



CROWDTHERMAL DELIVERABLE 2.3

INNOVATIVE FINANCE MECHANISMS FOR GEOTHERMAL ENERGY

Summary:

This report describes innovative Finance schemes that have been or can be used in future to increase the involvement and commitment of community members to and in Geothermal projects. The finance schemes are all alternative finance schemes.



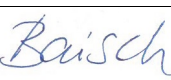

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EXECUTIVE SUMMARY

This report is part of the Crowdthermal project and describes which new and innovative finance models can be used to realize financing for geothermal projects. And, how these finance models relate to the involvement of community investors.

Advantages to be gained by using new financing schemes can be:

- Outreach to a larger part of the community
- More transparency for the involved community
- Customer friendly process through use of digital models
- Easy maintenance of the community funding project
- Easier to comply with regulation thanks to the digital approach
- Easier communication with the community group and individuals.
- Lower costs for the community funding project

When raising capital three main questions have to be answered first.

1. What type of capital is needed? What is the level of risk involved and does this match the risk appetite of possible investor groups?
2. How much capital is needed?
3. How does the project want to involve a community?

For the Crowdthermal project we have defined four types of investment capital, Risk absorbing capital, risk sharing capital, debt and reserve. Depending on the development phase of the project and the associated risk a type of capital can be selected. The different finance schemes can be used to raise different kinds of capital.

It is always important to look at the project specific situation when deciding which form of community funding to use, as these factors determine the success. For example, the local and national legal framework, the characteristics of the community, the availability of financiers and sponsors and the availability of government instruments, like guarantees and grants. Based on the general outlines however, such as the legal factors and the underlying market, certain financing schemes could be successful in a certain country while others would probably not be.

Taking all this into account this report describes the following proven, and yet to be used, innovative finance schemes for geothermal projects and links them to possible success in countries:

Crowdfunding,

Direct lending

(Crowdfunding) Social impact bonds / Green Bonds

Leasing

Match funding with grants or donations

Reward or output based funding

Donations

Revenue based financing

Steward ownership

and the possibility of a pay it forward mechanism between member states.

Per Finance scheme we describe the kind of capital raised, the amount of capital that can be raised and the involvement of the community that can be reached.

A number of additional financial supporting instruments are also described: Guarantee schemes, Decentralized Finance and Smart contracts and Fiscal instruments. These can be combined with a number of the proposed finance schemes to increase success.

Important findings from this report are:

1. IDEA from Spain uses reward or output based funding to support sustainable energy projects. This is a very good model that should be exported to be used European wide.
2. Steward ownership models could be a way to involve communities more in the development of geothermal projects.
3. Guarantee instruments can be a successful way to support financing schemes for geothermal projects.
4. Smart contracts can be a way to reduce financing costs and to make sure money is only used in projects if certain conditions are met.
5. Leasing and social impact bonds can be methods to reduce risks for government and/or investors and to get projects started even if a government is not willing or able to do so.
6. Leasing can also be a way to let the ownership of a project return to the government at the end who is most suited to handle decommissioning and post-closure.
7. Crowdfunding is a very flexible instruments with many different ways to involve community investors. Combined with guarantee schemes the risk for community investors can be manageable (as is suggested in report 3.4 of this project).
8. Direct lending can be a way to increase the funding for a project, while risk can be diversified, but the link between the project and the investors is limited

INTRODUCTION

In this report we describe which new and innovative finance models can be used to realize financing for geothermal projects and what advantages these new finance schemes could bring. The new Finance schemes are all alternative finance methods or solutions offered by other financing parties than regular banks. We focus especially on new financing schemes to involve the community in future geothermal projects.

In Deliverable 2.1 we have seen several European sustainable energy projects where forms of community funding were used. Deliverable 3.1. added some interesting cases, for example from Kenya, that have also used new ways of funding. These are all nice cases from which we can learn. The methods used in these projects are also described in this report, so we have an overall view of possibilities.

