



Asian Development Bank

Work in Progress: Not for Quotation

Title: **Sector Assistance Program Evaluation of ADB Assistance to the Bangladesh Energy Sector—Evaluation Approach Paper**

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A. Background

1. Bangladesh Energy Sector Outlook

1. The availability and access to reliable and affordable commercial energy sources has been identified as a prerequisite for achieving the socio economic development goals of Bangladesh including the inclusive and sustainable economic growth and poverty reduction. The strategic goals of the government for the sector development are (i) providing adequate and reliable energy resources to all; (ii) ensuring energy security through diversified and sustainable sources of energy; (iii) promoting rational and efficient use of energy; (iv) improving sector management and performance; and (v) mobilizing private sector participation and investments in the sector.

2. The Energy and Mineral Resource Division (EMRD) and the Power Division (PD) of the Ministry of Power, Energy and Mines (MPEMR) are responsible for the overall sector policy formulation, investment decisions and regulation of natural gas and power sectors respectively. The EMRD is also responsible for developing the coal sector to diversify the energy supply and improve energy security. The Bangladesh Energy Regulatory Commission (BERC) was set up in 2004 and its mandate include (i) setting electricity and gas prices; (ii) setting performance norms to sector entities; (iii) review and approve long term development plans for the gas and power sectors; and (iv) dispute resolution among sector entities.

2. Gas Sector Overview

3. Bangladesh is highly dependent on indigenous natural gas for its primary energy supply as well for power generation. Approximately 75% of Bangladesh's commercial energy supply is provided by indigenous natural gas resources and imported oil provides the balance. Natural gas contributes to over 89% of power generation capacity and approximately 41% of natural gas production is used for centralized power generation while fertilizer (18%), industry (14%) and commercial/households (12%) and captive power generation (12%) are the other major consumers of natural gas. The total natural gas consumption in Bangladesh reached 525 billion cubic feet (BCF) in 2006 and it is projected that gas consumption will reach 1,000 BCF by 2016.

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The proven and probable remaining gas reserves in Bangladesh is 14 trillion cubic feet (TCF) and at the current level of consumption, Bangladesh is likely to exhaust its gas reserves by 2025–2030.

4. The Bangladesh Oil, Gas and Mineral Corporation (Peterobangla) was created in 1972 as a state agency for oil and gas sector development. In 1989 the government unbundled the gas sector by creating separate subsidiaries of Peterobanlga under the Company's Act for exploration, drilling, production, transmission and distribution of gas. This includes (i) Bangladesh Petroleum Exploration Company (BAPEX) responsible for exploration and drilling; (ii) Sylhet Gas Fields Limited (SGFL) and Bangladesh Gas Field Company Ltd. (BGFCL) responsible for gas production in several gas fields; and (iii) Barktabad Gas System Ltd (BGPL), Titas Gas Transmission and Distribution Company (TGTDC) and Jalalabad Gas Transmission and Distribution Systems Ltd. (JGTDSL) for gas distribution in several franchise areas. Bangladesh Gas Transmission Company (BGTC) was set up to construct and operate the main gas pipeline from the gas fields in the eastern part of the country to central Dhaka.

3. **Power Sector Overview**

5. Although Bangladesh has achieved significant improvement in the operational performance of power sector entities during last decade, the electrification rate is below 40% and per capita consumption of electricity at 160 kilowatt per hour (kWh) is among the lowest in Asia. The country's dependable power capacity is 4,120 megawatts (MW), while the peak demand is 5,000 MW and suffers from extensive load shedding during the peak times and over 5,500 MW of new generation capacity is required to be commissioned by 2015 to meet the expected increase in demand for electricity. Bangladesh had been reasonably successful in attracting private sector for power generation in the past with installed capacity of independent power producers (IPPs) being equal to 1,330 MW.

