</li> </ul>   |

| <b>D. Promotion of Private Sector Participation and Public-Private Partnership</b>  |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li>1994: Policy decision prepared to invite private sector participation in generation.</li> <li>1996: Economically viable unbundling of electricity supply progressed with creation of a number of separate generation and distribution companies and a single transmission company.</li> <li>1998: IPP contracts awarded for Meghnaghat and Haripur projects.</li> <li>2004: PGCB and DESCO became profitable organizations.</li> <li>2004: PGCB's corporate bond issuance approved by the Government to raise funds to finance local currency costs.</li> <li>2005: PGCB and DESCO's shares off-loading in the stock market approved by the Government.</li> </ul> | <ul style="list-style-type: none"> <li>The first phase of the financial restructuring plan for BPDB and DESA implemented including (i) reduction of accounts receivable to an acceptable level, and (ii) settlement of unfunded pension liabilities and gratuities through budget allocation by the Government.</li> <li>Corporatization process of the newly hived-off entities, completed with relevant asset transfer among entities.</li> <li>BPDB holding company registered to introduce an enhanced corporate governance structure and put in place a business and operational strategy.</li> <li>Initial off-loading of PGCB and DESCO shares conducted subject to favorable market conditions.</li> <li>Various advanced public-private partnership models examined.</li> </ul> | <ul style="list-style-type: none"> <li>Financial restructuring completed in all the sector entities.</li> <li>Organizational restructuring completed with BPDB corporatized as a holding company.</li> <li>Private participation encouraged in new transmission and distribution project investment.</li> </ul> |
| <b>E. Investment</b>  |  |   |
| <b>1. Generation</b> <ul style="list-style-type: none"> <li>2005: Power generation installed capacity increased to 5,120 MW.</li> <li>2005: 1,290 MW (a total of seven plants) of new generation capacity added by IPPs under Government's Private Sector Power Generation Policy.</li> </ul>   | <ul style="list-style-type: none"> <li>Generation capacity increased to at least 7,000 MW by 2008 with per capita generation of 190 KWh and access to electricity increased to 48%.</li> <li>Private sector investment accelerated with public procurement reform aiming to ensure transparency and fairness in bidding process.</li> </ul>  | <ul style="list-style-type: none"> <li>Total net capacity increase of 17,900 MW by 2025.</li> <li>Alternative and renewable energy resources developed.</li> </ul>  |
| <b>2. Transmission</b> <ul style="list-style-type: none"> <li>2005: 1,436 km of 230 kV transmission lines looping around Dhaka with radial extension to the western part of Bangladesh and the southern region in the Chittagong area as well as 4,868 km of 132 kV owned by PGCB.</li> <li>2005: power system master plan updated for transmission for 2006-2025.</li> </ul>   | <ul style="list-style-type: none"> <li>850 km transmission line constructed to meet demand increase by 2008.</li> <li>15 projects committed by the Government for new substations and connecting transmission lines.</li> <li>The transmission system master plan finalized.</li> </ul>  | <ul style="list-style-type: none"> <li>104 new 132/33 kV substations connecting 132-kV lines capable of serving demand of 12,480 MW to be invested at the cost of \$1.2 billion until 2025.</li> </ul>  |
| <b>3. Distribution</b> <ul style="list-style-type: none"> <li>2005: Nationwide access to electricity: 35% of households.</li> </ul>   | <ul style="list-style-type: none"> <li>Increased access to electricity to 40% by 2008.</li> </ul>  | <ul style="list-style-type: none"> <li>100% access to electricity by 2020.</li> </ul>   |

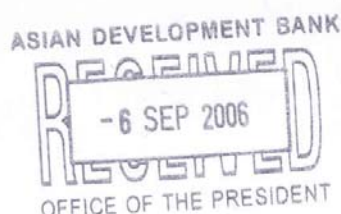
BERC = Bangladesh Energy Regulatory Commission, BPDB = Bangladesh Power Development Board, DESA = Dhaka Electric Supply Authority, DESCO = Dhaka Electric Supply Company Limited, IPP = independent power producer, km = kilometer, KV = kilovolt, kWh = kilowatt-hour, MW = megawatt, PGCB = Power Grid Company of Bangladesh Limited,  
Sources = The Government of Bangladesh and Asian Development Bank.



## DEVELOPMENT POLICY LETTER AND PROGRAM POLICY MATRIX



Minister for Finance & Planning



Ministry of Finance and Ministry of Planning  
Government of the People's Republic of Bangladesh  
Dhaka

No.: ERD/ADB-2/SPSDP-II/2006/ ৫৫৭

29 August 2006

**Mr. Haruhiko Kuroda**  
President  
Asian Development Bank  
Manila, Philippines.

**Re: Sustainable Power Sector Development Program.**

**Dear Mr. Kuroda,**

Given that the power sector plays a very vital role in driving socio-economic growth, the Government of Bangladesh (GOB) had all along been endeavoring to develop the power sector to meet the needs of the growing economy. This has received GOB's special attention given that in Bangladesh roughly one-third of the population has access to electricity resulting in the lowest per capita electricity consumption in the region. Efforts are continuing to mobilize adequate funding, both domestic and foreign, for power generation, transmission and distribution. At the same time attention has also been given to improve efficiency and service delivery capacities of the power sector entities through institutional and governance reforms at sector and corporate levels. The process got a boost with the adoption of a policy paper in 1994 titled "Power Sector Reforms in Bangladesh" in consultation with the major development partners that included Asian Development Bank (ADB). Since then the Government has been trying to improve sector governance as well as to inject commercial values for running the power entities with autonomy.

Power Sector in Bangladesh is beset with not only inadequate generation capacity but also plagued by poor quality of service delivery. While the generation gap results from funding constraints, the poor quality of service delivery is the outcome of poor financial performance of the major utilities. With a view to remove the current obstacles in the sector, GOB in its Poverty Reduction Strategy (PRS), 2005 has included capacity development for power generation, transmission and distribution as well as improving the service quality as strategic goals. These strategic goals will be achieved through (i) enhanced investment for power generation, transmission



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**Ministry of Finance and Ministry of Planning**  
 Government of the People's Republic of Bangladesh  
 Dhaka

Minister for Finance & Planning

and distribution system; (ii) tariff rationalization; (iii) adopting a transparent power pricing framework; (iv) unbundling power sector operations; (v) strengthening capacity through technical, managerial and administrative restructuring of power sector entities; (vi) achieving financial sustainability; (vii) creating conducive environment to attract private capital to supplement public sector investment and to enhance energy efficiency through integrated resources planning, minimizing waste and demand side management.

In the past decade, reforms to bring about structural and functional changes in the sector with the help of ADB's Power Sector Development Program (2003) have contributed to some encouraging results. Among these are (i) inculcation of corporate culture; (ii) significant reduction of system losses as well as improvement of billing and collection; (iii) transformation of Power Grid Company of Bangladesh Limited and Dhaka Electric Supply Company Limited into profitable organizations, (iv) creation of a competitive environment with the operation of independent public and private generation companies and several power distribution entities; and (vi) establishment of an independent sector regulator.

Reform is a continuous process and building on our past achievements, GOB is in the midst of finalizing a three-year road map (2006-2008) for power sector reforms prepared through intensive consultation with all the stakeholders including ADB.

In order to attain strategic goals in the power sector and to move further the reform agenda, government has requested for ADB's program support to lock-in and to institutionalize further reforms through improved sector governance; financial and organizational restructuring; capacity development; reinforcing private sector participation; and by helping to remove bottlenecks in power generation, transmission, and distribution system.

The attached policy matrix indicates the major actions that would be undertaken to transform the power sector into a well-functioning and self-sustaining one so that it responds positively to the development challenges facing the country. As the Sustainable Power Development Program (SPDP) will endeavor to consolidate the reforms undertaken earlier and also to bring additional



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reforms in the power sector, we believe that a heuristic approach based on the ground realities should be adopted. The relevance of the measures, implementation capacity as well as long-term benefits to the country should receive requisite attention.

I wish to reiterate Government's commitment to implement the program within a span of three years (2006-2008) with a view to make the sector a dynamic and self-sustaining one that can cater to our development needs. The strategies that will be followed are as follows:

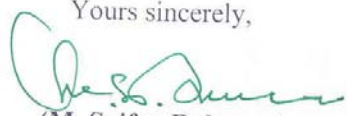
- (1) at the sector level, efforts will be made to make the Bangladesh Energy Regulatory Commission fully functional and to undertake financial restructuring of the power sector entities, in particular, Bangladesh Power Development Board and Dhaka Electric Supply Authority; and
- (2) corporatization and commercialization of the power sector entities.

However, regarding the preparation and implementation of restructuring plan for key power sector entities, detailed procedures and other matters would require to be agreed after further discussions/consultations with all relevant stakeholders. Provision of budget support for pension and gratuities of staff of BPDB and DESA who will opt to join the newly formed corporatized entities will be determined with concurrence of the Finance Division. The mechanism that was put in place to pay off electricity bills of government, semi-autonomous and autonomous bodies would be streamlined further to bring existing levels of outstanding bills to a desired level so that further budget allocation in this regard could be properly utilized.

The Government once again reaffirms its commitment to bring dynamism in the power sector through application of commercial practices consistent with the strategic goals and needs of the country. On behalf of the Government of Bangladesh, I wish to seek ADB's strong support and understanding in implementing the program.

A Policy Matrix outlining the proposed actions by the Government of Bangladesh is enclosed.

Yours sincerely,

  
(M. Saifur Rahman)

## PROGRAM POLICY MATRIX

| <b>Impact:</b> Sustainable economic development through increased capacity and improved reliability of power supply.<br><b>Outcome:</b> Improved power sector sustainability through financial and organizational restructuring.<br><b>Outputs:</b> Program outputs include the following five pillars: <ul style="list-style-type: none"> <li>• Pillar 1: Development of a national action plan for power sector reform</li> <li>• Pillar 2: Establishment of a fully functioning legal and regulatory framework</li> <li>• Pillar 3: Enhanced financial health of power sector entities</li> <li>• Pillar 4: Continued restructuring of sector entities</li> <li>• Pillar 5: Promotion of private sector participation and public-private partnership</li> </ul> |  |  |  |   |
|--|--|--|--|---|
| Strategic Goal   | Key Targets  | Progress   | First Tranche Condition<br>(Expected by June 2007)   | Second Tranche Condition<br>(Expected by June 2008) |
| <b>Pillar 1: Development and Implementation of a National Action Plan for Power Sector Reform</b>  |  |  |  |   |
| <b>Develop and implement a time bound sector reform action plan.</b>   | <ul style="list-style-type: none"> <li>▪ A detailed road map for power sector reform based on the approved policy papers of the Government, i.e., Power Sector Reforms in Bangladesh (PSRB), 1994 and Vision and Policy Statement for Power Sector Reforms, 2000.</li> </ul> | <ul style="list-style-type: none"> <li>▪ 3-year Road Map for Power Sector Reforms (2006–2008) was drafted in November 2005 and presented to development partners in November 2005. Development partners' consolidated comments were forwarded to the Government in January 2006.</li> <li>▪ Final stakeholder consultation process on 3-year road map was completed in June 2006.</li> </ul> | Government approval of 3-year Road Map for Power Sector Reforms (2006–2008) as agreed between Asian Development Bank (ADB) and the Borrower. |   |
|  | <ul style="list-style-type: none"> <li>▪ A strengthened monitoring system to oversee the sector reform process.</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Power Cell of the Ministry of Power, Energy, and Mineral Resources (MPEMR) is mandated to plan, implement, and monitor the power sector reform process, but no systematic monitoring mechanism is in place.</li> </ul>  | Establishment and implementation of a regular monitoring and reporting mechanism by MPEMR to oversee the power sector reform process.        |   |
| <b>Develop a long-term Power System Master Plan.</b>   | <ul style="list-style-type: none"> <li>▪ Updated Power System Master Plan for 2006–2025.</li> </ul>  | <ul style="list-style-type: none"> <li>▪ <b>Completed.</b> Power System Master Plan has been updated for generation and transmission for 2006–2025 under ADB TA-4379.</li> </ul>   |  |   |
|  | <ul style="list-style-type: none"> <li>▪ A strategy paper for rural electrification program's transition into unbundled energy sector.</li> </ul>  | <ul style="list-style-type: none"> <li>▪ <b>Completed.</b> Strategy paper was prepared in January 2005.</li> </ul>   |  |   |



