Responses to Comments and Questions from the CTF TFC Members on the Financing and Risk Transfer Program for Geothermal Power Proposal (Colombia)

Prepared by the Inter-American Development Bank (IDB)

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We would like to thank the governments of the United Kingdom, Japan, and the United States for their questions and comments. Please find below our responses.

Questions from the United Kingdom

> ***Q: The IDB is expecting that this facility will cover the risk of at least one geothermal drilling endeavour as the success rate is generally regarded as 50%. However, there is still a risk that the entire facility could be used up without any successful geothermal resource found. Our concern is that the facility is the statistical bare minimum that one could expect to ensure an outcome of 1 successful drilling exercise. This is based on the assumption that the market will respond favourably once a successful project can be demonstrated (page 14). Would it be possible to explain the grounds for this assumption?***

A: The two developers identified as active in the country have already invested in at least three ongoing projects that would be suitable for accessing the facility. Technical cooperation resources will help guarantee a sound and efficient process for selecting the best projects that will minimize the risk of using up the entire facility without success. However, we agree that there is the risk—inherent to this type of projects—that no successful geothermal resource is found. Although global players are not yet known to be present in the country, attention has been increasingly brought to the region in recent months, thanks to geothermal-specific initiatives by various international organizations in the Andean region and programs already underway in Mexico and Chile. A successful project in Colombia will likely provide an element of certainty to private investors when deciding on a potential location for their next venture. Other factors may also facilitate a favourable market response: (i) public information on the country's potential and its geographical distribution already exists and several areas with geothermal resources have been identified; and (ii) global momentum for the industry is starting to create a strong network of experts that is expected to enhance opportunities and technical capacity in the region. In the worst case scenario, if the facility does not lead to any successful drillings, we need to bear in mind that loss patterns also provide improved data that could help facilitate the development of solutions for geothermal development in the future.

> ***Q: If it is feasible we would like to see the number of jobs created included in the Results Matrix.***

A: Unfortunately, it is not possible to include it in the Results Matrix. The IDB has very strict criteria for the type of indicators that may be included in this annex, including its form of measurement. As mentioned in the proposal, this indicator will be estimated but not directly

measured, since a valid figure for indirect jobs is uncertain. Bancóldex will gather information on this as projects progress and, as a standard practice, we make sure that any requirements for information in addition to what is included in the Results Matrix are established in the Operations Regulations agreed with the executor. Based on the experience gained with gathering developmental information for this program, we will consider adding this or other developmental indicators in the future.

Q: It would also be useful to understand how the Executing Agency, Bancoldex was selected.

A: As a national credit institution, Bancóldex has a public mandate to develop, offer and promote innovative financial and non-financial instruments that enhance competitiveness, productivity and economic growth in Colombia, channelling financial and technical support to companies and corporations across sectors. Bancóldex goals include supporting innovation and they are committed to developing ways to provide adequate financing to sectors currently unattended by the private banking system. Bancóldex also has a good record of collaboration with the IDB, including with projects financed by the CTF. They have strong capabilities in terms of (i) overall project management; (ii) fiduciary management; (iii) environmental and safeguard management systems; and (iv) financial structuring capabilities. Nevertheless, due to the complex and innovative nature of these projects, and in order to ensure a sound selection of the projects with the highest potential to succeed, independent external expertise will be hired to assist Bancóldex.

Q: We'd be interested in seeing any analysis on why $10m was seen as the appropriate level of financing required from the CTF in order to make the risk mitigation instrument effective?

A: This estimate was a combination of two factors: The geothermal investment projection of the country for the next 10 years carried out by the Mining and Energy Planning Unit (UPME), and the willingness of the major interested firms to develop projects (these firms are already working on surface studies with a relatively advanced level of completion, which allows them to provide us with more accurate estimates on the size of investment required to develop their projects).

