

**MEXICO CTF**  
**GEO THERMAL FINANCING AND RISK TRANSFER FACILITY**  
**AMENDMENT PROPOSAL**

The **Geothermal Financing and Risk Transfer Facility** for Mexico was approved by the Clean Technology Fund (CTF) Trust Fund Committee in April 2014, and by the IDB Board in May 2014. It includes the following CTF Investment Plan and CTF DPSP resources: USD 31.5M SG loan, USD 2.8M grant, and USD 20M contingent recovery grant (CRG), in addition to a USD 54.3 M loan from the IDB's Ordinary Capital. CTF CRG funding would be available through *Nacional Financiera* (NAFIN, a National Development Bank) to cushion the risks of exploration and test drilling phases (where specific incremental risks are highest) operating as a guarantee to repay the loan in case the wells were unsuccessful. The IDB/NAFIN/CTF exploration loans would be made available to developers for production drilling.

The recently approved **Energy Reforms** in Mexico converted the public utility *Comisión Federal de Electricidad* (CFE) into a Productive Company of the State. As such, it is still owned by the Government of Mexico (GoM), but it must operate as a private company and generate its own revenue. CFE has been divided in one holding (CFE Corporate), and five subsidiaries: 1) CFE Distribution, 2) CFE Transmission, 3) CFE Basic Service Provider, 4) CFE Qualified Service Provider, and 5) CFE Generation. The Energy Reform states that basic and qualified service provider companies, along with qualified users, should get a certain percentage of power from clean energy sources, that will increase over time.<sup>1</sup> To achieve this obligation, CFE Basic Service Provider should award clean energy contracts through long-term energy auctions that include: (i) energy, (ii) power; and (iii) Clean Energy Certificates (CECs). CFE Basic Service Provider can only purchase energy through these energy auctions. Both CFE Basic Service Provider and CFE Qualified Service Provider can purchase energy, power and CECs through bilateral contracts.

In addition, as part of the Energy Reform implementation process, the GoM through the National Energy Control Center (CENACE), has carried out long-term energy auctions as a mechanism to effectively promote long-term investments, as well as to significantly increase the participation of non-conventional renewable energy in the country. In the third long-term auction, the average price reached was USD 20.57/MWh for solar photovoltaic and wind power projects. This has represented a very important challenge for the development and promotion of geothermal projects in Mexico given their significant capital investments at the exploration stage.

In this context, the financial terms offered by the original CTF operation were not attractive enough to geothermal operators (including CFE Generation). The significantly low prices of solar photovoltaic and wind energy in the long-term energy auctions led to additional pressure to other renewable energy projects. As a result, project execution has been delayed and no disbursements have occurred from the CTF or IDB loan or CRG resources. To ensure the viability of the operation, the Bank is proposing a revision of the operation, including its financial terms.

For the GoM, fostering geothermal energy in the country is paramount, due to the following reasons:

- (i) The Energy Reform seeks to increase the use of renewable energy sources in the country's energy matrix, and Mexico's NDC has ambitious GHG emission reduction targets for 2030.
- (ii) The GoM has devoted substantial time and resources, both national and external, for the development of both the Law for Geothermal Energy and its regulations to make it operational; if results are not achieved during this Administration, this will be considered a major failure.

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<sup>1</sup> The requirements of Clean Energy Certificates for the coming years are: 5.0% for 2018, 5.8% in 2019, 7.4% in 2020, 10.9% in 2021, and 13.9% in 2022.

- (iii) There is a very important amount (MXP \$150 million, approximately USD \$8 million) of resources allocated in the Trust Fund for the Energy Transition and Sustainable Energy Use (FOTEASE) to mitigate geothermal exploration risks. The availability of these resources is now at risk, and the upcoming change of Administration increases this risk. The Energy Ministry (SENER) has approved 21 exploratory permits, 13 of which have been given to CFE and the rest (8) to private geothermal developers.
- (iv) The development of public private partnerships (PPPs) between CFE and the private sector will be considered a major success in the framework of the Energy Reform, for one of its objectives is to foster CFE to operate as a private company with the ability to generate its own revenue.
- (v) Its baseload nature makes geothermal power highly appreciated for companies that require a steady flow of energy on a 24/7 basis. Our analysis shows that once the initial exploratory risk is mitigated, geothermal power can compete with natural gas as a source of baseload power, when gas is priced at USD 3/Million BTU (which is a low price for natural gas in Mexico). The price stability of geothermal power as compared to natural gas is a further advantage.

For these reasons, the IDB and the GoM are proposing a set of modifications that should be made to the financing facility in order to make the program more attractive for geothermal developers, including CFE.