| Strategic Goal   | Key Targets  | Progress  | First Tranche Condition<br>(Expected by June 2007)  | Second Tranche Condition<br>(Expected by June 2008) |
|--|--|---|---|---|
| <b>Develop a medium-term, sector-wide capacity building program.</b>                 | <ul style="list-style-type: none"> <li>A sector-wide, medium-term capacity building program through a comprehensive study on sector capacity.</li> </ul> | <ul style="list-style-type: none"> <li>The Power Division of MPEMR is drafting a 3-year capacity building program for the entire power sector to enhance corporate management, financial management, and technical skills in generation, transmission, and distribution.</li> </ul>   | Submission of a technical project proposal satisfactory to ADB for a medium-term capacity building program by the Power Division of MPEMR to the Planning Commission. |   |
| <b>Pillar 2: Establishment of a Fully Functioning Legal and Regulatory Framework</b> |  |   |   |   |
| <b>Establish and operationalize an independent energy regulatory commission.</b>     | <ul style="list-style-type: none"> <li>Passage in Parliament of Energy Regulatory Commission Act.</li> </ul>   | <ul style="list-style-type: none"> <li><b>Completed.</b> Parliament passed the Energy Regulatory Commission Act in 2003.</li> </ul>   |   |   |
|  | <ul style="list-style-type: none"> <li>Establishment of an energy regulatory commission pursuant to the Energy Regulatory Commission Act.</li> </ul>     | <ul style="list-style-type: none"> <li>Bangladesh Energy Regulatory Commission (BERC) was established in April 2004 and three commissioners out of five were appointed during 2004 and 2005. In July 2006, another commissioner was appointed. Recruitment of the remaining one commissioner is to be re-advertised.</li> </ul>                           |   | Appointment of the remaining one BERC commissioner. |
|  | <ul style="list-style-type: none"> <li>Operationalization of the sector regulator.</li> </ul>  | <ul style="list-style-type: none"> <li>An approved organogram is essential for BERC to recruit staff.</li> <li>BERC organogram was cleared by the Ministry of Establishments on 24 July 2006. BERC pay structure along with the approved organogram was sent to the Finance Division of the Ministry of Finance on 25 July 2006 for clearance.</li> </ul> | Approval of BERC organogram by the Secretaries Committee on Administrative Developments.  |   |
| <b>Set Licensing Regulations to ensure safety and fair business in power supply.</b> | <ul style="list-style-type: none"> <li>Publication of the Licensing Regulations by the Government.</li> </ul>  | <ul style="list-style-type: none"> <li>The Ministry of Law cleared the Licensing Regulations in June 2006.</li> <li>BERC confirmed the Regulations and submitted them for gazette notification in June 2006.</li> </ul>   | Gazette notification of the Licensing Regulations as finalized by BERC.   |   |

| Strategic Goal   | Key Targets  | Progress  | First Tranche Condition<br>(Expected by June 2007)  | Second Tranche Condition<br>(Expected by June 2008)  |
|--|--|---|---|--|
| <b>Set Tariff Regulations to achieve cost recovery.</b>                                    | <ul style="list-style-type: none"> <li>Tariff Regulation and tariff adjustment process adopted to achieve cost recovery.</li> </ul>  | <ul style="list-style-type: none"> <li>Power pricing framework was approved by the Government in 2005, and accordingly BERC is drafting the Electric Generation Tariff Regulations along with the tariff-setting mechanism.</li> </ul>  | Submission of the Electric Generation Tariff Regulations with the tariff-setting mechanism to the Energy and Mineral Resources Division of MPEMR by BERC. | Gazette notification of the Electric Generation Tariff Regulations as finalized by BERC.         |
| <b>Incorporate good governance into sector regulatory framework.</b>                       | <ul style="list-style-type: none"> <li>Collective efforts on anticorruption taken under supervision of the Anticorruption Commission.</li> </ul>   | <ul style="list-style-type: none"> <li>Being addressed under ADB TA 4140-BAN by promoting medium- to long-term development of collective efforts at various institutes involved in the power sector.</li> </ul>   |   |  |
|  | <ul style="list-style-type: none"> <li>A system ensuring public disclosure of operational and financial information from the power sector entities to enhance transparency in business.</li> </ul> | <ul style="list-style-type: none"> <li><b>Completed.</b> Latest operational and financial information from the power sector entities is available on the Power Cell website, <a href="http://www.powercell.gov.bd">www.powercell.gov.bd</a>.</li> </ul>   |   |  |
| <b>Pillar 3: Enhanced Financial Health of Power Sector Entities</b>                        |  |   |   |  |
| <b>Prepare and implement a financial restructuring plan for key power sector entities.</b> | <ul style="list-style-type: none"> <li>Financial restructuring planned and executed for key power sector entities.</li> </ul>  | <ul style="list-style-type: none"> <li>Power Grid Company of Bangladesh Limited (PGCB) and Dhaka Electric Supply Company Limited (DESCO) became profitable organizations, with net profits since fiscal year 2004.</li> <li>Draft financial restructuring plan for Bangladesh Power Development Board (BPDB) and Dhaka Electric Supply Authority (DESA) was drafted under ADB TA 4379 in March 2006.</li> <li>Stakeholder consultation is being undertaken on the financial restructuring plan of BPDB and DESA.</li> </ul> | Preparation of a draft financial restructuring plan for BPDB and DESA by the Power Division of MPEMR in a manner satisfactory to ADB.                     | Approval by the Ministry of Finance of the draft financial restructuring plan for BPDB and DESA. |

| Strategic Goal   | Key Targets  | Progress  | First Tranche Condition<br>(Expected by June 2007)   | Second Tranche Condition<br>(Expected by June 2008)  |
|--|--|---|--|--|
| <b>Settle unfunded pension and gratuities to accelerate corporatization process.</b> | <ul style="list-style-type: none"> <li>Budget allocated by the Government to settle unfunded pension and gratuities for corporatized entities to (i) establish appropriate trusts or funds for various terminal benefits, and (ii) contribute to the trusts for future service in accordance with the requirements of applicable law.</li> </ul> | <ul style="list-style-type: none"> <li>Budget allocation is being discussed among Government ministries.</li> </ul>   | Budget allocation of at least Tk1.8 billion by the Ministry of Finance for provision of unfunded pension and gratuities for West Zone Power Distribution Company Limited (WZPDC), Ashuganj Power Station Company Limited (APSC), and Northwest Zone Power Distribution Company Limited (NWZPDC). | Budget allocation of at least another Tk1.8 billion by the Ministry of Finance for provision of unfunded pension and gratuities for Electricity Generation Company of Bangladesh Limited (EGCB) and Dhaka Power Distribution Company Limited (DPDC). |
| <b>Reduce accounts receivable of the power sector entities.</b>                      | <ul style="list-style-type: none"> <li>Accounts receivable of the power sector entities reduced to an acceptable level.</li> </ul>   | <ul style="list-style-type: none"> <li>Outstanding debts owed by private consumers as of December 2005 are reduced to about 3.0 times the average monthly billing.</li> <li>Outstanding debts owed by the Government as of December 2005 are Tk1.4 billion, or 6.0 times the monthly average billing.</li> <li>Outstanding debts owed by the Government's autonomous and semiautonomous bodies as of December 2005 are Tk3.5 billion, or 12.7 times the monthly average billing.</li> </ul> | <p>Reduction of the Government's outstanding debts to less than Tk1.2 billion.</p> <p>Reduction of the Government's autonomous and semiautonomous bodies' outstanding debts to less than Tk3.0 billion.</p>  | <p>Reduction of the Government's outstanding debts to less than Tk1.0 billion.</p> <p>Reduction of the Government's autonomous and semiautonomous bodies' outstanding debts to less than Tk2.5 billion.</p>  |

| Strategic Goal  | Key Targets  | Progress   | First Tranche Condition<br>(Expected by June 2007)   | Second Tranche Condition<br>(Expected by June 2008) |
|---|--|--|--|---|
| <b>Pillar 4: Continued Restructuring of Sector Entities</b>                               |  |  |  |   |
| <b>Restructure the remaining power sector entities through corporatization.</b>           | <ul style="list-style-type: none"> <li>Economically viable unbundling of electricity supply into a number of separate generation and distribution companies, plus a single transmission company—all registered under the Companies Act 1994; appointment of management, constitution of boards of directors and transfer of assets.</li> </ul> | <ul style="list-style-type: none"> <li>A number of companies have been established in accordance with the Government's unbundling policy and started business, including PGCB, DESCO, APSC, EGCB, and WZPDC.</li> <li>NWZPDC was established in 2005 to take over BPDB's distribution network.</li> <li>DPDC was established in 2005 to take over DESA's distribution system. Corporatization of DESA is being assisted by ADB TA-3978.</li> <li>Study for corporatization of BPDB as a holding company is being assisted by ADB TA-4626. Work started in March 2006.</li> </ul> | Constitution of boards of directors of DPDC, EGCB, and NWZPDC in a manner satisfactory to ADB, and advertisement for recruitment of management of DPDC and NWZPDC. |   |
|   | <ul style="list-style-type: none"> <li>Improved corporate governance through appointment of competent boards of directors for the corporatized entities.</li> </ul>  | <ul style="list-style-type: none"> <li><b>Completed.</b> The principles and procedures for appointment of boards of directors were agreed upon under ADB Loan 2038.</li> </ul>   |  |   |
| <b>Pillar 5: Promotion of Private Sector Participation and Public-Private Partnership</b> |  |  |  |   |
| <b>Promote private sector investment in power sector development.</b>                     | <ul style="list-style-type: none"> <li>Formulation of a policy to promote independent power producer investments.</li> </ul>   | <ul style="list-style-type: none"> <li><b>Completed.</b> The Private Sector Power Generation Policy was approved by the Government in 1996.</li> </ul>   |  |   |
|   | <ul style="list-style-type: none"> <li>Public procurement policies reformed to ensure transparency and fairness in bidding process.</li> </ul>   | <ul style="list-style-type: none"> <li><b>Completed.</b> New public procurement regulations became effective in October 2003.</li> </ul>   |  |   |



| Strategic Goal   | Key Targets   | Progress  | First Tranche Condition<br>(Expected by June 2007)   | Second Tranche Condition<br>(Expected by June 2008)   |
|--|---|---|--|---|
| <b>Promote public-private partnership.</b>                                 | <ul style="list-style-type: none"> <li>Local-currency bonds of the corporatized sector entities issued to raise fund directly through local capital markets.</li> </ul> | <ul style="list-style-type: none"> <li><b>Completed.</b> The Government approved PGCB's bond issuance in February 2004.</li> </ul>  |  |   |
|  | <ul style="list-style-type: none"> <li>Shares of corporatized sector entities partially off-loaded in the stock market.</li> </ul>                                      | <ul style="list-style-type: none"> <li>In April 2006, the Ministry of Finance sanctioned approval in principle for off-loading of 25% of PGCB and DESCO shares in the stock market.</li> </ul>  | Formal approval by the Power Division of MPEMR for PGCB and DESCO to off-load up to 25% of their shares in the stock market in one or more tranches. | Subject to favorable market conditions, initial off-loading of PGCB and DESCO shares in the stock market. |
| <b>Establish good governance structure at sector and corporate levels.</b> | <ul style="list-style-type: none"> <li>Commercially oriented corporate governance system established.</li> </ul>  | <ul style="list-style-type: none"> <li><b>Completed.</b> Commercially oriented corporate governance systems have been adopted in the corporatized power sector entities including (i) independence of the boards of directors from the Government, (ii) market-oriented incentive packages for staff, (iii) defined delegation of powers to staff, and (iv) improved management information systems.</li> </ul> |  |   |

Sources: The Government of Bangladesh and Asian Development Bank.