6. Until 1998, Bangladesh Power Development Board (BPDB) was responsible for power generation, transmission and distribution in urban areas outside Dhaka. Dhaka Electricity Supply Authority (DESA) was responsible for power distribution in greater Dhaka area. The rural electricity cooperatives under the overall supervision of Rural Electricity Board are managing the power distribution in rural areas and they have achieved better service quality and financial performance than BPDB and DESA. Both BPDB and DESA have been performing poorly with high power systems losses, poor staff incentives and staff morale, high level of receivables and operating losses. The sector as a whole suffers from badly designed tariff with end user tariffs set at below cost recovery and with distorted transfer pricing between sector entities.

7. The government with the assistance of the donors has undertaken far reaching sector reform process since 2000 to improve the management/financial performance of the sector entities and attract investments to the sector. The Power Grid Company of Bangladesh (PGCB) which is responsible for operating the power transmission network and Dhaka Electricity Supply Company (DESCO) which manages the distribution network in parts of Dhaka were set up in 1996 under the Companies Act 1994 by transferring assets and operations from BPDB and DESA respectively. The West Zone Power Distribution Company (WZPDC) was created in 2003 to take over the power distribution in the western zone of the country. The Dhaka Power Distribution Company (DPDC) was corporatized in October 2005 to take over DESA's distribution assets outside the franchise area of DESCO. It is intended to create three more distribution companies to take over the reaming power distribution operations of BPDB and three generation companies to take over the generation assets of BPDB. The newly set up companies (PGCB and DESCO) have achieved a marked improvement in the performance with

respect to reduction of the power losses and consumer receivables, achieving financial viability and in creating more responsive and accountable cooperate culture. The government has also taken measures in 2007 to address the institutional issues that prevented the effective functioning of BERC (Bangladesh Energy Regulatory Commission)

B. ADB's Operational Strategy and Assistance to the Energy Sector of Bangladesh

8. For the period 1993–2008 16 public sector loans, one private sector loan, and one grant for 10 projects to the energy sector of Bangladesh were approved. The total project assistance for the nine year period was around \$1,754.6 million (Table 1). During the same period eight advisory technical assistance grants totaling \$5.3 million and three project preparatory technical assistance grants for a total of \$1.9 million were approved (Table 2).

**Table 1: ADB Loans to the Energy Sector
1993–2008**

Loan Number	Project Name	Fund Type	Amount \$ million	Date Approved
Conventional Energy Generation (other than hydropower)				
1293	Third Natural Gas Development	ADF	107.000	21 Dec 1993
1942	Dhaka Clean Fuel	ADF	42.400	26 Nov 2002
1943	Dhaka Clean Fuel	OCR	30.200	26 Nov 2002
7165/1793	AES Meghnaghat Power	NS	50.000	5 Dec 2000
Subtotal			229.600	
Energy Sector Development				
2188	Gas Transmission and Development	OCR	225.000	27 Oct 2005
2189	Gas Transmission and Development	ADF	5.000	27 Oct 2005
0019	Capacity Building of Gas Transmission and Development	Grant	5.000	27 Oct 2005
2332	Sustainable Power Sector Development Program (Project)	OCR	400.000	26 Jun 2007
2333	Sustainable Power Sector Development Program (Project)	ADF	5.000	26 Jun 2007
2334	Sustainable Power Sector Development Program (Program)	ADF	60.000	26 Jun 2007
Subtotal			700.000	
Transmission and Distribution				
1356	Rural Electrification	ADF	50.000	30 May 1995
1505	Ninth Power	ADF	134.000	18-Dec 1996
1730	Dhaka Power Systems Upgrade	ADF	75.000	21 Dec 1999
1731	Dhaka Power Systems Upgrade	OCR	82.000	21 Dec 1999
1884	West Zone Power System Development	ADF	60.200	17 Dec 2001
1885	West Zone Power System Development	OCR	138.700	17 Dec 2001
2038	Power Sector Development Program (Program)	OCR	100.000	10 Dec 2003
2039	Power Sector Development Program (Project)	OCR	186.000	10 Dec 2003
Subtotal			825.900	
TOTAL			1,754.600	

ADF = Asian Development Fund, NS = nonsovereign, OCR = ordinary capital resources.
Source: Asian Development Bank Database.

