

Ex-ante Evaluation

1. Name of the Project

Country: The Republic of Indonesia

Project: PLN Operation Improvement System Project for Supporting Generation Facilities

(Loan Agreement: 03/30/2007, Loan Amount: 4,498 million yen, Borrower: The Republic of Indonesia)

2. Necessity and Relevance of JBIC's Assistance

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 the Outer Java-Bali Systems), and peak demand in the future is expected to grow at an average of about 6.9% annually (6.4% in the Java-Bali System; 8.3% in the Outer Java-Bali Systems). Therefore, alleviating the demand for power, which will become acute, is a pressing issue for Indonesia.

The National Electricity General Plan (RUKN, 2006-2026) of Indonesia recognizes that structural reforms based on the fundamental principles of improving efficiency, transparency, and competitiveness are necessary to establish an efficient and autonomous power sector.

The power sector (inclusive of power generation, transmission, transformation, and distribution) in Indonesia has been operated by the National Electricity Company (PT Perusahaan Listrik Negara (Persero) (PLN), which is organized into 32 business units nationwide. However, in 1995 the assets and the operation, maintenance and management of the Java-Bali System were divided and transferred into two generation subsidiaries, Indonesia Power and PJB (GENCO), to promote efficiency in the power sector and related operations.

Surges in fuel prices and stringency in power supply and demand in recent years have created an urgent need to raise the available factor by cutting the cost price of power generation through an optimal fuel consumption structure and by improving maintenance technology in existing generation facilities. At present, however, information on the operation and maintenance of the various power plants, which would serve as basic data for responding to issues, is poor in reliability, and data collection is inadequate. Therefore, the establishment of a framework for accurate data collection and analysis and the efficient management of existing generating facilities through staff training are required. In addition, in the transmission and transformer sector, significant forced outages occur due to malfunctions of equipment in substations in the Java-Bali System. To improve the reliability of the system, the replacement of equipment in these substations is required.

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. Furthermore, in JBIC's Medium-term Strategy for Overseas Economic Cooperation Operations (April 2005), "basic infrastructure for sustainable growth" is cited as a priority area. The building of an economic infrastructure for establishing an investment climate essential for Indonesia to make the transition from a stage of stability following the Asian currency crisis to a stage of growth is also cited as a priority area. Providing assistance for this project, which will contribute to the efficient operation of existing power plants and transformation equipment, is consistent with this strategy.

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

3. Project Objectives

The objectives of this project are to promote efficient operations in power plants in all Indonesian power systems and to improve the reliability of the Java-Bali System facilities by introducing the operation improvement system into the power generation activities of PLN and its generation subsidiaries, by undertaking the training of employees, and by replacement of the equipment in substations in the Java-Bali System. Through these activities, the project will contribute to economic development in Indonesia by improving the investment climate of that country.

4. Project Description

(1) Target Area

All power generation systems in Indonesia. The project will develop a data collection system called Enterprise Asset Management (EAM) for the Java-Bali and Sumatra systems, and develop the infrastructure of a data communications environment by strengthening IT capacity (increasing network capacity, etc.) in other systems. The project will also replace the equipment in substations in the Java-Bali System.

(2) Project Outline

The following necessary materials and equipment will be purchased and provision of the following services will be provided in the respective areas mentioned above:

- (a) Introduction of a data collection system (EAM System)
- (b) Upgrading and installation of monitoring devices
- (c) Establishment of the GENCO Shared Service Center (GSSC) (Note: The collection and management of power plant operations and maintenance information will be uniform.)
- (d) Reinforcement of the network capacity
- (e) Replacement of equipment in substations
- (f) Capacity building to improve power plant operations and maintenance
- (g) Consulting services (concept design, assistance in bidding, and implementation supervision, etc.)

(3) Total Project Cost/ Loan Amount

6,008 million yen (Yen Loan Amount: 4,498 million yen)

(4) Schedule

April 2007 to September 2013 (78 months)

The project will reach completion upon completion of the training of staff.