### LIST OF INELIGIBLE ITEMS

1. The proceeds of the loan will be utilized to finance the foreign currency expenditures for the reasonable costs of imported goods required during implementation of the Program.
2. Notwithstanding the provision of para. 1 above, no withdrawals shall be made for:
  - (i) expenditures for goods included in the following groups or subgroups of the United Nations Standard International Trade Classification, Revision 3 (SITC, Rev. 3) or any successor groups or subgroups under future revisions to the SITC, as designated by the Asian Development Bank (ADB) by notice to the Borrower;

**Table A7-1: Ineligible Items**

| Chapter | Heading | Description of Items   |
|---------|---------|--|
| 112     |         | Alcoholic beverages  |
| 121     |         | Tobacco, unmanufactured; tobacco refuse  |
| 122     |         | Tobacco, manufactured (whether or not containing tobacco substitute)   |
| 525     |         | Radioactive and associated materials   |
| 667     |         | Pearls, precious and semi-precious stones, unworked or worked  |
| 718     | 718.7   | Nuclear reactors and parts thereof, fuel elements (cartridges), nonirradiated for nuclear reactors   |
| 897     | 897.3   | Jewelry of gold, silver or platinum group metals (except watches and watch cases); goldsmiths' or silversmiths' wares (including set gems) |
| 971     |         | Gold, nonmonetary (excluding gold ore and concentrates)  |

Source: Asian Development Bank.

- (ii) expenditures in the currency of the Borrower or of goods supplied from the territory of the Borrower;
- (iii) payments made for expenditures incurred more than 180 days before the effectiveness date of the loan;
- (iv) expenditures for goods supplied under a contract that any national or international financing institution or agency will have financed or has agreed to finance, including any contract financed under any loans from ADB;
- (v) expenditures for goods intended for a military or para-military purposes or for luxury consumption;
- (vi) expenditures for narcotics; and
- (vii) expenditures for pesticides categorized as extremely hazardous or highly hazardous in class 1a and class 1b, respectively, Classification of Pesticides by Hazard and Guidelines to Classification.

## PROJECT COST ESTIMATES AND FINANCING PLAN

Table A8.1: Part A: Clean Energy Capacity Expansion  
(\$ million)

| Item   | Cost             |              |               | Financing Plan |                      |               |
|--|------------------|--------------|---------------|----------------|----------------------|---------------|
|  | Foreign Exchange | Local Cost   | Total Cost    | ADB            | Government and/or EA | Total         |
| <b>A Base Cost</b>                               |                  |              |               |                |                      |               |
| Preconstruction Cost                             | 0.00             | 0.16         | 0.16          | 0.00           | 0.16                 | 0.16          |
| Civil Works                                      | 0.00             | 18.01        | 18.01         | 0.00           | 18.01                | 18.01         |
| Power Station Equipment                          | 114.67           | 1.59         | 116.26        | 114.67         | 1.59                 | 116.26        |
| Other Materials                                  | 0.00             | 12.53        | 12.53         | 0.00           | 12.53                | 12.53         |
| Internal Transportation Cost                     | 0.00             | 2.29         | 2.29          | 0.00           | 2.29                 | 2.29          |
| Indirect Costs                                   | 9.54             | 1.03         | 10.57         | 9.54           | 1.03                 | 10.57         |
| Duties and Taxes                                 | 0.00             | 40.14        | 40.14         | 0.00           | 40.14                | 40.14         |
| <b>Subtotal</b>                                  | <b>124.21</b>    | <b>75.75</b> | <b>199.96</b> | <b>124.21</b>  | <b>75.75</b>         | <b>199.96</b> |
| <b>B Contingencies</b>                           | <b>8.69</b>      | <b>8.33</b>  | <b>17.02</b>  | <b>8.69</b>    | <b>8.33</b>          | <b>17.02</b>  |
| <b>C Financing Charges During Implementation</b> | <b>12.21</b>     | <b>5.51</b>  | <b>17.72</b>  | <b>12.21</b>   | <b>5.51</b>          | <b>17.72</b>  |
| <b>Total Project Cost</b>                        | <b>145.11</b>    | <b>89.59</b> | <b>234.70</b> | <b>145.11</b>  | <b>89.59</b>         | <b>234.70</b> |

ADB = Asian Development Bank, EA = executing agency.

Sources: Bangladesh Power Development Board and Asian Development Bank estimates.

Table A8.2: Part B: Transmission System Efficiency Improvements  
(\$ million)

| Item   | Cost             |              |               | Financing Plan |                      |               |
|--|------------------|--------------|---------------|----------------|----------------------|---------------|
|  | Foreign Exchange | Local Cost   | Total Cost    | ADB            | Government and/or EA | Total         |
| <b>A Base Cost</b>                               |                  |              |               |                |                      |               |
| Preconstruction Cost                             | 0.04             | 13.72        | 13.76         | 0.04           | 13.72                | 13.76         |
| Civil Works                                      | 0.95             | 4.43         | 5.38          | 0.95           | 4.43                 | 5.38          |
| Transmission Lines                               | 32.98            | 0.00         | 32.98         | 32.98          | 0.00                 | 32.98         |
| Substations                                      | 47.90            | 0.00         | 47.90         | 47.90          | 0.00                 | 47.90         |
| Other Materials                                  | 3.11             | 0.39         | 3.50          | 3.11           | 0.39                 | 3.50          |
| Internal Transportation Cost                     | 0.00             | 2.81         | 2.81          | 0.00           | 2.81                 | 2.81          |
| Indirect Costs                                   | 3.28             | 17.03        | 20.31         | 3.28           | 17.03                | 20.31         |
| Duties and Taxes                                 | 0.00             | 29.40        | 29.40         | 0.00           | 29.40                | 29.40         |
| <b>Subtotal</b>                                  | <b>88.26</b>     | <b>67.78</b> | <b>156.04</b> | <b>88.26</b>   | <b>67.78</b>         | <b>156.04</b> |
| <b>B Contingencies</b>                           | <b>6.18</b>      | <b>7.46</b>  | <b>13.64</b>  | <b>6.18</b>    | <b>7.46</b>          | <b>13.64</b>  |
| <b>C Financing Charges During Implementation</b> | <b>10.65</b>     | <b>6.23</b>  | <b>16.88</b>  | <b>10.65</b>   | <b>6.23</b>          | <b>16.88</b>  |
| <b>Total Project Cost</b>                        | <b>105.09</b>    | <b>81.47</b> | <b>186.56</b> | <b>105.09</b>  | <b>81.47</b>         | <b>186.56</b> |

ADB = Asian Development Bank, EA = executing agency.

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

**Table A8.3: Part C: Distribution System Efficiency Improvements in DESA Area**  
(\$ million)

| Item   | Cost             |              |              | Financing Plan |                      |              |
|--|------------------|--------------|--------------|----------------|----------------------|--------------|
|  | Foreign Exchange | Local Cost   | Total Cost   | ADB            | Government and/or EA | Total        |
| <b>A Base Cost</b>                               |                  |              |              |                |                      |              |
| Preconstruction Cost                             | 0.00             | 1.57         | 1.57         | 0.00           | 1.57                 | 1.57         |
| Civil Works                                      | 0.00             | 1.85         | 1.85         | 0.00           | 1.85                 | 1.85         |
| Transmission and Distribution Lines              | 11.68            | 0.00         | 11.68        | 11.68          | 0.00                 | 11.68        |
| Substations                                      | 30.37            | 0.00         | 30.37        | 30.37          | 0.00                 | 30.37        |
| Other Materials                                  | 0.00             | 0.56         | 0.56         | 0.00           | 0.56                 | 0.56         |
| Indirect Costs                                   | 0.00             | 10.94        | 10.94        | 0.00           | 10.94                | 10.94        |
| Duties and Taxes                                 | 0.00             | 14.72        | 14.72        | 0.00           | 14.72                | 14.72        |
| <b>Subtotal</b>                                  | <b>42.05</b>     | <b>29.64</b> | <b>71.69</b> | <b>42.05</b>   | <b>29.64</b>         | <b>71.69</b> |
| <b>B Contingencies</b>                           | <b>2.94</b>      | <b>3.27</b>  | <b>6.21</b>  | <b>2.94</b>    | <b>3.27</b>          | <b>6.21</b>  |
| <b>C Financing Charges During Implementation</b> | <b>4.64</b>      | <b>2.46</b>  | <b>7.10</b>  | <b>4.64</b>    | <b>2.46</b>          | <b>7.10</b>  |
| <b>Total Project Cost</b>                        | <b>49.63</b>     | <b>35.37</b> | <b>85.00</b> | <b>49.63</b>   | <b>35.37</b>         | <b>85.00</b> |

ADB = Asian Development Bank, EA = executing agency.

Sources: Dhaka Electric Supply Authority and Asian Development Bank estimates.

**Table A8.4: Part D: Distribution System Efficiency Improvements in DESCO Area**  
(\$ million)

| Item   | Cost             |              |               | Financing Plan |                      |               |
|--|------------------|--------------|---------------|----------------|----------------------|---------------|
|  | Foreign Exchange | Local Cost   | Total Cost    | ADB            | Government and/or EA | Total         |
| <b>A Base Cost</b>                               |                  |              |               |                |                      |               |
| Preconstruction Cost                             | 0.00             | 0.52         | 0.52          | 0.00           | 0.52                 | 0.52          |
| Civil Works                                      | 0.00             | 0.76         | 0.76          | 0.00           | 0.76                 | 0.76          |
| Distribution Lines                               | 32.88            | 5.18         | 38.06         | 32.88          | 5.18                 | 38.06         |
| Substations                                      | 16.54            | 2.27         | 18.81         | 16.54          | 2.27                 | 18.81         |
| Transformers                                     | 7.70             | 0.46         | 8.16          | 7.70           | 0.46                 | 8.16          |
| Meters   | 11.10            | 0.65         | 11.75         | 11.10          | 0.65                 | 11.75         |
| Other Materials                                  | 14.68            | 0.92         | 15.60         | 14.68          | 0.92                 | 15.60         |
| Indirect Costs                                   | 0.14             | 11.88        | 12.02         | 0.14           | 11.88                | 12.02         |
| Duties and Taxes                                 | 0.00             | 29.59        | 29.59         | 0.00           | 29.59                | 29.59         |
| <b>Subtotal</b>                                  | <b>83.04</b>     | <b>52.23</b> | <b>135.27</b> | <b>83.04</b>   | <b>52.23</b>         | <b>135.27</b> |
| <b>B Contingencies</b>                           | <b>5.81</b>      | <b>6.84</b>  | <b>12.65</b>  | <b>5.81</b>    | <b>6.84</b>          | <b>12.65</b>  |
| <b>C Financing Charges During Implementation</b> | <b>11.32</b>     | <b>5.48</b>  | <b>16.80</b>  | <b>11.32</b>   | <b>5.48</b>          | <b>16.80</b>  |
| <b>Total Project Cost</b>                        | <b>100.17</b>    | <b>64.55</b> | <b>164.72</b> | <b>100.17</b>  | <b>64.55</b>         | <b>164.72</b> |

ADB = Asian Development Bank, EA = executing agency.

Sources: Dhaka Electric Supply Company Limited and Asian Development Bank estimates.

