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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 for the evaluation and analysis of the economic, legal, administrative (and geo-technical) conditions of countries for the implementation of geothermal energy projects. The benchmark matrix was developed based on a country analysis between Germany and Hungary.

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

As a result, recommendations have been passed on to the Hungarian Government concerning how investment security and, in a wider sense, the investment environment, can be improved substantially in Hungary. A wider approach usually leads to the question of possible subsidy systems and a possible nation-wide geological risk insurance as was already implemented in Germany or any further public fund system to be applied for geotechnical risk coverage.

As R&P is also assigned for the fund management of GRMF (Geothermal risk mitigation facility – East Africa), the insight into particular aspects of Mining law or water regulation is given.

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.

In particular, the legal, administrative and economic conditions of projects were the main content 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 such as 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 were analyzed in detail. The perspective was always from an investor's point of 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 certain countries it is obvious that there is a high potential for geothermal project development. Nevertheless, in the worst case no projects or only a small number of projects have been realized. The reasons for the poor exploitation of the evident resource can be attributed to geotechnical or technical aspects including high risk resources or poor infrastructure.

In the benchmark study in Hungary, R&P concentrated on non-technical barriers.

As non-technical barriers, we assumed:

- administrative aspects
- economic aspects
- and legal aspects,

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

The particular aspects have been defined as follows:

Administrative aspects: knowledge of geothermal project administration; awareness of potential; knowledge/experience of the handling of the permission process, etc.

Economic aspects: economic feasibility, subsidies (existing, sufficient, non-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, energy market regulation, heat price regulations, etc.

3. METHODICAL APPROACH

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

1) Research of all relevant criteria for the development of geothermal projects (universally valid, not specific for Hungary)

2) Analysis of the criteria and focus on the ones with highest expected impact

3) Development of a benchmark systematic including the most important criteria which cannot be valued monetarily

4) Iterative development of the weighting of the particular criteria and testing during the test-run "Germany", giving also the results for the evaluation of Germany and thus enabling a first benchmark

5) Valuation of Hungary following the benchmark systematic.

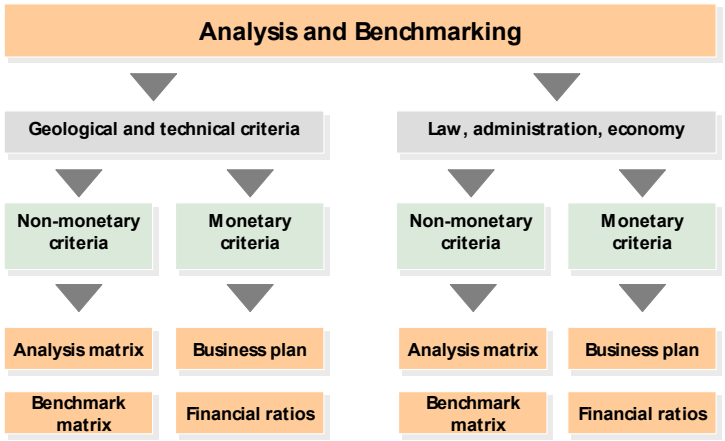

Figure 1: Methodical Approach.

Step 1)

Identification of economic, administrative or legal criteria that have an influence in general on the realization of geothermal projects (without any specific national conditions).

Step 2)

After identifying the criteria, listing the main criteria that were "filtered" out of the overall criteria list. The selection was conducted from the investor´s point of view, asking the question, to which extent the geothermal project (investment) could be negatively influenced by the specific criteria. The remaining criteria guided the further analysis and formed the basis for the matrix of the definite evaluation.

Step 3) & 4)

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

There were further objectives to be fulfilled by the matrix:

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

- The formulation of recommendations, which were derived from the comparison of country conditions e.g. regulatory framework which gave stable conditions in country one, yet inhibited development in country two.

The weighting of the particular criteria have to balance the criteria within the system and should - concerning the final result - have the correct effect on the final result of the benchmarking.

