# Second Geothermal Dialogue

## Effective financing of geothermal development – what have we learned?

**2 March 2015**
Munich Re, Königinstraße 107, 80802 Munich

A meeting organized by **Climate Policy Initiative** in partnership with the **Climate Investment Funds**, kindly hosted by **Munich Re**

On March 2, Climate Policy Initiative (CPI) and the Climate Investment Funds (CIF) held the **Second Geothermal Dialogue** in Munich, at the premises of Munich Re.

This meeting was the second of **a series of three Geothermal Dialogues** that **bring together key actors involved in the development of geothermal projects to share experiences and to explore emerging lessons about scaling up effective geothermal finance.** Participants include governmental representatives of: countries receiving support from the CIF for geothermal projects; countries involved in other 'non-CIF' geothermal projects; project developers and financiers; multilateral development banks; insurers; and representatives of the CIF Administrative Unit. The dialogues are part of a research program carried out by Climate Policy Initiative on behalf of the Climate Investment Funds. The overall objective of the program is to help policymakers and donors understand which financing tools to use to facilitate fast and cost-effective deployment of geothermal energy. Just prior to the dialogue, CPI published the first of three case studies being carried out under this research program: 'Public Finance and Private Exploration in Geothermal: Gümüşköy Case Study, Turkey'.

## Summary

Geothermal energy has significant potential for the development of low-carbon energy systems. Discussions in the First Geothermal Dialogue underlined that geothermal can provide reliable and cost competitive power, but highlighted exploration risk and limited debt financing during this phase as key barriers to scaling up the development of the sector.

In the **Second Geothermal Dialogue**, panelists and participants looked more closely at specific examples of different financing, policy, and risk mitigation models for geothermal from around the world. CPI began by presenting preliminary findings from the second and third CPI case studies of the series, the Sarulla project in Indonesia and the Olkaria III project in Kenya, which was followed by a round table discussion on recent developments in the sector. The dialogue concluded with a summary of key lessons and barriers to scaling up geothermal.

## 320 MW Sarulla Geothermal Power Plant Project in Indonesia

CPI's second case study in this series focuses on the Sarulla project in Indonesia. Once completed, the Sarulla project, which will consist of three units of 110 MW each, will be the largest single contract geothermal project in the world. The project is sponsored by a consortium of private developers (PT Medco, Itochu Corporation, Kyushu Electric Power Company, and Ormat International), which managed to secure $1.1 billion debt financing in May 2014. The first unit is expected to come on stream in September 2016.

Panelists at the Second Geothermal Dialogue discussed the key challenges faced by stakeholders of the project prior to financial close, and the role of the public sector – including CIF's concessional finance – in enabling the development of the project. Three main insights emerged:

- **A streamlined project development model is necessary to speed up geothermal deployment in Indonesia.** The Sarulla project's mandatory compliance with regulatory frameworks that predate the 2003 Geothermal Law caused financing delays. Under pre-2003 laws, Pertamina, an Indonesian state-owned oil and natural gas corporation, owned the concession for the geothermal reservoir rather than the developer. This complicated stakeholders' attempts to put together a bankable project financing structure.
- **Due diligence and the planning of a comprehensive drilling program to speed up development helped lenders and developers to finance all three of the project's 110MW units under a single contract, and to fund the field development phase.** Due to a lack of similar projects in recent years, it took time for development finance institutions (DFIs) to educate both commercial financiers and the government about the plant's bankability requirements.
- **The government feed-in tariff, guarantees, and concessional resources from the Clean Technology Fund (CTF) were essential to reaching financial close.** The experience of the sponsors group also played a role. The 30-year feed-in tariff support and guarantee from the government to ensure the creditworthiness of the off-taker provided a high level of certainty regarding the revenue stream over the project cycle to project developers. Technical assistance offered by DFIs informed the government of options that could improve the project's bankability. CTF concessional financing was crucial to the project developer, by minimizing the risk of interest payments which might put too much pressure on the project's cash flow. A Political Risk Guarantee from JBIC gave further comfort to commercial banks to participate in the project.

