

Ex-post Evaluation Report 2012-09

Electrical Grid Expansion in Nicaragua

Loan Agreement No. : NIC-001-1998

Year Month Date : 2000. 11. 20

Country : Nicaragua

The Export-Import Bank of Korea
(Government Agency for the EDCF)

EDCF Evaluation Team

(Evaluated by Institute of International Affairs,
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I. Project Outline

- This project was implemented as part of Nicaragua's national electrical grid expansion project with the goal of improving the living standards of local inhabitants and of encouraging the industrial development of the project area. The government of Nicaragua anticipated that such a project would promote productivity in electric power transmission, which has been entirely run by the state since the break-up of the country's power sector. The government also hoped to increase access to electricity which was one of the targets of its national development plan.

- The project was carried out from September 2001 until March 2009, for a total duration of ninety months. There had been two changes in project scope due to various problems such as the fragmentation of the power industry, modification in project area informed by research in electricity demand, trouble in securing a site for the electric power substation, etc. The project was delayed by 66 months as a result. The owner of this project - and the debtor of the EDCF loan for the project - is Nicaragua's state-run power transmission utility National Company of Transmission of Electricity (Empresa Nacional de Transmisión Eléctrica, ENATREL); the payment of the EDCF loan was guaranteed by the Ministry of Finance of Nicaragua.

- The project loan (loan number: NIC-001-1998) of USD 5.7million is to be repaid over a period of thirty years (including a 10-year grace period) in regular semi-annual installments, with an annual interest rate of 2%. The due date for capital expenditure was set at 30 months from the effective date of the loan.

[Project information and cost]

(Unit: USD thousand)

Category	Total Project Cost		EDCF		
	Planned amount ¹⁾	Actual amount	Amount limit (A) ¹⁾	Actual amount(B)	Difference (B-A)
1. Cost of construction (of electric transformer, transmission and distribution equipment, etc.)	5,694	5,694	5,694	5,694	-
2. Material and equipment	1,600	1,859 ²⁾	-	-	-
Subtotal	7,294	7,553	5,694	5,694	
3. Loan commission rate	6	6	6	6	-
Total project cost	7,300	7,599	5,700	5,700	-

1) Amount according to L/A

2) Additional purchase of necessary material and equipment (paid entirely by Nicaragua) due to increased number of electric power substations (3 to 11), situations where controlling other project implementing agencies was impossible, etc.

Nicaragua has nationally prioritized some sectors for development - electric power, water supply, education, etc. - and is making an effort to improve the indicators related to those sectors. Nicaragua's national average electrification rate of 55% (as of 2006) is substantially lower than the average for Central and South America which is 92% (as of 2005). This is due to an urban-rural imbalance in access to electricity (urban: 90%, rural: 40%). The government of Nicaragua has therefore set the target of raising access to electricity in rural areas by 7% per year.

- EDCF mainly supports national development projects that are given high priorities by the recipient government. They are mostly infrastructure projects that are fundamental for economic development but require large amounts of capital to build, such as roads, railways, ports, airports, communication networks, and power grids. This project fitted this general profile, and was therefore selected for EDCF support.

- As a result of this project, electric power substations were built and electric equipment was supplied to install power lines in 11 areas in western Nicaragua: Nandaime, Ticuantepe, Las Banderas, Boaco, La Gateada, El Viejo, Leon, Estelí, Yalagüina, Asturias, and Central America Hydroelectric Power Station.

[Project Statement]

Electric Power Station	Installation Details	Consistency with the Plan
Nandaime	Bay 138KV power line	Consistent
Ticuantepe	15/25 MVA new electric transformer	
Las Banderas	Bay 138KV electric transformer	
Boaco	Bay 138KV power line Bay 138KVelectric transformer	
La Gateada	Bay 138KV electric transformer	
El Viejo	15/25 MVA new electric transformer	
Leon	15/25 MVA new electric transformer	
Esteli	Communication equipment (PLC Digital)	
Yalaguina	Communication equipment (PLC Digital)	
Asturias	Communication equipment (PLC Digital)	
Central America Hydroelectric Power Station	Communication equipment (PLC Digital)	

- The project itself was not sufficiently large to bring about a radical change in Nicaragua's power industry; it is worth noting, however, that careful modifications in its planning resulted in the allocation of materials and equipment to the regions that needed them most. Another positive aspect of the project is that the facilities are functioning well without any breakdowns.

- As a follow-up to the project, EDCF is participating in Nicaragua's renewable energy and sustainable electrification project (Programa Nacional de Electrificación Sostenible y Energía Renovable: PNESER) in which nine donor organizations including the World Bank are participating.

- The project evaluation followed ODA Korea's integrated evaluation guidelines and integrated evaluation manual, and EDCF's evaluation manual and ex post facto report guidelines (2011), and was made in reference to the five OECD DAC criteria of Relevance, Efficiency, Effectiveness, Impact, and Sustainability. During field investigations, the evaluation team interviewed senior Nicaraguan government officials (the Vice-Minister of the Ministry of Finance and a Director at the relevant department) and the manager of the project implementing agency; furthermore the evaluation team visited the project sites and checked the current state of the facilities and their operation.

