

GRMF – TECHNICAL ASPECTS

7TH APPLICATION ROUND

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22nd June 2021



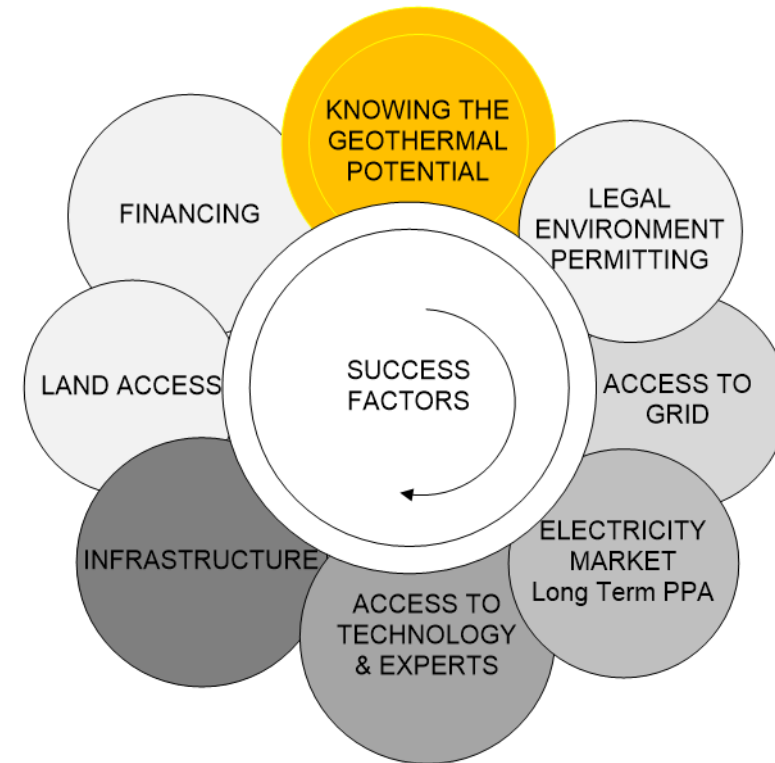
INDEX

1	What to consider when planning a geothermal development project
2	Common pitfalls Surface Studies applications
3	Common pitfalls Drilling Programme applications
4	Common pitfalls for schedules, experience and costs
5	Overview of common pitfalls, as addressed here
6	Questions & Answers



1 WHAT TO CONSIDER IN PLANNING GEOTHERMAL PROJECT?

- A certain level of planning should have been reached to be eligible for the GRMF program:
 - Surface Study (SS) is to refine previous studies in order to site the first well.
 - Drilling Programmes (DP) applications should include a specified site and well target justified by previous studies.
- For more information on geothermal energy project development please refer to best practice guides published within the geothermal community.



1 WHAT TO CONSIDER IN PLANNING GEOTHERMAL PROJECT?

Each geothermal system is unique.

The production capacity of geothermal systems is highly variable:

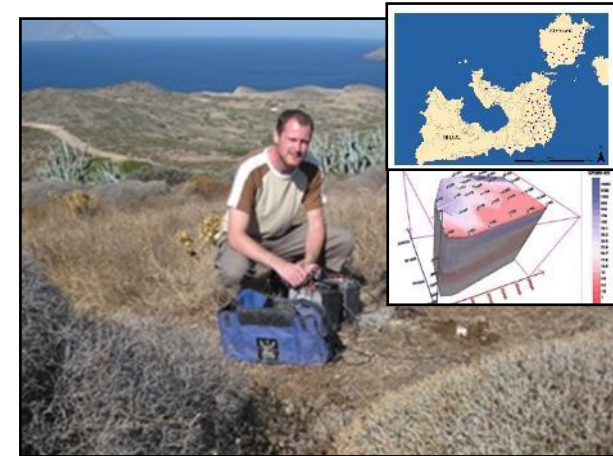
- Temperature
- Reservoir volume
- Geology and tectonics
- Fluid chemistry
- Dynamics and physics

Detailed studies and exploration of the geothermal resource are the foundation of successful geothermal development.



2 COMMON PITFALLS SS – RECONNAISSANCE STUDY

- A concession wide reconnaissance study is not eligible in GRMF.
- Surface study defined project area should be within a previously known geothermal area.
- To enable the justification and definition of further studies to site first wells support of existence and potential of the geothermal resource should be presented, that is previous studies such as results of a reconnaissance study should be used to justify the applied for surveys.
- If the prospect area is near or within the boundaries of another prospect, evidence and justification that the two prospects are not connected is required with the full application.



For a successful application: Follow given format. Give all information available.



2 COMMON PITFALLS SS – JUSTIFICATION OF ACTIONS



- The eligibility of proposed actions can be clarified by connecting the dots on how previous geoscience studies of the area support them.
- The applicant is advised to state clearly what studies have been conducted in the prospect area and how these previous studies are used to define the proposed surface surveys applied for.
 - The existence of a reconnaissance study should be clarified and all previous studies of the geothermal field/area presented.
 - The actions applied for should be clearly justified by previous studies and explained how the actions will assist in siting the first wells.
 - The applicant is advised that previous studies must have been conducted for the area and that eligible surface surveys in GRMF are focused on siting the first wells.