**Table 2: Technical Assistance Grants to the Energy Sector
1999–2008**

TA Number	Project Name	Amount(\$)	Date Approved
ADVISORY TECHNICAL ASSISTANCE			
Conventional Energy Generation (other than hydropower)			
4953	Tendering Process for Independent Power Producer Plants	600,000	16 Jul 2007
Energy Sector Development			
3244	Capacity Building of the Dhaka Electric Supply Co. Ltd.	90,000	20 Aug 1999
4528	Promoting Private Sector Participation in the Energy Sector	500,000	23 Dec 2004
4626	Corporatization of the Bangladesh Power Development Board	800,000	2 Aug 2005
4898	Promotion of Private Sector Participation in the Power Sector	600,000	15 Dec 2006
Transmission and Distribution			
3343	Corporatization of the Ashuganj Power Station	1,000,000	17 Dec 1999
3801	Corporatization of the West Zone Distribution Operations of the Bangladesh Power Development Board	900,000	17 Dec 2001
3978	Corporatization of the Dhaka Electric Supply Authority	850,000	7 Nov 2002
TOTAL ADVISORY TECHNICAL ASSISTANCE		5,340,000	
PROJECT PREPARATORY TECHNICAL ASSISTANCE			
Energy Sector Development			
4332	Gas Sector Development	480,000	28 Apr 2004
4379	Power Sector Development Program II	840,000	23 Aug 2004
4952	Gas Sector Development Program	575,000	16 Jul 2007
Total Project Preparatory Technical Assistance		1,895,000	
Total Technical Assistance		7,235,000	

Source: Asian Development Bank Database.

9. The objectives of Ninth Power Project¹ were closely interconnected with the promotion of power sector reforms in Bangladesh. Loan 1505² for the Ninth Power project was designed to finance (i) transmission lines and sub-stations associated with the Meghnaghat Power Project; (ii) extension and enhancement of the distribution system in Dhaka, including new consumer connections; and (iii) engineering services for preparing new generation projects. It supported the unbundling of BPDB and DESA, by providing support to the two new corporate entities (PGCB and DESCO) which were being created from BPDB and DESA.

10. The Dhaka Power System Upgrade Project consisting of two loans totalling \$157 million was also designed to support the power sector reforms. The loans and associated conditions were designed to help build institutional capacity, improve efficiency and facilitate private sector participation. Two of the four beneficiaries were the newly created companies in the sector (PGCB and DESCO) and a third was the Rural Electricity Board (REB) responsible for coordinating the rural power distribution undertaken by rural power cooperatives. The objectives were to complete the 230 kV power transmission ring around Dhaka, reduce distribution system losses and improve reliability in Dhaka area of the areas taken over by DESCO and REB and carry out preparatory works for a training institute for REB.

¹ ADB. 1996. *Ninth Power Project*. Manila. (Loan 1505-BAN[SF] approved for \$134.4 million on 18 December).

² ADB. 1996. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and Technical Assistance Grant to the People's Republic of Bangladesh for the Ninth Power Project*

11. The West Zone Power System Development Project: financed (i) a 230 KV backbone transmission system in the west zone of Bangladesh which had been supplied with 132 kV transmission lines; (ii) upgrading the urban power distribution system in the southwest supplied by BPDB; and the (iii) upgrading of power distribution in rural areas in southwest supplied by REB. The Project also had a technical assistance and loan covenants to ensure the corporatization of the power distribution operations of BPDB in the west zone by creating West Zone Power Distribution Company.

