

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: The Republic of Indonesia

Project: Java - Sumatra Interconnection Transmission Line Project (II)

Loan Agreement: December 18, 2015

Loan Amount: 62,914 million Yen

Borrower: The Republic of Indonesia

2. Background and Necessity of the Project

(1) Current State and Issues of the Power Sector in Indonesia

The Indonesian national electricity company, PT. Perusahaan Listrik Negara (Persero) (hereinafter referred to as “PLN”), estimates that Indonesia will have 43,457MW of installed power generation capacity, with 36,787MW of peak demand for power, in 2015. The reserve ratio for power supply facilities is 18%, which is far below PLN’s target of 35%. According to the Long-Term Electricity Development Plan 2015-2024 (RUPTL) prepared by PLN, the demand in Indonesia nationwide is expected to increase at an average annual rate of 8.7% (3,800MW per year), and the peak demand will reach 74,536MW by 2024. Thus, it is urgent to address this tight power supply situation.

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

The National Electricity General Plan (RUKN) formulated by the Ministry of Energy and Mineral Resources in November 2008 emphasizes that the transmission systems should be expanded and strengthened to improve the stability and reliability of power supply and integrated to efficiently supply high-quality electricity. Through the Infrastructure Development Plan 2015-2019 and the 2015 National Budget Allocation, the Government of Indonesia announced its 35,000MW power development acceleration program, in which this Project is included.

This Project is intended to construct an interconnected transmission system to supply electricity to the hard-pressed Java-Bali system from the mine-mouth coal-fired power plants (Sumsel No. 8 to 10 with a total capacity of 3,000MW) to be developed by independent power producers (hereinafter referred to as “IPP”) in Sumatra Island, which is rich in coal reserves. The Project is given high priority since it is expected to provide more reserve capacity for the Java-Bali system.

(3) Japan and JICA’s Policy and Operations in the Power Sector

According to Japan’s Country Assistance Policy for the Republic of Indonesia (revised in April 2012), “assistance for further economic growth” has been identified as a priority area with “infrastructure development in Jakarta Metropolitan Area” as one of its development issues and “program for stable power supply to Jakarta Metropolitan Area” as one of its assistance programs. Meanwhile, JICA’s Country Analysis Paper for Indonesia has designated “improvement of stability and reliability of power supply” as a priority development issue. Thus, this Project is in line with these policy and analysis documents.

Japan has implemented a total of 112 ODA loan projects (with a total commitment of 910.6 billion yen) for the Indonesian electricity sector. Japan has also carried out technical cooperation projects; recent examples include Study on Optimal Electric Power

Development in Java-Madura-Bali (from 2008 to 2009) and Project for Promotion of Clean Coal Technology (CCT) (from 2011 to 2012).

(4) Other Donors' Activity

The World Bank implemented Power Transmission Development Project in 2010 and Upper Cisokan Pumped Storage Hydro-Electrical Power Project in 2011 while stating in its Country Partnership Strategy for Indonesia (2013-2015) that the country should increase power generation capacity to meet the rapidly growing demand in order to strengthen its competitiveness. Meanwhile, the Asian Development Bank's Country Partnership Strategy for Indonesia (2012-2014) has set targets for the electricity sector, such as promoting the use of alternative energy and improving transmission and distribution systems to boost energy efficiency. Under this strategy, the Asian Development Bank implemented Java-Bali 500kV Power Transmission Crossing Project in 2010.

(5) Necessity of the Project

As described above, this Project is in line with the development issues and policies of Indonesia as well as the assistance policies of Japan and JICA; therefore, it is highly necessary and relevant for JICA to implement this Project.

3. Project Description

(1) Project Objectives

By constructing submarine and overhead transmission lines and AC/DC converter stations for the Java-Bali and Sumatra systems, this Project aims to establish an electric power interchange and supply mechanism for these two systems, thereby contributing to the improvement of the tight power supply situation as well as economic development in the Java and Sumatra regions.

(2) Project Site/Target Area: Western Java/Southern Sumatra regions

(3) Project Components

- 1) New construction of a 500kV DC submarine transmission line with a length of approx. 40km
- 2) New construction of 500kV DC overhead transmission lines with a length of approx. 110km in the Java side and approx. 384km in the Sumatra side, respectively
- 3) New construction of relevant converter stations (AC/DC converter and switching stations)
- 4) New construction and expansion of AC overhead transmission lines and relevant substations (in both Java and Sumatra sides)

(4) Loan Amount

210,078 million Yen (of which, Loan Amount: 177,986 million Yen; E/S Loan Amount: 62,914 million Yen)

(5) Schedule

Planned from March 2009 (E/S) to May 2019 (123 months in total); project completion is defined as the commencement of the service (November 2017)

(6) Project Implementation Structure

- 1) Borrower: The Republic of Indonesia
- 2) Executing Agency: National electricity company (PT. Perusahaan Listrik Negara (Persero))

3) Operation and Maintenance System: same as 2) above.

