



UNITED NATIONS
UNIVERSITY

GEOHERMAL TRAINING PROGRAMME



LaGeo S.A. de C.V.

ENVIRONMENTAL LAW AND REGULATIONS IN CENTRAL AMERICA

Paul Moya and¹ José Antonio Rodríguez²

¹Instituto Costarricense de Electricidad
UEN de Proyectos y Servicios Asociados

Apartado Postal 10032-1000

San José

COSTA RICA

pmoya@ice.go.cr

²LaGeo S.A. de C.V.

15 Av. Sur La Libertad

EL SALVADOR

jarodriguez@lageo.com.sv

ABSTRACT

The regulatory frameworks of El Salvador and Guatemala have different foci on geothermal resource development, due to the institutional profiles of the countries, in particular, related to the electric sector. The Telecommunications and General Electricity Superintendence (SIGET) is the official entity for power generation, transmission, distribution, and electrical energy trading in El Salvador, while in Guatemala, the state developer through the Instituto Nacional de Electrificación (INDE) is in charge of the geothermal prefeasibility and feasibility studies.

The Environmental Impact Assessment (EIA) process is similar in both countries and there is no specific requirement for geothermal projects, the same for any other type of energy projects. Furthermore, the environmental national entity is known as MARN (Ministry of Environment and Natural Resources) for both countries, and gives the permits for any developing project under the Environmental Law and its regulations.

For Nicaragua and Costa Rica, most of the sites with geothermal energy potential are located in protected areas. Because their existing Forest Law, Environmental Law and National Park Law do not allow any geothermal development in protected areas, these countries have been forced to modify their law or create new ones in order to allow for the development of their geothermal resources. Nicaragua has already made a reform to Law 443 (approved in September 2006) that allows exploration for, and exploitation of the geothermal resources in protected areas. Meanwhile, in Costa Rica a new bill, entitled “Law to Regulate Geothermal Energy Production in National Parks” (File No. 16,137), has been written and presented to the Costa Rican congress.

1. INTRODUCTION

In El Salvador, SIGET is the official entity for power generation, transmission, distribution, and energy trading, which deals with the public, private and mixed sectors. Being the only geothermal developer in El Salvador, LaGeo has carried out all its requirements under the General Electricity Law and deals directly with SIGET. The awarding of the concession requires that the developer presents SIGET with an environmental impact study, previously approved by the Ministry of the Environment and Natural Resources (MARN).

In Guatemala, the state developer through the Instituto Nacional de Electrificación (INDE) is in charge of the geothermal prefeasibility and feasibility studies. The country deregulated its electricity sector, allowing private industry to participate in the business of power generation.

Nicaragua and Costa Rica have found most of their geothermal resources inside protected areas. Nicaragua has already made a reform to Law 443 in order to allow for the development of its geothermal resources; this reform is discussed in the next section. Meanwhile, even though Costa Rica has considerable undeveloped geothermal resources (estimated at a minimum of 865 MW), most of this potential is located inside national parks. Current law do not permit exploration for, or exploitation of geothermal energy inside national parks, and thus the potential for future geothermal development of the country is very limited. A new bill, entitled “Law to Regulate Geothermal Energy Production in National Parks” (File No. 16,137), has been written and presented to the Costa Rican congress. Its main purpose is to authorize ICE to develop geothermal resources inside the national parks while maintaining their protection for future generations (Moya *et al.*, 2006). There have been conversations with some members of congress to acquaint them with this law, and they have shown their willingness to support it when it will be discussed in the legislature. A description of this new bill is presented in the following sections.

2. COSTA RICA

Under the current law, the increasing energy demand in Costa Rica can be satisfied only by utilizing thermal energy, because ICE is prevented from developing hydro or geothermal projects due to numerous legal restrictions. Examples of some of the Costa Rican law that have led to this situation are:

1. National Park Law: this law prohibits any commercial, industrial or agricultural activities inside national parks; electrical generation, which is an industrial activity, is prohibited.
2. Forest Law and Environment Law: these are also rigid law in the sense that they restrict activities in national parks, biological reserves, mangrove swamps, protected zones, wildlife refuges and forest reserves. They give the Ministry of Environment and Energy the authority to “prevent or eliminate as soon as possible, the usage or occupation in the total area, in order to maintain a respect for the ecological characteristics ... which have determined their establishment” (1).