## 110 MW Olkaria III Geothermal Power Plant Project in Kenya

CPI's third case study focuses on the Olkaria III geothermal power project in Kenya. The project, which is 110 MW, is the first solely privately funded and developed geothermal project in Africa, and the first operated by a private independent power producer in Kenya. Discussions at the Second Geothermal Dialogue focused on successes and the use of financing and risk sharing mechanisms used by the public and private actors. The discussion provided the following main insights:

- **The phased development approach adopted by the project developer to mitigate Olkaria III's resource risks provides a useful example for developers and financiers seeking to manage risks in future geothermal projects**. Sponsors' ability to verify the geothermal reservoir in the earlier development stage of the project allowed lenders to comfortably assess the potential of the expansion project and its ability to service interest and debt payment.
- **The project financing structure has evolved in the different phases of development of the plant.** The private developer started development without financial close, which was only achieved once the commercial operation of the plant was proven. The project developers' long-standing experience, government's guarantee, and good management of environmental risks, played a role in attracting long-term debt finance for the full expansion of the project.
- **A balanced allocation of risks can be achieved with public-led exploratory drilling and private sector development and operation.** Kenya is exploring different models of geothermal development in order to bring in the private sector at earlier stages, and meet its 5000 MW target. The project development model of involving the public Geothermal Development Company (GDC) to conduct the initial drilling seems to be a balanced risk allocation model for geothermal development in Kenya. Through this approach, GDC covers the initial exploration risk and then leaves the private sector to manage resource risks during development and operation.

## Financing Geothermal Development: perspectives from project developers and financiers

In this session, panelists shared their experiences in developing and financing geothermal plants in various countries and how different financing structures and risk mitigation tools helped to mitigate exploration risks, achieve economies of scale, reduce costs, and close the competitiveness gaps. Key lessons which emerged were:

- **Government licenses of geothermal fields have to be time-bound and should include clear criteria in order to speed up the development of geothermal resources.** There is evidence of developers sitting on licenses for years to the detriment of the timely achievement of policy goals.
- **Public finance is most needed to address exploration risk, the riskiest stage of geothermal development.** The availability of exploration finance is a critical bottleneck in many developing countries where the private sector has shown little appetite for funding the early (and riskiest) stage of geothermal development. KfW Development Bank's Geothermal Development Facility, the African Development Bank's (AfDB) concessional financing for exploratory drilling, and the CIF's SREP provide examples of public finance trying to address this bottleneck. The European Bank for Reconstruction and Development's (EBRD) Early Stage Geothermal Support Framework, finance, and policy dialogue is also working to address this issue by moving from a government-led model towards greater private participation in this phase.

- **There is high appetite for insurance products to cover early stage drilling.** Despite entailing higher transaction costs, the use of insurance is beneficial especially when deployed in projects large enough to achieve economies of scale. The insurance premium for a particular site is expected to become lower over time as more wells are drilled.
- **More data on success rates for geothermal drilling is key to enabling the pricing of risks by insurance companies and facilitating future geothermal development.** The availability of an open shared database on results from drilling activities was considered important by stakeholders, as it would help them with the early assessment of drilling risks. Such a database would also allow insurance providers to more accurately estimate the premium for their insurance coverage.

## Stocktaking Session: Early Lessons

The final session invited a broad discussion amongst participants to highlight key lessons and priorities for geothermal development going forward. Insights from the discussion included:

- **The high risks associated with early stage development suggest that geothermal development could start with smaller size projects where risks are more manageable and then gradually expand.** Governments may therefore want to consider providing tailored regulatory framework and tariffs that better support developers of small scale projects in order to drive the growth of the sector while building a solid knowledge base for future deployment.
- **Scaling up geothermal development requires different public support tools tailored to countries' specific circumstances.** International public support in the form of targeted capacity building can be crucial to creating an enabling environment both where geothermal penetration is currently below its potential, and where private participation and adequate domestic public resources are lacking.