Ex-ante Evaluation

1. Name of the Project

Country: People's Republic of Bangladesh
Project Title: New Haripur Power Plant Development Project (II)
Loan Agreement: March 1, 2009
Loan Amount: 22,210 million Yen
Borrower: The Government of the People's Republic of Bangladesh

2. Background and Necessity of the Project

In Bangladesh, the serious gap in the power supply and demand has posed a bottleneck for economic growth. The power generation capacity is about 3,800 MW, which falls far short of the peak-hour demand of around 4,700 MW, thus forcing the government to carry out planned outages, mainly around peak hours. Going forward, the demand for electricity is projected to increase at 8–10% annually, and in its master plan, the Ministry of Power, Energy and Mineral Resources estimates that the power generation capacity of Bangladesh would have to be increased 4,200MW by 2012 and 11,400MW by 2020. In order to eliminate the supply and demand gap, thereby stabilizing the power supply, in addition to the development of new power sources, the big challenge is to improve the efficiency of the power sector as a whole by raising the availability factor of power plants and reducing the systemic loss of electricity. In particular, efforts must be made to establish an operation and maintenance framework that improves availability factors and reduces rolling blackouts, to improve the financial base and ensure sufficient funds for capital investment through rationalization of power pricing, and to expedite procurement for new projects.

In regards to this, the government of Bangladesh has set "To provide access to affordable and reliable electricity to all by the Year 2020" as a goal in its Policy Statement on Power Sector Reforms (2000), and is working towards increasing capital investment. Concurrently, in addition to drafting the aforesaid sector reform plan, the government set up the Energy Regulatory Commission and is now implementing the gradual split up of the three functions (generation, transmission and distribution) of the Bangladesh Power Development Board (BPDB) with a view to eliminating the government's excessive involvement in the power industry and promoting the streamlining of management of Bangladesh's power sector.

In the "Japan's Country Assistance Program for Bangladesh" prepared by the Japanese Government, in the power sector, in addition to the lack of capital investment,

a number of issues such as inefficient operation by government operations, power pricing systems that does not duly reflect generation cost and unpaid power bills have been pointed out. To address these issues, the Japanese Government is focusing its assistance on improving policy, management, operation and financials across the power sector, increasing power generation facilities to reduce the gap between demand and supply, and encouraging reforms in the power transmission and distribution department. 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 Economic Infrastructure", one of the development issues in the area of assistance for "Economic Growth". Therefore, there is a high level of necessity and relevance for JICA to support this project that aims to boost Bangladesh's power generation capacity and stabilize the supply of electricity by supporting the construction of a new power plant and the streamlining of operation and maintenance of both new and existing power plants.

3. Project Description

(1) Project Objectives

The object of this project is to meet the growing power demand by constructing a new thermal power plant and supporting the strengthening and streamlining of the operation and maintenance system of power plants as a whole, thereby contributing to the enhancement of Bangladesh's industrial competitiveness and improvement of the people's livelihood.

(2) Project Site / Target Area

Haripur Region, Narayanganj City (outskirts of Dhaka)

(3) Project Outline

(a) Construction of a combined cycle power plant (360MW)

(b) Engineering consulting service (Detailed design, tender assistance and construction supervision)

(c) Management consulting service (Structual enhancement of EGCB, support for development of an operation and maintenance framework for the Haripur Power Plant, etc.)

(4) Total Project Costs/Loan Amount

52,829 million Yen (Japanese ODA loan: 39,977 million yen, Japanese ODA loan for phase II: 22,210 million yen)

(5) Project Implementation Schedule

Planned for April 2007 ~ June 2015 (Total 99 months. As projected at time of

appraisal). Project completion is defined as "When Long Term Service Agreement is completed".

(6) Project Implementation Structure

(a) Borrower: The Government of the People's Republic of Bangladesh

(b) Executing Agency: Electricity Generation Company of Bangladesh (EGCB)

(c) Operation / Maintenance: As per (b)

(7) Environmental and social consideration / poverty reduction / social development

(a) Environmental and social consideration

(i) Category: A

(ii) Reasons for categorization: This project falls into a thermal power sector project which is likely to have significant adverse impact on the environment under the "Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations" (established in April 2002).