The lack of flexibility in the Costa Rican legislation has led the Attorney General of the Republic to state several times that the “current Forest Law can be considered an absolute protection of all natural territory in Costa Rica” (2).

As indicated in the previous sections, the Costa Rican legal regulation of geothermal energy exploitation limits its development. For this reason, it is necessary to introduce new legislation that will comprise all the phases of geothermal energy production, taking into consideration all

environmental concerns and at the same time eliminating the prohibition on geothermal energy production within National Parks.

A new bill (File No. 16,137) has been written and presented to the Costa Rican congress. It is entitled: "Law to Regulate Geothermal Energy Production in National Parks". The main purpose of this new bill is to authorize ICE to develop the geothermal resources inside national parks while retaining sensitivity and concern for environmental issues. In all the preliminary studies and final phases of any geothermal development, the principles of environmental sustainability must be respected, as well as continued environmental improvement in the potential area of interest. The new law assigns to the "Secretaría Técnica Ambiental" (SETENA) the overseeing of any possible geothermal development, in order to ensure that these principles are being followed correctly (Moya, et al. 2006).

Technical description of the main aspects of geothermal development (production and injection wells, pipelines, separation stations, power house, etc.) is included in the bill. Also, an environmental fee is established in order to pay for the use of the geothermal resource inside the national park. This fee is very important, because it represents a direct financial aid to the national parks to improve tracks and services for tourists, houses for forest rangers, fences, internal roads, etc.

Another issue considered in the new bill is directional drilling, which must be implemented to minimize the number of drilling sites. In addition to all this, before a geothermal project can be developed, an environmental impact study must be approved (which is now also the case for any new project outside national parks), in order to identify and mitigate all possible environmental impacts in the area of interest.

In summary, some positive aspects of the new bill are (Moya, et al, 2006):

1. The law facilitates the use of clean energy sources such as geothermal energy that are not utilized today due to legal restrictions, while helping to meet the country's constantly growing energy demand.
2. The law takes into account all environmental concerns inside the national parks, and obligates ICE to use all available techniques to mitigate any possible visual, audible, atmospheric and hydraulic pollution, as well as any impact on the flora and fauna inside the national park.
3. Supervision by SETENA in the process of exploration, development and exploitation ensures that environmental impacts on the national parks will be minimized. If pollution occurs in any of these phases, SETENA may deny permission to continue the geothermal development, with no right of appeal by ICE.
4. The environmental fee (0.1% of the value of the energy produced inside the national park) provides financial aid to the national parks. The fee can be paid in cash or in construction materials to improve the facilities inside the parks.
5. Directional drilling will be implemented to reduce the number of drilling sites required, and thereby reduce the environmental impact inside the national park.
6. Only the facilities necessary to develop the field will be allowed inside the national park. The law obligates ICE to remove any facility that is not strictly necessary during exploration and exploitation. This is done in order to maintain the park in as close to a pristine condition as possible.
7. All activities taking place inside the national parks, from exploration to exploitation, can be verified in a public file. This also guarantees the transparency of the entire process.
8. For the exploration phase, ICE is restricted to evaluating the geothermal potential by drilling no more than ten geothermal wells.
9. ICE's environmental principles as well as continuing environmental improvements are fundamentally embodied in the bill. In the event of environmental damage, ICE is forced to repair it, following the parameters of the Environmental Law.

3. EL SALVADOR

In 1998, the Telecommunications and General Electricity Superintendence (SIGET) became the official entity for power generation, transmission, distribution, and electrical energy trading, which included provisions for public, private, and mixed sectors.

