

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: The People's Republic of Bangladesh

Project: National Power Transmission Development Project

Loan Agreement: February 20, 2013

Loan Amount: 18,736 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 Electricity Sector in Bangladesh

In the People's Republic of Bangladesh (hereinafter called Bangladesh), the annual electric consumption per capita is just 170 kWh (FY2009/10), the lowest level in the world, and the electrification rate is also as low as 47%. The electricity supply cannot meet the increasing demand. In FY2009/10, the supply capacity remained at 5,271 MW while the peak demand was 6,454 MW. As the maximum generation capacity of 4,699 MW is only around 70% of the demand, the government needs to conduct scheduled outage mainly during peak hours. With the increasing electrification rate and industrialization following the recent high rates of economic growth, the demand is expected to increase by an average of 10% per year. However, due to a delay in plans of new power plant construction caused by lack of funds, etc., the demand-supply gap is expected to remain. In such a situation, there is an urgent need to establish a stable power supply system through such measures as development of new power sources (especially high efficiency power plants), diversification of energy sources including coal-fired thermal power generation, and decrease of system losses in power transmission and distribution.

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

In the "Policy Statement on Power Sector Reforms (2000)", the Bangladesh government set three long-term visions – (a) securing of the power supply capacity so that all citizens can use electricity by 2020; (b) reliable electricity supply; and (c) electricity supply at appropriate prices. Moreover, the Sixth Five Year Plan (2011-2015), which is the latest state plan, also mentions the necessity of electricity sector reform and describes it as an important infrastructure for economic growth that will lead to poverty reduction, setting such targets as increasing power generation capacity to 15,457 MW by 2014/15 and to 20,000 MW by 2020/21 and increasing the electrification rate to 68%. As for the development of power transmission and distribution networks, the government has a target of developing a 400 kV transmission line (650 km), a 230 kV transmission line (460 km) and a 132 kV transmission line (422 km) through multiple projects. This project was requested as a

high priority project among such projects.

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

The Country Assistance Program (May 2006) and the Assistance Policy (June 2012) for Bangladesh positions “acceleration of economic growth from which all the citizens can benefit to become middle income earners” as a priority field and provides that Japan will assist the development of power plants and transmission and distribution networks to eliminate a shortage of electricity. Based on this policy, in the Country Analytical Work (February 2012), JICA described the electricity sector as a priority field and announced that they would provide assistance for planning and implementation of comprehensive sector reform as well as infrastructure improvement in cooperation with other donors. The Project is in line with this policy. The major support activities in the electricity sector in the past include the followings.

- Loan assistance: Power Transmission Network Development Project, Central Zone Power Distribution Project, New Haripur Power Plant Development Project, Rural Electrification Upgradation Project
- Technical assistance: dispatches of electricity policy advisors, Total Quality Management (TQM) training, study for master plan on coal power development

(4) Other Donors' Activity

As major donors, ADB and WB have been supporting the electricity sector reform in Bangladesh, including spinning-off and improving business efficiency of electricity companies; development of new power sources; development of transmission and distribution networks; and energy efficiency.

(5) Necessity of the Project

To respond to the electricity demand in Bangladesh increasing by about 10% per year, new capital investment with a good balance among the areas of power generation, transmission and distribution, and in the area of power transmission the transmission capacity has to be increased in line with the new power source development in the future. The new and existing target substations of the Project are located around regional hub cities including Chittagong, the second largest city in Bangladesh, and will supply electricity to highly commercial/industrial areas. Frequent outage and serious voltage drop are severe impediments to economic activities especially among small and medium-sized businesses lacking with private power generation facilities, and the imbalance between supply and demand is expected to be worse by 5-10% per year. Aiming at stabilizing the electricity system across Bangladesh, maintaining the low rate of power loss in transmission and achieving stable electricity supply, the Project is in line with the tasks and development policies of the Bangladesh government as well as the assistance policies of the Japanese government and JICA. Therefore, JICA's assistance through the Project has a high degree of necessity and relevance.

3. Project Description

(1) Project Objective

The objective of the Project is to contribute to the economic growth of Bangladesh by stabilizing the electricity system of the country, improving reliability of power supply and reducing the rate of power loss in transmission through construction and expansion of substations and transmission lines across Bangladesh.

(2) Project Site/Target Area: Throughout Bangladesh

(3) Project Components (Including the Procurement Method)

- 1) Construction and expansion of 230/132 kV substations (international competitive bidding)
- 2) Construction and expansion of 132/33 kV substations (international competitive bidding)
- 3) Construction of 230 kV and 132 kV transmission lines (international competitive bidding)
- 4) Consulting service (detailed design, bidding assistance, construction supervision, etc.) (shortlist method)

(4) Estimated Project Cost (Loan Amount)

Total project cost: 25,976 million yen, including a loan of 18,736 million yen

(5) Schedule

The project period will be from February 2013 to February 2018 (a total of 61 months). The Project will be completed when service provision has started at all the facilities (February 2017).

