

Use of Geothermal Heat in Industrial Processes in SICA Member Countries (GEO II) Project

Geothermal Direct Use Market Sounding Webinar

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A brief overview of geothermal energy and its direct uses



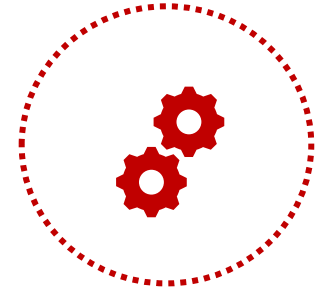
More than **75 major volcanoes** located in the **Pacific Ring of Fire** and approximately **1,343 hot springs** are currently registered in the Central American region.



The economically and technically exploitable geothermal potential of Central America is estimated around **3 to 5 gigawatts (GW)**.



Many SICA member countries have not taken advantage of opportunities to:
-**make** the energy consumption of production processes **sustainable**
-**environmentally friendly**.



Geothermal heat is used for industrial applications such as, for example, **fruit dehydration** and **crop drying**, **air conditioning** of greenhouses or **cooling** of cold rooms and buildings.



GEO II Implementation



On behalf of:

German Federal Ministry for Economic Cooperation and Development (BMZ)



Implementation:

German Development Agency GIZ



Political Counterpart:

General Secretariat of the Central American Integration System (SG-SICA).



Approved amount:

4.400.000 €



Complementary implementation module:

It is implemented jointly with the BGR (geoscientific cooperation) and the KfW (financial cooperation).



Type of cooperation:

Technical Cooperation



Duration:

3 years (11/2020 – 10/2023)

Project objective



SICA member countries have improved conditions for the direct use of geothermal energy for industrial applications.



Intervention areas

1 Support for the adaptation of regulatory frameworks. The Project's technical advisory work will contribute to improve the conditions for the regulation of the direct use of geothermal energy in SICA member countries.

2 Development of productive demonstration projects. It will be supported to lay the foundation that companies need to make investment decisions on plants/facilities for the direct use of geothermal energy.



Intervention areas

- 3 Development of methodological tools for the management of direct use geothermal projects.** Create instruments, tools, methods or guidelines for the direct use of geothermal energy .
- 4 Exchange of experiences in SICA member countries.** Professional exchange of experiences with the direct use of geothermal energy.



Map of Direct Use projects



1

- 1.1 Food Dehydration Project (Amatitlán) and Cold Storage Rooms Project (Amatitlán)
- 1.2 Agajal Milk Cooling Project (Jalpatagua, Jutiapa)

2

- 2. Potential Project in evaluation

3

- 3.1 Drying facility for Coffee Grains (Berlín)
- 3.2 Cold Storage Room (Usulután)
- 3.3 Agro-industrial Processing Center (Ahuachapán)

4

- 4.1 Geothermal Cheese Stove (Pavana, Choluteca)
- 4.2 Geothermal Salt Plant (Nacaome)
- 4.3 Cooling in Escuela Agrícola Luis Landa (Nacaome)
- 4.4 Drying Fruits Project (Namasigüe)

5

- 5.1 Direct Use Pilot Project in Mateare, Telica y Tipitapa.

6

- 6.1 Food Processing Center (Miravalles)
- 6.2 Cooling in Recreo Verde Hotel, San Carlos
- 6.3 Climate control of greenhouses for tomato production (Cartago)

7

- 7.1 Potential Project with Heat Pumps

8

- 8.1 Geothermal use in the Hotel sector (Punta Cana)
- 8.2 Climate control of greenhouses (Guayabal)

Map of Direct Use projects

Guatemala



1.1 Food Dehydration Project and Cold Storage Rooms Project (Amatitlán)

Technology: Geothermal dryer, Absorption Chiller.

Impact: Direct use training center with cascade utilization of geothermal energy.

The percentage of progress is 90%. Estimated completion date: end of 2022.

