

Geothermal Risk Mitigation Schemes in Germany

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ABSTRACT

The financial risks associated with deep geothermal projects form a major obstacle to accelerated industry development. Different approaches have evolved in order to mitigate the sector-specific risks. This paper introduces insurance schemes mitigating the exploration risk of deep geothermal projects in Germany.

Terms and conditions of insurance solutions in the private market sector as well as the new German federal risk mitigation program are summarized. Based on practical experience from insurance negotiations, an insight is given on status, applicability, challenges and pitfalls of the insurance schemes. Improved possibilities for risk coverage are an important market incentive and will facilitate the further development of deep geothermal projects.

1. INTRODUCTION

The exploration risk is defined as the risk of not being able to exploit a geothermal reservoir with sufficient quality or quantity. A geothermal well not being able to produce a certain minimum of thermal capacity is not economically viable. When an unsuccessful well has to be abandoned, investments for the drilling works are lost.

Therefore, the exploration risk constitutes one of the main constraints for investments in the industry sector. Many project owners communicate their desire for exploration risk insurances, especially in the early stages of geothermal project development, when the risk of project failure is particularly high.

Exploration risk insurance provides the developer with financial security for the venture capital needed until the completion of drilling works and successful well testing. Proof of risk coverage also facilitates the acquisition of loan capital.

In the following sections, risk mitigation solutions available on the private market and through governmental schemes are summarized, with special regard to the exploration risk. Conditions and financial terms of the different schemes as well as status and challenges of the programs are introduced.

Special attention is paid to the practicability and pitfalls of the two options. Also, a number of recommendations and subjective comments are given. The statements are based on the involvement of the GeoThermal Engineering GmbH in risk mitigation discussions for different geothermal projects in Germany (with both private insurance companies and governmental funds) as well as on the collaboration with the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and the German Reconstruction Loan Corporation

“Kreditanstalt für Wiederaufbau” (KfW), which is administering the German nationwide support program.

2. PRIVATE INSURANCE MARKET

The private market sector for exploration risk insurances is covered by insurance companies acting as a direct, unique insurer on the one hand and insurance brokers distributing the risk between one leading and several contributing partners on the other hand. Companies active on the German geothermal market include Munich Re, Swiss Re, Axa, Gothaer, and R&V. Insurance brokers include Marsh and Willis. Both individual insurance companies and the brokers offer coverage for singular projects as well as frame contracts to developers with several projects.

2.1 Terms and Conditions

The pre-conditions for a discovery or exploration risk insurance on the private market are a mature project preparation and a substantiated geological-technical exploration and development concept. In addition, the financial strength as well as the technical ability and know-how of the project developer need to be proven.

The minimum requirements for an offer of an exploration risk insurance include a project description with a geological feasibility study, seismic investigations including interpretation, a development concept, the drilling path and well design as well as a stimulation and hydraulic test program, the power plant and heat use concept, all necessary permits, information on contractors and key personnel plus a business plan. Furthermore, an independent expert's report on the conclusiveness of all data and an estimate on the probability of success to generate the requested thermal capacity (flow rate and temperature) are required.

The general concept of the private insurance solutions is to let the customer choose the desired insurance sum according to the expected investment costs. The own risk share (deductible) also needs to be negotiated. Usually, all costs spent on drilling, stimulation, test program can be insured. Individual companies offer to cover costs like seismic investigation or the drilling site construction as well. A cap for individual cost items should be avoided, as it reduces the flexibility of a project developer. The policy itself is also a significant investment of usually between 10 and 25 % of the insured sum, which needs to be accounted for in the project budget.

2.2 Limitations

Most private insurance providers require an external report quantifying the probability of success of a geothermal project. The so-called POS-studies are based on a statistical evaluation of reference well testing. Especially in regions with only few experiences and data, like the Upper Rhine Graben or the Northern German Basin, calculating a reliable statistical POS in the conventional way is

impossible. As a consequence, it is much more challenging and still uncommon to obtain exploration private risk coverage for projects outside the Molasse Basin, where sufficient reference data exists.