The Electricity Law and Regulation, for the concession permit, in Art. 8. Chapter II, states that those entities interested in electric energy generation, exploration and development using hydraulic or geothermal resources, for national or public use, should submit an application and a request established by SIGET, furthermore, Art. 13 states that any party interested in obtaining a guarantee for hydraulic or geothermal resource exploitation should submit a written request to SIGET, including an environmental impact assessment, previously approved by the national authority allowing a systematic assessment of the project's environmental effects and their mitigation during construction, operation, and abandonment stages.

Article 103 of the Salvadorian Constitution states that the subsurface of El Salvador belongs to the State, which may award concessions for its exploitation. The process and conditions for awarding the concessions are defined in Section I of the General Electric Law, with SIGET being responsible for the process. Concessions are permanent and transferable, however, SIGET has the right to monitor the exploitation in order to verify that it is done "efficiently and rationally", and all the conditions that the concessionaire must observe are specified in a Concession Contract. In order to obtain a concession, the developer must initiate the process by requesting an award for concession for a specific project. Following a request, SIGET must call a public hearing to find out whether there is opposition to the project, or alternative projects for the same resource.

If there is no opposition, SIGET must put the project to tender in a public process, and the winner of this tender is finally awarded the financing and licensing concession. In the past, these processes have taken two and a half years to conclude, but recently the by-law were modified in order to expedite the concessions.

The awarding of the concession requires that the developer presents SIGET with an environmental impact study, previously approved by the Ministry of the Environment and Natural Resources (MARN), that considers all phases of the development, operation, and abandonment of the project, in full detail. As this may be a difficult or even impossible task before deep exploration activity begins and the project is completely conceptualized, MARN reviews and approves the environmental impact studies on a "best guess" basis. MARN will then extend separate environmental permits for each component of the project, as they are required and defined by the developer with its own, short Environmental Impact Study.

Operation of the project to generate electricity requires that the project be registered in SIGET, and the Transmission Company (ETESAL) and the Energy Trading Unit (UT) guarantee that there will be no problems associated with the interconnection, or with the physical or commercial operation. In order to ensure compliance, the interconnection point of the project must pass the corresponding technical audits.

Currently, Agreement No. 39, which contains the document categorization activities, or projects according to the Environment Law, has been published in Official Journal No. 83, Volume 375, from May 9, 2007.

Categorization is based on Art. 22 of the Environment Law which final part, expresses that "... the Ministry shall categorize activity, work or project, according to their size and nature of the potential impact"; which at the same time is based on list of activities, works or projects requiring an Environmental Impact Study according to Art. 21 in the body of the law.

Group A includes "activities, works or projects with low environmental impact potential," where the developer does not need to present environmental documentation.

Group B comprises "activities, works or projects with potential environmental impact low, moderate or high," where the developer must submit environmental impact documentation for the permit approval. This group is divided into two categories (1 and 2); the first one is related with low potential environmental impact and the latter with moderate to high potential environmental impact.

Recently, the Chinameca geothermal exploration project was classified as Group B Category 1, and, therefore, an environmental impact study was not required.

4. GUATEMALA

The State developer through the Instituto Nacional de Electrificación –INDE- is in charge of the prefeasibility and feasibility studies of geothermal fields in Guatemala. Finance can come from state funds, international financial grants, technical cooperation, loans from IADB, JICA(OTCA), OLADE, IAEA, USAID, ROCAP, etc.

On November 15, 1996, the Congress of the Republic of Guatemala passed the General Electricity Law with the purpose of establishing the main norms for the development of transmission, commercialisation, distribution and generation of electricity. Subsequently, on March 21, 1997, the Ministry of Energy and Mines issued the Regulations for the General Electricity Law.

Generation and commercialisation are organised in an electricity wholesale market giving open access to new participants and open frontiers for wholesale markets in other countries. Income through import benefits the market by increasing competition and ensuring supply for end users. In turn, the opportunity to export generation surpluses increases the size of the market, to which domestic generators have access.

Guatemala deregulated its electricity sector, allowing private industry to participate in power generation. In the case of geothermal development, the private participation has been through concession arrangements, initiating after the project has reached the plant construction stage.