12. The Power Sector Development Program consisting of a program loan and an investment loan (is closely linked to the reform process. The program loan was designed to help government and agencies settle their outstanding dues to power sector entities. It was released in two equal tranches of US\$50m, subject to policy initiatives concerning tariffs, competitive generation, and independent regulation being taken by the Government. The project loan had three components (i) the construction of a 2x100MW peaking plant at Siddhirganj near Dhaka; (ii) construction of a national load dispatch centre in Dhaka; and (iii) improvement and extension of distribution in North West Bangladesh. The program loan gave ADB significant leverage for a period as its release was linked to progress on reforms. The creation of a North West Zone Distribution Company was one of the loan conditions.

13. The Gas Transmission and Development Project was designed to address the most urgent requirement of the government's gas sector investment program. It aims to improve gas infrastructure in the western part of the country while enhancing the role of the private sector and is coordinated with the Government's road map for sector reform. There are four components covering extension of the gas transmission network, field appraisal of five producing gas fields to determine locations for future drilling, extension of the gas distribution network in Western Bangladesh and capacity building for government ministries, Petrobangla and its subsidiaries.

14. The Sustainable Power Sector Development Program consists of a program loan and two project loans. The program loan is designed to support further reforms in the power sector with a series of conditions relating to progress in implementing power sector reform road map consisting of (i) the establishment of a fully functioning legal and regulatory framework, (ii) enhanced financial health of newly set up power sector entities, (iii) continued restructuring of sector entities through corporatization of remaining operations of BPDB and DESA, and (iv) the promotion of private sector participation in power generation. The project loans have five components, two new peaking power plants at Sirajganj and Khulna to address the power shortages, augmenting the power transmission capacity in Dhaka area, rehabilitation of power distribution network in Dhaka area by supporting the newly set up DPDC and DESCO and capacity development in sector policy formulation at the Ministry of Power, Energy & Mines.

15. The Dhaka Clean Fuel Project has six components, all aim at promoting the use of compressed natural gas (CNG) as a transport fuel in Dhaka. They cover transmission and distribution pipelines, establishment of filling stations and workshops, purchase of vehicles and capacity building.

16. ADB has also provided 8 advisory technical assistance grants during 1999–2008. These TAs were mainly aimed at (i) supporting the unbundling and corporatization of different parts of the power sector; and (ii) promoting private sector investments in power generation. Although Bangladesh has made significant progress in power sector reform process and setting up commercially oriented sector entities, its track record on attracting private investments to power generation since 2001 has not been good.

C. Key Lessons Learned From Relevant Evaluation Studies

17. The first SAPE³ of ADB assistance to Bangladesh Power Sector was completed in December 2003. It provided a comprehensive assessment of over 30 years of ADB's assistance to Bangladesh's power sector with seven projects and 5 TAs as case studies. The first SAPE noted that ADB's sector strategy of continued physical investments in transmission distribution network rehabilitation and expansion combined with policy dialogue on a reform agenda for unbundling the sector, corporatization and greater private sector participation had been relevant to the overall sector development objectives of the government. However, the degree of achievement of these sector development objectives was assessed as less than satisfactory due to the continued weakness of some of the sector entities. The main area of concern at sector level was the financial sustainability of the sector due to inadequate power tariffs and weak self financing capability of the sector entities. At a strategic level the SAPE (i) recommended a gradualist approach to sector reform allowing learning by doing and winning support by demonstrating success as in the case of the corporatization of DESCO, (ii) recognized that the privatization of power transmission and distribution is difficult to achieve in the context of Bangladesh, and (iii) emphasized the importance of attaining commercial viability of the sector entities.

18. The SAPE observed that (i) ADB's public sector lending achieved their objectives albeit with considerable delays in implementation that had been crucial in addressing the bottlenecks in the system; (ii) ADB's private sector lending and credit guarantees have added significant new generation capacity at competitive prices; and (iii) ADB's TAs have targeted key areas of capacity building on sector planning, financial management, sector unbundling and privatization. At the project level the SAPE identified the following key issues and/or lessons (i) need to minimize project implementation delays; (ii) need to reduce the dependency on foreign consultants for project preparation and implementation, (iii) greater ownership of TAs by the executing agencies, and (iii) avoid the use of projects for financing routine management improvement initiatives.

