

Non-Technical Barriers of Geothermal Projects

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ABSTRACT

This paper will deal with the question of analysis and comparison of countries, with respect to their investment environment for geothermal projects.

For the World Bank and the German Federal Ministry for Environment Rödl & Partner developed a benchmark system, that allows the evaluation and analysis of the economic, legal, administrative (and geo-technical) conditions of countries for the implementation of geothermal projects. The benchmark matrix was developed on the base of Hungary; within the project the comparison with Germany was conducted.

Possible barriers for any geothermal project are similar in all countries world-wide. The analytic approach in the aforementioned fields showed non-technical (and non-geological) barriers that substantially inhibit the further development of the geothermal market, for instance in the investment volume in Hungary.

As results recommendations have been given to the Hungarian Government, for how the investment security and in a wider sense the investment environment can be improved substantially in Hungary. A wider approach, leads usually to the question of possible subsidy systems and a possible nation-wide geological risk insurance (how it was already implemented in Germany).

The EU-financed project GEOFAR (Rödl & Partner is a member) aims at the development of an EU-wide solution to lower the barrier (geological risk) of geothermal projects in Europe.

1. INTRODUCTION

Rödl & Partner was assigned by the World-Bank and the German Federal Ministry for Environment, Nature Conservation and Nuclear Safety to elaborate a Benchmark – System focusing on the conditions of geothermal projects in Hungary.

Specifically the legal, administrative and economic conditions of projects were the focus of the study. The geological potential was analyzed by geologists and resulted in a map which shows the specific potential areas. Furthermore, geotechnical aspects have been included, as well as surface aspects, like heat demand or existing district heating networks.

All aspects have been combined and resulted in a specific criteria list and evaluation, which even showed a condensed result for the country – in comparison to Germany.

As already mentioned, the focus was on legal, administrative and economic barriers, which have been analyzed in detail. The perspective was always an investor's view.

The following paper will discuss several results from the study and will also outline possible solutions to overcome these barriers.

2. UNDERSTANDING OF NON-TECHNICAL BARRIERS

What is understood as a "non-technical" barrier?

In particular countries it is obvious, that there are many potential geothermal installations, and yet no projects or only a small number of projects have been realized. The reasons for this can certainly be on geotechnical or technical aspects, like high risk resources or a poor infrastructure.

In the benchmark study in Hungary, however, we concentrated on non-technical barriers.

As non-technical barriers, we assumed:

- administrative aspects
- economic aspects
- and legal aspects.

which interfere with or inhibit the implementation of geothermal heat and power projects, as well as combined cycle projects.

Administrative aspects: knowledge of administration of geothermal projects; awareness of geothermal possibility; knowledge/experience how to handle permission process, etc.

Economic aspects: economic feasibility, subsidies (existing, sufficient, not-sufficient), feed-in regulations (fixed tariffs); heat price, market situation for heat sales (price regulations).

Legal aspects: mining law regulation concerning concession, water regulation, construction law, energy sales regulation, any energy market regulation, heat price regulations, etc.

3. METHODICAL APPROACH

The analysis and development of the benchmark matrix for the non-monetary valuable criteria was subsequently conducted in the following steps:

- 1) Research of all relevant criteria for the development of geothermal projects (universally valid, not specific for Hungary)
- 2) Analysis for the criteria and focus on the most important ones

- 3) Development of a benchmark systematic including the most important criteria which cannot be valued monetarily
- 4) Iterative development of the weighing of the particular criteria and testing during the test case of "Germany", giving also the results for the evaluation of German system, enabling a first benchmark
- 5) Valuation of Hungary following the benchmark systematic.