**Table A8.5: Part E: Capacity Development**  
(\$ million)

| Item   | Cost             |             |             | Financing Plan |                      |             |
|--|------------------|-------------|-------------|----------------|----------------------|-------------|
|  | Foreign Exchange | Local Cost  | Total Cost  | ADB            | Government and/or EA | Total       |
| <b>A Base Cost</b>                               | 4.40             | 3.40        | 7.80        | 4.40           | 3.40                 | 7.80        |
| <b>B Contingencies</b>                           | 0.54             | 0.40        | 0.94        | 0.54           | 0.40                 | 0.94        |
| <b>C Financing Charges During Implementation</b> | 0.06             | 0.00        | 0.06        | 0.06           | 0.00                 | 0.06        |
| <b>Total Project Cost</b>                        | <b>5.00</b>      | <b>3.80</b> | <b>8.80</b> | <b>5.00</b>    | <b>3.80</b>          | <b>8.80</b> |

ADB = Asian Development Bank, EA = executing agency.

Sources: Government of Bangladesh and Asian Development Bank estimates.

**Table A8.6: Summary Financing Plan**  
(\$ million)

| Source   | Foreign Exchange | Local Currency | Total Cost   | Percent      |
|--|------------------|----------------|--------------|--------------|
| <b>A. Long-Term Loans – Foreign Exchange</b>           |                  |                |              |              |
| 1. Asian Development Bank (ordinary capital resources) | 400.0            | 0.0            | 400.0        |              |
| 2. Asian Development Bank (Asian Development Fund)     | 5.0              | 0.0            | 5.0          |              |
| <b>Subtotal (A)</b>                                    | <b>405.0</b>     | <b>0.0</b>     | <b>405.0</b> | <b>59.5</b>  |
| <b>B. Government Loans – Local Currency</b>            |                  |                |              |              |
| 1. BPDB/NWPGC  | 0.0              | 35.8           | 35.8         |              |
| 2. PGCB  | 0.0              | 32.8           | 32.8         |              |
| 3. DPDC  | 0.0              | 14.1           | 14.1         |              |
| 4. DESCO   | 0.0              | 25.9           | 25.9         |              |
| <b>Subtotal (B)</b>                                    | <b>0.0</b>       | <b>108.6</b>   | <b>108.6</b> | <b>16.0</b>  |
| <b>C. Equity Injections/Internal Resources</b>         |                  |                |              |              |
| 1. BPDB/NWPGC  | 0.0              | 53.8           | 53.8         |              |
| 2. PGCB  | 0.0              | 48.7           | 48.7         |              |
| 3. DPDC  | 0.0              | 21.3           | 21.3         |              |
| 4. DESCO   | 0.0              | 38.7           | 38.7         |              |
| <b>Subtotal (C)</b>                                    | <b>0.0</b>       | <b>162.5</b>   | <b>162.5</b> | <b>23.9</b>  |
| <b>D. Government Budget Support to MPEMR</b>           | 0.0              | 3.8            | 3.8          |              |
| <b>Subtotal (D)</b>                                    | <b>0.0</b>       | <b>3.8</b>     | <b>3.8</b>   | <b>0.6</b>   |
| <b>Total</b>   | <b>405.0</b>     | <b>274.9</b>   | <b>679.9</b> | <b>100.0</b> |

BPDB = Bangladesh Power Development Board; DESA = Dhaka Electric Supply Authority; DESCO = Dhaka Electric Supply Company Limited; DPDC = Dhaka Power Distribution Company Limited; MPEMR = Ministry of Power, Energy and Mineral Resources; NWPGC = Northwest Power Generation Company Limited.

Sources: Government of Bangladesh and Asian Development Bank estimates.

## IMPLEMENTATION SCHEDULE

**Table A9.1: Part A: Clean Energy Capacity Expansion**

| Description  | Year<br>Month | 2006 |   |   |    |    | 2007 |   |   |   |   |   |   |   |   |   |    |    | 2008    |   |   |   |   |   |   |   |   |   |    |    | 2009 |   |   |   |   |   |   |   |   |   |    |    |
|--|---------------|------|---|---|----|----|------|---|---|---|---|---|---|---|---|---|----|----|---------|---|---|---|---|---|---|---|---|---|----|----|------|---|---|---|---|---|---|---|---|---|----|----|
|  |               | 7    | 8 | 9 | 10 | 11 | 12   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Consultant Services  |               |      |   |   |    |    | T CA |   |   |   |   |   |   |   |   |   |    |    |         |   |   |   |   |   |   |   |   |   |    |    |      |   |   |   |   |   |   |   |   |   |    |    |
| Design, supply, erection, testing and commissioning of 150 MW power plant at Sirajganj                                       |               |      |   |   |    |    |      |   |   |   |   |   |   |   |   |   |    |    | T CA DA |   |   |   |   |   |   |   |   |   |    |    | C    |   |   |   |   |   |   |   |   |   |    |    |
| Design, supply, erection, testing and commissioning of 150 MW power plant at Khulna  |               |      |   |   |    |    |      |   |   |   |   |   |   |   |   |   |    |    | T CA DA |   |   |   |   |   |   |   |   |   |    |    | C    |   |   |   |   |   |   |   |   |   |    |    |
| Supply, installation, testing and commissioning of 132kV underground cable for evacuation of power from Khulna power station |               |      |   |   |    |    |      |   |   |   |   |   |   |   |   |   |    |    | T CA DA |   |   |   |   |   |   |   |   |   |    |    | C    |   |   |   |   |   |   |   |   |   |    |    |

C = commissioning, CA = contract award, DA = design approval, kV = kilovolt, MW = megawatt  
Source: Asian Development Bank staff estimates.

Table A9.2: Part B: Transmission System Efficiency Improvements

| Description  | Year<br>Month | 2006 |   |   |    |    |    | 2007 |   |   |   |   |   |      |   |   |    |    |    | 2008  |   |   |   |   |   |       |   |   |    |    |    | 2009 |   |   |   |   |   |   |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |
|--|---------------|------|---|---|----|----|----|------|---|---|---|---|---|------|---|---|----|----|----|-------|---|---|---|---|---|-------|---|---|----|----|----|------|---|---|---|---|---|---|---|---|----|----|----|---|--|--|--|--|--|--|--|--|--|--|--|
|  |               | 7    | 8 | 9 | 10 | 11 | 12 | 1    | 2 | 3 | 4 | 5 | 6 | 7    | 8 | 9 | 10 | 11 | 12 | 1     | 2 | 3 | 4 | 5 | 6 | 7     | 8 | 9 | 10 | 11 | 12 | 1    | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |   |  |  |  |  |  |  |  |  |  |  |  |
| Consultant Services  |               |      |   |   |    |    |    | T    |   |   |   |   |   | CA   |   |   |    |    |    |       |   |   |   |   |   |       |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |
|  |               |      |   |   |    |    |    |      |   |   |   |   |   |      |   |   |    |    |    |       |   |   |   |   |   |       |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |
| Design, supply, erection, testing and commissioning of 400kV TL                                    |               |      |   |   |    |    |    |      |   |   |   |   |   | T    |   |   |    |    |    | CA    |   |   |   |   |   | LA DA |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    | C |  |  |  |  |  |  |  |  |  |  |  |
|  |               |      |   |   |    |    |    |      |   |   |   |   |   |      |   |   |    |    |    |       |   |   |   |   |   |       |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |
| Design, supply, erection, testing and commissioning of 230 kV, O/H and U/G TL                      |               |      |   |   |    |    |    |      |   |   |   |   |   | T    |   |   |    |    |    | CA    |   |   |   |   |   | LA DA |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    | C |  |  |  |  |  |  |  |  |  |  |  |
|  |               |      |   |   |    |    |    |      |   |   |   |   |   |      |   |   |    |    |    |       |   |   |   |   |   |       |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |
| Design, supply, erection, testing and commissioning of 132kV U/G TL                                |               |      |   |   |    |    |    | T    |   |   |   |   |   | CA   |   |   |    |    |    | DA    |   |   |   |   |   |       |   |   |    |    |    |      |   |   |   |   |   | C |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |
|  |               |      |   |   |    |    |    |      |   |   |   |   |   |      |   |   |    |    |    |       |   |   |   |   |   |       |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |
| Design, supply, erection, testing and commissioning of 132kV three O/H TL in west zone             |               |      |   |   |    |    |    | T    |   |   |   |   |   | CA   |   |   |    |    |    | LA DA |   |   |   |   |   |       |   |   |    |    |    |      |   |   |   |   |   | C |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |
|  |               |      |   |   |    |    |    |      |   |   |   |   |   |      |   |   |    |    |    |       |   |   |   |   |   |       |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |
| Design, supply, erection, testing and commissioning of 230/132kV GIS SS at Dhaka Old Airport       |               |      |   |   |    |    |    |      |   |   |   |   |   | T LA |   |   |    |    |    | CA    |   |   |   |   |   | DA    |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    | C |  |  |  |  |  |  |  |  |  |  |  |
|  |               |      |   |   |    |    |    |      |   |   |   |   |   |      |   |   |    |    |    |       |   |   |   |   |   |       |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |
| Design, supply, erection, testing and commissioning of 132/33kV GIS SSs in Dhaka                   |               |      |   |   |    |    |    |      |   |   |   |   |   | T    |   |   |    |    |    | LA CA |   |   |   |   |   |       |   |   |    |    |    |      |   |   |   |   |   | C |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |
|  |               |      |   |   |    |    |    |      |   |   |   |   |   |      |   |   |    |    |    |       |   |   |   |   |   |       |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |
| Design, supply, erection, testing and commissioning of 132/33kV SSs in west zone                   |               |      |   |   |    |    |    | T    |   |   |   |   |   | LA   |   |   |    |    |    | CA    |   |   |   |   |   | DA    |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    | C |  |  |  |  |  |  |  |  |  |  |  |
|  |               |      |   |   |    |    |    |      |   |   |   |   |   |      |   |   |    |    |    |       |   |   |   |   |   |       |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |
| Design, supply, erection, testing and commissioning of bay extensions in 230/132kV SSs in Dhaka    |               |      |   |   |    |    |    |      |   |   |   |   |   | T    |   |   |    |    |    | CA    |   |   |   |   |   | DA    |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    | C |  |  |  |  |  |  |  |  |  |  |  |
|  |               |      |   |   |    |    |    |      |   |   |   |   |   |      |   |   |    |    |    |       |   |   |   |   |   |       |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |
| Design, supply, erection, testing and commissioning of bay extensions in 132/33kV SSs in west zone |               |      |   |   |    |    |    | T    |   |   |   |   |   | CA   |   |   |    |    |    | DA    |   |   |   |   |   |       |   |   |    |    |    |      |   |   |   |   |   | C |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |
|  |               |      |   |   |    |    |    |      |   |   |   |   |   |      |   |   |    |    |    |       |   |   |   |   |   |       |   |   |    |    |    |      |   |   |   |   |   |   |   |   |    |    |    |   |  |  |  |  |  |  |  |  |  |  |  |

C = commissioning, CA = contract award, DA = design approval, GIS = gas insulated switchgear, kV = kilovolt, LA = completion of land acquisition and compensations, O/H = overhead, SS = substation, T = tender, TL = transmission line, U/G = underground.

Source: Asian Development Bank staff estimate

Appendix 9 65

Source: Asian Development Bank estimate.



