



ALTERNATIVE FINANCE RISK MITIGATION

Despite its huge potential, deep geothermal still plays a marginal role in the European energy mix. The high resource risk that is present in the early stages of geothermal project developments makes it difficult to mobilise the required capital through traditional bank finance. **Alternative finance methods** can be vital elements of the funding plan for geothermal projects. Community funding can also **achieve public engagement** and **increase acceptance**. However, the new approaches to finance also bring about new types of risks. The objective of CROWD THERMAL's Task 3.2 "Alternative finance risk mitigation" was a **compilation of alternative finance risks and the associated mitigation options for geothermal projects**.

We analysed different alternative finance methods with the help of **nine case studies** of both shallow and deep geothermal projects for heat and power production. Based on this assessment, CROWD THERMAL Deliverables 3.2 "**Alternative finance risk inventory**" and 3.3 "**Alternative finance risks' mitigation tools**" present the **key advantages, potential risks, and possible risk mitigation measures** for different alternative finance instruments, each from a **project developer's** and from a **community investor's** perspective. The alternative finance solutions included in the assessment are crowdfunding (general), crowdfunding (loans), crowdfunding (shares/equity), crowdfunding (reward-based), direct lending, and leasing.

The basis of the risk analysis is an understanding of the **technical workflow** of a deep geothermal project and its associated **resource-related risks**. The most critical and cost-intensive phases are highlighted showing why and where community funding can play an important role. The most suitable alternative finance method very much depends on the individual **project context**. Successful community funding needs to match the technical and financial characteristics of a geothermal project with the community investors' risk appetite and motivation for involvement. Some general recommendations can be given:

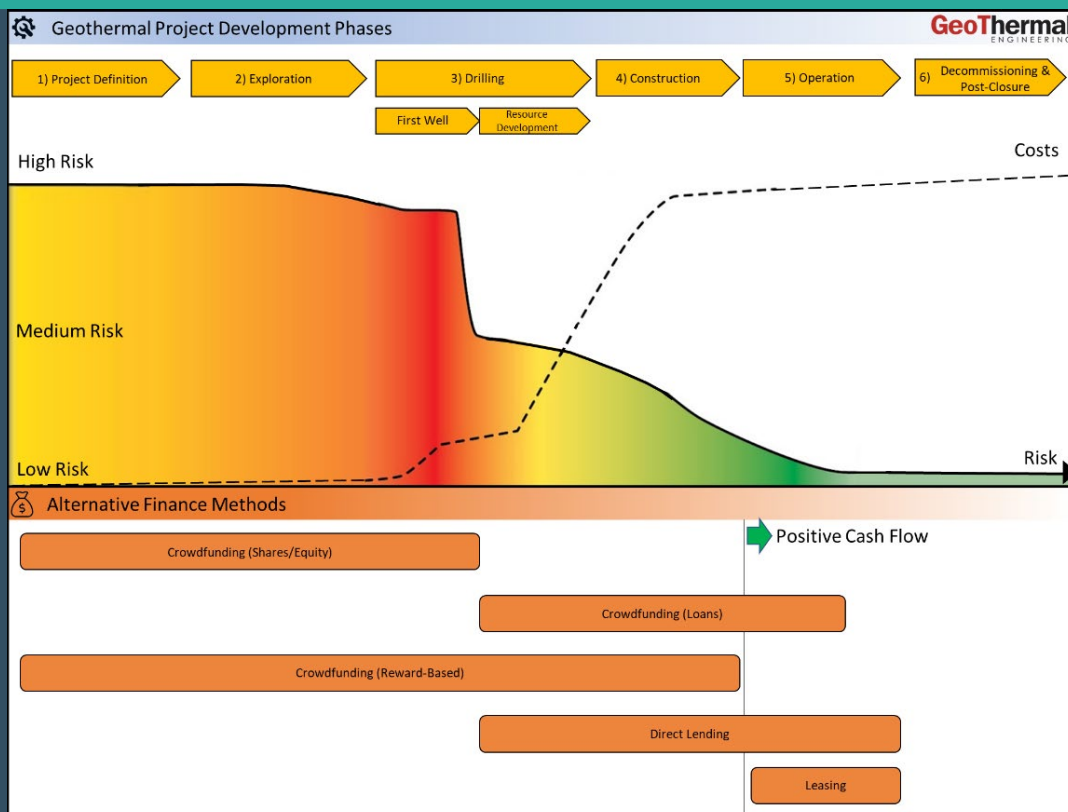


Figure 1: Technical geothermal project development phases, associated risks, costs, and most appropriate alternative finance methods (modified after ESMAP 2012 and Altfinator.eu).



ALTERNATIVE FINANCE RISK MITIGATION

At the early project development stages, especially **crowdfunding (shares/equity)** or **crowdfunding (reward-based)** can be attractive options to raise additional funds and to enhance local project ownership. The high resource-related risk in the early phases however leads to high return expectation of investors. Community funding is generally less risky in the construction and operation phases, but the potential returns at these stages are also less attractive.

One of the main challenges for project developers is the high-risk drilling phase. **Loan-based models** pose a large financial risk in this phase, as the fixed interest rate of a loan must be paid independent of the project results and possible time delays. Unless a guarantee or insurance scheme is in place, loan-based models are therefore only recommended after at least one well has successfully been drilled.

For project developers, **direct lending** and **leasing** are two more alternative finance strategies especially suitable at the late project stages. They offer the opportunity of easier access to funding than through conventional bank finance (direct lending) and the advantage that the resource risk is taken off the project developer (leasing), respectively.

