

**Nicaragua: Rehabilitation and Expansion of Power Distribution Systems II**

**Ex-post evaluation**

<b>OECD sector</b>	23040/Electricity transmission and distribution	
<b>BMZ project number</b>	1994 65 048	
<b>Project-executing agency</b>	Empresa Nacional de Transmisión	
<b>Consultant</b>	DECON	
<b>Year of evaluation</b>	<b>2002</b>	
	<b>Project appraisal (planned)</b>	<b>Ex-post evaluation (actual)</b>
<b>Start of implementation</b>	Q 3/94	Q 1/95
<b>Period of implementation</b>	36 months	45 months
<b>Investment costs</b>	EUR 10.43 million	EUR 10.35 million
<b>Counterpart contribution</b>	EUR 2.68 million	EUR 2.68 million
<b>Financing, of which Financial Cooperation funds</b>	EUR 7.67 million	EUR 7.67 million
<b>Other institutions/donors involved</b>	None	None
<b>Performance rating</b>	3	
• <b>Significance / relevance</b>	3	
• <b>Effectiveness</b>	3	
• <b>Efficiency</b>	4	

## **Brief Description, Overall Objective and Project Purposes with Indicators**

The project was part of a cycle of five official German Financial Cooperation (FC) projects to modernize Nicaragua's transmission and distribution network within the framework of the sector reform supported by the InterAmerican Development Bank. The project purpose was to contribute to safe and economically efficient power supply, in particular for the producing consumers of electricity in the project region (center and eastern parts of the city of Managua). The measures applied comprised the rehabilitation and expansion of two substations and a section of the power distribution system in Managua, support for the temporary project-executing agency Empresa Nicaragüense de Electricidad and consulting services.

### **Major Deviations from the original Project Planning and their main Causes**

Due to institutional changes following the sector reform the project-executing agency was replaced twice. Currently the project facilities are being operated by the state-owned Entresa (substations) and by the private company Unión Fenosa (distribution network).

## **Key Results of the Impact Analysis and Performance Rating**

The overall project objective was to help support Nicaragua's sustainable economic development through positive employment and income effects. The achievement of the overall objective was to be measured against the number of producing power consumers and the number of people with employment in the project area. The project purpose was to contribute to safe and economically efficient power supply, in particular for the producing consumers of electricity in the project region. The achievement of the project purpose was to be judged on the basis of the power failures caused by the network, the loss situation, undelivered power and the satisfaction of producing consumers of power surveyed randomly - all of which in the project area. Additionally, through an interconnected network at least 90% of the long-term incremental costs were to be covered by average tariff revenues. The project's target group comprised craft businesses as well as commercial and small industrial power consumers that employ a high number of workers and are vital for the economic development of Managua.

Based on the figures provided, the overall objective of the project was achieved. Newly won customers are mainly from trade and industry. The increase in employment in the project region exceeds the expectations by far. Although it cannot be clearly shown that better electricity supply encouraged more economic development in the project area, it is plausible. The indicators for the achievement of the project purpose were only partially fulfilled. The electricity supply in the project area has become more reliable. Both the probability of shutoffs and the risk of not receiving requested power deliveries have decreased considerably. Accordingly, random surveys conducted by the project-executing agency show that the satisfaction of the producing customers with the power supply has improved substantially. The target group was also reached. However, the network losses could not be significantly reduced. As at the time of the project appraisal, in 2001 the losses amounted to 19%, with non-technical losses accounting for the brunt of them (14%). Whether the long-time incremental costs are indeed covered to 90% by the average tariff revenues could not be assessed conclusively.

The current operational appraisal criteria to test for eligibility for support that are applicable to FC projects involving electricity supply were clearly not fulfilled by the interconnected network in place in Nicaragua at the time of the project appraisal. The cost coverage was too low and the transmission and distribution losses were too high. The project rationale counteracted these deficits by heightening the cost coverage through a corresponding legal covenant; also, the

project measures were to help reduce the losses. Cost coverage has improved since the project appraisal. However, the network losses within the interconnected system could not be reduced. Currently, network losses of approx. 32% substantially exceed the maximum value of 20% stipulated in the operational appraisal criteria. Consequently, the efficiency of the Nicaraguan interconnected network remains unsatisfactory. Yet the network losses in the project area of 19% are below the cut-off value stated in the operational appraisal criteria.