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

1) Environmental and Social Consideration

(i) Category: A

(ii) Reason for Categorization: Involving the construction of a submarine transmission line, this Project falls into the power transmission sector under the JBIC Guidelines for Confirmation of Environmental and Social Considerations (established in April 2002).

(iii) Environmental Permit: The Environmental Impact Assessment (EIA) report for this Project was approved by the Ministry of Environment in August 2009. However, an additional EIA study may be required for the 500kV AC overhead transmission line in the Sumatra side (from Sumsel No. 9 and 10 to the AC/DC converter station) after the locations of these mine-mouth coal-fired power plants are determined if they are outside of the area covered by the approved EIA report.

(iv) Anti-Pollution Measures: It is planned to take measures in accordance with the Environmental Management Plan (RKL) to prevent and mitigate noise, vibration and other adverse effects.

(v) Natural Environment: Although the project site is not located in or around any sensitive areas such as national parks, the installation of the submarine cable may affect coral reefs. The construction will be designed to avoid damage to coral reefs as much as possible, and the coral reefs required to be removed will be transplanted to other places.

(vi) Social Environment: This Project will require the acquisition of approximately 306 ha of land but not involve involuntary resettlement of residents. These processes will be managed in accordance with relevant plans as well as Indonesian laws and regulations.

(vii) Other / Monitoring: The project site will be monitored for atmospheric, noise, and other pollution during the construction and operation phases in accordance with the Environmental Monitoring Plan (RPL). The coral reefs in the site will be also monitored after the installation of the marine cable. These monitoring results will be reported by the project implementing agency to JICA.

2) Promotion of Poverty Reduction: none in particular

3) Promotion of Social Development (e.g. Gender Perspective, Measure for Infectious Diseases Including HIV/AIDS, Participatory Development, Consideration for the Handicapped etc.): none in particular

(8) Collaboration with Other Donors: none in particular

(9) Other Important Issues: none in particular

4. Targeted Outcomes

(1) Quantitative Effects

1) Operation and Effect Indicator

Indicator	Baseline	Target (2019) 【Expected value 2 years after project completion】
(i) Capacity utilization rate (%) 500kV bus of the AC/DC converter stations	N.A.	99.9
Main transformers of the AC/DC converter stations	N.A.	98.6
AC overhead transmission lines	N.A.	99.6
DC transmission facilities (including converters)	N.A.	96.0
(ii) Transmission loss rate (%) DC transmission facilities (including converters)	N.A.	5.0

2) Internal Rate of Return: EIRR: 11.8% (FIRR: not calculated)

Cost: Project costs (excluding taxes) and operation & maintenance costs

Benefit: Substitute construction for coal-fired power plants in Java Island

Project Life: 30 years

- (2) Qualitative Effects: Improvement of convenience and promotion of economic activities by ensuring stable power supply in Java and Sumatra Islands; and promotion of economic development and improvement of the investment climate by enhancing the reliability of power supply in the regions.

5. External Factors and Risk Control

None in particular

6. Lessons Learned from Past Projects

- (1) Results of Evaluation of Similar Past Projects

The ex-post evaluation of Java-Bali Transmission Line/Substation Development Project in Indonesia suggested that the stability of power supply could have been further increased if other high-voltage substations outside of the project had been expanded to match the capacity of the project facilities.

- (2) Lessons for the Project

This Project is designed to achieve possible best outcomes by reviewing the medium- to long-term power development plan at the preparatory study to collect information on the development and expansion plans of power generation, transmission, and distribution facilities.

7. Plan for Future Evaluation

- (1) Indicators to be Used

- 1) Capacity utilization rate (%)

- (i) 500kV bus of the AC/DC converter stations

- (ii) Main transformers of the AC/DC converter stations
- (iii) AC overhead transmission lines
- (iv) DC transmission facilities (including converters)
- 2) Transmission loss rate (%)
 - (i) DC transmission facilities (including converters)
- (2) Timing
 - Two years after project completion