The fintech world is in constant development. New financing schemes are being developed as we speak. Interesting new examples are smart contracts using the block chain technology, new guarantee schemes, steward ownership and sale and lease back schemes.

The finance schemes described in this report can be useful to increase the success of community funding in geothermal projects. For success the compatibility with legal infrastructure is essential. That is why the new finance schemes will be related to the usability in the three case study countries using the information about the legal framework and energy market infrastructure in these countries as described in Deliverable 2.2. of the Crowdthermal project (the regulative framework).

To give some guidance on the usability of these models in other member states, we will use the information from the Crowdthermal questionnaire, that has been filled in by different Linked Third Parties (LTP's), of the Crowdthermal project to classify these countries to see which of the three case study countries is closest to their situation. Using this the member states can see which schemes could be interesting to use in their country.

CHAPTER 1. INNOVATIVE FINANCE SCHEMES AND COMMUNITY FUNDING

Community funding is the umbrella for alternative finance methods that are used to facilitate investment by the community directly into projects or companies. This means members of the community choose in which project, or project category they want to invest, and their repayment and return are usually connected to the success of the specific project or project category. The process of community funding can be realized via a platform, like a crowdfunding platform or a direct lending platform, or directly into bonds issued by a project or company itself.

Community funding in general is focused more on impact and social context than just on financial reward. This makes it a suitable form of (co)finance for geothermal projects where it is important to involve the community and other stakeholders.

Community funding comes in different shapes and sizes. It uses new finance schemes and old traditional ways. New fintech development can help to realize a community project at lower cost, because it can reduce the cost of the financing process or can realize funding where the bank would not fund. It can

also increase the outreach to all possible members which makes the community project more effective. Geothermal projects could possibly benefit from using these new financing schemes.

Because the outreach to, and involvement of, the community is very important for the acceptance, use and community support of geothermal projects, involving the community on the finance side of a project can be useful to make the successes and results of the project more accessible to the community.

In describing the new finance schemes in this report, we focus on their usability for community funding because that is the type of funding, we want to increase in the Crowdthermal project. The objective is to connect the crowd to the success and results of geothermal projects. Some of the new fintech schemes may be less useful to realize these community goals but can still be interesting to increase financing options for geothermal projects in general. That is why they have been added.

Fintech companies are developing digital, transparent and efficient financing models that are customer friendly and very accessible for individual users. This supports the growth of new inclusive business models for community investment, ownership and governance of geothermal projects. It can increase the transparency for community members and adapt their involvement to the level the (individual) members require.

In short, advantages to be gained by using new financing schemes can be:

- Outreach to a larger part of the community
- More transparency for the involved community
- Customer friendly process through use of digital models
- Easy maintenance of the community funding project
- Easier to comply with regulation thanks to the digital approach
- Easier communication with the community group and individuals.
- Lower costs for the community funding project.

IMPORTANT REMARK: CASE TO CASE ANALYSIS ALWAYS NEEDED

We feel it is important to stress the importance of a case to case approach when deciding how to build a community funding campaign. The advantages and success of community funding are largely dependent on some project specific factors. For example:

- the local and national legal framework
- the characteristics of the community
- the availability of financers and sponsors
- the availability of government instruments, like guarantees and grants.

Therefore, it is important to always look at those factors on a specific case to case basis to set up and realize a successful community funding project.

Does this mean we cannot make a recommendation which forms of community funding could be interesting for a certain country?

No, looking at the general outlines, such as the legal factors and the underlying market, in this case the geothermal and energy market, we can see that certain financing schemes could be successful in a

certain country while others would probably not be. So, this general outline is what we will use to give an indication in this report which possible finance schemes could be interesting for certain countries.

CHAPTER 2. NEW FINANCE SCHEMES FOR GEOTHERMAL (COMMUNITY) FINANCE

In this chapter we will start in paragraph 2.1 with an overview of 'proven' finance schemes that have been used in sustainable energy projects before or have been considered for that goal. In paragraph 2.2 we will describe some 'new' interesting methods that could be options for future projects or could be combined with some of the methods already used before, in this way creating additional new finance schemes.