- Through interviews with the Ministry of Finance officials, pieces of information pertaining to project relevance and sustainability have been obtained that could not be inferred from surveys of literature alone, such as those having to do with the relationship between the project and Nicaragua's national development strategy, ownership of the Nicaraguan government, its strategy for coordinating between different aid projects, and the role of the Ministry of Finance in the progress of the project. Additional interviews were conducted with staff from ENATREL, the project-implementing agency, which answered technical questions on the reasons behind the frequent delays and changes of the project. The team has also visited the Leon electric power substation and checked the conditions of the installed equipment.

II. Assessment by Evaluation criteria

Overall, this project is found to be **successful** (3.6/4.00)

[Total Evaluation Table]

Criteria	weight	Evaluation questions	Evaluation	points
Relevance	20%	- Is it consistent with the power sector development policies and priorities of the recipient country? - Is it consistent with the MDGs? - Is it consistent with EDCF's assistance strategy?	Highly Relevant	4
Efficiency	20%	- Were the system and structure efficient? - Were objectives achieved on time? - Were activities cost-efficient?	Partly Efficient	2
Effectiveness	20%	- To what extent were the objectives achieved or are likely to be achieved? - Was technology applied properly in accordance with local conditions?	Highly Effective	4
Impact	20%	- Socioeconomic impacts - Technology transfer effects	High Impact	4
Sustainability	20%	- System of operation and maintenance - Financial and institutional soundness	Highly Sustainable	4
Total evaluation			Successful	3.6

First, upon reviewing the relevance of this project to the development policies and priorities of the recipient country, the MDGs, and EDCF's assistance strategy, the evaluation rated the project as "**highly relevant**" (4.0).

- The power sector was a major focus of EDCF's management strategy for the years 2006 to 2009. This project thus shares the same vision with EDCF's assistance policies.
- Despite significant improvements, Nicaragua's average electrification rate, as of 2006, was just 65%, which is still far below Latin America's average of 92% in 2005. In particular, a severe urban-rural

gap exists in access to electricity, with electrification rates reaching 90% in urban areas but only 40% in rural areas. The objective of this project - to ensure a stable supply of power by replacing aging substation facilities and transmission lines - seems to address properly the needs of the beneficiaries.

- The Nicaraguan government's National Plan for Human Development (Plan Nacional de Desarrollo Humano) prioritizes the expansion of infrastructure including water supply and electricity that touch almost every aspect of life. Moreover, the Bolaños administration's national development plan had, among its ambitions, the objective of "*achieving an annual power supply growth rate of 7% on the basis of the national plan for rural electrification (Plan Nacional de Electrificación Rural)*". This indicates that the project is well aligned with the recipient government's policy.
- The scope of this project has changed twice, but the changes were limited to its location and the type of equipment used, hardly affecting the expected outcome. Therefore, the fit between Nicaragua's development strategy and EDCF's assistance strategy has been maintained.
- This project was aimed at upgrading economic infrastructure and thus more or less diverges from the trend of ODA going increasingly to social infrastructure and MDG-related sectors. However, support for this project was approved in 1998, before the announcement of MDGs (2000). Even thereafter, the power sector has been considered a key driver of development in developing countries.
- Post-completion maintenance was planned from the outset of the project, and inspection of the Leon substation found that the substation was being maintained by resident staff from ENATREL.
- However, the initial feasibility study indicates that this was realized only during the third period, after the project scope changed twice.

- Second, in terms of efficiency this project lasted for 90 months from the entry into force of the loan agreement until its completion. Additionally, a three-year lag occurred from equipment delivery (2006) to project completion (2009). Such delays can be attributed to uncontrollable changes in the implementation stage as well as to partially foreseeable obstacles. In view of the project duration and rate of progress compared to the original plan, this project has been rated **partially efficient/successful (2.0)**.
- The project was delayed twice. The first delay was caused by the decision to split off Nicaragua's power industry, the second by a readjustment of the project area informed by a survey on electricity demand. Delays in engineering works were also a contributing factor.
 - The decision by the Nicaraguan government to partially privatize the power sector came in the same year the loan agreement for this project was signed (2000). Since privatization can bring changes in the way transmission and distribution networks are operated, a degree of uncertainty was certainly to be expected. Moreover, if modifying the plan to account for the effect of privatization was difficult at the time of signing the agreement, EDCF should nevertheless have consulted the partner country thereafter to modify the loan disbursement and equipment delivery schedules. The premature loan execution and equipment delivery have resulted in depreciation and other costs, reducing the efficiency of this project.
 - Despite the delay it has caused, the change in project scope informed by ENATREL's survey allowed the allocation of equipment to regions that needed it most. Still, delays and additional costs could have been minimized had such a survey taken place earlier in the project cycle.
 - Although project delays in the environmental assessment and bidding stages are frequent in Nicaragua and therefore foreseeable to a certain extent, it may be viewed as akin to force majeure as there is little room for intervention by EDCF.

