

## TC ABSTRACT

### I. Basic Project Data

▪ Country/Region:	REGIONAL/Regional
▪ TC Name:	Support for the Preparation of low and high enthalpy Geothermal Projects in LAC region
▪ TC Number:	RG-T3022
▪ Team Leader/Members:	GISCHLER BLANCO, CHRISTIAAN (INE/ENE) Team Leader; HARATSU, MISA (INE/ENE) Alternate Team Leader; BALDIVIESO, HECTOR (INE/ENE); JACOME MONTENEGRO, CARLOS ALBERTO (INE/ENE); CORREA POSEIRO, CECILIA (INE/ENE); GONZALEZ TORRES, CAMILA (INE/ENE); RIQUELME, RODRIGO (INE/WSA); CARDENAS VALERO, JUAN CARLOS (INE/ENE); ARAGON SALINAS, RODRIGO NICOLAS (INE/ENE); NIETO ITUARTE, ENRIQUE (IFD/CMF); ROBBERECHTS, ELIZABETH M. (INO/IEN); THYS, PIERRE KENOL (INE/ENE); HERNANDEZ-SANTOYO, JOEL (INE/ENE); KITAGAWA, YUKI (INE/ENE); SEMINARIO, ANA CECILIA (ITE/ITE); BONIFAZ URQUIZU, JEANETTE (INE/ENE); SUBER, STEPHANIE ANNE (INE/ENE); HURWITZ, ZACHARY DANIEL (VPS/ESG); CENTENO LAPPAS, MONICA CLARA ANGELICA (LEG/SGO); LUTZ, LIZA M. (LEG/SGO)
▪ Taxonomy:	Client Support
▪ Number and name of operation supported by the TC:	N/A
▪ Date of TC Abstract:	06 Jun 2018
▪ Beneficiary:	Ministries of Energy or its equivalent public entities, Local Development Banks
▪ Executing Agency:	INTER-AMERICAN DEVELOPMENT BANK
▪ IDB funding requested:	\$ 450,000.00
▪ Local counterpart funding:	\$ 0.00
▪ Disbursement period:	36 months
▪ Types of consultants:	Firms
▪ Prepared by Unit:	Energy
▪ Unit of Disbursement Responsibility:	Infrastructure & Energy
▪ TC included in Country Strategy (y/n):	No
▪ TC included in CPD (y/n):	No
▪ Alignment to the Update to the Institutional Strategy 2010-2020:	Productivity and innovation ; Climate change

### II. Objective and Justification

- 2.1 The general objective of this TC is to enhance low and high enthalpy geothermal developments in the Latin-America and the Caribbean (LAC) region. The TC will encourage the dialog, catalyze the use of further funds such as bilateral, multilateral and climate funds for promoting the use of high and low geothermal energy and develop financial instruments for exploration and exploitation of geothermal power.
- 2.2 Even though LAC high enthalpy and low enthalpy Geothermal Energy (GE) potential is estimated in 70GW according to the Geothermal Energy Association, the deployment of this technology remains underexploited. High enthalpy GE consist on high temperature water deposits that allow electricity to be generated with a high efficiency factor using steam turbines. Low enthalpy GE consist on lower temperature deposit which is not enough for power generation but could be used as a direct source of heat

