Japanese ODA Loan

Ex-Ante Evaluation

1. Name of the Project

Country : Republic of Honduras
Project : Cañaveral and Río Lindo Hydropower Strengthening Project
Loan Agreement : March 26, 2015
Loan Amount : 16,000 million yen
Borrower : The Government of the Republic of Honduras

2. Background and Necessity of the Project

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

The real GDP growth rate in Honduras has reached 2.3% in average from 2009 to 2013 driven by Free Trade Agreement with the United States, and its electricity demand rate has increased by 2.5% in average from 2009 to 2013. It is necessary to strengthen the power generation capacity in order to satisfy the electricity demand expected to increase further in the future. National generation capacity is 1,743 MW, of which thermal electric power generation accounts for 55% (959 MW), hydroelectric power generation accounts for 32% (558 MW) of total energy matrix, and 91% of the thermal electric power is supplied by Independent Power Producers (hereinafter referred to as "IPP"). The generation capacity of national electric energy company (Empresa Nacional de Energía Eléctrica, hereinafter referred to as "ENEE") is 549 MW, of which hydroelectric power generation is 464 MW which is equivalent to 83% of the national hydroelectric power generation. However, ENEE has a continuous deficit of its financial structure, and its deficit reached 6,964 million lempira (about 268 million dollar) and ▲1.8% of GDP in 2013. Principal factors of the deficit are due to 32% of transmission and distribution losses, 83 million lempiras (about 4 million dollars) in monthly average of subsidy payment to end users, and expenses for purchase of electricity through costly Power Purchase Agreements (hereinafter referred to as "PPA") with IPP. Especially, expenses for purchase of electricity through PPA occupied 74% of the total expenses for operation and maintenance of ENEE in 2013, and thus, it is urgent to maitain and strengthen its own power generation capacity with economical power generation cost.

(2) Development Policies of the Electric Power Sector in Honduras and the Position of the Project

The Hernández administration inaugurated in January 2014 has implemented an electric power sector reform law since July of the same year and has coped with improvement of ENEE's financial structure through its institutional reform and reduction of transmission and distribution losses etc. Furthermore, the present government is taking over "Country Vision 2010 - 2038 and

National Plan 2010-2022" announced by the former administration, proceeding to quit the expensive PPA, and setting as goal that ratio of the renewable energy reached 80% of energy matrix by 2022.

Cañaveral and Río Lindo hydroelectric power plants were the first hydroelectric power plants of the country constructed in 1964 and 1974 respectively, and they are generating 24% of the national hydroelectric power generation capacity. Both plants are not only contributing as ENEE's own electric power sources to its financial structure but also playing an important role as a reservoir type power plant utilized for peak power demand. However, they have not been repaired or reinforced after their mayor maintenance undertaken in 1993, and natural wear and water leak due to age deterioration are detected in some of the equipment, till both plants have reached the moment for renewal. This Project is regarded to be an important project in the electric power sector reform because this Project will maintain and strengthen ENEE's own capacity of electricity supply by strengthening power generation capacity of both plants.

(3) Japan and JICA's Assistance Policy and Operations in the Electric Power Sector in Honduras

The JICA Country Analysis Paper for the Republic of Honduras analyzes that "Disaster Risk Reduction and Climate Change Management" is one of the prioritized pillars for cooperation. The Japanese Country Assistance Policy for the Republic of Honduras also sets "Mitigation of Risk of Climate Change" as one of the cooperation programs, and this Project is situated in this program. As regards the cooperation for the electric power sector, JICA has extended Japanese ODA Loan for a project of construction of El Cajón Hydroelectric Power Plant which has the largest maximum output of 300 MW in 1980 in the Republic of Honduras. This Project is a parallel cofinancing project with the Inter-American Development Bank (hereinafter referred to as "IDB") under the "Cofinancing for Renewable Energy and Energy Efficiency (CORE)", which is a cofinancing mechanism created between JICA and IDB in March 2012 under awareness of the problem of serious negative effects of climate change in Central America and the Caribbean region.

(4) Other Donors' Activities

IDB, other than cofinancing for this Project, is implementing Policy Based Loan for the promotion of the electric sector reform. The World Bank is implementing "Power Sector Efficiency Enhancement Project (PROMEF)" to consolidate ENEE's institutional management.

(5) Necessity of the Project

This Project will contribute to initiatives of the Government of the Republic of Honduras to various issues in the electric power sector through improvement of ENEE's financial structure and promotion of renewable energy by rehabilitating

and strengthening the existing hydroelectric power plants which reach the moment for renewal. As this Project is in line with the Japanese and JICA's country assistance policy, the necessity and relevance for JICA's support in implementing this Project are high.

3. Project Description

(1) Project Objective(s)

The objective of this Project is to contribute to the sustainable economic development through improved stableness of electricity supply, and the mitigation of the negative effects of climate change through ensuring and strengthening the electric generation capacity through renewable sources, by rehabilitating and empowering the facilities of the existing Cañaveral and Río Lindo Hydroelectric Power Plants, located in the northwestern part of the Republic of Honduras.

(2) Project Site/Target Area

San Francisco de Yojoa City, Cortés Province

(3) Project Component(s)

1) Rehabilitation and strengthening of power generation equipment (maximum output of total of both plants; 109 MW→129.8 MW) (International Competitive Bidding)

2) Rehabilitation and strengthening of auxiliary equipment and civil facilities (Local Competitive Bidding)

3) Consulting services (tendering assistance for 1), 2), support for implementation, etc.) (Short List)

4) Rehabilitation and strengthening of substations, and its consulting service etc.

