

## **LAWS AND REGULATIONS ON GEOTHERMAL ENERGY UTILIZATION IN COSTA RICA**

**Alfredo Mainieri**

Instituto Costarricense de electricidad UEN Proyectos y Servicios Asociados  
Centro de servicios Recursos Geotérmicos

San José

COSTA RICA

*amanieri@ice.go.cr*

### **ABSTRACT**

Three laws include the dispositions that regulate activities related with the exploration, development and exploitation of geothermal energy for energy production in the Costa Rican Republic. The first of these was published in 1976 as Law No. 5961. The second one, Law No. 7200 was published in 1990. Finally, in 1995, Law No. 7508 was published as a modification to Law No. 5961. This document makes reference to these laws and the modifications to which they have been submitted to adapt them to new conditions in order to improve private participation in electricity generation. A new law, currently under study in the Legislative Assembly, will allow geothermal energy to be exploited in national parks, if approved.

### **1. LAW NO. 5961**

Considering that geothermal energy is an important autochthonous energy source for electricity production, characterized as being low contaminating, renewable, environmentally friendly and reliable, in October of 1976 the government of the Costa Rican Republic declared, by Law No. 5961, that the exploitation of this energy source is of public interest and authorized the Instituto Costarricense de Electricidad, better known as ICE, to manage all aspects of the investigation, exploration, exploitation and protection of geothermal resources. The law went into effect in December of this same year when it was published in La Gaceta.

In detail, this law decrees the following:

Article 1 – The investigation, exploration and exploitation of national geothermal resources, defined as the energy accumulated in groundwater which by different geological processes, is under high pressure and temperature conditions, is of public interest. The Instituto Costarricense de Electricidad is in charge of all activities related to geothermal resources, exclusively, and does not require permissions or concessions emitted by the government of the Costa Rican Republic.

Article 2 – Wherever possible, ICE will avoid alteration of the natural conditions in areas of touristic interest that are related with its projects and will collaborate with the other governmental dependencies to conserve their beauty and other natural resources. To ensure the protection of these resources, the Executive Power will establish the Areas of Absolute Forest Protection, if necessary, as required by ICE.

Article 3 – ICE is authorized for the acquisition of all lands required for the investigation, exploration, exploitation and protection of geothermal resources, exercising the disposition of Law No. 2292 created November 20, 1958.

Article 4 – This law is of public order and eliminates the legal dispositions that oppose it.

Based on what is stated in this Law, ICE carried out the prospection that allowed the localization and development of the first stage at the Miravalles field, located on the southern flank of the volcano with the same name. Currently, there are five plants with a total installed capacity of 163.5 MWe in this field. Once completed the development at Miravalles, ICE did studies on the flanks of Rincón de la Vieja, where two new geothermal fields were located, Pailas and Borinquen. As a result of the first feasibility study done in Pailas, the presence of a commercially exploitable geothermal reservoir was confirmed and for 2007 the construction of an initial 35 MW power plant is planned.

## **2. LAW NO. 7200**

### **LAW AUTHORIZING AUTONOMOUS OR PARALLEL GENERATION**

According to what was initially stated in the laws which govern the electric industry in Costa Rica, all of the aspects related with the production of electricity from any source are ICE's responsibility, exclusively. Regardless, in October of 1999, this changed with the creation of **Law No. 7200** or **Law Authorizing Autonomous or Paralell Generation** with which the participation of private companies in electricity generation was authorized and regulated. This law in itself is not directly related with the use of geothermal resources for electricity production, however, reference is made thereto since it forms part of the basis for the modifications of Law No. 7508 created thereafter and cited later, which allows and regulates the participation of private companies in the generation of electricity from geothermal sources.

If Law No. 7200 is not directly related with the use of geothermal energy, its mention is necessary since in Article 3 the production of electricity from non conventional sources and the elements by which the authorization and regulation of electricity generation are established to authorize electricity generation at limited capacity power plants belonging to rural electric cooperatives or private businesses.

Later in May of 1995, with the publication of Law No. 7508, the dispositions of the law that permit and regulate electricity generation from geothermal resources by private companies were put forth. In its main articles, this law says the following.

ARTICLE 1 – In effect of this law, autonomous or parallel generation is defined as that produced at limited capacity power plants operated by private businesses or electricity cooperatives and that can be integrated in the national electricity grid.

