

**ASIAN DEVELOPMENT BANK  
Independent Evaluation Department**

**SECTOR ASSISTANCE PROGRAM EVALUATION**

**FOR**

**BANGLADESH ENERGY SECTOR**

In this electronic file, the report is followed by Management's response, and the Board of Directors' Development Effectiveness Committee (DEC) Chair's summary of a discussion of the report by DEC.



# Evaluation Study

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Project Number: SAP:BAN 2009-36  
Sector Assistance Program Evaluation  
October 2009

## Bangladesh: Energy Sector

Independent Evaluation Department

Asian Development Bank

## CURRENCY EQUIVALENTS

(as of 12 October 2009)

Currency Unit	–	Taka (Tk)
Tk1.00	=	\$0.14
\$1.00	=	Tk69.06

## ABBREVIATIONS

ADB	–	Asian Development Bank
ADF	–	Asian Development Fund
BERC	–	Bangladesh Energy Regulatory Commission
BOO	–	build-own-operate
BOOT	–	build-own-operate-transfer
BOT	–	build-operate-transfer
BPDB	–	Bangladesh Power Development Board
CAPE	–	country assistance program evaluation
CNG	–	compressed natural gas
COS	–	country operations strategy
CSP	–	country strategy and program
DESA	–	Dhaka Electric Supply Authority
DESCO	–	Dhaka Electric Supply Company Limited
DPDC	–	Dhaka Power Distribution Company
EGCB	–	Electricity Generation Company of Bangladesh
EMRD	–	Energy and Mineral Resource Division
GHG	–	greenhouse gas
GSRR	–	gas sector reform road map
GTCL	–	Gas Transmission Company Limited
IED	–	Independent Evaluation Department
IOC	–	international oil company
IPP	–	independent power producer
JICA	–	Japan International Cooperation Agency
LNG	–	liquefied natural gas
LTSF	–	long-term strategy framework
MPEMR	–	Ministry of Power, Energy and Mineral Resources
NWPGC	–	North West Power Generation Company
OCR	–	ordinary capital resource
PBS	–	Palli Bidyut Samities (rural electric cooperatives)
PCR	–	project completion report
Petrobangla	–	Bangladesh Oil, Gas & Mineral Corporation
PGCB	–	Power Grid Company of Bangladesh
PPER	–	project performance evaluation report
PSA	–	production-sharing agreement
PSOD	–	Private Sector Operations Division
PSRB	–	Power Sector Reforms in Bangladesh
REB	–	Rural Electrification Board
RPGCL	–	Rupantarita Prakritik Gas Company Limited
SAPE	–	sector assistance program evaluation
TA	–	technical assistance
TGTDCL	–	Titans Gas Transmission and Distribution Company Limited
USAID	–	United States Agency for International Development
WZPDC	–	West Zone Power Distribution Company

## WEIGHTS AND MEASURES

kW	–	kilowatt
kWh	–	kilowatt-hour
mmbtu	–	British thermal unit
MMCFD	–	million cubic feet per day
MW	–	megawatt
PSIG	–	pounds per square inch gauge
TWh	–	terawatt-hour

## NOTES

- (i) The fiscal year (FY) of the Government and its agencies ends on 30 June. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2000 ends on 30 June 2000.
- (ii) In this report, "\$" refers to US dollars.

### Key Words

adb, asian development bank, energy, gas, electricity, power sector, evaluation, Bangladesh, performance evaluation, development impact.

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DEC Chair Summary

The guidelines formally adopted by the Independent Evaluation Department (IED) on avoiding conflict of interest in its independent evaluations were observed in the preparation of this report. David Parish, Md. Abdul Bashir, and Delwar Bakht were the consultants. To the knowledge of the management of IED, there were no conflicts of interest of the persons preparing, reviewing, or approving this report.

## EXECUTIVE SUMMARY

### Sector Development Context

The Bangladesh power sector in 1994–1996 was in crisis because of the poor financial and operational performance of key power sector utilities. The commercial performance of the state agencies was poor as reflected by high power distribution losses, pilferage of electricity, noncollection of electricity bills, and high degree of outages due to lack of maintenance of the power generation plants owned by Bangladesh Power Development Board (BPDB). The corporate culture was highly politicized; the staff lacked incentives to improve performance and were constrained by bureaucratic controls. The sector was not in a position to undertake the urgently required investments and, because of poor cost recovery, could not attract private investments. The gas sector was in a relatively better position due to the commercial orientation of the public sector entities engaged in gas production and distribution. However, it lacked the financial and technical capacity to expand production capacity to meet the anticipated increase in the demand for gas.

By 2009, Bangladesh has achieved significant progress in reforming the power distribution and transmission sector. The reforms have improved the commercial performance of the sector by significantly reducing power distribution losses, and stabilizing bill collection and the operational performance of transmission system. The electrification ratio increased from about 10% in 1994 to over 37% in 2008 and electricity consumption in the country increased by over 100% during 1998–2008. However, power shortages increased during 2002–2008 due to insufficient public sector investments in power generation and failure to attract new investments from the private sector. Although Bangladesh managed to attract significant investments from the private sector for gas exploration and increased gas production by over 100% during 1998–2008, the country is again increasingly facing with gas shortages due to the rapid increase in demand for gas for power generation, for residential areas, and for industry. Given the high degree of dependence of the power sector on natural gas (over 85% of electricity is generated using natural gas), planning the development of the two sectors always require close coordination.

### Government Policy Response

In 1994, the Government adopted the Power Sector Reforms in Bangladesh (PSRB) policy paper in consultation with major development partners including the Asian Development Bank (ADB). The PSRB formed the basis for the power sector reforms undertaken during 1994–2008, with some minor adjustments, and ADB as the lead development partner for the energy sector played a leading role during the implementation of the PSRB. The following are the major functions of the PSRB:

- (i) Set up an independent regulatory body for the energy sector;
- (ii) Functionally unbundle the power distribution, transmission, and generation operations of poorly performing BPDB by setting up commercial entities based on a sound corporate governance framework with clearly defined targets for improving performance;
- (iii) Transform into a corporate entity the power distribution utility Dhaka Electric Supply Authority (DESA) serving Dhaka city;
- (iv) Attract private sector investments to power generation through a transparent solicitation process; and

- (v) Expand rural electrification through rural electricity cooperatives, which have been a success story in Bangladesh.

The Government policy in the gas sector during 1998–2008 was to attract private investments to upstream gas field development while improving the network coverage and operational efficiencies of national gas companies engaged in gas production and distribution. The promotion of gas as a transport fuel was also one of the key features of the Government strategy.

### **ADB Energy Sector Support Program**

As the lead development partner in the power sector, ADB has assisted the Government in all aspects of the PSRB, including (i) providing technical assistance for vertical unbundling of the power sector entities and setting up new companies with firm commercial basis for power distribution, transmission, and generation; (ii) providing investment financing for the newly set up companies for rehabilitating distribution networks and augmenting transmission systems; and (iii) promoting private sector investments in power generation through technical assistance to the Government in the solicitation process and financing of private sector investments through lending operations of the Private Sector Operations Department (PSOD).

During 1993–2008, ADB approved \$1,755.9 million of financial assistance (\$1,211.9 million from ordinary capital resources, \$5.0 million in grants, and \$539.0 million from the Asian Development Fund) to the energy sector in Bangladesh. This amounted to 29.6% of the total ADB lending to Bangladesh during 1993–2008. ADB lending operations consisted of 14 public sector project loans, and 1 grant assistance to finance 9 projects, 2 public sector program loans, and 1 nonsovereign loan. The power subsector was given nine loans amounting to \$1,291.3 million and the gas subsector was given five loans and one grant assistance amounting to \$414.6 million. During that period, ADB also provided 19 advisory technical assistance (TA) grants amounting to \$10.4 million.

### **Evaluation of ADB Assistance to the Energy Sector**

**Country Positioning.** The ADB energy sector strategy has been substantially aligned to address the key challenges facing the energy sector and it has provided appropriate assistance to address most, if not all, of the challenges. It has been highly responsive and flexible to the emerging challenges as demonstrated by support for peaking power plants through public sector operations when private sector investments did not materialize. ADB support for institutional reforms in the power sector has taken into account the political economy and the ability of the Government to manage the reform program. That is demonstrated by ADB's support for phased and gradual reforms, with each reform step leading to a higher level of reform, and with ADB assisting the Government at every stage of reform implementation. As the lead development partner, ADB succeeded in forming effective partnerships with other development partners and gave consistent advice to the Government over the evaluation period.

**Contribution to Development Results.** ADB has contributed to achieving key development outcomes such as (i) promoting commercial orientation and corporate governance of energy sector utilities, (ii) improving the performance and reach of power and gas transmission networks; and (iii) ensuring private sector investments in power generation. ADB's contribution to (i) increasing the electrification ratio of the country, (ii) increasing the production capacity of the gas sector, and (iii) establishing a regulatory framework for the energy sector is substantial. Overall ADB's contribution to development results is rated “substantial.”



## ADB Performance

ADB's performance in terms of quality of policy advice, long-term engagement with a consistent sector policy, leadership role demonstrated in coordinating development assistance, continuity of staff engagement, energy sector expertise of ADB staff involved in managing the Bangladesh energy sector program, recognition and acceptance of ADB as a trustworthy and knowledgeable development partner by the relevant stakeholders is rated "substantial." ADB also had highly competent national staff in the Resident Mission who has been closely involved in policy dialogue and project implementation.

Combining the strategy and program assessments, the overall performance of ADB assistance to the the Bangladesh energy sector is rated "successful."

**Relevance.** The program of assistance that ADB provided during the sector assistance program evaluation (SAPE) period has been "highly relevant" to Bangladesh's energy sector needs, especially in promoting commercialization and removing power transmission constraints. A consistent and coherent thread runs through operations over the past 15 years. Investment has been undertaken, with the new companies as the executing agencies. Institutional and regulatory reforms promoting private sector investment in power generation and network expansion in the power and gas sectors were the key themes of the assistance program. Those themes are highly relevant to the Government strategy. Change has been gradual, and successive loans and TA have taken the program forward in a logical and consistent way, focusing on the highest investment priorities.

**Efficiency.** The resources provided by ADB have resulted in "efficient" use. Contributions to the efficiency improvement in the sector as well as returns on investments have been satisfactory. The completed projects have an economic internal rate of return of over 12%, indicating that the economic benefits have exceeded the economic costs. The intended project outputs have been achieved within the cost estimates, although with delays of several years. The new corporate entities set up under ADB assistance have better managerial efficiencies and lower cost of service delivery. ADB-supported projects and TA also increased the efficiency of power and gas distribution networks through reduced technical losses and pilferage, and improved cost recovery. However, ADB-supported peaking power plants are likely to be used initially as baseload power plants, resulting in inefficient use of scarce gas resources.

**Effectiveness.** All the completed and substantially completed projects have delivered their intended physical outputs and also development outcomes. Most of the investment and TA projects have produced the expected physical outputs and institutional and policy reforms. The level of service delivery in both the power and gas sectors has expanded considerably, as measured by both output and number of customers. However, TA and policy dialogue on private sector investments in power generation have not been effective in attracting new investments since 2002 due to governance issues on the part of the Government and lack of interest from experienced and competent investors.

**Sustainability.** The investments and policy reforms are as a whole "likely to be sustainable" from the financial and institutional points of view. The sense of ownership is strong and management in the utilities set up with ADB assistance is competent. The utilities are profitable and some are even listed in the stock market. The cost recovery in the energy sector is improving due to reduced transmission and distribution losses, and higher bill collection. Although both gas and power tariffs are set at levels below full cost recovery at present, the required tariff adjustments (below 20% for gas and below 30% for power) would still leave

Bangladesh with the lowest energy prices in South Asia. However, the capacity of the Bangladesh Energy Regulatory Commission (BERC) to conduct a comprehensive review of gas and power tariffs and implement price adjustments in the face of likely opposition from consumer groups is not yet proven. The outstanding liabilities of the power sector to the Government and account receivables of the power sector from delinquent customers are legacy issues and do not threaten the overall sustainability of the sector.

**Impact.** The impact of ADB assistance in terms of institutional reforms and improvement in sector performance is "substantial." ADB was clearly the lead development partner in the energy sector during 1994–2008. ADB's policy advice, and TA and financial support were instrumental in transforming the poorly performing power sector in the 1990s into several well-managed and profitable companies engaged in power transmission and distribution. ADB was also instrumental in introducing compressed natural gas (CNG) as a transport fuel through Dhaka Clean Fuel Project. ADB-financed power and gas transmission projects had a direct impact on the availability of power and gas to several parts of the country. However, the lack of investments in power generation has prevented the intended beneficiaries from realizing the full benefits of improved power distribution and transmission networks.

### **Key Findings and Issues**

While the ADB assistance has made significant contributions towards improving the energy sector corporate governance, institutional reforms, expanding the coverage and access to electricity and gas networks, increasing the power generation and gas production capacity, there are several key findings that can be taken into account to make the ADB's future energy sector operations more relevant to addressing the outstanding development challenges of the sector outlined in para. 27 and 29.

**Promotion of the Power Sector Reform Program.** ADB has played a significant and influential role in promoting the far-reaching sector reform program implemented by the Government in the power sector. ADB engaged the Government in policy dialogue and provided TA to prepare the PSRB in 1994 and to update it to give it greater clarity and focus in 2000 and 2006. ADB provided targeted TA to implement the corporatization of power distribution and transmission operations of BPDB. ADB also financially supported the newly created entities to address the outstanding financial obligations and to undertake the new investments for network expansion and rehabilitation. ADB's activities have demonstrated the effectiveness of long-term engagement, extensive sector knowledge, and critical mass of lending and nonlending assistance even in difficult environments such as Bangladesh.

**Approach to Reform Implementation.** ADB's phased and gradualist approach to reform implementation has been successful. Although there were initial setbacks, over time, the reforms have proved their worth and demonstrated increases in efficiency and quality of service. This highlighted the importance of long-term engagement, continuity and appropriate sequencing of assistance provided even if early results were not promising. The high degree of acceptability of ADB by the relevant stakeholder as a reliable and knowledgeable development partner with adequate understanding of political economy and reform implementation capacity of the government was one of the main contributory factors to the success in ADB's support for reform implementation.

**Persistent Power Shortages.** Power shortage has persisted throughout the evaluation period and the current situation in the power sector reflects a critical shortage of base load capacity. The major ADB- and World Bank-funded investments currently in progress are not

likely to help solve this problem as these projects are not aimed at adding base load generation capacity. The government's policy of expecting the private sector to develop independent power producers (IPPs) for base load capacity while providing development partner support for peaking plants has not proved successful due to variety of reasons ranging from poor investors climate for foreign investments, governance issues associated with solicitation of investments for power generation, uncertainties over gas supply and lack of domestic private sector investors capable of investing in power generation projects. The reasons for past failures in IPP solicitation in the power sector could be properly understood and necessary steps could be taken to prevent similar failures in the future. The public sector financing of power generation sector should also be considered as an option while continuing to support the solicitation of private sector investments in power generation.

**Corporatization of BPDB Operations.** The recent attempts to corporatize the remaining operations of BPDB have not been successful due to increased resistance from the stakeholders. Corporatization of BPDB's generation function and power distribution in the northwestern zone<sup>1</sup> has not resulted in the expected outcomes. BPDB's generation function requires a significant restructuring to improve its operational performance (i.e., plant efficiencies and availability). BPDB also requires a major financial restructuring, including a write-down of outstanding liabilities to the Government. The World Bank is providing assistance to the Government on this area.

**Over dependency on natural gas is threatening the energy security of the country.** Bangladesh is heavily dependent on natural gas to meet its primary commercial energy demand in power generation, industrial and residential sectors. The country's current level and projected increased in gas production proven gas reserves are inadequate to meet the anticipated demand for natural gas. Hence, there is need for continued involvement including ADB to support the public sector gas companies to maintain the production levels of existing gas fields while supporting policy reforms to attract new investments to develop new gas fields. In the short term, it is more appropriate in the short term to focus further investments in gas transmission and distribution sector to remove the bottlenecks in gas transmission and efficiency improvement (i.e., loss reduction) in gas distribution.

**Price of Gas Resources.** The present policy of making the country's gas resources available to users at a minimal price is unsustainable. Costs will rise as increasing quantities of available gas come from international oil companies. Furthermore, the present price of gas does not provide sufficient cash flow to support further gas exploration.<sup>1</sup> There is scope for significant increases in gas and electricity prices as a means to ration the demand for gas in the short to medium term. This is an economically more efficient way of controlling the demand for gas and electricity than the prevailing practice of load shedding during peak hours and cutting off gas supply to industrial consumers and power plants. The current policy of subsidizing gas prices is not a good signal from the power sector to encourage more efficient use of the gas resource. The prevalence of less efficient open-cycle gas turbines and gas-fired steam plants may be prompted by low gas prices in Bangladesh, and if the gas is priced at its true economic value, more efficient power generation technologies could be deployed.

**More Emphasis on Diversified Energy Supplies, Efficiency Improvement, and Regional Cooperation.** Bangladesh has ample opportunities to further improve in supply-side efficiency especially in power generation. Improving end-user energy efficiency can be

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<sup>1</sup> Loan 2038-BAN: *Power Sector Development Project* approved for \$100.0 million on 10 December 2003 supported the creation of the North Western Power Distribution Company.

promoted through tariff reforms, removal of implicit subsidies in gas and electricity tariffs, and installation of meters for residential gas consumers. ADB may encourage the Government to make a decision on the development of Bangladesh's domestic coal resources, with appropriate safeguards to mitigate adverse impacts. It may also be possible to import power from neighboring countries and promote renewable forms of energy such as wind power and converting waste to energy.

## **Lessons Learned**

**Programmed Lending Linked to a Road Map.** Programmed lending for investments linked to an agreed-upon medium-term road map for sector reforms can achieve development impacts even in difficult environments. ADB assistance to Bangladesh during 1994–2008 was closely linked to the gradual and phased implementation of the PSRB. ADB has taken into account the reform implementation capacity and political economy issues at play and provided TA grants to implement reforms and investment loans that were conditional upon achieving certain milestones in the PSRB. The new corporate entities established as part of the reform process became the key recipients of ADB financing. This created adequate incentives for the Government to implement the subsequent steps of the PSRB.

**Corporate Governance.** Improved corporate governance, managerial autonomy, and performance-based incentives can significantly change institutional performance even if there is no change in ownership and personnel. The improved operational and managerial performance due to the commercialization and corporatization of Power Grid Company of Bangladesh (PGCB) and DESCO has demonstrated that full privatization alone is not an essential requirement for improved performance; appropriate incentives must be provided to the management.

**Attracting Private Foreign Investments.** Earlier success in attracting private foreign investments to power generation does not guarantee continued private sector investments in a country like Bangladesh with a weak investment climate. The changes in investor perception as a result of the 1997 Asian crisis and the failure of large IPP investors such as Enron, lack of domestic investors capable of investing in power generation, and the inability of the Government to maintain the same degree of professional and transparent decision making have combined to contribute to the failure of successive rounds of bidding for IPPs. This was not anticipated by the policy makers and development partners and greater account should have been taken of these risks in deciding development partner support for the power generation sector.

**Investment of the Domestic Private Sector in New Industries.** The domestic private sector is capable of investing in relatively capital-intensive new industries like CNG supply, if appropriate incentives and policy regimes are established. ADB has financed the public infrastructure (i.e., gas pipelines), regulatory framework, and technical and safety regulation through capacity building for relevant authorities, and investment financing for the private sector through the banks.

**Headquarters Staff and Resident Mission Officers.** Continuity of senior headquarters staff and increased involvement of competent and senior national officers from the Resident Mission made a significant impact on the performance of ADB in delivering energy sector assistance to Bangladesh. There was a high degree of continuity of headquarters staff with a core team of 2–3 senior staff members responsible for maintaining the policy dialogue and processing of ADB investments during the evaluation period of 1994–2008. ADB staff demonstrated a high degree of sector expertise, enabling ADB to gain respect and credibility from the Government and other development partners. The Bangladesh Resident Mission is

perhaps unique among ADB resident missions because it has very senior and competent national officers responsible for implementing projects, monitoring progress in sector reforms, and conducting day-to-day policy dialogue with key decision makers.

This SAPE puts forward the following recommendations for consideration by ADB Management in formulating country strategy and operations for Bangladesh in the energy sector.

Recommendations	Responsible Department	Time Frame
<p><b>Encourage the Government to address the price subsidies in energy sector (paras. 77, 115, 122 Appendix 1 paras. 21 – 24 and Appendix 2 para. 14)).</b></p>	SARD	2010
<p>(i) Support the Government and in particular BERC in undertaking a comprehensive energy pricing study to understand the linkages between natural gas pricing and electricity pricing, industrial competitiveness, fiscal impacts of price adjustment; and impacts on consumer welfare and energy efficiency improvements with due recognition given to underlying political economy issues (paras. 77 and 115).</p>		
<p>(ii) Proactively encourage the Government and in particular BERC in addressing the issue of energy price subsidies (para. 77) through policy dialogue.</p>		
<p><b>Promote improvement of supply side and demand side energy efficiency (paras. 65, 113, 116, 123, Appendix 1 para. 6).</b></p>	SARD	2011/12
<p>(i) Include investment components in ADB's future assistance to improve the thermal efficiency and availability of existing power plants, provided the investments takes place under the ownership and management of recently established public sector generation companies operating at arm's length from BPDB (paras. 116, 123).</p>		
<p><b>Increase efforts to attract new investments to power generation (paras. 14, 27, 71, 111, 112 119, 124).</b></p>	SARD	2011/12
<p>(i) Increase efforts to promote commercialization of the generation operations of BPDB and to promote public private partnerships in power generation. (paras. 27, 114).</p>		
<p>(ii) Consider financing public sector baseload power generation plants using more efficient technologies to compliment the on-going efforts to solicit private investments subject to government agreeing to commercialize the generation operations of BPDB (paras. 92, 111, 112, 119, 124).</p>		
<p>(iii) Consider advising the government on environmentally and socially sustainable</p>		

development of the coal sector as a means to promoting fuel diversity and energy security in Bangladesh (para. 116).

**Promote regional trading in the power sector (paras. 70, 116, 125).**

SARD

2011/12

- (i) Increase emphasis on promoting regional trading in electricity to enable Bangladesh to benefit from the hydropower resources in neighboring countries (para. 125).
  - (ii) Take advantage of ADB's position to assume the role of honest broker in facilitating power transmission connectivity between India and Bangladesh for mutual benefit (para. 70).
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## I. INTRODUCTION

### A. Objective and Scope

1. The objective of this sector assistance program evaluation (SAPE) is to provide a sector-level independent assessment of the Asian Development Bank's (ADB) assistance to the energy sector in Bangladesh. Bangladesh has undertaken far-reaching institutional reforms to improve the performance of the energy sector utilities in the country with active assistance from development partners since 1993. ADB has been the leading development partner in the energy sector. Its assistance to the energy sector was suspended in 1989, but it was resumed in supporting the Government's sector reform program adopted in 1994 and covering both power and gas subsectors. This SAPE covers all the lending and nonlending assistance to the gas and power sectors during 1993–2008. The previous SAPE for Bangladesh, undertaken in 2003,<sup>1</sup> was limited to the power sector. As of 2003, most of the impacts of the reforms had not been fully realized and the sustainability of the reforms had not been established. The SAPE findings are intended to feed into the country assistance program evaluation (CAPE) being carried out by the Independent Evaluation Department (IED) and to provide inputs to ADB's future operation in the energy sector in Bangladesh.

### B. Evaluation Framework and Methodology

2. The evaluation framework for the SAPE draws on the guidelines<sup>2</sup> for preparing CAPE reports and follows a top-down/bottom-up approach. The top-down assessment comprises three separate assessments: (i) strategic, (ii) contribution to development results (value addition of ADB support), and (iii) ADB's performance. The bottom-up assessment considers the criteria of relevance, effectiveness, efficiency, sustainability, and impact.

3. The evaluation methodology includes on a review of documents and other relevant studies, review of the performance of the portfolio, and discussions between ADB staff and officials of Government agencies concerned with the Bangladesh energy sector. An independent evaluation mission (IEM) was fielded during 10–24 May 2009, and the evaluation incorporates the results of the IEM's interviews to gather data. As part of the SAPE, the project performance evaluation reports (PPER) for two public sector projects<sup>3</sup> and one nonsovereign project<sup>4</sup> were prepared and the findings of the PPERs were incorporated into the bottom-up assessment of ADB's energy sector assistance program.

### C. Findings of Earlier Evaluations

4. The 2003 Bangladesh Power Sector SAPE assessed the performance of ADB's assistance to the power sector for 1973–2000, consisting of 16 public sector loans and 1 nonsovereign investment for a total of \$1.122 billion (15% of ADB's portfolio in Bangladesh at that time), and 19 technical assistance (TA) grants for \$8.8 million. The 2003 SAPE did not include ADB assistance to the gas sector.

5. The 2003 SAPE found that the Bangladesh power sector faced financial and institutional problems. However, it noted that some of the recently established power sector entities were

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<sup>1</sup> ADB. 2003. *Sector Assistance Program Evaluation of Asian Development Bank Assistance to Bangladesh Power Sector*. Manila.

<sup>2</sup> ADB. 2006. *Guidelines for the Preparation of Country Assistance Program Evaluation Reports*. Manila.

<sup>3</sup> ADB. 2006. *Guidelines for Preparing Performance Evaluation Reports for Public Sector Operations*. Manila.

<sup>4</sup> ADB. 2007. *Guidelines for Preparing Performance Evaluation Reports for Nonsovereign Operations*. Manila.

profitable and showed signs of evolving into sustainable entities. The continuous poor performance of the Bangladesh Power Development Board (BPDB) and Dhaka Electric Supply Authority (DESA) was identified as reasons for continued and deepening reforms. At the strategic level, ADB's approach to sector reform based on pilot testing and learning by doing was found to be successful. ADB assistance was rated as relevant in addressing the changing needs of the sector and ADB's consistent support was cited as a key factor in the commercialization drive of the sector. The ADB-financed projects were found to be effective and efficient although they achieved their objectives with some significant delays. ADB assistance was also highly effective in facilitating private sector investments for installed capacity of over 1,000 megawatts (MW).

#### **D. Organization of the Report**

6. Section II describes the conditions of the energy sector at the beginning of the evaluation period in 1994–1995, how changes had evolved by mid-2001, and the present status of the sector as of 2008. It also explains the key development challenges faced by the sector at the beginning of the evaluation period and at present. Section III presents the Government's policy response to the development challenges facing the sector; and Section IV, ADB's strategy and assistance program, which addressed sector issues and challenges. Section V discusses top-down assessment, and Section VI assesses the performance of ADB's program. Section VII summarizes the SAPE's overall energy sector performance ratings. The last section identifies conclusions, key issues, lessons identified, and recommendations and options for improving ADB's partnership with Bangladesh in the energy sector.

## **II. SECTOR DEVELOPMENT CONTEXT**

### **A. Background and the Institutional Context**

7. Bangladesh's energy sector is highly dependent on natural gas. Natural gas is the main source of primary energy, contributing over 61% of the commercial energy supply in 1994 and increasing to over 70% in 2008. It has been the primary energy source (85%–90%) used in power generation. Close to 57% (i.e., inclusive of captive power generation) of the country's natural gas production is used in power generation. Given the importance of natural gas as primary energy supply and electricity in final energy consumption, the energy sector in Bangladesh is dominated by the natural gas and power subsectors.

8. The Ministry of Power, Energy and Mineral Resources (MPEMR) are responsible for overall sector policy formulation, investment decisions and regulation of the energy sector in Bangladesh.. The Energy and Mineral Resources Division (EMRD) of MPEMR is responsible for developing the oil, gas, and coal sectors to diversify energy supply and improve energy security while the Power Division of MPEMR is responsible for implementing the power sector reforms and ensuring adequate power generation capacity. The Bangladesh Energy Regulatory Commission (BERC) was set up in 2004 and its mandate includes (i) setting electricity and gas prices, (ii) setting performance norms for sector entities. (iii) reviewing, and approving long-term development plans for the gas and power sectors, and (iv) resolving disputes among sector entities.

9. In 1994, BPDB, operating under the supervision of MPEMR, was responsible for planning, constructing, and operating power generation and transmission facilities throughout the country and power distribution in urban areas except Metropolitan Dhaka and its adjoining areas. DESA was responsible for electricity distribution in the greater Dhaka area. The Rural



Electrification Board (REB) was responsible for power distribution in rural areas through a system of cooperatives known as Palli Bidyut Samities (rural electric cooperatives [PBSs]).

10. During 1996–2000, several changes were made to the institutional arrangements in the power sector. The Power Grid Company of Bangladesh (PGCB) was established to gradually take over the operation of the high-voltage power transmission network (230 kilovolts [kV] and 132 kV) from BPDB. The Dhaka Electric Supply Company (DESCO) was established to take over power distribution in parts of Dhaka from DESA. PGCB and DESCO were established on a commercial basis as Government-owned companies under the Companies Act. Several privately owned power generation projects were also established during this period as independent power producers (IPPs) selling electricity to BPDB. Some distribution areas were transferred from BPDB and DESA to PBSs.

11. Further institutional reforms were undertaken during 2001–2008. More distribution zones in Dhaka were transferred to DESCO from DESA, the West Zone Power Distribution Company (WZPDC) was established in 2001 to take over power distribution from BPDB in the western part of the country, and the Dhaka Power Distribution Company (DPDC) was established in 2006 to take over the remaining operations of DESA. WZPDC and DPDC were also established under the Companies Act as Government-owned companies. In the generation sector, the Ashunganj Power Company Limited was created to take over the power station at Ashunganj, and the Electricity Generation Company of Bangladesh (EGCB) and North West Power Generation Company (NWPGC) were established to implement several power generation plants financed by ADB and the World Bank.

12. The Government established the Bangladesh Oil, Gas & Mineral Corporation (Petrobangla) in 1972 to consolidate the state-owned natural gas sector operations. The mandate of Petrobangla is to (i) explore and develop natural gas and other mineral resources; (ii) coordinate the production, transmission, distribution, and marketing of natural gas resources through subsidiary companies; (iii) conduct oil and gas exploration activities; and (iv) enter into production sharing contracts (PSC) with international oil companies (IOCs) for exploring, developing, and producing natural gas and act as the off-taker for gas produced by IOCs under PSCs. The operating companies under Petrobangla were set up on a commercial basis from the inception, and their activities were coordinated by Petrobangla to ensure achievement of the overall sector development objectives. There are two gas production companies (Bangladesh Gas Fields Company Limited [BGFCL] and Sylhet Gas Fields Limited [SGFL]), one exploration company (Bangladesh Petroleum Exploration & Production Company Limited), one transmission company (Gas Transmission Company Limited), four distribution companies for different franchise areas (Titas Gas Transmission and Distribution Company Limited, Bakhrabad Gas Systems Limited, Jalalabad Gas Transmission and Distribution Systems Limited, and Pashchimanchal Gas Company Limited), and one company for marketing products based on natural gas, such as compressed natural gas or CNG (Rupantarita Prakritik Gas Company Limited) operating under the supervision of Petrobangla.

## **B. Sector Performance**

### **1. Power Sector**

13. The performance of the power sector during 1994–2008 is summarized here. A more detailed description is in Appendix 1. The power sector during 1994–1997 was characterized by inadequate power generation capacity, frequent and extended plant outages, and high distribution losses mainly due to pilferage of electricity. Although the installed power generation

capacity in Bangladesh in 1995 amounted to 2,900 MW, the available generation capacity was only 2,130 MW due to poor maintenance of the generation plants. The average plant load factor (i.e., an indicator of the utilization of generation plants) was around 42% (the industry norm is 65%–75%), indicating high levels of nonavailability and outages. Bangladesh's per capita power generation in 1995 amounted to 84 kilowatt-hours (kWh) compared with 303 kWh in India and 328 kWh in Pakistan at that time. During 1995–2000 several new power plants were added to the generation system, including 423 MW by BPDB and 685 MW by the private sector as IPPs. Thus, the installed capacity increased to over 4,000 MW and available capacity to slightly over 3,000 MW by 2000, indicating continued nonavailability of close to 800 MW of installed generation capacity due to maintenance problems. The unconstrained demand had reached 3,550 MW by the year 2000, resulting in load shedding of about 500 MW (Table 1). Total electricity generation increased from 10.8 terawatt-hour (TWh) in 1995 to 17 TWh in 2001, with 2.2 TWh from the private sector.

**Table 1: Installed and Available Power Generation Capacity, Electricity Generation, and Average Load Shedding**

Year	Installed Capacity (MW)		Available Capacity (MW)	Electricity Generation (GWh)		Load Shedding (MW)
	BPDB	IPP	BPDB +IPP	BPDB	IPP	
1994	2,608	0	1,881	9,784		540
1995	2,908	0	2,133	10,806		537
1996	2,908	0	2,105	11,474		545
1997	2,908	0	2,148	11,857		674
1998	3,091	0	2,320	12,882		711
1999	3,310	302	2,850	13,872	578	774
2000	3,331	380	2,665	14,318	1,244	536
2001	3,320	685	3,033	14,828	2,192	663
2002	3,420	810	3,217	14,449	3,771	367
2003	3,420	1,260	3,428	12,880	6,298	468
2004	3,420	1,260	3,592	13,342	7,478	694
2005	3,735	1,260	3,720	14,067	7,939	770
2006	3,895	1,260	3,782	15,416	8,286	1,312
2007	3,872	1,330	3,717	15,494	8,244	1,345
2008	3,814	1,388	4,130	16,155	9,138	2,087

BPDB =-Bangladesh Power Development Board, GWh = gigawatt-hour, IPP = independent power producer, MW = megawatt.

Source: Bangladesh Power Development Board.

14. The installed power generation capacity further increased to 5,200 MW as of mid-2009. The maximum availability of generation capacity was about 4,100 MW due to maintenance outages of plants and was further reduced to around 3,600 MW due to gas supply shortages. During 2001–2008 BPDB added 415 MW of gas-fired generation capacity and 250 MW of coal-fired power plants. The unconstrained power demand is estimated to be 5,050 MW and the average load shedding during peak time is estimated to be over 1,500 MW in 2009. Although the total electricity consumption and per capita power generation had increased to 25.3 TWh and 176 kWh, respectively, by 2008, compared with 10.8 TWh and 84 kWh in 1995, Bangladesh

still suffers from significant shortages of power generation capacity and its per capita generation ranks among the lowest among ADB member countries.<sup>5</sup>

15. The private sector generation capacity as of 2009 is 1,727 MW coming from (i) six IPPs with a total capacity of 1,271 MW supplying power to BPDB under long-term PPAs; (ii) six small-scale IPPs (with a total capacity of 99 MW); and (iii) 252 MW of generation capacity procured on short- to medium-term basis under rental arrangements.<sup>6</sup> Bangladesh was successful in attracting two large IPPs (360 MW Haripur and 450 MW Meghnaghat) in 2001–2002 that used highly efficient combined-cycle gas turbine technology. However, except for small-scale IPPs and rentals, not a single large-scale IPP has been commissioned since 2002. As a result, reductions in load shedding achieved between 1998 and 2002 have not been sustained.

16. There were 2.2 million electricity consumers in 1994 and the electrification ratio of around 10% of the total number of households was the lowest in ADB's developing member countries at the time. The operating performance of BPDB and DESA in power distribution was poor. Distribution losses (technical and nontechnical losses in the overall power system) were 37.2% and the cash collection to generation ratio of BPDB was 62.4% in 1994. The performance of DESA was worse than BPDB's with a cash collection to electricity purchase ratio of 54.6%. The operating performance of PBSs was somewhat better. The distribution losses were in the range of 15% and the cash collection to billing ratio was 99%.