Besides the chances of community funding for geothermal projects, there are also some challenges associated with it. With the high-risk profiles of deep geothermal projects, taking the crowdfunding route usually means having to pay **high interest rates** to investors. Even though the project developer carries most of the exploration risk, community investors need to be aware that they often share in the risk of project failure. This is especially true for crowdfunding (shares/equity). But even with other forms of crowdfunding, community investors are in danger of losing their investment as long as the drilling success is not secured by a risk mitigation scheme (e.g. insurance or public funds).

Based on our analysis, we therefore stress the **importance of risk mitigation strategies** like **trust fund concepts**, **governmental guarantees**, or suitable **insurance products**. Within CROWD THERMAL's Task 3.3, recommendations for an earmarked exploration risk mitigation framework for community funded geothermal projects were developed and presented.

Generally, **legal knowledge of local and EU fundraising regulations** is crucial to decide on the most appropriate form of business model, alternative finance method and overall financial mix. Project developers choosing to use crowdfunding should partner with a trusted and experienced crowdfunding platform.

For sustainable community funding, it is deemed most successful to **focus on impact investors** aiming at supporting the energy transition and/or local projects. Project developers need to be aware that involving people requires time and energy. It is recommended to **involve the community early** and to **clearly communicate the goals, the benefits, and the potential risks** of a project and investment upfront. Following best practice strategies to build and keep trust is prerequisite for successful and sustainable financial community engagement. Examples are the **personal relationship with local stakeholders** and the **involvement of well-known experts or reputable institutions**, for instance through match funding.



Photo: Christina Baisch - Illustrations: Leonnidas - Text: GeoThermal Engineering GmbH



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n° 857830.



FOLLOW US

www.crowdthermalproject.eu
Social Media: CrowdthermalEU

ALTERNATIVE FINANCE RISK MITIGATION



Understanding and developing a project in a holistic way, taking into consideration **technical, financial, and social dimensions** as well as their interdependency is another important risk mitigation measure for project developers. It reduces the risk of interface problems and increases the chances for a **Social License to Operate** and for both technical and economic success.

Alternative finance investors in geothermal projects need to be aware of the high resource-related risks in the early project development phases as well as the **long project development periods**. To a certain degree, community investors must accept these high risks in exchange for a chance of high returns. Transparent communication of opportunities and risks is however a key aspect and needs to be sought. The overview of advantages, risks and mitigation tools presented in CROWD THERMAL Deliverables 3.2 and 3.3 allows project developers and community investors alike to systematically improve their risk management and decision-making processes.

Technical Level				GeoThermal ENGINEERING		
1) Project Definition	2) Exploration	3) Drilling		4) Construction	5) Operation	6) Decommissioning & Post-Closure
<ul style="list-style-type: none"> Economic (e.g. FIT) and legal (e.g. mining law) framework Data mining Evaluation of existing geoscientific data Area of interest identification Securing exploration license 	<ul style="list-style-type: none"> Acquiring of new geoscientific data, like 3D seismic survey Evaluation of newly acquired data Integration with existing datasets Identification of potential geothermal targets (e.g. structures, faults, aquifers) Drill site identification Well path planning Securing drilling and testing permits 	First Well <ul style="list-style-type: none"> Drill pad construction Drilling and completion of the first well Logging, testing (production and injection test) and sampling If applicable: well and/or reservoir enhancement 	Resource Development <ul style="list-style-type: none"> Drilling and completion of subsequent well(s) Logging, testing, sampling and if applicable: enhancement Circulation test Securing construction permits 	<ul style="list-style-type: none"> Construction of the plant (power/heating) If applicable: construction or extension of district heating network Connection to the grid or district heating network Securing operation permits 	<ul style="list-style-type: none"> Power and/or heat production Maintenance Monitoring 	<ul style="list-style-type: none"> Plug and abandon of wells Decommissioning of the plant Monitoring of the abandoned wells
Financial Level						
Type of capital:						
<ul style="list-style-type: none"> Risk-absorbing Risk-sharing 	<ul style="list-style-type: none"> Risk-absorbing Risk-sharing 	<ul style="list-style-type: none"> Risk-sharing 	<ul style="list-style-type: none"> Debt 	<ul style="list-style-type: none"> Debt 	<ul style="list-style-type: none"> Debt 	<ul style="list-style-type: none"> Reserves Risk-absorbing (Government)
Financial risk						
<ul style="list-style-type: none"> high 	<ul style="list-style-type: none"> high 	<ul style="list-style-type: none"> high 	<ul style="list-style-type: none"> medium to high 	<ul style="list-style-type: none"> low 	<ul style="list-style-type: none"> low 	<ul style="list-style-type: none"> medium
Capital required						
<ul style="list-style-type: none"> low 	<ul style="list-style-type: none"> medium 	<ul style="list-style-type: none"> high 	<ul style="list-style-type: none"> high 	<ul style="list-style-type: none"> high 	<ul style="list-style-type: none"> medium 	<ul style="list-style-type: none"> low
Social Level						
<ul style="list-style-type: none"> Announcement of the project to the public and relevant stakeholders Asking for need of information and communication Asking for interest in financial participation 	<ul style="list-style-type: none"> Offering regional information markets, topical tables (risks, financing, environmental impacts etc.) Offering dialogue groups Offering financial participation opportunities 	<ul style="list-style-type: none"> Offering site visits of existing projects / video / VR / 3-D presentations Keeping dialogue groups 	<ul style="list-style-type: none"> Establishing local office with sufficient consultation times Keeping dialogue groups 	<ul style="list-style-type: none"> Operation starting party "Local energy festival" on a yearly base Providing operation diary, website showing produced energy / saved CO₂-emissions Initiating spin-off to other joint energy projects (RES, efficiency) 		

Figure 2: Integration of technical, financial, and social project levels.

More information:

CROWD THERMAL Deliverables 3.2 "Alternative finance risk inventory" and 3.3 "Alternative finance risks' mitigation tools"