When considering possible new finance schemes to use in a specific geothermal project, a number of factors are important:

4. What type of capital is needed? What is the level of risk involved and does this match the risk appetite of possible investor groups?
5. How much capital is needed?
6. How does the project want to involve a community?

Ad 1. For the Crowdthermal project we have defined four types of investment capital:

- (1) risk-absorbing capital that not only shares the risk but also compensates project developers for the financial risk if the project is not successful. Often because it does not have to be repaid if the project is not succesful, or not completely succesful. For example, donations, grants, subsidies etc.
- (2) risk-sharing, capital that carries part of the risk of the project, so the total risk is decreased for other participants. For example, equity
- (3) debt
- (4) reserves.

Which type of capital is needed, is determined by a number of factors. An important factor is the phase of the geothermal project that financing is required for. Each phase has a certain risk profile which determines what the risk is that is involved for investors. The risk determines what kind of capital should ideally be used.¹

Ad 2. Some new finance schemes are suited to raise large amount of capital, some others are better suited to raising smaller amounts.

Ad 3. Some new financing schemes create a high level of involvement of the community, both in the sense of risk and return for the community as in the sense of involvement of the community in the decision process of the project. Other finance schemes do not involve the community in the same degree in decision making and risk and return.

¹ A more complete explanation of the risk characteristics can be found in deliverable 3.2 "Alternative finance risk inventory; Alternative finance risk' mitigation tools".

Per finance scheme described in the next paragraph, these three factors will be defined as they can help in choosing which finance scheme to use for a certain project.

2.1 PROVEN INNOVATIVE FINANCE SCHEMES

This paragraph contains a number of innovative finance schemes that have been used for a first time in sustainable energy projects. It will be followed by 2.2 with finance schemes that could be used in this way but have not been used yet.

Some examples (best practices) of the use of these finance schemes are described in Deliverable 2.1 of the Crowdthermal project (best practices in Europe). Descriptions of the methods used in the best practices are included here so this report gives a complete overview of all possible finance schemes for community funding.

Crowdfunding

The first finance scheme to describe is crowdfunding. Crowdfunding is a form of funding where funds are raised directly from the community. The community invests into a project or company directly, often through an online platform. This means the investment made also carries the risk of the project or company directly. So, if the project or company fails the investors will lose their money. It also means there can be direct contact between the project or company and its investors and potential benefits can also be given to the investors directly. For the funds that are raised in this way the community investors can receive reciprocation in several forms:

- A set interest rate paid yearly or at the end (in case of loans),
- A dividend which is tied to the result of the company that is financed (in case of equity),
- A different reward like a reduction in energy prices (in case of reward-based crowdfunding). Or anything else the investors and the project agree on as a suitable reward for the money invested.

As can be seen in the list above describing the rewards received, different kinds of crowdfunding are possible. The main categories are:

Crowdfunding and marketplace lending

In case of a crowdfunding loan or marketplace lending the community invests and so participates directly in a debt instrument of a certain project or company. The investment is often made through a platform. The debt instrument used is often a loan but a different debt product can also be used. For example, a bond issued by the company. A bond is often used in marketplace lending².

²As no bank is involved crowdfunding loans and marketplace lending could also be classified as forms of direct lending. The distinction between direct lending and crowdfunding loans or marketplace lending in this report is made by the difference in the risk profile for investors. In case of direct lending through an intermediary the risk is diversified between all the projects the platform invests into. With crowdfunding loans or marketplace lending this is not the case.

In case of crowdfunding the loan is placed with the crowd, consisting of individual investors, and the investments made can be done in small to medium amounts (sometimes as small as 100 euros per investment). Through the platform the investors choose how much they invest and in which product or company. In return for their investment they receive interest payments. Most often regularly during the lifetime of the loan (for example once a month or once every year). During, or at the end, of the loan period, the full amount that was invested will be repaid.

