

## "Implications of the New Mexican regulatory

## framework for geothermal energy"

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### Target

Analyze the legal status of geothermal resources in Mexico before and after the recent energy reform, proposing adaptations that allow development of low enthalpy geothermal energy projects

#### Introduction

The interest of this work comes from iiDEA group of the Engineering Institute of the National Autonomous University of Mexico, whose objectives are research, innovation and development of low enthalpy geothermal energy projects in Mexico. One of the barriers of the development of these projects is the non existing robust legal regime to develop such projects.

#### Development

Comparision between the previous and current regulation

Before
•The use of ground water or steam above 80 °C,
require the previous grant for geothermal gener-
ation and other uses. (CONAGUA)

them are really ambitious:

accountability.

ting the environment.

ploration and extraction of oil

Placa Orificio

Flash Evaporation Binary Cycle

Modular Geothermal

Desalination Unit

Geothermal Food Dehydrator

Bomba

- After . SENER will be in charge of issuing the technical or administrative provisions of a general nature. . Three stages are proposed: reconnaissance, ex-
- ploration and exploitation. Low enthalpy geothermal energy is not present . It aims to give legal certainty to investors. in the regulation
  - . It is proposed that exploration permits are valid for three years, renewable for another three
    - years Low enthalpy geothermal energy is not contemplated

Direct uses of geotermal energy in Mexico (International Geothermal Association, 2013)

USE	INSTALLED CAPACITY			
Individual heating	0.460 MWt	4.397 TJ/year		
Greenhouse warming	0.004 MWt	0.059 TJ / year		
Agricultural drying	0.007 MWt	0.101 TJ / year		
Bathing or swimming	155.347 MWt	4,018.229 TJ / year		
TOTAL	155.818 MWt	4,022.786 TJ / year		
Use of low onthalmy resources in many countries (International Goethermal Association 2012)				

Use of low enthalpy resources in many countries (International Geothermal Association, 2013)

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Country	Capacity MWt	Anual use TJ/year
Argentina	307.5	3906.7
France	1345	12929
Germany	2485.4	12764.5
Mexico	155.8	4022.8
Norway	3300	25200
Venezuela	0.7	14
World	50583	438071

#### **CERTAINTES** . SENER geothermal exploration permission

- (territorial rights)
- . SENER geothermal exploitation concession (territorial rights)
- CONAGUA geothermal water concession
- (not available) . General requirements for permittee / licen-
- see
- New electricity market structure CRE mandatory scheme beginning in 2018
- UNCERTAINTIES
- SENER geothermal concession payment (how much and when)
- Exemption from water rights to CONAGUA
- . Formats do not exist in the CRE yet . Bases and rates of new market

this new regulatory framework

- . How they will operate the energy certificate
- . Payment Energy porter The role that CFE and CENACE will have in