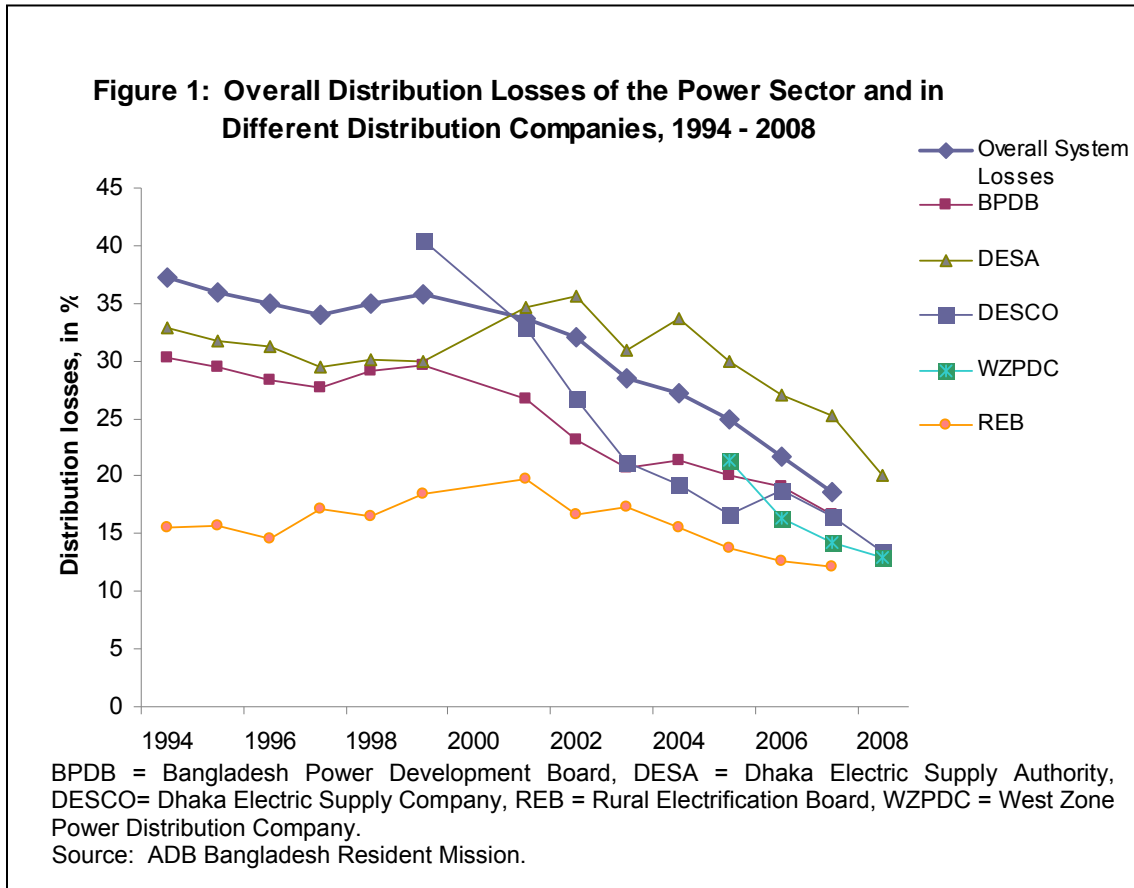
17. The performance of the distribution entities showed marginal improvement during 1994–2001 (Figure 1). Since 2002, however, newly created companies such as DESCO and WZPDC have shown marked improvement, with distribution losses dropping to 14%–16% by 2008. It should be noted that DESCO has managed to achieve these improvements while acquiring new areas from DESA. Distribution losses in DESA and BPDB had also been reduced to around 20% by 2008, and the overall power system losses in 2007 were equal to 18.6% compared with 37.2% in 1994. The cash collection ratios of BPDB and DESA had improved to 97%–100% by 2008, compared with less than 80% in 1994 and below 90% in 2001. The newly set up companies and REB have maintained cash collection ratios of over 98%.

18. The consumers of electricity and electricity consumption also increased during 1994–2008. The total number of connections increased from 2.2 million in 1994 (i.e., electrification rate of 10%) to over 4.7 million by 2001 (electrification rate of over 17%), and the majority of new consumer connections were provided by REB. By 2008, the total number of electricity consumers had reached 10.6 million (i.e., electrification rate of over 37%). Total electricity consumption grew by 181% over the period, or 7.1% per annum.

19. The financial performance of the power utilities is mixed. DESCO and PGCB have been consistently profitable since they were established and have built up substantial cash reserves in their balance sheets. They are run on commercial lines with levels of accounts receivable currently in the range of 70–75 days' sales. WZPDC made profits in fiscal year (FY) 2006 but has since slipped back into incurring losses. Since its establishment it has steadily improved management of its accounts receivable, which, however, remain high at 96 days' sales. DESA which has a long history of losses moved into profit in FY2006. This trend is expected to continue under DPDC, which took over the operations of DESA in 2008.

<sup>5</sup> In 2006, per capita power generation in Thailand was 2,080 kWh; India, 670 kWh; Pakistan, 618 kWh; Viet Nam, 598 kWh; Sri Lanka, 470 kWh; Lao People's Democratic Republic, 193 kWh; Bangladesh, 146 kWh; Cambodia, 101 kWh; Nepal, 97 kWh; and Myanmar, 93 kWh.

<sup>6</sup> In the Bangladesh context, "rental arrangements" means the procurement of generation capacity from the private sector for short to medium duration (3-15 years), with BPDB responsible for the supply of fuel.

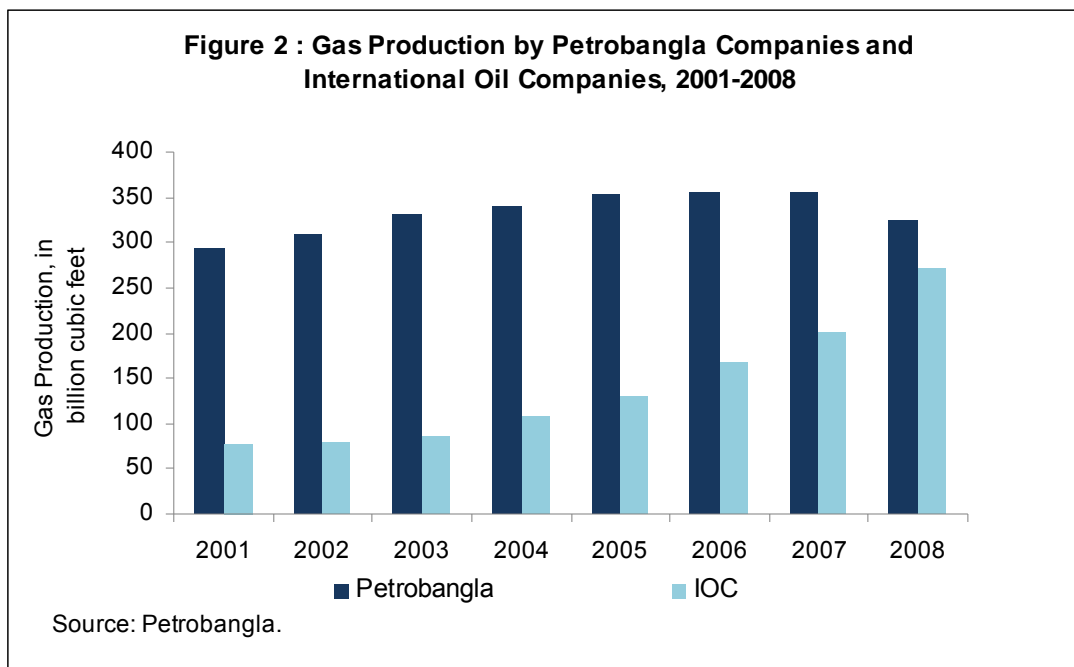


20. BPDB has performed poorly throughout 1994–2008. It has continuously incurred losses over the evaluation period and its losses have exceeded taka (Tk) 9 billion (\$130 million) in each of the past 3 years. It is insolvent and is sustained in business only by the forbearance of the Government as it is unable to meet its debt service obligations to the Government. As of June 2008, BPDB owed the Government Tk82.7 billion (\$1.2 billion). It also has high account receivables, most of which are not collectable due to poor bookkeeping of BPDB and DESA, and the long time that has lapsed. BPDB can only become viable with higher bulk supply tariffs, which in turn will have to be passed on to the final consumers with a write-off of most of its debts to the Government. The performance of the PBSs, which operate under the umbrella of REB, has been mixed. All of them have a reasonable to good record of controlling system losses and accounts receivable. But in many cases, they are not financially viable due to the high costs of operating distribution systems in rural areas with a poor customer base.

## 2. Natural Gas Sector

21. The performance of the gas sector during 1994–2008 is summarized here. A more detailed description is in Appendix 2. Natural gas production in the country was 223 BCF (billion cubic feet) in 1994. National gas production companies under Petrobangla were responsible for most of the gas production as there was no significant private sector presence. Petrobangla had performed adequately in meeting the gas demand of the economy and was engaged in gradually expanding the gas distribution network to the main economic centers of the country. However, the existing gas infrastructure had limited capacity and production in existing gas fields was expected to decrease by 1998 in the absence of new investments in field

development. During 1993–2000, the Government had invited private sector investments in upstream gas field development under PSAs. As a result, 10 blocks<sup>7</sup> were awarded to IOCs, which were successful in bringing some of the newly discovered field to production by 1998. Gas production increased to 370 BCF by 2001: 293 BCF from state-owned gas companies and 77 BCF from IOCs (Figure 2).



22. The significant increase in gas production between 2001 and 2008, with total output reaching 596 BCF in 2008, was due mainly to the rapid increase in gas production by IOCs as newly discovered gas fields were brought into production (Figure 2). Production by IOCs increased from 77 BCF in 2001 to 271 BCF by 2008, while production from Petrobangla companies marginally increased from 293 BCF in 2001 to 325 BCF in 2008. The increased gas production also resulted in increased tax payments from IOCs, amounting to over Tk29.5 billion (\$433 million) in 2007 compared with Tk4.25 billion (\$290 million) in 2000.

23. Between 1998 and 2008, the gas transmission network was further strengthened to supply gas to the greater Dhaka area from the newly discovered gas fields in the northeastern part of the country. Gas transmission pipelines to the west of the country were initiated to provide a gas supply to proposed power projects and industrial consumers. However, the gas supply to Chittagong area is facing bottlenecks at present as a result of inadequate capacity of pipelines connecting Chittagong with gas fields in the central and northeastern parts of the country and falling production in gas fields in the south. The natural gas customer base increased from 610,000 in 1994 to over 1.05 million in 2000. The losses associated with gas distribution remained high, with no significant reduction during 1994–2000. The gas distribution network in Dhaka city was further strengthened during this period to provide high-pressure gas to CNG filling stations. The possibility of exporting excess gas to neighboring countries was seriously considered, but was rejected in favor of promoting its use in domestic industries, the residential sector, and other applications (i.e., CNG as transport fuel). Gas prices increased by

<sup>7</sup> A defined geographical area with exclusive right for exploration and production of natural gas,

about 30% on average between 1994 and 2000 in local currency terms (15% in terms). The increase enabled Petrobangla to absorb the higher costs associated with gas produced by IOCs.

24. The demand for gas further grew during 2001–2008, and the excess production capacity that existed in 2000 had been fully utilized by 2008. The total number of gas consumers increased to 1.85 million in 2008 compared with 1.05 million in 2000. Gas consumption increased to 596 BCF in 2008 compared with 370 BCF in 2001. This was mainly due to the increased gas consumption by the power sector (i.e., 300 BCF in 2008 compared with 147 BCF in 2000) as several large gas-fired power plants (i.e., over 900 MW amounting to over 30% of existing power generation capacity) were commissioned during 2002–2003. The retail gas prices increased by 15%–20 % in local currency terms (i.e., gas prices decreased by about 15% in dollar terms due to the depreciation of the taka) between 2000 and 2005. There had not been any gas tariff adjustment since 2005 until the July 2009 increase of gas prices by about 10% and the increase in the price of feed gas (the gas supplied to CNG filling stations) by 400% in April 2009.

## **C. Development Challenges**

### **1. Power Sector**

25. The power sector in 1994–1995 faced major institutional issues in BPDB and DESA (paras. 16–17). Because of poor commercial management, the sector entities incurred financial losses and had cash flow problems. The sector was not in a position to undertake the urgently required investments or to attract private investments due to poor cost recovery. The main development challenges the sector faced during 1994–1995 were

- (i) establishing transparent corporate governance and a regulatory regime to provide performance-based incentives to sector entities;
- (ii) improving the commercial performance of the sector to improve its cost recovery and financial viability. This required fundamental corporate and institutional reforms as the prevailing practices were ingrained in the existing corporate culture;
- (iii) attracting investments from the private sector to increase the generation capacity of the country and maintain an adequate and reliable power supply. This was a major challenge in the context of poor cost recovery and financial insolvency of the sector due to poor commercial performance of the distribution sector;
- (iv) providing comfort to development partners that can supply concessionary financing for investments in urgently needed power transmission and distribution projects; and
- (v) changing the prevailing culture of electricity pilferage and nonpayment of electricity bills in collusion with utility employees. State-owned enterprises and the public sector in general were among the worst defaulters in the power sector.

26. The reforms undertaken during 1995–2000 (paras. 10–11) addressed some of those issues. Private sector investments in power generation increased with the award of several build-own-operate-transfer (BOOT) contracts for large-scale gas-based power plants. The outstanding development challenges in the 2001–2002 were

- (i) establishing the performance-driven and accountable corporate culture in the newly established companies. This required a drastic change from the existing practices and culture of the power sector;

- (ii) trade union opposition to major changes and resistance from the management of incumbent entities such as BPDB and DESA to transfer of assets and staff to new companies;
- (iii) maintaining the reform momentum with further unbundling of power generation and distribution operations of BPDB and the restructuring of the operations of DESA;
- (iv) the poor commercial performance of the sector including the newly created companies. That needs to be addressed as a matter of urgency to restore the financial viability of the sector; and
- (v) the need for further investments in power generation from the private sector as the country was still suffering from power shortages. This required the continuation of the solicitation process for private sector investments initiated during 1995–2000.

27. By 2008, Bangladesh had achieved significant progress in reforming power distribution and transmission. The reforms improved some aspects of the commercial performance of the sector. However, insufficient investments in power generation and failure to attract new investments from the private sector increased power shortages during 2001–2008. The outstanding challenges in the sector as of 2008–2009 are

- (i) addressing the power shortages as a matter of urgency through a combination of investments from the private sector and the public sector. The unconstrained power demand in 2015 is expected to be over 10,000 MW and the required power generation capacity by 2015 to provide a reliable power supply is 12,000 MW compared with the available generation capacity of 4,100 MW in 2008;
- (ii) commercializing the generation operations of BPDB, which have not been restructured. BPDB continues to operate in a suboptimal manner, with low plant factors and thermal efficiencies. The existing generation assets need to be rehabilitated to improve their efficiency and availability. The generation companies created out of BPDB need to be made fully operational with the transfer of assets and the signing of PPAs with BPDB;
- (iii) further improving the power distribution operations of WZPDC, BPDB, and DPDC. It is necessary to corporatize BPDB's remaining distribution zones and rationalize distribution franchise areas between BPDB and REB. Steps have already been taken to establish new distribution companies to take over BPDB's retail operations in the south, central, and northwest zones, but the companies are not yet operational;
- (iv) addressing the financial insolvency of BPDB and the former DESA, which have large unpaid Government debts and irrecoverable accounts receivable. To set the power sector's financials on a sound basis, a major financial restructuring is required including the write-off of BPDB's liabilities to the Government; and
- (v) overall financial nonviability of the sector despite improvements in control over losses and bill collection. Significant increases in retail power tariffs are needed to ensure that all sector entities achieve financial viability.

## **2. Natural Gas Sector**

28. The main challenges facing the natural gas sector during 1994–1996 were as follows:

- (i) maintaining the production level of existing fields operated by national gas companies;
- (ii) undertaking exploration in new areas to expand gas reserves;

- (iii) attracting investments and technical expertise from IOCs under PSAs for exploration and development of new gas fields;
  - (iv) establishing a national gas transmission network by connecting the main gas fields with the main demand centers in the greater Dhaka and Chittagong area; and
  - (v) improving the technical and commercial performance of gas distribution companies to reduce distribution losses.
29. Due to the increased demand for gas and the prevailing shortages, the country faces in 2009 a set of challenges similar to the ones it faced in 1994. They include
- (i) diversifying the primary energy supply from natural gas to other forms of energy, given the high dependence of the economy on natural gas and limited proven gas reserves in the country and difficulties in increasing production capacity in the short and medium terms;
  - (ii) arresting the declining production in gas fields operated by Petrobangla subsidiaries through timely maintenance of existing fields, drilling of additional wells, and appraisal of existing gas fields to ascertain the possibilities for additional gas production;
  - (iii) adjusting end user gas prices since the prevailing gas pricing structure and high level of Government taxes do not provide adequate margins for the national gas companies to undertake the requisite investments in developing new fields;
  - (iv) attracting new investments from IOCs for exploring new areas, especially the off-shore blocks where the national oil companies do not have any prior experience. As a matter of urgency, the Government has called for proposals from IOCs in a new round of bidding for exploration in off-shore areas;
  - (v) improving energy efficiency, including the efficiency of using scarce gas resource. The prevailing practice of setting gas prices below international prices is encouraging inefficient use of gas and its use for applications for which more economical alternatives are available; and
  - (vi) discouraging the use of gas for captive power generation by industries using sub-optimum and inefficient technologies. However, this can be done only after ensuring a reliable (in terms of both continuity and quality) supply of grid-based power.

### III. GOVERNMENT'S PRIORITIES, POLICY, AND PLANS

#### A. Power Sector

30. In 1994, the Government adopted the Power Sector Reforms in Bangladesh (PSRB)<sup>8</sup> policy paper in consultation with major development partners including ADB. It addressed the structural issues of the sector (paras. 13–20). The PSRB formed the basis for the power sector reforms undertaken during 1994–2008, with some minor adjustments. The Government had prepared a time-bound reform road map to prioritize the critical aspects of the PSRB. It identified DESA, responsible for over 36% of national electricity sales, as the initial focus of the reform process. It was decided to establish a new corporate entity under the Companies Act with an independent board of directors and nonpublic sector directors to ensure the introduction of a commercial corporate culture. In parallel with the reform of DESA, the Government also took steps to unbundle BPDB along functional lines. As the first step, PGCB was formed under the Companies Act to take over power transmission from BPDB.

<sup>8</sup> MEMR. 1994. *Report on Power Sector Reforms in Bangladesh*. Dhaka.



31. The PSRB recommended the establishment of an independent regulatory body for the sector. It also (i) gave emphasis to mobilizing private investments to the power sector especially to power generation under build-own-operate/build-operate-transfer (BOO/BOT) basis through a transparent solicitation process; (ii) recommended private sector participation in power distribution under a franchise model and contracting out of services such as meter reading, billing and collection, and continuation of REB's cooperative-based approach for rural electrification. During 1994–2000, the Government adopted several measures to implement the key objectives of the PSRB. They included (i) creating PGCB to take over power transmission from BPDB; (ii) splitting DESA to form DESCO to take over power distribution in part of Dhaka city; and (iii) contracting with IPPs over 1,000 MW of new generation capacity.

32. In 2000, building on the PSRB, the Government issued the Vision and Policy Statement on Power Sector Reforms.<sup>9</sup> This further clarified the structural arrangements for unbundling sector entities, private sector participation, and sector regulation. The specific aspects are

- (i) initiating the establishment of a single buyer-based industry structure;
- (ii) continuing measures for the establishment of an effective and accountable regulatory regime;
- (iii) corporatizing existing power generation units as well as the units under construction as profit centers;
- (iv) operating new generation plants including the privately financed plants based on the least-cost generation plan;
- (v) increasing private sector participation in the power generation sector;
- (vi) having PGCB finance and operate the transmission grid on a commercial basis;
- (vii) increasing efforts to improve the commercial and financial performance of the distribution entities;
- (viii) transforming the existing distribution systems of BPDB and DESA into a number of new entities to be incorporated under the Companies Act; and
- (ix) letting rural electric cooperatives (PBSs) to continue to manage power distribution in their franchise areas under the overall supervision and management of REB.

33. The Government had made significant progress in achieving some of these policy objectives by 2008. In 2003 the Government established BERC. However, BERC was not functional due to administrative and legal issues until 2007 and became operational only in 2008. BERC is now fully functional and made its first major regulatory order in late 2008 for revising the bulk supply tariffs for distribution entities. However, the independence and competence of BERC are not yet proven and past experience with the appointment of commissioners to BERC demonstrated a high degree of Government interference. It is yet to be seen whether the Government would interfere in influencing the regulatory decisions of BERC. The unbundling process in the power sector has progressed further with the (i) setting up of three power generation companies to take over the operation of BPDB-owned generation assets; (ii) improvement of the commercial performance of DESCO by reducing distribution losses, introducing time-of-use tariffs and prepaid meter, and improved bill collection; and (iii) setting up of DPDC to take over power distribution in the remaining areas of Dhaka city from DESA and WZPDC for power distribution in the west zone of the country. However, the newly established generation companies are only partially effective because they are not fully independent from BPDB. Further corporatization of BPDB is presently on hold, pending approval of its overall corporate restructuring plan.

<sup>9</sup> MEMR. 2000. *Vision and Policy Statement on Power Sector Reform*. Dhaka.

34. The Government adopted a Power Sector Reform Road Map for 2006–2008<sup>10</sup> to address the remaining structural weaknesses of the sector. The specific actions to be undertaken include

- (i) making BERC fully functional as power sector regulator and establishing the licensing regulations and tariff-setting procedures;
- (ii) improving the transparency, corporate governance and accountability of the sector entities;
- (iii) restructuring BPDB to make it financially viable through corporatization of operational units, debt restructuring, funding of the pension liabilities, and settling the account receivables of Government entities to the power sector;
- (iv) further unbundling of the sector by establishing several generation and distribution companies under the Companies Act, with full managerial independence;
- (v) introducing a more streamlined process for promoting private sector investments in power generation through a transparent bidding process; and
- (vi) mobilizing financing from domestic capital markets for financially viable power sector entities such as PGCB and DESCO.

## **B. Gas Sector**

35. The gas sector, unlike the power sector, was established on commercial principles and practices from the outset and the financial performance of public sector gas companies was satisfactory in the 1990s. Government policy during 1994–2004 was to operate public sector entities on a commercial basis, with Petrobangla acting as the supervising agency in the gas sector and attracting IOCs for upstream gas exploration and production activities. The main policy thrust of the Government during 1994–2003 was to

- (i) attract private investments from IOCs under PSAs, with Petrobangla acting as off-taker;
- (ii) expand the gas transmission network to provide adequate transmission capacity from the newly developed gas fields to demand centers in Dhaka and Chittagong through the national gas transmission company (i.e., Gas Transmission Company Limited [GTCL]);
- (iii) maintain and expand through timely investments the gas production capacity of gas fields operated by Petrobangla;
- (iv) expand the gas transmission network to the western part of the country, which does not have gas resources;
- (v) improve the operating efficiencies of gas distribution companies to reduce distribution losses and improve commercial performance; and
- (vi) promote the use of CNG and other by-products of gas as transport fuel.

36. The Government's gas sector policy for 2005–2010 is enunciated in the Gas Sector Reform Road Map (GSRR)<sup>11</sup> of 2004. The GSRR took into account the developments in 1994–2004 and the emerging challenges. It provides for further incentives to attract private investments for exploration and production of oil and gas and gas distribution in specified franchise areas. In gas transmission private sector participation is encouraged for building gas pipelines on BOT basis, with GTCL retaining overall responsibility for gas transmission. It is further proposed that minority stakes of GTCL and gas distribution companies be offered to the

<sup>10</sup> MEMR. Power Division. 2005. *Three Year Road Map for Power Sector Reform 2006–2008*. Dhaka.

<sup>11</sup> MPEMR. Energy and Mineral Resources Division. 2004. *Gas Sector Reform. Road Map 2005–2010*. Dhaka.

private sector to bring in private sector management practices and efficiency improvements to the state-owned gas companies.

37. The Government has further refined the gas sector policy framework in the revised GSRR 2009–2012.<sup>12</sup> The salient aspects of the refined policy framework are to

- (i) expedite the award of contracts in the third round of bidding for IOCs for undertaking off-shore exploration activities;
- (ii) strengthen the capacity of national gas companies to undertake exploration activities;
- (iii) establish commercial contracts between Petrobangla companies engaged in gas production, transmission, and distribution to improve the corporate governance of the sector;
- (iv) redefine the franchise areas of gas distribution companies and set up a new company as a joint venture to develop gas distribution in the southwest region and also another gas distribution company in the southeastern region; and
- (v) provide further incentives to improve operational performance, such as loss reduction in gas distribution companies.

#### **IV. ADB ENERGY SECTOR ASSISTANCE STRATEGY AND PROGRAM**

##### **A. ADB Power Sector Strategy**

38. In 1994, ADB together with the World Bank assisted the Government in formulating the PSRB to address the structural weaknesses in the power sector. ADB has become the key policy dialogue partner and the major financier of the sector during 1994–2008. As the lead development partner in the sector, ADB has assisted the Government in all aspects of the PSRB including (i) providing technical assistance for vertical unbundling of the power sector entities and setting up new companies with firm commercial basis for power distribution, transmission, and generation; (ii) providing investment financing for the newly set up companies for rehabilitating the distribution network and augmenting the transmission system; and (iii) promoting private sector investments in power generation through technical assistance to the Government in the solicitation process, and financing of private sector investments through lending operations from the Private Sector Operations Division (PSOD).

39. Taking into account the significant progress achieved in implementing the 1994 PSRB, the specific objectives of the Government's 2000 Vision and Policy Statement for Power Sector Reforms, and overall development objectives outlined in the 1999 Country Operations Strategy (COS),<sup>13</sup> ADB refocused its sector assistance strategy for 2001–2008 as follows:

- (i) promote effective and independent regulation of the sector to ensure improved technical performance, cost recovery, and financial viability;
- (ii) support and participate in private sector investment in generation and distribution;
- (iii) support institutional improvements in poorly performing BPDB and DESA, pending transfer of assets and operations to newly created commercial entities;
- (iv) continue to support the Government's reform measures, including unbundling the sector into generation, transmission, and distribution;
- (v) support the establishment of new commercial sector entities to act as role models to promote further improvements in the sector;

<sup>12</sup> MPEMR. Energy and Mineral Resources Division. 2009. *Gas Sector Reform. Road Map 2009–2012*. Dhaka

<sup>13</sup> ADB. 1999. *Country Operating Strategy: Bangladesh*. Manila.

- (vi) increase the scope and franchise area of REB for expanding network access in rural areas;
- (vii) strengthen the long-term planning of the sector to ensure timely and adequate investments in power generation and transmission;
- (viii) promote regional cooperation; and
- (ix) gradually convert ADB assistance from concessionary financing (Asian Development Fund [ADF]) to ordinary capital resources (OCR).

40. The Country Strategy and Program (CSP) of 2006–2010<sup>14</sup> has reaffirmed ADB's continued support to the power sector reform program of the Government and its role in coordinating assistance from other development partners to the sector. The intended development outcomes of CSP 2006 - 2010 included (i) improvement in sector governance through predictable long-term decision making and independence of regulatory processes; and (ii) improved corporate governance through an independent board of directors, management/staff incentives for better performance, and outsourcing of routine services such as bill collection and meter reading to the private sector. The main policy thrust of the power sector remains the continuing support for further reforms to improve the commercial orientation of the power distribution sector while supporting private sector investments in power generation.

## **B. ADB Gas Sector Strategy**

41. ADB reentered the financing of the natural gas sector in 1993 in support of the Government's policy reforms. ADB's strategy for the natural gas sector was aimed at (i) supporting increased private sector investments in the oil and gas sectors, especially in upstream exploration and production through PSAs with state-owned Petrobangla; (ii) expanding the gas transmission network to make gas available to major economic centers of the country; (iii) improving the operational performance of gas distribution companies through improved management, loss reduction programs, cost-reflective end user pricing, and installation of meters; and (iv) encouraging the use of natural gas in an economically optimum manner through price reforms, and promoting alternative uses of gas such as CNG as a transport fuel. The COS of 1999 had reaffirmed this strategy with more emphasis on support for policy and institutional reforms to create the enabling environment for further private sector investments in the sector by establishing an independent regulatory body, and supporting private sector participation in gas exploration and production and marketing of gas products such as CNG.

42. The 2006–2010 CSP had recommended the continuation of the overall gas sector strategy adopted by ADB during 1994–2005. It emphasized support for (i) further commercialization of gas sector entities through greater autonomy for them, independent tariff setting and regulation, and private sector participation in gas distribution and marketing; (ii) developing gas markets in the western part of the country by expanding the gas transmission and distribution network to the region west of Bangabandhu bridge; and (iii) improving environmental sustainability by reducing gas loss and leakages in gas production and distribution.

## **C. ADB Energy Sector Assistance Program**

43. As the lead development partner in the energy sector, ADB has adopted a programmatic approach for its assistance, grouping its operations under seven broad thematic

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<sup>14</sup> ADB. 2005. *Country Strategy and Program (2006–2010): Bangladesh*. Manila.

areas (Table 2): (i) promoting commercial orientation of power sector entities, (ii) promoting investments in power generation, (iii) removing transmission constraints, (iv) improving access to electricity, (v) increasing gas production capacity and mobilizing investments to gas production, (vi) improving the gas transmission and distribution network, and (vii) improving the governance and regulatory framework of the energy sector. The outcomes achieved and the impacts realized in each thematic area are described in Appendix 3.

44. During 1993–2008, ADB approved loans totaling \$1,755.9 million (\$1,211.9 million of OCR, \$539.0 million from the ADF, and \$5.0 million in grants) to the energy sector amounting to 29.6% of total ADB lending to Bangladesh. ADB lending operations consisted of 14 public sector project loans (8 ADF loans and 6 OCR loans) to finance 9 projects, 2 public sector OCR program loans, and 1 nonsovereign loan. The power subsector had six public sector projects valued at \$1,291.3 million, and one nonsovereign loan of \$50.0 million. The gas subsector had three projects valued at \$414.6 million. ADB also provided 19 advisory technical assistance grants valued at \$10.4 million during this period.

**Table 2: ADB Energy Sector Program by Development Theme, 1993–2008**

Strategic Period	Intended Development Outcomes	Operations Approved
<b>I. Promoting Commercial Orientation of Power Sector Entities</b>		
1993–1998	Supporting the commercial orientation of power sector entities by establishing DESCO and PGCB under Companies' Act to take over power distribution in Dhaka city from DESA and power transmission network from BPDB and through policy dialogue leveraged by targeted technical assistance grants, appropriate loan covenants and loan financing for network rehabilitation to be undertaken by newly created companies.	<ul style="list-style-type: none"> <li>• Loan 1505-BAN(SF): Ninth Power Project.</li> <li>• TA 2004-BAN : Financial Management Upgrade for BPDB and DESA</li> <li>• TA 2715-BAN: Valuation of Assets of the Dhaka Electric Supply Company</li> </ul>
1999–2005	Supporting the corporatization and establishment of power distribution companies for the west zone and northwest zone through targeted technical assistance and investment financing for the newly set up companies. Supporting the corporatization of remaining operations of DESA and the generation operations of BPDB. Policy interventions for improving corporate governance, settling the Government receivables and power sector cash deficits through program loan conditions	<ul style="list-style-type: none"> <li>• Loans 1730(SF)/1731-BAN: Dhaka Power Systems Upgrade Project</li> <li>• Loans 1884(SF)/1885-BAN: West Zone Power System Development Project</li> <li>• Loan 2038-BAN: Power Sector Development Program</li> <li>• TA 3244-BAN: Capacity Building of Dhaka Electric Supply Co. Ltd.</li> <li>• TA 3343-BAN: Corporatization of the Ashuganj Power Station</li> <li>• TA 3801-BAN: Corporatization of the West Zone Distribution Operations of the Bangladesh Power Development Board (BPDB)</li> <li>• TA 3978-BAN: Corporatization of the Dhaka Electric Supply Authority (DESA)</li> <li>• TA 4379-BAN: Power Sector Development Program II (Component</li> </ul>

Strategic Period	Intended Development Outcomes	Operations Approved
		A) <ul style="list-style-type: none"> <li>• TA 4626-BAN: Corporatization of the Bangladesh Power Development Board</li> </ul>
2006–2008	Supporting the corporatization are restructuring of remaining operations of BPDB through program loan conditions and promoting the listing of profitable power sector entities such as PGCB and DESCO.	<ul style="list-style-type: none"> <li>• Loan 2334-BAN Sustainable Power Sector Development Program</li> </ul>
<b>II. Promoting Investments in Power Generation</b>		
1993 –1998	Increasing investments in power generation through structuring and innovative structures for attracting private and public investments to power generation sector. Undertaking master plan and feasibility studies for power generation projects. Encouraging rural electrification cooperatives to invest in power generation.	<ul style="list-style-type: none"> <li>• Loan 1356-BAN(SF): Rural Electrification Project</li> <li>• TA 1962-BAN: Preparation of Power Sector Master Plan</li> <li>• TA 2338-BAN: Solicitation for Private Sector Implementation of the Meghnaghat Power Project</li> </ul>
1999–2005	Financing private sector investments in baseload power generation and public sector investments in peaking power plants and preparing a master plan for power sector development for 2006–2020.	<ul style="list-style-type: none"> <li>• EI 7165 /L1793-BAN : AES Meghnaghat Power Project</li> <li>• Loan 2039-BAN: Power Sector Development Project</li> <li>• TA 4379-BA: Power Sector Development Program II (Component B).</li> </ul>
2006–2008	Financing two peaking power plants to address the power shortages through public sector lending and supporting the solicitation of private sector investments to power sector.	<ul style="list-style-type: none"> <li>• Loans 2332/2333(SF)-BAN: Sustainable Power Sector Development Project</li> <li>• TA 4898-BAN: Promotion of Private Sector Participation in the Power Sector</li> <li>• TA 4953-BAN: Tendering Process for Independent Power Producer Plants</li> </ul>
<b>III. Removing Transmission Constraints</b>		
1993–1998	Financing the expansion of transmission network to evacuate power from newly built power generation plants and improve the reliability of power supply to Dhaka city.	<ul style="list-style-type: none"> <li>• Loan 1505-BAN(SF): Ninth Power Project</li> </ul>
1999–2005	Extending the 230 kV transmission network to the west zone and establishing a national load dispatch center to improve the transmission network operation	<ul style="list-style-type: none"> <li>• Loans 1730(SF)/1731-BAN Dhaka Power System Upgrade Project</li> <li>• Loans 1884(SF)/1885-BAN: West Zone Power System Development</li> <li>• Loan 2039-BAN: Power Sector Development Project</li> </ul>
2006–2008	Expand the power transmission capacity in	

Strategic Period	Intended Development Outcomes	Operations Approved
	Dhaka city by financing the first 400 kV transmission line in Bangladesh and expanding 132 kV network in the northwest.	<ul style="list-style-type: none"> <li>• Loans 2332/2333(SF)-BAN Sustainable Power Sector Development Project Loan</li> </ul>
<b>IV. Improving Access to Electricity</b>		
1993 –1998	Expanding the electricity distribution network in rural areas through support to PBS in greater Dhaka area, and rehabilitation and upgrade of power distribution network in areas under DESCO.	<ul style="list-style-type: none"> <li>• Loan 1356-BAN(SF): Rural Electrification Project</li> <li>• Loan 1505-BAN(SF): Ninth Power Project.</li> </ul>
1999–2005	Financing the expansion and rehabilitation of power distribution network in west zone and northwest zone through support to PBS in west and northwest zones.	<ul style="list-style-type: none"> <li>• Loans 1730(SF)/1731-BAN: Dhaka Power System Upgrade Project</li> <li>• Loans 1884(SF)/1885-BAN: West Zone Power System Development</li> <li>• Loan 2038-BAN: Power Sector Development Project</li> </ul>
2006–2008	Expand and rehabilitate the power distribution network of DESCO and newly created DPDC (i.e., successor entity to DESA) serving Dhaka area.	<ul style="list-style-type: none"> <li>• Loans 2332/2333(SF)-BAN Sustainable Power Sector Development Project</li> </ul>
<b>V. Increasing Gas Production Capacity and Mobilizing Investments to Gas Production</b>		
1993–1998	Increasing gas production capacity by rehabilitating existing gas wells and drilling new wells in the existing gas fields and by preparing a master plan for future development.	<ul style="list-style-type: none"> <li>• Loan 1293-BAN(SF): Third Natural Gas Development Project</li> <li>• TA 2024-BAN: Preparation of a Gas System Development Plan and the Strengthening of the Organizational and Regulatory Framework for the Oil and Gas Sector</li> </ul>
1999–2005	Appraising the existing gas fields operated by national oil companies with the objective of increasing the production capacity of the fields.	<ul style="list-style-type: none"> <li>• Loan 2188/ 2189(SF)-BAN : Gas Transmission and Development Project</li> </ul>
<b>VI. Improving the Gas Transmission and Distribution Network</b>		
1993–1998	Improving the gas transmission capacity to Dhaka city, expanding the gas distribution network, and improving the safety and efficiency of gas distribution.	<ul style="list-style-type: none"> <li>• Loan 1293-BAN(SF): Third Natural Gas Development Project</li> <li>• TA 2025-BAN: Safety and Efficiency Improvements in the Gas Sector</li> </ul>
1999–2005	Expanding the gas distribution capacity in Dhaka city and establishing the infrastructure (i.e., filling stations), and institutional arrangements for promoting use of CNG as a transport fuel. Extending the gas transmission network to the west zone of the country.	<ul style="list-style-type: none"> <li>• Loans 1942(SF)/1943-BAN: Dhaka Clean Fuel Project</li> <li>• Loans 2188/2189(SF)-BAN : Gas Transmission and Development</li> </ul>

Strategic Period	Intended Development Outcomes	Operations Approved
<b>VII. Improving the Governance and Regulatory Framework of the Energy Sector</b>		
1993–1998	Improving the regulatory framework for the gas sector	<ul style="list-style-type: none"> <li>• TA 2024-BAN: Preparation of a Gas System Development Plan and Strengthening of the Organizational and Regulatory Framework for the Oil and Gas Sector</li> <li>• TA 2800-BAN: Gas Regulatory Authority</li> <li>• TA 3092-BAN: Developing a Policy on Private Sector Participation in Gas Transmission</li> <li>• TA 3097-BAN: Institutional Reforms in the Gas Sector</li> <li>• TA 3129-BAN: Support for the Energy Regulatory Authority</li> </ul>
1999–2005	Promoting private sector participation in gas transmission and distribution, and a regulatory framework for gas sector.	<ul style="list-style-type: none"> <li>• TA 4528-BAN: Promoting Private Sector Participation in the Energy Sector</li> </ul>
2006–2008	Operationalizing the Bangladesh Energy Regulatory Commission	<ul style="list-style-type: none"> <li>• Loan 2333-BAN(SF): Sustainable Power Sector Development Program Loan</li> </ul>

BAN = Bangladesh, BPDB = Bangladesh Power Development Board, CNG = compressed natural gas, DESA = Dhaka Electric Supply Authority, DESCO = Dhaka Electric Supply Company Limited, DPDC = Dhaka Power Distribution Company, EI = equity investment, PBS = Palli Bidyut Samities, SF = special fund, TA = technical assistance.