(5) Implementation Structure

- (a) Borrower: The Republic of Indonesia
- (b) Executing Agency: PT Perusahaan Listrik Negara (Persero) (PLN)
- (c) Operation and Maintenance System: GSSC (to be established as a subsidiary of PLN)

(6) Environmental and Social Considerations

- (a) Environmental Effects/Land Acquisition and Resident Relocation

(i) Category: C

(ii) Reason for Categorization

This project is categorized as Category C because it does not include projects in sensitive sectors or with sensitive characteristics, does not take place in sensitive areas as stated in the “Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations” (established April 2002), and adverse effects on the environment are deemed to be minimal.

(b) Promotion of Poverty Reduction

None.

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

None.

(7) Other Important Issues

(a) This project is to promote more efficient operation of the Java-Bali System which has been transformed into a loop system through other ODA loan projects (Transmission Line Construction Project in Java-Bali).

(b) This project will promote more efficient operation of the Sumatra System in tandem with the Peusangan Hydroelectric Power Plant Construction Project and the North-West Sumatra Inter-connector Transmission Line Construction Project, which have been approved for this fiscal year.

5. Outcome Targets

(1) Evaluation Indicators (Operation and Effect Indicator)

Indicator	Baseline (year)	Target (2018, 5 years after completion)
(a) EAM and other components	-	
No. of power plants which collect accurate data through EAM	-	19*
No. of trained employees involved in generation operations and maintenance	-	All staff involved in operation and maintenance*
Reduction in costs for maintenance materials (%)	-	2.5
Reduction in forced outage hours (%)	-	7.5
Additional electricity income (million yen/year)	-	61.5
Reduction in fuel costs (million yen/year)	-	122.8
(b) Transformation component	-	
No. of forced outages due to malfunction of circuit breaker (No. of times/year)	2	0*
No. of forced outages due to malfunction of protection relay (No. of times/year)	2	0*

*Target values are expected to be reached two years after completion of the project.

(Note: After commencement of EAM system operation, there are plans to reset the baseline and target once accurate data collection and management become possible.)

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

Based on the conditions below, the project's economic internal rate of return (EIRR) is 13.4%, and the financial internal rate of return (FIRR) is 12.4%.

EIRR

- (a) Cost: project cost (excluding taxes), operation and maintenance expenses
- (b) Benefit: Increase in income from electricity charges, reduction in costs for maintenance materials and equipment, reduction in additional investment costs for IT, increase in oil export income
- (c) Project Life: 30 years

FIRR

- (a) Cost: Project cost, operation and maintenance expenses
Benefit: Increase in income from electricity charges, reduction in costs for maintenance materials, reduction in additional investment costs for IT, decrease in fuel oil costs
- (b) Project life: 30 years

(*Because it is difficult to establish quantitative evaluation indicators for the replacement of equipment in substations, they have not been included in the analysis of the above internal rate of return.)

6. External Risk Factors

None.

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

In the ex-post evaluations of similar past projects, it has been learned that establishment of an appropriate structure for operation, maintenance and management, and securing costs are important for the smooth operation and maintenance of facilities following the start of system operations. In this project, GSSC will be newly established as a subsidiary of PLN, and consultants will undertake implementation supervision in establishing an operation and maintenance structure including the appropriate organization structure and the assignment of personnel and budgetary allocations from the viewpoint of project sustainability.

8. Plans for Future Evaluation

(1) Indicators for Future Evaluation

- (a) Number of power plants collecting accurate data through EAM
- (b) No. of trained employees involved in generation operations and maintenance
- (c) Reduction in maintenance materials costs (%)
- (d) Reduction in forced outage hours (%)
- (e) Additional electricity income (million yen/year)
- (f) Reduction in fuel costs (million yen/year)
- (g) No. of forced outages due to malfunction of circuit breaker (No. of times/year)

- (h) No. of forced outages due to malfunctions of protection relay (No. of times/year)
- (i) Internal rate of return (%)

(2) Timing of Next Evaluation
After project completion