

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: The Republic of Indonesia

Project: Geothermal Development Acceleration Program (Hululais Geothermal Power Plant Project (E/S))

Loan Agreement: December 18, 2015

Loan Amount: 657million Yen

Borrower: The Republic of Indonesia

2. Background and Necessity of the Project

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

According to PT. Perusahaan Listrik Negara (Persero) (hereinafter referred to as “PLN”), the peak demand for power in Indonesia nationwide in 2015 is 36,787MW, while the installed capacity is 43,457MW and the reserve margin is 27% (Java Bali), far short of PLN’s target of 35% for Java Bali and 40% for Sumatra and East Indonesia. PLN’s Long Term Electricity Development Plan (RUPTL) (2015-2024) estimates that electricity demand of the country will reach 74,536MW in 2024, annually increasing approximately 8.7% on average. Thus alleviation of stringency in power demand is an urgent issue.

The peak power demand in the Sumatra system, to which the project power plants will be connected, is estimated at 5,590MW in 2015. It is projected to increase with economic growth, reaching 9,687MW by 2021, when those power plants are planned to be completed. Meanwhile, the planned power capacity of the system is 7,517MW as of 2015. Provided that there will be no additional power development, the capacity is estimated to decline to 7,381MW by 2021 due to the shutdowns of existing facilities caused by deterioration. Thus, the construction of new power plants is urgently required.

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

To meet the increasing power demand and to mitigate climate change, the Indonesian government is promoting energy diversification policy, including the promotion of renewable energy development. Presidential Regulation No. 79/2014 (issued on October 17, 2014) on National Energy Policy has aimed to promote a balanced energy mix by raising the share of new and renewable energy to 23% (including 7% of geothermal energy) by 2025 and to 31% by 2050. 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.

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

The Government of Japan considers “support for disparity reduction and building of a safe society” as one of the priority areas in the “Country Assistance Policy for Indonesia” (April

2012), it emphasizes “disparity alleviation and connectivity development” as one of the development issues. It specifically prioritizes “the program for rural development and development of hub urban district” as one of the cooperation programs. This Project will contribute to regional power and resource development, which is one of the targets of the assistance program. Meanwhile, JICA Country Analysis Paper for Indonesia also analyzes has designated “improvement of stability and reliability of power supply” and “reduction of impacts on the global environment” as key development issues. Thus, this Project is in line with these policy and analysis documents.

JICA has implemented a total of 112 ODA loan projects (with a total commitment of 910.6 billion yen) for the Indonesian electricity sector. JICA has also been carrying out technical cooperation projects; “The Project to Develop Medium and Long Term Geothermal Development Policy” and “Project for Technology Development of Steam-spot Detection and Sustainable Resource Use for Large Enhancement of Geothermal Power Generation.”

(4) Other Donors’ Activity

The World Bank states in its Country Partnership Strategy for Indonesia (2013-2015) that it will support infrastructure development in the electricity sector so that Indonesia can 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 in the electricity sector, such as promoting the use of renewable energy and improving transmission and distribution systems to boost energy efficiency. Under this strategy, the Asian Development Bank is to support programs and projects for transmission lines, geothermal power generation, renewable energy, and energy efficiency.

(5) Necessity of the Project

As described above, this Project is given high priority in the development policies of Indonesia and falls within one of the priority areas of Japan and JICA. Moreover, the Project can contribute to the mitigation of climate change. Therefore, it is highly necessary and relevant for JICA to provide assistance through the Project.

3. Project Description

(1) Project Objectives

The objective of the project is to improve the power supply capacity in the Sumatra system, by constructing the Hululais Geothermal Power Plant, thereby contributing to the betterment of the living standards as well as economic growth of the region by improving the investment climate and to the mitigation measures against climate change through the development of a renewable energy source and reduction of greenhouse gas emissions and air pollution.

(2) Project Site/Target Area: Lebong Regency, Bengkulu Province

(3) Project Components

1) Drilling of steam wells and construction of Facilities for Collecting and Reducing Steam (FCRS)

2) Construction of two geothermal power plants (with a capacity of 55MW each)

3) Construction of power transmission, substation, and distribution facilities

4) Consulting services (detailed design, tender assistance, construction supervision, etc.)