**V. STRATEGIC AND INSTITUTIONAL (TOP-DOWN) ASSESSMENT OF ADB ASSISTANCE PROGRAM**

**A. Strategic Positioning of Energy Sector Assistance Program**

**1. Relevance of ADB Energy Sector Assistance Program to Country Priorities**

45. The main energy sector challenges that the Government faced in the early 1990s were identified in its strategies for the power and gas subsectors (paras. 30, 31, and 35). The strategies were prepared with the extensive involvement of development partners including ADB. The main development challenges of the power sector were identified as weak governance, poor and ineffective management practices, inadequate investments in power generation, and insufficient cost recovery resulting in underinvestment. The Government's PSRB of 1994 had a comprehensive program to address these structural weaknesses in the sector through corporate restructuring, promotion of private sector investments in power generation and public sector investments in power transmission and distribution to increase access to electricity. The PSRB remained the overall Government strategy for the power sector throughout the evaluation period, with appropriate revisions and adjustments to take into account the policy lapses and emerging issues. Although the Government did not have a comprehensive strategy for the gas sector at the beginning of the evaluation period, the broad parameters of its gas sector policy were to attract private investments to upstream gas exploration and improve the operational efficiency of



public sector gas companies engaged in gas production and distribution. The Government has followed this overall policy with minor adjustment during the evaluation period.

46. The ADB energy sector strategy and the assistance program for Bangladesh have been formulated in recognition of the critical development challenges and the Government's priorities in addressing those challenges. ADB, as the lead development partner in the energy sector, played a highly influential role in defining the overall energy sector strategy. Hence, it is inevitable that ADB's energy sector strategy mirrors the Government's sector strategy. Its role as the lead development partner to the sector compelled ADB to provide both financial as well as technical assistance to implement several critical aspects of the Government's strategy.

## **2. Alignment of ADB Energy Sector Assistance Program for Bangladesh with ADB's Corporate Strategies**

47. ADB's Long-Term Strategy Framework 2001–2015<sup>15</sup> (LTSF) has identified the importance of access to physical infrastructure including energy for sustainable economic growth. Promotion of good governance of public institutions and institutional capacity building for public service delivery together with private sector participation in infrastructure were key themes of LTSF 2001–2015. LTSF 2008–2020 (i.e., Strategy 2020) has repeated these themes with added emphasis on regional cooperation and environmental sustainability. The Energy Policy of 1995 and its review in 2000 recommended that ADB support commercialization and corporatization of energy sector utilities as an essential step for improved performance and private sector participation. Support for private sector investment in power generation and public sector financing of power generation when private sector investments are not forthcoming are also in accordance with Energy Policy Review 2000.

48. ADB's energy sector operation in Bangladesh has closely followed the key aspects of ADB's LTSF and energy sector policies applicable during the evaluation period. They include promoting good governance in the energy sector and internal capacity building for energy service delivery through sector reforms, and promoting private sector investments in the power sector. Regional cooperation has not been a major area in ADB's energy sector assistance program to Bangladesh. This was mainly due to lack of interest of concerned governments, other bilateral political issues, and the extremely sensitive nature of energy security to the countries in the South Asian region. However, ADB had taken several initiatives through policy dialogue and regional technical assistance grants to complement the efforts of other development partners (i.e., mainly United States Assistance for International Development [USAID]) to promote regional cooperation in the energy sector between Bangladesh, India, Bhutan, and Nepal.

## **3. Selectivity and Ownership**

49. ADB's power sector assistance program included extensive assistance for commercialization and corporatization of urban power distribution operations of poorly performing state utilities, lack of which was correctly considered as one of the main reasons for the underperformance of the sector. The power distribution sector in Bangladesh had poor cost recovery due to pilferage of electricity and required extensive fiscal subsidies in the form of unpaid debt obligations of the power sector to the Ministry of Finance. The rural power distribution sector did not require fundamental restructuring as it was well managed under a

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<sup>15</sup> ADB. 2001. Moving the Poverty Reduction Agenda Forward in Asia and the Pacific: *The Long-Term Strategic Framework: of the Asian Development Bank (2001-2010)*. Manila.

different governance structure (i.e., rural electric cooperatives under REB supervision). For this reason there was adequate interest from other development partners, including the World Bank, to finance rural electrification. ADB has therefore refrained from financing rural electrification except for rehabilitating and expanding distribution networks of areas transferred from BPDB and DESA to REB. ADB assistance to power distribution was mainly for rehabilitating and improving power distribution networks in urban areas. This is also in line with the Government's strategy of reforming the urban power distribution sector while gradually expanding rural electrification, with assistance from other development partners.

50. Power transmission also required financial assistance to expand the transmission network capacity to meet the increasing demand. ADB assistance to power transmission was channeled through the newly created power transmission company. Assistance to power generation was initially focused on facilitating and providing debt financing to private sector investments in power generation. ADB played a significant role in structuring, facilitating, and financing Bangladesh's first large-scale private sector power generation project. ADB has also provided financial assistance to public sector peaking power plants while providing technical assistance to facilitate private sector investments in baseload power generation.

51. In the gas sector, ADB's strategy again closely mirrored the Government strategy of network expansion, incremental improvement in the production of gas fields operated by state gas companies, and promotion of the use of gas as a transport fuel while encouraging private sector investment in upstream gas production. ADB also supported the Government's strategy of establishing a transparent and independent regulatory framework for the sector through policy dialogue in coordination with other development partners. ADB has in general refrained from financing public sector investments in new gas fields and limited its investments to improvement of existing gas fields operated by the public sector. Most of ADB's gas sector investments were aimed at expanding the gas transmission and distribution network to improve the delivery of gas to new power plants, CNG filling stations, and industrial consumers.

52. ADB's energy sector strategy during 1995–2001 was the object of a high degree of ownership shown by the Government and other relevant stakeholders. That was demonstrated by the success in forming new corporate entities to take over the power distribution and transmission companies and in attracting private investments for power generation in the face of opposition from trade unions. ADB's energy sector strategy for this period had been formulated in recognition of the prevailing political economy and the reform implementation capacity of the Government. This was highlighted in the gradual and phased manner in which the sector reform program was supported by ADB. However, there was a change in Government in 2001, and the new administration did not show the same degree of commitment for initiating the next phase of reforms. There have been lack of success in new private investments for power generation since 2001, lack of direction in restructuring the remaining operations of BPDB, absence of tariff increases, and significant delays in making BERC fully functional. However, there have been sufficient ownership and commitments from the Government to implement ADB-financed projects and comply with most of the policy reform conditions and covenants of project and program loans. It is expected that the Government that came into power in 2008 would increase its commitment to implement the next phase of the reforms.

#### **4. Sequencing and Continuity of Sector Strategy and Program**

53. ADB's power sector assistance program followed a coherent strategy during 1994–2008 as it followed the overall strategy set out in the PSRB of 1994. ADB has supported the implementation of institutional reforms in the energy sector over the 1994–2008 period in a

phased manner. Each intervention contributed to realizing the key development outcomes and impacts, namely, (i) financially viable and efficiently managed sector entities; (ii) reliable and affordable supply of electricity to an increased number of people; and (iii) an adequate supply of gas to meet the needs of power and industrial consumers. Although these outcomes have not been fully achieved, ADB's continued assistance made a major contribution to the improvements in the performance of the energy sector in Bangladesh.

54. One of the key aspects of ADB assistance to the energy sector is the continuity and sequencing of the assistance provided through a variety of lending and nonlending instruments. This is demonstrated in the assistance to private sector investments in power generation where ADB provided initial technical assistance to undertake the prefeasibility studies and to solicit and evaluate investment proposals in a transparent manner; and investment finance for private sector investors and public sector investments for power transmission lines required for evacuating the power generated. ADB assistance in reforming the power distribution sector was also appropriately sequenced with initial technical assistance for diagnostic studies followed by assistance for implementing corporate restructuring, and then investment support for newly created entities to rehabilitate and improve networks.

55. ADB's energy sector assistance program took into account the absorptive capacity of the Government and initially focused on the reform of power distribution in Dhaka city and the power transmission sector. Gradually the power sector reforms were expanded to cover power generation and distribution in the rest of the country. In recognition of the poor performance of BPDB in operating the existing power plants, ADB focused its assistance to power generation on promoting private sector investments for baseload generation. However, there have been no private sector power generation projects since 2001 because of some reasons including lack of transparency in the solicitation process and lack of interest from credible private sector investors. ADB also showed flexibility in recognizing the evolving sector context and had been willing to finance public sector investments in peaking power plants. These were urgently needed investments as the country was facing power shortages resulting in load shedding. Similarly, when Bangladesh was faced with surplus gas in 2001–2003 due to increased gas production from international oil companies, ADB stepped in to promote the use of CNG as a transport fuel.

56. Because of the long-term nature and continuity of assistance, the Government and other stakeholders have found ADB credible and acceptable as the lead development partner in the energy sector. ADB assistance to the sector has formed a critical mass required to make a significant impact in terms of outputs achieved through the physical investments financed by ADB and the outcomes of institutional and policy reforms promoted by ADB through technical assistance grants, program loans, and policy dialogue. ADB's leadership role has been duly recognized by other development partners and most of the bilateral development partners have formulated their sector strategies to complement ADB assistance to the sector. Table 3 summarizes the rating for the strategic positioning of ADB assistance.

**Table 3: Assessment of Strategic Positioning of ADB Assistance**

	<b>Rating</b>
Relevance of Assistance Program to Country Priorities	High
Alignment with ADB Energy Sector Strategies	Substantial
Selectivity and Ownership	Substantial
Sequencing and Continuity	Substantial
<b>Overall Assessment of Positioning of Sector Assistance</b>	<b>Substantial</b>

Source: Independent Evaluation Mission.

## B. Contribution to Development Results

57. The contribution of ADB's energy sector assistance program for achieving several key development results at the country level is assessed as “substantial” (Table 4). The results were identified in the Government energy sector strategy and ADB provided a series of interventions to support their realization.

**Table 4: Assessment of ADB Contribution to Development Results**

<b>Development Outcome</b>	<b>ADB's Contribution</b>
Improved Energy Sector Governance, Policy Formulation and Regulation	Substantial
Ensuring Energy Security	Modest
Improving Financial and Operational Performance of Energy Sector Entities	Substantial
Enhancing Greenhouse Gas (GHG) Efficiency of Energy Sector.	Substantial
Access to Commercial Energy ( Electricity and Natural Gas)	Substantial
Regional Cooperation	Negligible
Private Sector Participation	Modest
<b>ADB's Overall Contribution to Development Outcomes</b>	<b>Substantial</b>

ADB = Asian Development Bank.

Source: Independent Evaluation Mission.

### 1. Improved Energy Sector Governance, Policy Formulation, and Regulation

58. In 1994, the energy sector, especially the power subsector, was characterized by weak governance, high levels of energy losses mainly due to theft of electricity and gas with collusion from utility employees, political interference in managing sector entities, and lack of accountability. ADB played a significant and influential role in formulating the Government's policy response as articulated in the PSRB of 1994. Although several other development partners including the World Bank were involved in formulating the PSRB, ADB assumed a dominant position in supporting the Government in implementing it. ADB also provided policy advice to update and revise the PSRB during 1994–2008, taking into account the evolving and emerging sector issues. The PSRB was reiterated in the “Vision and Policy Statement for Power Sector Reforms, 2000.” It was further confirmed in the latest 3-year Road Map for Power Sector Reforms (2006–2008), which was drafted during the preparation of the Sustainable Power Sector Development Program.<sup>16</sup> Other development partners have taken important secondary roles and have focused on particular areas of reform. For example, USAID has been heavily involved in rural electrification and supporting the regulator while the World Bank has focused on rural electrification by supporting REB.

59. During the implementation of the PSRB, the Government took several initiatives to improve the corporate governance of newly set up energy sector entities. The new companies have shown marked improvements in their corporate governance and management performance, and some are now publicly listed. ADB played a crucial role by insisting that these companies be established based on sound corporate governance principles through appropriate loan covenants and then following up during project implementation. However, there has been limited success in reforming power generation and distribution in urban areas outside Dhaka presently served by BPDB. ADB's attempts to create power distribution companies for the northwest zone as well as power generation companies to take over the power generation

<sup>16</sup> ADB. 2007. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Bangladesh for the Sustainable Power Sector Development Program*. Manila.

function of BPDB have not produced the intended outcomes. Although the companies have been set up, they have not been given the requisite powers to take over the operations and assets of BPDB.

60. ADB has been active in efforts to reduce corruption and enhance transparency in the sector. There has been a significant reduction in nontechnical losses (mainly pilferage due to collusion of utility staff and customers) in transmission and distribution (Figure 1 and para. 17). Loan covenants aimed at reducing losses and improving revenue collection have been a feature of every ADB loan and they have been generally complied with and effective in both the power and gas subsectors. ADB has also required that procurement for its loans follow its procurement procedures. It is impossible to prove that all procurement has been faultless, but there are a number of encouraging signals. For example, the IPP at Meghnaghat was procured at one of the cheapest prices in Asia and ADB played a major role during the solicitation and evaluation process.

61. Although ADB initiated the setting up of BERC through several TA grants, USAID has played a major role in building the capacity of the staff before BERC became functional. There were significant Government delays in appointing the commissioners of BERC. However, ADB was instrumental in getting BERC functional. The commissioners were appointed to fulfill the conditions of the Sustainable Power Sector Development Program.<sup>17</sup>

## **2. Energy Security**

62. Despite the over 150% increase in electricity generation and gas production during the evaluation period, Bangladesh has had limited success in ensuring energy security, as the country faces crippling power shortages and gas shortages at present. However, ADB made a significant contribution to the limited success Bangladesh had in attracting private investments to the energy sector. ADB provided assistance in formulating the Government policy for attracting private sector investments to power generation, which resulted in over 1,200 MW of new generation capacity between 1998 and 2002. ADB's assistance was critical in facilitating one of the cheapest power generation projects (Meghnaghat Power Plant IPP with 450 MW capacity)<sup>18</sup> undertaken by the private sector in Asia. However, there has not been a follow-up private sector generation project to Meghnaghat and ADB's efforts to help the Government attract new investments to power generation were not successful. ADB is financing public sector peaking power plants (540 MW) and these projects will significantly alleviate the prevailing peak time power shortages (over 2,000 MW). ADB had a limited role in promoting private sector investments to the gas sector, which was the major factor for increasing the country's gas production. However, ADB has provided assistance to the state-owned gas production companies to maintain the output of their gas fields.

## **3. Improved Financial and Operational Performance of Energy Sector Entities**

63. The operational, commercial, and financial performance of the power sector entities engaged in power distribution and transmission have improved during the evaluation period (paras. 17–19). The improvements particularly relate to transmission and distribution loss reduction, bill collection, network performance measured in terms of reduced outages, increased network stability, improved voltage profile; and financial performance as indicated by

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<sup>17</sup> Footnote 16.

<sup>18</sup> ADB. 2000. *Report and Recommendation of the President to the Board of Director for a Proposed Loan to Bangladesh for the AES Meghnaghat Power Project*. Manila.

improved cost recovery and self-financing capability. ADB's contribution to these outcomes includes (i) setting explicit and realistic targets as loan covenants for loss reduction, and (ii) reducing account receivables and raising bill collection. These targets were effectively monitored by ADB during project implementation. ADB also assisted the newly set up companies engaged in power distribution and transmission to rehabilitate and extend networks. Close monitoring of performance indicators combined with targeted financial and technical assistance from ADB acted as incentive for the management to focus on performance improvements, and a performance-driven management culture was installed in the new entities formed with ADB assistance. ADB also supported efficiency improvements in the gas sector to a limited extent. ADB assistance was instrumental in setting up management systems to reduce gas distribution losses in the country's largest gas distribution company, Titas Gas Transmission and Distribution Company (TGTDC).

64. There has been no significant efficiency improvement in power generation plants operated by BPDB. Despite the sound financial performance of the newly created power sector companies, the overall financial performance of the power sector remained weak due to inefficiencies in BPDB, especially in power generation; generation capacity shortages; and inadequate electricity tariffs. ADB had limited success in addressing the institutional and financial problems of BPDB, which is still responsible for most of the power generation (over 70%) and power distribution (over 30%). BPDB continues to be a major fiscal burden on the national economy as it is not servicing its debt obligations to the Government.

#### **4. Enhanced Efficiency of the Energy Sector**

65. ADB's assistance to the energy sector had made a significant improvement in reducing the technical and nontechnical losses in power distribution (para. 17). The reduction in technical losses has a direct impact on reducing greenhouse gas (GHG) emissions. The reduction of non-technical losses (mainly pilferage of electricity and gas) would also compel the pilferers to use less energy. Although ADB had limited success in improving the efficiencies of BPDB thermal power plants, ADB supported private sector power projects that are highly efficient. However, the peaking power plants supported by ADB are likely to be used as baseload capacity because of capacity shortfalls and in this role they are not very efficient and would not contribute to reducing GHG emissions.

66. ADB-supported gas transmission and distribution investments have allowed the replacement of liquid fuels with natural gas for industrial applications as well as for power generation. As the level of GHG emissions of natural gas is lower than that of liquid fuels, these investments would have contributed to the reduction in GHG emissions. ADB has also played a significant role in introducing CNG as a transport fuel in greater Dhaka and established the institutional framework for regulating CNG operations. As a result, most vehicles in Dhaka city switched to CNG. The change definitely improved air quality and reduced GHG emissions in the transport sector.

67. The prices for electricity and gas in Bangladesh are among the lowest in developing Asia. The average electricity price is around \$0.05/kWh and the low electricity prices are mainly due to low gas prices (\$1.7 million British thermal units [mmbtu] compared with international prices of \$8–\$10/mmbtu) as gas is the main source of primary fuel used in the power sector. At the same time, the insufficient power generation capacity leads to load shedding, which in turn results in inefficient captive power generation (15% of gas production is used in captive power generation) by industrial consumers. The low electricity and gas prices encourage the inefficient use of energy by end users, and lack of a reliable power supply also contributes to this

inefficiency. However, neither ADB nor the Government has taken effective measures to remove the implicit subsidies and encourage efficient use of natural gas.

## 5. Access to Commercial Energy (Electricity and Natural Gas)

68. There has been a large increase in the number of electricity customers over the past 15 years, with the electrification rate increasing from 10% to 37%. ADB has contributed to this growth in three ways. First, its investments have enabled new customers to be connected to distribution grids. For example, under the Ninth Power Project<sup>19</sup> it was expected that 113,000 additional customers would be connected, but in practice a further 57,000 customers were added in the DESCO area and 200,000 in the area served by PBSs. Second, the reforms that ADB assistance promoted in the sector have made distribution companies more efficient and therefore able to serve more customers because less power is lost through technical failings and theft. Third, due to the reform and improvement of the transmission sector and the promotion of IPPs in the generation sector, distribution companies can offer more power to users.

69. The total number of residential customers increased from 4.3 million in FY2001 to 8.9 million in FY2008. The most rapid growth came in the areas served by PBSs, where customers increased from 950,000 in FY1995 to 2.7 million in FY2001 and 6.2 million in FY2008. ADB had limited involvement in direct support to REB. However, the growth in customer numbers could not have been achieved without ADB support to the sector as a whole and to the expansion of the medium-voltage network. The consumer base for natural gas also increased from 0.64 million in 1994 to 1.85 million by 2008, and ADB-financed gas distribution pipelines have contributed to that increase. However, piped natural gas is available only in the urban areas in central and eastern Bangladesh. The Gas Transmission and Development Project<sup>20</sup> is expanding the gas transmission and distribution network to the west zone, but the pipelines are still under construction.

## 6. Regional Cooperation

70. For Bangladesh, regional cooperation in the energy sector effectively means cooperation with India in the short term. However, there are substantial longer term benefits in regional cooperation on a wider scale, involving Bhutan and Nepal with their extensive hydro capacity as well as India. Such a regional network could be to the mutual advantage of all four countries with the use of coal-based thermal power in eastern India and cheap hydro capacity available in Nepal, Bhutan, and northeast India for baseload power generation; and natural gas-based thermal plants together with hydropower plants to meet peaking demand in the region. ADB has been active in encouraging a regional approach to the development of the energy sector including the trading of natural gas and electricity through gas pipeline and power transmission line linkages while recognizing the political sensitivities and energy security considerations especially with regard to natural gas. USAID had a major program to prepare a strategy for energy sector cooperation in South Asia. However, attempts of ADB and other development partners to promote regional cooperation in the energy sector have not resulted in the desired outcomes due mainly to political reasons and lack of clarity and commitment from the governments of the region.

<sup>19</sup> ADB. 1996. *Report and Recommendation of the President to the Board of Director for a Proposed Loan to Bangladesh for the Ninth Power Project*. Manila.

<sup>20</sup> ADB. 2005. *Report and Recommendation of the President to the Board of Director for a Proposed Loan to Bangladesh for the Gas Transmission and Development Project*. Manila.

## 7. Private Sector Participation

71. ADB has been instrumental in attracting private sector investments to power generation in Bangladesh during 1998–2002 through well-structured transactions (i.e., Meghnaghat Power Plant IPP). ADB's policy advice together with World Bank assistance enabled the Government to put in place attractive incentives to private sector investments in power generation. However, there has been no significant private sector response since 2002 despite several TA grants that ADB provided to facilitate the solicitation of those investments. The recent private sector investments in power generation are mainly small power plants on rental basis, which ADB has not encouraged as they are not in the least-cost development plan. ADB has also supported private sector investments in power transmission and distribution by supporting the listing of DESCO and PGCB on the local stock exchanges and encouraging PGCB to issue local bonds.

72. ADB has supported private sector participation in CNG operations by providing Rupantarita Prakritik Gas Company Limited (RPGCL), the implementing agency for Dhaka Clean Fuel Project,<sup>21</sup> with technical capacity to oversee the technical and safety regulation of the CNG sector and to promote private sector investments in CNG filling and conversion stations under the overall supervision of RPGCL. This has been a tremendous success story with extensive participation of the domestic private sector in distributing CNG and converting vehicles to use CNG.

### C. ADB Performance

73. ADB performance was assessed on the basis of (i) the quality of the program at entry, (ii) portfolio management, (iii) policy dialogue, and (iv) aid coordination (Table 5).

**Table 5: Assessment of ADB Performance in Bangladesh Energy Sector**

<b>ADB Performance Evaluation Criteria</b>	<b>Rating</b>
Quality at Entry of ADB Assistance	High
Portfolio Management	Substantial
Quality of Policy Dialogue	Modest
Development Assistance Coordination	Substantial
<b>ADB's Overall Performance</b>	<b>Substantial</b>

ADB = Asian Development Bank.

Source: Independent evaluation mission.

#### 1. Quality at Entry

74. In general, the quality of ADB assistance at entry is high. As the main development partner to the energy sector, ADB's lending and nonlending operations are underpinned by extensive knowledge and an understanding of the energy sector issues in Bangladesh. ADB has undertaken diagnostic studies together with the Government to identify priority areas for assistance. ADB's lending operations for both the gas and power sectors were preceded by technical assistance to identify priority projects for developing the sectors. The policy reforms aimed at institutions, tariffs, and financial restructuring of utilities were based on sound analysis and identification of underlying problems and institutional and policy barriers.

75. Lessons from past operations have been incorporated into the project design, especially the commercialization and corporatization of power sector entities such as DESCO. The factors

<sup>21</sup> ADB. 2002. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Bangladesh for the Dhaka Clean Fuel Project*. Manila.



that contributed to success in institutional reforms undertaken in 1990s have been incorporated into the subsequent reforms undertaken in recent times. However, the contextual differences, and the changes in the wider political economy and investment climate should have been given more consideration. Success in institutional reforms and private sector investments achieved during 1997–2002 have not been repeated to the same extent since then. Although the ADB lending instruments for the power and gas transmission and distribution sectors were appropriate for addressing critical constraints, assistance provided to the power generation sector was neither sufficient nor appropriate, considering the critical power shortages the country faces. ADB's assistance to power generation was primarily to attract private investments. Due to a variety of reasons including those outside the control of the Government, the anticipated investments have not materialized since 2002.

## **2. Portfolio Management**

76. The management of ADB's energy sector portfolio has been excellent and the involvement of ADB's Resident Mission (RM) staff in program implementation and policy dialogue has been commendable. There has been a high degree of staff continuity in both the RM and headquarters with respect to the energy sector operations in Bangladesh. ADB staff have been able to demonstrate a high degree of sector knowledge and earn the respect of the Government counterparts and other development partners. ADB has maintained up-to-date indicators to monitor the management performance of energy sector utilities. Lapses in the performance of the utilities, indicated by distribution losses and low bill collection ratios, have been promptly taken up by ADB with the Government. ADB has been proactive in ensuring improved corporate governance and human resource practices in the newly created utilities. It has made appropriate adjustments to the projects during implementation to respond to the critical needs of the sector. ADB investments in the energy sector did not have major environment and social issues, and the limited impacts were successfully mitigated. The reforms ADB promoted did not cause major socioeconomic challenges, and ADB together with the Government has been successful in having broader stakeholder support for the reform process. Delays in project implementation did not materially affect the final outcomes. ADB took timely actions to minimize their impact.

## **3. Policy Dialogue**

77. The quality of policy dialogue in promoting far-reaching energy sector reforms, especially in power sector reforms and private sector participation, has been outstanding. Although ADB did not produce major knowledge products relating to the energy sector except the power sector master plans, it has set the trend in sector reforms in Bangladesh. ADB has been able to imbue the stakeholders including the Government counterparts with a deep sense of ownership of the reform program and has recognized the political economy of the country. However, the policy dialogue has not resulted in the desired outcomes in energy price reforms in the electricity and gas sectors, in creating an enabling environment for private sector investments, and in regional cooperation. The several targeted TA grants to promote private sector investments did not result in investment climate to provide adequate confidence to private sector investors to commit investments to the power sector in Bangladesh. There is need to undertake a rigorous and detailed study of the energy pricing issues, taking into account the linkages between electricity and gas prices and the economic inefficiencies encouraged by price distortions and subsidies with due recognition to underlying political economy issues. The policy dialogue undertaken by ADB together with other development partners has not resulted in energy trading among Bangladesh and its immediate neighbours as there are underlying political issues and lack of excess energy production capacity in the region.

#### 4. Aid Coordination

78. ADB has coordinated development partner assistance to the energy sector in Bangladesh and chaired the development partner coordination meetings. In that role, ADB has enabled the development partners to take a consistent and coherent sector strategy and avoid overlapping financial assistance and conflicting policy advice. The other development partners have appreciated ADB's sector expertise and leadership role, broad knowledge, and sharing of information with other development partners. ADB has assisted the bilateral sources in channeling their assistance to the energy sector as cofinanciers of ADB-financed projects where ADB has undertaken the project preparatory activities. However, there was a difference of opinion with the World Bank on the pace and scope of the reforms implemented during 1995–2001. As a result, the World Bank refrained from financing the energy sector investments except through the private sector and REB. The differences have narrowed down since then and the World Bank has supported the reforms during 2002–2008 through policy conditions on program loans and technical assistance. Recently the World Bank adopted a strategy similar to ADB's by approving a loan to finance peaking power plants and supporting the corporatization of power distribution in the south zone to complement ADB's efforts to corporatize the west and northwest zones. The World Bank is also supporting private sector participation in power generation and financial restructuring of BPDB, complementing ADB assistance.

79. On the basis of the high degree of relevance of ADB's energy sector strategy to the needs and challenges of Bangladesh's energy sector; excellent performance in delivering ADB assistance through high quality policy dialogue, well-structured lending and nonlending program; effective aid coordination; and substantial contribution to the energy sector and overall development result, the top-down rating of ADB's energy sector strategy is equivalent to "successful" (Table 6).

**Table 6: Overall Top-Down Rating of Bangladesh Energy Sector Strategy**

<b>Criterion</b>	<b>Rating Scale</b>	<b>Overall Rating</b> (scale of 0–8)	<b>Description</b>
Strategic Positioning	0–8	6	Substantial
Contribution to Development Result	0–8	6	Substantial
ADB Performance	0–8	6	Substantial
<b>Overall</b>	<b>0-24</b>	<b>18</b>	<b>Successful</b>

Note: Since contribution to development result is not rated, aggregate top-down rating (TR) is assessed as highly successful if  $TR \geq 20$ ; successful if  $14 \leq TR \leq 19$ ; partly successful if  $8 \leq TR \leq 13$ ; and unsuccessful if  $TR \leq 7$ .

Source: SAPE Mission.

#### VI. BOTTOM-UP ASSESSMENT OF ENERGY SECTOR ASSISTANCE PROGRAM

80. During 1993–2008, ADB approved five loans and one grant assistance to finance three public sector projects in the gas subsector, one of which has been completed; one nonsovereign loan to the power sector, which has already been completed; two program loans to the power sector, both of which are fully disbursed; and nine loans to finance six public sector projects in the power subsector, out of which two projects have been completed. One of the public sector projects in the power sector (Sustainable Power Sector Development Project) is at an early stage of implementation and was not included in the assessment. ADB has also

approved 19 advisory TA grants during this period. The individual lending and nonlending operations are assessed in Appendixes 4 and 5, respectively.

## A. Relevance

81. ADB projects/programs for promoting commercialization and corporatization of the power distribution and transmission sector were "highly relevant" to sector development needs (paras. 25–29) and Government priorities (paras. 30–37). The ADB sector assistance program was closely aligned with the ADB energy sector policy of 1995 and its update in 2000. The program was well-structured, taking into account the implementation capability of the Government and the priorities and strategies of other development partners active in the sector. ADB identified the risks to successful implementation of the reforms such as trade union opposition and lack of political commitment, and mitigated them through a critical mass of financial and technical assistance programs. ADB's recent attempts to commercialize the remaining distribution operations of BPDB and generation operations are facing opposition from BPDB management. Other development partners such as the World Bank and Japan International Cooperation Agency (JICA) have shown increasing interest in complementing ADB in restructuring the remaining operations of BPDB. During 1995–2001, the Government manifested a high degree of ownership for the reform agenda supported by ADB, but the same degree of ownership was not demonstrated during 2001–2008 as reflected in the Government's failure to commercialize power distribution in the northwest zone as required under the Power Sector Development Program loan. However, ADB's lending modality of channeling the financial assistance for urgently required rehabilitation and expansion of power plants and network through the reformed entities has compelled the Government to operationalize the new entities under commercial principles to take over the operations from poorly performing BPDB.

82. ADB assistance to power generation was primarily focused on facilitating private sector investments in that operation. ADB approved appropriately sequenced operations starting with TA grants for feasibility studies, solicitation and bid evaluation,<sup>22</sup> and nonsovereign lending as demonstrated in the AES Meghnaghat Power Project.<sup>23</sup> However, there has not been any significant private sector investment in power generation since 2002, despite several initiatives undertaken by the Government with the assistance of ADB (TA for the Promotion of Private Sector Participation in the Power Sector and Tendering Process for Independent Power Producer Plants) and the World Bank. ADB has supported public sector investments in peaking power plants through the Power Sector Development Program (Project) and Sustainable Power Sector Development Program (Project) to complement the expected private sector investments in baseload power plants.

83. Most ADB financing was targeted toward improving connectivity in and reliability of the transmission system. The investments were supposed to complement the expected private sector investments in power generation and facilitate the evacuation and delivery of power to load centers. As investments in power generation have not materialized as expected, with the resultant load shedding, the anticipated benefits of transmission network investments that ADB financed have not been fully realized. ADB was not a major financier of rural electrification, as funding from other development partners to REB for expanding rural access has been adequate. ADB's investment in power distribution was primarily focused on rehabilitating and expanding distribution networks transferred to DESCO, WZPDC, North West Zone Power Distribution

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<sup>22</sup> ADB. 1995. *Technical Assistance to Bangladesh for the Solicitation for Private Sector Implementation of the Meghnaghat Power*. Manila.

<sup>23</sup> Footnote 18.

Company (NWZPDC), DPDC, and REB from DESA and BPDB under the Rural Electrification,<sup>24</sup> Dhaka Power Systems Upgrade,<sup>25</sup> and the West Zone Power System Development Projects.<sup>26</sup> The selection and focus of ADB investments in rural electrification were appropriate as they were selected to complement ADB investments in the medium-voltage network and took into account the assistance that other development partners provided.

84. ADB investments in the gas subsector were dominated by assistance to gas transmission and distribution, with limited support for improving the production capacity of existing gas fields operated by public sector gas companies. This approach is relevant and appropriate in the context of increasing private sector investments in upstream gas exploration and development of new gas fields. ADB has also focused, to a limited extent (compared with its work in the power sector) on efficiency improvements in gas distribution under the Third Natural Gas Development Project<sup>27</sup> and the TA for Safety and Efficiency Improvements in the Gas Sector. There has not been a major thrust (as in the the power subsector) for institutional reforms in the gas sector. This is relevant as the gas sector had been operated commercially from the outset and has no major institutional weakness. ADB's intervention under the Dhaka Clean Fuel Project<sup>28</sup> to introduce and promote CNG as a transport fuel is highly relevant in the context of Bangladesh. However, the relevance of recent financing for the Gas Transmission and Development Project<sup>29</sup> to further expand the gas transmission network to the western part of the country is doubtful as the country currently faces gas shortages that are likely to continue until 2016–2018.

85. The program of assistance that ADB provided during the SAPE period has been "highly relevant" to Bangladesh's energy sector needs, especially in promoting commercialization and removing power transmission constraints. A consistent and coherent thread has run through operations over the past 15 years in that (i) institutional and regulatory reforms have established commercial entities to take over the operation of the electricity sector, and (ii) the newly created entities were given the responsibility of implementing ADB-financed investments. This approach is highly relevant to the Government strategy. While the institutional reforms were implemented in a phased manner, the successive loans and technical assistance have taken the program forward in a logical and consistent way, focusing on the highest investment priorities.

## **B. Effectiveness**

86. ADB assistance in terms of policy dialogue, technical assistance for institutional reforms, and financial incentives through program and project loans is one of the major contributory factors for institutional reforms in the power sector. All the completed and substantially completed projects have delivered the physical outputs and achieved the major development outcomes. The majority of the TA grants, especially related to commercialization of electricity distribution utilities, have been effective. The investments in power transmission financed by

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<sup>24</sup> ADB. 1995. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Bangladesh for the Rural Electrification Project*. Manila.

<sup>25</sup> ADB. 1999. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Bangladesh for the Dhaka Power Systems Upgrade*. Manila.

<sup>26</sup> ADB. 2001. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Bangladesh for the West Zone Power Systems Development Project*. Manila.

<sup>27</sup> ADB. 1993. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Bangladesh for the Third Natural Gas Development Project*. Manila.

<sup>28</sup> Footnote 21.

<sup>29</sup> ADB. 2005. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Bangladesh for the Gas Transmission and Development Project*. Manila.

ADB under the Ninth Power<sup>30</sup> allowed the evacuation of power from new private sector generation plants commissioned during 1998–2002. Investments in the transmission line under the Dhaka Power System Upgrade have improved the reliability of the transmission system in Dhaka city and the western of the country and increased the power transmission capacity to the western part of the country.. However, these improvements to the transmission system have not been reflected in improved quality in power supply due to the prevailing power shortages. The electrification rate of Bangladesh had increased to over 37% by 2008 compared with 10% in 1994. ADB-financed investments in expanding the medium-voltage network have been effective in facilitating rural electrification in greater Dhaka, west zone, and northwest zone. However, most of the last mile network expansion was undertaken by REB with financing from other development partners and the Government.

