

REQUEST FOR EXPRESSIONS OF INTEREST **CONSULTING SERVICES**

Selection # as assigned by e-Tool: RG-T3022-P003

Selection Method: Full Competitive Selection

Country: Regional

Sector: Infrastructure and Energy Sector (INE); Mining, Geothermal, Hydrocarbons cluster (INE/MGH)

Funding – TC #: ATN/MC-17429-RG

Project #: RG-T3022

TC name: Support for the Preparation of Low and High Enthalpy Geothermal Projects in LAC Region

Description of Services:

The Inter-American Development Bank aims at unlocking the geothermal potential of the LAC Region, for which it is supporting the governments in the region to create enabling institutional and regulatory environments and to have solid characterization of their geothermal resources. The Bank is seeking support to carry out pre-feasibility studies in geothermal fields across the region in order to reduce as much as possible the exploration phase risk and to provide stronger decision-making tools to key stakeholders regarding the development of geothermal projects.

The consultant firm will be tasked to carry out pre-feasibility studies in selected geothermal fields across the Latin-America and the Caribbean Region. These services will be contracted under a Framework Agreement approach.

Link to TC document: <https://www.iadb.org/en/project/RG-T3022>

The Inter-American Development Bank (IDB) is executing the above mentioned operation. For this operation, the IDB intends to contract consulting services described in this Request for Expressions of Interest. Expressions of interest must be delivered using the IDB Portal for Bank Executed Operations (<http://beo-procurement.iadb.org/home>) by: April 6th, 2020, 5:00 P.M. (Washington D.C. Time).

The consulting services (“the Services”) include:

Geothermal pre-feasibility studies involving the following activities:

- a) Topographic and inspection existing infrastructure
- b) Regulatory framework analysis
- c) Pre-feasibility exploration services, including geology, geophysical, geochemical and thermogradient analysis.
- d) Development of a conceptual geothermal models in selected field and proposal for a drilling campaign
- e) Design of expansion and repowering plans of existing geothermal generation plants
- f) Advisory services for regional geothermal developers
- g) Support for knowledge and dissemination activities

These activities will be requested on a demand basis as part of the framework agreement, to be delivered between the signature of the contract and the 4Q of 2021.

Eligible consulting firms will be selected in accordance with the procedures set out in the Inter-American Development Bank: [Policy for the Selection and Contracting of Consulting firms for Bank-executed Operational Work](#) - GN-2765-1. All eligible consulting firms, as defined in the Policy may express an interest. If the Consulting Firm is presented in a Consortium, it will designate one of them as a representative, and the latter will be responsible for the communications, the registration in the portal and for submitting the corresponding documents.

The IDB now invites eligible consulting firms to indicate their interest in providing the services described below in the draft summary of the intended Terms of Reference for the assignment. Interested consulting firms must provide information establishing that they are qualified to perform the Services (brochures, description of similar assignments, experience in similar conditions, availability of appropriate skills among staff, etc.). Eligible consulting firms may associate in a form of a Joint Venture or a sub-consultancy agreement to enhance their qualifications. Such association or Joint Venture shall appoint one of the firms as the representative.

Interested eligible consulting firms may obtain further information during office hours, 09:00 AM to 05:00 PM, (Washington D.C. Time) by sending an email to Christiaan Gischler (christiaang@iadb.org), Javier García (jgarciaf@iadb.org), and Gastón Siroit (gsiroit@iadb.org)

Inter-American Development Bank
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SUSTAINABLE ENERGY FOR ALL INITIATIVE
RG-T3022
DRAFT TERMS OF REFERENCE