19. In May 2007 IED completed the Energy Policy 2000⁴ (2000 Review) to assess the relevance and effectiveness of the *Energy 2000: Review of the Energy Policy of the Asian Development Bank*. Some of the findings of the study that relate to the energy sector in Bangladesh include:

- (i) Local investors are willing to promote IPP projects;
- (ii) Lack of progress in establishing a well functioning regulatory regime in Bangladesh continue to dampen investment in the power sector;
- (iii) The delay in the appointment of a regulator stalled independent tariff setting and contributed to a continuing financial crisis.
- (iv) The power project developed under ADB technical assistance (TA) for a 450 megawatt (MW) gas-fired combined cycle power plant near Dhaka, and partly financed by ADB through its private sector window provides an example of the best practice for securing an equitable and large IPP contract.

20. Some key lessons identified by the 2000 Review were

- (i) Full privatization of public utilities is not necessarily the only option. Corporatization with government ownership can also deliver good results if

³ ADB. 2003. *Sector Assistance Program Evaluation of Asian Development Bank Assistance to Bangladesh Power Sector*. Manila.

⁴ ADB. 2007. *Energy Policy 2000 Review: energy Efficiency for a Better Future*. Manila.

- commercially and financially sustainable principles are introduced to improve efficiency and the delivery of better services to customers.
- (ii) There has been a general lack of compliance with financial covenants in the power sector suggesting that ADB needs to improve the quality of its financial analysis for the power projects.

D. Evaluation Objectives and Scope

21. The objective of this SAPE is to assess the effectiveness of ADB's completed and continuing program and operations in the energy sector in Bangladesh and derive lessons and good practices to guide future ADB strategy in the sector. The first SAPE was an assessment of ADB's strategy in the power sector. The proposed SAPE will assess the development effectiveness of ADB's operations in the energy sector. Aside from the power subsector, ADB has also been active in the gas subsector. Although this SAPE will primarily cover the period 1999—2008 it will include two projects approved prior to 1999 and completed in 2003 and 2004. This SAPE will provide inputs for IED's Country Program Assistance Evaluation for ADB's assistance to Bangladesh. The approach will generally follow IED's *Guidelines for the Preparation of Country Assistance Program Evaluation Reports*.⁵

22. The proposed SAPE will be supported by information derived from two project performance evaluation reports (PPERs) that will be prepared for the following projects:

Table 3: Proposed Project Performance Evaluation Reports

Loan No	Project Name	Amount \$ million	Date Approved	Date Completed
1293(SF)	Third Natural Gas Development Project	107.0	21 Dec 1993	23 Oct 2003
1505(SF)	Ninth Power Project	134.4	18 Dec 1996	12 Jul 2004

23. These two projects were the last two completed energy projects in Bangladesh. The PPERs will follow the *Guidelines for Preparing Performance Evaluation Reports for Public Sector Operations*.⁶ Profiles of the two PPER projects and the critical issues that will need to be considered during their evaluation are presented in Appendix 1.

E. Evaluation Approach and Methodology

24. The evaluation will adopt the guidelines for preparing country assistance program evaluation reports and follow a top down—bottom up approach. The two independent PPERs will be inputs to the bottom-up approach. The evaluation framework for the top down—bottom up approach is presented in detail in Appendix 2.

25. Positioning of the sector strategy and assistance program contributions to development impact (the top-down assessment) will be largely assessed through the review of Government development strategies and plans, ADB strategy documents, portfolio data, IED reports, and the activities of other development partners, and through interviews and surveys of Government entities, other stakeholders, and ADB staff. The criteria used for the top-down assessment are as follows:

⁵ ADB. 2006. *Guidelines for the Preparation of Country Assistance Program Evaluation Reports*. Manila. Available: <http://www.adb.org/Documents/Guidelines/Country-Assistance-Program/guide-preparation-0206.pdf>.