87. ADB-financed investments under the Third Natural Gas Development Project for rehabilitating existing gas fields operated by national gas companies have been effective in increasing production by about 250 million cubic feet per day (MMCFD), which is 13% of the national output. The improvements in gas distribution networks in greater Dhaka and Jalalabad franchise areas under the Third Natural Gas Development Project and Dhaka Clean Fuel Project had been effective in increasing the capacity of the distribution network to meet the increasing demand for gas. The efficiency improvements and loss reduction measures introduced under the Safety and Efficiency Improvements in the Gas Sector<sup>31</sup> enabled TGTDC to reduce losses from over 8% to below 3.5%. However, the effectiveness of pipeline expansion financed under the Gas Transmission and Development Project is doubtful in the medium term because of the inadequate funding allocated to gas compressor stations and the prevailing gas shortages.

88. ADB assistance (TA for Capacity Building of the Dhaka Electric Supply Co. Ltd., the Ninth Power and the Dhaka Power Systems Upgrade projects) has been effective in making DESCO and PGCB (which are responsible for power distribution in Dhaka and power transmission in the entire country, respectively) highly efficient and financially profitable corporate entities. The two entities have achieved significant improvement in operational performance (paras. 17–19) with the assistance of ADB operations. Support provided by the Corporatization of the West Zone Distribution Operations of the BPDB and West Zone Power System Development was effective in establishing WZPDC to take over power distribution in the west zone. The efficiency improvements achieved by WZPDC are described in para. 19.

89. However, ADB's attempts to corporatize the generation operations of BPDB, in particular the Ashuganj power complex under the Corporatization of the Ashuganj Power Station,<sup>32</sup> have not been effective. The corporatization of NWZPDC, supported under the Power Sector Development Program, has also not been effective because the new corporate entity to take over power distribution in the northwest zone has not become functional due mainly to strong opposition from BPDB management and the trade unions and the Government's lack of political will to implement difficult reforms. These delays and nonimplementation of agreed-upon reforms had a negative impact on the overall effectiveness of ADB's assistance program. The program loan conditions under the Sustainable Power Sector Development Program have been highly effective in making BERC functional in 2008. However, it is premature to assess the effectiveness of BERC in terms of improving the overall performance of the energy sector.

<sup>30</sup> Footnote 19.

<sup>31</sup> ADB. 1993. *Technical Assistance to the People's Republic of Bangladesh for the Safety and Efficiency Improvement in the Gas Sector*. Manila (TA 2025-BAN approved for \$480,000.00 on 21 December).

<sup>32</sup> ADB. 1999. *Technical Assistance to the People's Republic of Bangladesh for Corporatization of the Ashuganj Power Station*. Manila (TA 3343-BAN approved for \$1 million on 17 December).

90. ADB assistance for facilitating private sector assistance to power generation under Solicitation for Private Sector Implementation of the Meghnaghat Power and Meghnaghat Power had been highly effective in facilitating the 450 MW Meghnaghat power plant and attracting over 1,200 MW of private sector generation capacity during 1998–2002. However, this success was not repeated during 2002–2008, and Promotion of Private Sector Participation in the Power Sector<sup>33</sup> and Tendering Process for Independent Power Producer Plants<sup>34</sup> have not yet resulted in new confirmed private sector investments in power generation. ADB played a significant role in structuring the 70 MW Mymensingh power plant under the Rural Electrification Project as an IPP with investments from REB. ADB financed the feasibility studies for power plants under the Ninth Power Project, but there is still no committed investment in new generation capacity. The Power Sector Development Program has financed the addition of 240 MW of generation capacity using open cycle gas turbines. Their commissioning in 2009 will help alleviate power shortages during peak time. While the lack of capacity, governance issues including political interference, and unrealistic expectations of cost power purchase have contributed to lack of success in attracting private investment to power generation, it must be noted that there was inadequate interest from experienced and competent investors to invest in large-scale power plants in Bangladesh.

91. ADB's assistance program to Bangladesh is "effective" in achieving the intended outcomes except in the case of attracting private sector investments for power generation. The outcomes were achieved through a combination of policy dialogue, project and program loans, and technical assistance, which have promoted both reforms and viable projects. The linkages between the various elements of the program have been well thought out, consistent, and in accordance with good practice standards. ADB has led the development partner community both as the most trusted partner of the Bangladesh Government and through leadership of the local coordination group for energy. Despite delays of 2–3 years in project implementation, most of the key outputs have been delivered and the delays have not affected the effectiveness of the projects.

### **C. Efficiency**

92. The ADB-supported institutional reforms have contributed to efficiency improvements in the power sector as measured by reduced distribution losses and managerial efficiencies. The TA resources had been efficiently used in achieving the desired outcomes in general, although sometimes with considerable delays. The TA and loan financing for Mymensingh (i.e., after its conversion to a combined-cycle power plant) and Meghnaghat power plants are highly efficient in terms of the thermal efficiency of the plants in the use of scarce gas resources and economic efficiency due to their relatively low capital cost and operating cost. However, the peaking power plants financed under the Power Sector Development Program and Sustainable Power Sector Development Program are unlikely to be economically efficient due to their low thermal efficiency and likely use as baseload power plants due to prevailing generation capacity shortages.

93. The ADB-financed investments in power transmission have helped improve efficiency in power transmission by reducing transmission losses from 4.75% in 1998 to below 3.5% in 2008. With inadequate investments in power generation, end users have not realized some of the

<sup>33</sup> ADB. 2006. *Technical Assistance to Bangladesh for the Promotion of Private Sector Participation in the Power Sector*. Manila (TA 4898-BAN for \$600,000 approved on 15 December).

<sup>34</sup> ADB. 2007. *Technical Assistance to Bangladesh for the Tendering Process for Independent Power Producer Plants*. Manila (TA 4953-BAN for \$600,000 approved on 16 July).

economic benefits of the improved transmission network. However, the economic efficiency of transmission investments should also include the economic benefits due to improved reliability and ability to transmit power from cheaper generation sources to load centers. The ADB-financed investments in power transmission have contributed to more efficient power system operation despite generation capacity shortages. Improvements in power distribution have facilitated higher electrification rate and reduced technical and nontechnical losses (paras. 16–17). Such investments are highly efficient due to the high economic cost of electricity losses. Investments in rural electrification are economically efficient in Bangladesh because of the low capital cost per household due to high population density and the relatively high consumer surplus (i.e. economic benefits) from electricity usage.

94. Investments in the gas sector, especially under the Third Natural Gas Development Project, are highly efficient as they considerably increased the outputs of existing gas fields. The gas transmission expansion projects supported by ADB under the Third Natural Gas Development and Dhaka Clean Fuel projects have increased the availability of natural gas to the wider community and facilitated the replacement of imported oil with natural gas in the transport sector, resulting in economic savings. The low gas prices in Bangladesh result in higher consumer surplus and high economic benefits, but low financial return on investments.

95. The resources provided by ADB were utilized efficiently in implementing the projects and TAs where most of the projects had been implemented without waste of resources and cost overruns. The completed projects have an economic internal rate of return (EIRR) of over 12%. That indicates that the economic benefits exceeded the economic costs, and the ADB-financed projects are economically efficient and led to efficient use of energy resources. The intended project outputs were achieved within the cost estimates, although with delays of several years. The new corporate entities set up under ADB assistance have better managerial efficiencies and lower cost of service delivery. ADB-supported projects and TA also increased the efficiency of the power and gas distribution network by reducing technical losses and pilferage and improving cost recovery. However, ADB-supported peaking power plants are likely to be used initially as baseload power plants, resulting in inefficient use of scarce gas resources.

#### **D. Sustainability**

96. The projects and structural reforms that ADB has supported are technically and operationally sustainable and enjoy the backing of the Government in terms of political commitment. One of the major benefits of the program is the way in which it has demonstrated the capacity of local human resources to implement projects and programs successfully once they are operating within an appropriate framework. The promotion of DESCO and PGCB by ADB has established role models for power sector institutions, which are now being adopted more widely. The practices being adopted by WZPDC, DPDC, DESCO, and PGCB are also likely to be institutionally sustainable. However, there are doubts about the sustainability of WZPDC as it is having difficulties in retaining competent senior management and BPDB is resisting the formation of NWPDC. However, it can be safely assumed that the ADB-financed investments in power transmission and distribution are sustainable from an institutional point of view as these initial teething problems are expected to be resolved. The Meghnaghat and Mymensingh power plants have demonstrated their sustainability as these plants have been in operation for over 5 years with a high degree of reliability. The public sector power generation plants financed by ADB under the Power Sector Development and Sustainable Power Sector Development programs are to be entrusted to newly set up companies, and it is too early to assess the institutional sustainability of these entities.

97. Although the newly set up entities responsible for implementing ADB-financed projects are profitable and the projects themselves have a financial internal rate of return (FIRR) exceeding the weighted average cost of capital (WACC), the financial sustainability of the power sector as a whole is still questionable. BPDB chronically incurs losses and is in default of its debt obligations to the Government in excess of \$1.1 billion (Tk80 billion). ADB has focused heavily on the payment of electricity and gas bills by state-owned agencies in its policy dialogue with the Government and in loan conditions. Performance on paying these bills has improved significantly and most institutions are now up-to-date on their bill payments. However, there has been little if any focus on the much larger issue of debt service payments to the Government by the power utilities, in particular BPDB. BPDB can only be made viable with a significant increase in bulk supply tariffs that it levies to the distribution companies. Even with the existing bulk supply tariff, most of the distribution sector outside Dhaka is not viable due to the low end user tariffs in Bangladesh, which average about \$0.05/kWh. Significant tariff increases throughout the sector are required to ensure financial sustainability. In this context, there also have to be concerns over the competence and independence of the regulatory body (i.e., BERC) in tariff setting. BERC will require further assistance to develop a set of financial models that enable it to consider tariff issues across the energy sector.

98. Although the individual companies responsible for ADB-financed gas sector projects are profitable, Petrobangla is incurring losses due to the increasing share of more expensive gas from IOCs. The national gas production companies are also not receiving adequate wellhead margins to enable them to invest in sustaining the current production level. The current low levels of gas prices in Bangladesh (\$1.7/million British thermal units [mmbtu] compared with prices of international liquefied natural gas [LNG] of \$8–\$10/mmbtu) need to be raised to ensure the long-term financial sustainability of the gas sector. Any increase in gas prices is likely to cause further financial stress to the power sector as gas is the major source of primary energy for power generation in Bangladesh. Institutional sustainability in the gas sector is better than in the power sector due to more professional management practices adopted by Petrobangla. However, the national gas companies are faced with difficulties in retaining technical staff due to low remuneration and this may impact on the long-term sustainability of the sector.

99. The ADB-assisted investments and policy reforms are as a whole "likely to be sustainable" from a technical, financial, and institutional point of view despite the concerns over the overall financial viability of the power sector as the entities responsible for operating ADB-financed investments are appropriately structured to ensure their financial viability. There is a strong sense of ownership and strong and competent management in the utilities set up under ADB assistance. They are profitable and some of them are even listed on the stock exchanges. Cost recovery in the energy sector in terms of reduced transmission and distribution losses, and higher bill collection is improving. Although both gas and power tariffs are set at levels below full cost recovery at present, the required tariff adjustments are not significant (below 20% for gas and below 30% for power). However, the capacity of BERC to undertake a comprehensive review of gas and power tariffs and implement price adjustments in the face of likely opposition from consumer groups is not yet proven. The power sector's outstanding liabilities to the Government and account receivables from delinquent customers are a legacy issue and it is not threatening the overall sustainability of the sector.

## **E. Impact of Outcomes**

100. The overall commercial orientation of the power sector improved during the evaluation period. The performance of DESCO and PGCB has shown a marked improvement compared with that of its predecessor entities (paras. 16–20), and it has an impact on the technical



performance of the transmission network and the quality of service in the power supply in Dhaka. The governance of the sector has improved considerably as a result of reforms. The creation of companies under the Companies Act to manage the power sector led to better governance as boards of directors took over control from bureaucratic Government personnel. ADB obliged the boards of these companies to include private sector representatives instead of bureaucrats.

101. ADB assistance to the power sector has financed the expansion of power transmission and the medium-voltage distribution network of the country and the low-voltage distribution network in urban areas. The investments have raised rural electrification from 10% in 1994 to over 37% in 2008 as well as increased overall electricity consumption in the country from 9.8 TWh in 1994 to 23.3 TWh in 2008. The increase in the electrification rate would have improved the quality of life of the electrified households through reduced indoor air pollution, savings in kerosene consumption, and increases in income-generating activities. Consumption in productive sectors such as industry and commercial enterprises has contributed to most of the increase in electricity consumption. This would have had a direct relationship with the overall economic and industrial growth of the country and employment generation in nonfarm sectors. However, the impact of improvement in the power distribution sector has not translated into better and more reliable supply of electricity because generation capacity is still inadequate and power shortages persist. Thus, the overall economic impacts of the power sector investments are limited.

102. Expansion of the gas sector in terms of both production (from 223 BCF in 1994 to 596 BCF in 2008) and access to gas supplies through the expansion of gas transmission and distribution has been a major contributory factor for the expansion in the power sector and industry in Bangladesh, which in turn contributed to overall economic growth. The expansion of the gas distribution network to over 1.8 million households in 2008 compared with 0.6 million in 1994 has resulted in improved indoor air quality, savings on kerosene, and less pressure on traditional biomass. The use of CNG as a transport fuel promoted by ADB under the Dhaka Clean Fuel Project has had a major impact in improving air quality in Dhaka and allowing savings of around \$1.2 billion per year on fossil fuel imports.

103. The overall impact of ADB assistance to the Bangladesh energy sector is considered as "substantial," as it was instrumental in establishing a commercially oriented institutional culture in a sector that was dominated by poorly performing agencies prior to 1995. This has a significant impact on the financial viability of the sector as well as on the quality of service. However, the failure to attract adequate investments to power generation has reduced the full benefits from these improvements to the management of sector entities reaching the consumers.

#### **F. Overall Bottom-Up Evaluation of Sector Assistance Program**

104. The lending and nonlending operations are separately assessed in Appendixes 4 and 5, respectively, and the results of the assessment are summarized in Table 7. The lending program was given a weight of 80% and the nonlending program 20% to arrive at the overall bottom-up rating.

**Table 7: Overall Bottom-Up Rating of Bangladesh Energy Sector Program**

Criteria	Rating Scale	Lending Program		Nonlending Program		Overall Rating	
Relevance	0–3	Highly relevant	3	Relevant	2	Highly relevant	3
Effectiveness	0–6	Effective	4	Effective	4	Effective	4
Efficiency	0–3	Efficient	2	Efficient	2	Efficient	2
Sustainability	0–6	Likely	4	Likely	4	Likely	4
Impact	0–6	Substantial	4	Substantial	4	Substantial	4
<b>Overall Rating</b>	<b>0–24</b>	<b>Successful</b>	<b>17</b>	<b>Successful</b>	<b>16</b>	<b>Successful</b>	<b>17</b>

Note: Aggregate bottom-up rating (BR) is assessed as highly successful if the BR  $\geq 20$ , successful if  $16 \leq BR \leq 19$ , partly successful if  $11 \leq BR \leq 15$ , and unsuccessful if  $BR \leq 10$ .

Source: Independent Evaluation Mission.

105. ADB lending and nonlending operations have been grouped into six thematic clusters as shown in Table 2, and outcomes achieved and the impact realized in each cluster are explained in Appendix 3. The relevance, effectiveness, efficiency, sustainability, and impacts of ADB assistance in each of these areas are also assessed in Appendix 3 and summarized in Table 8.

**Table 8: Energy Sector Assistance Program (Bottom-Up) Assessment by Component**

	Relevance	Effectiveness	Efficiency	Sustainability	Impact
Promoting Commercial Orientation of the sector	Highly relevant	Effective	Efficient	Likely	Substantial
Promoting Investments in Power Generation	Relevant	Less effective	Less efficient	Likely	Modest
Removing Transmission Constraints	Highly relevant	Effective	Efficient	Likely	Substantial
Improving Access to Electricity	Relevant	Effective	Efficient	Likely	Substantial
Increasing Gas Production Capacity	Relevant	Effective	Efficient	Less likely	Modest
Improving the Gas Transmission and Distribution Network	Highly relevant	Effective	Efficient	Likely	Substantial
<b>Overall Bottom-Up rating</b>	<b>Highly relevant</b>	<b>Effective</b>	<b>Efficient</b>	<b>Likely</b>	<b>Substantial</b>

Source: Independent Evaluation Department.

## VII. OVERALL ASSESSMENT

106. **Strategic Assessment of ADB Assistance to Bangladesh Energy Sector.** Overall, the strategic (top-down) assessment of ADB's energy sector assistance to Bangladesh has been rated "successful" in terms of its high degree of relevance to country priorities and ADB energy sector strategies, selectivity and ownership, sequencing and continuity, and substantial contribution to achieving development outcomes; in improved sector governance and operational performance of sector entities; and the highly commendable performance of ADB in ensuring project quality at entry, effective portfolio management, and its leadership role in coordinating development assistance to the sector.

107. The bottom-up assessment of the energy sector program is based on separate assessments of relevance, effectiveness, efficiency, sustainability, and impact of lending and nonlending operations of ADB (Table 7) as well as the assessment of ADB assistance to seven thematic pillars. The contributions of ADB operations that are completed and close to completion were evaluated, but operations that are at an early stage of implementation were not considered. ADB assistance for all the thematic pillars has been rated as "successful" except assistance for promoting investments in power generation, which is rated as "partly successful."

108. **Overall Assessment.** Overall, ADB assistance to the Bangladesh energy sector is rated "successful" (Table 9).

**Table 9: Overall Rating of Performance Assessment at the Sector Level**

Item	Rating Scale	Score	Rating
Strategic Assessment	0–24	18	Successful
ADB Energy Sector Assistance Program	0–24	17	Successful
<b>Total Score</b>	<b>0–48</b>	<b>35</b>	<b>Successful</b>

Note: An overall sector assistance program evaluation performance assessment is derived as a combination of the bottom-up and top-down assessment of performance. The overall sector assistance program evaluation performance score is derived by adding up the bottom-up and top-down ratings. The rating is highly successful if the  $R \geq 40$ ; successful if  $30 \leq R \leq 38$ ; partly successful if  $19 \leq R \leq 29$ ; and unsuccessful if  $TR \leq 18$ .

Source: Independent Evaluation Mission

## VIII. KEY FINDINGS, LESSONS, AND RECOMMENDATIONS

### A. Key Findings and Issues

109. **ADB Has Played a Significant and Influential Role in Promoting the Far-Reaching Power Sector Reform Program Implemented by the Government.** ADB engaged the Government in policy dialogue and provided technical assistance to prepare the PSRB in 1994 and update it for greater clarity and focus in 2000 and 2006. ADB provided targeted technical assistance required to implement the corporatization of power distribution and transmission operations of BPDB. ADB also gave financial support to the newly created entities to rehabilitate and expand the distribution and transmission networks they took over from BPDB and DESA. ADB also provided budgetary support through program loans to finance the adjustment cost of outstanding account payables from Government entities to the power sector and termination benefits of BPDB staff belonging to BPDB units transferred to the newly created companies. The foregoing has demonstrated the effectiveness of long-term engagement, extensive sector knowledge, and critical mass of lending and nonlending assistance even in difficult environments such as Bangladesh.

110. **ADB's Phased and Gradualist Approach to Reform Implementation Was Successful in Some Cases.** The approach was successful with DESCO and PGCB, while the performance of WZPDC is mixed. For DPDC it is too early to make a judgment. The institutional model of undertaking investment projects through companies such as DESCO and PGCB instead of state corporations such as DESA and BPDB has been amply justified by the results. The full benefits of corporatization are realized over many years and there can be initial setbacks. DESCO faced initial problems mainly due to DESA's refusal to hand over the assets and the rundown of assets transferred to DESCO. PGCB was initially purely a project development company. Both DESCO and PGCB existed for some time before they became

operational. However, over time they proved their worth and demonstrated increases in efficiency and quality of service. Their example highlights the importance of long-term engagement even if the early results are not promising. The high degree of acceptability of ADB by the relevant stakeholder as a reliable and knowledgeable development partner with adequate understanding of political economy and reform implementation capacity of the government was one of the main contributory factors to the success in ADB's support for reform implementation,

**111. Power Shortages Have Persisted Throughout the Evaluation Period.** The current situation in the power sector reflects a critical shortage of baseload capacity. The major investments funded by ADB and the World Bank and currently in progress will not help solve this problem as they will create additional peaking capacity and demand due to the expansion of the distribution network. Such peaking stations will almost certainly be run for more than the design level of seven hours per day and will make inefficient use of scarce gas resources (i.e., peaking plants are less efficient than baseload power plants, but have a lower capital cost). No new, low-cost baseload capacity will be available before 2013.

**112. The policy of expecting the private sector to develop IPPs for baseload capacity has not proved successful** due to variety of reasons ranging from poor investors climate for foreign investments, governance issues associated with solicitation of investments for power generation, uncertainties over gas supply and lack of domestic private sector investors capable of investing in power generation projects. The reasons for past failures in IPP solicitation in the power sector should be properly understood and necessary steps need to be taken to prevent similar failures in the future. The public sector financing of power generation sector could also be considered as an option while continuing to support the solicitation of private sector investments in power generation.

**113. Over dependency on natural gas is threatening the energy security of the country.** Bangladesh is heavily dependent on natural gas to meet its primary energy demand in power generation, industrial and residential sectors. The country's current level and projected increased in gas production proven gas reserves are inadequate to meet the anticipated demand for natural gas. Hence, there is need for continued the development partners including ADB support for the public sector gas companies to maintain the production levels of existing gas fields while supporting policy reforms to attract new investments to develop new gas fields. In the short term, it is also more appropriate to focus further investments in gas transmission and distribution sector to remove the bottlenecks in gas transmission and efficiency improvement (i.e. loss reduction) in gas distribution.

**114. Corporatization of Remaining Operations of BPDB Have not Been as Successful as in the Past.** The corporatization of BPDB's generation function and power distribution in the northwestern zone<sup>35</sup> has not resulted in the expected outcomes. Although new generation companies (Electricity Generation Company of Bangladesh and NWPGC) had been set up as subsidiaries of BPDB to implement the ADB-financed peaking power plants under the Power Sector Development Program and Sustainable Power Sector Development Program, the existing generation plants of BPDB have been partly transferred to one of them. BPDB's generation function requires significant restructuring to improve its operational performance (i.e., plant efficiencies and availability). ADB recently provided technical assistance<sup>36</sup> to undertake

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<sup>35</sup> ADB. 2003. Report and Recommendation of the President to the Board of Directors for a Proposes Loan to Bangladesh for the *Power Sector Development Project supported the creation of North Western Power Distribution Company*. Manila.

<sup>36</sup> ADB. 2005. *Technical Assistance to Bangladesh for Corporatization of the Bangladesh Power Development Board*. Manila (TA 4626-BAN, approved for \$800,000, on 2 August).

comprehensive restructuring of BPDB's remaining functions. However, the Government has not yet made a final decision on the acceptability of the TA consultant's recommendations. BPDB, together with residual DESA holding its financial obligations, requires a major financial restructuring, including a write-down of outstanding liabilities to the Government. The World Bank is providing assistance to the Government on this matter.

**115. The Present Policy of Making the Country's Gas Resources Available to Users at a Minimal Price Is Unsustainable.** Costs will rise as increasing quantities of available gas come from IOCs. Furthermore, the present price of gas does not provide sufficient cash flow to support further gas exploration. On the other hand, most of the gas companies are currently profitable due to low historical costs and are accumulating cash and financial investments on their balance sheets. The gas prices in Bangladesh are set at below the economic value of gas and this is justified on social equity grounds of providing electricity, cooking gas, CNG for transport, and fertilizer at a lower cost. However, with the possible exception of fertilizer, it is likely that consumers of electricity and CNG will have the willingness to pay for gas at higher than the present cost (based on the results of surveys undertaken by IED during the preparation of SAPE) . Hence, there is scope for significant increases in gas and electricity prices as a means to rationalize the demand for gas in the short to medium term. This is an economically more efficient way of controlling the demand for gas and electricity than the prevailing practice of load shedding during peak hours and cutting off gas supply to industrial consumers and power plants. The expansion of gas distribution for domestic use may be limited as an interim measure to preserve gas for more industrial applications with greater economic and financial benefits and for power generation.

**116. Need for More Emphasis on Supporting the Diversification of Primary Energy Supplies, End User Energy Efficiency Improvement, and Regional Energy Cooperation.** Bangladesh has ample opportunities for further improving supply-side efficiency, especially in the power generation sector, by converting open-cycle gas turbines to combined-cycle units and shutting down gas-fired steam turbines and diesel engines. Improvement in end user energy efficiency can be promoted through tariff reforms, and by removing implicit subsidies in gas and electricity tariffs and installing meters for residential gas consumers. This should be accompanied by an energy efficiency campaign to promote compact fluorescent light (CFL) bulbs, improved gas burners, boiler efficiency improvements in industrial plants, and co-generation of heat and electricity where possible. The options for diversifying power supply include imported coal-based power plants in the short term (2013) and development of domestic coal as a fuel source for baseload power generation in the long term. In this regard ADB could engage the Government to make a decision on the development of Bangladesh's domestic coal resources with appropriate safeguards to mitigate the adverse impacts. It may also be possible to import power from neighboring countries and promote renewable forms of energy such as wind power and waste converted to energy. Once adequate generation capacity is available, the use of inefficient gas-fired captive power plants by industrial consumers should be discouraged to preserve the gas resource.

## **B. Lessons Learned**

**117. Programmatic Lending for Investments Linked to Agreed-Upon Medium-Term Road Map for Sector Reforms Can Achieve Development Impacts Even in Difficult Environments.** ADB assistance to Bangladesh during 1994–2008 was closely linked to the gradual and phased implementation of the Government's PSRB prepared with the active participation of ADB and the World Bank. ADB has taken into account the reform implementation capacity and political economy issues at play and provided TA grants for

implementing reform and investment loans that were conditional upon achieving certain milestones in the PSRB. The new corporate entities established as part of the reform process became the key recipients of ADB financing. This created adequate incentives for the Government to implement the subsequent steps of the PSRB and the newly created entities had adequate financial resources through ADB financing to undertake critical investments. However, the World Bank set more ambitious targets in the reform process. Due to the Government's failure to achieve those targets, the World Bank did not commit significant resources to the energy sector between 1995 and 2002, and thus lost its influence with the Government.

**118. Improved Corporate Governance, Managerial Autonomy, and Performance-Based Incentives Can Lead to Significant Change in Institutional Performance Even Without a Change in Ownership and Personnel.** The improved operational and managerial performance resulting from the commercialization and corporatization of PGCB and DESCO has demonstrated that full privatization is not an essential requirement for improved performance if the management receives appropriate incentives. In PGCB, it was further demonstrated that the performance of the personnel from a poorly performing entity such as BPDB can improve significantly if appropriate incentives and a corporate culture can be established in the institution.

**119. Earlier Success in Attracting Private Foreign Investments to Power Generation Is not a Guarantee for Continued Private Sector Investments in a Country like Bangladesh.** Bangladesh has a weak investment climate and an underdeveloped domestic private sector. The success in attracting private sector investments for power generation during 1998–2002 raised expectations among development partners and the Government that Bangladesh would continue to attract investments to the power sector. The changes in investor perception as a result of the 1997 Asian crisis, the fallout from the high-profile failures of global energy companies, and the inability of the Government to maintain the same degree of professional and transparent decision making together contributed to the failure of successive rounds of bidding for IPPs. This result was not anticipated and greater account should have been taken of these risks in deciding development partner support for the power generation sector.

**120. The Domestic Private Sector Is Capable of Making Investments in Relatively Capital-Intensive New Industries in a Suitable Investment Climate.** If appropriate incentives and policy regimes are established, the domestic private sector can be persuaded to invest in the energy sector. For example, ADB financed the public infrastructure for CNG (i.e., gas pipelines), a regulatory framework, and technical and safety regulations through capacity building for the relevant authorities, and investment financing for the private sector through the banking sector. The business-friendly regulatory regime and the attractive financing available through ADB loans resulted in a vibrant industry dominated by a large number of domestic entrepreneurs.

**121. Continuity of Senior Headquarters Staff and Increased Involvement of Competent and Senior National Officers from the Resident Mission Are Needed.** In delivering energy sector assistance to Bangladesh, the significant impact on ADB's performance was due to the work of dedicated headquarters staff and officers from the Resident Mission. There is a high degree of continuity of headquarters staff with a core team of 2–3 senior staff members responsible for maintaining the policy dialogue and processing ADB investments during the evaluation period of 1993–2008. As ADB staff had demonstrated a high degree of sector expertise and credibility, ADB earned the respect of the Government and other development partners. The Bangladesh Resident Mission is perhaps unique among ADB missions in having senior and very competent national officers responsible for project implementation, monitoring the progress of sector reforms, and day-to-day policy dialogue with key decision makers.

## IX. RECOMMENDATIONS

122. **Proactively Encourage the Government to Address Price Subsidies in the Energy Sector.** The present practice of underpricing natural gas is economically and financially unsustainable. It also promotes the inefficient and wasteful use of gas. However, there are misconceptions about the socioeconomic impacts of price adjustments among the stakeholders, and complex political economy issues are blocking effective measures to address pricing issues in the energy sector. ADB could support the Government in undertaking a comprehensive energy pricing study through the newly created energy regulator to understand the linkages between natural gas pricing and electricity pricing, industrial competitiveness, fiscal impacts of price adjustment, impacts on consumer welfare, and energy efficiency improvements. The findings of the study could be the basis for policy dialogue to accompany future ADB lending to the energy sector.

123. **Promote Supply-Side and Demand-Side Energy Efficiency Improvement.** Energy efficiency in power plants operated by BPDB is low, but there have been no concerted efforts by development partners to engage BPDB in this regard. The economic returns of improvements are likely to be high, especially in Bangladesh where power and gas shortages persist. ADB's future assistance to power generation could have investment components to improve the thermal efficiency of existing power plants, provided that these plants are transferred to the recently established public sector generation companies. The low gas and electricity prices may have also resulted in inefficient use of scarce energy resources by the end users, especially in captive power generation. Hence, ADB could also explore opportunities to finance projects to improve end user energy efficiency.

124. **Consider Financing Public Sector Baseload Power Generation Plants Using More Efficient Technologies.** Bangladesh is suffering from crippling power and gas shortages at present and the past efforts to attract private sector investments have not resulted in new investments in past 6 years due to variety of reasons. Hence, there is a need for development partners including ADB to provide support for public sector power generation capacity additions to compliment the ongoing efforts to attract private investments. However, given the poor track record of BPDB in operating the existing power plants, any assistance to public sector power generation should be provided through the newly created public sector power generation companies operating under commercial basis. ADB is also ideally positioned to advise the government on environmentally and socially sustainable development of the coal sector as means of promoting fuel diversity and the energy security of Bangladesh .

125. **ADB Should Put Increasing Emphasis on Promoting Regional Trading in Electricity.** Regional trading in electricity will enable Bangladesh to benefit from the hydropower resources in neighboring countries. ADB is ideally positioned to assume the role of honest broker in facilitating power transmission connectivity between India and Bangladesh. ADB could also provide technical assistance to finalize the commercial and technical arrangements to enable Bangladesh to take part in the India power market.

## POWER SECTOR OVERVIEW

### A. Overview of Power Sector Institutions, 1994–2008

1. In 1994, which marks the beginning of the period to be evaluated the Bangladesh Power Development Board (BPDB), operating under the supervision of the Ministry of Energy and Mineral Resources (MEMR), was responsible for planning, constructing, and operating power generation and transmission facilities throughout the country and power distribution in urban areas except Metropolitan Dhaka and its adjoining areas. The Dhaka Electricity Supply Authority (DESA), which purchased power from BPDB at 132 kilovolts (kV), was responsible for distributing electricity in the greater Dhaka area. The Rural Electricity Board (REB) was responsible for distributing power in rural areas through a system of cooperatives known as Palli Bidyut Samities (PBSs, rural electric cooperatives). The PBSs purchased power from BPDB at 33 kV level. There was no private sector involvement in the power sector at that time.

2. During 1996–2000, several changes were made to the institutions of the power sector to improve their operational performance. Among the changes were the establishment of (i) the Power Grid Company of Bangladesh (PGCB) to gradually take over the operation of the high-voltage power transmission network (230 kV and 132 kV) from BPDB, and (ii) the Dhaka Electricity Supply Company (DESCO) to take over power distribution in the central Dhaka area from DESA. PGCB and DESCO were established on a commercial basis as Government-owned companies under the Companies Act. Several privately owned power generation projects were also established during this period as independent power producers (IPPs) selling electricity to BPDB.

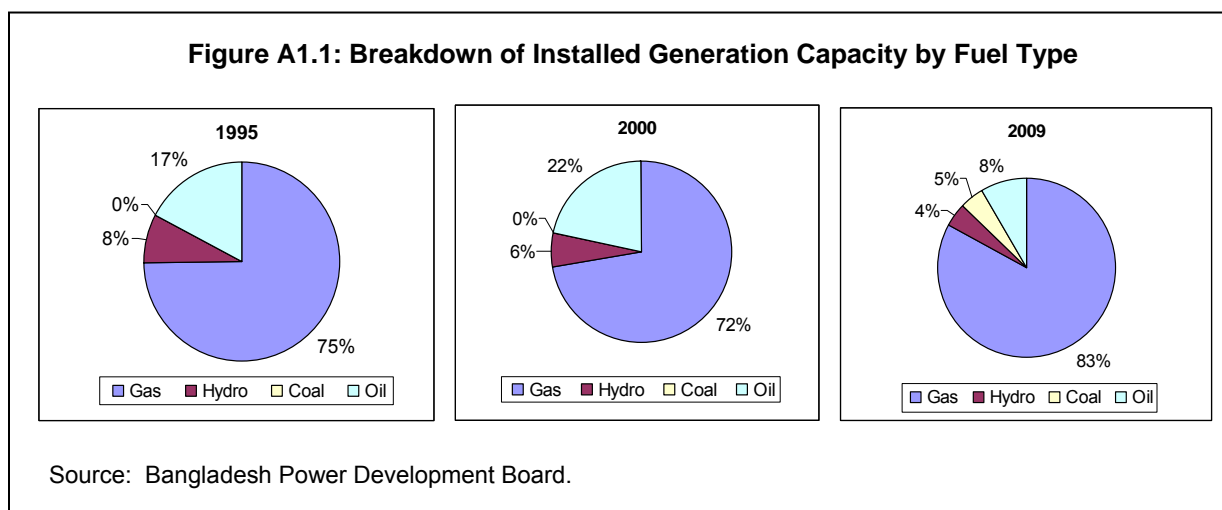
3. Further institutional reforms were undertaken during 2001–2008 with the objective of vertically unbundling the power sector to improve its governance and operational performance. The reforms included the establishment of (i) the West Zone Power Distribution Company (WZPDC) in 2001 to take over power distribution from BPDB, and (ii) the Dhaka Power Distribution Company (DPDC) in 2006 to take over the remaining operations of DESA. The two companies were also established under the Companies Act as Government-owned companies. The Electricity Generation Company of Bangladesh (EGCB) and North West Power Generation Company (NWPGC) were established during this period to undertake the implementation of several power generation plants financed by the Asian Development Bank (ADB) and the World Bank. The Government is presently considering further institutional reforms in the power sector, including the conversion of BPDB into a holding company and establishing a "single buyer" for purchasing electricity from public sector generation plants and IPPs and selling it to power distribution companies.

