

# REToolKit Case Study

## *Nicaragua PERZA: Off-grid Rural Electrification Project*

### **1. The project in short**

Nicaragua is predominantly an agricultural economy, with over 32% of its GDP coming from the agricultural sector (2000). Nicaragua has one of the lowest rural electrification rates in Latin America, with almost 90% of the rural population lacking access to electricity. Most of the poor live in rural areas. The lack of electricity in rural areas is therefore a serious obstacle to the economic and social growth of the country.

In the past, most of the international aid efforts in relation to Nicaragua's rural electrification has focused on grid extension. But for a significant part of Nicaragua's poor, such grid-based solutions are economically and financially unviable due to the remote and dispersed nature of many rural inhabitants. Therefore, the Government of Nicaragua is looking for international support for the design and implementation of the new rural electrification strategy, which covers both grid extension and off-grid solutions.

The World Bank, through a US \$12 million IDA credit, and the Global Environment Facility (GEF), through a US \$4 million grant, are financing the Off-grid Rural Electrification Project (PERZA) to (i) support the sustainable provision of decentralized electricity services in several remote rural areas in Nicaragua, and (ii) strengthen the Government's institutional capacity to implement its national electrification strategy. The specific objectives of the project include: (i) supporting the Government in the design and implementation of its strategy, including the creation of an improved legal, regulatory and financial framework for rural electrification; (ii) implementing innovative public/private decentralized electricity delivery mechanisms in several pilot sites for later replication on a national scale; and, (iii) demonstrating the potential of targeted rural microfinance and business development services to enhance the development impact of rural electrification.

Early upstream studies funded by ESMAP and PPIAF have helped during project identification. The Global Partnership for Output-Based Aid (GPOBA) has been an integral part of pre-project design related to OBA implementation and management.

### **2. Project Design and Status**

Past experience shows that electricity access alone is a necessary, but not sufficient input for significant local development<sup>1</sup> – accompanying complementary services can increase the development impact.<sup>2</sup> Therefore, based on the specific demand in rural Nicaragua, microcredit (to address liquidity gaps of rural users) and targeted business development services (to increase the potential for productive uses, which in turn makes the energy provider's business more sustainable) have been identified as two key complementary services to be provided by PERZA to the same communities that will receive electricity access. Approximately two thirds of the IDA credit will be used for OBA payments to the private sector providers of (i) offgrid electricity services and (ii) accompanying microcredit and business development services.<sup>3</sup> Some of the mini-hydro village minigrids will be connected to the national backbone grid (for sales of excess energy and to buy energy during times of turbine maintenance).

As of today, transactions for the first two hydro village grids and the solar battery charging stations have been launched (construction for the first hydro has started); standard bidding

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<sup>1</sup> Compare OED19xx, Sanghvi 19xx.

<sup>2</sup> Compare Chong/Hentschel 1999 and 2004; Motta/Reiche 2000; Foster et al. 2004

<sup>3</sup> Compare Golmark/Rysankova/Reiche2004 for an analysis of OBA design features of LCR offgrid projects.

documents and subsidy contracts have been prepared; several concrete legal and regulatory barriers for decentralized electrification have been removed; the legal situation for small hydro development has been improved; the accreditation of Solar Home System dealers has been started; eleven microfinance institutions have expressed interest (of which three have already applied for funds) and over 90 providers of small business development services have applied for accreditation, with over 30 accredited to date. The first new rural users will be connected in early 2005.

### **3. Design Principles**

The environmentally-friendly technologies to be employed as part of the pilot site sub-projects include mini-hydro power generation and electricity distribution through independent mini-grids, small individual solar home systems, as well as battery charging stations powered by solar photovoltaic panels. Several new business models being piloted are designed to ensure an efficient use of scarce public subsidies while involving the private sector for operational expertise, as well as risk sharing/financing. Several of the mini-grid subprojects, for example, will be developed as investment “packages” where a combination of private equity, debt and government subsidy enables the private investor/provider to obtain adequate returns. The packages are being bid out based on the lowest subsidy or the local tariff required.

The subsidies to be provided are output-based, transparent, targeted, and designed in a way to minimize market distortions. Because the subsidies are ex post against initial capital expenditure subsidies instead of ongoing operation and maintenance, operation of the subsidized systems is expected to continue after the PERZA project terminates. Maximum subsidy levels and disbursement rhythms have been optimized based on technology and capacity to pay of users and local service providers. In the case of the mini-grids, about 70-80% of the payment would usually be made upon construction completion and 20-30% would be paid against yearly connection targets – balancing the incentive effect of a performance based subsidy with the financial strength of cooperatives and other small producers in local areas. PERZA’s direct investment subsidies are accompanied by market development measures, such as training to providers and users.

The parallel GPOBA funding is being used to assure an optimal design of the planned subsidy allocation scheme and verification procedures, including the necessary (re)design of: (i) the national financing mechanism (FODIEN) around basic OBA principles; (ii) processes and rules for subsidy allocation; (iii) model OBA contracts; and, (iv) operations procedures for detailed administration of the OBA scheme, including implications for disbursement, monitoring and verification.

It is hoped that the successful demonstration of these new, environmentally friendly and decentralized business models which will incorporate output-based aid elements will help to attract private sector players and decrease perceived risks of market entry - based on these lessons, a comprehensive replication strategy on national scale will be formulated.

