

Ex-ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country:	The People's Republic of Bangladesh
Project:	Rural Electrification Upgradation Project
Loan Agreement:	March 24, 2010
Loan Amount:	13,241 million yen
Borrower:	The Government of the People's Republic of Bangladesh

2. Background and Necessity of the Project

(1) Current State and Issues of the Power Sector in Bangladesh

Lack of electricity supply is one of the largest bottlenecks for the economic growth of Bangladesh. To keep up with an increase in electricity demand as a result of recent steady economic growth, the Government of Bangladesh (GOB) has taken some measures to close the demand-supply gap, including the introduction of Independent Power Producers (IPPs). However, the generation capacity still remains at about 70% of the peak-hour demand, with the result that the Government has to enforce extended hours of scheduled load-shedding. While electricity demand is projected to increase by about 8% every year because of recent steady economic growth, a delay in the development of new power plants is likely to widen the gap between supply and demand further. As such, strengthening of the power generation capacity needs to be addressed on an urgent basis. With regard to power transmission and distribution, although facilities have been expanded and made more efficient as a part of the sector reform plan established by the Power Division of GOB, the distribution loss rate is still relatively high (15.6%) due to aged facilities, too long low-voltage lines, and defective meter inspection, which leaves ample room for further improvement. Particularly in rural areas, electricity demand increases during the dry season for the operation of irrigation pumps. Satisfying the irrigation demand is a national priority especially from the viewpoint of food security.

(2) Development Policies for the Power Sector in Bangladesh and the Priority of the Project

GOB has made progress with the power sector reform with a view to providing stable and affordable electricity to all the people by 2020. Some of the measures for achieving this goal include the following: (1) Bangladesh Power Development Board (BPDB)'s vertically integrated departments should be divided into generation, transmission and distribution entities; business efficiency should be improved through elimination of the Government's excessive involvement in the business; and the newly established entities should introduce new equipments; and (2) Bangladesh Energy Regulatory Commission (BERC) should be established to create a proper mechanism for deciding electricity prices. Since a new Government was elected in early 2009, stable power supply and the power sector reform have continued to be GOB's priority issues.

With regard to power distribution in rural areas, GOB has carried out electrification programs since the establishment of Rural Electrification Board (REB) in 1977. In each rural area, REB has established a rural electric cooperative called Pali Bidyut Samity (PBS), which consists of local people receiving electricity in each community, and has entrusted the management of the power distribution business to PBS to increase power supply in each area. Narrowing the gap in the electrification rate between the rural areas (31%) and the urban areas (83%) still remains as an important issue. Because of limited power generation capacity, however, GOB's current priority issues are to improve the efficiency and stability of power distribution system and to contribute to the improvement of agricultural productivity through the repair and reinforcement of the existing distribution system. In the rural areas west and south of the Jamuna River in particular, the lack of power distribution facilities has put a strain on the

relation between electric power systems' supply capacity and power demand. The purpose of the Project is to contribute to poverty reduction in the poverty-stricken western and southern areas of Bangladesh through the construction and repair of power distribution networks in the area.

(3) Japan and JICA's Policy and Operations in the Power Sector

For JICA, "economic growth" is one of the key assistance goals in Bangladesh. Accordingly, JICA has positioned the power sector as one of the important sectors for the "development of the economic infrastructure," one of the priority issues in the area of "economic growth." Therefore, there is a high level of necessity and relevance for JICA to support the sector and JICA's policy is to give support to the establishment and implementation of a comprehensive plan for the sector reform in cooperation with other donors. The Project is in accordance with this policy. The following are the major past aid records within the power sector:

- ODA Loan: Rural Electrification Project, Central Zone Power Distribution Project, New Haripur Power Plant Development Project
- Technical Cooperation: Power sector policy advisors, strengthening of the management of BPDB through introduction of TQM

(4) Other Donors' Activities

In addition to JICA, the following four donors have provided support through mutual coordination and cooperation as lead donors:

- Asian Development Bank: provision of support for the promotion of efficient management of BPDB, establishment of BERC, construction of power plants and transmission and distribution networks, etc.
- World Bank: provision of loans for development of the power sector, provision of support to establishment of financial reform and reconstruction plan for the whole sector, construction of power plants, split-up of local power distribution corporations, technical assistance in rural area electrification and REB reform, renewable energy projects, etc.
- United States Agency for International Development, UK Department for International Development: provision of support mainly to strengthen the capacity of REB

(5) Necessity of the Project

The project aims to improve the efficiency and stability of electricity supply in the rural areas from Jamuna River and to the south/west through the construction and rehabilitation of power distribution facilities. The Project in particular is expected to contribute to the improvement of livelihood in the poverty-stricken rural areas through efforts to satisfy power demand that increases in the dry season for the better operation of irrigation facilities. In addition, the Project is also expected to reduce system loss in the existing power distribution network. Therefore, the Project is in accordance with the country assistance program for Bangladesh and JICA's policy, and the necessity and relevance of JICA's support of this project is high.

3. Project Description

(1) Project Objectives

The purpose of the Project is to construct and rehabilitate the existing power distribution facilities to reduce power distribution loss and strengthen and stabilize the power supply systems, which will make power supply efficient and thereby contribute to the economic development and poverty reduction in the western and the southern part of Bangladesh. In addition, the Project will also contribute to the elimination of greenhouse gas through improvements in the efficiency of aged power distribution facilities.