1. Background Information

- 1.1. The total installed generation capacity in LAC was approximately 415GW in 2017, generating more than 1,600TWh that year. The electricity matrix in the region is characterized by a high participation of renewables, with almost 46% of the energy originated in hydropower, while 42% of the generation is based on non-renewable fossil fuels, mostly natural gas. It is projected that the region's annual demand of electricity will more than double by 2040, reaching 3,650TWh, and requiring new installed capacity of more than 400GW. According to the existing national power expansion plans, this additional capacity will be mostly renewable in the form of hydropower and intermittent sources such as wind and solar energy.¹
- 1.2. The high dependency of LAC's power sector on hydropower, makes it vulnerable to climate change effects, particularly to ever longer drought periods and to the more extreme ENSO² events fluctuations. This causes security of supply concerns in the power systems of the region's countries and volatility in their electricity prices. In order to satisfy a growing electricity demand with a diversified, firm and flexible energy supply, the region is facing some challenges. On one hand, there is a limitation for the use of fossil fuels in their generation expansion plans due to the commitment of the countries to reduce their GHG emissions global contributions. On the other hand, renewable sources present important barriers; hydropower developments face strong resistance due their social and environmental impacts (land occupancy, disruption of river ecosystems, methane emissions, etc), while other renewable sources, such as solar PV and wind energy, provide an intermittent supply that is unable to fully satisfy the flexibility needs of a power system.
- 1.3. In LAC countries, there is an identified potential for geothermal generation of approximately 13.4GW³, with the Geothermal Energy Association estimating that the total potential of the region can reach 70GW. For those countries with available resources, geothermal energy can provide clean, firm, reliable, and flexible power generation, besides providing opportunities for direct heat uses in productive activities. Its continuous availability can also facilitate the integration in the network of other intermittent renewable sources. All this, providing electricity at a competitive cost that can reach a value of around US\$0.07/kWh.⁴ Nevertheless, the development of this promising technology faces challenges in accessing financial resources for capital investment. This is mostly due to the risks associated with the exploration phase of a power plant project development, a phase when there is a need of high investment in exploratory drilling together with a high uncertainty in finding adequate geothermal resource in the selected spot.
- 1.4. The heat associated with geothermal fields can also be used for direct productive uses, either in cascade schemes linked with power generation or as stand-alone activity⁵. The technology can provide synergies with the mining industry in those processes requiring of hot fluid input, such as raffinate heating in copper production and enhanced heap leaching for the extraction of gold and silver, or in the temperature management of underground facilities. It also shows important synergies with the agroindustry, providing heat for greenhouses or in the processing of the produces (peeling, frying, drying). Geothermal fluids can also feed district heating installations that increase efficiency and reduce the use of biomass or be the basis to create spa thermal pools tourism. Oil and gas extraction processes usually come along the extraction of large amounts of hot water which, instead of being reinjected or let out for vaporization, can be used for direct application of

¹ *Energy Outlook for Latin America and the Caribbean, Olade, 2018.*

² *El Niño Southern Oscillation*

³ *In fields already located and evaluated. IDB, 2019.*

⁴ *Source: IRENA, Renewable Energy Costs, 2018.*

⁵ *Low enthalpy fields (temperatures lower than 150C) may not be used for power generation but they can provide direct uses of heat*

heat in productive processes.

- 1.5. Globally, there are few experiences of geothermal generation projects with exclusive participation of the private sector. Most of the geothermal developments around the world require, in different degrees, the participation of a public entity with public financing able to absorb the risks associated with the first stages of the projects. In LAC, there are currently 17 operational geothermal power plants, with a total installed capacity of 1,818MW, and an additional 187MW being constructed in 2019. In most of the cases, it is a public entity or utility the one in charge of developing all stages of the project and assuming their risks. Regarding the applications of direct uses of geothermal heat in productive uses, the LAC region still needs to explore the promising opportunities and business models that could arise from it.
- 1.6. The Inter-American Development Bank aims at unlocking the geothermal potential of the LAC Region, for which it is supporting the governments in the region to create enabling institutional and regulatory environments and to have solid characterization of their geothermal resources. The Bank is seeking support to carry out pre-feasibility studies in geothermal fields across the region in order to reduce as much as possible the exploration phase risk and to provide stronger decision-making tools to key stakeholders regarding the development of geothermal projects.