ARTICLE 2 – Limited capacity power plants are those which are either hydroelectric or conventional and do not produce more than twenty thousand kilowatts (20,000 kW).

ARTICLE 3 – The purchase of electricity from rural electricity cooperatives and private businesses by the Instituto Costarricense de Electricidad is declared public interest as long as at least 65% of the social capital is for Costa Rican citizens, where limited capacity power plants are established for the exploitation of small scale hydroelectric potential and non conventional energy sources and have not been previously part of the national electricity grid.

ARTICLE 5 – The National Electricity Service will be empowered to approve concessions destined for the exploitation of limited capacity power plants to a maximum of twenty thousand kilowatts

(20,000 kW) and for a period of up to but not exceeding fifteen years. Also it can extend, modify or transfer them without requiring legislative approval, an indispensable requirement when the potential surpasses twenty thousand kilowatts, or when less than twenty thousand kilowatts (20,000 kW) and the buyer has approved concessions which when added to the new ones exceed this amount.

ARTICLE 6 – In order to approve a concession for the exploitation of limited capacity power plants, the National Electricity Service, in addition to what is stated in the Water, Hydraulic and Electrical Forces Nationalization Law No. 258 created August 18, 1941 and its reforms, must demand a declaration of eligibility, approved by the Instituto Costarricense de Electricidad. This declaration must be provided in a period of no more than one hundred and twenty natural days, after the date of the presentation of the request.

ARTICLE 7 – The Instituto Costarricense de Electricidad can declare a project for the exploitation of a limited capacity power plant as eligible, so long as the potential from parallel generation does not amount to fifteen percent (15%) of the combined potential of the areas that conform the national electric system.

The Instituto Costarricense de Electricidad will reject the requests that interfere with an anterior project or concession, in process or approved.

Article 8 – In addition to the declaration of eligibility, to which article 6 refers, for limited capacity power plants of greater or equal to two thousand kilowatts (2,000 kW) the interested party must provide a certification of an environmental impact study elaborated by a professional in this branch to the National Electric Service. This study must be previously presented to the Ministerio de Recursos Naturales Energía y Minas for its approval or rejection within sixty natural days after its presentation.

ARTICLE 11 – To help with the fulfillment of environmental control and recuperation programs, at the signing of the suppliers contract, the concessionist must provide an unconditional fulfillment guarantee in favor of the Ministerio de Recursos Naturales Energía y Minas equivalent to 4% the value of the project, during the construction period of the project, which will maintain active for one year after the project enters into operation. The guarantee will reduce an amount equivalent to one percent (1%) of the value of the project and it will remain active during the entire period of the concession.

### **3. LAW NO. 7508**

#### **REFORMS TO THE LAW WHICH AUTHORIZES AUTONOMOUS OR PARALLEL ELECTRICITY GENERATION NO. 7200**

Since Law No. 7200 was initially created to regulate the generation from privately owned hydroelectric and thermal plants, in 1995 the government of Costa Rica considered it necessary to extend it so that within its range were the possibility of electricity production from other types of energy resources. For this reason in May of 1995, Law 7508 was published, modifying the following articles of Law No. 7200.

#### **ARTICLE 3 – Public Interest**

The purchase of electricity from cooperatives and private businesses is declared as public interest, whenever at least thirty five percent (35%) of the Social Capital belongs to Costa Rican citizens (Law 7200 set this percentage at 65%) whom establish limited capacity power plants for the exploitation of small scale hydroelectric potential and non conventional energy sources, so long as they have not previously been part of the national electric system.

**ARTICLE 5 – Permissions of the SNE (Nacional Electric Service)**

The SNE will be able to approve concessions destined for the exploitation of limited capacity power plants up to a maximum of twenty thousand kilowatts (20,000 kW) for a period of no longer than twenty years (Law 7200 set this period at fifteen years).

**ARTICLE 20 – Authorization for energy purchase**

ICE is authorized to purchase electricity from privately owned power plants for no more than an additional fifteen percent (15%) to the limit indicated in article 7 of this law (referring to article 7 of Law 7200). This authorization for the acquisition of energy from hydro, geothermal, wind energy and any other non-conventional source in blocks of no more than fifty thousand kilowatts (50,000 kW) of maximum potential.