- In terms of cost, the changes in project scope and the increase in the number of substations (from 3 to 11) raised the overall project cost but did not have a substantially negative impact on efficiency; additional costs have been borne by the Nicaraguan government.
 - Throughout the implementation of the project, communication with the Nicaraguan government has been carried out through three channels: the Panama Office of the Export-Import Bank of Korea, Korean staff dispatched to IDB, and EDCF-related agencies. The smooth communication and rapid handling of tasks by Korean personnel left a deep impression on Nicaraguan officials.
 - However, the privatization of the power sector that was carried out simultaneously with the execution of the loan agreement led to major modifications in the initial project plan, raising doubts about the necessity of the initial plan.
- Third, the evaluation on effectiveness found the project to be '**highly effective**' (4.0) in terms of fulfillment of its objectives, the operation of the installed facilities, and the appropriate use of equipment.
- The final plan that was drawn after a couple of modifications was implemented smoothly. While it is difficult to measure the overall effect of the project due to the small scale of its output, its short-term objective of installing and operating the facilities has been successfully met.
 - The installed facilities is optimally suited to Nicaragua's current level of technology, and there has been no report of malfunctions. It can thus be concluded that the equipment used in this project is appropriate and has been properly maintained.
- Fourth, the evaluation on socio-economic impact and technology transfer effect found the project to have had a '**high impact**'(4.0). Due to the limited scale of the project, its impact did not show on the

indices related to electricity and neither did it have a meaningful impact on the quality of life of the residents. Nevertheless, since the facility did not yield any negative impact, no points have been deducted on this score.

- This equipment procurement project was too limited in scale to have a measurable socio-economic impact, and has produced little impact of note aside from adding 140 temporary jobs for the installation of the equipment.

- Fifth, in terms of sustainability, the project was rated **'highly sustainable'** (4.0) based on an evaluation of its O&M status, financial soundness, and institutional environment. The project operator was found to be financially sound, able to recruit people as necessary, and maintaining equipment in excellent condition. The project is considered all the more sustainable given the large-scale follow-up project being undertaken with the same goal of expanding access to electricity.

- It was confirmed through an interview with an HR director at ENATREL that the institution had a well-functioning recruitment system in place. The evaluation team was able to verify on-site that a sufficient number of maintenance staff was posted at the facility. Also, ENATREL is training its staff on a regular basis through its training programs and ECAE (Electricification Council of Central America)'s technical knowledge exchange programs.

- The demand-side sustainability of this project is also promising given the continual increase in the number of people gaining access to electricity (303,432 in 1991 to 864,184 in 2011)

- Furthermore, the institutional sustainability of the project will likely be secured by the follow-up project PNESEER, aimed at increasing the nation-wide electrification rate and financed by various countries and multilateral organizations.

- PNESEER stands for National Program of Sustainable Electricitication and Renewable Energy, and is financed by KEXIM, AECI, IDB, WB, etc. and by Nicaragua's public and private entities as well. A total of USD 370 million USD has been invested, with Korea providing USD 270 million to support the power transmission and distribution portion of the project. The goal of this project is to reach an electrification rate of 95% by 2014.
- Lastly, the project is deemed financially sustainable: Nicaragua's residential electricity was priced at USD 0.137/Kwh, industrial electricity at USD 0.101/Kwh, and commercial electricity at USD 0.137/Kwh as of 2006, which are close to Latin America's averages, and profits from electricity sales are on a sustained growth trajectory.

III. Lessons and Recommendations

1. Lessons

- Equipment installed for the project is being properly maintained under responsible management by the agency in charge. The ex-post evaluation also found the project to have been maintained well in a continual manner.
- The success of this project paved the way for the follow-up PNESEER project, indicating that this project has set a good precedent.
- This project was postponed for about 66 months due to the decision to split off the power sector and to insufficient research on feasibility, which led to increased costs and decreased efficiency. Such inefficiency would have been avoided if KEXIM had modified the plan as soon as it became aware of such a decision.

- Moreover, this project was simply done by installing a few facilities and changing old equipment. Six substations, two transmission lines, and simple communication equipment were distributed to 11 areas, and it raises doubts as to whether such a widely dispersed distribution of equipment represents an optimal use of the budget.

2. Recommendations

A. Assess project risk from multiple angles

- The lack of consideration for the risk associated with the institutional change on the part of the recipient country caused futile delays and administrative costs. Such losses in time and labor could have been greatly reduced if the plan had been properly modified before implementation. Therefore, it is highly recommended that the follow-up project consider in advance the institutional, cultural, and administrative changes that may occur in the recipient country.

B. Plan for contingencies

- While assessing potential risk at the project planning stage, it is necessary to establish an internal mechanism to make swift modifications to the plan in case of unexpected contingencies. Preparing contingency plans and countermeasures would help to minimize inefficiencies resulting from unforeseen changes by shortening the response time.

C. Support power sector development via joint-donor projects such as PNER

- Power supply-related indices in Nicaragua had shown little improvement until in 2010 and 2011, when they began to improve markedly. The recent advances can be attributed to PNER, a project jointly financed by KEXIM and other donor countries and multilateral

institutions. This suggests that taking part in projects such as PNER would contribute more to the development of the recipient country's power sector than providing equipment on a one-off basis.