



## **RURAL ELECTRIFICATION, GUATEMALA**

### **Case Study (Power)**

#### **Project Summary:**

The Republic of Guatemala, nestled between Mexico, Belize, Honduras and El Salvador, has a population of about 13 million, 60 percent of which live in rural communities. During the latter part of the twentieth century, the country's economic progress was limited by a civil war that consumed the majority of government's resources – both political and economic. With the Peace Accord and the creation of a new Constitution in 1996, there was a call for more investment in power, water and transportation infrastructures to address some of the social and economic divisions. Leaders across the political spectrum recognized the need for improved infrastructure and basic services in the country, especially for rural communities with mostly indigenous populations. Since that time, the government has worked to improve infrastructure and has involved the private sector in several areas to help with the much needed investment.

In 1998, only 60 percent of Guatemalan households had an electricity connection. In rural areas, the percentage was even lower; at 52 percent) it was one of the lowest connection percentages in Central America. Up to that time, the government's National Institute of Electrification (INDE) was a vertically integrated utility that controlled the generation, transmission and distribution of electricity in Guatemala. Under INDE, the distribution system was run by three companies: Electricity Distribution of the East (DEORSA) and Electricity Distribution of the West (DEOCSA), both of which served rural communities, and the Electric Company of Guatemala S.A. (EEGSA), which served the metropolitan area around Guatemala City. The distribution system suffered from a lack of maintenance, both preventive and corrective. Simultaneously, the quality of service was also decreasing, due both to poor maintenance and increasing demands on the system caused by the increased use of electricity.

To modernize the electricity sector in Guatemala and expand service to more rural communities, the government, through the INDE, created a Rural Electrification Plan (PER). The PER called for the breakup of INDE and the involvement of private companies in the expansion of service to rural communities. The aim of the plan was to expand service to over 280,000 new rural connections (in 2,633 communities) within five years, amounting to an increase over 1.5 million people served. Upon successful completion of this effort, electricity was made available to 90 percent of the population as a whole and to 75 percent of the population in rural areas.



To undertake this new plan, INDE retained control of generation and transmission and decided to include the private sector in the distribution of electricity. In 1998, the government requested bids for DEORSA and DEOCSA and entered into a public-private partnership (PPP). INDE retained ownership of the assets and the private company was contracted to expand, operate and maintain the distribution system in rural areas. The same private company (hereafter referred to as DISCOS) was awarded the contracts for both distribution systems.

Under the PER, the focus was on communities and households farther than 200 meters from the existing grid. For each connection completed and verified by third party supervisors, DISCOS was paid a fixed amount. DISCOS earned additional revenue from the sale of electricity, per the approved tariffs.

Between 1999 and 2001, DISCOS connected over 300,000 customers, consisting of 130,000 PER connections and 195,000 non-PER connections. As of 2007, DISCOS supplied electricity to over 1.29 million customers, the majority of which were residential. From 1998 to 2007, DISCOS added over 650,000 customers, meeting the goal of 280,000 new rural connections.

### **Project Objectives:**

The Ministry of Energy and Mines (MEM), through INDE, established PER and outlined their long term plan for electricity in Guatemala. The main objective of the rural electrification scheme was to modernize the electricity sector of Guatemala and expand coverage to include a larger number of rural households. The goal was to have over 75 percent of rural households connected to the grid within a five year period, bringing the connectivity rate of the country's population to 90 percent. This translated to 280,000 new connections.

A second goal of the PPP was to improve the reliability and quality of electrical service. Prior to DISCOS, the transmission and distribution lines were in poor condition due to deferred maintenance, and electricity was not always available; storm-related outages in particular were a problem. The system also suffered technical and nontechnical losses along the lines. DISCOS wanted to reduce these losses to improve reliability in electricity. By doing so, they aimed to promote economic activity and help reduce poverty in isolated rural areas.



## **Project Description:**

### **1. Partners**

The public partner is the Guatemalan government, through the Ministry of Energy and Mines' public electric utility, INDE. INDE retains ownership of the distribution assets and initially took a 20 percent stake in the distribution companies (reduced to 15 percent in 2000).

The private partner is a Spanish based international investment group with interests in a number of different sectors in many countries around the world. Under the name DISCOS, this private partner purchased an 80 percent stake in DEOCSA and DEORSA.