(iii) Environmental Permit: The EIA report has been approved by the Department of Environment (DOE) of the Ministry of Environment and Forest.

(iv) Anti-Pollution Measures: The impact of the project on air quality, water quality, noise and vibration will be mitigated by such measures as installing exhaust stacks, wastewater treatment facilities and noise absorption units, and these impacts are expected to comply with the emission and environmental standards of Bangladesh. In addition, measures are expected to be taken to reduce the impact of warm water drainage on river systems at the time of detailed design.

(v) Natural Environment: This project will be implemented on the premises of existing power station, and there are no rare species or natural preserves in the vicinity of the project site. Thus the adverse impact on the natural environment is likely to be minimal.

(vi) Social Environment: This project will be implemented on the premises of existing power station, and so it does not involve land acquisition or resettlement.

(vii) Other / Monitoring: Environmental impacts regarding such items as air quality, water quality, noise pollution will be monitored by the executing agency.

(b) Promotion of Poverty Reduction: None.

(c) Promotion of Social Development (Gender perspective, measures for infectious diseases including HIV/AIDS, participatory development, consideration for the disabled etc.): None.

(8) Cooperation with Other Donors

During the construction period, in cooperation with local NGOs, HIV/AIDS education and training will be provided for the workers.

(9) Other Important Issues

In order to enhance the sustainability of the project, "Long Term Service Agreement" will be introduced in the operation and maintenance of the new thermal power plant. In addition to the steady supply of hard-to-find parts such as hot parts produced by gas turbine manufacturers, personnel at the new Haripur power plant will be given guidance on the operation and maintenance of the plant. Moreover, management consultant will be employed to support the streamlining and revitalization of the operation and maintenance of both the existing and new power plants in Haripur, that will be regarded as profit centers in strategic business unit that are solely responsible for revenues and expenditures of these plants.

4. Outcome Targets

(1) Evaluation Indicators (Operation and Effect Indicator)

Indicator		Target (2015) [At project completion]
Maximum output (MW)		360
Plant load factor (%)		70
Availability factor (%)[Note]		86.3
Auxiliary power ratio (%)		5
Gross thermal efficiency (%)		50
Outage hours by cause (hrs/year)	Human error	0
	Machine failure	0
	Planned outage	1,200
Outage times by cause (times/year)	Human error	0
	Machine failure	0
	Planned outage	1
Annual Amount of Net Generation Output (GWh/year)		2,097

Note) In the case of power plants for base power source use, around 50 days per year of planned outage are necessary for implementing periodic inspections. Thus an availability factor of 86% or so should be considered reasonable.

(2) Internal Rate of Return

Based on the conditions indicated below, the Economic Internal Rate of Return (EIRR) of this project is 20.6% and the Financial Internal Rate of Return (FIRR) is 8.8%.

[EIRR]

Cost: Project cost (excluding tax), operation and maintenance expenses

Benefit: Earnings from power sales based on assumed wholesale power prices
Project life: 25 years

[FIRR]

Cost: Project cost, operation and maintenance expenses
Benefit: Earning from selling electricity
Project life: 25 years

5. External Factors / Risk Control

Delays in construction works due to natural disasters such as floods.
Delays in a main gas pipeline construction project supported by the World Bank to which this project plans to hook up a gas pipeline as a feeder.

6. Lessons Learned from Findings of Similar Projects Undertaken in the Past

In the ex-post evaluations of similar past projects, the lesson learned is that to ensure the success and sustainability of projects, strengthening of the operation and maintenance system of the executing agency is indispensable. In this project, in addition to hiring a management consultant to support the said system, long-term maintenance services will be introduced including technical transfer, thereby reinforcing the actual activities of the project.

7. Future Evaluation Plan

(1) Indicators to be Used in Future Evaluations

(a) Maximum output (MW)
(b) Plant Load Factor (%)
(c) Availability Factor (%)
(d) Auxiliary Power Ratio (%)
(e) Gross Thermal efficiency (%)
(f) Outgage hours by cause (hours/year)
(g) Outgage times by cause (times/year)
(h) Annual Amount of Net Generation Output (GWh/year)
(i) EIRR (%)
(j) FIRR (%)

(2) Timing of Next Evaluations

At project completion.

End