## PROCUREMENT PLAN

**Project Information:** Construction of two 150 MW simple cycle gas turbine power plants; construction of 400 kV, 230 kV, and 132 kV transmission lines and associated substations; distribution upgrading, installing energy meters, and capacitors, etc.

|                    |   |
|--------------------|---|
| Country:           | Bangladesh  |
| Borrower:          | People's Republic of Bangladesh   |
| Project:           | Sustainable Power Sector Development Project  |
| Loan Reference:    | Project Number: 36107   |
| Effectiveness:     | Target: July 2007   |
| Amount:            | \$400 million   |
| Committed:         | \$400 million   |
| Executing Agencies | Part A: Bangladesh Power Development Board and its successor Northwest Power Generation Company Ltd.<br>Part B: Power Grid Company of Bangladesh Ltd.<br>Part C: Dhaka Power Distribution Company Ltd.<br>Part D: Dhaka Electric Supply Company Ltd.<br>Part E: Ministry of Power, Energy and Mineral Resources |

|   |                     |
|---|---------------------|
| Approval of Original Procurement Plan:    | not applicable      |
| Approval of Most Recent Procurement Plan: | not applicable      |
| Period Covered by this Plan:              | July 2006–June 2010 |

### Threshold: Goods and Related Services, Works, Supply and Installation

| Procurement Method                             | Threshold             |
|--|-----------------------|
| International Competitive Bidding (ICB) Works: | \$1,000,000 and above |
| ICB Goods/ Supply and Installation:            | \$500,000 and above   |
| National Competitive Bidding (NCB) Works:      | Below \$1,000,000     |
| NCB Goods/ Supply and Installation:            | Below \$500,000       |

### Procurement Threshold: Consulting Services

| Procurement Method                        | Threshold     |
|---|---------------|
| Quality- and Cost-Based Selection (QCBS): | All contracts |

**Table A10.1: Tentative Contract Package List**  
(\$ million)

| Contract No.   | Item Description  | Contract Type | Mode of Procurement/<br>Method of Consultant Selection | Estimated Contract Value |
|--|---|---------------|--|--------------------------|
| <b>Part A: Clean Energy Capacity Expansion</b>             |   |               |  |                          |
| 1  | Design, supply, erection, testing, and commissioning of peaking power plant (1x150 MW GT) and associated facilities at Sirajganj                      | Turnkey       | ICB  | 67.00                    |
| 2  | Design, supply, erection, testing, and commissioning of peaking power plant (1x150 MW GT) and associated facilities at Khulna                         | Turnkey       | ICB  | 73.00                    |
| 3  | 132 kV double circuit underground cable supply, laying, testing, and commissioning  | Turnkey       | ICB  | 4.50                     |
| 4  | Consultant Services   |               | QCBS   | 1.36                     |
| <b>Total (Part A)</b>                                      |   |               |  | <b>145.86</b>            |
| <b>Part B: Transmission System Efficiency Improvements</b> |   |               |  |                          |
| 1  | Design, supply, erection, testing and commissioning of Meghnaghat-Aminbazar 400 kV transmission line  | Turnkey       | ICB  | 10.00                    |
| 2  | Design, supply, erection, testing, and commissioning of Aminbazar-Old Airport 230 kV O/H and U/G transmission line                                    | Turnkey       | ICB  | 7.00                     |
| 3  | Design, supply, erection, testing and commissioning of Old Airport-Cantonment, Old Airport-University and Rampura-Ullon 132 kV U/G transmission line  | Turnkey       | ICB  | 10.00                    |
| 4  | Design, supply, erection, testing, and commissioning of Magura-Chuadanga, Naogaon-Joypurhat and Thakurgaon-Panchagar 132 kV O/H transmission line     | Turnkey       | ICB  | 11.00                    |
| 5  | Design, supply, erection, testing and commissioning of 230 and 132kV bay extensions in Meghnaghat and Aminbazar substations                           | Turnkey       | ICB  | 5.00                     |
| 6  | Design, supply, erection, testing, and commissioning of 230/132 kV GIS substation at Dhaka Old Airport  | Turnkey       | ICB  | 17.00                    |
| 7  | Design, supply, erection, testing, and commissioning of three 132/33 kV GIS substations in Dhaka  | Turnkey       | ICB  | 19.00                    |
| 8  | Design, supply, erection, testing, and commissioning of two new 132/33 kV substations and bay extension in two existing substations in Northwest Zone | Turnkey       | ICB  | 7.25                     |
| 9  | Design, supply, erection, testing, and commissioning of two new 132/33 kV substations and bay extension in one existing substation in Southwest Zone  | Turnkey       | ICB  | 6.25                     |
| 10   | Special maintenance tools and equipment   | Supply        | ICB  | 3.20                     |
| 11   | Consultant Services   |               | QCBS   | 1.35                     |
| <b>Total (Part B)</b>                                      |   |               |  | <b>97.05</b>             |

| Contract No.   | Item Description  | Contract Type | Mode of Procurement/<br>Method of Consultant Selection | Estimated Contract Value |
|--|---|---------------|--|--------------------------|
| <b>Part C: Distribution System Efficiency Improvements in DESA Area</b>  |   |               |  |                          |
| 1  | Design, supply, installation, testing, and commissioning of 10 nos. 33/11 kV upgraded substations   | Turnkey       | ICB  | 7.00                     |
| 2  | Design, supply, installation, testing, and commissioning of Shyampur 33/11 kV SS at existing switching station  | Turnkey       | ICB  | 1.00                     |
| 3  | Design, supply and installation of 132/33 kV transformers and associated materials at Mogbazar, Maniknagar and Shyampur 132/33 kV SS  | Turnkey       | ICB  | 5.00                     |
| 4  | Design, supply, installation, testing, and commissioning of 2 nos. new 132/33 kV SSs and conversion of one 132/33/11 kV SS to regular SS  | Turnkey       | ICB  | 16.00                    |
| 5  | Design, supply, installation, testing, and commissioning of 5 nos. new 33/11 kV SSs   | Turnkey       | ICB  | 7.00                     |
| 6  | Supply, installation, testing, and commissioning of 132 and 33 kV U/G cables  | Turnkey       | ICB  | 12.00                    |
| 7  | Design, supply, installation, testing, and commissioning of 132 kV O/H transmission lines   | Turnkey       | ICB  | 1.00                     |
| <b>Total (Part C)</b>  |   |               |  | <b>49.00</b>             |
| <b>Part D: Distribution System Efficiency Improvements in DESCO Area</b> |   |               |  |                          |
| 1  | Supply, Installation, testing, and commissioning of 33 kV U/G cables  | Turnkey       | ICB  | 15.00                    |
| 2  | Design, supply, installation, testing, and commissioning of 33/11 kV substations (new and upgrade)  | Turnkey       | ICB  | 18.00                    |
| 3  | Supply of cables, conductors, and accessories (Lot A: 11 kV U/G cables, lot B: 11 and 0.4 kV aerial conductors, lot C: 11 kV and LV poles, pole fittings and line hardware)   | Supply        | ICB  | 21.00                    |
| 4  | Supply of transformers, transformer protection equipment, switchgear and RMUs (lot A: 11/0.415 kV, 3-phase distribution transformers, lot - B: 11/0.23 kV, 1-phase distribution transformer, lot C: 11/0.415 kV packaged substation, lot D: Transformer protection equipment and lot E: 11 kV switchgear and RMU's) | Supply        | ICB  | 10.00                    |
| 5  | Supply of meters (lot A: 1-phase meters, lot B: 3-phase HT meters, lot C: 3-phase LT meters, lot D: remote metering units)  | Supply        | ICB  | 11.50                    |
| 6  | Supply of conductors and miscellaneous materials (lot A: Conductor and transformer loops, lot B: meter seals, lot C: sectionalizing switch, lot D: conductor accessories, lot E: insulators and insulator accessories, lot F: special maintenance tools and equipment, and lot G: capacitor banks)                  | Supply        | ICB  | 15.00                    |
| <b>Total (Part D)</b>  |   |               |  | <b>90.50</b>             |
| <b>Part E: Capacity Development</b>                                      |   |               |  |                          |
| 1  | Consultant Services   |               | QCBS   | <b>6.00</b>              |
| <b>Total (Part E)</b>  |   |               |  | <b>6.00</b>              |

GIS = gas-insulated substation, GT = gas turbine, HT = high tension, kV = kilovolt, LT = low tension, LV = low voltage, MW = megawatt, O/H = overhead, RMU = ring main unit, SS = substation, U/G = underground.

Sources: Executing Agencies and Asian Development Bank.

## SUMMARY POVERTY REDUCTION AND SOCIAL STRATEGY

### A. Linkages to the Country Poverty Analysis

|   |  |
|---|--|
| <b>Is the sector identified as a national priority in country poverty analysis?</b><br><input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No   | <b>Is the sector identified as a national priority in country poverty partnership agreement?</b><br><input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No |
| <b>Contribution of the sector/subsector to reduce poverty in Bangladesh:</b><br><p>Despite considerable progress, Bangladesh is still one of the world's poorest nations, with average per capita gross domestic product only marginally higher than the dollar-a-day international poverty standard. At present, only a third of the population has access to electricity, considered insufficient even by low-income country standards. In 2000, only 12% of the poorest households had electricity connections (3% in rural and 46% in urban areas). People who do have access to electricity receive poor, unreliable services with frequent power shortages and low voltage. The <i>Partnership Agreement on Poverty Reduction</i> between the Government of Bangladesh (the Government) and Asian Development Bank (ADB) emphasizes the need to provide reliable power supply to help reduce poverty.</p> <p>Provision of reliable power supplies is essential for sustained economic growth and other social services. The project loan is expected to reduce system losses, and improve quality of supply, leading to more efficient energy use and making more power available to support sustained economic growth. Expanding clean energy capacity and augmenting transmission grid and distribution systems are expected to result in efficient and more reliable service delivery, particularly benefiting commercial, residential, and agricultural consumers. More reliable power supply will help manufacturing and service industries, including the garment sector that employs several million poor people, particularly poor women. Agricultural production is also dependent on energy, especially electricity. Poor and vulnerable consumers, including hospitals, schools, and other social facilities, who are often the hardest hit by inadequate power supply, load shedding, and poor quality of power, are likely to benefit directly from the project loan. A positive, direct impact on local labor is expected during implementation of the project loan, and an indirect impact will also occur due to enhanced income-generating opportunities resulting from increased access to electricity. The ongoing multi-funding agency support to the Government's power sector reform is an indication of the importance the Government places on the sector's contribution to national development.</p> |  |

### B. Poverty Analysis

**Proposed Classification:** General intervention

#### What type of poverty analysis is needed?

The envisaged program and project loans, which follow the Power Sector Development Program approved in 2003, are expected to have indirect benefits on the lives of poor people who use small amounts of electricity and women who engage in micro-level production activities.

On the policy side, improved governance through financial stabilization, corporatization, and commercialization will result in better service to the public. The functioning independent regulator will provide transparent consultative procedures for issuing tariff rulings that protect consumer interests. Possible reduction in costs of products can be expected from price rationalization and efficiency gains. Employees will benefit from a new management structure and skills training. In the past, energy enterprises' losses have put huge pressures on the national budget, with adverse implications for macroeconomic stability and resource allocation for social spending, particularly for the poor. Capital expenditures, in 2002 amounting to Tk20 billion annually, or 15% of the Annual Development Program, are equivalent to 90% of total public spending on health and 40% of public education spending.

Continued sector reforms will facilitate power utilities to transition from ADB budget "sinks" to public revenue sources, freeing up government funds for critical social investments. Increased private sector participation is expected to benefit all power consumers. Indeed, the larger power plants operated by independent power producers currently produce the low-cost electricity. Reducing current subsidies to the power sector will increase Bangladesh's social capital, which will, in turn, stimulate economic growth, creating a "virtuous circle" of economic growth that will generate more Government revenue to fund social and poverty reduction spending.

Unstable power supply and peak period power cuts affect peoples' lives in various ways. The poor, and particularly women who work as front-line workers on a piece basis, are severely affected by power loss. Health clinics and diagnostic services are also seriously disrupted, as many units become nonoperational due to low voltage or have a shorter service life because of constant power outages. Water supply and streetlights are of poor quality due to power disruption. Students will benefit from longer study hours, information technology-based learning, and communications opportunities. Improved recreational facilities and better municipal services are expected to result from improved power supply. The project loan will reduce lost productivity due to power outages, reduce equipment damage and loss due to frequency fluctuations and low voltage, and reduce potential impairment of emergency services due to load shedding.