(industrial applications and residential-district-heating). Latin America accounts for 14% of existing global high enthalpy GE capacity, however only Mexico, Chile and Central American Countries have operating plants with a total installed capacity just over 1.6GW. High enthalpy GE is a large available renewable energy (RE) resource that could provide reliable and base load power and contribute with the electricity network stability. LAC region produce approximately 1,830 million tCO<sub>2</sub> annually from fuel combustion, with an average carbon intensity of 0.41. Electricity generation in most Central American countries depends on imported fuels (diesel and fuel oil) and is vulnerable to high and volatile international oil prices. In Central America, the power sector has contributed to the increase in oil consumption in the region due to a substantial increase in the participation of fossil fuels in the generation mix during the last decades, resulting in high generation costs. Geothermal power could improve energy security by using natural and renewable resources for electricity generation, while reducing the dependence on volatile and high-priced fossil fuels and greenhouse emissions. Furthermore, low enthalpy geothermal energy can be used for additional purposes such as district heating and industrial processes. The use of this kind of technology is applied in the Scandinavia, Central and Eastern Europe and is increasingly being adopted in cities like Bordeaux, Munich, Amsterdam and Warsaw, displacing natural gas for residential heating. The potential of geothermal for district heating is significant; however, low enthalpy geothermal technology is at present not developed in LAC. This technology could be used for district heating in the southern cities of Chile and Argentina, where most of the heating is done by biomass (wood) and natural gas. The main reasons why few of these projects have been developed in LAC are: (i) the high-upfront costs that can reach up to the 30% of the total project costs; these must be tackled during the assessment stage without the certainty that sufficient resources will be found to make the project economically viable; therefore they represent a considerable financial risk for project developers; (ii) the specific know-how ranging from geothermal exploration to drilling and reservoir engineering via plant operation and maintenance; (iii) lack of enabling regulatory and legal framework conditions, as well as fiscal and environmental policies that increase the perception of risk for the developers (iv) lack of available commercial financing and only a small or no proven track records. its high-risk characteristics in preparation stage impedes its promotion. In this regard, it is highly required to mobilize the concessional resource to implement the preparatory studies to analyze the feasibility for geothermal development to make use of the high potential that may exist in the region.

### **III. Description of Activities and Outputs**

- 3.1 The TC will finance preliminary studies and position papers that assess the potential benefits of high and low energy geothermal technologies, social and environmental issues, as well as legal and institutions bottle necks that prevents the development of geothermal energy in LAC. Additionally, dissemination events with the aim of promoting and enhancing the development of low and high enthalpy geothermal energy will be executed. Component I: This component will finance preliminary studies to identify the potential for geothermal development using high and low enthalpy, social and environmental issues, as well as legal and institutions bottle necks that prevents the development of geothermal energy in the beneficiary countries and position papers that assess the potential benefits of these technologies to be used for promotion of geothermal development. As a result, this component will develop conceptual models for the financial and operational structure of geothermal projects. Component II: This component will finance workshops, round tables, publications, webinars, videos of successful projects to increase comprehension of the stakeholders such as policymakers, energy regulators, environmental authorities, local governments, neighboring communities or industries about a geothermal value, that

would lead to a promotion and enhancement of the low and high enthalpy geothermal energy development in the beneficiary countries of the region.

- 3.2 **Component I: Preliminary non-drilling assessment..** Preliminary studies to identify the potential for geothermal development using high and low enthalpy , social and environmental issues, as well as legal and institutions bottle necks that prevents the development of geothermal energy in the beneficiary countries and position papers that assess the potential benefits of these technologies to be used for promotion of geothermal development
- 3.3 **Component II: Dissemination strategy..** This component will finance workshops, round tables, publications, webinars, videos of successful projects to increase comprehension of the stakeholders such as policymakers, energy regulators, environmental authorities, local governments, neighboring communities or industries about a geothermal value, that would lead to a promotion and enhancement of the low and high enthalpy geothermal energy development in the beneficiary countries of the region.

#### IV. Budget

Indicative Budget

Activity/Component	IDB/Fund Funding	Counterpart Funding	Total Funding
Preliminary non-drilling assessment.	\$ 300,000.00	\$ 0.00	\$ 300,000.00
Dissemination strategy.	\$ 150,000.00	\$ 0.00	\$ 150,000.00

#### V. Executing Agency and Execution Structure

- 5.1 The IDB, through the Energy Division (INE/ENE), will be responsible for the execution of this TC. Prior to the execution of the project activities in the selected beneficiary countries, the Bank shall obtain the corresponding no-objection in the form of letter as well as in-kind commitments from the respective authorities from each country. The countries will access the TC based on first come first serve. The Bank will contract individual consultants, consulting firms, and non-consulting services in accordance with Bank's current procurement policies and procedures.
- 5.2 The IDB, through the Geothermal thematic Group, as an Executing Agency will provide the adequate international coordination required for implementing this regional TC.

#### VI. Project Risks and Issues

- 6.1 Even though it has been detected a potential coordination risk due to the project having multiple beneficiaries, this risk will be mitigated with the cooperation and continuous support of the Geothermal ENE's group. This thematic group is conformed by ENE's specialist and analysts located in different COFs and Head Quarter that will contribute with the local and regional dialog.

#### VII. Environmental and Social Classification

- 7.1 The ESG classification for this operation is "undefined".