**The original objective remains the same**, namely, to increase power production from geothermal sources and to reduce both GHG emissions and the dependency on fossil fuels in Mexico. The program intends to scale up private investment in geothermal power generation projects by making available financial mechanisms tailored to meet the specific needs of each project's stage of development, and targeted at reducing Value at Risk for developers and removing the main barrier to investment. The IDB considers this the most effective structure to mobilize continued financing for the development of geothermal projects. Two business models have been designed for this purpose, one with a more active involvement of private developers (see Annex II), and the other with a more active role for CFE (see Annex III). All the actors involved in the program (NAFIN, Ministry of Finance and SENER) have agreed to a hybrid version of the two models. This means that the program will be open to all developers that have an authorized exploration permit. In case CFE wants to participate in this facility, they would have to follow the model described in Annex III. This will be more beneficial for (i) opening the participation to the private sector and (ii) fostering the creation of PPPs between CFE and private developers.

The new proposal involves **changing the CTF loan resources into CRG**. NAFIN would offer the USD 51.5 million of CTF CRG resources to geothermal developers, including CFE Generation, that would use the funds to drill. If the drilling is not successful (as confirmed by an independent party), the funding would be converted into non-reimbursable grant. If, on the other hand, the drilling is proven successful<sup>2</sup> and the power obtained from those resources can be sold at a competitive price, the grant would be transformed into a concessional loan (with an interest rate<sup>3</sup> not higher than 0.75%).

This loan would be repaid in the following way:

- a) For the case of exploration areas given to CFE, the successful wells would be tendered so that geothermal developers would form a PPP with CFE Generation to exploit the set of successful wells, build a plant and operate and maintain the geothermal plant.

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<sup>2</sup> In case of success, SENER would determine a deadline for the geothermal developer to make the investment decision for the further development of the field and the power plant. If such investment decision is not made by the deadline, the exploration permit/concession would expire and SENER would give it to another developer through a competitive mechanism that will be further described in the revised operating manual. When receiving the exploration concession, the new developer would have to repay the cost of the successful wells.

<sup>3</sup> NAFIN's spread will be added to that interest rate. The objective is to maintain the overall rate to the developers as low as possible so that the selected geothermal projects can be competitive in the Mexican energy market.

- b) The awarded geothermal developers would repay the loan once the plant is operational (3-4 years after the resources are proven). Therefore, the grace period of the loan (provided by NAFIN using CTF resources) would have to be at least 6 years to be on the safe side.
- c) IDB funds would be used to fund the construction of the plant and transmission lines, through NAFIN, to the awarded developers. By doing so, the cost the financing of the plant could also be reduced, making the overall project more competitive.
- d) Once the CTF CRG resources are repaid to NAFIN, NAFIN could use these funds as CRG once again for other geothermal developments.
- e) At the end of the new disbursement period (8 years counting from the day of the approval of this amendment by the IDB), all repaid funds would be returned from NAFIN to the CTF.

In Annex III we find two new advantages: First, from a procurement and economies of scale point of view, only one contract (bid) with a drilling company will be carried out (therefore obtaining a reduced cost per drilled well), in addition to a contract with a third party to determine if the well is successful. Second, IDB will support with additional non-reimbursable grants or CRG resources the creation of the PPP (legal and financial costs, etc.) between CFE and private geothermal developers.

**The reinsurance scheme** included in the original proposal, although very innovative, involved an additional cost to the developers. Therefore, this part of the original proposal will be eliminated.

With the measures mentioned before, it is expected that the new financial scheme will be more attractive to both CFE and private geothermal developers using contracts with qualified service suppliers, via power purchase agreements with qualified users or sales in the Mexican energy market. Should the CTF decide to support the new proposal, the execution of geothermal projects can begin rapidly, for there are 21 exploration permits already in place, in addition to 6 exploitation concessions.

CTF CRG resources to support projects will still be administered through a special account at NAFIN. This account will receive any income from the investment of its funds as well as reimbursements from sub projects. Private developers and CFE Generation will be asked to take on risk for the development of wells, by investing at least 25% of the entire drilling costs. These requirements, together with a thorough technical, economic and underwriting due-diligence of projects by an independent expert, will limit moral hazard.

The Energy Division of the IDB and the Geothermal Unit of CFE analyzed two geothermal projects currently underway and reached the following findings: It is possible to obtain a gross levelized cost of geothermal power in power generation of 65.57 USD/MWh (using prices of 2018). Once the CEL prices of 10.00 USD/MWh are applied and discounted, it is then possible to reach a market energy cost of 55.57 USD/MWh, using prices of 2018. Once the process is optimized by integrating a PPP model and economies of scale, the market energy price is further reduced to 47.01 USD/MWh. This price is competitive with the levelized cost of combined-cycle power plants at 45-55 USD/MWh (assuming a natural gas price of 3 USD per Million BTU and gas pipeline costs).