Q: We think that the CO2e savings may have been overestimated in Table 3.1. The counterfactual is defined as "an investment project in a 50 MW plant representative of the main energy sources in Colombia." (p10, Annex VII). This is compared to investing in to a 50MW geothermal plant. Because the main energy sources in Colombia (hydroelectric and thermos electric gas and coal) have lower load factors than geothermal energy, the representative plant in the counterfactual would generate a lower amount of energy annually compared to the geothermal plant (I think around 204,984 MWh instead of 416,100 MWh). However, for the savings calculations, it is implicitly assumed that the same amount of energy would be generated in the counterfactual as with the geothermal plant. The entirety of the 416,100MWh generated annually from the geothermal plant is counted as emissions averted, but in reality only the 204,984 MWh that would be generated in the counterfactual should be counted as emissions averted. We think that in order to reconcile this either the CO2 emissions savings should be reduced, or the costs

should be added to the counterfactual to account for the investment in the extra capacity that would be needed to produce the same annual energy generation as geothermal (e.g. another 50MW plant). Page 8 of Annex VII, paragraph xviii CO2 refers to the fact that emission costs have not been included in the counterfactual "as a conservative measure" – this seems quite a substantial omission.

A: Thank you for the observation. We understand it is better to construct the counterfactual with the amount of energy, rather than the capacity. We have performed this exercise (see CBA attached) and now included the additional investment costs for the counterfactual so that the CO2e savings are not overestimated. We estimate that an additional 44.4 MW should be installed in the counterfactual scenario so that the representative plant produces the same output as the geothermal plant. Regarding the omission of emissions costs in the counterfactual, we believe that is a more solid approach to consider only once the externalities associated to CO2 emissions (either as a benefit for the project or as a cost for the counterfactual), even if its plausible to think that the counterfactual should account for negative externalities in any situation. By this, we wanted to avoid the possibility of overestimating the total environmental benefits of geothermal plants.

Q: Regarding the statement on page 15 that the main beneficiaries of the proposal will be large public/private firms, could you please provide some reassurance that such firms needs support given they may have enough reserves to cover the exploration costs themselves.

A: These large firms are defined as public/private due to the nature of their capital structure, where participation of public shareholders is high. However, two important aspects of identified firms have a negative impact on their capacity to cover the costs themselves: (i) they are local players with wide experience in the energy and utilities business, but are not geothermal-focused developers; and (ii) in practice, they operate as private firms, which implies that their investment decisions follow a process more similar to that of private sector developers. When considering self-financing of high risk ventures such as geothermal, even well-capitalized and experienced firms may struggle to internally justify greenfield projects, due to the high risk associated to the IRR of geothermal projects vis-à-vis alternative projects, and only those capable of diversifying risk and absorbing the losses can carry out these projects from such an early stage. Furthermore, the capital-intensive nature of the industry, the long lead times and the fact that a large share of investments are dollar based, makes it also highly probable that further public/multilateral involvement might be needed to support these projects.

Comments from Japan

C: We would like to request to be shared us information in connection with the progress of the project, since JICA is also seeking an opportunity to support geothermal development in Colombia. Moreover, JICA is expecting to exchange of opinions and ideas on geothermal development in Colombia.

A: At this point we are not yet gathering detailed technical information on specific projects that might be eligible for the program. We have identified two potential candidates currently working on geothermal in the country, both of which we understand are in a relative

advanced stage of completion of feasibility studies (3G surface studies). We look forward to finding synergies with JICA's initiatives in any project selected as final beneficiary of the program, after its approval.

The IDB welcomes the opportunity to share experiences and opinions on ideas for complementing our activities related to geothermal in the country with those of JICA.

Questions from the United States

Q: From the project description, the project itself is public and both private and public entities will be eligible to submit projects. If public firms can apply for the program, why is it being submitted through the DPSP? Why is there not more of a targeted focus on private sector geothermal activities?

A: EPM and ISAGEN, the most important renewable energy developers in Colombia, are large public and mixed firms with autonomous technical, managerial and financial autonomy. These firms, which are expected to be key players in geothermal development in the country, operate under a fully competitive electricity market, are subject to private sector law, and participate in local and international bond markets. They are not covered by sovereign guarantees and do not have access to the sort of public support mechanisms that have made possible the development of geothermal power in other countries. We consider therefore that geothermal development in Colombia relies on the availability of instruments such as the DPSP, and that this Program fulfils the objective of the DPSP of delivering scale and speed, and leveraging private sector resources.

