

## Ex-Ante Evaluation

### 1. Name of the Project

Country: The Republic of Nicaragua

Project: "National Sustainable Electrification and Renewable Energy Project"

Loan Agreement: October 8, 2013

Loan Amount: 1,496 million yen

Borrower: The Republic of Nicaragua

### 2. Background and Necessity of the Project

#### (1) Current State and Issues of the Electricity Sector in Nicaragua

Nicaragua achieved economic growth at an average rate of 3.1 percent per year (from 2007 to 2011) in terms of GDP, thanks to the Free Trade Agreement with the USA (DR-CAFTA) among other circumstances that favored the nation during the period. Consequently, power demand has been picking up at an annual rate of 5.0 percent (2007-2011). Meanwhile the country has been experiencing chronic power shortages since the 2000s, and this led the country to increase thermal power development, which can be developed in a shorter-term. As a result, today 77 percent (837.9 MW) of the power generated in the country come from thermal power plants while only 23 percent (255.8 MW) come from renewable sources (2011). The country's high dependency on thermal power is engraving the current account imbalance along with today's increasing international oil prices. The country's power sector thus faces the urgent challenge of alleviating the power supply-and-demand imbalance by diversifying the energy source and promoting energy efficiency.

The United Nations Economic Commission for Latin America and the Caribbean (UNECLAC) reported that the nationwide percentage of households with electricity supply in Nicaragua is approximately 78 percent (2011), marking a lower level than the average of the five neighboring countries in Central America which is approximately 91 percent. Further, in rural areas, where power distribution companies generally have difficulties in collecting their investments, the electrification rate of households is as low as about 30 percent. Improving rural electrification rates is another important issue to be solved in the country's power sector. The Nicaraguan government plans to promote rural electrification through public finance, and seeks to do so through other energy sources than the traditional and common diesel fuel as for remote areas where connectivity to the central grid is difficult, avoiding further dependence on thermal power generation.

#### (2) Development Policies of the Electricity Sector in Nicaragua and Priority of the Project

In 2010, the Nicaraguan government launched the National Program of

Sustainable Electrification and Renewable Energy (hereafter referred to as the “PNESER”) which aims to promote rural electrification, use of renewable energy, and energy efficiency in cooperation with the Inter-American Development Bank (IDB) and several other donors. More specifically, the program prioritizes the seven following components as particularly urgent projects, and aims to convert 44 percent of the country’s power generation source to renewable energy and achieve a household electrification rate as high as 84 percent by 2016: 1) Rural electrification through network extension, 2) normalization of services in settlements (prevention of illegal connection), 3) expansion in isolated areas with renewable energy, 4) preinvestment and Studies for Generation Projects with Renewable Energy, 5) energy efficiency programs, 6) strengthening the transmission system in rural areas, and 7) sustainability of Isolated Systems of the Nicaraguan Electricity Company (ENEL).

The “National Sustainable Electrification and Renewable Energy Project” (hereafter referred to as “the Project”) will finance the sub-projects included in component 3) which contribute to the use of renewable energy and component 5) that contribute to promote energy efficiency.

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

The Project forms part of “Program for Disaster Risk Alleviation and Environmental Conservation” under the pillar “Environmental Conservation and Disaster Prevention,” which is one of the priority areas of Japanese assistance for Nicaragua (March 2013). In March 2012, JICA and the IDB launched the “Cofinancing for Renewable Energy and Energy Efficiency” scheme (hereafter referred to as the “CORE Scheme”) for Central America and the Caribbean Region. The Project will be implemented under the CORE Scheme and meets the assistance policy of JICA.

(4) Other Donors’ Activities

The IDB has assumed leadership in coordinating donors for PNESER. The major donors other than the IDB and JICA are the Central American Bank for Economic Integration (CABEI), Export-Import Bank of Korea (KEXIM), European Investment Bank (EIB), OPEC Fund for International Development (OFID), and Nordic Development Fund (NDF), etc.

(5) Necessity of the Project

As discussed above, the Project contributes to the use of renewable energy and promotion of energy efficiency, both of which are important issues for the country, as part of the PNESER which is jointly implemented by the Nicaraguan government and donors. Further, the Project is also consistent with the assistance policies of Japan and JICA. Thus, both the need and relevance for JICA’s support for this project implementation are high.

### **3. Project Description**

- (1) Purpose of the Project: The objective of the Project is to promote renewable energy and energy efficiency in Nicaragua, by constructing small hydropower plants (Pequeñas Centrales Hidroelectricas) and introducing energy efficient equipment in governmental and residential sector, thereby contributing to the mitigation of global climate change.
- (2) Project Site / Target Area: All areas in the Republic of Nicaragua
- (3) Project Component
  - ① Construction of small hydroelectric plants (via international competitive bidding): about 4 locations; output, 100 to 1,000 KW each
  - ② Promotion of energy efficiency (via international competitive bidding): installation of public lighting (about 10,000 units); replacement of magnetic fluorescent lights (MFL) with electronic lighting (EL) in the government sector (about 30,000 units); replacement of incandescent bulbs(IB) with compact fluorescent bulbs(CFL) in the residential sector (about 1.8 million units)
- (4) Total Project Cost  
2,192 million yen (Loan Amount: 1,496 million yen)
- (5) Project Schedule: Scheduled from October 2013 to November 2016 (38 months in total). The Project completion is defined as commencement of the service of the facilities.(November 2016).
- (6) Project Implementation Structure
  - 1) Borrower: The Republic of Nicaragua
  - 2) Executing Agency: Program Coordination Unit of PNER (UCP-PNER) Empresa Nacional de Transmisión Eléctrica( ENATREL)
  - 3) Systems for Operation, Management, and Maintenance: Small hydroelectric plants by community organizations; streetlights by private power distribution companies; public facility lighting by the respective public organizations; housing lights by respective households
- (7) Environmental and Social Consideration/Poverty Reduction/Social Development
  - 1) Environmental and Social Consideration
    - ① Category: B
    - ② Reason for Categorization: The project is not located in a sensitive area, nor has it sensitive characteristics, nor falls it into sensitive sectors under the JICA guidelines for environmental and social considerations (April, 2010), and its potential adverse impacts on the environment are not likely to be significant.
    - ③ Environmental Permit: An Environmental Impact Assessment (EIA) Report for this project is not required under the Nicaraguan Law.

