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Honduras Geothermal Development: Regulations and Opportunities

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Honduras, Power sector Laws, Regulations,
Investment Opportunities.

Abstract

The US Department of Energy (DOE) through the Assistant Secretary for Policy, Planning, and Evaluation funded a project to review and evaluate existing power sector laws and regulations in Honduras. Also included in the scope of the project was a review of regulations pertaining to the privatization of state-run companies. We paid particular attention to regulations which might influence opportunities to develop and commercialize Honduras' geothermal resources.

We believe that Honduras is well on the road to attracting foreign investment and has planned or has already in place much of the infrastructure and legal guarantees which encourage the influx of private funds from abroad. In addition, in light of current power rationing and Honduras' new and increasing awareness of the negative effects of power sector development on the environment, geothermal energy development is even more attractive. Combined, these factors create a variety of opportunities. The potential for private sector development of geothermal energy is positive.

Introduction

La Empresa Nacional de Energia Electrica (ENEE), the state-owned national electricity company, is responsible for supplying electrical power to all of Honduras, with the exception of the island of Roatan. The Government of Honduras considers the availability of electricity to be a major factor in attracting foreign investment to the country. To date, Honduras has successfully developed several free trade and export processing zones. For growth and

investment to continue in these zones, electric power will need to be assured. However, Honduras has already reached her capacity in electricity production with the current installed capacity of approximately 566 MW, of which 423 MW are hydro and 143 MW are diesel (Lexis-Nexis, 1993). The country is in desperate need of 100-150 MW of additional power. At this time, ENEE is under-utilizing its generating capacity due to mechanical, environmental and quality problems at several of the generating sites. For example, the EL Cajon dam (rated at 292 MW) is hampered by tremendous silting problems leaving the generators operating at less than 60% capacity. The reservoir is heavily polluted with pesticides, silt, and debris flowing in to it from the natural watershed system.

Currently, Honduras is importing or discussing the importation of electricity from Nicaragua, Panama, and Costa Rica. Ironically, ENEE had plans to export electricity to these very same countries only three or four years ago. During the summer of 1994 serious power rationing began.

Geothermal exploration began in Honduras in the late 1970's (Geonomics Inc., 1977) with photogeologic and limited field investigations of the hot springs in the Pavana area of southwestern Honduras. GeothermEx (1980) with funding from the United Nations Development Program (UNDP) identified six sites whose reservoir base temperatures appeared to have potential for electricity generation. During 1985-1989, these six sites, Pavana, Sambo Creek, El Olivar, San Ignacio, Azacualpa, and Platanares (Figure 1) were further investigated in a geothermal assessment of Honduras conducted by a team of Los Alamos National Laboratory (Los Alamos), United States Geological Survey (USGS) and ENEE scientists funded by the U. S. Agency for International Development

(USAID) (Laughlin and Goff, 1991). At the same time that the Los Alamos geothermal project began, the UNDP funded two Italian geothermal companies, Geotermica Italiana srl and Dal, to assess the geothermal potential of a large region in central Honduras. This region included the sites of El Olivar, San Ignacio, and Azacualpa.

Discharge rates and calculated reservoir base temperatures indicated that three sites, Platanares, San Ignacio, and Azacualpa, have the highest geothermal potential and warranted additional work (Table 1).

TABLE 1

Geothermal site	Discharge (l/min.)	Base temperature (°C)	Thermal power (MW)
Platanares	3370	225	48
San Ignacio	1200	190	14
Azacualpa	3300	185	36
Pavana	1400	150	11
Sambo Creek	1770	155	15
El Olivar	200	120	1.3

Calculated base temperatures, discharge rates, and thermal power outputs. From Laughlin and Goff (1991).

After detailed investigations at these sites, Platanares, because of its higher reservoir temperature and output was ranked as the number one site. Extensive geologic, geophysical, hydrogeochemical, and exploration drilling investigations (Goff et al., 1987; Goff et al., 1991; Heiken et al., 1991, and C. Janik et al., 1991), confirmed the geothermal potential of the Platanares site (Fig. 1). Although the exploration drilling encountered only a shallow aquifer, large flows of 160-165°C fluid were produced from two of the holes under artesian conditions from 460 to 644 m in depth (Goff et al., 1991). A deeper, 225°C reservoir, presumed to be at less than 1500 m, has yet to be encountered. DiPippo and Goff (1994) however, conclude that 7 MW could be produced from the shallow aquifer with either a binary- or flash-type plant.