In case of marketplace lending the project or company raises the funding by giving out debt instruments, like bonds or a loan, to all investors, so not just the crowd. This can be done through an online platform, like with crowdfunding, but can also be done through a bond market or directly. The investors that use marketplace lending are other companies or professional investors (family offices etc) but can also be individual investors.

With crowdfunding loans or marketplace lending it is the company itself which gives out the debt instrument. This means investors lend the money directly to this one project or one company. Thus, the risk of their investment is also directly related to the risk of this one project or company. If the project or company runs into difficulties the investors have a chance that their interest cannot be paid and maybe even that the money, they invested cannot be returned to them.

Crowdfunding loans and marketplace lending are the most common type of crowdfunding as the process of assessing a loan is something that can be done on strict, largely objective, criteria. This is harder for equity investments and reward-based investments.

Because a loan or bond is debt financing, the loan will have to be repaid even if the project is not successful. As opposed to risk-absorbing or risk-sharing investments. This means crowdfunding loans are less risky than for example equity crowdfunding for investors, as the money will be returned. Unless the project or company folds.

For the project or company owner it is the opposite, a loan is riskier as the payments of interest and repayment of the loan amount have to be made regularly according to the schedule. Even if the project is not successful or has delays. Equity or reward-based funding is more flexible for the project or company.

In case of geothermal projects the risk in the first project phases is so substantial, that if the project is not successful it may be impossible to repay even debt instruments. This means the risk for investors is still considerable in case of a loan or bond, especially for community investors who, due to limited funds, cannot diversify as much as is needed to offset the failing of a project.

In this case a solution can be to combine a crowdfunding loan with a guarantee scheme. Guarantee schemes are described in paragraph 2.3 Additional financial support mechanisms.

Crowdfunding loan

Type of capital:	Debt
Amount of capital:	Suited for small up to moderate amounts
Involvement of community	Risk moderate (because it is a debt product), involvement moderate

Market place lending

Type of capital:	Debt
Amount of capital:	Most suited for medium to large amounts
Involvement of community	Risk moderate (because it is a debt product), involvement low

Equity crowdfunding

With equity crowdfunding the investors also choose the project or company and invest, but instead of participating in a loan they receive shares in the project or company. If there is a profit and the company pays out a dividend, they receive their share of the dividend. If there is no dividend, they receive nothing. If the investor wants to reclaim the investment made, he (or she) will have to find someone who wants to buy the shares. The shares will increase in value if the worth of the company or project has grown but will decrease in value if the results are negative.

This means the upward potential of the earnings is larger. But there is also a larger risk of decreasing of the value of the investment than with a crowdfunding loan.

To make a proposal for investment into equity crowdfunding, the value of the shares of a company has to be determined. This can be difficult and brings a larger uncertainty about the value of the investment made. This combined with the risks of the loss in value, makes crowdfunding equity in general less fit for smaller community investors.

In the case of geothermal projects however, the crowd has more than just pure financial motives to invest in the project. They want to support a specific project, or the development of more sustainable energy sources. In this case equity crowdfunding could be very suited. For the project it means they acquire extra capital and committed investors. For the investors it means financial returns are not certain, but they support the project and its goal in the most effective and supporting way.

An additional added value of equity crowdfunding is the possibility to attract additional (bank) loans, because a certain percentage of equity capital is always required for these projects. In this case more than 10x the value of the equity investment can be raised in additional debt capital.

If the risk is considered too large for community investors, equity crowdfunding can also be combined with a guarantee scheme. Guarantee schemes are explained in paragraph 2.3.

Equity crowdfunding

Type of capital:	Risk-sharing
Amount of capital:	Suited for all amounts
Involvement of community	High, investors share fully in the risk and have voting rights as shareholders.

