

Ex-ante Evaluation

1. Name of the Project

Country: The Republic of Indonesia

Project: Peusangan Hydroelectric Power Plant Construction Project

(Loan Agreement: 03/29/2007, Loan Amount: 26,016 million yen, Borrower: The Republic of Indonesia)

2. Necessity and Relevance of JBIC's Assistance

According to the National Electricity General Plan (2006-2026, RUKN), the peak demand for power in Indonesia nationwide in 2005 was 18,772 MW (14,424 MW in the Java-Bali System; 4,348 MW in Outer Java-Bali Systems), and peak demand is expected to grow at an average of about 6.9% annually henceforth (about 6.4% in the Java-Bali System; about 8.3% in Outer Java-Bali Systems). Moreover, the plan states that efforts will be made to reform the power sector and to supply power to all levels of society.

Peak demand in the Aceh-North Sumatra Systems, where this project is located, is 1,054 MW (actual demand in 2005), and peak demand is expected to grow at an average of about 10.5% annually, to reach 2,335 MW in 2013. Meanwhile, the capacity of the system's facilities is 1,343 MW (actual demand in 2005). In view of future operation stoppages, which can be anticipated due to the aging of existing peak power supply facilities, and from the viewpoint of establishing an appropriate power supply structure, development of a new peak power source is urgently required.

For this project, JBIC provided a loan for engineering services (E/S loan) in 1994 as well as a loan for the main project through a co-financing scheme with the Asian Development Bank in 1995.

However, security problems impeded commencement of the main construction work, which failed to proceed before the loan execution deadline in December 2003, and JBIC consequently terminated assistance in the execution of the project. The region subsequently suffered severe damage in the earthquake and tsunami disaster in December 2004, and in August 2005 signed a peace agreement with the Government of Indonesia. In view of these factors, assistance through a yen loan for this project, which is essential for the recovery and reconstruction of the area, is again strongly desired.

Japan's "Assistance Plan for Indonesia" (November 2004) places emphasis on economic infrastructure development and states that providing assistance for "private sector-led sustainable growth" is a priority area and an important subject for assistance. Moreover, from the viewpoint of peace and stability, JBIC considers the promotion of the recovery and reconstruction of infrastructure in areas of conflict such as Aceh as being an important issue as efforts are made to fulfill and maintain the political agreement for peace. Furthermore, in JBIC's current Strategy for Overseas Economic Cooperation Operations (April 2005), assistance for infrastructure development for sustainable growth and for improving global-scale issues is earmarked as a priority area. In assistance for Indonesia, economic infrastructure essential for returning the country to the path of sustainable development through economic reform is also cited as a priority area.

Therefore, JBIC's assistance is highly necessary and relevant.

3. Project Objectives

The objectives of this project are to relieve the stringency in power supply and demand in the Aceh-North Sumatra System and to improve the stability of supply by constructing a hydroelectric power plant (dam and conduit type, 86.4 MW) and related transmission and distribution facilities near Lake Tawar in the upstream of the Peusangan River in Aceh Province in the northern part of Sumatra, and thereby to contribute to the economic development of northern Sumatra and the recovery and reconstruction of Aceh Province through improvement of the investment climate. Moreover, the project will contribute to the lowering of the burden placed on the global environment by using renewable energy.

4. Project Description

(1) Target Area

Aceh Tengah District, Aceh Province

(2) Project Outline

The following will be carried out to improve the power supply capacity of the Aceh-North Sumatra System:

- Construction of hydroelectric power plants in two locations (dam and conduit type hydroelectric generation facilities of 44.2 MW and 42.2 MW)
- Construction of related transmission lines of 150kV (about 76km) and related substation facilities
- Extension of related power distribution grids
- Consultant services (detailed design review, bidding assistance, assistance in operation and maintenance, and assistance in environmental management, etc. However, a detailed design review and preparation of bidding documents for the transmission and distribution of electricity are not included.)

(3) Total Project Cost/Loan Amount

34,687 million yen (Yen Loan Amount: 26,016 million yen)

(4) Schedule

January 2007-December 2014 (96 months)

(5) Implementation Structure

(a) Borrower: The Republic of Indonesia

(b) Executing Agency: PT Perusahaan Listrik Negara (Persero)

(c) Operation and Maintenance System: PT Perusahaan Listrik Negara (Persero)

(6) Environmental and Social Considerations

(a) Environmental Effects/Land Acquisition and Resident Relocation

(i) Category: A

(ii) Reason for Categorization

This project is classified as Category A because it comes under the hydroelectric power generation sector in the “Japan Bank of International Cooperation Guidelines for Confirmation of Environmental and Social Considerations” (April 2006).