FIGURE 1

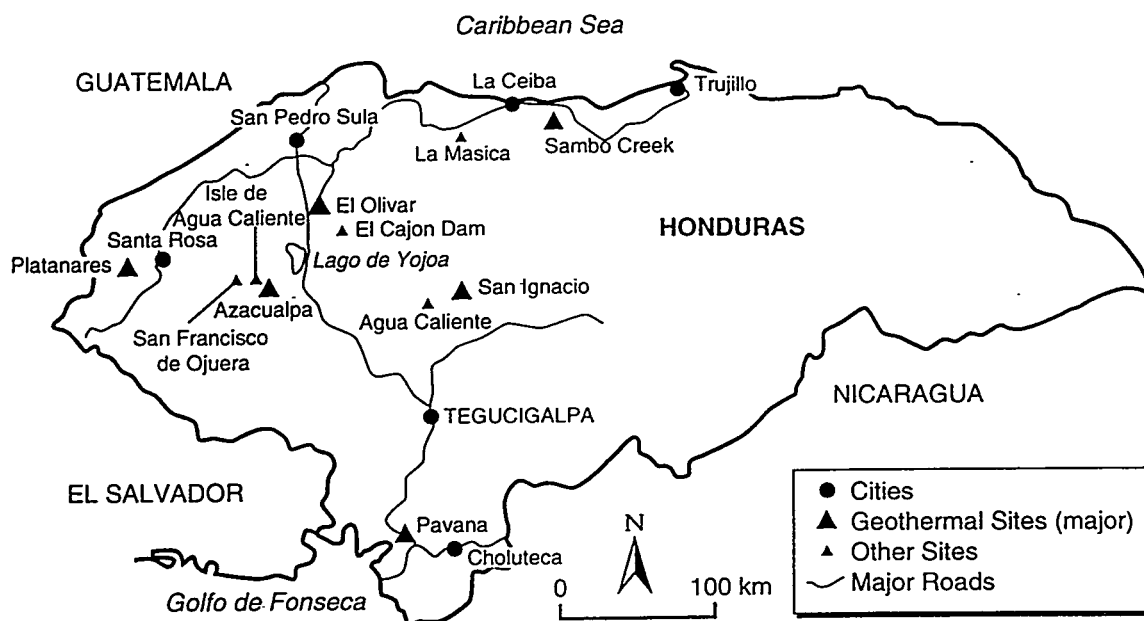


Figure 1 Map of Honduras showing locations of major geothermal sites and other hot springs areas (after Goff et al. 1991).

Methods and Techniques

Working closely with ENEE, we discussed the issues Honduras is currently facing in its power generating capacity, the most critical being the present shortfall in power producing capabilities. We also met with representatives of the National Commission for the Environment (CONAMA), the Foundation for Investment and Development of Exports (FIDE), and the Secretariat of Natural Resources. From these interactions we gleaned a greater understanding of the interest in and support (both expressed and implied) of private sector development of electrical energy production in Honduras.

We began our study by examining a compilation of power sector laws and regulations of neighboring Guatemala, which have been recently rewritten to facilitate privatization (Armstrong, 1991). We then examined recent and past Honduran legislation regarding the privatization of State-run utilities and other energy sector companies and evaluated the time frames in which privatization might realistically occur. Research concerning Honduras' laws relating to energy and power generation was conducted, paying particular attention to the production of electricity of geothermal power. Opportunities to commercialize Honduras' geothermal resources were investigated.

Results

During the Callejas administration (1989-1993), 25 state-owned companies were sold to the private sector. Prior to this administration, only 11 small companies were privatized. The 36 enterprises are valued at \$155 million and have increased government revenue by \$32 million. Over 2,000 permanent new jobs have been created along with an estimated 5,700 indirect jobs. Net exports have increased by \$15 million per year and private investment in new plant and equipment has totaled \$18 million. State-owned companies scheduled for privatization or currently in the process include:

- IHMA (grain elevators)
- Port Authority (free trade zone)
- ACENSA (sugar mill)
- Mejores Alimentos (canning)
- ACANSA (sugar mill)
- CORFINO (saw mill)

During the Callejas administration, the Honduran Congress endorsed several decrees permitting almost all government entities to participate in the privatization process. The government is now preparing to privatize a number of large public utilities, including Hondutel, the national telephone company.