An Environmental Impact Assessment (EIA) is required for each project as well as a community license for any construction in the area. The entity in charge of the EIA approval is the Ministry of Environment and Natural Resources (Ministerio de Ambiente y Recursos Naturales (MARN). Assessment should be performed by an authorized consultant or technician and according to the established regulations.

5. NICARAGUA

The reform to law No. 443 ("Law for the Exploration and Exploitation of the Geothermal Resources") was published by Normas Jurídicas de Nicaragua in La Gaceta No. 173, September 5th, 2006. This reform states:

Article 7, second paragraph:

The proclamation of National Interest authorizes geothermal resource exploration and exploitation. In cases where an area under investigation for exploration or exploitation is located totally or partially in protected areas, the concession holder(s) must obtain the respective approval of the Environmental Impact Study and the Environmental Permit from the Ministry of Environment and Natural Resources, before initiating exploration or exploitation of the resource. Three percent of the estimated value of

the Environmental Impact Study and the Environmental Permit shall be paid to the Ministry of Environment and Natural Resources by the concession holder as funds to be utilized exclusively for the process of monitoring and overseeing of the execution of these studies.

Article 19: It is the obligation of the concession holder to present the Nicaraguan Institute of Energy with legal proof regarding the environmental permits, which are a requirement for initiating the exploration phase, made by the Ministry of Environment and Natural Resources.

Article 28:

The exploitation concession may be extended under certain circumstances for an additional period of no more than 10 years, provided that the concession holder requests the renewal at least five years after the start of exploitation and at least three years prior to the expiration date of the exploitation concession.

The extension must be approved by the Energy Regulating Entity, provided that the concession holder has fulfilled the obligations of the initial exploitation contract, there are technical data that indicate that generation from the field can be increased, and the concession holder provides a plan for additional investment proportional to the planned increase in generation capacity. If the additional investments are suspended due to technical results that show that it is not possible to achieve the level of generation that was expected, the extensions to the exploitation concession must be proportional to the plan of investment that is executed.

Article 78:

The contracts or concessions for exploration or exploitation of geothermal resources that were granted prior to origin the present law, may be adapted to this law only if the concession holder so requested before December 31th, 2006.

6. SUMMARY

6.1 Costa Rica

There is a substantial geothermal potential located inside protected areas in Costa Rica. Nevertheless, because current law do not allow anyone to explore or exploit any type of energy inside the national parks, the future of geothermal development in Costa Rica is very limited.

The establishment of numerous national parks and protected zones has had a negative impact on geothermal development, because it inhibits the utilization of existing geothermal resources in high-temperature zones. These restrictions are unproductive for the country, since the production of electricity depends primarily on two energy sources: hydroelectric and geothermal, which in 2006 provided 76.5 and 14.1% of the total electricity produced in the country, respectively.

A new bill (File No. 16,137) has been written and presented to the Costa Rican congress; it is entitled: "Law to Regulate Geothermal Energy Production in National Parks". The main purpose of this new bill is to authorize ICE to develop the geothermal resources inside national parks in an environmentally sensitive manner.

The law takes into account all environmental concerns inside the national parks, and obligates ICE to use all available techniques to mitigate any possible visual, sonic, atmospheric and hydraulic pollution, as well as any impact on the flora and fauna inside the national park.

The environmental fee (0.1% of the value of the energy produced inside the national park) provides financial aid to the national parks. The fee can be paid in cash or in construction materials to improve the facilities inside the parks.

There have been conversations with some of members of congress to inform them of this law, and they have shown their willingness to support the new law when it will be debated in congress.

6.2 El Salvador

With regards to the incentives for renewable energy sources, there is a draft bill under discussion in the Congress; however no date has been established for its approval. It provides a number of tax benefits for projects from the following sources: small hydro, geothermal, solar and wind, with a capacity of less than 20 MW. At the same time, it includes tax benefits for research and development projects.

