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ROI - oriented Project Realization and Risk Management

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ABSTRACT

In nearly all cases the development of geothermal energy projects (especially low-enthalpy projects) are developed from the point of view of geologists, engineers and technicians. This common project approach causes from the beginning tremendous problems regarding e.g. financing, industrial partner ships, public-private-partnerships, ... as the actually entitled interests of investors, operators, manufacturers insurance companies, etc. are not really considered of the necessary quality. These considerations normally start after a long phase of the project development, often at a point of time when correction is difficult or nearly impossible. The professional international project development and placement requires the interdisciplinary cooperation between technicians, economists, lawyers, geologists, etc. from the beginning of the project idea. This will be an absolutely different approach as the focus will be on not only the technical realization, but also the economic and legal realization. This attitude is also supported by the World Bank. In this way our company has managed public financial support for different national and international geothermal projects as well as the worldwide first private exploration risk insurance for the deep drilling in Unterhaching, nearby Munich (Germany). This was only possible due to the strict economic approach to the project, where we are responsible for the total project management for the community of Unterhaching. The economical and legal approach also means the implementation of a strict and consequent risk management system, specific to hydrothermal geothermal energy projects.

1. INTRODUCTION

The experience from the geothermal project in Unterhaching, near Munich, shows that the approach towards the realization of a project can be quite different. The project participants, such as engineers and geologists, have their own angle from which problems and difficulties, as well as chances are evaluated. Geologists often are strongly focused on the quality of the geothermal potential, which layers “probably” will be found during a drilling or in a specific zone of disturbance - “probably”, because geologist seldom can make a statement with 100% certainty. The steps that have to be taken after completion of the drilling, like tenders for power plants or district heating networks, do not bother the geologists, although already in this early project phase important decisions have to be made, which can have enormous effects on the possibilities of financing of the project.

The participating engineers, however, take the geology as given, focus in its planning preferably on the best case - variant without necessary graduation and without detailed consideration of the resulting investment costs. Above all, with innovative technologies the will to lead the installation into operation is apparently stronger than the objective to lead the complete project to economic success.

2. ROI - ORIENTED PROJECT REALIZATION AND RISK MANAGEMENT

Thus, the more important is a project management that connects both groups - engineers and geologists - and its strengths for the project realization and puts in a certain way “gates” of economic efficiency. Above all in the first project phases, in which questions of financing and acquisition of subsidies have to be solved, it is of utmost importance to provide a reliable business planning, which is created for the eyes of investors on the base of the existing information.

Already in this phase it is of enormous importance to name and analyze risks, which are connected with the project implementation. An identified and named risk, which was evaluated monetarily, is in the eyes of the investor, who almost never will be geologist or engineer, a barrier that can be estimated in terms of its consequences. If this risk is evaluated monetarily and action alternatives are shown, it provides for the investor a clear picture of the project. Diverse options for realization should be discussed already in this project phase in order to be prepared and enabled to react, if for example the geological risk “partial flow rate achieved from production drilling” occurs.

The approach from a strictly economic angle, with integration of the important risk management at the same time, holds great possibilities, as already in the first project phases the “language” of investors, financing institutes and insurance companies is spoken. Problems in this project phases frequently originate from difficulties in communication, which produce the result that no mutual trust could be achieved between the project developer and investor, which is the basis for mutual, successful project realization.

For any investor, the return-on-investment (ROI) is the only aspect of significance. This position has to be incorporated in the early phases of project realization and has to be considered in all decisions. Exactly in these decisions, however, engineers and geologists, due to their different approach to project management, do not have the ability to estimate all economic consequences of a decision. The strict economic approach achieved and will achieve, that investors can estimate the risk of their investment realistic and consequently will invest their capital risk-consciously in geothermal projects.

On side of the investors, for example, the World Bank supports this approach and demands it for any geothermal project. From our experience from project evaluations for the World Bank, engineers can evaluate in an excellent way the technical risks and geologists, as a matter of course, provide the base for the project realization. However, the investor is not interested in technical solutions or geological

data, but only in the question with what certainty and how much ROI his investment will generate.

The World Bank is also confronted in developing countries with the problem that the existing structures of the administrative, legal and political conditions already make a project realization difficult. In the case of a purely technical or geological approach many things are kept out of focus, which leads a geothermal project to success or failure. In order to minimize the risk of investment from the angle of international financing institutes, like the World Bank or EBRD, a risk analysis in these countries is absolutely irreplaceable.

The Federal Ministry for Environment and the World Bank authorized Rödl & Partner in cooperation with GTN - "Geothermie Neubrandenburg" to develop a benchmark system, taking as example Hungary, which allows the comparison of different countries concerning the realization of geothermal projects. On one hand the available information about geological resources, and on the other hand the political, economic and administrative conditions are integrated in the system. The objective is the development of a tool that allows a fast but detailed comparison of countries, focusing on the key factors that have to be fulfilled to enable a project realization.