For the non-monetarily valuable criteria one k.o. - criteria (= “knock out criteria”) could be specified and three key criteria were weighted substantially 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 of whether or not the utilization of geothermal resources is theoretically outlawed in the specific country. For Hungary this question could be answered negatively as there is no legal norm prohibiting the utilization of geothermal resources.

As key criteria, which were far higher weighted in the matrix than the other criteria, the following could be determined:

1. Does an exclusive legal protection exist, which assures that the right for the exploration of geothermal resources is guaranteed to the holder of the concessions for the permit area?

2. 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?

3. Is it necessary for the applicant to be the owner of the area under consideration (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 “call for action” if the result is to 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 would be fulfilled, the final benchmarking result would at once be improved considerably.

4.RESULTS

Which results could be achieved by this analysis?

The results were:

- an all comprising criteria list for non-technical barriers
- key criteria for project implementation
- economic results for project examples
- a “score” from benchmarking Germany with Hungary
- recommendations on how to improve the situation in Hungary

In the following sections, particular results will be presented shortly and final recommendations will demonstrate how public administration could react to improve the current conditions.

4.1 Legal criteria

The approach to include -as far as possible- all relevant legal criteria demanded to consider any legal topic that could be touched by the implementation of a geothermal project.

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

- 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 evident importance for projects. If – see also k. o. – criteria – the mining concession is not long-lasting, thus withholding the assurance of the resource for a specific investor, this could be a reason for the lack of project realization. Similarly, water regulation could be limiting the amount of thermal water that could be sourced from drilling.

4.2 Administrative criteria

Administrative criteria are more difficult to research. Aside from the general administrative regulations, the experience of the authorities plays an important role. For the study, interviews were conducted with the respective authorities. The result was that a certain uncertainty from the authorities regarding how they would have to deal with questions or administrative processes related to geothermal projects was present. Therefore, guidelines from national authorities could be helpful concerning how authorities treat geothermal projects.

4.3. Economic aspects

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

The economic aspects also considered– in the case, for example,that projects were not economically feasible - how large a subsidy program (direct subsidies, grants, remuneration fees, etc.) should be in order to enable sufficient profitability in the particular country bearing in mind, that if a public entity were to invest, a different profitability would be demanded.

These values were standard ratios from business planning (financial models). They showed, how far or in which constellations, geothermal projects in Hungary can be feasible or not.

If risk management is considered to be a large part of the economic outlook of a project, there would always be the discussion on geological risk. In particular 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 decisive for a widened implementation of geothermal projects.

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

4.4 Recommendations for improvement

Recommendations for improvement of the investment environment can be given after having the results of the benchmark. Consequently, they can also be divided into the analyzed fields: economic, administrative, legal.

For Hungary a clear recommendation was given, stating 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 if projects are to be realized.

An example for an administrative recommendation is that the topic “geothermal energy production” should also be communicated within the authorities. As a result, the knowledge base about the topic would be widened, enabling faster administrative processes. Since the beginning of 2009, the government in Germany established various instruments to improve the economic outcome of a geothermal installation. A recommendation to Hungary was to establish a subsidy system of any kind to enable the public hand (local administrative bodies) to clarify the first feasibility aspects for the installation of a geothermal project for heat generation. This would help the market to develop a definite number of projects and thereafter attract investment.

5. CONCLUSION

A systematic analysis of non-technical (& non –geological) conditions for geothermal projects can help to identify barriers, which influence the project development indirectly yet can have a substantial impact on the economic success of the project. On the one hand, legal conditions play an important role for the security of an investment in geothermal projects, and on the other hand existing subsidy systems can be required in order to help (depending on the project type) achieve the required profitability. Specific recommendations can be given if a benchmark analysis is concluded.

The legal issues should not be undervalued. If there is no legal security for an investor, it will be difficult for investment to occur; as geothermal projects are in any case already confronted with risks regarding geotechnical factors during the exploration phase, as well as further risks in the later operational phase.

In developing countries, assistance should be provided in order to analyse the situation and identify hurdles for investors, otherwise the development of the market could be easily delayed for years or even decades.