### B. Power Generation

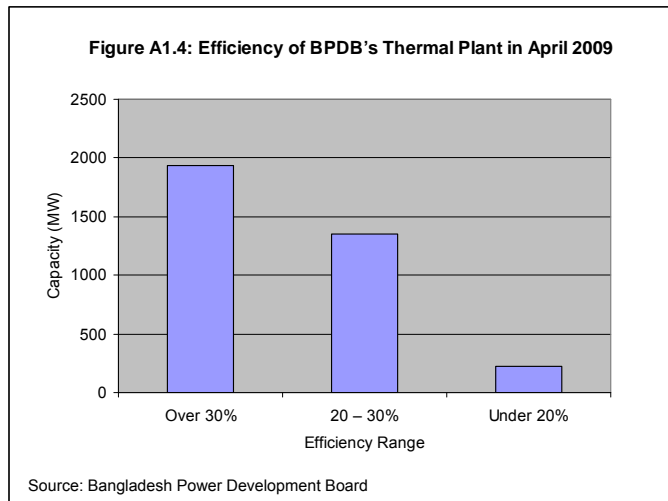
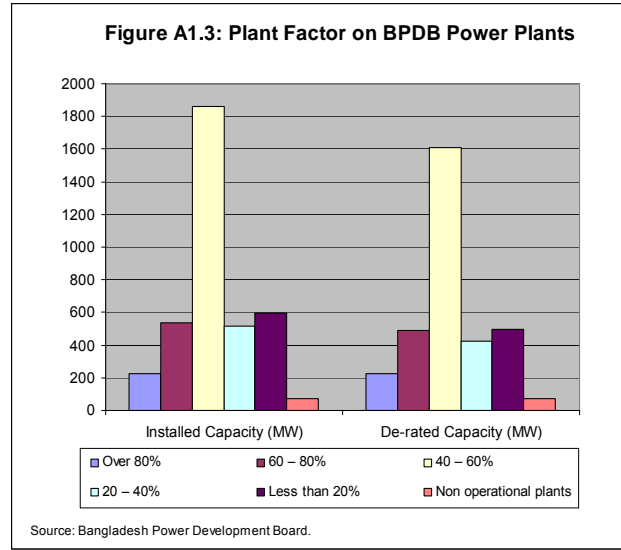
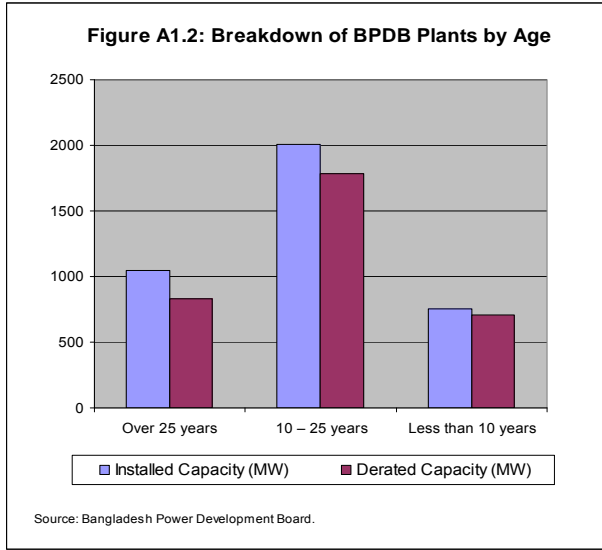
4. Although the installed power generation capacity in Bangladesh in 1995 amounted to 2,900 megawatts (MW), the available generation capacity was equal to only 2,130 MW due to poor maintenance of the generation plants. The constrained power demand in 1995 was around 2,400 MW, indicating an average generation shortfall of around 300 MW. The average plant load factor (i.e., an indicator of the utilization of generation plants) for most of the power plants was around 42% (the industry norm was 65%–75%), indicating a high level of nonavailability and outages of generation plants. Bangladesh's per capita power generation in 1994 amounted to 84 kilowatt-hours (kWh), compared with 303 kWh in India and 328 kWh in Pakistan.



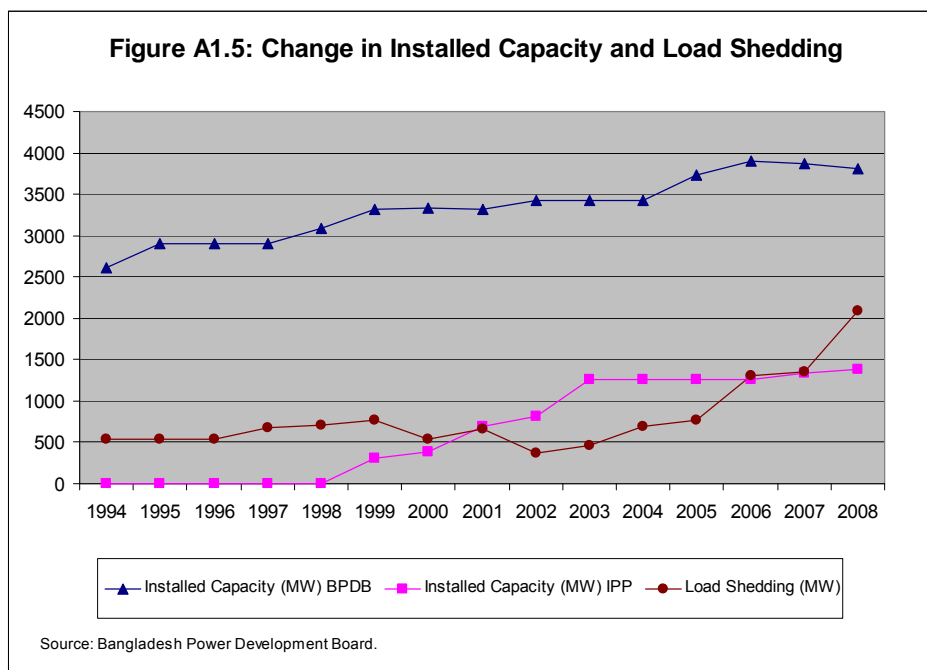
5. During 1994–2000, several new power plants were added to the generation system, including 423 MW from BPDB and 685 MW from the private sector as IPPs. This increased the installed capacity to 3,830 MW and available capacity to slightly over 3,000 MW, indicating continued nonavailability of close to 800 MW of installed generation capacity due to maintenance problems. The unconstrained demand had reached 3,550 MW by the year 2000, resulting in load shedding of over 500 MW. However, total electricity generation increased from 10.8 terawatt-hours (TWh) in 1995 to 17 TWh in 2001 with 2.2 TWh from the private sector. The annual plant factor for BPDB plants also increased to 50% by 2001. Most of the newly commissioned power plants are based on gas and the use of gas in power generation increased at the expense of oil (Figure A1.1).



6. The installed power generation capacity has increased to 5,600 MW and the derated generation capacity is about 5,050 MW as of mid-2009. Due to maintenance outages of plants, the maximum availability of generation capacity is in the range of 4,000 MW, and this is further reduced to around 3,600 MW due to gas supply shortages. The unconstrained demand is estimated to be 5,050 MW and the average load shedding during peak time is estimated to be over 1,500 MW in 2009. During 2001–2008, BPDB added 415 MW of gas-fired generation capacity and 250 MW from coal-fired power plants. Although over 80% of the generation capacity of BPDB is gas-based, thermal efficiency remained at around 32% (i.e., advanced combined-cycle gas turbines can achieve a thermal efficiency of over 55%), indicating the possibilities for efficiency improvements in BPDB's generation operations. The plant factor for BPDB plants was around 45% in 2008, indicating a high incidence of nonavailability of power plants due to maintenance outages and fuel supply shortages. By 2007, per capita power generation had increased to 168 MW, which is among the lowest in ADB member countries. Figures A1.2, A1.3, and A1.4 show the breakdown of BPDB power plants by age, availability (plant factor), and thermal efficiency.



7. The generation capacity of the private sector as of 2009 is 1,727 MW, consisting of (i) six IPPs having a total capacity of 1,271 MW, supplying power to BPDB under long-term power purchase agreements; (ii) six small-scale IPPs (less than 30 MW) having a total capacity of 99 MW; and (ii) 252 MW of generation capacity procured on short- to medium-term basis under rental arrangements. In 2001–2002, Bangladesh was successful in attracting two large IPPs (360 MW Haripur and 450 MW Meghnaghat) using efficient combined-cycle gas turbine technology. However, except for small-scale IPPs and rentals, not a single large-scale IPP has been commissioned since 2002. These small-scale IPPs and rental power plants are also inefficient in their use of scarce gas resource. The increase in installed power generation capacity and average load shedding are shown in Figure A1.5.



### C. Power Transmission

8. The power transmission network of Bangladesh in 1994 consisted primarily of a 132 kV transmission network connecting the load centers in Dhaka, Chittagong, and Khulna with the power stations in the greater Dhaka area. A 230 kV east–west connector connected western Bangladesh with the rest of the country. The entire power transmission network was operated by BPDB. During 1994–2008, a 230 kV transmission network was established to connect the main load centers at a higher voltage and facilitate high power transmission capacity. The network included a 230 kV transmission ring around greater Dhaka and a wider 230 kV ring connecting the main cities in central Bangladesh (Ramapur-Ghorashal-Ashugonj-Comilla (N)-Meghnaghat-Haripur); 230 kV connections to Chittagong, Khulna, and Barapukuria in south, southwest, and northwest Bangladesh. The east-west connector was also strengthened with an additional circuit from Ashuganj to Ishurdi through Sirajganj. These improvements increased the capacity and reliability of the transmission system and reduced transmission losses (Tables A1.1 and A1.2).

**Table A1.1: Line Lengths and Substation Capacity of Transmission Network**

Year	TX Line Lengths		230 / 132 KV Substations		132 / 33 Substations	
	230 kV	132 kV	No.	MVA Capacity	No.	MVA Capacity
1994	419	2,469	8	2,875	58	2,900
2000	1,144	4,168	9	3,275	62	3,950
2005	1,466	5,255	9	3,825	63	6,165
2008	2,314	5,533	12	5,850	71	7,525

kV= kilovolt, MVA = megavolt-amperes.

Source: Bangladesh Power Development Board and Power Grid Company of Bangladesh.

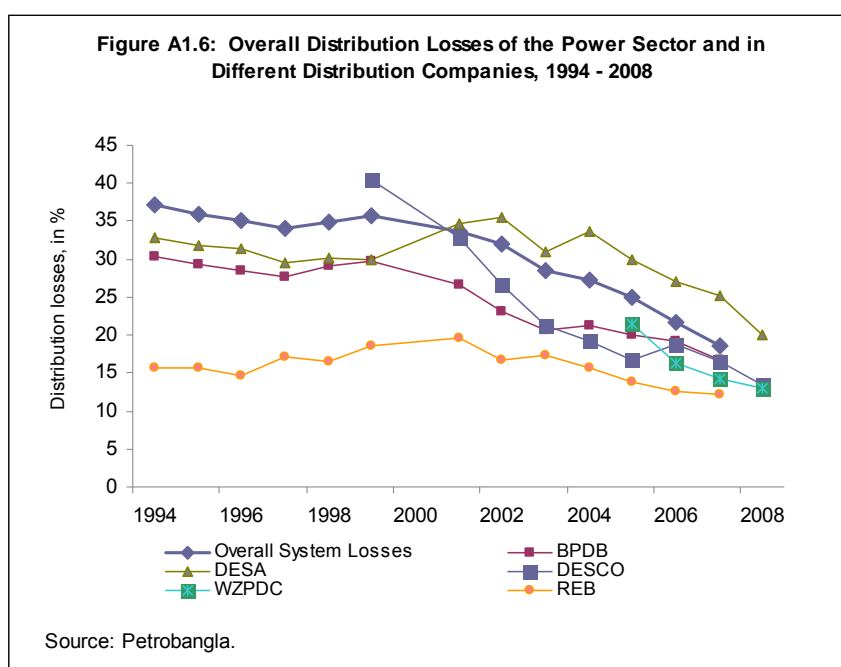
**Table A1.2: Reliability and Transmission Loss Indicators of Transmission Network**

Year	Transmission Interruption		Transmission Losses (%)
	Number	Duration	
2000	173	146 hours, 41 minutes	4.88
2003	63	73 hours, 57 minutes	3.79
2006	73	38 hours, 13 minutes	3.44
2008	30	66 hours, 20 minutes	3.55

Source: Power Grid Company of Bangladesh.

#### D. Power Distribution

9. The total number of electricity consumers in 1994 was 2.2 million, and the electrification rate was about 10% of the total number of households. The operating performance of BPDB in power distribution was poor. The total distribution losses consisting of technical and nontechnical losses in the overall power system were equal to 37.2% and the cash collection-to-generation ratio was 62.4%. The performance of DESA which was responsible for power distribution, was worse than that of BPDB with cash collection-to-power purchase ratio being equal to 54.6% and distribution losses equal to 32.8%. The operating performance of PBSs was somewhat better: distribution losses were in the range of 15% and collection ratio was 99%. The performance of the distribution entities during 1994–2001 showed marginal improvement as shown in Figure A1.6. Since 2002, however, distribution losses in the newly created companies such as DESCO and WZPDC have been markedly reduced. During this period, the losses in DESA and BPDB were also reduced to around 20%. The cash collection ratios of BPDB and DESA had improved to 97%–100% by 2008 compared with less than 80% in 1994 and below 90% in 2001. The newly set up companies and REB have maintained cash collection ratios of over 98% since inception.



10. Electricity consumers and consumption of electricity also increased during 1994–2008 (Table A1.3). The total number of connections increased from 2.3 million in 1994 (i.e., electrification rate of 10%) to over 4.3 million by 2001 (electrification rate of over 17%). The majority of the new consumer connections were provided by REB. By 2008, the total number of electricity consumers had reached 10.6 million (i.e., electrification rate of over 37%). REB alone connected over 3.9 million consumers during this period. The level of electricity consumption has increased steadily in all consumer categories over the past 7 years. The highest rate of increase is in the small commercial and residential categories and the lowest in the large industrial and commercial consumers. This may reflect the success of rural electrification programs and the increasing use of captive generators by large consumers. Analysis of consumption by area shows that since 2000–2001 demand has grown by 150% in REB areas but only 80% in Dhaka.

**Table A1.3: Electricity Consumption by Consumer Group (GWh)**

Fiscal Year	Residential	Agriculture	Small Industrial	Small Commercial	Large Industrial and Commercial	Total
2001	3,102	372	466	369	2,403	6,712
2002	3,619	358	523	403	2,838	7,740
2003	4,537	408	604	621	3,948	10,118
2004	7,084	616	1,086	1,254	5,740	15,780
2005	7,456	681	1,128	1,349	6,248	16,862
2006	7,760	795	1,143	1,400	6,602	17,700
2007	8,194	857	1,205	1,544	6,329	18,129
2008	9,376	915	1,293	1,813	6,368	19,765

Source: Bangladesh Power Development Board, Dhaka Electricity Supply Authority, Dhaka Electricity Supply Company, West Zone Power Distribution Company, Rural Electrification Board.

### E. Financial Performance of Power Sector Entities

11. The financial performance of the power utilities is mixed. DESCO and PGCB have been consistently profitable since their establishment and have built up substantial cash reserves on their balance sheets. They are run on commercial lines with levels of accounts receivable currently in the range of 70–75 days' sales.

12. DESA has a long history of incurring losses. Shareholders' funds were negative throughout the evaluation period. However, DESA moved into profit in fiscal year (FY) 2006. This reflects the reduced system losses and increased collections from customers. However, these profits are achieved only at the expense of defaults on DESA's indebtedness to BPDB for bulk supply tariff (BST) payments. At the end of FY2008 DESA owed BPDB taka (Tk) 27.9 billion (\$400 million), equivalent to over 2 years' operating expenses and almost 2 years' sales revenue. Moreover, DESA's bookkeeping standards are poor and there may be further unrealized amounts in its accounts, which ought to be written off. For example, even after recent improvements in its balance sheet in FY2008, it had customer receivables equivalent to 216 days' billings, which suggests that provisions related to receivables are inadequate. DPDC was established in 2008 to take over the operations of DESA with a clean balance sheet, and it is not burdened with the outstanding liabilities of DESA to BPDB and to the Government. However, BPDB's BST increased by 15% in October 2008. The increase will have a major adverse impact

on the finances of DPDC. Unless DPDC is permitted to increase retail tariffs, it will struggle to break even despite further performance improvements.

13. The key financial indicators for DESA are set out in Table A1.4.

**Table A1.4: Financial Indicators for Dhaka Electric Supply Authority**

Financial Indicator	FY1995	FY2000	FY2005	FY2006	FY2007	FY2008
Working Ratio(Opex/sales)	118.8	119.0	101.0	98.8	95.3	94.8
Current Ratio	0.40	0.51	0.38	0.43	0.42	0.44
Accounts Receivable (days)	251	415	314	341	244	216
Accounts Payable (days)	198	551	936	900	811	718
Return on Fixed Assets	-23.2	-35.9	-3.6	0.4	9.2	3.0
Self-Financing Ratio	-34.0	-57.3	23.0	107.6	48.1	870.1
DSCR	-0.08	-0.14	0.04	0.05	0.15	0.24
Amounts due to BPDB (taka billion)	4.26	20.69	31.42	32.27	29.15	28.53

BPDB = Bangladesh Power Development Board, DSCR = debt service coverage ratio, FY = fiscal year, Opex = operating expenditures.

Note: Dhaka Electric Supply Authority has had consistently negative shareholders' fun;, indicators such as debt equity ratio and return on equity are excluded.

Source: Dhaka Electric Supply Authority and Independent Evaluation Mission.

14. DESCO is the most consistently profitable of the electricity retailers. It has managed its affairs commercially for a number of years and has reduced the level of accounts receivable to 73 days' sales, which is the lowest in Bangladesh. It has a high self-financing ratio because it has made very little capital investment in recent years. As it has expanded and improved the performance of the various parts of Dhaka in which it operates, it has earned progressively higher returns on equity and fixed assets. It believes that further efficiency improvements are possible through further loss reduction and improved management of working capital. Alone among the power distributors, it is able to sustain its profitability despite the latest increase in the BST. Table A1.5 sets out the key financial indicators.

**Table A1.5: Financial Indicators for Dhaka Electric Supply Company Limited**

Financial Indicator	FY2000	FY2005	FY2006	FY2007	FY2008
Working Ratio (Opex/sales)	106.40	83.90	80.30	82.60	80.90
Current Ratio	2.28.00	2.37	2.64.00	2.65	2.58
Accounts Receivable (days)	165.00	155.00	128.00	93.00	73.00
Accounts Payable (days)	182.00	124.00	111.00	82.00	70.00
Return on Equity	-6.40	29.00	26.90	33.30	46.40
Return on Fixed Assets	-5.20	12.40	16.10	18.20	28.60
Debt/Equity Ratio	50:50	76:24	69:31	69:31	68:32
Self-Financing Ratio	-479.10	232.60	303.20	2231.00	4,366.70
DSCR	-	2.81	2.49	1.47	1.62

BPDB = Bangladesh Power Development Board, DSCR = debt service coverage ratio, FY = fiscal year, Opex = operating expenditures

Source: Dhaka Electric Supply Company Limited and Independent Evaluation Mission.

15. WZPDC made profits in FY2006, but has since been incurring losses. The company's equity is eroding as a result of losses and it is not in a position to undertake additional significant investment without an equity injection. Since its establishment, it has steadily improved management of its accounts receivable, but they remain high at 96 days' sales. Its accounts are

of doubtful quality since there is an item for a clearing account on its balance sheet, which by definition should clear to zero at year end; however, the amount is small. Key financial indicators for WZPDC are in Table A1.6.

**Table A1.6: Financial Indicators for WZPDC**

<b>Financial Indicator</b>	<b>FY2005</b>	<b>FY2006</b>	<b>FY2007</b>	<b>FY2008</b>
Working Ratio (Opex/sales)	108.40	97.30	100.60	100.50
Current Ratio	0.97	1.13	1.22	1.02
Accounts Receivable (days)	939.00	192.00	104.00	96.00
Accounts Payable (days)	183.00	69.00	56.00	62.00
Return on Equity	-2.70	3.00	-5.20	-6.40
Return on Fixed Assets	-1.60	2.00	-1.70	-2.00
Debt/Equity Ratio	37:63	63:37	76:24	76:24
Self-Financing Ratio	-1.00	8.80	3.80	15.10
DSCR	0.02	0.10	0.09	0.16

Source: West Zone Power Distribution Company and Independent Evaluation Mission.

16. The performance of the PBSs, which operate under the umbrella of REB, has been mixed. All have a reasonable to good record of controlling system losses and accounts receivable, but in many cases they are not financially viable. The situation reflects the high cost of operating distribution systems in rural areas and the poor customer base. Increases in the BST have left many previously viable PBSs in an unsustainable financial position.

17. While the financial performance of the various companies partly reflects their capabilities and management, the structure of tariffs is also important. PGCB levies a wheeling charge of Tk0.2291 per kWh on all electricity passing through the transmission grid. This tariff has not changed in 7 years, but is still adequate to enable PGCB to operate profitably and is likely to continue to be adequate at least in the short term. The tariff analysis in the report and recommendation of the President (RRP) for Loan 2332,<sup>1</sup> carried out using data up to 2006, estimated that an increase in the wheeling charge would be needed soon with a further increase in 2012 to about Tk0.33 per kWh. In practice, however, PGCB has improved its profitability since 2006. Key financial indicators for PGCB are in Table A1.7.

**Table A1.7: Financial Indicators for PGCB**

<b>Financial Indicator</b>	<b>1999/2000</b>	<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>
Working ratio (Opex/sales)	37.30	49.00	46.20	51.10	50.20
Current Ratio	1.68	2.48	2.95	3.65	4.11
Accounts Receivable (days)	330.00	132.00	98.00	85.00	71.00
Accounts Payable (days)	2775.00	201.00	175.00	167.00	209.00
Return on Equity	3.50	6.20	12.70	16.40	17.60
Return on Fixed Assets	1.90	1.70	4.10	7.50	10.40
Debt/Equity Ratio	61:39	80:20	78:22	76:24	75:25
Self-Financing Ratio	18.70	55.50	51.10	56.30	61.90
DSCR	1.92	1.31	1.59	2.09	2.58

DSCR = debt service coverage ratio.

Source: Power Grid Company of Bangladesh and independent evaluation mission.

<sup>1</sup> ADB. 2007. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Bangladesh for the Sustainable Power Sector Development Program*. Manila.

18. BPDB is both a wholesale and retail power supplier. Its wholesale power operations depend on the BST. The BST was increased twice in recent years from Tk1.9409 per kWh in September 2003, to Tk2.1609 in March 2007, and Tk2.4452 in October 2008. The BST is slightly lower for PBSs. In the RRP for Loan 2332, it was estimated that BPDB's pooled generation costs were Tk2.26 per kWh in 2007. They have increased further since then because of inflation and the continued high cost of acquiring incremental capacity through the use of small rented generation plants. Even with its current BST, BPDB is unlikely to break even on its generation operations. The tariff implications are further discussed below.

19. BPDB continued to incur losses over the evaluation period. The losses have exceeded Tk9 billion (\$130 million) in each of the past 3 years. BPDB is insolvent and is sustained in business only by the forbearance of the Government. It maintains adequate cash flow by defaulting on its debts to the Government. In June 2008, Tk82.7 billion (\$1.2 billion) of overdue debt service obligations was due to the Government. There is no prospect of this amount being repaid in full although there could be some repayment if BPDB reduced its holdings of cash, which are far too large. BPDB and DESA also have large unfunded pension liabilities to their employees, which ADB estimates at \$163 million in the RRP for Loan 2332.

20. Key financial indicators for BPDB are in Table A1.8.

**Table A1.8: Financial Indicators for BPDB**

	1994/95	1999/2000	2004/05	2005/06	2006/07	2007/08
Working Ratio						
(Opex/sales)	98.80	92.30	106.80	114.90	113.70	111.70
Current Ratio	1.00	0.95	1.05	0.95	0.91	0.90
Accounts Receivable						
(days)	317.00	432.00	454.00	448.00	387.00	356.00
Accounts Payable (days)	0.00	58.00	86.00	91.00	73.00	53.00
Return on Equity	-6.20	-4.80	-7.10	-11.40	-7.00	-8.20
Return on Fixed Assets	-4.60	-3.10	-8.50	-10.00	-5.40	-5.70
Debt/Equity Ratio	44:56	42:58	37:63	42:58	32:68	38:62
Self-Financing Ratio	32.90	46.90	4.70	-9.60	-1.10	7.20
DSCR	0.21	0.18	0.03	-0.03	0.00	0.01
Loss (taka billion)	4.81	3.94	6.09	9.38	9.04	9.82
Overdue Debts to						
Government (taka billion)	22.20	48.01	62.81	69.69	74.25	82.69

DSCR = debt service coverage ratio

Source: Bangladesh Power Development Board and independent evaluation mission.

21. Although the BST (i.e., the tariff BPDB levies to distribution companies such as DESCO, DPDC, and REB) has been increased substantially in recent years, retail tariffs are virtually unchanged with only one increase of 5% in 2007. Consequently, the operations of the PBSs and WZPDC's are not viable with the current tariff structure, and DESA/DPDC's operations are marginal. The other distribution areas of BPDB are also almost certain to be nonviable as independent companies. DESCO has a better customer mix and continues to be viable for the time being.

22. The tariff analysis in the RRP for Loan 2332, carried out in 2006, suggests that the BST needed to increase by 10% in January 2007, followed by 5% real rises in FY2009 and FY2010. In addition, automatic tariff adjustment would start in FY2008. Indexation for inflation and



exchange rate fluctuations will result in rises averaging about 6% per annum. The overall impact was to increase the BST by 30% between 2006 and 2009. In this scenario, BPDB was expected to break even in FY2009. In practice, BPDB already increased the BST twice, about 26% in total. The present average BST is about Tk2.5 per kWh. The 10% increase in the BST in March 2007 should have led to a substantial improvement in BPDB's financial performance in 2007/8. But the fact is that BPDB's losses increased further. The per unit cost of supply for BPDB (which covers all its operations including retail as well as bulk supply) increased from Tk2.70 per kWh in 2006 to Tk2.77 per kWh in 2007 and Tk2.91 per kWh in 2008. This also suggests that the 10% increase in the BST in January 2007 has already been absorbed by inflation. Based on BPDB's 2007/08 accounts, BPDB would still have incurred losses even with a 15% increase in sales revenue. Consequently, it seems certain that BPDB will continue to incur losses even with the higher level of BST granted in October 2008.

23. The analysis of retail tariffs in the RRP for Loan 2332 suggests that the retail companies in Dhaka would become profitable with an increase in retail tariffs similar to that in the BST (i.e., around 30% between 2006 and 2009). Since 2006, the BST has risen by 26% and retail tariffs by around 5%. A further 20% increase in retail tariffs should enable the retail sector to attain viability at present BST. However, as the BST is required to increase by a further 20% to enable BPDB to break even, the increase in retail tariff should be in the order of 40%. A review of the financial results for 2008 suggests that all the retailers should be viable with such an increase in retail tariffs, even with the higher BST. Increases on this scale would be substantial but would still leave Bangladesh with some of the lowest retail power tariffs in Asia. The alternative is further sector losses, financed by the tax payer. However, past experience suggests that power tariffs are rarely if ever increased by more than the inflation rate. Even further increases in retail tariffs would be needed in the event of higher gas prices to the power sector and of further increases in BST to meet higher gas prices and to enable BPDB to break even. This casts serious doubts over the sustainability of the current financial model for the power sector.

24. The current policy in Bangladesh is to have uniform retail tariffs, but with slightly higher tariffs in REB areas to reflect the higher costs of supply. In practice, tariffs that enable WZPDC to make a profit will give very high profits for DESCO. This is a common issue in other countries, for example India. It is often resolved by having differential BSTs, with higher BSTs in distribution areas with low costs and better customer bases. The Bangladesh Energy Regulatory Commission (BERC) and the Bangladesh power sector should consider whether it wishes to adopt that approach in Bangladesh. The approach will necessitate an integrated approach to retail tariffs and BST. This approach would be desirable as BERC's current approach of setting BST and retail tariffs at different times can create an unsustainable financial environment for power retailers, as at present.

## GAS SECTOR OVERVIEW

### A. Institutional Overview of the Natural Gas Sector

1. The Government created the Bangladesh Oil, Gas & Mineral Corporation (Petrobangla) to consolidate the development of the natural gas sector and its operations in 1972. The mandate of Petrobangla is to (i) explore and develop natural gas and other mineral resources; (ii) coordinate the production, transmission, distribution, and marketing of natural gas resources through subsidiary companies; (iii) conduct oil and gas exploration activities; and (iv) enter into production sharing agreements (PSAs) with international oil companies (IOCs) for exploration, development, and production of natural gas and act as the off-taker for gas produced by IOCs under PSAs. In addition to Petrobangla subsidiaries in the natural gas sector, several IOCs are engaged in gas production under PSAs<sup>1</sup> and their production is purchased by Petrobangla under the terms of the PSAs.

2. The operating companies under Petrobangla were set up on a commercial basis from the outset and their activities were coordinated by Petrobangla to ensure the overall sector development objectives. The companies are the following:

- (i) **Bangladesh Petroleum Exploration Company (BAPEX).** Responsible for exploration and drilling. Recently BAPEX's mandate was expanded to include gas production in three (SaldaNadi, Fenchganj, and Shahbazpur) new gas fields. In 2007, it produced 19 billion cubic feet (BCF) of natural gas.
- (ii) **Bangladesh Gas Fields Company Limited (BGFCL).** Originated as a Shell subsidiary and responsible for operating the country's main gas fields (Titas, Habiganj, Bakhrabad, Narsingdi, Kamta [not under production now] and Meghna). It produced 275 BCF of natural gas in 2007.
- (iii) **Sylhet Gas Fields Limited (SGFL).** Operates the gas fields located in north-eastern Bangladesh (Haripur, Kailashtila, Beanibazar, Chatak [not under production now], and Rashidpur). Gas production in 2007 was 65 BCF.
- (iv) **Gas Transmission Company Limited (GTCL).** Responsible for operating the high pressure gas transmission network for transmitting gas from gas fields to demand centers in greater Dhaka, Chittagong, and the western part of the country.
- (v) **Titas Gas Transmission and Distribution Company (Limited).** The premier gas distribution company of the country responsible for gas distribution in central Bangladesh, including the greater Dhaka area. The company's market share in gas distribution is over 73%.
- (vi) **Bakhrabad Gas Systems Limited (BGSL).** Responsible for gas distribution to southeast Bangladesh, including the Chittagong area. The company has a market share of 18% in gas distribution.
- (vii) **Jalalabad Gas Transmission and Distribution System Limited (JGTDSL).** Responsible for gas distribution in northeast Bangladesh in the Sylhet area. The company's market share in gas distribution is 4.5%.
- (viii) **Pashchimanchal Gas Company Limited (PGCL).** Was set up in 2000 with the mandate to distribute gas to the northwestern region of Bangladesh, which was

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<sup>1</sup> The PSAs value the gas at a price linked to international oil market prices. Part of the revenues (50%–60%) from gas sales is set aside for recovering the development cost of gas fields and the remainder is divided between Petrobangla and the IOC. After recovering the development cost, the total revenues are divided between Petrobangla and the IOC. Petrobangla has to pay in cash for the IOC's share of gas as Petrobangla is the sole off-taker of gas from the IOC.

not connected to the gas transmission network until 2000. The company has a market share of 3%.

- (ix) **Rupantarita Prakritik Gas Company Limited (RPGCL)**. Its mandate is to promote natural gas products such as compressed natural gas (CNG), liquefied petroleum gas (LPG), and liquid fuel extracted from natural gas liquid (NGL).

## B. Trends in Gas Production

3. The proven, recoverable gas reserve in Bangladesh was estimated to be 13 trillion cubic feet (TCF) in 1994, sufficient to meet the expected gas demand until 2020. Production of natural gas in the country was 223 billion cubic feet (BCF) in 1994..National gas production companies under Petrobangla were responsible for most of the production as there was no significant private sector presence in gas production at that time. Petrobangla had performed adequately in meeting the gas demand of the economy and was engaged in gradually expanding the gas distribution network to the main economic centers of the country. However, the existing gas infrastructure had limited capacity for both gas production and gas transmission, and production in the existing gas fields was expected to decrease by 1998 in the absence of new investments in field development. It was expected that there would be gas shortages of over 100 BCF by 2000.

4. The financial performance of the two gas production companies under Petrobangla is satisfactory (Tables A2.1 and A2.2). They are profitable, have strong debt-to-equity ratios and substantial cash reserves. Their financial position has improved steadily over the evaluation period.

**Table A2.1: Financial Indicators for BGFCL**

Indicator	FY1995	1999/2000	2004/05	2005/06	2006/07	2007/08
Working Ratio <sup>a</sup>	57.3	43.7	34.7	28.9	34.5	52.9
Return on Equity <sup>b</sup>	15.9	12.9	18.6	17.5	16.2	11.5
Return on Net Fixed Assets <sup>c</sup>	20.4	19.0	43.3	39.5	36.9	26.4
Debt Equity Ratio <sup>d</sup>	29:71	30:70	25:75	24:76	21:79	18:82

<sup>a</sup> The ratio of operating expenses to total sales.

<sup>b</sup> Net profit as a percentage of shareholders' funds. This is normally measured on the average of two balance sheets, but in Tables A2.1 and A2.2, it is measured on the year-end balance sheet only so as to simplify data collection. This approach has no material impact on the conclusions.

<sup>c</sup> Net profit as a percentage of net fixed assets. This is normally measured on the average of two balance sheets, but in Tables A2.1 and A2.2, it is measured on the year-end balance sheet only so as to simplify data collection. This approach has no material impact on the conclusions.

<sup>d</sup> The ratio of long-term debt to shareholders' funds.

Source: Bangladesh Gas Fields Company Limited.

**Table A2.2: Financial Indicators for SGFCL**

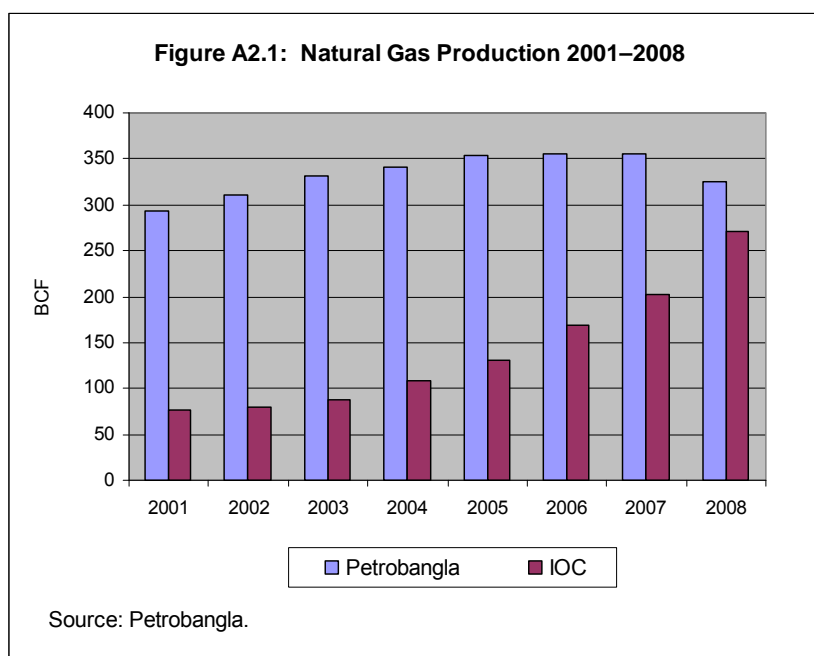
Indicator	1994/95	1999/2000	2004/05	2005/06	2006/07	2007/08
Working Ratio	12.3	16.1	18.7	15.7	10.9	8.2
Return on Equity	19.1	14.1	11.8	12.6	22.2	25.9
Return on Net Fixed Assets	9.8	18.3	19.3	24.2	48.8	59.1
Debt Equity Ratio	66:34	29:71	19:81	15:85	12:88	9:91

Source: Sylhet Gas Fields Limited.

5. The financial position of the companies is satisfactory, but is not strong enough to enable them to undertake additional exploration activities or to finance additional production wells and work over activities necessary to sustain and increase production. The well head margin allowed under the companies' contracts with Petrobangla is too small.

6. During 1994–2000, the Government invited private sector investments in upstream gas field development under PSAs. Ten blocks were awarded to IOCs in 1993/94. The IOCs were successful in bringing some of the newly discovered field to production by 1998. Gas production by state-owned gas companies also increased from 223 BCF in 1994 to 293 BCF by 2001 due to incremental improvements and work-over of existing gas fields. During this period, some IOCs also started production, contributing 77 BCF, and total gas production reached 370 BCF compared with 223 BCF in 1994. Hence, the anticipated gas shortage of 100 BCF by 2000 was averted by the timely investments made by IOCs and Petrobangla subsidiaries.

7. The proven gas reserves in Bangladesh have increased to 20.6 TCF compared with 13 TCF in 1994 mainly due to the exploration activities of the IOCs. The current proven available reserves are equal to 13 TCF as 7.6 TCF have been produced up to 2008. The probable gas reserves in the country at 50% probability are estimated to be 32 TCF–42 TCF. The significant increase in gas production during 2001–2008 (Figure A2.1) was mainly due to the rapid increase in gas production by IOCs as newly discovered gas fields were brought into production. Production by IOCs increased from 77 BCF in 2001 to 271 BCF by 2008, while production from Petrobangla subsidiaries marginally increased from 293 BCF in 2001 to 325 BCF by 2008. The increased gas production also resulted in increased tax payments amounting to over taka (Tk) 29.5 billion (\$433 million) in 2007 compared with Tk14.25 billion (\$290 million) in 2000.



### C. Gas Transmission

8. During 2001–2008, the gas transmission network was further strengthened to supply gas to the greater Dhaka area from the newly discovered gas fields in the northeastern part of the country. The gas transmission pipelines to the western part of the country were initiated to

provide gas supply to proposed power projects and industrial consumers. However, the supply to the Chittagong area is facing bottlenecks due to inadequate pipeline capacity because there are no investments in gas transmission to the south of Bangladesh. The financial position of GTCL is shown in Table A2.3.

**Table A2.3: Financial Indicators for GTCL**

Indicator	1994/95	1999/2000	2004/05	2005/06	2006/07	2007/08
Accounts Receivable (days)	73.0	129.0	201.0	131.0	162.0	162.0
Working Ratio	57.6	47.4	38.7	35.5	32.5	30.9
Return on Equity	-3.1	1.4	11.4	12.6	14.5	15.6
Return on Net Fixed Assets	-1.2	0.7	7.1	9.6	12.4	15.3
Debt Equity Ratio	59:41	62:38	47:53	43:57	37:63	32:68

Source: Gas Transmission Company Limited.