This numeral is important for the future of geothermal energy because for the first time, a public enterprise (ICE) is authorized to purchase electricity generated from non conventional sources, geothermal, wind energy or of any other nature. Based on this new disposition a bidding process for a geothermal potential block of 50 MW was published and made law in the second half of the 1990s, of which 27.5 MW were installed and have been operating uninterruptedly at Miravalles since March, 2000.

**ARTICLE 21 – Purchases through bidding processes**

Purchases must be made following a public bidding process with competitive sale prices and the possibility to evaluate technical, economic and financial capacity, of the provider as well as the characteristics of the energy source offered.

**ARTICLE 22 – Active period of contracts**

Contracts for the purchase and sale of electricity cannot remain active for a period of more than twenty years and the operating power plant actions must be transferred, free of cost and loans, to ICE once the contract expires. This article modifies the range of the initial law, Law No. 7200, in which the contracts could not remain active for more than 15 years. Once this period was completed, the SNE (National Electricity Service) was permitted to extend them.

**4. BILL in 2006 TO MODIFY THE NATIONAL PARKS LAW IN ORDER TO PERMIT THE EXPLOITATION OF GEOTHERMAL ENERGY WITHIN THEIR BOUNDARIES  
FILE NO. 16,137**

The convenience of utilizing geothermal resources present within National Park boundaries, due to the increasing price of petroleum and its byproducts, today is of greater importance for Central American countries than in the past. It is for this reason that Costa Rica and Nicaragua have presented bills to modify their current legal status, so that, while taking the necessary measures for environmental protection within National Park boundaries, prospecting can be carried out and that if the results are positive drill and construct geothermal power plants.

In the late 1980s a nationwide geothermal reconnaissance study resulted in the evaluation and quantification of Costa Rica's geothermal potential in terms of resources and reserves. When this study (and some others) was carried out, there were no limitations or restrictions on the access to resource areas because the legal constitution of protected zones was still in an early stage. With the exception of the Rincón de la Vieja National Park, formed in the late 1970s, there were no legal barriers to exploration and future exploitation of geothermal energy in identified zones of high-temperature resources.

There is a substantial geothermal potential located inside protected areas. Nevertheless, because current law does 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 formation 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 previously located 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 2004 provided 80.5 and 15.4% of the total electricity produced in the country, respectively.

In Costa Rica and some other countries, the current law does not allow the exploration or exploitation of geothermal resources inside national parks. As a result of the aforementioned, once the previous legislative period was completed, a bill entitled “Law for the Regulation of Geothermal Energy Exploitation in National Parks”. With the approval of this law, lands with clear geothermal potential will be able to be used for electricity production.

Even though in many countries there are laws and regulations intended to prevent the abuse (or improper utilization) of natural resources, there has been abuse of natural resources, and therefore, there is a threat that these may be damaged for all mankind. Therefore, each country must develop its natural resources sustainably and responsibly. The world has begun to talk about “the age of renewable energy”, in order to implement a new industrialization model. The fossil fuels age should come to an end and new, efficient technologies of producing energy should be implemented: “a greater use of the geothermal energy will supply citizens with the opportunity of obtaining an effective control of their own energetic resources and also to utilize a domestic source, which is stable and secure” (4).

The “social function” of natural resources should not be overlooked. Protecting the environment does not mean inhibiting its rational use. The equilibrium between nature and human beings should be addressed politically, in order to improve the quality of sustainable life.

A new bill, in 2006, (File No. 16,137) has been written and presented to the Costa Rican congress. It is entitled: “Law for the Regulation of Geothermal Energy Exploitation 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 the continued environmental improvement in the potential area of interest. The new law assigns to the “Secretaría Técnica Ambiental (SETENA)” the oversight of any possible geothermal development, in order to assure that these principles are being followed correctly.

A 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 resources 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 pads. In addition to all this, before a geothermal project can be developed, an environmental impact study must be approved (as is now 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.

- 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.
- 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.

- Oversight 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.
- 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.
- Directional drilling will be implemented to reduce the number of drilling pads required, and thereby reduce the environmental impact inside the national park.
- 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.
- 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 whole process.
- For the exploration phase, ICE is restricted to evaluating the geothermal potential by drilling no more than ten geothermal wells.
- 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.

There have been conversations with some of the new representatives to inform them of this law and its importance to Costa Rican geothermal development. In these conversations, representatives have suggested that they are willing to support the new law when it is discussed in congress.