### **2. Implementation Environment - Legislative and Administrative**

On November 13, 1996, the General Law of Electricity was approved by the Guatemalan government. The law established new rules for the electricity sector and promoted electricity infrastructure development by eliminating the state run monopoly and encouraging private sector participation, creating a wholesale electricity market. The National Commission of Electric Energy (CNEE) and Administrator of the Wholesale Market (AMM) were the regulatory bodies created to provide public oversight of the process. The law allows generation, transmission and distribution projects to be freely undertaken by any private entity. As a result, INDE was required to break up its vertical monopoly in the market.

The CNEE regulates generation, transmission, distribution and commercialization, and is responsible for overseeing compliance with the newly established regulatory framework. CNEE's role is to protect consumer rights, prevent anti-competitive behavior, define transmission and distribution tariffs, and issue the standards that guarantee open access to transmission networks.

### **3. Financial Agreement**

DISCOS invested US\$109 million in DEORSA and DEOCSA to gain an 80% initial stake in both distribution companies (INDE kept the remaining 20 percent). The debt-equity ratio for this initial amount was 66 to 34, with DISCOS paying US\$37 million in equity and US\$72 million in debt. In 2000, INDE sold another five percent of its stock in the companies to DISCOS for US\$6.3 million.



For each verified connection to the grid, DISCOS was paid US\$650 by INDE. The amount was based on costs of past connections under INDE’s rural programs as well as costs of similar connections in neighboring countries. DISCOS, INDE and the Guatemalan Bank created the “Fideicomiso” Trust Fund in May of 1999 to ensure funds would be available to pay DISCOS for connections. The government used the original US\$109 million it received from DISCOS as the initial contribution to the trust fund. The government then added additional funds, bringing the trust fund total to US\$333 million.

In 2002, DISCOS, as part of their Strategic Business Plan, required a capital investment of US\$94 million for the following three years. DISCOS provided US\$44 million in equity for this investment and borrowed the rest. The Inter-American Development Bank approved a US\$25 million loan to DISCOS to “expand service and improve reliability” of service in rural areas, and Banco Industrial, Guatemala’s largest private bank, also provided US\$25 million.

To repay debt and cover the costs of operation and maintenance, DISCOS will use the US\$650 per connection from PER and tariffs for the electricity used by customers. The tariff is broken into fixed and variable rates of about US\$0.90 per month as a fixed charge and US\$0.074 per kWh.

#### **4. Contract Provisions**

A 50 year concession agreement was signed between INDE and DISCOS in September of 1998. The private company was required to connect an additional 280,000 rural households between 1999 and 2004. INDE paid the DISCOS US\$650 for each verified, eligible connection. A connection was deemed eligible if the connection was residential, over 200 meters from the existing grid and verified by an independent supervisor.

The DISCOS was required to supply all households within a 200 meter zone of the existing network. To gain a connection, households within 200 meters of the grid needed to request a connection, but they were obliged to pay a connection fee. The amount of the connection fee was capped by CNEE and DISCOS and was required to be returned to the household within five years, either as shares in the distribution company or in another way that guarantees the money was repaid with at least five percent interest per year. This structure helped to provide DISCOS with the capital investment needed to expand the system.

Ownership of the distribution assets remained with the Guatemalan government, under INDE. DISCOS was contracted to operate and maintain the assets and to return them in good condition



at the end of the concession period. All new assets constructed in the service expansion phase fell under the agreement as well and also became property of INDE. Although transmission facilities remained with INDE, DISCOS was contracted to undertake specific investments in the system for a fixed price. For all transmission projects, DISCOS immediately returned the assets to INDE, which is responsible for their operation and maintenance.

From 1999 to 2003, DISCOS was required to buy electricity from INDE, which had maintained its generation and transmission functions when the national power utility was divided. After 2003, DISCOS was able to purchase power on the open market.

The Multilateral Investment Guarantee Agency (MIGA), a member of the World Bank Group, provided investment insurance coverage against the risks of currency restriction, expropriation, war and civil disturbance and breach of contract. The guarantee was for 90 percent of the original investment and lasts for a period of 15 years.

## **5. Implementation Metrics**

Under PER, rural communities over 200 meters from the existing grid were identified and added to the list to receive a connection. The plan included communities in the Huehuetenango, Quiché Alta Verapaz and Peten departments, where the overwhelming majority of beneficiaries of the project were indigenous people, speaking at least 14 languages in addition to Spanish. In response to this, PER included elements of an indigenous peoples plan to ensure these communities would receive the services they needed. DISCOS worked with community leaders, discussing community capacity and needs, prior to connecting transmission lines. They also discussed community participation in construction, maintenance and management of service delivery.