(4) Estimated Project Cost

19,672 million yen (Japanese ODA Loan amount : 16,000 million yen)

(5) Project Schedule

From March 2015 to August 2022 (total : 90 months). The Project completion is defined as when the main equipment of both plants is put into service.

(6) Project Implementation Structure

1) Borrower: The Government of the Republic of Honduras

2) Guarantor : None

3) Executing Agency : Empresa Nacional de Energía Eléctrica : ENEE

4) Operation and Maintenance System : ENEE has operated and maintained Cañaveral and Río Lindo Hydroelectric Power Plants for more than 40 years and the quality of maintenance has been fine. There has not been any serious failure other than failure due to age deterioration.

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

1) Environmental and Social Considerations

① Category: B

② Reason for Categorization : Under the "JICA Guidelines for Environmental and Social Considerations" (April 2010) (herein after referred as "JICA Environmental Guidelines"), the Project is categorized as "B" because the Project is not considered to be of a large scale hydroelectric project, is not located in a sensitive area, and has none of the sensitive characteristics under the JICA Environmental Guidelines, it is not likely to have a significant adverse impact on the environment.

③ Environmental Permit : The Executing Agency has obtained Environmental Permit License from Ministry of Natural Resources and Environment of the Republic of Honduras in October 2012. According to the Honduran national law, it is not obligatory to make Environmental Impact Assessment Report for this Project.

④ Anti-Pollution Measures : Some of the equipment which is dismantled during the civil works of this Project contain asbestos and PCB. Such asbestos-contained wastes and PCB-contained wastes are treated and disposed in accordance with methods and manuals stipulated in the Republic of Honduras, satisfying criteria of emission stipulated in the national law.

⑤ Natural Environment : The target sites of the project are not in the vicinity of any vulnerable areas such as national park. Adverse impact on natural environment is expected to be minimal.

⑥ Social Environment : This project is implemented inside the existing hydroelectric plants; it is not expected to involve any resettlement.

⑦ Other/Monitoring : Monitoring on disposal of asbestos and PCB during the Project is expected to be implemented by the Executing Agency.

2) Promotion of Poverty Reduction : None

3) Promotion of Social Development (e.g. Gender Perspective, Measures for Infectious Diseases Including AIDS, Participatory Development, Considerations for the Persons with Disabilities, etc.) : None

(8) Collaboration with Other Schemes/Donors

This Project is a parallel cofinancing project with IDB under CORE. Proceeds of Japanese ODA Loan will be allocated to power generation equipment, and IDB's loan will be allocated to substation.

(9) Other Important Issues

This Project will contribute to reduction of greenhouse gas (GHG) by aiming at strengthening power generation capacity through renewable energy. Climate change will be mitigated through this Project, and CO2 emission reduction is expected to be about 21,600 tons per year.

4. Targeted Outcomes

(1) Quantitative Effects

1) Operation and Effect Indicators

Hydroelectric Power Plant	Indicators	Baseline (average 2004-2013)	Target (2023) 【2 years after completion】
Cañaveral Hydroelectric Power Plant	Maximum Output (MW)	29.0	32.2
	Generated Energy (GWh/year)	171.5	179.7
	Plant Factor (%)	67.5	65.9
	Planned Outage Hours (hours/unit/year)	88.09	40.09
Río Lindo Hydroelectric Power Plant	Maximum Output (MW)	80.0	97.6
	Generated Energy (GWh/year)	532.0	553.6
	Plant Factor (%)	76.35	64.75
	Planned Outage Hours (hours/unit/year)	143.75	95.75

2) Internal Rate of Return

Based on the following preconditions, the the economic internal rates of return (EIRR) of Cañaveral and Río Lindo Hydroelectric Power Plants are 15.4% and 29.8 % respectively, and the financial internal rates of return (FIRR) are 13.7% and 27.1% respectively.

【EIRR】

Cost：Project cost, operation and maintenance expenses

Benefit：Prevented outage, increase of electricity demand

Project Life：40 years

【FIRR】

Cost：Project cost, operation and maintenance expenses

Benefit：Reduction of purchase of electricity by increased generation energy, Increased incentive revenue through increased generation capacity

Project Life：40 years

(2) Qualitative effects

Contribution to the Honduran sustainable economic development by ensuring stable and economical electricity supply

5. External Factors and Risk Control

Implementation on schedule of IDB's parallel cofinancing project

6. Lessons Learned from Past Projects

(1) Results of Evaluation of Similar Past Projects

The ex-post evaluation of "Umiam Hydro Power Station Renovation Project", the Japanese ODA Loan to India, indicates a lesson that it is important to prevent failure posterior to rehabilitation by confirming well renovation scopes of

materials and equipment to be necessarily renovated and ensure enough fund for the scopes.

(2) Lessons for the Project

Since this Project is also a project of rehabilitation of power plants, renovation scopes of materials and equipment will be confirmed well and included in the Project's scopes. Further, since the condition of main equipment is turned out only after dismantled, percentage of contingency amount is raised to avoid that necessary material and equipment would not be renovated because of lack of fund.

7. Plans for Future Evaluation

(1) Indicators to Be Used

Same as 4. Targeted Outcomes (1) Quantitative Effects 1) Operation and Effect Indicators

(2) Timing

2 years after projects completion