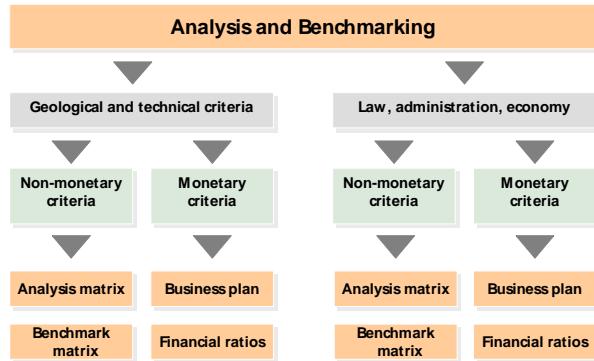


Figure 1: Methodical Approach

Step 1)

tried to answer which economic, administrative or legal criteria have influence in general on the realization of geothermal projects (without any specific national conditions).

Step 2)

After completion of the criteria list the main criteria were "filtered" out of the overall criteria list. The selection was conducted from the investor's point of view, by asking the question of how far the geothermal project could be influenced by the specific criteria. The remaining criteria guided the further analysis and form the base for the matrix for the concrete evaluation.

Step 3) & 4)

The evaluation matrix integrates all identified criteria and enables the weighting in percent and valuation of each criterion with points (0, 10, 20, 30) depending on the present situation in Hungary. The elaboration of the matrix and the evaluation system was iteratively and agreed by clients and participants.

The most important objective was to achieve that the matrix enables:

- The benchmarking of different countries (consequently the criteria have to be valid for any national conditions)
- The reflection of the status concerning the conditions for geothermal projects in the country in its results
- The identification of the changes (e.g. changes of law) that would have the greatest impact on the final result. This enables a prioritization of actions.

The weighting of the particular criteria had to balance the criteria within the system and should - concerning the final

result - have the correct effect on the final result of the bench-marking.

For the non-monetary criteria one k.o. - criteria (= "knock out criteria") could be specified and three key criteria are weighted higher than the others, due to their importance for project realization (always seen from the point of view of an investing party).

This k.o. - criteria is the question, how if at all the utilization of geothermal resources is theoretically outlawed in the country concerned. For Hungary this question could be answered negatively, as there is no legal norm prohibiting the utilization of geothermal resources.

The key criteria, which were far more heavily weighted in the matrix than the other criteria the following could be determined by the following:

1. Does an exclusive long-term legal protection exist, which assures that the right for the exploitation of geothermal resources is guaranteed to the holder of the concessions for the permit area?
2. Is it necessary that the applicant is the owner of the area in focus (in which the geo-thermal reservoir is located)?

Step 5)

The analysis of the conditions resulted in negative answers for the key criteria 1) and 2) for Hungary. Consequently the final results of the benchmarking matrix are worse than for Germany. The key criteria therefore "demand for action" if the result shall be improved substantially. To show the effect of positive key criteria, the result is shown with and without the specified key criteria. For Hungary it can be seen that if the key criteria were fulfilled at once the final benchmarking result would be improved considerably.

4. RESULTS

What results could be achieved by this analysis?

The results were:

- an all encompassing criteria list for non-technical barriers
- key criteria for project implementation
- economic results for project examples
- a "mark" from benchmarking Germany with Hungary
- recommendations how to improve the situation in Hungary

In the following particular results will be presented shortly and finally recommendation will show, how administration could react to improve the conditions.

4.1 Legal criteria

The approach was to include as many relevant legal criteria as possible in order to consider any legal topic that could be involved in the implementation of a geothermal project.

Considering a geothermal project, the following legal fields are usually involved:

- Mining Law

- Construction Law (- contracts)
- Delivery (- contracts)
- Water regulation
- Energy law (-regulations, concerning power and heat generation)
- Administrative regulations

Above all Mining Law and water regulations are of paramount importance for projects. If – see also k. o. – criteria – the mining concession does not offer long-lasting assurance for resource to a specific investor, this could be a reason that no project will be realized. Similarly, a water regulation could be limiting the amount of thermal water that could be produced from a drilling.