⁶ ADB. 2006. *Guidelines for Preparing Performance Evaluation Reports for Public Sector Operations*. Manila.

- (i) The **strategic/sector positioning** will review ADB's strategic positioning in Bangladesh's energy sector and the alignment of the strategy with Government strategy and infrastructure development needs/priorities; binding development constraints; coordination with activities of other development partners and the private sector; and suitability of institutional arrangements.
- (ii) **Contribution to development results/impact** will be measured in terms of benefits and costs that accrue to the country from ADB's program in the sector. Did ADB spearhead any new discussions on or approaches to energy sector challenges in Bangladesh? Did ADB's assistance make a difference to the development of the energy sector in Bangladesh? Specific issues that will be considered will be the level of innovation of project design and implementation; and the extent to which there was improved access to local and foreign private capital.
- (iii) **ADB performance** will be assessed based on the responsiveness of its engagement in the sector; whether the mix of lending and nonlending services, as well as operational approaches were tailored to the particular conditions of the sector and whether they were chosen in accordance with ADB's comparative advantage. .

26. ADB performance will be assessed taking into consideration client feedback, the quality of strategy and program design documents, level of staff and consultant resources allocated to project/program preparation and implementation, flexibility and resourcefulness in addressing implementation problems, and quality of policy dialogue.

27. The bottom-up assessment will comprise the standard evaluation criteria used to evaluate individual operations (at the individual loan projects and TA projects level). They are:

- (i) **Relevance** assesses appropriateness ADB's sector strategies and programs with priority development needs, Government development strategies, and ADB's and Bangladesh's comparative advantage and capacity constraints.
- (ii) **Effectiveness** assesses the achievements of outcomes. Determine whether ADB's assistance (a) responded to needs and achieved useful results in terms of outputs and outcomes; (b) has been aligned with good practices and international standards where appropriate; (4) has been effectively coordinated with other key development partners in the sector? Did ADB's assistance achieve what it intended?
- (iii) **Efficiency** assesses whether there was efficient use of resources in the design and implementation of the sector strategy and individual projects? Were the costs and benefits commensurate with the initial plans and project designs?
- (iv) **Sustainability** assesses the likelihood of sustaining achieved outputs and outcomes? Are conducive sector policies and procedures in place? Are the policies and sector interventions likely to contribute to durable development gains?
- (v) **Impact** assesses whether ADB sector operations have contributed to long-term energy sector development in Bangladesh, sustainable economic growth, and the MDG targets. What are the positive and negative impacts that have been created due to the implementation of ADB assistance in the sector?

28. The SAPE will assess ADB's contribution to outcomes through a combination of perception assessments, data analyses, and literature reviews involving desk studies at ADB Headquarters and field visits to Bangladesh. Generally, the evaluation team will undertake:

- (i) Literature and secondary data reviews of relevant documentation such as CSPs, Government strategies and plans, monitoring and evaluation reports, project and program reports, documentation on perceived assistance results in sector-level evaluations, ADB documents and working papers, existing studies on the energy sector of Bangladesh, and relevant data and information found on the Internet;
- (ii) Informal and more formal perception surveys, discussion and site visits, consultations with representatives of national and local government, regulatory agencies, non-government institutions, relevant research institutions, the private sector, and other development partners operating in Bangladesh, interviews with relevant ADB staff involved in Bangladesh energy sector operations,
- (iii) Data analysis including statistical analysis of secondary data and indicators to supplement primary data that will be collected from the surveys, field visits and direct observations.