This engineering service (E/S) loan will be provided for consulting services for 3) to assist PLN in implementing the Project.

(4) Estimated Project Cost (Loan Amount)

1,367million Yen (Loan Amount: 657 million Yen)

(5) Schedule

December 2015-December 2021 (73 months in total); project completion is defined as the completion of all disbursements

(6) Project Implementation Structure

1) Borrower: The Republic of Indonesia

2) Executing Agency: PT. PLN (Persero) for the power plants and transmission lines ; PT. Pertamina (Persero) for drilling of steam wells and construction of FCRS)

3) Operation and Maintenance System: PLN will operate and maintain the power plants and transmission lines. PT. Pertamina will authorize its subsidiary, PT. Pertamina Geothermal Energy (hereinafter referred to as "PGE"), to operate and maintain FCRS.

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

1) Environmental and Social Consideration

(i) Category: B

(ii) Reason for Categorization: This Loan is for Engineering Services, and it does not fall into Category C according to "the JBIC Guidelines for Confirmation of Environmental and Social Considerations" (established in April 2002).

(iii) Environmental Permit: PLN is preparing an Environmental Impact Assessment (EIA) report for this Project, which is expected to be approved by the end of 2016. Details, including the approval, will be confirmed later in this Project (E/S).

(iv) Anti-Pollution Measures: It is planned to conduct environmental impact assessment and develop mitigation measures for hydrogen sulfide (H₂S), waste management, and water, noise, and other pollution control. Details will be confirmed later in this Project (E/S).

(v) Natural Environment: Since the transmission line to be constructed may run through a designated conservation forest, it is planned to apply for forest land development permission in accordance with local procedures. Details will be confirmed later in this Project (E/S).

(vi) Social Environment: Details will be confirmed later in this Project (E/S).

(vii) Other / Monitoring: Details will be confirmed later in this Project (E/S).

- 2) Promotion of Poverty Reduction: None in particular
- 3) Promotion of Social Development (gender consideration, prevention measures of HIV and other infectious diseases, participatory development, consideration for disabilities, etc.): The power plant construction package in this Project is planned to include HIV/AIDS prevention activities for construction workers to be employed during the construction phase.
- (8) Collaboration with Other Donors: None in particular
- (9) Other Important Issues: By introducing renewable energy systems, this Project can reduce greenhouse gas emissions and contribute to climate change mitigation.

4. Targeted Outcomes

(1) Quantitative Effects

- 1) Operation and Effect Indicators: To be determined at the construction phase of this Project.
- 2) Internal Rate of Return: To be determined at the construction phase of this Project.

- ##### (2) Qualitative Effects: Improvement of living standards in Sumatra Island by ensuring stable power supply; improvement of the investment climate by enhancing the reliability of power supply; and mitigation of global environmental problems by introducing renewable energy sources.

5. External Factors and Risk Control

Steam supply and natural disasters

6. Lessons Learned from Past Projects

(1) Evaluation Results of Similar Projects

The ex-post evaluation of completed ODA loan projects indicated that in geothermal power generation projects, it is essential to secure steam supply to achieve the targeted outcomes. Moreover, the ex-post evaluation of Tiwi Geothermal Power Plant Complex Rehabilitation Project in the Philippines suggested that it is important to (i) have adequate development and rehabilitation plan which keep the balance of geothermal reservoirs and (ii) ensure country's strong commitment for the implementation of the project.

(2) Lessons applicable to the Project

In this Project, the results of a surface survey and drilling of steam wells for Unit 1 indicates that the project site may provide a large quantity of resources. PGE is planning to conduct exploratory drilling to estimate the steam supply available for Unit 2 before the appraisal of the construction loan of this Project.

The consulting services in this Project will include reservoir simulation to develop a long-term resource management plan and make accurate estimates in order to assure the

sustainability of the Project. Moreover, this E/S loan will be provided to review the well operations monitoring plan and the supplementary well development plan after the start of operations. Furthermore, because this Project is given priority in the 35,000MW power development acceleration program implemented by the Government of Indonesia and because a 30-year steam supply agreement has been made between PLN and PGE, it can be safely assumed that the Indonesian government is strongly committed to this Project.

7. Plan for Future Evaluation

(1) Indicators to be Used

To be finalized by loan for construction

(2) Timing

To be finalized by loan for construction