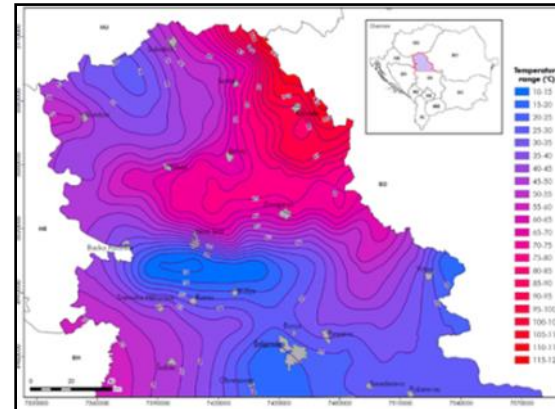
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2 COMMON PITFALLS SS – RESOURCE TEMPERATURE

To avoid uncertainty regarding estimated resource temperature:

1. state the range clearly
2. support your estimate with references to surveys of the area such as gas and solute geothermometers or resistivity surveys.



For a successful application: Follow given format. Give all information available.



2 COMMON PITFALLS SS – WORK PLAN

- the Applicant is advised to take care to focus the proposed work on a specific area, which has been identified in previous geological/geochemical surveys
- Work plan should be reasonable for the study area, suggested actions should be supported by previous studies and justified for the siting of the first wells.
- Quantification and duration of actions should be clearly presented that is number of measuring stations, size of survey area etc.



For a successful application: Follow given format. Give all information available.



3 COMMON PITFALLS DP – DRILLING TARGET

- The drilling target should be specified and justified with reference to previous studies of faults and fractures and estimated permeability within the targeted layer/fault.



For a successful application: Follow given format. Give all information available.



3 COMMON PITFALLS DP – GRID CONNECTION

- The applicant is advised to provide a map that shows the distance from project site to nearest interconnection point of grid, as it is a measure on cost of infrastructure and planning stage of the project.



For a successful application: Follow given format. Give all information available.



4 COMMON PITFALLS SS & DP – CONTRADICTIONS IN SCHEDULES

- In the review the connection between description and justification of the activity and work plan is used to justify the costs applied for.
- All cost should be connected to activities that have a specific duration and execution stated in the work plan and are justified by previous studies of the field.
- When the sections are in contradiction, in terms of e.g. justification of action, method used, size of area to be surveyed etc. then the cost is questioned in the review accordingly.

– **Description:**
Action 1: described
and justified



– **Work Plan:**
Action 1:
methodology,
duration



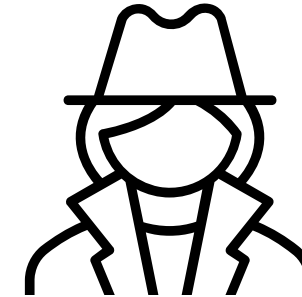
– **Cost estimate:**
Action 1: Cost
estimate in
coherence with
previous sections

For a successful application: Follow given format. Give all information available.



THE IMPORTANCE OF THE STORY LINE

- In geothermal development multiple options are possible however a GRMF applicant must make sure that in the application one option is chosen and consistently presented
- If multiple stories are told in the application the purpose becomes a mystery and the reviewer becomes a detective connecting the dots without a satisfying ending (→ no Agatha Christie novel!)
- If one story is told the reviewer can, with ease, find the action planned with reasoning backed by previous studies, its schedule, experienced actors and finally justification for cost (– so the “killer” is obvious from page one, still not an Agatha Christie novel but closer :)



4 COMMON PITFALLS SS & DP – EXPERIENCE



- Experience of Key Personnel and Experience of eligible entity are main criteria and need to be met for the project to be eligible for the application phase.
- In case of a known experience gap within the Applicant project team please present a strategy for how this will be solved e.g. planned procurement of consultant/contractor and the criteria they will need to fulfil. Be sure to familiarize with the procurement manual.
- The wish for Organization Chart (OC) is twofold:
 1. An OC to present the project team that will work on the activities applied for under the GRMF fund. This OC should include the names of the presented Key Personnel.
 2. Another OC can then be presented to introduce the eligible entity itself which then gives an overview of the Applicant company.
- In case the Applicant has multiple projects, it is good practice to include also the staffing strategy to meet the expected workload in case all applications are successful.

For a successful application: Follow given format. Give all information available.



4 COMMON PITFALLS SS & DP – COST ESTIMATE

- Breakdown is necessary and should be according to planned activities
- In SS budget break down is required to show costs of the individual studies scheduled in order to enable cost comparison
- In DP it is important that chosen cost scheme is reflected in specified well design and drilling target



For a successful application: Follow given format. Give all information available.



5 OVERVIEW OF COMMON PITFALLS AS ADDRESSED HERE



- A concession wide reconnaissance study is ineligible, GRMF studies focus previous studies to enable siting and drilling of the first wells.
- Present estimated temperature & potential used for planning in your project clearly and support your estimate with reference to previous data & surveys.
- Work plan in SS should be reasonable for the study area, suggested actions are to be supported by previous studies and explained how they assist in the siting of the first wells.
- Work plan in DP should clearly justify the site and well target and be supported by industry standards.
- Connecting the dots – make sure there is coherence in your story; actions, schedule, cost and experience.
 - Contradictions in described activities, work plan and cost items can affect the review, e.g. if an area of 10 m² is described and activity cost is then specified for an area of 15 m² this would negatively impact the grant amount. Coherence is essential.



Thank you for your attention!

Q/A



Lilja Tryggvadóttir,
Technical Project Manager



EXAMPLES OF BEST PRACTICE GUIDES

Best Practices Guide for Geothermal Exploration, IFC

- https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_handbook_geothermal-bp-2ed

Geothermal Handbook, ESMAP

- https://www.esmap.org/sites/esmap.org/files/DocumentLibrary/FINAL_Geothermal%20Handbook_TR002-12_Reduced.pdf