4.2 Administrative criteria

Administrative criteria are more difficult to research. Besides the general administrative regulations, also the experience of the authorities plays an important role. During the study we were directly in contact with authorities, and sometime it showed that there was certain uncertainty of the authorities on how to deal with questions related to geothermal projects. Therefore, guidelines of national authorities could be helpful for how to treat a geothermal project within the authorities.

4.3. Economic Aspects

For the economic evaluation several project types, (power generation, heat, combined cycle, etc.) have been combined at different locations, to give a broad idea of an economic feasibility. Certainly, a specific profitability will always depend on the specific project – including financing, revenues, etc.

The economic aspects of project – e.g. if there is no economic feasibility given - considered how large a subsidy program (direct subsidies, grants, remuneration fees, etc.) should be to ensure sufficient profitability (bearing in mind, that if a public entity would invest a different demand for profitability would be the case.)

These values were the usual ratio coming from business planning (financial models). They showed under what circumstances or in which installations, geothermal projects in Hungary can be feasible.

If risk management is considered to be a large part of the economic point of view of a project, there will always be a discussion about the geological risk. In low-enthalpy hydro-geothermal projects this topic is still being considered to be the main barrier for an increased project implementation.

Thus, this topic can be the deciding factor for the widened implementation of geothermal projects.

In Hungary, there are no existing risk mitigation instruments. Even a private enterprise solution has to be considered nonexistent. Consequently, any investment in a production drilling has to be considered as a venture of the investor, as there is always the risk of total or partial loss (in the case of achieving partial flow rate) of the investment, i.e. capital.

4.5 Recommendations for improvement

Recommendations for improvement of investment environment can be given after having the results of the

benchmark. Consequently, they can also be divided up into the analyzed fields: economic, administrative, legal.

In Hungary a clear recommendation was given, that the *legal* situation (concerning water regulation and Mining Law) was confusing for any investing party and therefore will have to be improved and clarified.

An example for an administrative recommendation is that the topic “geothermal energy production” has to be communicated also within the authorities, and consequently the knowledge base about the topic should be widened, enabling faster administrative processes. A wide field can be the economic criteria. Since the beginning of 2009 the government in Germany established various instruments to improve the economic outcome of geothermal installations. A recommendation for Hungary was to establish some kind of subsidy system to enable the public sector (local administrations) to clarify the first feasibility aspects for the installation of a geothermal project for heat generation. This would just help the market to get into a defined number of projects and consequently into investments.

4.5 Risk Insurance Systems in Europe

In Europe there are already several existing systems to overcome the geological risk.

First of all there is the private enterprise insurance – which was developed by Rödl & Partner for the geothermal project in Unterhaching – which is presently on the market in Germany, and in many cases may be adapted to projects even in other European countries.

Furthermore, in Germany there already exists a subsidized solution, which is offered by the KfW (German Development Bank). Besides, France and Suisse offer also subsidized systems to overcome this barrier.

In the project GEOFAR (see also GEOFAR.EU) financed by ALTENER, several partners, including Rödl & Partner, are presently working on this topic to create an Europe-wide solution.

May be this solution will help to foster long term geothermal development in all European countries.

5. CONCLUSION

A systematic analysis of non-technical (& non –geological) conditions for geothermal projects can help to find barriers, which influence the project development indirectly but eventually rather substantially. One on hand the legal conditions play an important role for the security of an investment into geothermal projects, and on the other hand existing subsidy systems can be required to help (depending on the project type) achieve the demanded profitability. Concrete recommendations can be given, if a benchmark is concluded. For example in Germany there are 180 concessions given in the field of low-enthalpy projects, and due to stable and secure conditions, we can presume that a large number of projects will be realized. Other than in Germany, the main barrier of geological risk – meaning, if the achieved flow rate does not coincide with the economic plans- is still present in several countries. A European solution may help to overcome these barriers, to foster the further implementation of geothermal projects, helping the countries to reach their climate protection objectives or to fulfill the obligations from EU directives.