9. Over the evaluation period, GTCL has moved from incurring losses to making high levels of profit. Its revenue comes from a wheeling charge for every cubic meter of gas (and liter of condensate) carried through its network of transmission pipelines. As of 30 June 2008, it had substantial cash reserves with almost Tk5 billion in cash, bank balances, and short-term investments. It also enjoys a high level of equity finance for a stable utility company that makes its profits from the margin on gas transmission. The level of accounts receivable remains high, and on the other financial criteria the company is in sound condition.

10. GTCL is the major executing agency for the Gas Transmission Development Project,<sup>2</sup> which has committed \$171 million to gas transmission, supported by a further \$133 million in local currency costs. The total planned investment is therefore \$304 million. Experience from recent tenders for compressors suggests that the actual cost of completing the program may be higher. The financial analysis that accompanied the loan suggests that the investment is viable at the current level of the wheeling charge. However, the company will need to borrow or obtain additional equity to finance investment on this scale.

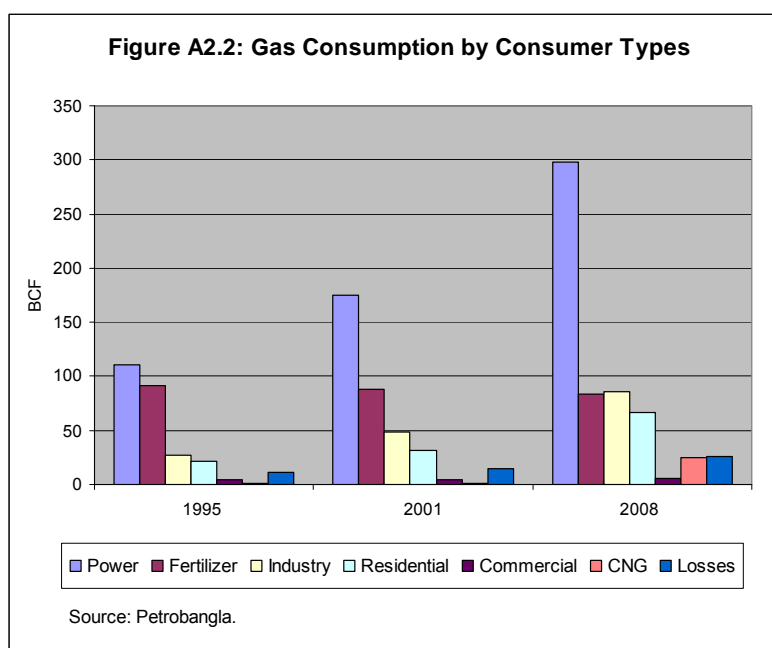
#### **D. Gas Distribution Sector Performance**

11. The Government had decided to price gas below international prices for substitute fuel (i.e., oil) as a means to subsidize the electricity and fertilizer sectors. The average gas prices in 1994 were set at \$1.23/ British thermal unit (mmbtu) when the equivalent price of oil was about \$2.08/mmbtu. The profitability of Petrobangla subsidiaries was low due to low operating margins as well as high gas distribution losses (i.e., mainly nontechnical). Titas Gas Transmission and Distribution Company (TGTDC), which was responsible for over 70% of gas distribution, had gas distribution losses of over 9% during 1994–2003 as against the industry standard of below 2%. The gas distribution companies have undertaken aggressive measures to reduce gas distribution losses (i.e., mainly pilferage) through consumer surveillance and metering of gas supply to gas distribution zones. Those measures enabled TGTDC to reduce distribution losses from over 8% in 2001 to below 3.5% by 2008. The gas sector was also suffering from a high degree of accounts receivable during 1994–1998 due to overdue payments mainly from fertilizer companies and to a lesser degree from the Bangladesh Power Development Board (BPDB).

<sup>2</sup> ADB. 2005. *Report and Recommendation of the President to the Board of Director for a Proposed Loan to Bangladesh for the Gas Transmission and Development Project*. Manila.

12. The natural gas customer base increased from 610,000 in 1994 to over 1,050,000 by 2000 and to 1.85 million by 2008. The gas distribution network in Dhaka city was further strengthened during this period to provide high pressure gas to CNG filling stations. Due to new gas field findings by IOCs in the late 1990s, Bangladesh had the potential of producing gas in excess of its demand by 2000. The IOCs were reluctant to make further investments in developing new gas fields at that time due to the limited domestic demand for gas. The possibility of exporting excess gas to neighboring countries was seriously considered and natural gas for domestic industries, the residential sector, and other applications (i.e., CNG as a transport fuel) was promoted. Increasing the gas prices by about 30% on average between 1994 and 2000 in local currency terms (15% in dollar terms) enabled Petrobangla to absorb the higher cost associated with gas produced by IOCs.

13. The demand for gas picked up during 2001–2008 and the excess production capacity that existed in 2000 was fully utilized by 2008. Gas consumption increased to 600 BCF by 2008 compared with 370 BCF in 2001 mainly because of the increased gas consumption by the power sector (i.e., from 147 BCF in 2000 to 300 BCF in 2008) as several large gas-fired power plants (i.e., over 900 megawatts (MW) amounting to over 30% of existing power generation capacity) were commissioned during 2002–2003. There has been a significant increase in gas consumption by industry (i.e., from 42 BCF in 2000 to 85 BCF in 2008 ) as more industries switched from electricity and liquid fuel to gas due to the low price of gas in Bangladesh. Gas consumption in the domestic sector also increased from 31 BCF in 2000 to 66 BCF in 2008 due to the increased number of households connected to the gas distribution network (1,050,000 in 2000 and 1,850,000 in 2008). The introduction of CNG as a substitute for liquid fuel in 2001/02 resulted in CNG consumption increasing to over 32 BCF in 2008 (Figure A2.2).



14. Although gas production increased by over 70% from 2001 to 2008, Bangladesh currently faces gas shortages amounting to 75 BCF–100 BCF. The result is curtailment of gas supply to power plants, fertilizer plants, and industries in the Chittagong area. Due to anticipated gas shortages, Petrobangla is not in a position to commit reliable gas supplies to new power plants and industries. The situation is having a serious impact on the economic development of

the country. Power shortage due to lack of investments in power generation capacity as well as gas shortages is compelling industrial consumers to use gas in captive power plants. But captive power plants are not efficient as large-scale base-load power plants due to their small size. Hence their use is reinforcing the gas shortage as it encourages inefficient use of gas in captive power plants. The prevailing low prices of gas in Bangladesh (average gas price of around \$1.7/mmbtu compared with \$4–6/mmbtu in India) are encouraging inefficient use of gas. Retail gas prices were increased by 15%–20% in local currency terms (i.e., gas prices decreased by about 15% in dollar terms due to the depreciation of the taka) between 2000 and 2005, and there had not been any gas tariff adjustment since 2005 until the August 2009 increase in overall gas prices by 10% and the increase in feed gas prices for CNG by 400% in April 2009.

15. The financial position of the gas distribution companies is sound. All of them are profitable and generating surplus cash from their operations (Tables A2.4 to A2.8).

**Table A2.4: Financial Indicators for TGTDC**

Indicator	FY1995	1999/2000	2004/05	2005/06	2006/07	2007/08
Accounts Receivable (days)	119.0	164.0	162.0	140.0	129.0	116.0
Working Ratio	91.9	92.4	91.7	91.4	90.3	88.1
Return on Equity	25.2	27.9	36.4	38.0	40.6	41.3
Return on Net Fixed Assets	10.4	12.7	24.4	28.5	33.2	48.4
Debt Equity Ratio	72:28	69:31	63:37	61:39	60:40	40:60

Source: Titas Gas Transmission and Distribution Company Limited.

**Table A2.5: Financial Indicators for BGSL**

Indicator	1994/95	1999/2000	2004/05	2005/06	2006/07	2007/08
Accounts Receivable (days)	66.0	122.0	124.0	94.0	84.0	78.0
Working Ratio	90.1	91.5	83.0	70.4	71.5	60.9
Return on Equity	4.4	5.8	21.6	38.5	48.3	71.4
Return on Net Fixed Assets	2.9	5.4	51.6	114.0	130.5	211.9
Debt Equity Ratio	39:61	21:79	22:78	19:81	23:77	25:75

Source: Bakhrabad Gas Systems Limited.

**Table A2.6: Financial Indicators for JGTDSL**

Indicator	1994/95	1999/2000	2004/05	2005/06	2006/07	2007/08
Accounts Receivable (days)	189	156	160	137	153	141
Working Ratio	83.7	91.0	92.9	92.9	88.7	90.1
Return on Equity	35.2	4.6	6.2	7.3	12.2	12.0
Return on Net Fixed Assets	122.1	4.9	8.8	10.9	21.1	23.0
Debt Equity Ratio	48:52	37:63	27:73	25:75	22:78	25:75

Source: Jalalabad Gas Transmission and Distribution System Limited.

**Table A2.7: Financial Indicators for PGCL**

<b>Indicator</b>	<b>1994/95</b>	<b>1999/2000</b>	<b>2004/25</b>	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>
Accounts Receivable (days)			91	66	75	13
Working Ratio			93.4	93.5	95.7	95.5
Return on Equity			19.4	11.5	7.0	11.8
Return on Net Fixed Assets			10.0	6.0	3.9	7.2
Debt Equity Ratio			60:40	58:42	57:43	53:47

Source: Pashchimanchal Gas Company Limited.

**Table A2.8: Financial Indicators for RPGCL**

<b>Indicator</b>	<b>1994/95</b>	<b>1999/2000</b>	<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>
Accounts Receivable (days)	350	337	87	77	74	105
Working Ratio	679.0	104.0	85.4	81.4	58.4	66.3
Return on Equity	-0.1	-9.7	21.5	16.3	41.4	42.6
Return on Net Fixed Assets	-0.7	-5.8	24.6	37.6	50.5	48.9
Debt Equity Ratio	32:68	68:32	55:45	54:46	59:41	57:43

Source: Rupantarita Prakritik Gas Company Limited.

16. The distribution companies have a stable business model. The prices at which they purchase gas from Petrobangla are fixed as are selling prices to their various customers. They are not therefore exposed to fluctuations in international oil or gas prices. End user prices vary, with low prices to the fertilizer and power sectors offset by higher prices for commercial and industrial users. The figures show a general pattern of improving profitability for the various distribution companies, with increasing returns on equity and on fixed assets. Debt equity ratios show that there is a comfortable cushion of equity in the companies and they could accommodate additional debt to finance further investment. They are currently financing their investment programs wholly from internal sources.

17. However, the satisfactory financial position of the distribution companies is in contrast to the situation at Petrobangla. Petrobangla's finances are complex. The company buys gas from both IOCs and state-owned gas companies. The price paid to the state-owned gas companies is fixed. The price paid to IOCs varies between fields. When a new field comes onstream, the price of gas is high to enable the IOC to recover its incurred costs. Once the cost has been repaid, the price is reduced but is still higher than the price paid to state gas companies. To cope with these fluctuations in price, Petrobangla operates a Price Deficit Fund. The distribution companies pay a levy into the fund for each unit sold and the proceeds are used to even out fluctuations in the cost of gas to Petrobangla. In the recent past, the fund has been in deficit and Petrobangla incurred a deficit of Tk64.8 million in 2008. There are prospects of some improvement in this position in the short term. But in the long term, with the present structure and level of prices, the losses can be expected to increase as new fields are developed and increasing quantities of gas come from IOCs.



**IMPACTS REALIZED AND OUTCOMES ACHIEVED IN KEY THEMATIC AREAS OF  
ADB ASSISTANCE TO THE ENERGY SECTOR**

ADB Inputs	Expected Outputs	Outcome Achieved	Impact Realized
<b>I. Promoting Commercial Orientation of Power Sector Entities</b>			
<b>A. Technical Assistance</b>			
TA 2715-BAN : <i>Valuation of Assets of the Dhaka Electric Supply Company</i>	The assets and liabilities to be transferred from (Dhaka Electric Supply Authority) DESA to DESCO were finalized and opening balance sheet for DESCO was created.	DESCO was incorporated in 1996 and became operational in 1998 and a new management team was installed in 2000. The company's performance has markedly improved since then, with distribution losses reduced to 12.9% by 2008 compared with 46.7% in 1998, and collection ratio improving to 100% from 88% in 1998. The company's franchise area was expanded to include Gulshan, and it had become a commercially viable enterprise. The company was successfully listed in the stock market in 2006.	The overall commercial orientation of the power sector improved during the evaluation period. The performance of DESCO and PGCB has markedly improved compared with DESA and BPDB, respectively. This has an impact in terms of overall development and performance of the transmission network and the commercial performance of DESCO. There are encouraging signs of improvement in DPDC. However, the sustainability of improvements achieved in West Zone Power Distribution Company (WZPDC) is doubtful due to management problems.
TA 3244-BAN : <i>Capacity Building of Dhaka Electric Supply Co. Ltd. (DESCO)</i>	The initial business plan, management structure, and operating procedures for DESCO were prepared.	Although DESA has shown some improvement between 1998 and 2005, its underlying corporate culture and overall financial status remained weak with excessive accounts receivables and high distribution losses (over 20%) compared with DESCO. DPDC was established in 2005 to take over the operations of DESA and the transfer of operations took place in 2008. Already the distribution losses have been reduced to 13.2% through new management practices.	The overall cost recovery of the power sector has improved due to reduction in overall distribution loss from over 35% in 1995 to less than 18%, and increase in collection ratio from below 80% to 100%. However, BPDB, which is responsible for most of the power generation in the public sector and power distribution in urban areas outside Dhaka city, remains financially insolvent and is incapable of repaying its debts to the Government. Ongoing initiatives supported by ADB, the World Bank, and Japan International Cooperation Agency (JICA) will restructure the remaining operations of BPDB.
TA 3343-BAN : <i>Corporatization of the Ashuganj Power Station (APS)</i>	Detailed plan for implementing the corporatization process of APS and specific steps to be taken during the transitional period.	PGCB was created in 1996 as the transmission network operator. Initially BPDB was reluctant to transfer the transmission lines to PGCB and PGCB's role was limited to managing the construction of ADB-financed transmission lines under Loan 1505. In 2002/03 PGCB took over the responsibility for managing the transmission network of the entire country. Since then transmission losses have been reduced to 3.55% from 4.88% in 2000, and transmission line outages from 146 h in 2000 to 66 h. Power Grid Company of Bangladesh (PGCB) has been profitable and was listed in 2006.	However, the improved power distribution has not translated into better and more reliable supply of electricity because generation
TA 3801-BAN : <i>Corporatization of the West Zone Distribution Operations of the Bangladesh Power Development Board</i>	Corporatization plan of West Zone Distribution Operations of BPDB including legal framework, power purchase agreement, and financial system, among others.		
TA 3978BAN : <i>Corporatization of the Dhaka Electric Supply Authority</i>	Strategy for transferring the remaining operations of DESA to a new company (i.e., Dhaka Power Distribution Company (DPDC) under a viable financial structure with appropriate staff and management incentives.		
TA 4379-BAN : <i>Power Sector Development Program II ( Component A)</i>	Financial restructuring plan for BPDB and DESA		
TA 4626-BAN: <i>Corporatization of the Bangladesh Power Development Board (BPDB)</i>	Strategy for corporatization of remaining generation and distribution of BPDB.		

**IMPACTS REALIZED AND OUTCOMES ACHIEVED IN KEY THEMATIC AREAS OF  
ADB ASSISTANCE TO THE ENERGY SECTOR**

ADB Inputs	Expected Outputs	Outcome Achieved	Impact Realized
<p><b>B.Loans</b> Loan 1505(SF)-BAN Ninth Power Project</p> <p>Loans 1730(SF)/1731-BAN: Dhaka Power Systems Upgrade</p> <p>Loans 1884(SF)/1885-BAN: West Zone Power System Development</p> <p>Loans 2038/ 2039-BAN: Power Sector Development Project and Program</p>	<p>Support for the establishment of the PGCB and DESCO by financing the expansion of transmission and distribution network handed over to PGCB and DESCO and specifically through the loan agreement paras 2 to 5, 8(b), and 9 requiring the handover of assets and establishment of new companies.</p> <p>Financed further expansion of transmission and distribution network handed over to PGCB and DESCO and specific provisions of project agreement between ADB and DESCO under Loan 1730 to ensure the handover of transmission lines to PGCB and additional areas to DESCO and improve the corporate governance of PGCB and DESCO.</p> <p>Supported the rehabilitation of the power distribution network transferred to WZPDC and had specific assurances to ensure the operationalization and improved corporate governance in WZPDC and transfer of distribution operations of the west zone from BPDB to WZPDC.</p> <p>The program loan supported the rehabilitation of the distribution network transferred to North West Zone Power Distribution Company. (NWZPDC. The program loan 2038 had conditionalities directly supporting</p> <ul style="list-style-type: none"> <li>• improving the financial position of PGCB and DESCO by settling Government receivables to the power sector;</li> <li>• reorganization of remaining operations of BPDB and DESA, BPDB's northwest zone distribution network, and Siddhirganj Power Station into independent corporate bodies.</li> </ul>	<p>WZPDC was established in 2002 to take over the distribution operations in the west zone from BPDB. However, there have been frequent changes in the management of the company and the key positions are vacant at the time of the independent evaluation mission (IEM). However, there has been an improvement in the performance of the company and the distribution losses have been reduced to 13% from 225% in 2003, but the company is incurring losses and the increase in consumers (20%) and that in sales (10%) are less than expected.</p> <p>Since the North West Power Distribution Company was established, it has not become functional and BPDB continues to manage the power distribution network in the northwest zone. Similarly the Ashuganj Power Company has not become independent and Ashuganj power plant is operated as part of BPDB.</p> <p>The power generation companies established to implement the ADB-financed peaking power plants under Loan 2038 and Loan 2332 have not been given the responsibility for operating BPDB-owned power plants. However, these companies have been assigned the responsibility for implementing several other power generation plants financed by development partners.</p> <p>The overall BPDB corporatization plan prepared under ADB TA 4626 has not yet been fully adopted by the Government. However certain key aspects of the plan have been or are being implemented with the assistance of ADB and the World Bank including the financial structuring of BPDB.</p> <p>There has been some improvement in the commercial operations of BPDB with reduced</p>	<p>capacity is inadequate and power shortages persist.</p>

**IMPACTS REALIZED AND OUTCOMES ACHIEVED IN KEY THEMATIC AREAS OF  
ADB ASSISTANCE TO THE ENERGY SECTOR**

ADB Inputs	Expected Outputs	Outcome Achieved	Impact Realized
<p>Loans 2332/2333(SF)-BAN: <i>Sustainable Power Sector Development Project</i></p> <p>Loan 2334(SF)-BAN <i>Sustainable Power Sector Development Program</i></p>	<p>The loan agreement between ADB and the Government under Loans 2332/2333</p> <ul style="list-style-type: none"> <li>• transferring to a separate company the authority to manage the Sirajganj power station and the Khulna peaking power stations financed under the project.</li> <li>• financing the rehabilitation of power distribution network of newly set up DPDC</li> </ul> <p>The tranche conditions under program Loan 2334</p> <ul style="list-style-type: none"> <li>• ensures the approval of the BERC organogram and the appointment of the BERC commissioners;</li> <li>• supports the preparation of the draft financial restructuring plan for BPDB and DESA with assistance under TA 4379-BAN;</li> <li>• ensures the appointment of the boards of directors of DPDC, Electricity Generation Company of Bangladesh (EGCB), NWZPDC in a manner satisfactory to ADB; and</li> <li>• ensures off-loading of 25% of PGCB and DESCO shares in the stock market.</li> </ul>	<p>loss reduction and improved bill collection. However, it remains financially insolvent and its performance in operating generation assets remains poor, with low thermal inefficiencies and a high degree of forced outages.</p>	
<p><b>II. Promoting Investments in Power Generation</b></p>			
<p><b>A. Technical Assistance</b> TA 2338-BAN: <i>Solicitation for Private Sector Implementation of the Meghnaghat Power</i></p> <p>TA 4379-BAN : <i>Power Sector Development Program II ( Component B)</i></p>	<p>Assisted the Government in preparing the Meghnaghat Project by developing procedures, guidelines, and documents for bidding, and in evaluating proposals.</p> <p>TA 4379 produced an update of the Power System Master Plan identifying generation and transmission expansion options and sites and expansion plans.</p>	<p>ADB's assistance to Rural Electrification Board (REB) facilitated its investment in Mymensingh IPP project and rural electrification cooperatives demonstrated the capability of domestic investors to invest in power generation. The plant capacity was later expanded to 210 MW by converting it to a more efficient combined-cycle power plant.</p>	<p>The installed power generation capacity has increased from 1,880 MW in 1994 to 4,118 MW with the private sector contributing over 1,300 MW. Hence, power generation capacity has significantly increased. However, Bangladesh has a generation capacity shortage of over 1,500 MW and the private sector has no committed investments in power</p>

**IMPACTS REALIZED AND OUTCOMES ACHIEVED IN KEY THEMATIC AREAS OF  
ADB ASSISTANCE TO THE ENERGY SECTOR**

ADB Inputs	Expected Outputs	Outcome Achieved	Impact Realized
<p>TA 4898-BAN : <i>Promotion of Private Sector Participation in the Power Sector</i></p> <p>TA 4953-BAN: <i>Tendering Process for Independent Power Producer Plants</i></p>	<p>Financed the preparation of an institutional framework and recommendation for new policy initiatives and reforms for private sector participation in the power sector. PPP guidelines; several PPP models in generation and distribution subsectors were prepared.</p> <p>Assisted in finalizing the request for proposals and evaluating them for the implementation of the Shirajganj IPP Project on a build-operate-own basis.</p>	<p>ADB assistance providing for the structuring, solicitation, and finally for constructing the Meghnaghat IPP project has resulted in the addition of 450 MW of base-load power generation capacity to the grid under very attractive terms. The plant has been operated very efficiently and reliably by the private sector operator and the changes in the ownership of the plant did not affect its performance.</p> <p>During 1998–2002, over 1,200 MW of generation capacity was added through private sector investments and these plants contribute to over 30% of energy generation.</p>	<p>generation at present.</p> <p>Inadequate investments in power generation by BPDB and the Government's failure to attract sufficient private investments are the major reason for the underperformance of the sector despite the improvements in distribution and transmission sub-sectors.</p>
<p><b>B. Loans</b></p> <p>Loan 1356(SF)-BAN : Rural Electrification Project</p> <p>Loan 1505(SF)-BAN: <i>Ninth Power Project</i></p> <p>Loan 1793/ EI7165-BAN : AES Meghnaghat Power Project</p> <p>Loans 1884(SF)-BAN: <i>West Zone Power System Development Project</i></p> <p>Loan 2038-BAN: <i>Power Sector Development Program</i></p> <p>Loans 2332/2333(SF)-BAN: <i>Power Sector Development Project</i></p>	<p>Financed the 70 MW Mymensingh power plant implemented by REB as an IPP.</p> <p>One component of Loan 1505 financed the detailed engineering and feasibility study for a gas-based peaking power plant in the east zone and a baseload power plant in the west zone.</p> <p>Financed the 450 MW baseload power plant through a combination of nonsovereign financing products.</p> <p>A change in scope for Loan 1884 financed the feasibility study of a baseload power plant in the west zone.</p> <p>Financed the east zone 2 x 100 MW peaking power generation plant at Sidhirganj.</p> <p>Financed the construction of 2 x 150 MW natural gas-fired gas turbine peaking power plant in Sirajganj and Khulna.</p>	<p>However, there has not been any significant private sector investment in power generation since 2002. ADB TA 4898 has prepared a policy framework for attracting private investments for power generation and the Government has adopted most of the recommendations. However, the solicitation process under TA 4953 has not generated adequate interest from the private investors for the 450 MW Shirajganj power plant mainly because of Bangladesh's poor track record in attracting private investments and concerns about the availability of gas supplies.</p> <p>The feasibility study for the east zone peaking power plant was completed under Loan 1505 and it was included for financing under Loan 2039 ( i.e., 2 x 100 MW Siddhirganj peaking plant). It is expected to be commissioned in the latter part of 2009. However, the feasibility study for the west zone baseload power plant was not undertaken due to problems in selecting the consultant.</p>	

**IMPACTS REALIZED AND OUTCOMES ACHIEVED IN KEY THEMATIC AREAS OF  
ADB ASSISTANCE TO THE ENERGY SECTOR**

ADB Inputs	Expected Outputs	Outcome Achieved	Impact Realized
<b>III. Removing Transmission Constraints</b>			
<p><b>A. Loans</b> Loan 1505-BAN(SF) <i>Ninth Power Project</i></p> <p>Loan 1730: <i>Dhaka Power Systems Upgrade</i></p> <p>Loans 1884(SF)/1885 : <i>West Zone Power System Development</i></p> <p>Loan 2039-BAN: <i>Power Sector Development Project</i></p> <p>Loans 2332/2333(SF)-BAN: <i>Sustainable Power Sector Development Program</i></p>	<p>Financed the 230 kV transmission lines to evacuate power from the Meghnaghat Power Project.</p> <p>Financed the completion of 230 kV ring of transmission lines and substations around greater Dhaka</p> <p>Financed the extension of 230 kV network to the west zone.</p> <p>Financed the construction of the National Loan Dispatch Center to allow centralized control and operation of the power transmission network.</p> <p>Financing the 400 kV overhead transmission lines in Dhaka and strengthening 132 kV transmission lines in the northwest.</p>	<p>The power transmission network was further developed under the newly created PGCB. ADB was the major financier of PGCB, as several other development partners including the World Bank was initially reluctant to finance PGCB's investments.</p> <p>During 1996–2008, the 230 kV transmission network was established in the country with the completion of the 230 kV transmission ring connecting the load centers around Dhaka city. This has enabled the smooth evacuation of power generated by large private sector IPP projects commissioned during 1998-2002. The extension of the 230 kV transmission network to the western zone of the country was completed in 2008. The national load dispatch center is presently under construction and is expected to be commissioned in 2010.</p>	<p>PGCB has proven its credentials as a competent entity and it has improved the network performance in terms of reduced transmission outages and transmission losses. However, the shortage in power generation has prevented end users from realizing the full benefits of improved network operations.</p>
<b>IV. Improving Access to Electricity</b>			
<p><b>A. Loans</b> Loan 1356-BAN: <i>Rural Electrification</i></p> <p>Loan 1505-BAN: <i>Ninth Power Project</i></p>	<p>Financed the expansion of the power distribution network of 7 PBSs by constructing 33 kV, 11 kV, and 0.4 kV distribution lines and 50 MVA of 33/11/0.4 kV substation capacity.</p> <p>Financed the expansion of power distribution in Dhaka with the construction of 132 kV, 33 kV, 11 kV, and 0.4 kV multiple circuit distribution system and enhancement of distribution capacity by about 300 MVA.</p>	<p>The PBSs under Loan 1356 have provided 120,000 additional connections and reduced distribution losses from 34% in 1999 to 15% by 2005.</p> <p>Loan 1505 and Loan 1730 financed the expansion and rehabilitation of the distribution network of DESCO and DESA, which was later transferred to DPDC. The total number of consumers in Dhaka city increased from 585,000 in 2000 to over 1,025,000 in 2008, and electricity sales increased from 3,490 GWh to 6,270 GWh and ADB-financed distribution had a major role in facilitating this expansion.</p>	<p>The electrification rate has increased from 10% in 1994 to over 37% in 2008, with total number of electricity consumers increasing from 2.3 million in 1994 to over 10.6 million in 2008.</p> <p>The bulk of increase in electrification was due to the effort of REB, which increased its consumer base from 1.2 million to 7.3 million. Although ADB was not a major financier of REB (i.e. the World Bank and bilateral funding agencies together with the Government were the main</p>

## IMPACTS REALIZED AND OUTCOMES ACHIEVED IN KEY THEMATIC AREAS OF ADB ASSISTANCE TO THE ENERGY SECTOR

ADB Inputs	Expected Outputs	Outcome Achieved	Impact Realized
Loans 1730(SF)/1731-BAN: <i>Dhaka Power Systems Upgrade</i>	Financed the rehabilitation and expansion of the rural distribution network in the Dhaka area taken over by the PBSs from DESA, and the upgrading and expansion of the distribution system of the Gulshan area taken over by DESCO from DESA.	Loan 1730 and Loan 1884 had also financed the expansion of the distribution network in 7 PBSs in Dhaka area and 8 PBSs in the west zone.  Loan 1730 is also financing the construction of a training center for REB. However, there have been significant delays in completing this building and it may not be completed before loan closure.	financiers of REB), the strengthening of the medium-voltage network in and around Dhaka, west zone and north-west zone under ADB projects facilitated the expansion of the low-voltage network of REB.
Loans 1884(SF)/1885-BAN: <i>West Zone Power System Development</i>	Loans 1884(SF)/1885 are financing the upgrade and expansion of the distribution networks for eight PBSs in the west zone.	Loan 2039 has financed the rehabilitation and expansion of the power distribution network in the northwest zone. The construction work is in progress. The rehabilitation and expansion of the distribution network under Loan 2332 are still at procurement stage.	
Loan 2039-BAN: <i>Power Sector Development Program</i>	Loan 2039-BAN is financing the upgrade and extension of the distribution network in northwest Bangladesh by renovating, rehabilitating, and extending the 33 kV, 11 kV, and 0.4 kV distribution systems in 10 towns.		
Loans 2332/2333(SF)-BAN: <i>Sustainable Power Sector Development Program</i>	Financing the improvement of distribution system efficiency in DPDC and DESCO areas that includes <ul style="list-style-type: none"> <li>• DPDC area reinforcement, renovation, and augmentation of existing substations; construction of new substations;</li> <li>• DESCO area upgrading and expansion of the distribution system in Gulshan Circle, including Tongi area and in Mirpur Circle.</li> </ul>		
<b>V. Increasing Gas Production Capacity and Mobilizing Investments in Gas Production</b>			
<b>A. Technical Assistance</b> TA 2024-BAN : <i>Preparation of Gas Development Master Plan and Strengthening of the Organization and Regulatory Framework for the Oil and Gas Sector</i>	Prepared a master plan identifying priority investments in the gas sector during 1996–2005 based on the demand projections, new gas discoveries. Recommendations for pricing.	The Government has implemented the development of new gas fields through the participation of IOCs, and the gas transmission network through Government and ADB financing.  Gas production in Titas and Habiganj gas fields increased by 251 MMCFD (13% of national gas output) as a result of the work over gas fields under Loan 1293.	Total gas production in Bangladesh increased from 223 BCF in 1994 to 596 BCF in 2008. The increase helped the country maintain its energy security and economic growth as gas is the dominant form of commercial energy source contributing to over 80% of electricity generation.

**IMPACTS REALIZED AND OUTCOMES ACHIEVED IN KEY THEMATIC AREAS OF  
ADB ASSISTANCE TO THE ENERGY SECTOR**

ADB Inputs	Expected Outputs	Outcome Achieved	Impact Realized
<p><b>B. Loans</b> Loan 1293-BAN: <i>Third Natural Gas Development</i></p> <p>Loans 2188/2189(SF)-BAN: <i>Gas Transmission and Development</i></p>	<p>Under Loan 1293 the workover of five gas wells in Titas gas fields and installation of additional gas treatment plants in Titas and Habiganj gas fields increased the gas production capacity by 175 million to 80 million cubic feet per day (MMCFD).</p> <p>Under Loans 2188/2189(SF) five producing gas fields are to be appraised. The appraisal may result in higher gas reserve estimates.</p>	<p>The field appraisal of existing gas fields undertaken under Loan 1293 has confirmed additional reserves of 4.6 TCF amounting to over 30% confirmed remaining gas reserves. The gas field appraisal under Loan 2188 is still being implemented and the results are not yet known.</p>	
<b>VI. Improving the Gas Transmission and Distribution Network</b>			
<p><b>A. Technical Assistance</b> TA 2025-BAN: <i>Safety and Efficiency Improvements in the Gas Sector</i></p>	<p>TA 2025 supported the gas distribution companies (Titas Gas Transmission and Distribution Company Limited [TGTDC], Bakhrabad Gas Systems Limited [BGSL], and Jalalabad Gas Transmission and Distribution System Limited [JGTDSL]) in carrying out safety and efficiency improvements of their gas distribution systems and in implementing a system loss reduction plan that will reduce and/or maintain the unaccounted-for gas to below 2% of purchases.</p>	<p>The gas transmission capacity to Dhaka city was expanded by connecting the Ashuganj–Elanga pipeline to Dhaka gas supply system under Loan 1293. This enabled TGTDC to meet the increasing demand for gas in Dhaka. The gas supply to Dhaka city was further increased under Loan 1942 by about 150 MMCFD. The gas supply to Dhaka city would further improve <i>after</i> the completion of the Monohardi–Dhanua pipeline and the compressor station in Ashuganj under Loan 2188.</p> <p>The gas distribution network in the greater Dhaka area was expanded, by over 506 km and, that in the Sylhet area by over 350 km, and that in Bakhrabad franchise area by over 137 km under Loan 1293. The operational performance of the gas transmission network was improved by installing measuring and regulating stations and tele-metering. Loan 1942 further improved the gas distribution network within Dhaka city to allow the supply of high pressure gas to CNG filling stations.</p>	<p>The reach and the capacity of the gas transmission network increased during the evaluation period. This enabled the supply of an increasing volume of gas to the demand centers and to an increasing number of consumers (0.6 million in 1994 to 1.8 million in 2008).</p> <p>The increased availability of gas and use of gas for new applications such as transport have resulted in foreign exchange savings, improved industrial competitiveness, better quality of life due to improved indoor air quality for households with gas supply, and improved outdoor air quality due to use of CNG for transport.</p>
<p><b>B. Loans</b> Loan 1293-BAN: <i>Third Natural Gas Development</i></p>	<p>Loan 1293 financed the following:</p> <ul style="list-style-type: none"> <li>• connection of central Dhaka areas to Ahuganj–Elanga gas pipeline;</li> <li>• gas transmission and distribution expansion to Sylhet and Chhatak areas;</li> <li>• construction of 64 km 20-inch gas pipeline;</li> <li>• construction of 870 km of distribution and service mains;</li> <li>• installation of 60,000 meters for nonmetered customers;</li> <li>• enforced disconnection of delinquent customers;</li> </ul>	<p>Loan 1293 and the associated TA helped especially Titas Gas Transmission and Distribution Company (TGTDC) to achieve efficiency improvement including the reduction</p>	

## IMPACTS REALIZED AND OUTCOMES ACHIEVED IN KEY THEMATIC AREAS OF ADB ASSISTANCE TO THE ENERGY SECTOR

ADB Inputs	Expected Outputs	Outcome Achieved	Impact Realized
<p>Loans 1942(SF)/1943-BAN: <i>Dhaka Clean Fuel</i></p> <p>Loans 2188/2189(SF)-BAN: <i>Gas Transmission and Development</i></p>	<ul style="list-style-type: none"> <li>• introduction of better management practices for monitoring losses;</li> <li>• outsourcing of meter reading and bill collection.</li> </ul> <p>Loans 1942(SF)/1943 financed the following:</p> <ul style="list-style-type: none"> <li>• construction by Gas Transmission Company Limited (GTCL) of 60 km 20-inch gas transmission pipeline from Dhanua to Aminbazar;</li> <li>• installation of two compressed natural gas (CNG) city gate stations;</li> <li>• expansion of the gas distribution network in Dhaka city by 100 km to supply natural gas to over 100 CNG filling stations;</li> <li>• establishment of CNG filling stations along the main highways; and</li> <li>• conversion of vehicles to be used with CNG.</li> </ul>	<p>of gas distribution loss from over 8% in 1994–2000 to below 3.5% by 2008. This was achieved through better commercial practices and installation of meters.</p> <p>Loan 1942 was instrumental in introducing CNG as a transport fuel. The Project set up the institutional capacity for the technical regulation of CNG use for transport, provided financing for CNG filling stations, and introduced the technology for converting vehicles to CNG use. The Project has resulted in a vibrant private sector industry.</p> <p>Loan 2188 is under implementation and gas pipelines are being procured for gas transmission expansion to west of Jamuna bridge and the gas distribution network in Rajshahi. However, the compressor stations are unlikely to be financed under the Project due to cost overrun and inadequate fund allocation. This would make it difficult to maintain the gas supply pressure.</p>	
<p><b>VII. Improving the Governance, Regulatory Framework of the Energy Sector</b></p>			
<p><b>A. Technical Assistance</b> TA 2024-BAN: <i>Preparation of a Gas System Development Plan and Strengthening of the Organizational and Regulatory Framework for the Oil and Gas Sector</i></p> <p>TA 2800-BAN: <i>Support a Gas Regulatory Authority Project</i></p>	<p>TA 2024 financed the preparation of a long-term plan for developing the gas system and recommendations for strengthening the regulatory functions of the Government, rationalizing gas prices, and defining the role of Petrobangla.</p> <p>TA 2800 supported the draft gas law recommending a single energy regulatory commission (ERC) for both power and gas. After the ERC Act was passed in 2003 the Government obtained funding from USAID</p>	<p>The Government decided to establish a combined regulatory agency for both gas and power sectors. Hence, the initial ADB TAs aimed at establishing a gas sector regulatory agency did not achieve the intended outcome.</p> <p>Although TA 2800, and TA 3129 had undertaken the initial work required for setting up of Bangladesh : Energy Regulatory Commission (BERC), most of capacity building assistance to BERC was provided by USAID. Both ADB and the World Bank maintained the policy dialogue through appropriate loan assurances and program loan conditions to ensure that the BERC is established as intended. There had</p>	<p>Although BERC finally became fully operational in 2008, it is yet to make an impact on the energy sector governance as an independent regulatory agency. However, it has effectively taken over the responsibility for tariff setting from the Government. It is yet to be seen whether it would be able to maintain its independence and integrity.</p>



**IMPACTS REALIZED AND OUTCOMES ACHIEVED IN KEY THEMATIC AREAS OF  
ADB ASSISTANCE TO THE ENERGY SECTOR**

ADB Inputs	Expected Outputs	Outcome Achieved	Impact Realized
<p>TA 3129-BAN: <i>Support for the Energy Regulatory Project</i></p> <p>TA 4379-BAN: <i>Power Sector Development Program II</i></p> <p>TA 4528-BAN: <i>Promoting Private Sector Participation in the Energy Sector</i></p>	<p>for a comprehensive TA to provide long-term support to the new ERC. The remainder of the TA was cancelled.</p> <p>TA 3129 provided support for the establishment of ERC, but due to the USAID TA (above) the remainder of the TA was cancelled</p> <p>TA 4379 encouraged the Government to initiate the financial restructuring of BPDB and add generation capacity according to the long term generation expansion plan.</p> <p>TA 4528 developed policies and procedures that reflect recent developments in corporate governance arrangements in more developed countries and provided for a regulatory framework and policy regime that would attract more private sector investments in the gas sector.</p>	<p>been a significant delay in appointing the commissioners to BERC after it was established in 2003. The ADB program loan 2038 was instrumental in finally getting the BERC functional in 2008.</p> <p>Since becoming fully operational in 2008, BERC has made only a single regulatory order for adjusting the bulk supply tariffs for the power sector. It is expected to make tariff rulings on end user gas prices and electricity prices during the next 12 months.</p>	
<p><b>B. Loans</b></p> <p>Loan 2038-BAN: <i>Power Sector Development Program Loan</i></p> <p>Loan 2334-BAN: <i>Sustainable Power Sector Development Program (Program)</i></p>	<p>Operationalization of the BERC;</p> <p>Program Loan 2334 carried conditionalities that required the appointment of the BERC commissioners and the gazette notification of the electricity generation tariff regulation and the tariff-setting mechanism</p>		

Source: Independent Evaluation Department Study Team.