29. SAPE stakeholder consultations will focus on ADB's recent general strategic direction and choices, lessons learned and implications for good practices in future strategic planning for the energy sector. Private sector and other relevant non-government and stakeholders such as (potential) project financiers, domestic consulting firms, and sector research institutions, will also be consulted. Focus group discussions will also be held as needed.

F. Evaluation Issues

30. ADB's performance in addressing strategic and important issues that are critical for the overall performance of the energy sector and its ability to contribute to overall development objectives of the country including environmentally sustainable inclusive economic growth would be evaluated during the SAPE. These issues are discussed in the following paragraphs.

31. **Energy sector governance, policy formulation and regulation.** Bangladesh energy sector consisting of mainly power and gas sectors has been dominated by state owned enterprises (BPDB and Petrobangla respectively) and since 1995, the government has taken measures to unbundle these entities to improve the accountability and corporate governance of the sector entities. At the same time the government has taken measures to improve the regulatory framework of the energy sector by setting up BERC. The newly created sector entities are expected to achieve improved performance in terms of service delivery, financial performance and in mobilizing new investments. ADB's energy sector assistance consisting of policy dialogue, technical assistance, loan covenants and policy conditions to promote the above mentioned sector reforms will be evaluated with respect to strategic positioning, relevance, impact and sustainability as outlined in the Evaluation Matrix (Appendix 4).

32. **Increasing natural gas reserves and production through mobilizing new investments.** Bangladesh is critically dependent on natural gas for its commercial energy supply and the present production capacity and confirmed gas reserves are not sufficient to meet the expected demand for gas beyond 2015. It is necessary to undertake new gas explorations to increase the resource base and invest in new gas fields to increase the gas production by mobilizing private investments as the state owned gas companies do not have the financial capabilities and technical expertise to undertake off-shore gas exploration. The government's policy is to attract private sector investments through production sharing agreements (PSA) and in gas transmission through built–operate–transfer (BOT) approach. A package of incentives consisting of purchase price assurances, risk sharing measures and relaxations on restrictions on disposition of gas has been offered. ADB's assistance in mobilizing new investments for exploration and gas field development will be evaluated in terms

of its relevance, effectiveness and efficiency as well as sustainability of the investments in developing new gas fields.

33. Improving financial viability of gas sector entities. Given the importance of natural gas sector to Bangladesh's overall economy, it is important to ensure the financial viability of key gas sector entities. At present the two state-owned gas producing companies, BGFCL and SGFL are profitable due to low cost of production. The gas transmission company BGTC is also profitable due to the attractive gas transmission fee approved by the government. However, the three gas distribution companies (BGSL, TGTDC and JGTDSL) are not profitable due to inadequate end use gas tariffs, cross subsidies from the gas sector to power sector and high degree of losses in gas transmission and distribution. The ADB assistance to the gas sector was aimed at addressing some of these issues especially the reduction of losses in gas distribution and the SAPE will evaluate the efficiency, effectiveness and sustainability of these interventions.

34. Attracting new investment in power generation. Bangladesh's power generation capacity has been consistently short of the power demand and the country suffered from power cuts since early 1990s. The government succeeded in attracting three Independent Power Producers in late 1990s to add over 900 MW of generating capacity. This has reduced the power shortages to below 400 MW by 2002 from over 750 MW in 1998. However there have not been significant additions to the generating capacity since then and power shortages has reached 1400 MW by 2007. The government's recent attempts with support from development partners to attract IPPs have not been successful mainly due to lack of interest from foreign investors. The MDBs have recently agreed to finance public sector peaking power plants while keeping the base load power generation for private sector participation. The SAPE will evaluate the strategic focus and relevance of ADB's energy sector strategy with respect to supporting power generation in the above context and ADB interventions to attract private sector investments to power generation in terms of effectiveness, efficiency and sustainability.