The project is in the final design phase of the absorption chiller with a progress level of 60%.



1.2 Agajal Milk Cooling Project (Jalpatagua, Jutiapa)

Technology: Geothermal Heat pump.

Impact: Dairy cooperative benefits from project by gaining energy independence.

Map of Direct Use projects

El Salvador



3.1 Drying Facility for Coffee Grains (Berlín)

Technology: Geothermal dryer with heat exchanger over a reinjection well.

Impact: Community obtains more efficient dryer to increase product quality and decrease production time.

New model with replication potential.



3.3 Agro-industrial Processing Center (Ahuachapán)

Technology: Geothermal dryer with heat exchanger over a reinjection well.

Impact: 136.469 MWh_{th} available for local producers to increase market penetration and reduce food waste

New business model with high replication potential.



3.2 Aramuaca Fruit Drying Center (San Miguel)

Technology: Geothermal dryer for fruits.

Impact: added value to excess fruit that is difficult to sell in the market.

Map of Direct Use projects

Costa Rica



6.1 Food Processing Center (Miravalles)

Technology: Geothermal dryer with heat exchanger on reinjection well

Impact: Establishment of efficient processing center for local producers.

Reactivate the economy.

Improve post-harvest agricultural processes.



6.2 Acuaculture (Shrimp), (Bagaces)

Technology: Heat exchanger on soil and geothermal dryer.

Impact: Exploitation of in situ resources in a project that gives immediate added value to the product.



6.3 Climate control of greenhouses for tomato production (Cartago)

Technology: Shallow wells and heat exchangers.

Impact: Greenhouse climatization system to avoid condensation on plants and use of geothermal CO₂.



4.1 Geothermal Cheese Stove (Pavana, Choluteca)

Technology: Geothermal stove.

Impact: In situ resource utilization by reducing the use of firewood.
Employment generation for the community.

Reduction of GHG emissions by replacing wood-burning stoves with geothermal energy.

Reduced logging (deforestation) for firewood extraction.

Miravalles regional center for drying and storage of agricultural products, CR

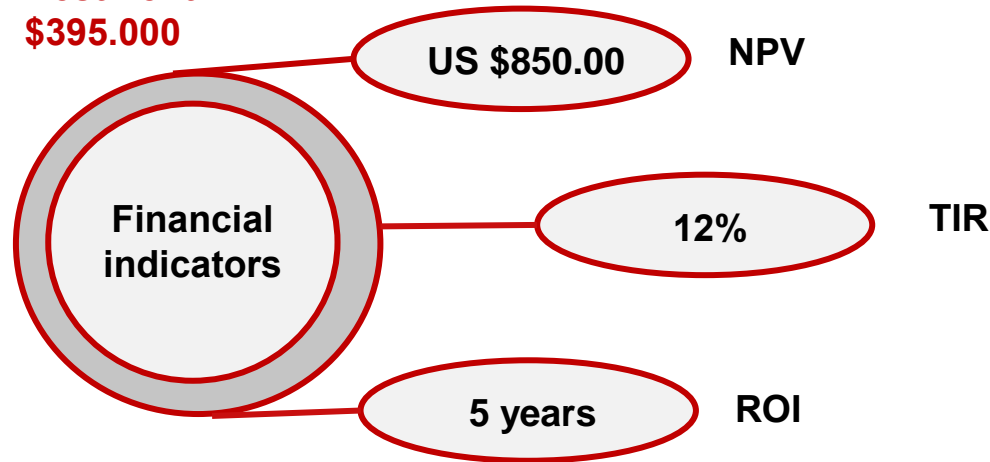
Grupo ICE, Miravalles (national utility)

Cascade design

Innovation or Disruptive technology / Innovation/equipment: Cascade design, Geothermal dryer, Geothermal refrigerated warehouse.

Scaling up potential in La Geo, SV and San Michkael, GT.

Investment:
\$395.000



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