June 1992 brought the signing of Honduras' Investment Law. An essential objective of the law is to reduce to a minimum the government's intervention in economic activity and to entice both national and foreign private investment. The intention of the Law is to promote production, transfer technology, increase exports and create employment for the population of Honduras. In order to achieve the objective, an adequate legal and administrative framework guaranteeing investors security in their investment while providing stability and clarity in laws and regulations must be in place. Ultimately, the law seeks to improve the country's competitive condition in the world market economy by establishing clear game rules for national and foreign investors (FIDE, 1992).

A draft of the "Preplanning Project for the Definitive Law for the Electrical Subsector" was brought before the Honduran Legislators in the summer of 1993. After changes and modifications are made, it will be published in *La Gaceta* and become a Law. Once the draft becomes a law, it will be administered and regulated by the new Comision Nacional de Energia Electrica (CNEE) which will be added to the Secretariat of Communications, Public Works, and Transportation. The broad objective of the proposed law is "essentially to regulate the activities of generation, transmission, and distribution of electrical energy that might take place in the nation's territory, and will be applied to all persons and public entities, private or mixed, that might participate in any of the activities

mentioned." (La Ley Marco del Sub-sector Electrico, 1993).

CNEE will function as a de-concentrated organism. Some of its responsibilities will be to perform studies, write regulations, establish the rate of updating for calculating rates, present programs for expansion prepared by ENEE to the national Energy Cabinet, and approve contracts for the sale of energy. In effect, CNEE will oversee operations performed by ENEE and function as an intermediary between ENEE and the Energy Cabinet.

A major aspect of the proposed Law is that free production of electrical energy will be allowed. Power may be produced by constructing electricity generating plants or renting generating units. Private and mixed enterprises will have two options to sell their product. Either they can sell directly to a large consumer or distributing enterprise, or they can sell the power directly to ENEE.

An important provision of the Law is that ENEE will be obliged to sell to private companies the systems of distribution which it currently owns. CNEE will proceed to divide the nation into distribution zones for electrical energy based on criteria that make each one of them technically viable and income producing. This activity must be carried out within the first twelve months that the Law is in effect.

The proposed Law requires that protection and conservation of the environment must be considered in the preparation of studies for the construction of generation and transmission projects.

ENEE will continue to plan, coordinate, supervise, and control the operations of the generating power plants and the transmission lines and substations that currently belong to the Interconnected National System. These responsibilities will include the international interconnections.

Honduras' new Environmental Law was passed in June 1993 and became a law in July 1993. In August 1993, the Environmental Commission was upgraded to

a ministry. The Ministry for the Environment is responsible for formulating the regulations pertaining to the administration of the new law and these were due for publication in 1994.

In principle, the Environmental Law was conceived to protect the environment, while restoring and managing natural resources. The law defines the natural resources, cultural resources, and rural and urban space that might be affected by physical, chemical or biological agents. It also dictates that nonrenewable resources should not be destroyed. Also, any projects that might contaminate the environment require an "environmental impact evaluation" so that negative impact can be prevented. The State will adopt the means it feels necessary to correct any environmental damage that would affect the general resources of the nation. (La Gaceta, 1993).

Discussion

A number of opportunities now exist for individuals and companies interested in investing in the developing markets of Honduras. Among these are:

- The potential for private sector development of geothermal and other sources of energy is positive. With the success of the Roatan Electric Company, a privately funded venture, the ground work for private ownership of power generating facilities is in place. In addition, the proposed Preplanning Project for the Definitive law for the Electrical Subsector specifically allows for free production of electrical energy by private and mixed enterprises.
- As the Environmental Law and the concurrent regulations are enforced, opportunities for companies supplying consulting skills and analytical tools to qualitatively and quantitatively evaluate the environmental impact of a variety of businesses will increase.
- Honduras currently has a favorable investment climate and laws and regulations are in place to protect investors money and to equalize risk.

Conclusions

Our research has shown that Honduras is well on the road to attracting foreign investment and has in place much of the infrastructure and legal guarantees which encourage the influx of private funds from abroad. In light of current power rationing and Honduras' new and increasing awareness of the negative effects of power sector development on the environment, geothermal, an environmentally benign energy source, is an attractive form of alternative energy.

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