

Ex-ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: The People's Republic of Bangladesh
Project: Bheramara Combined Cycle Power Plant Development Project
(Engineering Service)
Loan Agreement: March 24, 2010
Loan Amount: 2,209 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

In Bangladesh, the serious demand-supply gap of electricity is one of the largest bottlenecks for economic growth. As the capacity of power supply facilities is only around 4,000 MW compared to the peak electricity demand of 6,100 MW, they have no choice but to have scheduled load-shedding of electricity supply during the peak time. Although it is forecasted that, in keeping pace with the steady growth of the economy, the electricity demand will increase in the future at a rate of around 8% annually, the demand-supply gap is anticipated to be widened even further because of a delay in the planned construction of new power plants due to the lack of external funding. To overcome these problems and achieve stable power supply, it is necessary, in addition to new development in power generation, to improve the efficiency of the power sector. In concrete terms, it is urgently required, in addition to changing over from inefficient aging power plants to new power plants that have higher thermal efficiency, to improve the system loss in the transmission/distribution. Moreover, it is strongly required that to secure stable mid to long-term power supply, Bangladesh should try to reduce its high dependency on natural gas power generation by changing the power generation profile in the future, while, on the other hand, it is required to simultaneously promote efficient use of natural gas resources in the country.

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

The Government of Bangladesh (GOB) has made progress with the power sector reform with a view to providing stable and affordable electricity to all the people by 2020. To achieve this, the government has formulated a plan to restructure the sector for the purpose of eliminating the excessive involvement of the government and improving the management efficiency in the electricity business entities; and has been working on gradual split-up of each of Bangladesh Power Development Board (BPDB)'s vertically integrated departments into power generation, transmission and distribution corporation, as well as establishment of Bangladesh Energy Regulatory Commission (BERC) etc. In addition, while carrying out necessary investment on infrastructure in parallel with implementation of restructuring of the sector mentioned above, the government is also trying to introduce Independent Power Producers (IPP). In recent years, against the background of tight electricity demand, improvement of overall efficiency of the sector has been highlighted as one of the policy areas which require an urgent attention.

The Project is to give assistance for the construction of a combined cycle power plant and for the enhancement of management system to the North West Power Generation Co., Ltd. (NWPGCL), which was spun off from BPDP in 2007 as a part of the sector reform plan implemented in the

power generation sector.

(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, Power Grid Development Project, Central Zone Power Distribution Project and 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 organizations have provided support through mutual coordination and cooperation as main donors:

- Asian Development Bank (ADB) has been providing support for the promotion of efficient management of the BPDP, establishment of BERC, construction of power plants, and development of power grid. In addition, the bank supports the construction of the main pipeline which supplies the fuel for the Project.
- The World Bank is broadly supporting a range of projects including 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 by Electricity Generation Company of Bangladesh and split-up of South Zone Power Distribution Company.
- United States Agency for International Development and UK Department for International Development are providing foreign aid focusing on enhancement of the capacity of the Rural Electrification Board.

(5) Necessity of the Project

The purpose of the Project is to deal with the tight electricity demand in Bangladesh by constructing a highly efficient new power plant as well as to carry out the sector reform by supporting the structural reform of NWPGL through cooperation among donors. The Project will also contribute to alleviation of the effect of climate changes through construction of a highly efficient power generation. Based on above, as the Project is also in line with the priority area specified in foreign aid policy of JICA, therefore, the necessity and relevance of JICA's support of this project is high.

3. Project Description

(1) Project Objectives

The objective of the Project is to deal with the increased power demand and achieve stable power supply by constructing a highly efficient combined cycle power plant in the western part of Bangladesh where electricity demand is tight; and, by doing so, to contribute not only to the improvement of the industrial competitiveness and the living standard of the target region, but also to the implementation of global warming measures in Bangladesh. The objectives of the loan,

while it targeting the engineering service, etc., in relation to the detailed design and others of the Project, is to facilitate the smooth implementation of the Project.

(2) Project Site/Target Area

Bheramara, Kushtia District (Western Bangladesh)

(3) Project Components

- 1) Construction of combined cycle power plant (360 MW class)
- 2) Construction of substations and other transmission facilities associated with the plant
- 3) Consulting services (detailed design, bidding assistance, construction supervision, strengthening of institutional capability, etc.)

With the loan, JICA support above-mentioned 3) in a form of Engineering Service (E/S) loan for the Project.