On the other hand, the new reforms in the sector include the making of the Energy National Council, which is concerned with developing renewable energy and promoting the national energy policy. However, the Council has not yet been established, and the reform should have taken effect on October 01, 2007

Furthermore, in terms of environmental legislation, it is expected that project categorization will bring a more expeditious way for geothermal developers.

6.3 Guatemala

Categorization projects within the EIA process have been carried out in similar conditions as El Salvador.

According to Agreement 431-2007, regulations assessment, environmental control and monitoring is established to meet CAFTA, where the country recently signed with the United States. Compilation of guidelines is summarized within the Environmental Assessment Technical Manual, which will facilitate the EIA process for different users. The social issues on project implementation continue to be a task to resolve.

6.4 Nicaragua

Since September 2006, Nicaragua is able to explore and exploit their geothermal resources in protected areas. The reform to Law 443 has made it possible to explore and exploit within these areas through concessions.

It is the obligation of the concession holder to present the Nicaraguan Institute of Energy with legal proof regarding the environmental permits, which are a requirement for initiating the exploration phase.

7. REFERENCES

(1) *Environmental Law No. 7554, Article 34*, October, 4th, 1995, San José, Costa Rica.

(2) *Attorney General of the Republic, Resolution C-103-988*, July, 1998.

Arevalo, A.S., 2006: *Environmental and Social Issues in Geothermal in El Salvador*, Workshop for Decision Makers on Geothermal Projects in Central America, UNU-GTP, 2006.

Decreto Legislativo No. 176, 4 de diciembre, 1997: *Diario Oficial No. 239*, Tomo 337

Environmental Impact Assessment Guide, Guatemala October 1999: CONAP, MAGA, CONAMA, ONGS, CECON, IDAEH, INGUAT

Grajeda, E.C., 2006: *Environmental and social Issues in Geothermal in Guatemala*, Workshop for Decision Makers on Geothermal Projects in Central America, UNU-GTP, 2006.

ICE, 1991: *Evaluación del Potencial Geotérmico de Costa Rica*. Resumen Ejecutivo, Instituto Costarricense de Electricidad, Noviembre 1991, San José, Costa Rica.

ICE y Asamblea Legislativa, 2005: *Energía Geotérmica en Parques Nacionales: barreras y oportunidades*. Simposio. Exposiciones del Lic. Henry Campos y del Dr. Alfredo Mainieri. 13 de octubre de 2005. San José, Costa Rica.

Ley General de Electricidad, Decreto Legislativo 843, 10 de octubre, 1996, *Diario Oficial No. 201*, Tomo 333.

Moya, P., 2003: The Costa Rican Geothermal Energy Development, The IERE Central America Forum Transnational Electrical Interconnections and Sustainability in Central America, Session 2, November 24-25, 2003. San José, Costa Rica.

Moya, P., Yock, A., 2005: First Eleven Years of Exploitation at the Miravalles Geothermal Field. Proceedings, Thirtieth Workshop on Geothermal Reservoir Engineering Stanford University, Stanford, California, January 31-February 2, 2005.

Moya, P., Rodríguez, E. M., Mainieri, A., 2006: *Utilization of Geothermal Energy in Protected Areas of Costa Rica*. Workshop for Decision Makers on Geothermal Projects in Central America, November 26-December 2, 2006, San Salvador, El Salvador.

Normas Jurídicas de Nicaragua, 2006: Ley de Reforma y Adicionales a la Ley No. 443, Ley de Exploración y Explotación de Recursos Geotérmicos. *La Gaceta No. 173 del 5 de Septiembre del 2006*, Managua, Nicaragua.

Rodríguez, J.A and Arévalo, A.S., 2007: *Geothermal, the environment, and neighbouring communities*, UNU-GTP, Iceland, Report 1. In prep.

Zúñiga, A., Harding, N., 2006: *New Law Allowing Geothermal Projects in Protected Areas in Nicaragua*. Workshop for Decision Makers on Geothermal Projects in Central America, November 26-December 2, 2006, San Salvador, El Salvador.