35. Ensuring Financial Viability of the Power Sector Entities. The BPDB (i.e., the central entity holding state owned generating assets, the off-taker for most of the IPPs and supplier of electricity to distribution entities) is incurring losses due to average sales tariff being less than the average cost of generation as well as poor collection ratio and high losses in the transmission and distribution network. The newly set up transmission company (PGCB) and distribution company for greater Dhaka area (DESCO) are profitable due to adequate wheeling charges approved by the government for PGCB and better consumer mix, low operating cost, reduction in losses and improved collection ratio in the case of DESCO. However, sustained tariff increases and removal of distortions in the tariff structure are required to maintain the overall financial viability of the sector and to attract investments from the private sector for power generation. ADB has provided technical assistance and maintained policy dialogue through loan covenants and program loans to improve the financial performance of the power sector entities through tariff increases and financial restructuring. The SAPE will assess the relevance/strategic positioning, effectiveness and sustainability of these interventions.

36. Enhancing the operational performance of power sector entities. The Bangladesh power sector also suffers from high degree of technical and non technical losses in power distribution. The technical losses are due to overloaded distribution network and lack of investments in network augmentation. The non technical losses are due to electricity theft and non-metered consumers. In addition to the losses, the distribution companies had a low collection ratio of around 80% to 90% causing further financial distress to distribution entities. However, the overall systems losses have been reduced from 37% in 1994 to below 25% by

2006 and in the recently set up DESCO the losses have been reduced to 16%. ADB's investment loans have had specific focus on distribution loss reduction through new investments and better management. The SAPE will evaluate the effectiveness, efficiency and sustainability of these interventions and their overall impact on the energy sector.

37. **Enhancing GHG Efficiency in Bangladesh.** Although the Bangladesh's primary concern is ensuring its energy security, it is recognized the importance of improving the efficiency of energy production and consumption and diversifying the sources of energy. The energy efficiency in the context of Bangladesh means the reduction of transmission and distribution losses in power sector, improving the thermal efficiency of existing power plants, reducing the gas leakages and flaring of gas in gas fields, promoting end user energy efficiency through tariff reforms, promoting cleaner types of fuel such as natural gas for transportation, standards on energy consuming appliances and promotion of energy efficient lighting. Bangladesh is also contemplating developing its coal reserves to reduce its dependency on natural gas and this is likely to significantly increase the GHG intensity in Bangladesh's energy sector. The SAPE will evaluate the extent to which ADB assistance has focused on improving the GHG efficiency and effectiveness and sustainability of these initiatives.

G. Resource Requirements and Schedule

38. The SAPE will be prepared by an IED and Consultant team. The team will be managed by a Senior Evaluation Specialist (the team leader) supported by an IED Evaluation Specialist (focusing on the bottom-up assessment) and a Senior Evaluation Officer. The IED team will be supported by two international consultants. One international consultant will focus on financial and regulatory issues while the other international consultant will focus on assessing the technical aspects of generation, transmission and distribution and energy efficiency and will prepare the two PPERs. Two national consultants in Bangladesh with expertise each in gas and power will support the team in the field. A survey consultant will also be required to carry out a survey covering different categories of power and gas consumers. The proposed terms of reference for the consultants are given in Appendix 3. Envisaged inputs levels are 2.0 person months for each of the international consultants, 2 person-months for the national consultant for gas, and 1.5 person-months for the national consultant for power. A tentative time schedule is presented below.

Activity	Proposed Schedule	
	PPER	SAPE
1. Approval of Approach Paper		II March 2009
2. Desk review, data collection, analysis phase,		II March—IV April 2009
3. Recruitment of consultants		II—III March 2009
4. Independent evaluation mission		I-II May 2009
5. IED internal review	II June 2009	IV June 2009
6. Government and interdepartmental review	IV June 2009	III July 2009
7. IED Management review	IV July 2009	III August 2009
8. DG, IED Approval	II August 2009	II September 2009

Appendices:

1. Project Performance Evaluation Reports
2. Evaluation Matrix
3. Terms of Reference for the Evaluation Team
4. Workplan and Timetable