Reward based crowdfunding

With reward based crowdfunding the investors chose a project or company in the same way as with the two crowdfunding possibilities above. The difference here is that the reward they receive is a non- monetary one. They can receive certain products, be invited to certain events or receive products at a discount. In sustainable energy projects this can be a discount for the energy used, more energy available at peak times or tickets to a swimming pool that is heated with the sustainable energy that was generated by the project (like in the Jubilee pool project in the UK)³. For an investor it is seen as a donation to the project, with a nice non-monetary return.

Reward based crowdfunding

Type of capital:	Risk-sharing
Amount of capital:	Most suited for small and medium amounts
Involvement of community	Risk-wise high, return dependent on success and non-monetary involvement high. Usually investors have no voting rights but are committed to the product and its realisation.

Direct lending

Direct lending is a form of lending where a financial intermediary gives out bonds or other debt (fixed income) instruments to investors and uses the incoming funds to finance a certain project or a certain company, without going through a bank (that is why the lending is called direct). The investors receive a return (usually a fixed interest) that is paid regularly during the lifetime of the loan. Usually once per month or per year. At the end of the investment period the amount they originally invested is paid back. The financial intermediary raises the money and gives a loan to a project or company.

As the financial intermediary has attracted the funds and invests into several projects the risk run by the investors is also spread out between the different projects or companies the financial intermediary invests into. If one of the projects fails, there is still the return of the other projects to realise a return for investors. So, the investment risk is diversified. This is an advantage of direct lending for investors.

A lower risk for investors can be attractive. It does mean however, that the direct relationship between a project and its investors is also less close. So, the commitment to a certain project or company is also less or even non-existent. This can make direct lending through a financial intermediary more suited to realise financial goals, than to realise social commitment goals. It can still be a way of community funding, as the community are the ones investing, but the community aspect is weaker than in, for example, crowdfunding or market place lending.

Direct lending through financial intermediary

³ <https://www.cornwallislesofscillygrowthprogramme.org.uk/projects/jubilee-pool-geothermal/>

Type of capital:	Debt
Amount of capital:	Most suited for larger amounts.
Involvement of community intermediary is	Risk low (because it is a debt product and the financial in between), involvement low.

(Crowdfunding) Social impact bonds / Green Bonds

Social impact bonds and green bonds are debt instruments specifically designed to realize certain non-financial objectives. They look like a regular bond but are very different.

A social impact bond is a “pay for success” financing instrument for projects that will create better social outcomes whereby the payment to investors is flexible, based on the achieved results or savings.

A green bond is a bond that is specifically earmarked to raise money for climate and environmental projects. It can be realized in the form of a social impact bond.

Social impact bonds can be a useful instrument to realize a specific project with social goals for which a government, or other governmental organization, is not prepared or able to raise the capital to start it. With a social impact bond, it is possible to attract funding from investors that want to support specific social (including green) goals that a project aims to realize. In case a government does not want to (or cannot) run the risk or costs associated with the project until they know it will be successful. A social impact bond can be a way to get the project started anyway. Investors into these kinds of bonds have a social or green goal as the main reason for their investment and accept a high risk and uncertain return on their investment because of the social or green “return” or reward.

With the social impact bond, the funding is put into a certain project by ‘social’ investors, usually large investors, pension funds etc. Only if the project is successful will a governmental organization pay for the cost of the project. If that is the case the invested money will be returned to the investors, possibly with a return as the governmental organization can be willing to pay more than the costs of the project if success has been proven.

Social impact bonds are very different to other options discussed here as their use means investors take the risks a government is not willing or able to take to realise a certain social goal. It is high risk, as the investment may be completely lost and a return is very uncertain. It is also very important to have the governmental organization involved from the start so there is a chance of (re)payment if the project is successful.

Usually social impact bonds are executed with large (social) investors as it can be complicated to work out the proposal and conditions, and large investors can handle the risks involved. But if there is a committed community it can also be funded by community investors.

The first example of a successful crowdfunding social impact bond called new era was recently realised in Tel Aviv in Israel.