**C. Participation Process****Is there a stakeholder analysis?**☒ Yes ☐ No

Participation during project preparation: The executing agencies undertook consultations with local officials and village leaders that raised the level of awareness, built local support, and enabled affected people to voice opinions and suggestions for project design and implementation. The poor, women, and other vulnerable groups have been carefully considered in conducting participatory activities. As a part of social assessment, stakeholders' consultations in the project areas were carried out with the broad objective of ensuring extensive participation of all types of stakeholders. The participatory approach will be continued during implementation.

**Is there a participation strategy?**☒ Yes ☐ No

All stakeholders were actively involved in order to reduce or avoid negative impacts and ensure that benefits are fairly distributed. Local officials and affected communities were also involved in finalizing the design. In particular, ADB's consultants hired under the project preparatory technical assistance and the Power Grid Company of Bangladesh Limited's consultants, respectively, carried out independent surveys with affected communities at different stages during the project preparation and finalization of the design. Local authorities were also consulted to define the alignment along with members of civil society and nongovernment organizations. The survey results are provided in the full resettlement plan in Supplementary Appendix I.

**D. Gender and Development****Strategy to maximize impacts on women:**

The executing agencies will ensure that women and men are given equal opportunities for employment on the investment project. Contractors will be required to ensure equal payment for equal work.

**Has an output been prepared?** ☐ Yes ☒ No

**E. Potential Issues**

| Issues               | Significant/Not Significant/Uncertain /None  | Strategy to Address Issues   | Output prepared  |
|----------------------|--|--|--|
| <b>Resettlement</b>  | <input checked="" type="checkbox"/> Significant<br><input type="checkbox"/> Not significant<br><input type="checkbox"/> None | The project loan involves physical construction of transmission lines and substations and will require temporary and permanent land acquisition. A full resettlement plan (RP) is therefore needed.  | Full RP was prepared and disclosed on 19 July 2006 to all affected persons.<br><br><input checked="" type="checkbox"/> Full<br><input type="checkbox"/> Short<br><input type="checkbox"/> None |
| <b>Affordability</b> | <input type="checkbox"/> Significant<br><input checked="" type="checkbox"/> Not significant<br><input type="checkbox"/> None | Lifeline subsidies will be maintained, and affordability will be addressed by the independent regulatory as part of the tariff-setting process.  | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No   |
| <b>Labor</b>         | <input checked="" type="checkbox"/> Significant<br><input type="checkbox"/> Not significant<br><input type="checkbox"/> None | The Project will create temporary and long-term employment opportunities. Temporary opportunities will be created during construction; long-term employment is expected to increase with new economic activities resulting from the project. Better off land owners are likely to gradually shift to nonagricultural activities. | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No   |

**E. Potential Issues**

| <b>Issues</b>                           | <b>Significant/Not Significant/<br/>Uncertain /None</b>  | <b>Strategy to Address Issues</b>   | <b>Output prepared</b>   |
|---|--|---|--|
| <b>Indigenous People</b>                | <input type="checkbox"/> Significant<br><input type="checkbox"/> Not significant<br><input checked="" type="checkbox"/> None | The social survey undertaken during project preparation found no communities belonging to indigenous people and ethnic minorities in the affected areas. Therefore, preparing an indigenous people's development plan is not needed. The executing agencies are required to make sure that benefits are equally distributed to affected indigenous people, if any, as provided in the RP. | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No |
| <b>Other Risks/<br/>Vulnerabilities</b> | <input checked="" type="checkbox"/> Significant<br><input type="checkbox"/> Not significant<br><input type="checkbox"/> None | Lack of capacity of implementing agencies for social safeguard policy implementation, particularly related to land acquisition and public disclosure and consultation, could be a potential implementation risk.  | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No |

## SUMMARY RESETTLEMENT PLAN

### A. Scope of Land Acquisition and Resettlement

1. The proposed investment components comprise the following: (i) part A: clean energy capacity expansion, (ii) part B: transmission system efficiency improvements, (iii) part C: distribution system efficiency improvements in the Dhaka Electric Supply Authority area, and (iv) part D: distribution system efficiency improvements in the Dhaka Electric Supply Company Limited area. Of these, only part B is expected to have resettlement impacts, mainly temporary. A full resettlement plan (RP), salient points of which are identified in this summary, has been prepared by the Executing Agency (EA) of part B, Power Grid Company of Bangladesh Limited (PGCB). Part B consists of five transmission line subprojects:

- (i) about 50 kilometer (km) of 400 kilovolt (kV) line from Meghnaghat to Aminbazar and associated line bay extensions;
- (ii) about 4 km of 230 kV lines from Aminbazar to Kallyanpur, about 6 km of 230 kV underground cables from Kallyanpur to Old Dhaka Airport, associated line bay extensions, gas insulated system substations at Dhaka Old Airport, Dhaka University and Cantonment;
- (iii) about 73 km of 132 kV line from Magura to Chuadanga through Jhenaidah, two new 132/33 kV system substations in Magura and Chuadanga, and line bay extensions at existing Jhenaidah system substation;
- (iv) about 40 km of 132 kV line from Naogaon to Joypurhat, one new 132/33 kV system substation in Joypurhat, and line bay extensions at existing Naogaon system substations; and
- (v) about 45 km of 132 kV line from Thakurgaon to Panchagar, one 132/33 kV system substation in Panchagar.

2. The updated RP will be submitted for approval of the Asian Development Bank (ADB) prior to awarding civil contracts. Land acquisition and resettlement impacts of the subprojects have been assessed and are documented in the RP.

3. As shown in Table A12.1, field studies indicate that some 60 households owning some 26 acres along all the five transmission line routes will be affected by loss of agricultural land. Primarily, this will be due to the land being used for transmission tower footings. Of the 60 households, 35 are expected to permanently lose land to construction of system substations in the 132-kV lines subprojects. The total amount of land lost will be 26 acres.

**Table A12.1: Estimated Land Acquisition and Resettlement Impacts**

| Type of Resettlement Effect                      | Affected Households | Acres (% of total) |
|--|---------------------|--------------------|
| <b>A. Land</b>                                   | 60                  |                    |
| 1. Agriculture                                   |                     | 20 (77%)           |
| 2. Homestead                                     |                     | 1 (4%)             |
| 3. Low Land and Water Bodies                     |                     | 5 (19%)            |
| <b>Total Land</b>                                |                     | <b>26 (100%)</b>   |
| <b>B. Crops for Compensation in Right-of-Way</b> |                     | <b>1,600</b>       |

Sources: Power Grid Company of Bangladesh Limited.

## B. Policy Framework and Entitlements

4. The policy framework and entitlements for the Project are based on national law (*Acquisition and Requisition of Immovable Property Ordinance of 1982*) and ADB's Policy on Involuntary Resettlement (1995). The two policies are compared in Table A12.2.

**Table A12.2: Comparison of ADB Resettlement Policy with National Policies**

| ADB Policy   | Current National Policy and Reference to Document or Precedence                                     |
|--|---|
| Involuntary resettlement should be avoided where feasible.   | Same  |
| Where population displacement is unavoidable, it should be minimized by exploring all viable project options.  | Alternative placement or alignment preferred.   |
| People unavoidably displaced should be compensated and assisted so that their economic and social futures would be generally as favorable as they would have been in the absence of the project.   | That is the National Policy in Bangladesh. This has been strictly planned and is being implemented. |
| People affected should be informed fully and consulted on resettlement and compensation options.   | Presently considered as necessary by the Executing Agency and other agencies.                       |
| The absence of a formal legal title to land by some affected groups should not be a bar to compensation, particular with regard to households headed by women and such other vulnerable groups as indigenous peoples and ethnic minorities, and to whom appropriate assistance should be provided to help them improve their status. | This is now being considered, although it is not yet formalized.                                    |
| As far as possible, involuntary resettlement should be conceptualized and executed as a part of the project.   | This is now being considered, although it is not yet formalized.                                    |
| The full costs of resettlement and compensation should be included in the presentation of project costs and benefits.  | Under discussion in Bangladesh.   |
| Costs of resettlement and compensation may be considered for inclusion in ADB loan financing for the project   | Not yet applied.  |

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

5. The entitlement matrix, based on the relevant policies, is presented in Table A12.3.

**Table A12.3: Entitlement Matrix**

| Type of Loss  | Compensation Entitlements  | Entitled Persons  | Implementation Guidelines  | Agencies Responsibilities   |
|---|--|---|--|---|
| 1. Loss of Agricultural Land, Low Land, Shrimp Pond, etc. | (i) Cash compensation under the law (CCL), including 50% premium<br>(ii) Additional grant to cover replacement market value of land (if higher than CCL including premium)<br>(iii) Reimbursement of registration cost for purchase of replacement land<br>(iv) Tk125/day for 90 days for loss of income | (i) Legal owner(s) of land as determined by deputy commissioner<br>(ii) Legal owner(s) of land as determined by deputy commissioner<br>(iii) Legal owner of replacement land purchased during resettlement plan (RP) implementation | (i) Deputy commissioner will identify entitled person and determine CCL including 50% premium.<br>(ii) Replacement market price will be determined by Property Valuation Advisory Team (PVAT).<br>(iii) Reimbursement of registration cost will be at 22% of deed value not exceeding replacement market value of land determined by PVAT. | (i) Deputy commissioner will pay CCL plus premium.<br>(ii) PGCB will pay additional grant through NGO.<br>(iii) PGCB will refund registration cost through NGO. |
| 2. Loss of Access to Land by Tenant                       | (i) One-time cash grant for loss of income<br>b) Tk125/day for 90 days   | (i) Renter or user of the land identified by Implementing Agency or   | (i) One-time cash grant will be at Tk5,000 per family or Tk200 per decimal <sup>a</sup> of land concerned, whichever is  | (i) PGCB will pay one-time cash grant directly to the affected  |



| Type of Loss   | Compensation Entitlements   | Entitled Persons   | Implementation Guidelines  | Agencies Responsibilities   |
|--|---|--|--|---|
| Farmers and Sharecroppers                                      | for loss of income  | nongovernment organization (NGO)   | lower.   | persons through NGO.  |
| 3. Loss of Crops   | (i) CCL for standing crops<br>(ii) Differential between CCL and one-time cash grant for loss of crops by owners<br>(iii) Harvest of crops free of cost, if any  | (i) Legal owners as determined by deputy commissioner<br>(ii) Legal owners as determined by deputy commissioner<br>(iii) Legal owners<br>(iv) Sharecroppers<br>(v) Tenants<br>(vi) Non-titled land users   | (i) Deputy commissioner will determine compensation for standing crops.<br>(ii) Differential of CCL including premium and one-time cash grant at 0.6 kg per m <sup>2</sup> x Tk10 per kg, if higher.<br>(iii) Entitled person may harvest the standing crops before Executing Agency takes over land.  | (i) Deputy commissioner will pay CCL including 50% premium for standing crops.<br>(ii) PGCB will pay grant through NGO.<br>(iii) NGO will motivate entitled person to vacate land.                      |
| 4. Loss of Homestead, Commercial Industries                    | (i) CCL, including 50% premium for land<br>(ii) Additional grant to cover replacement market price of land (if higher than CCL including premium)<br>(iii) Reimbursement of registration cost for purchase of replacement land  | (i) Legal owners as determined by deputy commissioner<br>(ii) Legal owner(s) of land as determined by deputy commissioner<br>(iii) Legal owner of replacement land purchased during RP implementation<br>(iv) Non-titled affected persons  | (i) Deputy commissioner will identify the entitled person and determine CCL including 50% premium through legal procedures.<br>(ii) Replacement market price will be determined by PVAT.<br>(iii) Reimbursement of registration cost will be at 22% of the deed value not exceeding replacement market price of land determined by PVAT.   | (i) Deputy commissioner will pay CCL plus premium.<br>(ii) PGCB will pay additional grant through NGO.<br>(iii) PGCB will refund registration cost through NGO.   |
| 5. Loss of Residential, Commercial, Industrial Structure, etc. | (i) CCL, including 50% premium for land<br>(ii) Additional grant to cover replacement market price of structure (if higher than CCL including premium)<br>(iii) Transfer grant for moving of structure<br>(iv) Reconstruction grant<br>(v) Tk125 day for 90 days for loss of income | (i) Legal owner(s) of structure as determined by deputy commissioner<br>(ii) Legal and socially recognized owner(s) of structure<br>(iii) Legal and socially recognized owner(s) of structure, including non-titled affected persons<br>(iv) Legal owner(s) of temporary structure | (i) Deputy commissioner will identify the legal owner and determine CCL including 50% premium.<br>(ii) Replacement market price will be determined by PVAT.<br>(iii) Transfer grant will be at 10% of the assessed value of the structure by deputy commissioner or Tk2,000 per household, whichever is higher.<br>(iv) Reconstruction grant will be at 10% of the assessed value. | (i) Deputy commissioner will pay CCL plus premium.<br>(ii) PGCB will pay additional grant through NGO.<br>(iii) PGCB will pay additional grant through NGO.<br>(iv) PGCB will pay reconstruction grant. |
| 6. Other Impacts Not Identified                                | (i) Affected households or individuals<br>(ii) Vulnerable groups  | (i) Additional assistance. For vulnerable groups, 20% additional compensation  | (i) Unforeseen impacts will be documented and mitigated based on the principles agreed upon in the RP.   | (i) Executing Agency  |