A detailed risk analysis can lead surely to the result, that a project, although technically, geologically and economically feasible, cannot be realized. This does not mean that the project idea has failed completely, because conditions for the project realization can change quickly, reducing risks and the project as a whole could be feasible after a certain time. However, if a geothermal project becomes a "white elephant", i.e. a grave of investment, it can be presumed that this would produce a long-lasting damage of image for the complete sector of geothermal energy production. This has to be avoided absolutely!

If the first phases of the geothermal project have been passed successful, in most of the cases a drilling will have to be realized to exploit the geothermal reservoir. During the realization of the drilling once more there can be decisions, which will influence the economic efficiency of the complete project. Again, there is no way to diverge from the project management from a strictly economic angle, as the costs connected with the first drilling can be a large part of the complete investment. The risks connected with the first drilling and the success of the first drilling, expressed in temperature and above all flow rate, demand to be dealt with, already a quite a lot of time *before* beginning the project. For the geothermal project Unterhaching, already a long time before the first meter was drilled the project management worked intensely to find a solution for this problem. After one year of negotiation of the concrete case of the drilling in Unterhaching, under the conceptual leadership of Rödl & Partner and in cooperation with the Munich Re Group, the first private enterprise insurance solution worldwide for the geological success of a drilling was signed. This success was based also on the strict economic approach towards project management concerning geothermal projects.

The necessary coordination between geologists, on the side of the client, Geothermie Unterhaching Ltd., as well as of the insurance company and the basic understanding of the way of thinking of the representative of the insurance company led to this success, which received worldwide attention.

Permanently the project management was calculating, in how far the risk can be or has to be insured reasonably to assure an economic project realization in dependency on partial success of the drilling, i.e. partial flow rate.

We were authorized by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety to develop an insurance concept for geothermal projects in Germany. This project is supported by "GTN - Geothermie Neubrandenburg", "Munich Re Group", "Anger´s Söhne" and the GGA. It can be expected that this investment barrier will be reduced by this solution, which will be supported by the Federal Ministry. At this moment no further information can be provided about the developed solution, but at the WGC 2005 surely certain results will be presented.

But does risk management mean in practice?

Always all possible risks have to be integrated in the analysis, as shown in the following diagram:

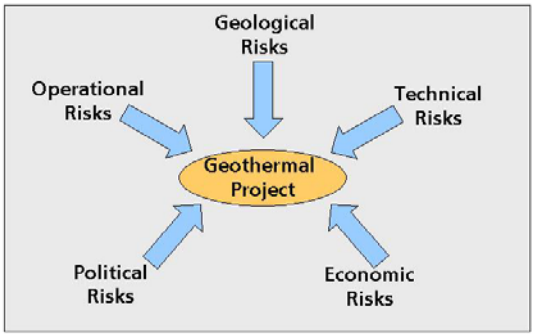

Figure 1: Geothermal Projects face different kinds of risks

All five sectors have to be considered in cooperation with experts to name all possible risks and to evaluate them monetarily.

The result of this evaluation of risks is presented afterwards in a transparent way in an evaluation system integrating already a certain classification of risks. Besides, alternative strategies have to be shown which help to achieve a reduction of risks, to draw the conclusion in which way a risk can be avoided.

Please see one example in the following table:

Risk	Effect / Consequence	Evaluation (Risk Class)	Alternative Strategy	Conclusion
Untight Pipes	• 2nd cementation • Closure of leakage by sealing material • Installation of smaller pipe tour →time for delivery of pipes →Price risk	A	• Checking at construction site • Improvement of quality control • …	Transfer purchase risk in contract to drilling company
…	…	…	…	…

Figure 2: Anticipatory Risk Analysis 1

Above all, the main risks can be named by following this procedure, which could cause the complete failure of the project, and subsequently influence or inhibit the economic feasibility of the project.

After this analysis a budget reserve has to be planned, which can be taken if a risk occurs (shown as an example in Figure 3):

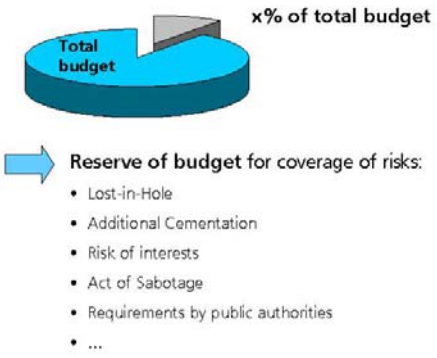

Figure 3: Anticipatory Risk Analysis 2

3. CONCLUSION

The strict economic approach to geothermal projects including risk management aspects has led already to pathbreaking success. The development of the first private enterprise insurance for the exploration risk of geothermal deep drilling and the presently developed concept, as a solution for geothermal projects in Germany gives evidence for the appropriateness of this approach. Risks have to be included right from the beginning in the most transparent way, bearing in mind the interests of every investor.

The success of the present projects, as well as the positive feedback from clients, investors and financing institutes confirm this approach, which has already given positive impulse to the geothermal energy sector, which allows us to look trustfully into the future.