### **Expected results:**

With the proposed modifications, the drilling phase, funded mainly by CTF, would be substantially accelerated. The project would promote and accelerate the creation of geothermal PPPs between CFE and geothermal developers. More geothermal projects would have the chance to participate in the Mexican electricity auctions. All this would be a boost for geothermal activity in Mexico, which can then have replication impacts throughout the LAC region.

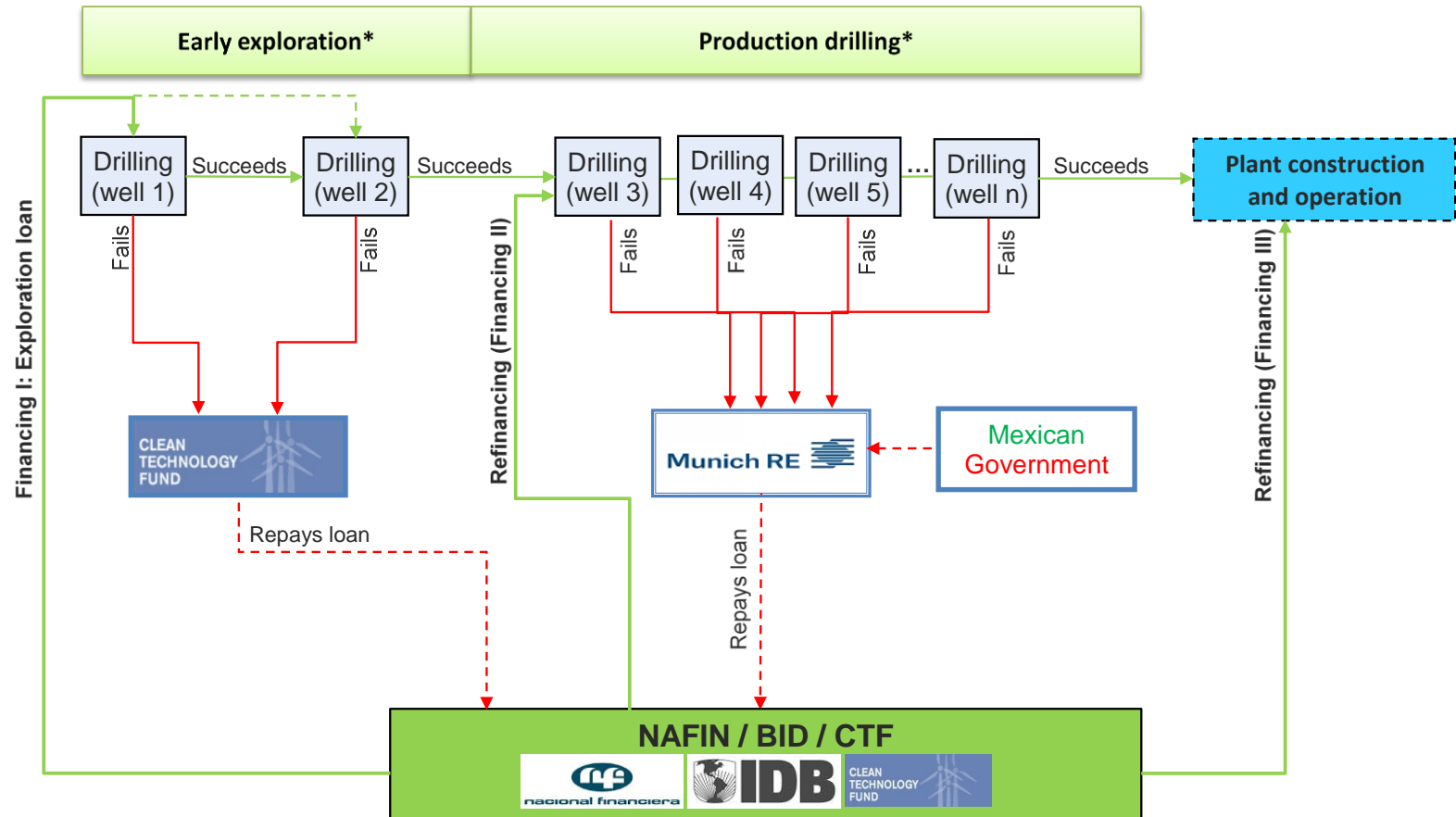
<b>Co-financing Indicators and Targets (consistent with results framework)</b>	
<b>Core Indicators</b>	<b>Targets</b>