CCL = cash compensation under the law, NGO = nongovernment organization, PGCB = Power Grid Company of Bangladesh Limited, PVAT = Property Valuation Advisory Team.

<sup>a</sup> decimal = 1/100 Acre

Source: Power Grid Company of Bangladesh Limited.

### **C. Information Dissemination, Consultation, Disclosure, and Grievance Redress**

6. Preparation of the RP involved consultations with stakeholders, particularly affected persons. Consultation showed that affected persons had positive views toward power sector development in Bangladesh and the implementation of the Project in their area. Their willingness to participate in project activities was confirmed during the consultation. A socioeconomic survey of affected persons has been undertaken. Information campaigns were held for affected persons to provide inputs to the RP. A resettlement information leaflet containing information on compensation and resettlement options has been made available in local language for distribution to affected persons. The EA conducted consultations with village and religious leaders. Each affected person has been provided information regarding specific entitlements. Disputes on entitlements can be forwarded to the resettlement unit for appropriate action. The RP has been disclosed on the ADB website, and information dissemination and consultation will continue throughout the project implementation period.

7. Grievance redress committees (GRCs) will be established for the subproject with representation from the EA, affected persons (including vulnerable groups), local government, and nongovernment organizations (NGOs). Other than disputes relating to ownership rights under a court of law, the GRC will review grievances involving all resettlement benefits, relocations, and other assistance forwarded by the EA's resettlement unit or affected persons. Grievances will be redressed within 2–4 weeks from the dates of lodging complaints. Appeals against GRC decisions can be addressed by affected persons to appropriate courts of law.

### **D. Compensation and Income Restoration**

8. The project activities will not involve displacement of people from their present homesteads and have only limited impact on the incomes and livelihoods of the affected persons. This RP was prepared to provide appropriate mitigation measures to look after the affected populations and all losses that might be incurred.

9. The socioeconomic survey data show that none of the acquired land will affect housing structures. A separate settlement area for relocating households will not be necessary. The socioeconomic survey indicated no plots of agricultural land to be converted for housing in the future. Houses on the transmission line rights-of-way will be discouraged, and an option for such households has been kept open if these affected persons would like to relocate and convert the house plot for another purpose, such as a garden or agriculture. The necessary compensation packages and budget (detailed in Table A12.4) will be available. Considering their potential vulnerability, particular attention will be given to female-headed households and renters. An affected person may choose a human resources development or occupational skills development option, and necessary training will be provided by selected training organizations or NGOs. Upon completion of such training, bank loan facilities will be extended in easy terms so that the affected persons can begin income generation programs. The program will be designed for sustainability and systematically monitored and evaluated.

10. The subprojects will affect a number of people from agricultural activities. Many of the affected persons may have to switch from agriculture activities to small-scale trading or become

day laborers. Compensation packages will be sufficient so that marginal farmers may make the switch, provided they have training or guidance from NGOs appointed for implementing the RP.<sup>1</sup>

## E. Institutional Framework and Resettlement Costs

11. The EA will engage a resettlement specialist and NGO, which will constitute a resettlement unit, and through which it will have overall coordination, planning, implementation, management and monitoring, and financing responsibilities for the RP. The EA will ensure that key institutions, including the local government, are involved in RP implementation. Further, experienced NGOs will be hired for RP implementation with clearly defined tasks, including training and community-based social development programs, as appropriate.

Table A12.4: Total Resettlement Budget for Subprojects  
(Tk million)

| Item  | 132 kV Magura–<br>Jhenaidah–<br>Chuadanga |              | 132 kV<br>Naogaon–<br>Joypurhat |             | 132 kV<br>Thakurgaon–<br>Panchagarh |              | 400 kV<br>Meghnaghat–<br>Aminbazar |             | 230 kV<br>Aminbazar–Old<br>Dhaka Airport |             |
|---|---|--------------|---------------------------------|-------------|-------------------------------------|--------------|------------------------------------|-------------|--|-------------|
|   | Land<br>(acres)                           | Budget       | Land<br>(acres)                 | Budget      | Land<br>(acres)                     | Budget       | Land<br>(acres)                    | Budget      | Land<br>(acres)                          | Budget      |
| Land for<br>Substations:                      | 10.0                                      | 45.00        | 0.6                             | 2.89        | 5.1                                 | 22.50        | 10.0                               | 0.69        | 0.0                                      | 0.00        |
| Rights-of-Way<br>for<br>Transmission<br>Lines | 392.0                                     | 4.38         | 248.0                           | 2.40        | 256.0                               | 2.70         | 672.0                              | 3.50        | 32.0                                     | 0.80        |
| <b>Total</b>                                  | <b>402.0</b>                              | <b>49.38</b> | <b>248.6</b>                    | <b>5.29</b> | <b>261.1</b>                        | <b>25.20</b> | <b>682.0</b>                       | <b>4.19</b> | <b>32.0</b>                              | <b>0.80</b> |

kV = kilovolt.

Sources: Power Grid Company of Bangladesh Limited.

## F. Monitoring

12. Internal monitoring by PGCB will deal with all aspects of land acquisition and resettlement at the subproject level. The project director or EA's resettlement unit will be responsible for monitoring the progress of resettlement activities at the subproject level. This will include (i) an information campaign and consultation with the affected persons, (ii) status of land acquisition and compensation payments, (iii) compensation for lost structures and assets, (iv) relocation of affected persons, and (v) payment of income-restoration assistance. Benchmarks for subproject level monitoring will come from land acquisition and the census.

13. The implementing NGO will conduct field-level monitoring and assess the daily operation of land acquisition and resettlement activities. The mechanisms to be used in field-level monitoring include (i) review of affected person files, (ii) informal sample survey of affected persons, (iii) key informant interviews, (iv) in-depth case studies, and (v) community and public meetings.

14. External monitoring involves review of resettlement implementation, in particular verification of the compensation, resettlement, and rehabilitation activities; verification of the grievance redress mechanisms utilization; and provision of feedback. The external monitoring

<sup>1</sup> Implementing NGOs will also liaise with PGCB and the contractors to assist the affected persons, especially women and other vulnerable persons, as feasible, to obtain employment during the construction period. The EA will make provision in the contractor contracts for preferential employment of qualified affected persons, including affected women, in subproject works.

shall also verify the results of internal monitoring in the field as well as consult with affected persons, officials, and community leaders for preparing review reports. The external monitoring will commence in the first quarter of project implementation and shall continue through the overall project implementation period.

15. The specific tasks and methodology for external monitoring shall include (i) review of pre-project baseline data on affected persons; (ii) identification and selection of an appropriate set of indicators for gathering and analyzing information on resettlement impacts; (iii) use of various formal and informal surveys for impact analysis; and (iv) assessment of the resettlement efficiency, effectiveness, impact, and sustainability while drawing lessons as a guide to future resettlement policy making and planning.

## SUMMARY INITIAL ENVIRONMENTAL EXAMINATION

### A. Introduction

1. Environmental assessment of the proposed policy reforms and investments under the Sustainable Power Sector Development Program (the Program) has followed ADB's environmental policy and assessment guidelines,<sup>1</sup> as well as the Government's environmental assessment regulations and guidelines. The executing agencies (EAs) of the Program have prepared an initial environmental examination (IEE) for each investment component. This summary IEE outlines key aspects of the proposed program, environmental benefits and negative impacts, proposed mitigation measures, and a preliminary environmental management plan (EMP).

2. The Program supports the Government's goal to provide electricity service to all the population by 2020, and it comprises policy and investment components. The program loan is to provide support and incentives to the Government for power sector reforms through financial stabilization and improved governance of sector entities. The investment components are linked to ongoing power sector reforms and will expand clean-fuel power generation capacity, enhance transmission network reliability, and improve quality of supply in Dhaka city and surrounding areas. Overall system efficiency will be improved. The investment components are presented in Table A13.1.

**Table A13.1: Investment Components**

| <b>Component / Executing Agency</b>   |
|---|
| <b>Part A: Clean Energy Capacity Expansion / BPDB</b><br>150 MW peaking power plants at Khulna and Sirajganj, plus associated switchgear and transmission facilities  |
| <b>Part B: Transmission System Efficiency Improvements / PGCB</b><br>400 kV transmission system, 50 kilometer (km) line from Meghnaghat to Aminbazar<br>230 kV transmission system improvements from Aminbazar to Dhaka Old Airport and Dhaka University<br>132 kV transmission system in western Bangladesh: 73-km line from Chuadanga to Jhenaida to Magura; 40-km line from Naogaon to Jaipurhat; 45-km line from Thakurgaon to Panchagar                    |
| <b>Part C: Distribution System Efficiency Improvements in DESA Area/DPDC</b><br>Upgrade of 10 substations; 5 new 33/11 kV substations.<br>2 new 132/33 kV substations to meet existing and new demand; 132- and 33-kV overhead lines and underground cables<br>Installation of transformers and associated equipment in 3 existing 132/33 kV substations and 33kV underground cables<br>Upgrading of a 11 kV switching station to a regular 33/11 kV substation |
| <b>Part D: Distribution System Efficiency Improvements in DESCO Area/DESCO</b><br>Gulshan distribution system upgrade: 4 new 33/11 kV substations<br>Mirpur distribution system upgrade: 2 new 33/11 kV substations   |
| BPDB = Bangladesh Power Development Board, DESA = Dhaka Electric Supply Authority, DESCO = Dhaka Electric Supply Company Ltd., DPDC = Dhaka Power Distribution Company Ltd., km = kilometer, kV = kilovolt, MW = megawatt, PGCB = Power Grid Company of Bangladesh Ltd.   |
| Sources: Government of Bangladesh and Asian Development Bank.   |

### B. Description of the Environment

3. The project components are located in four general areas: (i) the existing Goalpara power complex in Khulna (part A), (ii) west bank of the Jamuna River just south of the Jamuna River Bridge (part A), (iii) the Teesta and High Ganges basins and Himalayan piedmont areas of

<sup>1</sup> ADB. 2002 *Environment Policy of the Asian Development Bank*. Manila; and ADB. 2003. *Environmental Assessment Guidelines*. Manila.

western Bangladesh (part B3), and (iv) the Dhaka metropolitan area (parts B1, B2, C, and D). The project areas can be broadly classified as the greater lower basin of the Bairab, Jamuna, Meghna, and Padma river systems, typified by low-relief plains with large braided river channels. In low lying areas, housing and other structures are commonly built on 2–3 meter thick sand foundations to prevent flood damage.