3. THE GERMAN FEDERAL RISK MITIGATION PROGRAM

After realizing that over the past years, the development of geothermal projects in Germany had been slower than expected and that there is an obvious need for risk mitigation in the geothermal industry, the BMU established a risk mitigation program aimed at minimizing the financial risks of geothermal development. This federal program serves as an addition or an alternative to the private insurance market and is supposed to facilitate the fast development of geothermal power and heat projects in Germany.

The national risk mitigation scheme is part of the Renewable Energy Incentive Program MAP („Marktanreizprogramm“). The guidelines are specified in the “Richtlinien zur Förderung von Maßnahmen zur Nutzung erneuerbarer Energien im Wärmemarkt” (Guidelines for the support of measures to use renewable energies in the heat market). The program is administered by the KfW. Only deep geothermal projects (deeper than 400 m) in Germany are eligible for this program.

The support scheme mainly consists of project funding via subsidized long-term loans with low interest rates, which is the main difference to the private insurance market. It also contains three risk mitigation modules, one covering the technical drilling risks, one covering general project risks and one covering the exploration risk. The subsidies are only available for geothermal heat projects. The risk mitigation components are available for both heat and power projects.

For all applicants apart from municipalities or communities, the application forms may not be submitted to the KfW directly, but need to be conveyed by a clearing bank which is affiliated to the project developer (the so-called “Hausbank”).

3.1 Technical Drilling Risk

The technical drilling risk mitigation is incorporated into the KfW incentive program for renewable energy. The module partly covers the risk of excess drilling costs compared to the initially planned expenses. It mitigates the risk of additional work and expenses exceeding the anticipated costs in the case of technical drilling problems. Up to 50 % of the original planning costs of drilling and a maximum of 1.25 Mio. € are covered.

3.2 General Project Risks

General project risks like the risk of cost increase or business risks can partly be covered by the extended KfW loan program for large renewable energy projects. It is only available to geothermal power projects which can apply for a credit between 10 and 50 Mio. €. The program offers a 50 % credit indemnification option. Thus, part of the credit risk is covered by the KfW.

3.3 Exploration Risk

In addition to the drilling and project risk mitigation, a new program specially tailored to cover the exploration risk was launched in 2009 by the BMU and KfW in co-operation with the Munich Re Group.

The risk mitigation module is based on a 60 Mio. € revolving fund. Projects can apply for a loan of up to 16 Mio. € covering a maximum of 80 % of their drilling costs. The program implies a credit indemnification clause of 100 % of the loan amount during the drilling phase. In case of not reaching the specified project success parameters (the thermal capacity of a well), the investor is indemnified from repaying the remainder of the loan. Thus, the loan will be for-given and the fund will cover up to 80 % of the drilling costs, if the well is not successful. The own contribution (deductible) in case of project failure consists of 20 % of the drilling costs.

The risk surcharge (loading) is represented by a high interest rate during the credit risk period until the termination of drilling works and hydraulic tests plus a specific disagio, which is also defined by the project risk. Stimulation costs can optionally be included in the indemnity, provided that a higher risk surcharge plus higher disagio are accepted.

In either case, the indemnity is only applicable until successful testing of a well. After completion and positive testing of the well, the credit is continued without indemnity and at a reduced interest rate.

The application fee of this program amounts to 65.000 € covering the assessment of the project documentation by Munich Re and KfW. With promise of the loan, a further 45.000 € are charged for ongoing auditing and expert monitoring of the project progress.

Prerequisite for an application to the Hausbank and KfW is a mature project status. In order to be eligible for the program, a series of project documentation comparable to the one required for market-based insurances needs to be submitted. All documentation has to be complete and allowing for a qualified assessment of the project, the exploration risk and the eligibility by internal and external experts.