## ASSESSMENT OF LENDING OPERATIONS TO THE BANGLADESH ENERGY SECTOR, 1993–2008

### A. Completed Projects

#### 1. Loan 1293-BAN: Third Natural Gas Development

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Date Approved	21 Dec 1993
Date Effective	23 Mar 1994
Date Closed	23 Oct 2003
Approved Amount	\$107,000,000
Amount Disbursed	\$88,702,961
Attached ADTA	TA 2025: <i>Safety and Efficiency Improvements in the Gas Sector</i> , for \$480,000.
Executing Agencies	Part A: Bangladesh Gas Fields Company Limited (BGFCL) Part B: Bakhrabad Gas Systems Limited (BGSL) Part C: Titas Gas Transmission and Distribution Company, Limited (TGTDCCL) Part D: Jalalabad Gas Transmission and Distribution System Limited (JGTDSL)

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1. **Project Objectives.** The objectives were to (i) expand the gas production and treatment facilities at Titas, Habiganj, and Bakhrabad gas fields; (ii) upgrade, rehabilitate, and expand the gas transmission and distribution network in Bangladesh; and (iii) improve the efficiency and safety of the operations of the gas transmission and distribution companies.

2. **Project Components.** The Project had four components grouped by the executing agency (EAs) responsible for each component. Part A entailed drilling for appraisal-cum-development new wells in Titas and Habiganj gas fields to secure additional gas reserves. It also provided for workover of six wells in Bakhrabad and Titas gas fields, and additional gas processing plants in Titas and Habiganj gas fields with a capacity of 270 million cubic feet per day (MMCFD), to ensure adequate gas production for manufacturing cement and fertilizer, as well as for use in power stations, industry, commercial establishments, and households. Part B entailed construction of 849 kilometers (km) of 1-inch through 12-inch-diameter, 50/150/300 pounds per square inch gauge (PSIG) gas distribution and service mains in the Bakhrabad franchise area. Part C involved constructing 32 km of 20-inch-diameter, 1,000 PSIG gas transmission lines; upgrading and expanding the gas distribution network in the Titas franchise area; and installing metering and regulating stations. Part D involved constructing 57 km of 8- to 10-inch-diameter, and 1,000 PSIG transmission lines in the Jalalabad franchise area. The efficiency and safety of the operations of the gas transmission and distribution networks was to be achieved by installing new metering and regulating stations (MRSs), upgrading of the existing MRS, and training of the personnel of BGFCL, BGSL, TGTDCCL, and JGTDSL.

3. **Assessment at Project Completion.** The Project closed on 23 October 2003, almost 4 years beyond the scheduled closing date of 31 December 1999 indicated in the loan agreement, and after two extensions. The project completion report (PCR) rated the Project as highly relevant, efficacious, efficient, and likely sustainable based on the EAs' profitability and track record in maintaining gas production, and transmission and distribution facilities. It was also reported that the Project had no adverse environmental impact and there was no issue affecting indigenous people. Overall, the Project was rated "successful." The project performance

evaluation report (PPER) of the Project was prepared as part of the SAPE, and the findings of the PCR was confirmed during the PPER.

4. The Project's planned outputs were achieved, thus allowing for the expansion of gas production and upgrading of the transmission and distribution network. All four project components were completed with substantial delays ranging from over a year for the part implemented by BGSL to more than 4 years for the component implemented by TGTDC. The major causes of the implementation delays were (i) the late engagement of consultants and contractors, (ii) the EAs' protracted processing of turnkey contracts for MRSs, data acquisition and monitoring system, and the telecommunications component; (iii) the longer time required by contractors to install facilities; and (iv) frequent changes of project manager. Despite the time overruns in all project components, the Project was completed at 80% below the appraisal cost.

## 2. Loan 1356-BAN: Rural Electrification

Date Approved	30 May 1995
Date Effective	31 Oct 1995
Date Closed	29 Jun 2000
Approved Amount	\$50,000,000
Disbursed Amount	\$43,558,902.68
Attached ADTA	TA 2338-BAN: <i>Solicitation for Private Sector Implementation of the Meghnaghat Power</i> for \$211,000; Supplementary amount of \$222,000 approved on 12 Mar 1997; Supplementary amount of \$165,000 approved on 3 August 1998.
Executing Agency	Parts A and B: Rural Power Company Limited (RPC) Parts C and D: Rural Electrification Board (REB)

5. **Project Objectives.** The objectives were to (i) intensify rural electrification in seven rural electricity cooperatives (PBSs); (ii) increase the availability and security of power supply to five PBSs; and (iii) introduce elements of corporatization, commercialization, and private sector participation in the power sector.

6. **Project Components.** The Project had four components.

- (i) Part A involved construction of a gas-based open-cycle power plant and interconnection with the 132 kilovolt (kV) system of the Bangladesh Power Development Board (BPDB) at Mymensingh.
- (ii) Part B provided for consulting services.
- (iii) Part C intensified and expanded the distribution networks of PBSs.
- (iv) Part D computerized the accounting and commercial operations of the PBSs in part C.

7. **Assessment at Project Completion.** The PCR gave an overall rating of "highly successful." The Project was assessed as highly relevant, highly efficacious, highly efficient, likely sustainable, and with moderate impact on institutional development. The PCR found the project to have been successfully implemented below appraisal costs. There have been some governance issues in recent years and the plant's operator was dismissed. However, the Project has continued to be a source of reliable and cost-effective power to BPDB and subsequent investments have converted the plant into a more efficient combined-cycle plant with increased generation capacity. The SAPE Mission assessed the Project to be relevant, highly effective, efficient, likely sustainable, and with substantial impacts. The overall rating for the Project is "successful."

### 3. Loan 1505-BAN: Ninth Power Project

Date Approved	18 Dec 1996
Date Effective	17 Jul 1997
Date Closed	12 Jul 2004
Approved Amount	\$134,400,000
Disbursed Amount	\$88,099,954.16
Attached ADTA	TA 2715-BAN: <i>Valuation of Assets of Dhaka Electric Supply Company</i> for \$175,000
Executing Agencies	Parts A and B: PGCB Part C1: Dhaka Electric Supply Authority (DESA) Part C2: DESCO Part D: Power Division of MPEMR

8. **Project Objectives.** The objectives were to (i) enable evacuation of the power generated from the Meghnaghat build-own-operate-transfer Project; (ii) improve the utilization of existing system assets through optimized load dispatch; (iii) start the unbundling of BPDB into separate generation, transmission, and distribution entities; and the corporatization of the transmission segment; (iv) create a corporatized distribution entity for the Dhaka area; and (v) prepare projects for possible financing by private sector developers and the Asian Development Bank (ADB). Creation of an independent energy regulatory authority was not specifically identified as an objective in the report and recommendation of the President (RRP), but was one of the project objectives.

9. **Project Components.** The Project was set up to provide four major parts for the physical components.

- (i) Part A: Construction of 230 kV double-circuit transmission lines and substations.
- (ii) Part B: Construction of a National Load Dispatch Center (NLDC) and associated communication network.
- (iii) Part C: Construction of about 280 km of 132 kV, 33 kV, 11 kV, and 0.4 kV distribution systems in metropolitan Dhaka, including provision for about 113,000 new consumer connections and enhancement of distribution capacity by about 200 megavolt-amperes (MVA).
- (iv) Part D: Provision of engineering (consulting services for feasibility studies and detailed engineering) for (a) one gas-fired combined-cycle plant in the western part of Bangladesh (called the west zone), and (b) two gas-fired open-cycle peaking plants in the eastern part of Bangladesh (east zone).

10. **Assessment of the Project at Completion.** The project scope had several changes during implementation. .

- (i) Part A: A 230/132 kV transmission line branch and substation were added, and some lines were rerouted to enhance the effectiveness of the network around Dhaka.
- (ii) Part B: As part of the original scope of work, ADB funded preparatory consulting services for the NLDC, while the World Bank was to cofinance the investment costs. However, during the course of the Project, the World Bank decided not to provide the financing because of slow sector reform. Although the reforms were implemented at a slower pace than initially anticipated, there were major achievements that indicated that the Government had the political will to pursue

- reforms in the future. Following this, at the Government's request, the component was funded by ADB under another project.<sup>41</sup>
- (iii) Part C: Some 55 km of 132 kV, 33 kV, 11 kV, and 0.4 kV multiple-circuit distribution system was implemented (compared with 280 km in the project design), which provided for 248,000 new connections in Dhaka (compared with 113,000 in the original design).
  - (iv) Part D: Engineering for the combined-cycle plant in the west zone was cancelled because BPDB failed to engage a consultant within the stipulated period. However, engineering for the power plant for the east zone was carried out successfully as planned.

11. The cost of the Project was less than that envisaged at appraisal because of significant changes in the design and cost during implementation. All parts of the Project had serious delays, with completion of the last work in August 2003—an overall delay of 2 years. Loan closing was extended three times, with the final closing on 12 July 2004. The reasons included (i) delays in appointing PGCB management, (ii) delays in handing over the project assets from BPDB to PGCB because of stiff resistance from the BPDB workers' union, (iii) court cases by landowners over the location of a number of towers, (iv) teething problems in DESCO—the entire management was dismissed in January 2000 for poor performance, and (v) the excessive time DESA took in evaluating bids.

12. All the project objectives were successfully achieved. Through the policy reforms, a new effective and efficient model was adopted for the power sector, with corporatized independent operating companies, an independent tariff regulator, and a move toward privatization. The recent sale of about 25% of the shares of DESCO and PGCB in the capital market was a positive step by the Government to attract the private sector to the transmission and distribution segments of the power industry. However, the achievements are mixed considering (i) the performance of DESA (now DPDC) to date, (ii) the need for further progress on system losses, and (iii) financial performance (as embodied in the loan covenants)—although these conditions are expected to improve in the future. The PCR assessed the project as highly relevant, effective, efficient, and most likely to be sustainable. The Project was given an overall rating of “successful.” The PPER of the Project was prepared as part of the SAPE, and the findings of the PCR were confirmed during the PPER.

#### 4. E7165/L1793-BAN: AES Meghnaghat Power

Date Approved	5 Dec 2000
Date Effective	11 Apr 2001
Date Closed	11 Apr 2004
Approved Amount	Direct Loan \$50,000,000 Complementary Financing Scheme \$20,000,000 Political Risk Guarantee \$70,000,000
Disbursed Amount	Direct Loan \$50,000,000 Complementary Financing Scheme \$20,000,000 Political Risk Guarantee \$70,000,000
Executing Agency	Meghnaghat Power Limited (MPL)

<sup>41</sup> ADB. 2003. *Report and Recommendation of the President to the Board of Directors for a Proposed Loan to Bangladesh for the Power Sector Development Project*. Manila (Loan 2039-BAN approved for \$186 million on 10 December).

13. **Project Objectives.** The Project was designed to add baseload capacity to help solve Bangladesh's power shortages. Since the Government did not have the capacity to finance the substantial investments required to expand the country's power capacity, it invited the private sector to participate in developing baseload power generation capacity.

14. **Project Components.** The Meghnaghat Power Project involved the construction and operation of a gas-fired, combined-cycle power plant in southeast Dhaka, on the northern bank of the Meghna River in Meghnaghat, Bangladesh.

15. **Assessment of the Project at Completion.** The Project was completed at a cost of \$295 million, financed by \$220 million in debt and \$75 million in equity and about \$5 million below budget. MPL passed the performance tests and received a takeover certificate. The Project's commercial availability through January to October 2007 was high at 99.5%. The 2007 load factor of 88.21% through October was in line with budget expectations, while the heat rate was better than the budget target, which is expected to result in below-budget fuel costs. From the start of commercial operations until the end of September 2007, MPL had supplied about 14,875 gigawatt-hours of electricity to BPDB.

16. **Assessment of the Project at Project Completion.** The extended annual review report (XARR) for the Meghnaghat Power Project states that the Project achieved the development rationale and objectives set out in the report and recommendation of the President (RRP). The XARR rates the Project's contribution to private sector development as "excellent." It notes that the successful development and operation of MPL are expected to pave the way for future private sector participation as independent power producers (IPPs). The successful operation of MPL created a demonstration and catalytic effect for more private sector participation in the sector. The business success was rated "satisfactory." MPL's financial performance through fiscal year 2005 exceeded the appraisal targets. Although it slipped in 2006 due to major maintenance on the two gas turbine units, MPL is back on track to exceed its financial targets for 2007. The XARR rated the Project's economic sustainability as "excellent." MPL gave high priority to its environmental, health, and safety performance. In terms of social impact, MPL helped improve the electrification rate in Bangladesh, created jobs, and engaged in community support programs. As such, the Project's environmental, social, health, and safety performance is rated "excellent." Overall, the Project was rated "highly successful" and ADB's investment profitability was rated "satisfactory." The SAPE Mission concurred with this assessment and the Project was rated as highly relevant, highly effective, highly efficient, and likely to be sustainable with substantial impacts. The overall rating of the Project was confirmed as "highly successful."

## B. Projects under Implementation

### 1. Loan 1730(SF)/1731-BAN: Dhaka Power Systems Upgrade

	L 1730(SF)	L 1731
Date Approved		21 Dec 1999
Date Effective		2 Aug 2000
Date Closed	31 December 2009 (expected)	30 June 2008
Approved Amount	\$75,000,000	\$82,000,000
Disbursed Amount	\$ 46,317,678 (as of 23 Apr 2009)	\$74,357,490 (as of 23 Apr 2009)
Executing Agency	Part A: PGCB Part B(i): REB Part B(ii) DESCO Part B(iii) DPDC (DESA) Part C: REB	

17. **Project Objectives.** The objectives are to (i) enable evacuation and economic utilization of the power generated from the contracted build-own-operate/build-own-transfer (BOO/BOT) projects; (ii) reduce losses and improve the reliability of the existing transmission and distribution system in the Dhaka area; and (iii) initiate preparatory works for a training and management development institute in the Rural Electrification Board (REB).

18. **Project Components.** The Project has three major components.

- (i) Part A: Construction of 230 kV transmission lines and substations around Dhaka.
- (ii) Part B: Upgrading and expansion of the distribution system in rural areas around Dhaka.
- (iii) Part B: Upgrading and expansion of the distribution system in Gulshan distribution circle of Dhaka city.
- (iv) Part B: Upgrading and expansion of the distribution system in the rest of Dhaka city.
- (v) Part C: Preparatory work for a training and management development institute.

19. **Implementation Progress**

- (i) The DPDC component (Part B) revised the target for completion and moved it to 31 December 2009.
- (ii) In July 2002 the Asian Development Bank (ADB) approved the Government's request for a minor change in scope from consulting services to civil works for the REB training institute.
- (iii) Contract for the REB training Institute (signed on 23 October 2006 for completion by 1 November 2008) suffered 3 months' start-up delay. REB moved the completion target to 31 December 2009.
- (iv) As of May 2009 substations under Part A have been commissioned, and works on the distribution network under Part B have been completed;

20. **Preliminary Assessment of the Project.** The Project is closely related to the reform of distribution in Dhaka and is relevant to sector reform efforts. The PPER rates project implementation as unsatisfactory mainly due to the delays in completing the REB training institute. However, the investments in distribution network rehabilitation and expansion were crucial to the success of DESCO after its creation. The investments undertaken by DESA in rehabilitating its network in Dhaka also contributed to efficiency improvements and the subsequent establishment of DPDC. The power transmission network improvement under the PGCB component completed the 230 kV transmission ring around Dhaka city and improved the reliability of the power transmission system. The Project is relevant and effective in reforming and rehabilitating the power transmission network. The distribution network in Dhaka achieved significant efficiency improvements in power distribution and the outcomes are institutionally and financially likely to be sustainable. The Project had substantial impacts in reforming the power distribution and transmission sector. Hence the Project is rated "successful."

## 2. Loan 1884(SF)/1885-BAN: West Zone Power System Development

	L 1884(SF)	L 1885
Date Approved		17 Dec 2001
Date Effective		7 Nov 2002
Date Closed	30 June 2008	30 Sep 2009 (expected)
Approved Amount	\$60,200,000	\$138,700,700
Disbursed Amount	\$49,273,075 (as of 24 Apr 2009)	
Attached ADTA	TA 3801-BAN: <i>Corporatization of the West Zone Distribution Operations of the Bangladesh Power Development Board</i> , approved for \$900,000	
Executing Agency	Part A: PGCB Part B: BPDB/WZPDC Part C: REB	
Subsector	Transmission and Distribution	

21. **Project Objectives.** The objectives are to (i) expand electrification in southwest Bangladesh, (ii) enable evacuation and economic utilization of the power generated from the projects being contracted out at Baghabari and Bheramara, and (iii) reduce losses and improve the reliability of the existing transmission and distribution systems in southwest Bangladesh.

22. **Project Components.** The Project has three components.

- (i) Part A: Construction of 230 kV transmission lines and substations in the west zone and the second 230 kV east-west interconnector between Ashuganj and Serajganj.
- (ii) Part B: Upgrade and expansion of the electricity distribution networks in Khulna, Barisal, Jessore, Kushtia, and Faridpur cities.
- (iii) Part C: Upgrade and expansion of the electricity distribution networks of eight PBSs.

23. **Implementation Progress.** Most of the physical works have been completed. On 29 June 2004, ADB approved a minor change in scope by including an additional package of consulting services for a feasibility study and detailed engineering of a gas-based combined-cycle power plant in the west zone under L1884-BAN(SF). The Project is more than 99% complete by the time of the SAPE Mission and is expected to be closed in a couple of months. Most of the subprojects under Part A were completed before the original project closing date, but there have been delays of 1–2 years in completing Part B and Part C.

24. **Preliminary Assessment the of Project's Likely Outcomes.** The Project was designed in parallel with reform initiatives in the west zone to put the distribution operations of BPDB into a separate company and was relevant to the continuing national reform efforts. The reforms have been partially successful in that the West Zone Power Distribution Company (WZPDC) is operational, but its performance has been mixed. Initial improvements in financial performance have not been sustained, there have been numerous changes in management, separating the operations of WZPDC from those of the PBSs is not complete, and BPDB continues to exercise much influence over the company. However, the PGCB component of extending and improving the 230 kV transmission network to the west zone has been successfully completed.

The Project is relevant to the overall sector development objectives of commercialization and is effective and efficient in achieving most of the intended outcomes. However, its sustainability is questionable due to the institutional weakness of WZPDC. The physical investments have been



completed with some minor changes and there have been savings from the cost estimates at appraisal. The Mission concludes that the Project is relevant, effective, efficient, but less likely to be sustainable. With substantial impacts and overall, the Project is “successful.”

### 3. Loan 1942(SF)/1943-BAN: Dhaka Clean Fuel

	1942(SF)	1943
Date Approved		26 Nov 2002
Date Effective		17 Dec 2003
Date Closed	31 Dec 2009 (expected)	30 Jun 2008
Approved Amount	\$42,400,000	\$30,200,000
Disbursed Amount	\$11,516,866 (as of 22 Apr 2009)	\$29,982,575 (as of 22 Apr 2009)
Executing Agency	Part A: Gas Transmission Company Limited (GTCL) Part B: TGTDCCL Part C: Rupantarita Prakritik Gas Company, Limited (RPGCL) Part D: RPGCL Part E: RPGCL Part F: GTCL	

25. **Project Objectives.** The Project will (i) develop domestic natural gas resources to be used as substitute for imported liquid fuels for the transport sector, and thus improve the foreign exchange position of the country; (ii) improve the ambient air quality in Dhaka; and (iii) establish the foundation for private sector participation in the future development of CNG-fueled transport.

26. **Project Components.** The Project has six components. Parts A and F(i) of the Project will be executed by GTCL; Parts B and F(ii) by TGTDCCL; and Parts C, D, E, and F(iii) by RPGCL.

- (i) Part A: Construction of a 60 km 20-inch natural gas transmission pipeline between Dhanua and Aminbazar, Savar; and two city gate stations (CGSs) at Ashulia and Savar.
- (ii) Part B: Construction of 97 km of 16-inch extended natural gas distribution pipelines in Dhaka.
- (iii) Part C: Establishment of 3 major compressed natural gas (CNG) filling stations just outside Dhaka, 3 major filling stations along the Dhaka-Chittagong highway for buses and trucks, and 20 minor filling stations in Dhaka for cars and auto rickshaws.
- (iv) Part D: Purchase of 300 CNG-fueled buses, 2,000 CNG-fueled four-stroke auto rickshaws, and CNG conversion kits for 10,000 petrol cars owned wholly or partly by the Government and by private owners.
- (v) Part E: Establishment of three new workshops to increase the capacity to convert petrol-fueled to CNG-fueled cars, handle repair and maintenance, as well as act as referral workshops for workshops to be established by the private sector.
- (vi) Part F: Capacity building in the following areas: (a) technology development and training for the workshops; (b) implementation of new safety codes, standards, and regulations related to conversion and the use of CNG equipment for the transport sector; (c) public consultation and awareness campaign regarding public safety and benefits of using CNG; and (d) environmental management.

27. **Implementation Progress.** There was an initial delay of about a year in loan effectiveness due to non-approval of the Project pro forma for the RPGCL component, which

included the procurement of 200 CNG-fueled buses for the Bangladesh Road Transport Corporation (BRTC). The protracted negotiations of the terms of the financing arrangements stalled the signing of the subsidiary loan agreements. In October 2004 the Government requested the restructuring of the scope of the Project due to (i) the reluctance of banks to relend to BRTC; (ii) substantial development in the private sector in installing CNG filling stations and conversion workshops, and import of CNG-fueled buses; (iii) enforcement of a total ban on 2-stroke three wheelers; and (iv) the Government's reduction of relending rates. Salient features of the restructuring included the (i) procurement directly by the private sector of CNG filling stations with capacity of 500 cm/hour to be installed along highways leading to Dhaka, and (ii) cancellation of the procurement of the 4-stroke three-wheeled vehicles. Consequently, \$28,993,464.70 was cancelled from the loan amount. The works under the GTCL component (Parts A and F) were completed by the loan closing date of 30 June 2008. Most of the TGTDC component (Part B) was completed without delay. At the request of the Government, the loan closing for Loan 1942 was extended to 31 December 2009 to allow RPGCL to complete its project components.

28. **Preliminary Assessment of the Project.** The SAPE Mission considers the loan as highly relevant in that it developed a new market for natural gas with substantial private sector involvement while significantly improving air quality in Dhaka. The loan appears to be efficient and highly effective while producing sustainable benefits, which had a high impact on air quality improvement and savings of foreign currency spent for imports of liquid fuel. The overall rating of the Project is "highly successful."

**4. Loan 2038-BAN: Power Sector Development Program (Program)  
Loan 2039-BAN: Power Sector Development Program (Project)**

	<b>L 2038 (Program)</b>	<b>L 2039 (Project)</b>
Date Approved		10 Dec 2003
Date Effective		2 Aug 2004
Date Closed	13 Dec 2005	30 Jun 2010 (expected)
Approved Amount	\$100,000,000	\$186,000,000
Disbursed Amount	\$100,000,000	\$139,203,143 (as of 24 April 2009)
Executing Agency	MOF and MPEMR	Part A: BPDB/EGCB Part B: PGCB Part C: BPDB/NWZPDC
Subsector	Transmission and Distribution	

29. **Project Loan Objectives.** The objective is to improve the quality of electricity supply by (i) improving peak load generation capacity to reduce load shedding, (ii) introducing competition in generation by investing in a new NLDC, (iii) improving network reliability, and (iv) increasing access to electricity services by upgrading and new investments in 10 towns in the northwest of Bangladesh. This support will further boost the restructuring of the sector by transferring the operation of urban distribution in northwest Bangladesh from BPDB to North West Zone Power Distribution Company (being created) and reduce losses and extend the electricity supply to urban households and the commercial sector.

30. **Program Loan Objectives.** The objective is to support the Government's efforts to reform the power sector through the financial stabilization of two major transmission and distribution companies (PGCB and DESCO), and partially BPDB and DESA by settling the outstanding dues of the Government and its semi-autonomous and autonomous bodies to the power sector. These actions are expected to prepare the sector for long-term financial sustainability and gradually relieve the Government of financial support for the sector.

31. **Project Loan Components.** The Project has three components.
- (i) Part A: Construction of 2 x 100 MW peaking power generation capacity at Siddhirganj near Dhaka.
  - (ii) Part B: Construction of a national load dispatch center at Rampura in Dhaka.
  - (iii) Part C: Renovation, upgrading, and extension of distribution in Rajshahi, Serajgonj, Bogra, Pabna, Rangpur, Dinajpur, Joypurhat, Thakurgaon, Nilphamari, and Gaibanda towns in northwest Bangladesh.
32. **Implementation Progress (Project Loan).** Part A: An implementation delay of 2 years is experienced due to delays caused by the contractor. The power plants are expected to be commissioned in the the third quarter of 2009. Part B: The contract for the load dispatch center was signed in December 2005 and commissioning is expected by April 2010. Part C: all procurement has been completed and construction work is ongoing.
33. **Preliminary Assessment of the Project Loan.** Although the proposed investments in power plants under the Project are relevant at the time of approval, they are likely to be less efficient due to their likely use for baseload power generation. However, the construction of the peaking power plant and rehabilitation of the distribution network have been effectively carried out. The institutional sustainability of the Project is affected due to lack of progress in NWPDC and the commercializing of the generation plants of BPDB. However, the Project-financed investments to expand the power distribution network in the northwest, and the generation assets are likely to be sustainable as BPDB is likely to be restructured and appropriate corporate institutions are going to be established to operate the Project-financed assets. Hence the Project is assessed as relevant, less efficient, effective, likely to be sustainable with substantial impacts. The overall rating of the Project is “likely to be successful.”
34. **Assessment of Program Loan at Completion.** Although the Program loan is relevant in maintaining the reform momentum, it is less effective in terms of corporatizing the northwest power distribution operation of BPDB, obtaining firm commitment from the Government regarding the restructuring of the remaining operations of BPDB, and of making BERC operational (i.e., this was subsequently achieved under Program Loan 2334). The Program loan is effective in addressing the persistent account receivables from public sector entities to the power sector and transferring the Gulshan circle from DESA to DESCO. Hence, the Program loan is rated as relevant, less effective, efficient, and likely to be sustainable (i.e. as the intended reforms of the Program loan were carried out to meet the conditions for subsequent ADB program loans), but with modest impacts. The overall rating of the Program loan is “partly successful.”

## 5. Loan 2188/2189(SF)-BAN: Gas Transmission and Development

	L 2188	L 2189(SF)
Date Approved		27 Oct 2005
Date Effective		28 Nov 2006
Date Closed		31 Dec 2010 (expected)
Approved Amount	\$225,000,000	\$5,000,000
Disbursed Amount	\$19,930,099	\$0
Executing Agency	Part A: Gas Transmission Company Limited (GTCL) Part B: Bangladesh Gas Fields Company Limited (BGFCL), and Sylhet Gas Fields Limited (SGFL) Part C: Pashchimanchal Gas Company Limited (PGCL) Part D: Petrobangla Bangladesh Petroleum Exploration and Production Company Limited	

35. **Project Objectives.** The Project will support economic growth by helping Bangladesh meet its gas requirements. The Project is also expected to enhance the role of the private sector in natural gas-related activities including (i) upstream gas development; (ii) gas transmission and distribution; and (iii) metering, audit, and operation and maintenance activities.

36. **Project Components.** The Project has the following components.

- (i) Part A: Gas transmission implemented by GTCL. This part involves construction of transmission pipelines in various locations and installation of compressors at Muchai and Ashuganj (south) with throughputs of 370–890 MMCFD.
- (ii) Part B: Field appraisal being implemented by BGFCL and SGFL. Five producing gas fields will be appraised. The three-dimensional survey is expected to result in upgrading the estimates of reserves. No new exploration activities are involved.
- (iii) Part C: Rajshahi area gas distribution implemented by PGCL. Involves the construction of a gas distribution network in the Rajshahi area.
- (iv) Part D: Capacity building implemented by Petrobangla/BAPEX<sup>42</sup>(BAPEX)/TGTDCL/EMRD. To strengthen the policy-making capabilities of the Energy and Mineral Resource Division (EMRD), training will be carried out for EMRD and Petrobangla and its companies on corporate governance, financial management, e-governance, and gas system management. In addition, this component will support the implementation of the gas sector system loss reduction plan.

37. **Implementation Progress.** Implementation is 1 year behind schedule due to start-up delays (such as loan signing, loan effectiveness, rebidding partly due to the EA's lack of experience). Price proposals received for some components of Part A were higher than the estimated cost. Out of 41 procurement packages under Part A, 13 contracts have been awarded. Procurement of equipment for the 3-D seismic survey was completed in August 2008. BGFCL and SGFL expect completion of field operation works for Part B by December 2011. Completion of the gas distribution network under Part C is expected by December 2010. Part D (capacity building) is expected to be completed by June 2010. Upgrade of the Data Center of BAPEX under Part D is expected to be completed by June 2010, while TGTDCL expects to complete the implementation of the system loss reduction plan by May 2010.

38. **Preliminary Assessment of the Project.** The Project is relevant to the development of the gas sector in western Bangladesh, provided that further gas resources are found. The prevailing gas shortages are likely to impact on the economic efficiency of the Project as some of the expected benefits are not likely to be immediately realized. However, over a period of time with the increased production of gas, there should be adequate gas supplies to effectively utilize the gas pipelines to be built under the project. The SAPE Mission learned that adequate funding had not been allocated to the urgently required compressor stations. As a result, this important component was cancelled. Although the Project is not yet complete, the preliminary assessment is that it is likely to be efficient, effective, and sustainable. Hence the overall assessment is that the Project is likely to be "successful."

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<sup>42</sup> Bangladesh Petroleum Exploration Company

**6. Loan 2332/2333-BAN: Sustainable Power Sector Development Project  
Loan 2334-BAN: Sustainable Power Sector Development Program**

	L 2332	L 2333(SF)	L 2334 (SF)
Date Approved		26 Jun 2007	
Date Effective		24 Sep 2007	
Date Closed	30 Jun 2010 (expected)		16 Jun 2008
Approved Amount	\$400,000,000	\$5,000,000	\$60,000,000
Disbursed Amount	\$33,223,610	\$0	\$63,997,158
PPTA			
Attached ADTA			
Executing Agency	Part A: Bangladesh Power Development Board (BPDB)/North West Power Generation Company Limited (NWPGC) Part B: Power Grid Company of Bangladesh Limited (PGCB) Part C: Dhaka Power Distribution Company Limited (DPDC) Part D: Dhaka Electric Supply Company Limited (DESCO) Part E: Power Division of MPEMR		Finance Division of the Ministry of Finance (MOF) and the Power Division of the Ministry of Power, Energy and Mineral Resources (MPEMR)

39. **Project Loan Objectives.** The objective is to expand the capacity for clean-fuel power generation and for improved efficiency in transmission and distribution systems by (i) increasing peak load generation capacity using clean natural gas, and (ii) augmenting and expanding transmission and distribution systems to improve network efficiency and reliability. This support will 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.

40. **Program Loan Objectives.** The Program loan was designed to help the Government and agencies settle their outstanding dues to power sector entities. It was released in two equal tranches of \$50 million, subject to policy initiatives concerning tariffs, competitive generation, and independent regulation being taken by the Government.

41. **Project Loan Components.** The Project loan had five components.

- (i) Part A: Clean energy capacity expansion involves the construction of two new 150 MW natural gas-fired turbine peaking power plants, in Shirajganj and Khulna.
- (ii) Part B: Transmission system efficiency improvements involve the construction of 400 kV overhead transmission lines and 132 kV transmission lines, and improvements on the 230 kV transmission system.
- (iii) Part C: Distribution system efficiency improvements in DESA area involve construction of new substations; reinforcement, renovation, and augmentation of existing substations; installation of transformers and associated equipment; and upgrading of the Shyampur Bangladesh Small and Cottage Industries Corporation 11 kV switching station.
- (iv) Part D: Distribution system efficiency improvements in DESCO area include upgrading and expanding distribution systems.
- (v) Part E: Capacity development.

42. **Implementation Progress (Program Loan).** The first tranche of SDR20,225,000 was released on 26 September 2007 upon compliance of the Government and sector entities with the conditions for its release. The second tranche of the same amount was released on 16 June 2008. The loan conditionalities that had been fully complied with as of May 2008 follow.

- (i) Appointment of the remaining Bangladesh Energy Regulatory Commission (BERC) Commissioners.
- (ii) Gazette notification of the electricity generation tariff regulations along with the tariff-setting mechanism as finalized by BERC.
- (iii) Approval by the Government of the financing restructuring plan for BPDB and DESA.
- (iv) Budget allocation of at least another Tk1.8 billion by the Ministry of Finance for provision of unfunded pension and gratuities for newly corporatized entities including EGCB and Dhaka Power Distribution Company Limited (DPDC).
- (v) Initial off-loading of Power Grid Company of Bangladesh Limited and DESCO shares in the stock market.

423. **Preliminary Assessment of the Project Loan.** Although the power generation component of the Project is likely to be less efficient as it is supporting an inefficient technology, the Project as a whole is “likely to be successful.”

434. **Assessment of the Program Loan.** The conditions on the Program loan were beneficial in carrying aspects of the reform program forward, for example, in selling shares of DESCO and PGCB; and making BERC operational and carrying out further restructuring. Hence, the Program loan is relevant and effective in maintaining the reform momentum, and reforms achieved under the Program loan are “successful” with substantial impacts (i.e., making BERC functional, establishment of DPDC, reduction of Government receivables to the power sector, listing of PGCB and DESCO, and obtaining a commitment from the Government for comprehensive institutional and financial restructuring of BPDB).