“New Era”, which is the first impact investment of its type in Israel, will aim to reduce the loneliness of 200 elderlies in Tel Aviv Jaffa, improve their quality of life and provide them with tools to assist them in reconnecting to the community. The program includes house calls by social workers and volunteers that will assist in connecting the elderlies to the community, a cognitive behavioural therapy program integrating them into group activities in their neighbourhoods, and the use of the technological component, which will make the connection accessible with quality contents, calls with family members and even other participants in the program.⁴

If a geothermal project can contact motivated community investors, if necessary combined with large ‘social’ investors, the social impact bond model could be applied. In this case the investors would invest into the project, for example the exploration for a feasible project site or maybe even the drilling of the first well. If this is successful the government can repay the investors and pay them a return as they have taken the risk involved in the first phase of the project.

Social impact bonds

Type of capital:	Risk-absorbing
Amount of capital:	Most suited for medium amounts from larger investors but can be used for crowdfunding too
Involvement of community	Risk high, involvement high

Leasing

Leasing is a process by which a firm can obtain the use of certain fixed assets for which it must pay a series of contractual, periodic, tax deductible payments. It is a contract between the funder (lessor) and the end-user (lessee) for the acquisition and use of an asset and/or solution and (if included) any associated costs, such as maintenance in return for payment over an agreed period (⁵In other words, leasing is a form of financial activity associated with the transfer of capital goods for temporary use for a defined time against payment.

In case of financial lease, the lessor maintains ownership of the asset while the lessee enjoys the use of the asset for the duration of the lease agreement, usually accompanied by an option to buy the asset at the end of the contract. The lessee bears all costs and risks associated with the use of the leased asset. In case of operational lease, the facilities are owned by the lessee at the end. In case of operational lease the ownership at the end lies with the lessor who also bears the cost associated with the use of the asset.

Leasing can be interesting for geothermal projects if a lessor can be found that is able to handle the risks involved in the development of geothermal projects. This would usually be a government or government related organisation or NGO.

⁴ <https://forbes.co.il/e/for-the-first-time-in-the-world-an-impact-investment-that-is-open-to-everyone/>

⁵ Padley and Dixon, 2005).

This could work as follows: the government or NGO funds the exploration, first drillings and maybe even construction phase of the geothermal project. The party who will run the operation, or a community owned company, then leases the facility from the government or NGO to run it and produce energy. At the end of the productive phase and lease period, the government or NGO is still the owner and can handle the decommissioning and post-closure. This last phase could also be handled by the leasing party (the lessee) in case parties choose an operational lease. But a government is usually better equipped to handle the decommissioning and post-closure.

If in a certain member state, community members would be more motivated to realise geothermal projects than government parties, roles could even be the other way around. Meaning the community members could finance the exploration and development and the government could lease it back to use it for energy production for the country A bit like is done with social impact bonds. The difference is that the capital of the community or investors would have to remain available during the whole leasing period. This would require a community with a large amount of capital at its disposal willing to absorb the considerable risks involved, which does not seem likely.

Another option would be an initiative at European level funding the development of projects and then leasing them to a member state or a community in a member state.

Leasing

Type of capital:	Asset-based debt, but can be risk-sharing in case of operational lease
Amount of capital:	Suited for large amounts
Involvement community:	Risk high if community is the lessee and it is financial lease, lower in case of operational lease. Risk moderate if the community is the lessor (because it is a debt product),

Match funding with grants or donations

Another interesting finance scheme is match funding. Match funding is when a governmental organization adds funding to funding generated by other investors to finance a project or company. The funding raised from the government is preferably in a risk sharing or risk absorbing form, so it reduces the risk for the other investors. This makes it more attractive for other investors to invest. It is especially important for community investors who cannot diversify their investments in the way that large investors can.