DISCOS employed 18 contractors to work on electrification projects in different zones. Of these companies, only four were Spanish and each company received one-year contracts of approximately US\$1 million. DISCOS provided the materials for the projects and the contractors provided the labor, machinery and logistics.

The per capita income for Guatemala was US\$1,600 in 1998 (US\$2,325 in 2006) and even lower in rural communities because of the highly uneven distribution of income. In many cases, because of this low income level, families in rural communities used very little electricity each month (often using only a single light bulb). It was estimated that over 80 percent of rural customers use less than 300kWh per month.



Given this situation, the government established a social tariff system so that rural residents who used a low quantity of electricity paid a lower rate. Pricing of tariffs is based on the wholesale price of electricity, transmission charges and a price cap on distribution profits. The price cap is set every five years by CNEE. The subsidized social tariff is applied to all residential customers whose monthly consumption is below 300kWh. This translates to about US\$3 a month for electricity at the social tariff rate. DISCOS pays less per kWh for electricity sold at the social tariff than it does for electricity sold at the normal tariff. By changing the price paid by DISCOS, the subsidized social tariff does not affect the profits of the company.

### **Commentary:**

#### **1. Overcoming Impediments**

In the beginning, DISCOS discovered that about a third of the communities selected for connections under PER either already had a connection or the connection was under construction. This reflects an inadequate inventory of the system conducted by INDE. DISCOS and INDE needed to have weekly meetings to identify replacement communities that fit the PER criteria. Having had an accurate list of communities would have saved time and money on both sides.

In 2001, there was a backlog of 13,000 connections that needed to be certified by the independent supervisors, representing about two to three months of connections. While evaluators of the program felt this was a reasonable delay, it may have slowed the connection rate of DISCOS because waiting for payment reduced the funds available for investment in system expansion. DISCOS also faced a slowdown in transmission investments because there were problems obtaining and negotiating the “way-leaves” (rights-of-way).

#### **2. Key Points for Success or Failure**

The rural electrification program had several points of success and some potential problems. While the Ministry of Energy and Mines tried to inject competition into the electricity market by involving the private sector, competition could have been stronger if more companies could have participated in PER funding. If other companies had competed with DISCOS for PER connections, it might have been possible for the government to lower the payment. There is a fine line however, because DISCOS was able to increase efficiency by purchasing materials in bulk and this might not have been as feasible if they were not making all 280,000 connections.



Another potential problem with the program was the payment price for new connections. A payment of US\$650 was selected based on past connection costs and was uniform for every connection. While this enabled DISCOS to know its revenue level, it did not guarantee that every connection cost the same amount. Connections closer to the grid (while still beyond 200 meters) would have been less expensive to make than those farther away and in more isolated areas. As of 2002, DISCOS was averaging 7 percent profit per connection, but anticipated higher costs for connections to more remote locations. Since the contract did not contain any penalties if DISCOS did not make all the connections, there was no incentive for them to make connections in more remote locations, if that connection would reduce their profit. While this did not seem to have a major impact on the program (since over 650,000 connections were made), it might have been possible to increase the payment for connections much farther away and slightly decrease the payment for connections closer to the grid. Doing so might have helped guarantee connections to the most remote areas were made, by eliminating potential cost disincentives.

The tariff rate set by CNEE caused some concern for DISCOS because the low rates and low levels of consumption—between 30 and 40 kWh per month for rural households. DISCOS argued for a higher fixed rate to help cover more of the fixed costs associated with billing and metering.

To minimize the non-payments and late payments, DISCOS opened a twenty-person call center spread throughout its service area to help people understand what the bill means and how to pay them. By doing so, DISCOS was able to maintain a closer connection with its customers and make its operations more efficient.

Another important success of the program is the social tariff for customers who consume less than 300kWh per month. The social tariff was set in such a way that it helped poor, rural customers without harming DISCOS. Since the government reduced the generation price of electricity for DISCOS when distributing to customers receiving the social tariff, there was not a disincentive for DISCOS to connect these communities. DISCOS was able to connect the communities targeted in PER.

Another important point was the establishment of the Fideicomiso Trust Fund because it ensured that funds for the PER would be used for the PER and not by other programs. Overall, the program thus far has been successful because the number of households connected to the grid



has increased dramatically. MEM should use this PPP as a model to connect the remaining unconnected citizens.