Major private sector involvement in the projects covered by the program is also expected through the participation of private firms at least at three different levels:

(i) International developers may participate as partners in the first local geothermal development. Local companies are very interested in the possibility of teaming up with international firms

(ii) Commercial banks are interested in financing local geothermal development corporations. The program will open for these banks a new line of business and, above all, would be the first step to engage local banks in geothermal financing techniques. The Team has meet with three private banks and all of them are interested in entering the geothermal market. In this line, there also have been conversations between private banks and public sector geothermal developers.

(iii) Finally, national and international suppliers of goods and services are going to be involved in the geothermal development. At this stage, several international companies are advising the local developers in order to perform feasibility studies.

Q: The proposal indicated that the project will generate up to $190 million in co-financing from private sources, yet it provides no information about from where this co-financing will come? Are there funders currently ready to make investments in geothermal activities that may result from this program? If not, how will the IDB attract such partners?

A: The co-financing is expected to come from two main sources: the firms' retained earnings, and debt. The precise combination of debt and equity is not pre-determined, since the program does not want to interfere with the firms' optimal financing structure. However, developers are expected to compete in terms of leveraging the investment provided by the geothermal guarantee fund that would be set up. As mentioned above, potential funders are interested and have held informal conversations with geothermal developers in order to provide financing for the different stages of the geothermal development.

Q: The description of the potential for geothermal power in Colombia is very vague throughout the proposal. Without a clear description of the geothermal fields or a pipeline of projects, it is difficult to anticipate what kind of success this project may have and what sort of environmental impacts may result from drilling activities. Please provide a more-thorough description of Colombia's geothermal potential and specific areas where this project will occur. If potential geothermal fields have not been identified, then please explain why the project has been brought forward for approval at this time.

A: This is a program that works under demand, so any potential developer can submit a proposal to the fund. However, in the short term we foresee that development will occur in the areas identified by the UPME. Among those areas, the areas where studies and licensing process are most advanced, and hence where the upcoming projects are expected, are as follows:

- *Macizo Volcánico del Ruiz (Cordillera Central)*. 50 MW Plant.
- *Binacional Tifiño – Chiles – Cerro Negro.* 138 MW Plant.

The first project in the *Macizo Volcánico del Ruiz (Cordillera Central)* is well more advanced in terms of finished feasibility studies and overall readiness.

Additional questions from the United Kingdom

Q: On our first question, given that the IDB acknowledges that there is a risk that there are no successful wells drilled, is it possible to increase the size of the facility to ensure that the probability of a successful well is increased?

A: Given the current size of the Colombian geothermal industry and the expected medium term pipeline defined by the national authorities, we do not consider that increasing the size of the facility would be the right step, even if more CTF resources were available. It is true that geothermal exploration is risky, and we cannot rule out the possibility of the program failing to deliver proven geothermal resources—and the same applies to our other geothermal programs in Mexico, Chile, and the Caribbean. The good news is that our calculations were

made using very conservative assumptions, and we are therefore confident that there will be success. But more importantly, from the CTF perspective, the fact that IDB and other MDBs have submitted a number of proposals to support geothermal exploration, enables this risk to be mitigated at the CTF geothermal portfolio level.

Q: Could you elaborate a bit more on how Bandolex was selected as this wasn't really covered in your initial response?

A: Bancóldex was selected among other potential execution mechanisms with the criteria stated in the previous reply. Other alternative possibilities contemplated were a public institution (a ministry, a regulator, or an agency) or a fiduciary trust established by the public sector and managed by a public or private entity. The option of a Public Development Bank as Bancóldex was the option that provided more confidence to the team in different areas. It had especial advantages in terms of overall project management since it had experience in managing energy efficiency projects and guarantees projects. It could also integrate better than any other executing possibility the need for close dialogue between the potential developers, the national authorities and other private banks while, at the same time, having the structuring and fiduciary capabilities already in place. Finally, and in contrast with a special purpose type of executing mechanism, it has the advantage of building local capacity in order to scale up the project.