The investment of the government can be in all forms of capital. Grants or subsidies function as risk absorbing capital as they do not have to be paid back if the project is not successful. A guarantee or subordinated loan⁶ is also risk absorbing but only partly as it does not cover all

⁶ Subordinated debt is an unsecured loan or bond that ranks below other, more senior loans or securities with respect to claims on assets or earnings. In the case of borrower default, creditors who own subordinated debt will

the risk involved but reduces the risk for other investors. A government can also give a loan or invest in the form of equity. Equity would also be risk sharing (or even risk absorbing when matched with debt funding by investors). The most common forms of government involvement are grants, subsidies or guarantees

If government capital that is risk absorbing or risk sharing can be obtained, this can be an important factor in successfully raising funding from other parties to match it. Or it can boost the capital invested if it is granted after investments have been made. Often just the fact that a government invests gives other investors enough confidence in the project to also invest.

Research done by the European Commission into match funding ("Unlocking the crowdfunding potential for the European Structural and Investment Funds (ESIF)") has shown that most match funding happens in one of the following two ways:

1. If a successful (crowd)funding campaign has been realised the government provides extra funding or a donation to the company separately.
2. The government invests into a fund that combines government funding with other funding. This fund then invests into projects or companies. Governments often prefer this option as this means they do not have to do the due diligence research of the individual projects but can leave this to the fund manager.

Match funding

Type of capital:	Debt , equity or donations (grants). The government contribution can be risk absorbing or risk sharing in case of donation or grant, or debt as well if it subordinate debt is used.
Amount of capital:	Suited for all amounts
Involvement of community	Depends on the funding provided by both the government and the investors in the matching. Usually the risk is reduced for investors so would be moderate to low.

Reward or output based funding.

Reward based funding has already been mentioned in the crowdfunding section. The essential element of reward-based funding is that the reward investors receive is a non-monetary one.

Reward based funding can also be used when investment is not done by the crowd but by larger investors. Governments or NGO's for example, that want to support the development of more sustainable energy, could supply reward-based funding. It could also be called

not be paid out until after senior bondholders are paid in full. U.S. Securities and Exchange Commission. "Investor Bulletin: What Are Corporate Bonds," Pages 1-2. Accessed Aug. 11, 2020

output based funding as for their investment into the project they be paid back in realised products, in this case produced sustainable geothermal energy.

By doing this they increase the risk-absorbing capital of the project because no payments are necessary. Funds become available that do not have to be repaid until production stage is reached. If production is not feasible the funding does not have to be repaid. So, risk is reduced, and capital is increased. The ideal funding.

In Spain investments done by IDEA (the Spanish institute for energy diversification and saving) into sustainable energy projects, work like reward based funding. IDEA invests into a project and is repaid in units of produced sustainable energy. The monetary equivalent of every unit produced is deducted from the loan value until the full loan is repaid in this way. (for more details see Deliverable 2.2 “The regulative framework” page 20). This is probably the most effective way to support sustainable energy projects. It would be interesting to see if this model could be implemented on a European level.

Reward-based funding

Type of capital:	Risk-absorbing
Amount of capital:	Suited for all amounts
Involvement of community	Risk high for the government but the community is not involved,

Donations

Another interesting funding scheme is the attracting of donations. Donations are risk-absorbing capital as they do not have to be repaid. They in fact increase the equity of the project or company which makes it easier to attract other funding in the future.

In general, attracting donations is not an easy task but it is feasible for geothermal projects. In Germany the “ Elektrizitätswerke Schonea EG” . Started a project on the base of an initiative to exclude nuclear power generation⁷. A large number of people donated money to the project to be able to buy shares in a power producing company. Sadly, it was not possible to realise the share transfer, so the money had to be returned to the investors, but it did show the willingness of a large group of community investors from all over Germany to support such projects.

Donations

Type of capital:	Risk-absorbing
Amount of capital:	Most suited for small and medium amounts
Involvement of community	Risk high, involvement limited depending on conditions of the donations. Usually no voting rights.