2. Services to be performed

- 2.1. The consultant firm will be tasked to carry out pre-feasibility studies in selected geothermal fields, which will be chosen based on the IDB and national entities criteria. Pre-feasibility studies involve the following activities:
 - a) Topographic and existing infrastructure inspection
 - b) Regulatory framework analysis
 - c) Pre-feasibility exploration services
 - d) Development of a conceptual geothermal model of the selected field and proposal for a drilling campaign
 - e) Expansion and repowering of existing geothermal generation plants
 - f) Advisory services for regional geothermal developers
 - g) Support for knowledge and dissemination

3. Outputs

3.1. Key Activities

3.1.1. Topographic and existing infrastructure inspection

- Gathering and assessment of gaps in existing geographical information, identification of geothermal fields, geographic information, existing infrastructure, areas of special socio-environmental impact

3.1.2. Geothermal regulatory framework analysis

- Analysis of the existing power market and sectorial legal framework in the project's selected country, as well as environmental policy.
- Advisory services for regulation drafting, contractual and procurement processes.

3.1.3. Pre-feasibility exploration services

- Assessment of geology in geothermal fields.
- Geophysical assessments in geothermal fields.
- Thermal gradient analysis.

3.1.4. Development of a conceptual geothermal model of the selected field and proposal for a drilling campaign.

3.1.5. Design of expansion and repowering plans of existing geothermal generation plants.

- Analyze information about existing geothermal resources and conceptual geothermal models in the selected fields and the historical operation of the power plants.
- Carry out technical analysis on steam resources in existing drillings.
- Develop a strategy for repowering or expand the geothermal power plant.

3.1.6. Advisory services for regional geothermal developers

- Provide technical advice and analysis on technology options, providing a focus on new technologies available in the geothermal industry.
- Provide business advisory services to regional public stakeholders to expand their business as geothermal developers.

3.1.7. Identification and design of business models with direct uses of geothermal heat

- Identify socio-economic activities at local, regional and national level that can benefit from hot fluid supply from geothermal uses.
- Design pilot cost-benefit and business models in selected activities with geothermal supply.

3.1.8. Support for knowledge and dissemination

- Development of technical notes and presentations support the Bank or regional stakeholders to better understand specific geothermal subjects
- The consultant may be required to participate in training and workshop activities with local stakeholders regarding geothermal energy, providing content or specific presentations.

3.2. Project Schedule and Timeline

3.2.1. As a result of the Framework Agreement selection process, several firms may be retained to provide the agreed services. Then, the Bank may carry out competitive procedures among retained firms for each work order (WO), during which the implementation schedule, work plans and estimated costs will be determined. Over the contract execution period, it is expected that there will be, at least, two WOs a year. The awarded firm(s) will identify a range of cost depending on the type and number of experts assigned to meet WO's objectives and timelines.

3.3. Expected Deliverables

3.3.1. Deliverables contained in each WO may include, but not be limited to: reports, field assessments, laboratory analysis, workshops, presentations, fulfilling or updating database information and/or questionnaires.

3.3.2. The awarded firm will provide reports of their works in Spanish and/or English.

3.4. Professional profiles of the consulting firm

3.4.1. It will be expected that awarded consulting firm (s) will have the following profile:

- Proven experience in developing successful exploration campaigns, particularly in LAC Region.
- Recorded staff experts with solid technical background in geology and geotechnical sciences, with an available network of laboratories to carry out analysis.

- Proven project management capabilities to design and implement an exploration campaign, with an available network of exploratory equipment suppliers.
- Experts in the power sector, with proven experience in the analysis of the energy sector regulatory frameworks and markets.
- Experts in the geothermal energy industry, with proven experience in developing geothermal projects and understanding of their challenges.
- Proven ability to develop business models associated with geothermal energy.
- Proven experience in identifying and developing businesses with direct applications of geothermal energy.
- Proven experience in the country where the WO will be tasked. The ability to provide experts on the ground will be considered an advantage.
- The proposed experts of the team with each WO must show ability to communicate with local stakeholders in their native language.
- Proven experience in the proposed activities, preferably in the LAC region.

3.5. Reporting

- 3.5.1. The consultant shall report to the Project Team Lead, Christiaan Gischler (christiaan@iadb.org), and Project Members Javier Garcia Fernandez (jgarciaf@iadb.org), and Gastón Siroit (gsiroit@iadb.org).