45. Table A4 summarizes the ratings for the lending portfolio.

**Table A4: Summary Ratings for the Lending Portfolio, 1993–2008**

Loan No.	Project Name <sup>a</sup>	Loan Approval – Loan Closure	Amount (\$ M)	Bottom-Up Assessment					Overall Rating
				Relevance	Effectiveness	Efficiency	Sustainability	Impact	
<b>Energy</b>									
1293	Third Natural Gas	Dec 93–Oct 03	107.00	Highly relevant	Effective	Efficient	Likely	Substantial	<b>Successful</b>
1356	Rural Electrification	May 95–Jun 2000	50.0	Relevant	Effective	Efficient	Likely	Substantial	<b>Successful</b>
1505	Ninth Power	Dec 96–Jul 04	134.0	Relevant	Effective	Efficient	Likely	Substantial	<b>Successful</b>
1730/31	Dhaka Power System Upgrade	Dec-99–Jun 09	157.0	Relevant	Effective	Efficient	Likely	Substantial	<b>Successful</b>
1793	AES Meghnaghat Power	Dec 2000–Apr 04	50.0	Highly relevant	Highly effective	Efficient	Likely	High	<b>Successful</b>
1884/85	West Zone Power System Development	Dec 01–Sep 09	198.9	Relevant	Effective	Efficient	Likely	Substantial	<b>Successful</b>
1942/43	Dhaka Clean Fuel	Nov 02–Dec 09	72.6	Highly Relevant	Highly effective	Efficient	Likely	High	<b>Highly successful</b>
2038	Power System Development Program	Dec 03–Dec 05	100.0	Relevant	Less effective	Efficient	Likely	Modest	<b>Partly successful</b>
2039	Power System Development Project	Dec 03–Jun 10	186.0	Relevant	Effective	Less efficient	Likely	Substantial	<b>Successful</b>
2188/89	Gas Transmission and Development	Oct 05 ( approval)	235.0	Relevant	Likely to be effective	Likely to be efficient	Likely to be sustainable.	Not rated	<b>Likely to be successful</b>
2332/33	Sustainable Power Sector Development Project	Jun 07( approval)	405.0	Highly relevant	Likely to be effective	Likely to be less efficient	Likely to be sustainable	Not rated	<b>Likely to be successful</b>
2334	Sustainable Power Sector Development Program	Jun 07–un 08	60.0	Highly relevant	Effective	Efficient	Likely	Substantial	<b>Successful</b>
<b>Overall Bottom-Up Ratings for Energy Sector Program Implemented during 1999–2008</b>			<b>1,705.5</b>	<b>Highly Relevant (High Side)</b>	<b>Effective</b>	<b>Efficient</b>	<b>Likely</b>	<b>Substantial</b>	<b>Successful</b>

## **ADB TECHNICAL ASSISTANCE TO THE BANGLADESH ENERGY SECTOR**

### **1. TA 2024-BAN: Preparation of a Gas System Development Plan and Strengthening of the Organizational and Regulatory Framework for the Oil and Gas Sector**

1. The technical assistance (TA) was approved in December 1993 and completed in May 1999. It cost \$565,000. Its objectives were to prepare a gas system development plan covering gas production, transmission, and distribution systems; and to strengthen the organizational and regulatory framework for the oil and gas sector. The TA enabled the Government to plan gas infrastructure projects and identify alternative development scenarios depending on such factors as the discovery of additional gas reserves, potential for gas exports, producer and consumer pricing of gas, and planned infrastructure projects such as the Jamuna Bridge. The TA recommended the development of an appropriate gas pricing system to make gas production, transmission, and distribution more efficient, market oriented, and financially viable.

2. Those were important priorities for the gas sector, and the project completion report (PCR) of the associated loan rates the TA as generally successful. The TA provided the targeted outputs by (i) preparing a long-term gas system development plan; and (ii) making recommendations for strengthening the regulatory functions of the Government, rationalizing gas prices, and defining the role of Petrobangla to meet the challenges of the anticipated increase in private sector investment in the gas sector, particularly in gas exploration and production. The Mission concurs with the view that the TA was “successful.”

### **2. TA 2025-BAN: Safety and Efficiency Improvements in the Gas Sector**

3. The TA was approved in December 1993 and completed in May 2009. It cost \$492,000. The objective was to assist Titas Gas Transmission and Distribution Company Limited (TGTDC), Bakhrabad Gas Systems Limited (BGSL), and Jalalabad Gas Transmission and Distribution System Limited (JGTDSL) to improve the safety and efficiency of their gas distribution systems, and to implement a system loss reduction plan to reduce and/or maintain unaccounted-for gas to below 2% of purchases. The improvements covered the design, construction, operation, maintenance, testing, protection, and inspection of the gas distribution facilities. The consultants provided the companies with advice, training, and support in planning.

4. The TA fitted well with the Asian Development Bank’s (ADB) objectives of improving commercial performance in the gas sector by reducing gas losses. The PCR of the associated loan rates the TA as generally successful. The TA produced the targeted outputs by providing (i) the executing agencies (EAs) with the expertise to make comprehensive safety and efficiency improvements to the gas networks, (ii) assistance to TGTDC in implementing its system loss reduction plan, and (iii) recommendations for maintaining the system losses of the EAs within acceptable limits. The Mission concurs with the view that the TA was “successful.”

### **3. TA 2338-BAN: Solicitation for Private Sector Implementation of the Meghnaghat Power**

5. The TA was approved in May 1995 and closed in February. It cost \$598,000, following a series of additional approvals to an initial budget of \$211,000. The TA helped the Bangladesh Power Development Board (BPDB) to implement the Meghnaghat Project on a build-operate-own/build-operate-transfer (BOO/BOT) basis through assistance in developing procedures, guidelines, and documents for bidding, as well as in evaluating proposals. The work included (i)



identifying the framework of the bidding based on international practice, the requirements of the financial institutions, and the expectations of private sector developers, including incentives and guarantees; (ii) reviewing the relevant laws concerning production and sale of electricity, foreign private sector investments in Bangladesh, and contract and company law, and suggesting a framework for the development of the Project in consonance with these laws; (iii) recommending policy changes; and (iv) preparing the bid documents and evaluation reports at each stage of the three-stage bidding process. The process led to a contract with a private sponsor and construction of the station. The Project became operational in 2002 and has provided power at one of the lowest off-take prices in Asia.

6. The TA was highly relevant to the reform program by attracting private finance to provide urgently needed new generation capacity, and the project has performed effectively and efficiently since it was completed. The PCR rated the project as “satisfactory.” The Mission endorses this conclusion and considers the TA as vital to a highly successful project that is one of the highlights of ADB assistance to the Bangladesh power sector. The TA also provided the basis for future projects by independent power producers (IPPs); however, there have not been any successes in recent years. The TA is rated as “highly successful.”

#### **4. TA 2715-BAN: Valuation of Assets of the Dhaka Electric Supply Company**

7. The TA was approved in December 1996 and closed in June 2000. It cost \$175,000. The TA provided qualified international asset appraisers to estimate the current value of the assets proposed to be transferred by DESA to DESCO. The work included (i) reviewing the asset registers of DESA for the area; (ii) reviewing the financing of DESA's assets in the area; (iii) estimating the outstanding revenue owed to DESA by consumers for supply of electricity in the area prior to 1 July 1997; and (iv) estimating the current value of DESA's assets in the area based on asset registers, debt service liabilities, outstanding revenues due to DESA, the value of DESA's assets in the area that are not useful for service, and the value of bad/doubtful debts incurred by DESA for operations prior to 1 July 1997. The report assessed the value of DESA's assets transferred to DESCO as of 1 July 1997, based on the historical book value of assets less accumulated depreciation, and the reasons for such assessed value.

8. The TA was a necessary technical input to the separation of DESCO from DESA and hence was the first step in the reform process. As such it was relevant to the reform program. The results of the work were accepted by DESA and DESCO, and the TA was therefore successful in separating DESCO from DESA.

#### **5. TA 2800-BAN: Support for a Gas Regulatory Authority Project**

9. The TA was approved in May 1997 and closed in March 2004. Only \$126,000 was spent on the study out of a budget of \$600,000. The main objectives were to (i) assist the Government to establish the Gas Regulatory Authority (GRA) as an effective body, and (ii) transfer expertise to it to enable it to continue functioning after the withdrawal of the TA consultants. The work includes advice to GRA in (i) reviewing the development of the natural gas sector in Bangladesh in the context of issues related to the regulatory framework; (ii) establishing regulatory procedures and practices; (iii) establishing proper institutional arrangements; (iv) regulating gas pricing, taking into account parity pricing, tariffs, and subsidies; and (v) training the regulators. The TA scope was expanded in June 1998 to include assistance in drafting the Gas Law since operating the GRA requires the enactment of the Gas Act.

10. The TA was designed to support the development of a regulatory framework, which was a critical piece of the energy sector reform process. Support in preparing a Gas Act was successful and recommended a single Energy Regulatory Commission (ERC) for both power and gas, making the GRA unnecessary. The terms of reference were modified for a single ERC. However, without the formal establishment of ERC, the rest of the TA could not be continued. The TA was extended several times, with the consultants' work put on hold pending the enactment of the Gas Law and the establishment of ERC. The ERC Act was passed in March 2003 and in June 2003 the Government informed ADB that the United States Agency for International Development (USAID) would fund a comprehensive TA to provide long-term support to the new ERC. In view of these developments, ADB cancelled the remainder of the TA, with the Government's concurrence. USAID found the TA outputs very useful for its follow-up work. The TA outputs were used to set up ERC following the enactment of ERC Act 2003. The recent amendments to ERC Act 2003 should expedite the full functioning of ERC.

11. The technical assistance completion report (TCR) concludes that parts of the TA's objectives were met and the TA was partially successful. The Mission concurs with this assessment. One of the failings of the reform process in Bangladesh was the slow progress in making the energy regulator effective. This TA was not successful in accelerating that process.

#### **6. TA 3092-BAN: Developing a Policy on Private Sector Participation in Gas Transmission**

12. The TA was approved in November 1998 and closed in June 2000. It cost \$150,000. The TA aimed to assist the Government in developing a policy on private sector participation in gas transmission. This, together with the establishment of an independent GRA, would enable segregation of gas transmission from distribution and define the roles of the public and private sectors in gas transmission in Bangladesh.

13. There is no TCR and the Project seems to have achieved little. Apart from the sale of shares in the Titas gas company, there has been no progress in bringing private finance into gas transmission and distribution. Hence, the TA is rated as "unsuccessful"

#### **7. TA 3129-BAN: Support for the Energy Regulatory Authority Project**

14. The TA was approved in December 1998 and closed in September 2004. Only \$401,000 was spent out of a budget of \$900,000. The main objectives of the advisory TA were to assist the Government to establish the Energy Regulatory Authority (ERA) and ensure that the ERA has the correct structure and sufficient capacity to effectively carry out its responsibilities. The TA was divided into two phases: phase 1 provided assistance to the ERA and phase 2 planned for implementation after the ERA was established. Only phase 1 was completed. After the legislation to establish the ERC was passed, USAID agreed to fund a comprehensive TA to provide long-term support to the new ERC and ADB cancelled the remainder of the TA, with the Government's concurrence.

15. This TA was also crucial to establishing the regulatory framework for the energy sector. The TCR concludes that the TA was successful in that the phase 1 objectives were fully met and the TA provided a foundation for the subsequent work supported by USAID. However, as with the TA on gas regulation, this TA was only partially successful in that there were considerable delays in making the ERC fully operational. The TA is rated as "successful."

## **8. TA 3244-BAN: Capacity Building of Dhaka Electric Supply Co. Ltd.**

16. The TA was approved in August 1999 and closed in October 2000. Only \$60,000 was spent out of a budget of \$90,000. The TA was designed to support the start-up of DESCO by ensuring that the company had the necessary management and business systems and capacity to perform effectively. Activities included (i) preparing initial business policy statements, (ii) developing and operating information and reporting procedures and structures, (iii) developing job descriptions, (iv) proposing levels of delegation of authority, and (v) developing an outline and action program for completing a business plan.

17. The TA was small but highly relevant and effective in giving initial impetus to DESCO. The company was established under the Companies Act to ensure that it had commercial freedoms that were not available to BPDB and DESA. It was an experiment and the success of the experiment was crucial to the power sector reform process. The TA was therefore a significant contribution to the change process and was rated as "successful."

## **9. TA 3343-BAN: Corporatization of the Ashuganj Power Station**

18. The TA was approved in December 1999 and closed in June 2005. It cost \$1,000,000. The TA was intended to assist the Government and BPDB to (i) corporatize the Ashuganj Power Station (APS); (ii) introduce modern management information systems (MIS) in APS; and (iii) integrate APS into the power network as an IPP. The originally envisioned completion date was delayed for 46 months due mainly to a delay in signing the TA letter, difficulties in fielding consultants because of the strong resistance of some APS employees to corporatization, and inordinately slow progress in implementing the recommendations of the phase I report by BPDB. The delay was further aggravated by the travel restrictions imposed after 11 September 2001 and the national election in Bangladesh, requiring a break in the services of the consultants. The final TA report concluded that to ensure a successful corporatization process and efficient operations and financial standing of the company, key issues involving employee transfer, asset valuation, tariffs and legal arrangements, and MIS should be properly addressed and agreed upon by BPDB and Ashuganj Power Station Company Limited (APSCL) at an early stage. The consultants prepared a detailed plan for implementing the corporatization process and specific steps were articulated for the transitional period, which was well received by the stakeholders. The Government and BPDB accepted the TA's findings and major recommendations.

19. The TA was clearly relevant to the reform process as it was the first attempt to separate a power station from BPDB. The report provided a basis for undertaking this task, which was accepted by the Government and BPDB. However, the separation of APSCL from BPDB is still incomplete. Arrangements for the purchase power agreement (PPA) and for asset transfers have not been finalized, and APSCL is not an independent company. As such the TA has not been fully successful even though its technical objectives were met in full.

20. The TCR recommended that ADB conduct a comprehensive review of the financial and operational performance of APSCL about 3 years after TA completion. This is in accordance with the TA recommendation that the Government and BPDB need to continuously improve the financial and operational viability of APSCL. In view of the problems in achieving the final objectives of the TA, it would be appropriate to carry out this review to identify what further steps are needed to make the TA fully effective. The TA is rated as "unsuccessful" as it did not achieve the desired outcomes.

#### **10. TA 3801-BAN: Corporatization of the West Zone Distribution Operations of the Bangladesh Power Development Board**

21. The TA was approved in December 2001 and closed in October 2007. It cost \$900,000. It assisted the Government and BPDB to (i) corporatize BPDB's distribution in the west zone, (ii) introduce modern management systems in the new company, (iii) advise the new company on modernizing and upgrading the power network of Khulna city, and (iv) establish quality assurance practices in the new company for its efficient operation. The work was divided into two parts. The first covered the development of the overall approach to corporatization, the legal and accounting formalities required for the transfer of the assets and personnel of the west zone distribution system from BPDB to an independent company; detailed the operational system and the MIS required in the new company; and helped implement this corporatization. The second part comprised engineering assistance to the new company by way of developing expansion and modernization programs, preparing specifications and bid documents; assistance in bid evaluation; and improvement of operation and maintenance standards by implementing a quality assurance program, preparing manuals, and conducting training.

22. The TA covered another key task in restructuring the power sector with the separation of the first distribution area of BPDB into an independent company, the West Zone Power Distribution Company (WZPDC). As such the project was highly relevant to the reform program. There were delays in starting the project because of concerns over resistance to reform and the Government was slow to implement recommendation of the TA. However, work undertaken to a good standard by the consultants provided a sound basis for corporatization of WZPDC. The TCR concluded that the project was "successful" and the SAPE Mission agreed with this judgment. The TA provides a suitable template for the corporatization of further zones of BPDB's distribution operations. But here again there are delays in taking purposive steps toward implementation.

#### **11. TA 3978-BAN: Corporatization of the Dhaka Electric Supply Authority**

23. The TA was approved in November 2002 and closed in February 2009. It cost \$850,000. It assisted the Government and DESA with the transition from DESA to a planned new distribution company, which was taking over power distribution in the DESA franchise area. The assistance covered steps to (i) corporatize DESA, (ii) introduce a modern MIS in the new company, and (iii) integrate the new company into the power network as a distinct power distributor and define its relationship with other sector entities. The key activities included strategies for (i) evaluating assets, (ii) establishing a viable financing plan, (iii) formulating personnel policies, (iv) organizing for the transfer of assets and staff to the new company, (v) organizing the voluntary separation scheme for eligible staff of DESA, (vi) examining and organizing for sale DESA's shareholding in DESCO, and (vii) implementing financial and management information systems.

24. The project was highly relevant to the continued restructuring of the power sector. The work was carried out to a good technical standard although at various stages there were delays in taking the work forward. The formal corporatization of DESA under the Companies Act was fulfilled when the Dhaka Power Distribution Company Limited (DPDC) was registered as a company on 25 October 2005. DPDC took over responsibility for power supply in July 2008 and DESA became inactive. DPDC appears to be running well and benefiting from the technical assistance advice. Although the company is at an early stage of operations, the preliminary conclusion is that the TA has been "highly successful" both in producing sound advice and in having that advice implemented.

## **12. TA 4379-BAN: Preparing the Power Sector Development Program II**

25. The TA was approved in August 2004 with a budget of \$840,000. Its main objectives were to produce a new Power Sector Master Plan and to prepare a plan for the financial restructuring of the sector, in particular BPDB and DESA. The TA (i) supported further restructuring and deeper reforms, and provided policy advice; (ii) developed a short- to medium-term reform agenda and a long-term reform plan; (iii) proposed options for a sector structure after further unbundling BPDB and for a reconfiguration of distribution; (iv) reviewed accounts and accounting practice and prepared financial statements for BPDB and DESA for FY2004 based on international accounting standards; (v) developed a 10-year financial projection model and identified liabilities to be taken over by unbundled successor entities of BPDB; (vi) updated the 1995 Power System Master Plan to identify priority projects on the basis of least-cost analysis; (vii) undertook financial, economic, environmental, resettlement, and social analyses of selected priority projects suitable for ADB financing; (viii) assessed the reform impact on the poor and recommended mitigating measures; (ix) supported communication with stakeholders; and (x) provided continuing capacity building and training to the counterpart staff on reform-related issues.

26. The TA was a crucial next step in the overall program of sector reform and is therefore highly relevant. The work undertaken was to a generally good standard and it is showing some influence on the reform program. For example, the new Master Plan is influencing the selection of projects; and the financial restructuring plan is being taken forward with further study funded by the World Bank, which is identifying the accounting entries needed to carry out financial restructuring. However, the financiers have not expressed firm commitments to support the investment projects identified in the Master Plan, and the financial restructuring plan prepared under the TA seems to require further improvement. Hence, the TA is considered as “satisfactory.”

## **13. TA 4528-BAN: Promoting Private Sector Participation in the Energy Sector**

27. The TA was approved in December 2004 and closed in June 2008. Out of a budget of \$500,000, \$444,000 had been spent. The work is now complete although a final payment is due. The TA addressed issues constraining gas sector development and facilitating private sector participation. The key activities included (i) assessing the adequacy of the existing policy and regulatory framework for private sector participation in the gas sector; (ii) examining the corporate structure of gas-sector entities and preparing a corporate strengthening plan; (iii) analyzing the gas transmission and distribution pricing framework to evaluate how the prices reflect the size of the pipeline, volume of gas transported, distance or length of pipelines, and return on investment; (iv) examining unbundling options for gas transmission and distribution entities, identifying major issues to be addressed, and defining steps to achieve this unbundling; and (v) designing an investment package covering transmission and distribution business segments of the gas sector that would facilitate additional private sector investment.

28. The TA is clearly relevant to the reform of the gas sector and encouragement of private sector participation. The technical assistance performance report (TPR) concludes that the deliverables from the project are satisfactory. So far, however, there do not appear to have been any initiatives from the Government or Petrobangla as a result of the report. The outcome and final value of the work are therefore uncertain at this stage and it is unlikely that the TA recommendations would be implemented in the near future. Hence, the TA is rated as “partly successful.”

#### **14. TA 4626-BAN: Corporatization of the Bangladesh Power Development Board**

29. The TA was approved in December 2005 and closed in February 2009. It had a budget of \$800,000. The TA was designed to assist the Government and BPDB to (i) corporatize BPDB as a holding company, (ii) introduce appropriate financial and management systems in the new company, (iii) integrate the new company into the power sector network, and (iv) define the new company's relationship with subsidiaries and other sector entities. The work has produced an overall approach to the corporatization of BPDB, including schemes for (i) evaluating assets, (ii) establishing a viable financing plan, (iii) formulating personnel policies, (iv) organizing the transfer of assets and staff to the new company, (v) organizing the voluntary separation scheme for eligible BPDB staff, (vi) examining and organizing the sale of BPDB's shares in its subsidiary companies, and (vii) implementing MIS. There were various presentations and workshops as the work progressed and an approved final report was submitted in August 2008.

30. The work is crucial to the future progress of the reform program in the power sector. There had been opposition to corporatization and restructuring within BPDB and the establishment of new subsidiaries has proceeded very slowly. Opposition to the creation and operationalization of new generation and distribution companies continues and the reform process will only be effective once these companies are allowed to take responsibility for their planned activities. It is too early to judge whether the proposed reforms will proceed, but the report is a vital step on the path to a restructured industry. The TA is likely to provide the basis for the expected restructuring of BPDB. The TA is rated as "satisfactory."

#### **15. TA 4898-BAN: Promotion of Private Sector Participation in the Power Sector**

31. The TA was approved in December 2006 and closed in September 2008. It had a budget of \$600,000. The objective was to facilitate further private sector entries and investments, or public-private partnership (PPP) financing, for power sector projects in a flexible, efficient, and transparent manner. The existing policies for encouraging private sector investment were reviewed and proposals developed for PPPs, tailored to the local market environment. There were various workshops and reports on the project to discuss the findings.

32. The work is highly relevant to attracting additional private finance to the power sector. The report is well thought out and comprehensive, and addresses the terms of reference in full. However, it is uncertain at this stage whether the proposed new approach will be successful in attracting additional finance to the sector. Hence, the TA is rated as "partly satisfactory."

#### **16. TA 4953-BAN: Tendering Process for Independent Power Producer Plants**

33. The TA was approved in July 2007 and is still in progress. Out of a budget of \$600,000, \$210,000 has been expended to date. The objective is to help promote baseload IPPs at Shirajganj and Meghnaghat (phase 3), each with capacity of up to 450 MW. The TA is supporting the Government in the tendering process to select private sponsors through transparent international competitive bidding. The assistance involves (i) finalizing the request for proposal (RFP) to invite technical and price proposals for implementing the project on a BOO basis, (ii) issuing RFP documents and publishing the RFP notice, (iii) conducting pre-bid meetings and responding to bidders' queries on the RFP, (iv) evaluating technical and price proposals, (v) finalizing the content of the project agreements, and (vi) negotiating contracts with

the selected bidders. However, there have been several failures in the Government's attempts to attract private investors with the assistance of the TA, mainly due to lack of interest from the private sector.

334.. The TA is highly relevant to the current generation crisis in the Bangladesh power sector and could lead to the construction of a highly efficient baseload power plant, which is urgently needed. The TA also laid the foundation for Bangladesh to solicit proposals from the private sector when the investment climate improves and uncertainties with regard to gas supplies are removed. Hence, the TA is rated as “partly successful.”

35. Table A5 summarizes the details on the nonlending portfolio.

Table A5: Summary of Ratings for the Nonlending Portfolio, 1993–2008

TA No.	Project Name	Approval	Amount (\$'000)	Bottom-Up Assessment					Overall Rating
				Relevance	Effectiveness	Efficiency	Sustainability	Impact	
2024	Preparation of Gas System Development Plan and Strengthening of the Organizational and Regulatory Framework for the Oil and Gas Sector	Dec-93	577	Relevant	Effective	Efficient	Likely	Modest	Successful
2025	Safety and Efficiency Improvement of the Gas Sector	Dec-94	492	Highly relevant	Effective	Efficient	Likely	Substantial	Successful
2338	Solicitation of Private Sector Investment Proposals for Meghnaghat Power Plant	May-95	598	Highly relevant	Highly effective	Efficient	Likely	High	Highly successful
2715	Valuation of the Assets of Dhaka Electric Supply Company	Dec-96	175	Relevant	Effective	Efficient	Likely	Substantial	Successful
2800	Supporting Gas Regulatory Authority	Jun-97	600	Less relevant	Less effective	Less efficient	Less likely	Modest	Unsuccessful
3092	Developing Policy on Private Sector Participation in Gas Transmission Sector	Nov-98	150	Less relevant	Less effective	Less efficient	Unlikely	Negligible	Unsuccessful
3129	Support for the Energy Regulatory Authority	Jan-99	900	Relevant	Less effective	Efficient	Likely	Modest	Partly successful
3244	Capacity Building of the Dhaka Electric Supply Co. Ltd.	Aug-99	90	Relevant	Effective	Efficient	Likely	Substantial	Successful
3343	Corporatization of the Ashuganj Power Station	Dec-99	1,000	Relevant	Less effective	efficient	Less likely	Negligible	Unsuccessful
3801	Corporatization of the West Zone Distribution Operations of the Bangladesh Power Development Board	Dec-01	900	Relevant	Effective	Efficient	Likely	Substantial	Successful
3978	Corporatization of the Dhaka Electric Supply Authority	Nov-02	850	Relevant	Highly Effective	Efficient	Likely	High	Highly successful
4379	Power Sector Development Program III	Aug-04	840	Highly relevant	Effective	Efficient	Likely	Substantial	Successful



<b>Bottom-Up Assessment</b>									
4528	Promoting Private Sector Participation in the Energy Sector	Dec-04	500	Relevant	Effective	Efficient	Less likely	Modest	Partly successful
4626	Corporatization of the Bangladesh Power Development Board	Aug-05	800	Highly relevant	Effective	Efficient	Less likely	Substantial	Successful
4898	Promotion of Private Sector Participation in the Power Sector	Dec-06	600	Highly relevant	Effective	Efficient	Less likely	Modest	Partly successful
4953	Tendering Process for Independent Power Producers	July-07	600	Highly relevant	Effective	Efficient	Less likely	Modest	Partly successful
<b>Overall Rating of TA Assistance to Energy Sector 1993- 2008</b>				<b>Relevant</b>	<b>Effective</b>	<b>Efficient</b>	<b>Likely</b>	<b>Substantial</b>	<b>Successful</b>

Source: Independent Evaluation Department Study Team.

## MANAGEMENT RESPONSE TO THE SECTOR ASSISTANCE PROGRAM EVALUATION FOR THE ENERGY SECTOR IN BANGLADESH

On 11 November 2009, the Director General, Independent Evaluation Department, received the following response from the Managing Director General on behalf of Management:

### I. General Comments

1. We appreciate the comprehensive evaluation of ADB's assistance to the Bangladesh energy sector during the period 1993-2008 provided in the Sector Assistance Program Evaluation (SAPE). We commend IED for the in-depth analysis and the methodology used and for identifying the strengths of the ADB energy sector program and the areas needing improvement.

2. The SAPE has rated the overall energy sector program, as well as top-down and bottom-up approaches, as successful. These ratings underscore ADB's significant contributions towards improving the energy sector corporate governance and institutional reforms, expanding the coverage and access to electricity and gas networks, and increasing power generation and gas production capacity.

3. We agree that issues such as the persistent power shortages, overdependence on gas, and need for energy diversity and rationalized energy pricing require increased attention to ensure that ADB's future energy sector operations are more relevant, responsive and sustainable.

### II. Comments on Specific Recommendations and Follow-up Actions

4. **Recommendation 1: Encourage the Government to address the price subsidies in energy sector.** We agree. ADB will continue its policy dialogue with the Government on price subsidies. In this regard, we will develop an Initiating Paper on economic energy pricing to further this dialogue. The Government is already addressing economic pricing of downstream gas by developing gas pricing policy guidelines for implementation by the sector regulator, the Bangladesh Energy Regulatory Commission (BERC). The BERC has now been empowered to issue licenses to state gas sector companies and has started accepting tariff petitions filed independently by these companies. The Government needs to undertake a comprehensive energy pricing study as upstream gas pricing impacts not only downstream gas pricing but also the pricing in power and other sectors where gas is an input.

5. **Recommendation 2: Promote improvement of supply side and demand side energy efficiency.** We agree. The proposed power sector loan (expected Board consideration in 2010) will focus on power system efficiency improvements and will likely include the rehabilitation of inefficient thermal power plants, which will lead to increased thermal efficiencies and availabilities. We will engage in policy dialogue with the Government on the transfer of these plants to the recently established public sector generation companies. In addition, the related proposed project preparatory technical assistance grant will examine and

identify demand-side energy efficiency improvement components for inclusion in the proposed project scope.

6. **Recommendation 3: Increase efforts to attract new investments to power generation.** We agree. The recently concluded technical assistance for the corporatization of the Bangladesh Power Development Board (BPDB)<sup>1</sup> recommended various options for the unbundling of BPDB to improve public sector power generation operations. The most recent public sector peak load plants financed by ADB and other development partners have already been set up under separate companies. ADB will continue its policy dialogue with the Government to implement the most feasible option for the corporatization of BPDB.

7. Bangladesh already has a significant share of private sector participation in power generation with 33% of generation capacity currently owned and operated by the private sector. Private sector investment will continue to play an important role in power generation. ADB is continuing its assistance to Bangladesh through technical assistance<sup>2</sup> in creating the enabling environment and providing support for the bidding and selection of private sector investors for two base load power plants (i.e., Sirajganj and Meghnaghat Phase-3). The recent economic crisis and the political changes have delayed the bid process, but the Government is committed to bringing in the private sector to increase generation capacity. Together with other development partners, ADB will consider financing public sector baseload power generation plants using more efficient technologies to complement the on-going efforts to solicit private investments.

8. We agree that given the depletion of gas reserves, Bangladesh needs to consider options to diversify to other energy sources, including renewable energy sources and coal. The development of Bangladesh coal resources should be done in an environmentally sustainable and socially responsible manner and with the use of cleaner coal technologies in power generation.

9. **Recommendation 4: Promote regional trading in the power sector.** We agree. ADB completed a regional study on energy trade<sup>3</sup>, which recommended options for power trade between South Asian countries with hydropower potential and Bangladesh. The study also identified the related infrastructure requirements. The energy trade options recommended in the study are now being reviewed by the South Asian Association for Regional Cooperation Energy Working Group, and ADB will provide further support to take some of the priority projects forward, including projects involving Bangladesh. We will continue to assume the role of honest broker to facilitate power transmission connectivity between Bangladesh and India and other South Asian countries.

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<sup>1</sup> ADB. 2005. *Technical Assistance to Bangladesh for the Corporatization of the Bangladesh Power Development Board*. Manila (TA 4626-BAN).

<sup>2</sup> ADB. 2007. *Technical Assistance to Bangladesh for the Tendering Process for Independent Power Producer Plants*. Manila (TA 4953-BAN).

<sup>3</sup> ADB. 2006. *Technical Assistance for Preparing the Energy Sector Dialogue and South Asian Association for Regional Cooperation Energy Center Capacity Development Project*. Manila (TA 6368-REG).

## **DEVELOPMENT EFFECTIVENESS COMMITTEE (DEC)**

### **Chair's Summary of the Committee Discussion on 17 November 2009**

#### **COUNTRY ASSISTANCE PROGRAM EVALUATION FOR BANGLADESH**

- a) Sector Assistance Program Evaluation for the Urban Sector and Water Supply and Sanitation in Bangladesh**
- b) Sector Assistance Program Evaluation - Bangladesh: Energy Sector**

1. Management welcomed the comprehensive country assistance program evaluation (CAPE) for Bangladesh, which was prepared by the Independent Evaluation Department (IED) in close consultation with key stakeholders within and outside ADB to provide feedback to the preparation of the next country partnership strategy (CPS) for Bangladesh and related ADB operations. Director General, SARD expressed appreciation on the CAPE's overall assessment that ADB's assistance to Bangladesh for the period 1999-2008 was successful, and in particular, for the recognition of ADB's achievements in key sectors like energy and education.

2. Management raised concerns on some of the findings of the CAPE and the two sector assistance program evaluations (SAPEs), on which DEC members expressed their own views and IED provided clarifications.

#### **Evaluation methodology**

3. Director General, SARD was concerned that the CAPE's assessment of some ongoing operations in the agriculture and natural resources sectors and governance reform program loan appeared to be too definitive. It would be premature to draw any conclusion on the projects' development impact. Director, OED1 explained that the methodology applied to all CAPEs includes looking at ongoing portfolio in order to make evaluations forward-looking. As an early warning tool, such approach helps in identifying risks to success. The methodology does not mean to pre-judge the success of an ongoing project but certainly provides real-time feedback to Management, on the likelihood of project success. Implementation issues are best resolved, before it is too late. The methodology used in preparing the CAPE was similar to that used for India, Sri Lanka and Nepal, amongst others.

#### **Joint evaluation**

4. One DEC member noted that the CAPE did not refer to the fact mentioned in the SAPE on Urban Development and Water Supply and Sanitation that there had been originally a joint country evaluation initiative with the World Bank, Japanese Government, and the United Kingdom Department for International Development (DFID). The member recommended that IED should pursue more joint evaluations at the country, sector and project levels with other development partners (DPs), and especially when DPs have earlier signed up to joint strategic frameworks, such as in the case of Bangladesh. IED mentioned that from its side, the IED had delivered on the joint evaluation agreements made with the evaluation partners (e.g. two sector level assessments) but that there had been special circumstances which had prevented the completion of a full joint country evaluation. First, delays had been encountered as a result of the Caretaker Government's wish to postpone the evaluation. Then, the differing time frames of the country strategies of some of the DPs (however, not ADB) had made them to decide to go ahead on their own.

5. Director General, SARD noted that the findings of a joint evaluation could have meaningfully evaluated the formulation of a common country results framework. This in turn could have reviewed the preparation of individual country strategies of DPs. Country Director, BRM reported that 17 development partners have recently signed a statement of intent to prepare a joint cooperation strategy. The various evaluation initiatives undertaken by the evaluation partners in the context of the joint evaluation initiative have helped in this process, although they do not amount to a full joint country evaluation. IED staff informed the meeting that a paper on donor harmonization and alignment has been prepared jointly by the World Bank, DFID and ADB, which would be useful for all DPs and the Government.

### **Sector focus**

6. DEC members suggested that ADB should engage in fewer sectors and subsectors in Bangladesh, and maintain its current focus on financing projects and programs for infrastructure development, education, governance reform, including anti-corruption initiatives, and gender mainstreaming. Director General, SARD, expressed the view that ADB should also remain selectively engaged in urban primary health, small- and medium-size enterprises, and financial sector, given the Bank's successful track record in these areas, and the high potential for job creation and poverty reduction of ADB's assistance in these areas. However, the question remained as to whether ADB should be spreading its sector coverage. Country Director, BRM noted Management's concurrence with IED's recommendation to mainstream disaster risk management (DRM). There have been ongoing efforts for DRM in line with ADB's policy to mainstream climate change in its operations. Further, DRM has been embedded in the design and implementation of projects in Bangladesh for quite some time.

### **Sustainability**

7. DEC members were concerned about the long-term sustainability of the outputs and outcomes of the ADB program in Bangladesh. One DEC member cited, as an example, ADB programs on energy and urban development being rated successful but less sustainable. Director General, SARD discussed ongoing efforts by ADB to address regulatory and capacity issues, and improvements to institutional frameworks. Country Director, BRM, explained that it is essential for ADB to remain engaged in policy dialogue, maintain a long-term presence and pursue investments in the sectors, which was in line with the CAPE recommendation. There are adequate resources (including administrative resources) for ADB's efforts in achieving better sustainability. Director, SAUD suggested that evaluation of the sustainability of urban development operations should look at the long term. Although such operations were not fully sustainable as yet, the situation was much better now than before.

8. On portfolio performance in general, Director General, SARD mentioned the use of country-based project readiness filters to address issues relating to start-up and implementation delays, and increased delegation of procurement and disbursement functions to the resident mission. The Government has also launched a number of initiatives to streamline its business processes.

### **Private sector operations**

9. One DEC member noted the CAPE's recommendation to support private sector-led economic growth, and inquired about the role of the Private Sector Operations Department (PSOD) in implementing the recommendation. Director General, SARD indicated that with the establishment of the coordinating unit in PSOD, there has been closer coordination between

PSOD and regional departments. Country Director, BRM informed that a comprehensive private sector assessment for the next country strategy paper is already under discussion with PSOD. Director, SAEN described how private investments in Bangladesh had not come in the manner expected due to changes in the government and economic climate, and uncertainty of gas supply situation in recent years. ADB and World Bank have been working together with the government in order to attract private investments through projects involving independent power producers.

## **Conclusions**

10. DEC welcomed the CAPE and the two SAPE reports. DEC noted with satisfaction that ADB's program in Bangladesh has generally been consistent with the country's development strategy. DEC also noted Management's concurrence with IED's recommendations.
11. On the evaluation of ongoing projects, DEC welcomed the real-time feedback from IED and hoped that corrective actions taken by Management would result in much better evaluation ratings once the projects are completed.
12. DEC welcomed joint evaluations of programs and projects as and when there would be enough commonality of interest and involvement among various donors.
13. DEC emphasized the need for mainstreaming disaster risk management and improving project implementation.

**Ashok K. Lahiri**  
Chair, Development Effectiveness Committee