- ④ Anti-Pollution Measures: As for the effects of the Project to water quality, noise, and other factors during construction, specific alleviation measures will be finalized at the detailed design.
- ⑤ Natural Environmental Aspect: The site targeted in the Project is not projected to be in an area that would tend to be affected, such as a national park, anything similar, or in any other surrounding area.
- ⑥ Social Environmental Aspect: The Project will entail construction of small hydroelectric plants, but resettlement will not be necessary. Acquisition of land is projected to be minimum.
- ⑦ Other/Monitoring: The quality of the atmosphere, water, and other environments will be monitored during construction by the executing agency.
- 2) Promotion of Poverty Reduction: The Project includes components that consist of construction of small hydroelectric plants whose objective is to electrify rural areas along the North Atlantic coast, where the poverty rate (69 percent) is higher than the national average (43 percent). Therefore it is expected that the Project contribute to reduce poverty by improving the living standards of the beneficiary households.
- 3) Promotion of Social Development (e.g., Gender Perspective, Measure for Infectious Disease including HIV/AIDS, Participatory Development, Considerations to persons with disabilities, etc.): Not Applicable.
- (8) Collaboration with Other Schemes, Donors, etc.: Joint Cofinancing with the IDB under the CORE scheme
- (9) Other Important Issues: As for the construction of small hydroelectric plants, the site selection for several locations will be conducted based on the criteria regarding environmental and social considerations, economic aspect, and number of beneficiaries, which are specified apart. Moreover, the Project aims to build small hydroelectric plants and replace existing lightning with energy-saving ones, thereby contributing to reduce the emissions of greenhouse gases (GHG).

#### 4. Effects of the Project

##### (1) Quantitative Effects

###### 1) Operational and Effect Indicators

Indicator	Reference value (2013 actual)	Target (2018) 【2 years after Project completion】
Electrification of remote settlements by renewable energy (small hydroelectric plants)		
Unscheduled blackout hours per year	-	To be checked after the F/S
Percentage of facility utilization (%)	To be set for each sub-project when the F/S is finished	To be set for each sub-project when the F/S is finished

Sending-end electric energy (GWh/year)	To be set for each sub-project when the F/S is finished	To be set for each sub-project when the F/S is finished
Maximum output (MW)	To be set for each sub-project when the F/S is finished	To be set for each sub-project when the F/S is finished
Promotion of energy efficiency		
Number of streetlights replaced	0	10,000
Number of lights replaced in governmental sector	0	30,000
Number of lights supplied in residential sector	0	1,800,000

- 2) Internal Rate of Return: To be calculated for each sub-project when the F/S is finished.
- (2) Qualitative Effects: Inhibition of the emissions of contaminants into the atmosphere and alleviation of climate change by using renewable energy and promoting energy efficiency.

#### **5. External Factors and Risk Control**

- (1) Nicaragua's policy must not undergo a major change concerning rural electrification and renewable energy.
- (2) No opposition will be raised by local communities against the construction of small hydroelectric plants.

#### **6. Evaluation Results of Previous Similar Projects and Lessons Learned for the Project**

- (1) Evaluation Results of similar projects

The ex-post evaluation of previous similar projects of the power sector indicates that, if JICA is to finance part of a project through cofinancing, JICA, as well as other agents, will need to require the executing agency to take a proactive initiative in administrating the entire project as well as coordinating the implementation with consultants and constructors.

Moreover, the ex-post evaluation, along with other information concerning the "Water Supply and Sewerage System Improvement Project" of El Salvador (i.e., another cofinancing project) indicates that part of the project was delayed due to a complex implementation procedure. The evaluation indicates that, even when some activities are commissioned to another donor through a co-financing scheme, it is desirable that JICA undertake the project through deliberation with stakeholders of the recipient country.

- (2) Lessons Learned for the Project

The Project is based on joint cofinancing under the CORE scheme with the IDB,

therefore, the procurement and disbursement will be executed as per the IDB guidelines. Based on the lessons learned above, confirmation of the status and advice to the executing agency will be practiced together with the IDB not only by checking progress reports but also by holding meetings with the executing agency by JICA, as necessary.

The implementation of the Project is also commissioned to the IDB as per the co-financing scheme. While using the program design and appraisal contents of the IDB, JICA dispatched its own appraisal mission, and held detailed deliberation with the executing agency and the borrower. During the implementation of the Project, the responsible overseas office of JICA can participate in related meetings. In addition, JICA dispatches a secondee to the IDB in order to ensure smooth communication between the IDB and JICA under the CORE scheme in an appropriate and timely manner.

## **7. Plan for Future Evaluation**

- (1) Indicators for Future Evaluation
  - 1) Utilization factor (%)
  - 2) Sending-end electric energy (GWh/year)
  - 3) Maximum output (MW)
  - 4) Number of streetlights replaced
  - 5) Number of lights replaced in the government sector
  - 6) Number of housing lights supplied
  - 7) Internal profitability (%)
- (2) Timing for Future Evaluation
  - Two years after completion of the Project

End