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GEOHERMAL ENERGY IN MEXICO: CURRENT STATUS AND PERSPECTIVES

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Mexico: Abundant geothermal energy

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Perspectives: CFE Reserves (Mwe)

PROVEN RESERVES

*Under
construction
or planned

Field/Project	New	Decommisioned	Additional
Cerro Prieto V	100	0	100
Los Azufres III 1*	50	20	30
Los Azufres III 2	25	0	25
Los Azufres IV	75	15	60
Los Humeros III A*	27	15	12
Los Humeros III B	27	0	27
Las Tres Vírgenes 3	2	0	2
TOTAL	302	50	256
CP/Nuevo León I	50	30	20
CP/Nuevo León II	25	0	25
CP/Salttillo	50	0	50
Cerritos Colorados	75	0	75
TOTAL	275	30	245

PROBABLE RESERVES



- Historically the Mexican Federal Government had the monopoly to produce, transport and distribute electric power.
- Accordingly, CFE (Comisión Federal de Electricidad), a Federal Government institution, explored, developed and produced the geothermal resources presented before.
- Though since 1992 private companies were allowed to produce electricity, with some restrictions, they were discouraged from entering the geothermal industry due to the inexistence of a geothermal law.
- However, this year a new geothermal law was promulgated, allowing and encouraging the participation of private companies in geothermal power production.

PROVEN GEOTHERMAL RESOURCES

Binary-cycle plant(s) using separated brines from Cerro Prieto. Probable joint venture of CFE-others

45 MWe

Company: Grupo Dragón. **Field:** Domo de San Pedro, Nayarit.
First private geothermal power plant in Mexico, to go on-stream in 2014.

Instaled 10 Mwe
Under construction 25 Mwe

TOTAL

80 MWe

INDICATED GEOTHERMAL RESOURCES

Estimated potential in 14 prospects ($>180^{\circ}\text{C}$), CRE (2011)

600 MWe

Estimated potential in 4 prospects ($150-180^{\circ}\text{C}$), CRE (2011)

55MWe

TOTAL

655 MWe

INFERRED GEOTHERMAL RESOURCES

Estimated potential in un-identified zones ($>180^{\circ}\text{C}$), CFE (2010)

1044 MWe

Estimated potential in un-identified zones ($150-180^{\circ}\text{C}$) CFE (2010)

166 MWe

TOTAL

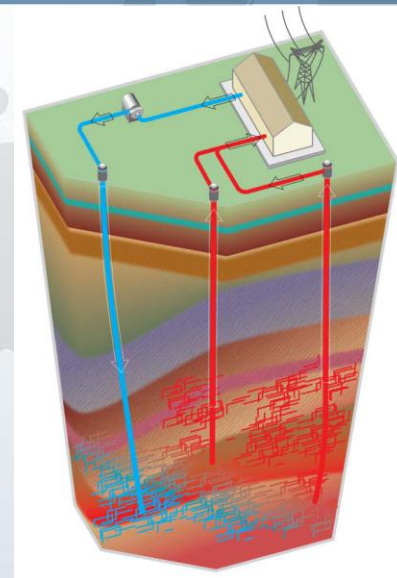
1210 MWe



OTHER MEXICAN GEOTHERMAL RESOURCES

Hot dry rock / Enhanced geothermal systems

Rock formations with high heat content but low or inexistent permeability and little or no water. Unlike the other geothermal systems, they are present in the whole Earth crust. **Its estimated energy content within the first 10 km of the crust is greater than 500 times the energy of all oil and gas systems known so far.** In México, very good prospects were identified, so far, in El Ceboruco, Nay., Acapulco, Pue., and Los Hornos, Pue. **Recently the IIE, in association with other institutions pertaining to the CeMIE-Geo, started an estimation of the Mexican EGS potential.**



Geopressured systems

Permeable systems containing water and dissolved methane at high pressure (≈ 700 bar) and moderate temperatures (150°C). Its technological development started in the USA, where the expectation is to exploit up to 10,000 MWe with these resources in the future. Due to similar geologic conditions it is expected that these systems also exist in the State of Tamaulipas, Mexico.



OTHER MEXICAN GEOTHERMAL RESOURCES

Marine geothermal systems

High-enthalpy systems at sea bottom. Not commercially exploited. In México were identified in the Gulf of California, particularly in the Wagner basin. Provisional estimates concluded that this area might have a potential about 300 times that of the Cerro Prieto field.

Magmatic resources

Not exploited currently. Their most attractive feature is their high temperatures (≥ 800 °C).

In México there are a number of young volcanoes, including El Ceboruco, Volcán de Colima, Parícutín, Popocatépetl, Chichonal, etc.





TO REMEMBER

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- México is blessed with great hidrothermal potential accesible to national and foreign companies.
- Joint ventures are possible between CFE and other companies.
- In México there are geothermal institutions and companies with very experienced personnel, which could collaborate with Mexican or foreign investors in essentially all aspects of exploring and developing geothermal fields.
- An insurance system for geothermal exploration drilling is being implemented.
- The Mexican EGS potential is being assessed and the corresponding information will be public.



THANK YOU



For more information

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