The main difference to insurance policies on the private market is that no conventional POS-study is requested for the KfW program. Thus, “alternative” projects outside the traditional geothermal provinces or EGS-projects might have a chance to obtain risk coverage under this scheme, provided that their project concept and documentation promise project success.

3.4 Challenges and Pitfalls

One general problem with public support schemes is that large governmental funds like the KfW program are sometimes difficult to administer. The development of guidelines, the answering of inquiries and the processing of application is expected to be longer than on the private market. This is due to the number of involved parties and the political and legal discussions associated with such programs.

Furthermore, governmental funds rely on external expertise in order to structure their programs. This is the case for the specification of the project documentation requirements as well as for the project assessment and the certification of results.

The major challenge with the KfW program however, and first hurdle to be taken by a project, is the need for private developers to find a Hausbank willing to convey the application forms to the KfW and to guarantee the payback of the loan to the KfW. A Hausbank basically carries the

risks for the KfW. In case of a developer going bankrupt, the clearing bank is obliged to back the loan to the KfW. Therefore, every potential Hausbank vigorously checks the credibility of the developer and the quality of the project as well as requiring guarantees from project developers.

The majority of potential clearing banks are not familiar with geothermal projects. Furthermore, they only receive a small fee for the service of conveying the KfW funds. Therefore banks expect a certain minimum credit volume to cover their profit expectations. Still, the application process is often not attractive to the banks. Especially during the current financial market situation, banks are very reluctant to act as the intermediary institution. A relatively small project with a total investment volume of less than 30 Mio. € is usually confronted with serious difficulties finding a Hausbank for this process.

The indemnification clause is a step in the right direction. Yet, the indemnity is only applicable during the drilling period and prior to proof of a successful well. The clearing banks in Germany still require securities for the entire loan period. As a consequence, they only support developers being able to guarantee 100 % indemnity until the end of the loan duration. This requirement can only be fulfilled by financially strong, usually large companies like utility companies. Communities which cannot become insolvent don't need a Hausbank in order to participate in the KfW-program.

Another problem of the new risk mitigation program of the KfW is the relatively high application fee combined with the fact that the increased interest rate and the disagio (as a further risk participation of the project developer) are only disclosed at the date of loan promise. The credit conditions depend on the success parameters defined by the project developer as well as on the project risk level. The judgment of this risk level is an extensive process concluding with the notification of individual credit conditions. The interest rate for the high risk period is expected to be between 10 % and 20 %, but is uncertain until the date of loan promise. Not knowing the costs of a credit beforehand renders reliable budget calculations difficult.

This aspect was raised to the program initiator. It was suggested to define a range of interest rates, if possible associated with specific POS-values. In this way, a project developer would be capable of calculating best- and worst-case scenarios in advance.

CONCLUSIONS

Since 2009, geothermal project developers in Germany can choose between two options of mitigating their exploration risk: the federal risk mitigation scheme administered by the KfW and private market-based insurance solutions.

The main advantage of the KfW risk mitigation scheme is that it combines both project financing via a credit and the mitigation of exploration risk in one program. The risk coverage consists of a loan being for-given if the project is unsuccessful.

This program is the preferred option for "alternative" projects in areas with little reference data or EGS-projects, as it does not require a classical POS-study.

When a project is able to find a clearing bank willing to submit the application forms to the KfW, the fund will most likely be granted. The difficulty in finding such a Hausbank however, is a serious pitfall for the program. The issue was raised to the program administrators and discussions have started to take the risk off the clearing banks and rather cover it directly by the KfW.

Another problem of the KfW program is the uncertainty of interest rate and disagio prior to loan promise. Not knowing the costs of a credit renders reliable budget calculations difficult for developers.

Until the clarification of the above-mentioned issues, the private insurance sector offers an attractive alternative to the governmental scheme for projects being able to produce a POS-study.