the

from the

national

subsoil

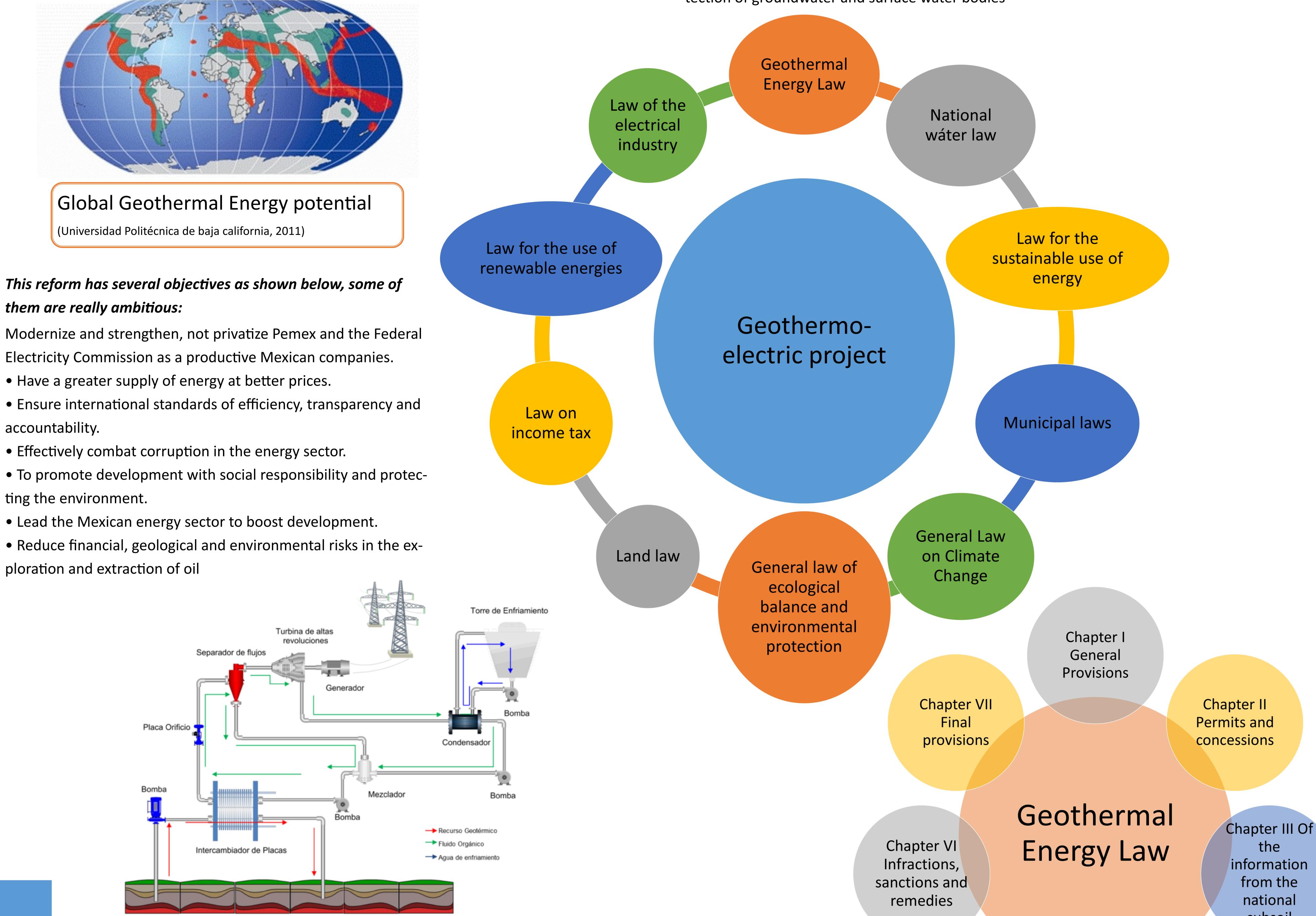
Chapter IV

Reports and

safety check

The environment geothermal energy standards relate strictly to generate electricity, as major standards include the following:

- . NOM-001-ECOL-1996. The maximum permissible limits of pollutants in wastewater discharges into national waters and property.
- . NOM-003-CNA-1996, Requirements for the construction of dewatering wells to prevent contamination of aquifers.
- . NOM-004-CNA-1996, Requirements for the protection of aquifers during the maintenance and rehabilitation of water extraction wells and the closure of wells in general.
- . NOM-081-ECOL-1994, which establishes the maximum permissible limits for noise emission of stationary sources and their method of measurement.
- . NOM-150-SEMARNAT-2006, which establishes environmental protection technical specifications to be followed in the drilling and construction of geothermal wells; at the same time provides protection of groundwater and surface water bodies



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# HIDRO-EYECTO **EVAPORADOR EVAPORADOR EVAPORADOR SECUNDARIO** PRECALENTADOR

Proposals for improving the regulation:

Once that the support from the Secretary was solicited regarding the issue of regulation of low enthalpy geothermal resources, and after receiving the trade DGEL / 211/589/2015, it is considered that there are still some important aspects to consider in the present regulation, which are listed below.

Chapter V Of

geothermal

registration

- Concession of Project, not the concession of geothermal fields.
- Support of several applications in a geothermal area.
- Financial security for investors.
- The geothermal resource is considered as a different resource of water.
- Reinjection and reinjection incentives



The recent reform enacted, focuses on the promotion of competitiveness of the sector through a new architecture of the national energy sector reform, that will promote the following activities:

- Encouragement of private investment in Mexico
- Increasing competitiveness in the energy sector Geothermal energy law aims to publicize this energy and encourage its use
- Reduce greenhouse gas emissions

Geothermal energy law currently regulates the activities of prospecting, exploration and exploitation of geothermal resources for the use of power generation, but despite lack of regulation for projects of low and medium enthalpy, the initiative to talk to members of the Secretary was taken. The secretary -approval procedures were known and how the incentives will work for the development of geothermal projects were clearer.

Leaving aside the problem of the lack of regulation, other aspect that turns equally important is the fact that the research done in university laboratories is not tied to the objectives of the current energy market, therefore it is required that this research stays not only in research articles, but in the application field.

Another point is that the Mexican geothermal industry has been focused on the technical side and if we want to invest in order to develop and promote renewable energies, it is urgent to visualize the industry under a technical-trade balance, that is, as a profitable business.

As a final point it can be considered that the reinforcement of the sector and the augmenting of openness to private initiative is a strategy of the Federal Government which can result in many benefits for the Mexicans.