(a)New Geothermal Capacity installed as a direct result of this intervention	100 MW	
(b) Catalytic effect of other private sector investments in geothermal (not directly funded by this program)	200 MW	
(b) Overall GHG emission reductions (in 30 years of operation)	33 MtCO <sub>2</sub>	
(c) Total Financing Mobilized (including direct and non-direct funding of geothermal projects, private equity and other commercial debt)	1145.7 MUSD	
Development Indicator(s):		
Women in geothermal power	20% more participation of women in all stages of geothermal cycle (planning, public consultation, prefeasibility, production drilling, plant and transmission line development, operation & maintenance of geothermal plant and field and power sales)	
Security of Supply	300 MW of baseload power	
Co-financing		
	Please specify as appropriate	Amount (in million USD)
• Government	NAFIN, SENER and others	65.8
• MDB		54.3
• Private Sector		1,025.6
• Bilateral		
• Others		
Total	1,145.7	
Expected Date of MDB Approval of the Modification		
April 2018		

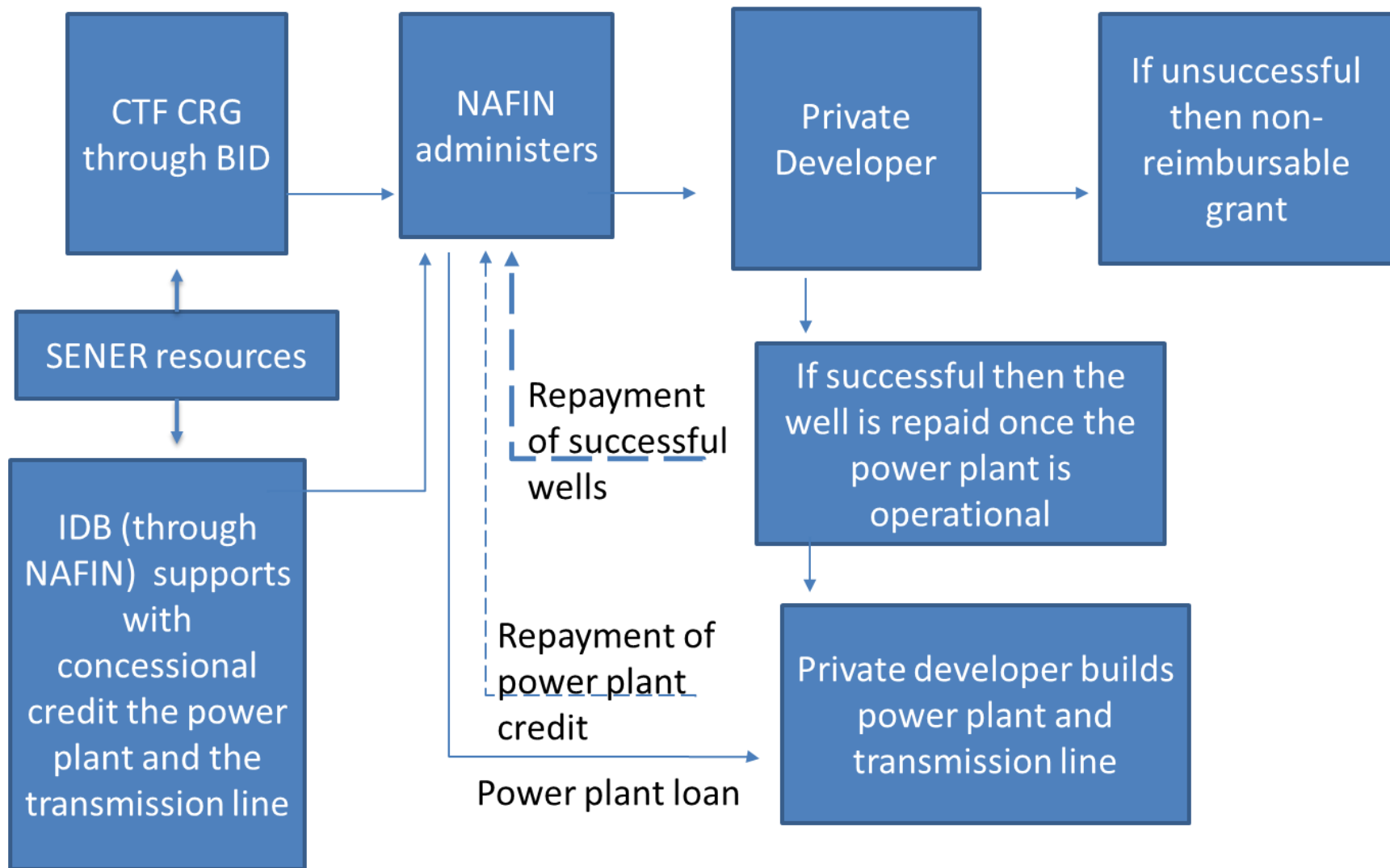
## ANNEX I

### Original structure

#### FINANCING SCHEMES FLOWCHART



## ANNEX II. Private Developers



## ANNEX III. CFE as a main actor