4. Soils are typical of river floodplains, ranging from sands to clays derived from the greater Himalayan mountain range. Land use outside of Dhaka is dominated by agriculture, with average forest cover of about 10%. Surface water is commonly used for all purposes. Groundwater use is also common, but many areas of the country suffer from high concentrations of arsenic in groundwater. There are no sensitive, threatened, or endangered species in the areas directly impacted by the investment components, with the exception of Gangetic dolphins in the river systems.

5. Climate is subtropical monsoon with three seasons: (i) summer and pre-monsoon from March to May, (ii) monsoon from June to October, and (iii) winter from November to February. Temperatures are in the range 9–25° C in winter and 24–34° C in monsoon season. Annual average rainfall ranges from around 1,850 to 2,500 millimeters per year, concentrated during May–July, with higher average rainfall around Dhaka. Air quality is poor in the Dhaka area, mainly due to industrial and transport sources, but it has improved with the introduction of compressed natural gas for transport. Air quality outside the cities is much better, given the lack of industrial air pollution sources. Areas north and east of these rivers are in seismic zone II, which requires that man-made structures be built to withstand 0.05 g ground acceleration. Areas south and west of these rivers are in seismic zone I, with lower earthquake risk.

6. Socioeconomic conditions vary between urbanized areas of Dhaka and secondary cities in the western zone and the smaller towns and villages in the rural areas. Outside the Dhaka urban core is becoming heavily industrialized, with ex-urban growth steadily encroaching on agricultural land. Schools and public health services are readily accessible. About a third of the population currently has some electric power service, although quality and reliability are not uniform. More than 90% of the population has access to improved water supply, with piped water common in urban areas and wells common in rural areas. About half of the population has access to improved sanitation.

### **C. Anticipated Impacts and Mitigation Measures**

7. Environmental and social benefits will occur due to expanding the electric power network, which uses clean natural gas for power generation (replacing diesel generating sets, traditional wood fuel, and agricultural biomass energy), improving power system efficiency via new transmission and distribution capacity, and reducing aggregate technical and commercial losses via system upgrades. Environmental benefits include improved indoor air quality, reduced regional air pollutant loads, and offsetting growth in greenhouse gas emissions. The incremental power supplies from the Project will be sufficient to serve at least 6 million consumers at current per capita generation rates.

8. Potential adverse environmental impacts will be restricted to the areas associated with investment components, and can be avoided and minimized through careful site and route selection. Sites of the proposed subprojects have been selected to avoid acquisition of private land, minimize resettlement, and minimize negative environmental impacts. Table A13.2 summarizes the anticipated impacts during construction and operations. Overall, the Project will have minimal negative impacts and these can be cost-effectively mitigated.

**Table A13.2: Project Impacts and Mitigation Measures**

| <b>Types of Impacts</b>           | <b>Impact Sources</b>   | <b>Location of Sources</b>                              | <b>Pollutant or Parameter</b>   | <b>Treatment Measures</b>   |
|-----------------------------------|---|---|---|---|
| Noise: Construction Period        | Construction equipment and equipment repair yards                                   | Construction sites and access roads                     | 70 dBA at site boundary   | Equipment to meet local noise standards. Construction scheduling to avoid evening and nighttime disruption.               |
| Noise: Operational Period         | Power plant<br><br>400-kV transmission line and associated substations              | Turbine-generator sets<br><br>Outdoor Switchyards       | 70 dBA at site boundary   | Locate facility 70–100 m from nearest receptor. Use of walls, fencing, and/or greenbelt to provide partial sound barrier. |
| Wastewater: Construction Period   | Domestic wastewater   | Work site and construction camps                        | BOD, COD, fecal coliform  | Primary treatment if needed by larger camps   |
|                                   | Industrial wastewater from construction equipment maintenance                       | Equipment maintenance yards                             | Petroleum and detergent   | Sedimentation and biological treatment, if necessary.   |
| Wastewater: Operational Period    | Domestic wastewater   | Power plant and substations                             | BOD, COD, fecal coliform  | Primary treatment, if needed.   |
|                                   | Cooling water from Khulna and Sirajganj power plants                                | Outlet to Bhaidab and Jamuna Rivers                     | Temperature, pH, BOD, etc. to meet Government's industrial wastewater standards   | Passive cooling; primary and secondary treatment, as necessary.   |
|                                   | Industrial wastewater and oils from transformer replacement                         | Transformers being taken out of service                 | Mineral oil; possible oil with PCBs   | Off-site disposal at licensed treatment facility, or alternate on-site treatment as approved by pollution control board   |
| Air Quality: Construction Period  | Dust during construction and exhaust gases from construction machinery and vehicles | Construction sites, access roads, and surrounding areas | Increased TSP, NO <sub>2</sub> , SO <sub>2</sub> levels at construction sites and surrounding areas                           | Continuous management measures to be imposed at the construction sites.   |
| Air Quality: Operational Period   | Nitrogen oxide (NO <sub>x</sub> ) emissions from power plant                        | Khulna and Sirajganj power plants                       | NO <sub>x</sub> stack emissions standard: 30 ppm<br><br>Ambient air quality standard: 100 µg /m <sup>3</sup> (annual average) | Best available technology design; control through water injection, if necessary.  |
| Solid Wastes: Construction Period | Spoils from earth moving, construction debris                                       | Construction sites and workers' camps                   | Earth and domestic solid waste  | Spoils to be used as base material for substations and greenbelts.  |
| Solid Wastes: Operational Period  | Garbage from power plant and substations  | Power plant and Substations                             | Domestic solid waste  | Disposed at facilities approved by local government pollution control agencies.   |

BOD = biochemical oxygen demand, COD = chemical oxygen demand, dBA = decibels (measured in the audible range), kV = kilovolt, NO<sub>2</sub> = nitrogen dioxide, NO<sub>x</sub> = nitrogen oxides, PCB = polychlorinated biphenyl, ppm = parts per million, SO<sub>2</sub> = sulfur dioxide, TSP = total suspended particles, µg = microgram.

Sources: Initial environment examination reports of the executing agencies.

## D. Institutional Requirements and Environmental Management Plan

9. A safeguards implementation unit (responsible for environment, resettlement, and any other social development obligations) will be established at each of the EAs. All the EAs will assume primary responsibility for the environmental assessment and implementation of EMPs for their respective component. ADB will review and approve IEEs and EMPs prior to finalizing contracts and commencing work. ADB will review monitoring reports and officially disclose the IEEs on its website.

10. The IEEs include EMP covering (i) summary of potential impacts, (ii) mitigation measures, (iii) environmental monitoring, (iv) public consultation processes, (v) outline of responsibilities and authorities for implementing the proposed monitoring and mitigation activities, (vi) reporting and review procedures, (vii) work plan (including staffing and schedules of assigned personnel, as well as activities and inputs of other government agencies and stakeholders), (viii) environmentally responsible procurement plan, (ix) cost estimates, and (x) mechanisms for feedback and adjustment. Table A13.3 presents minimum provisions for environmental monitoring related to procurement and construction for the respective components. Estimated costs for mitigation and monitoring measures are in Table A13.4.

11. Detailed design work for each investment component will follow the recommendations of the IEE and EMP. The EAs will be required to certify to ADB that the detailed designs comply with IEE (including EMP) recommendations before contracts can be made effective.

**Table A13.3: Minimum Provisions for Environmental Monitoring**

| Environmental Monitoring Tasks <sup>a</sup>  | Implementation Responsibility  | Implementation Schedule  |
|--|--|--|
| <b>A. Preconstruction Phase</b>  |  |  |
| Audit project bidding documents to ensure environmental management plan (EMP) is included.   | Executing agencies (EA) through project management office and implementation units | Prior to issue of bidding documents                              |
| Monitor contractor's detailed alignment survey to ensure relevant environmental mitigation measures in EMP have been included.   | EAs through project management office and implementation units                     | Prior to EA's approval of contractor's detailed alignment survey |
| Audit detailed designs of power plant, 400 kV transmission line and associated substations, and distribution system expansion to ensure environmental safeguards and mitigation measures have been included. | EAs through project management office and implementation units                     | Prior to EA's approval of contractor's detailed designs          |
| <b>B. Construction Phase</b>   |  |  |
| Regular monitoring and reporting of contractor's compliance with contractual environmental mitigation measures.  | EAs through project management office and implementation units                     | Continuous throughout construction period.                       |
| <b>C. Operation and Maintenance Phase</b>  |  |  |
| Observations during routine maintenance inspections of substations and transmission lines rights-of-way. Inspections will include monitoring implementation status of mitigation measures specified in EMP.  | EAs  | As per EA's inspection schedules                                 |

EA = executing agency, EMP = environmental management plan, kV = kilovolt.

<sup>a</sup> Monitoring of issues related to compensation of landowners for land acquisition and loss of production, etc. will be included in the resettlement plan.

Sources: Initial environment examination reports of the executing agencies.



**Table A13.4: Summary of Estimated Costs for EMP Implementation**

| Item                                      | Sub-item                        | Total Cost <sup>a</sup> (\$) |
|---|---------------------------------|------------------------------|
| Monitoring activities                     | As detailed under EMP           | 500,000                      |
| Mitigation measures                       | As prescribed under EMP and IEE | 900,000                      |
| Independent audit and monitoring agencies | As described above              | 400,000                      |
| Contingency                               | 10% contingency                 | 200,000                      |
| <b>Total</b>                              |                                 | <b>2,000,000</b>             |

EMP = environmental management plan, IEE = initial environmental examination.

<sup>a</sup> Indicative cost estimated at 0.5% of total investment component cost.

Sources: Initial environment examination reports of the executing agencies.

## **E. Public Consultation, Information Disclosure, and Grievances**

12. Affected communities have been consulted during preparation of the Project in general and during the IEEs in particular. There is general support for the proposed investment components, as electricity service is expected to improve and some employment opportunities will be created.

13. Each IEE and EMP, and the summary IEE for the investment project, will be translated into local language and made available to the public. A grievance redress committee (GRC) will be established to address all concerns and grievances of the local communities and affected parties. The GRC will comprise representatives from local authorities and affected parties, along with other stakeholders as mutually agreed with the local authorities and affected persons. This committee will address the Project-related grievances of the affected parties and will provide them a public forum to raise their concerns or objections. A senior official from each EA will be assigned to the GRC. The GRC will be established in a manner that ensures easy access to communities and affected parties. The EAs will be responsible to disseminate information about the functional norms of the GRC. The committee will meet at least twice per year, and more frequently if required.

14. The EMPs will include provisions for both internal and external monitoring. The EAs will be responsible for internal monitoring of the EMP implementation and will forward twice-yearly progress reports to the Government and ADB. The reports will cover EMP implementation with attention to compliance and corrective action for noncompliant activities. An independent monitoring agency will be hired by the EAs with ADB concurrence for undertaking external monitoring of the entire project. The external monitoring agency will be selected within 3 months of loan approval. The monitoring agency shall report on a twice-yearly basis directly to ADB and determine whether sound environmental management practices have been achieved, and suggest suitable recommendations and remedial measures for midterm correction and improvement.

## **F. Conclusion**

15. The proposed investments will have minimal negative environmental impacts, and these can be successfully mitigated by implementing component-specific EMPs. Environmental and social benefits of the investment components and long-term program objectives outweigh the negative impacts. Based on environmental assessment activity conducted to date, and subject to ADB confirmation of environment categorization, there is no need for a full environmental impact assessment.