(6) Project Implementation Structure

- 1) Borrower: The Government of the People's Republic of Bangladesh
- 2) Executing Agency: Power Grid Company of Bangladesh Limited
- 3) Operation and Maintenance System: Same as 2)

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

1) Environmental and Social Consideration

① Category: B

Reason for Categorization: The project is not located in a sensitive area, nor has it sensitive characteristics, nor falls it into sensitive sectors under the JICA guidelines for environmental and social considerations (April 2010), and its potential adverse impacts on the environment are not likely to be significant.

② Environmental Permit: The Initial Environmental Examination (IEE) Report for the Project was approved by the Department of Environment (DOE), Ministry of Environment and Forests in January 2012. The Environment Impact Assessment (EIA) Report is expected to be approved by DOE by the end of March 2013.

③ Anti-Pollution Measures: Coarse particulates will be reduced by sprinkling of water during construction and putting covers on truck beds. Heavy machinery

will be appropriately managed.

- ④ Natural Environment: The project site is not designated as sensitive areas near national reserves, national park and conservation areas for rare species. . The construction plan does not require felling of plants under transmission lines. Therefore, the adverse impact on the natural environment is expected to be minimal.
- ⑤ Social Environment: Out of about 25.5 ha of land required for the Project, about 20.6 ha of private land has to be acquired. Compensation has been provided at the replacement cost and land acquisition procedures are being carried out according to the domestic laws of the country and the compensation policy of the executing agency. The land acquisition is expected to be completed before the start of construction. There will be no relocation of residents for the Project.
- ⑥ Other / Monitoring: The executing agency will monitor air quality, water quality etc. to check pollution during construction and service provision. It will also monitor the progress of land acquisition before construction.

2) Promotion of Poverty Reduction: None

3) Promotion of Social Development: None

(8) Collaboration with Other Schemes and Donors: None

(9) Other Important Issues

As for the EPC contract for the consulting service and construction of substations concerning the Project, Japanese companies may be selected because Japanese companies are competitive in these areas.

4. Targeted Outcomes

(1) Quantitative Effects

1) Performance Indicators (Operation and Effect Indicator)

Indicator		Baseline (Actual Value in 2010)	Target (2017) 【At the time of project completion】
Transformer Capacity (MVA)	230/132 kV	6,450	10,875
	132/33 kV	9,773	16,063
Load Factor (%)	230/132 kV	68.7	52.6
	132/33 kV	87.7	71.1
Availability Factor (%)	Transformer	99.973	99.7
	Transmission line	99.978	99.7
Transmission System Loss (%)		3.07	2.65

2) Internal Rate of Return

Based on the conditions indicated below, the Economic Internal Rate of Return (EIRR) of the project will be 16.2%, and the Financial Internal Rate of Return (FIRR)

will be 12.2%.

【EIRR】

Cost: Project cost (tax not included) and administrative and maintenance cost

Benefit: Increase of revenue from power transmission

Project Life: 35 years

【FIRR】

Cost: Project cost and administrative and maintenance cost

Benefit: Increase of revenue from power transmission

Project Life: 35 years

- (2) Qualitative Effects: Revitalization of the local economic activities, and improvement of the living environment and living standard of the residents in the target area.

5. External Factors and Risk Control

Delay in civil engineering works etc. caused by natural disasters such as a flood

6. Evaluation Results and Lessons Learned from Past Projects

- (1) Evaluation Results of similar projects

From the result of the ex-post evaluation and such of the India Anpara Power Transmission System Project (1) (2), we have learned a lesson that it is important to continue effective measures such as setting of appropriate electricity price and separation of the power distribution division for restructuring of the electricity sector.

- (2) Lessons for the Project

The Project has no issue in the current financial condition of the executing agency and setting of power consignment price. However, based on the lessons above, we will continue monitoring the financial health etc. of the distribution division that will continue paying consignment fees, and promote reform of the electricity sector in Bangladesh. PGCB did not hire consultants for the transmission network development project (approved in 2006) and the project was delayed due to a shortage of manpower in the detailed design phase in the initial stage and rebidding resulted from inappropriate handling in the procurement supervision phase (e.g., inadequate screening of bidders). Therefore, we will prevent delay in the Project by hiring consultants for technical support (detailed design, procurement support and construction supervision).

7. Plan for Future Evaluation

- (1) Indicators to be Used

- 1) Transformer capacity (MVA), load factor (%), availability factor (%), and transmission system loss (%)
- 2) Economic Internal Rate of Return (EIRR) (%), and Financial Internal Rate of

Return (FIRR) (%)

(2) Timing of Next Evaluation: 2 years after the completion of the Project

END