Only some of the project purposes were achieved. Losses of 19% following a network rehabilitation can only be considered unsatisfactory. For the reasons stated, it is possible that the situation will improve in the future. In view of the attained reliability of supply and the cost coverage that exceeds the expectations - indicated by the high degree of customer satisfaction - we consider the project's **effectiveness** - despite the unsatisfactory network losses - to **still be sufficient (partial evaluation: rating 3)**.

According to the information available, economic activity in the project area has intensified during the course of the project. This is underscored by the growth in demand for power, which exceeds the expectations. The assumption that the improved power supply has contributed to growth and employment is plausible. However, one limitation that needs to be mentioned here is that, for the most part, this was achieved using only 30% of the funds supplied. Overall the **significance** and **relevance** of the project are **sufficient (partial evaluation: rating 3)**.

Despite an improvement in the sectoral conditions in the past years the efficiency of Nicaragua's interconnected system must be deemed insufficient owing to the persistently high network losses. Consequently, excessively high production capacities have to be maintained or created. They naturally also jeopardize the system's environmental efficiency due to the emission of unnecessarily high quantities of harmful gases, especially CO<sub>2</sub>. While the allocation efficiency of the system and therefore of the project is probably sufficient on the basis of the information available and in view of the broad coverage of the long-term incremental costs through the tariff revenues, for the reasons stated the production efficiency is not acceptable. Added to this is the fact that in the case at hand, the internal rate of return for the project is probably insufficient. As a result, overall the project's **efficiency** is slightly insufficient (**partial evaluation: rating 4**).

Under consideration of the impacts mentioned above, we assess the project's **developmental effectiveness** as **sufficient** overall (**rating 3**).

**General Conclusions applicable to all Projects**

Under this project an attempt was made to reduce the non-technical network losses through technical measures (insulated cables). Since the losses are a general problem that goes beyond the limits of the project and that is due primarily to deficiencies in the legal framework, looking back it would have made sense to establish a legal means to combat power theft in the form of a legal covenant or a precondition for disbursement.

**Legend**

Developmentally successful: Ratings 1 to 3	
Rating 1	Very high or high degree of developmental effectiveness

Rating 2	Satisfactory degree of developmental effectiveness
Rating 3	Overall sufficient degree of developmental effectiveness
Developmental failures: Ratings 4 to 6	
Rating 4	Overall slightly insufficient degree of developmental effectiveness
Rating 5	Clearly insufficient degree of developmental effectiveness
Rating 6	The project is a total failure

### Criteria for the Evaluation of Project Success

The evaluation of a project's "developmental effectiveness" and its assignment during the final evaluation to one of the various levels of success described below in more detail concentrate on the following fundamental questions:

- Are the project **objectives** reached to a sufficient degree (aspect of project **effectiveness**)?
- Does the project generate sufficient **significant developmental effects** (project **relevance** and **significance** measured by the achievement of the overall development-policy objective defined beforehand and its effects in political, institutional, socio-economic and socio-cultural as well as ecological terms)?
- Are the **funds/expenses** that were and are being employed/incurred to reach the objectives **appropriate** and how can the project's microeconomic and macroeconomic impact be measured (aspect of **efficiency** of the project conception)?
- To the extent that undesired (**side**) **effects** occur, are these tolerable?

We do not treat **sustainability**, a key aspect to consider for project evaluation, as a separate category of evaluation but instead as a cross-cutting element of all four fundamental questions on project success. A project is sustainable if the project-executing agency and/or the target group are able to continue to use the project facilities that have been built for a period of time that is, overall, adequate in economic terms or to carry on with the project activities on their own and generate positive results after the financial, organizational and/or technical support has come to an end.