(iii) Environmental Permit

The EIA report was approved in October 2006.

(iv) Anti-Pollution Measures

The water storage duration in the regulating pondage is short and awareness-raising activities will be conducted for the prevention of waste dumping in the area affected by river diversion, so no significant adverse impact on the quality of the river water is foreseen.

(v) Natural Environment

The project site is not located in or around any sensitive areas such as national parks. The discharge of the river will decline due to intake of water for power generation but appropriate maintenance discharge will be secured. Moreover, the routes of transmission lines will be selected to follow the existing roads as much as possible, and the project is likely to have a minimal adverse impact on the natural environment.

(vi) Social Environment

The project requires land acquisition of approximately 32.5ha and acquisition procedures will proceed in accordance with the domestic procedures of Indonesia. Furthermore, resettlement of four households will be necessary. The residents have basically agreed to their resettlement and further discussions regarding compensation, etc., will take place in the future. For the area affected by river diversion, there are plans to undertake work to upgrade irrigation water intake facilities and establish infrastructure for water supply facilities.

(vii) Other/ Monitoring

The executing agency will monitor the river water quality and the flow volume of irrigation water, etc., in accordance with the environmental management plan (RKL) and the environmental monitoring plan (RPL).

(b) Promotion of Poverty Reduction

This project will undertake extension of the power distribution grid and the development of substation facilities in the vicinity of this project site in Aceh Province, which is a poor area.

(c) Promotion of Social Development (e.g. Gender Perspective)

The contractor plans to undertake HIV/AIDS prevention measures for the construction workers.

(7) Other Important Issues

(a) Synergy effects can be expected of the PLN Operation Improvement System Project for Supporting Generating Facilities, which is an approved project for this fiscal year.

(b) A strengthening of the Sumatra System interconnection with this project can be expected following completion of the Northwest Sumatra Inter-connector Transmission Line Construction Project, which is an approved project for this fiscal year.

5. Outcome Targets

(1) Evaluation Indicators (Operation and Effect Indicator)

Indicator	Target (2015, one year after completion)
(a) Construction of power plant	
Maximum output (MW)	86.4
Unplanned outage hours: mechanical failures	32

(hours/year)	
Human error (hours/year)	0
Other factors (hours/year)	12
Capacity factor (%)	45
Net electric energy production (GWh/year)	327.21
(b) Development of power distribution grid	
System average interruption duration index (SAIDI) (hours/year/household)	16.4
Electrification ratio in the target area (%)	84.9
Power distribution loss rate in Aceh Province (%)	10.5
Peak load of Aceh Province (MW)	301
Electricity consumption (excluding loss) in Aceh Province (GWh)	1,261

(2) Internal Rate of Return (Financial and Economic Internal Rate of Return)

Based on the conditions below, the project's financial internal rate of return (FIRR) is 13.3% and its economic internal rate of return (EIRR) is 4.8%.

EIRR

- (a) Cost: Project cost (excluding VAT), operation and maintenance cost
- (b) Benefit: Comparison with the scenario of construction of an equivalent thermal power plant
- (c) Project Life: 30 years

FIRR

- (a) Cost: Project cost, operation and maintenance cost
- (b) Benefit: Electricity tariff
- (c) Project Life: 30 years

6. External Risk Factors

The risk of drought, which would affect the potential to secure water.

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

In the ex-post evaluations of previous ODA loan projects, it was learned that carrying out a check of the operation and maintenance agency in advance is important for the smooth running of the operation and maintenance of the facilities following the start of operation. For the main portion of the project, the consultant service TOR plans to respond by introducing supervision of the operation and maintenance system.

8. Plans for Future Evaluation

- (1) Indicators for Future Evaluation
 - (a) Maximum output (MW)
 - (b) Unplanned outage hours (hours/year)
 - (c) Capacity factor (%)

- (d) Net electric energy production (GWh/year)
- (e) System average interruption duration index (SAIDI) (hours/year/household)
- (f) Electrification ratio in the target area (%)
- (g) Power distribution loss rate in Aceh Province (%)
- (h) Peak load of Aceh Province (MW)
- (i) Electricity consumption (excluding loss) in Aceh Province (GWh)
- (j) FIRR, EIRR (%)

(2) Timing of Next Evaluation

After project completion.