(2) Project Site/Target Area

Rajshahi, Khulna and Barisal Divisions (33 PBSs in total)

(3) Project Components

- 1) Installation of medium- and low-voltage lines (about 5,200 km), construction and augmentation of substations
- 2) Consulting service (detailed design, construction supervision, bidding assistance, maintenance/administration capacity strengthening, etc.)

(4) Estimated Project Cost (Loan Amount)

18,436 million yen (portion financed by yen loan: 13,241 million yen)

(5) Schedule

It is scheduled to take place between March 2010 and December 2014 (58 months in total). The Project will be completed when the facility is placed in service (December 2014)

(6) Project Implementation Structure

- 1) Borrower: The Government of the People's Republic of Bangladesh
- 2) Executing Agency: Rural Electrification Board
- 3) Operation / Maintenance: The same as 2)

(7) Environmental and Social Consideration / Poverty Reduction / Social Development

1) Environmental and Social Consideration

a) Categorization: B

b) Reasons for Categorization: It is judged that the Project has no serious adverse environmental impacts because the Project does not fall under any sector that is likely to have impact and the Project area is not susceptible to the impact under the terms of the "Japan Bank for International Cooperation Guideline for Confirmation of Environmental and Social Considerations" (April 2002)

c) Environmental Permit: Environmental Impact Assessment (EIA) report concerning the Project is scheduled for preparation after the completion of the detailed design and approval will be obtained from the Department of Environment (DOE) of the Ministry of Environment and Forestry by the commencement of the construction works.

d) Anti-Pollution Measures: With regard to air quality, waste, soil pollution and noise during the works, no major environmental impact is expected because various measures will be taken, such as the sprinkling of water during works, recycling and other appropriate disposal of used electric wires, soil sampling survey for recycling of surplus soil after land development and announcement of works to neighboring residents.

e) Natural Environment: No serious adverse impact on the natural environment is predicted.

f) Social Environment: Although it is necessary to acquire a site for the new substation (estimated to be about 6.7 ha), the residents do not need to be relocated.

g) Others / Monitoring: The implementing entity will monitor air quality, soil pollution, etc.

2) Promotion of Poverty Reduction: it is expected that an establishment of stable power supply to the poverty-stricken rural areas will improve the inhabitants' living environment and generate incomes through the promotion of employment in the rural areas.

3) Promotion of Social Development (e.g. gender perspective, measures for infectious diseases including HIV/AIDS, participatory development, consideration for persons with disability, etc.): To promote the effect of the Project, there is a plan to strengthen REB's

and PBSs' ability to enlighten the inhabitants and provide customer services.

(8) Collaboration with Other Donors

The Socio-Economic Monitoring and Evaluation Cell, which was established in REB with the support of the World Bank, will be maintained for the Project to evaluate and monitor the Project's effect on social development.

4. Targeted Outcomes

(1) Performance Indicators (Operation and Effect Indicators)

Indicator	Reference value (Actual value in 2008)			Target value (2017) (Two years after the completion of the Project)		
	Barisal	Khulna	Rajshahi	Barisal	Khulna	Rajshahi
Maximum Output Capacity [MW]	96.0	273.9	829.2	162.9	484.7	1025.2
Annual Minutes of Accidental Blackouts per Consuming Household	[To be set for each PBS]			[To be set for each PBS]		
Electricity Sales [MWh]	27,619	71,470	169,490	50,774	131,394	321,472
Distribution loss [%]	[To be set for each PBS]			[To be set for each PBS]		

(2) Internal Rate of Return

Based on the following assumptions, economic internal rate of return (EIRR) for the Project is 13.1% and financial internal rate of return (FIRR) for the Project is 3.9%.

[EIRR]

Cost: Cost of the Project (excluding tax), management and maintenance/administration

Benefit: electricity sales

Project life: 25 years

[FIRR]

Cost: Cost of the Project, cost of management and maintenance/administration

Benefit: electricity sales

Project life: 25 years

5. External Factors and Risk Control

Delays in civil engineering work, etc. due to natural disasters such as floods, and maintenance of an appropriate level of retail price of electricity necessary for ensuring the financial soundness of the implementing entity

6. Lessons Learned from Past Projects

When similar projects were evaluated in the past, it was pointed out that low profitability of the power sector as a whole might influence sustainable production of project effects. The sustainability of the Project will be secured by improvement in profitability through the following: review of the electricity cost (bulk supply) and the retail price to consumers; an increase of the number of connections by the transfer of equipment possessed by BPDB; and securing major industrial and commercial customers.

7. Plan for Future Evaluation

(1) Indicators to be used

- 1) Maximum output capacity (MW)
- 2) Annual minutes of accidental blackouts per consuming household
- 3) Electricity Sales (MWh)
- 4) Distribution loss (%)
- 5) EIRR (%)

6) FIRR (%)

In addition to these indicators, it is planned that operation/effect indicators will be set up and data will be collected through baseline studies concerning social development and poverty reduction.

(2) Timing

Two years after the completion of the Project