(4) Estimated Project Cost (Loan Amount)

2,652 million yen (the amount of yen loan is: 2,209 million yen)

(5) Schedule

It is scheduled to take place between March 2010 and September 2017 (91 months in total). The Project will be completed at the time of the finalization of the loan (September 2017)

(6) Project Implementation Structure

- 1) Borrower: The Government of the People's Republic of Bangladesh
- 2) Executing Agency: North West Power Generation Co., Ltd.
- 3) Operation / Maintenance: The same as 2) above

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

1) Environmental and Social Consideration:

- a) Categorization: B
- b) Reasons for Categorization: Because the loan is an engineering service loan and the Project as a whole does not fall under category 'C' in terms of the "Japan Bank for International Cooperation Guideline for Confirmation of Environmental and Social Considerations" (established in April 2002)
- c) Environmental Permit: The Environmental Impact Assessment (EIA) report concerning the Project has been approved by the Department of Environment (DOE), Ministry of Environment and Forestry in July 2009. It is essential to monitor whether pumping up the groundwater for cooling purpose has any impact on the water use in the surrounding area; however, if there is any impact as a result of the operation of the main Project, measures to alleviate the situation by, for example, digging more wells, would be necessary.
- d) Anti-Pollution Measures: With regard to air quality, water quality and noise/vibration, it is anticipated that domestic emission and environmental standards by installing exhaust stacks, waste water treatment facilities, sound absorbing devices and so on would be satisfied. As for the wastewater, on top of the installation of cooling facilities, as the wastewater is discharged into a river which is located at some distance away, it is anticipated that the temperature of the water will be, through natural heat dissipation, cooled down below the wastewater standards of Bangladesh

- e) Natural Environment: It is not assumed that there will be any significant negative impact on the natural environment.
 - f) Social Environment: Although small-scale acquisition of private land, compensation for agricultural products, relocation of retail stores, and compensation associated with the relocation of farmers who are illegally cultivating the land are required, there will be no relocation of residents.
 - g) Others / Monitoring: The executing agency will monitor quality of the air, quality of the water, noise, ground water and so on.
- 2) Promotion of Poverty Reduction: None.
- 3) Promotion of Social Development (e.g. gender perspective, measures for infectious diseases including HIV/AIDS, participatory development, consideration for persons with disability, etc.): As part of a consulting service, education/training in relation to prevention of HIV/AIDS will be provided.

(8) Collaboration with Other Donors:

The progress of gas pipeline construction project supported by the ADB will be closely monitored. Furthermore, in cooperation with the World Bank and the ADB, which are the main donors in the power/energy sector, in addition to the restructuring of the power sector, JICA will closely follow the efforts to resolve the problems of the gas/energy sector.

(9) Other Important Issues:

To increase the sustainability of the Project, it is planned to put in place long-term maintenance service in relation to the management and maintenance/administration of the power plant. In addition, it is necessary to encourage GOB to take necessary policy measures to facilitate better overall fuel efficiency in the gas-fired power generation sector.

4. Targeted Outcomes

(1) Performance Indicators (Operation and Effect Indicators): Will be established when the main construction of the Project is implemented.

(2) Internal Rate of Return: Will be established when the main construction of the Project is implemented.

5. External Factors and Risk Control

Delay of civil engineering work, etc. due to natural disasters such as flood; and sustainability of natural gas supply to the new power plant.

6. Lessons Learned from Past Project

From the evaluation of the similar projects in the past, it is critical to strengthen the management and maintenance/administration system for the project to be successful and the sustainability to be ensured; therefore, with the Project, JICA will support them to establish/maintain the maintenance/administration system by employing, in addition to providing support for the introduction of LTSA, a consultant for institutional capability enhancement.

Further, from the experience in the past in relation to an executing agencies which were corporatized, efficient business operation was made possible because, after a large part of

organizational/operational autonomy was transferred to them, they began trying to vitalize the organization and were able to successfully reform the awareness regarding the mission of the business. Thus, for the business to continuously stay efficient, it is essential that, in addition to increasing the operational power of the executing agency, the internal management system is strengthened. The Project will support establishment of such system by employing a consultant for such institutional capability enhancement.

7. Plan for Future Evaluation

(1) Indicators to be used

Will be determined when the main construction of the Project is implemented.

(2) Timing:

Will be determined when the main construction of the Project is implemented.