⁷ Deliverable 2.1. Best Practices in Europe page 14

Revenue based financing

Revenue based financing is a new concept that can be classified as ‘founder-friendly’ financing. It acts like equity as it is risk-sharing and does not have to be repaid. But no shares or voting rights are transferred to the investor. Instead the investor will receive a certain percentage of turnover as repayment for the investment. Sometimes a ‘cap’ is used which limits the total amount that has to be repaid. This cap is often linked to the size of the original investment that was made (for example the total amount paid will not be more than two times the original investment). In case of a motivated community, or group of larger investors, that wants a sustainable energy project realized, this could be an attractive option to make sure the project goes ahead.

An interesting example of a platform that wants to specialize in revenue based financing aimed at businesses with a ‘sustainable and impactful’ effect and a business model which might have a ‘positive social and environmental impact’, is the recently started Remagine platform in Germany⁸. Remagine has raised 20 mln. Euros to invest into high-growth companies with the profile mentioned above.

For geothermal projects revenue-based financing could be an attractive option to use with both large investors and community investors.

Revenue-based financing

Type of capital:	Risk-sharing
Amount of capital:	Suited for all amounts
Involvement of community	Risk high, involvement limited depending on conditions of the repayments, no voting rights.

2.2 NEW INNOVATIVE FINANCE SCHEMES

Steward ownership

Steward ownership is a different way of running a company, involving all stakeholders and interests in the goals and management of the company as defined in the article on the subject by alternative ownership advisors⁹:

“a steward-owned company is not a wealth-building engine for an individual or for speculative investors, and it is not a commodity that can be bought and sold. It is permanently independent, and its purpose is safeguarded by “stewards” of the company who shepherd the health and vitality of the business in order to benefit their stakeholders (such as employees, customers, vendors, community members, etc.)”.

In the model of steward ownership investors and/or owners can get shares in the company but will share the voting rights with the other stakeholders of the company in case of major decisions effecting the goals of the company. The company is managed by a team aiming for the goals of all stakeholders together. And profit is invested back into the company or donated. Investors can get

⁸ <https://techcrunch-com.cdn.ampproject.org/c/s/techcrunch.com/2021/01/25/berlins-remagine-secures-24m-to-finance-high-growth-and-impact-led-startups/amp/>

⁹ <https://www.alternativeownershipadvisors.com/blog/steward-ownership>

their investment back, but the amount paid is usually capped at a number of times the amount originally invested. This means that possible profit is capped so profit maximisation that is not in the interest of the company is not possible. Usually a “golden share” is used which can veto any decisions that would negatively affect the realization of these company goals.

In this way steward ownership combines the positive points of venture capital (equity) and debt financing (capped reward) for the company or project. The investors have a very different position to a regular venture capitalist or debt investor. They have a limited upside earning potential and cannot drive the company towards short term profit maximalization that might damage the interests of the other stakeholders. The golden veto right share protects against this. Of course the risk for the investors is that they can do less to protect their investment if the team running the company makes bad decisions. But the team and employees are usually more motivated by the actual goal of the company.

Steward ownership could be very interesting for investors into geothermal projects, including community investors. It is challenging to set up the company and structure the rights of parties involved in the right way. Because of the setup the interests and positions of community investors, government and social investors can be protected at the same time while the environmental sustainability goals are also safeguarded as they are part of the goals of the company itself.

It could be the most successful way to protect the interests of all communities involved and affected by geothermal projects. This includes both community investors and community members that do not or cannot invest into the project.

Steward ownership

Type of capital:	Risk-sharing
Amount of capital:	Suited for all amounts
Involvement of community	Risk high, involvement high

Pay it forward between member states

This form of financing is a new idea that has not been used yet but could work in a similar way to the CO₂ rights that are traded in the EU Emissions Trading System (ETS system¹⁰). In this system companies in member states can buy or sell CO₂ rights to realise their obligatory climate goals.

In the pay it forward system we would look at a trading of sustainable energy units realised between member states. Each member state would get a total amount of sustainable energy units that they have to deliver to reach the European sustainability goals. We could call them Sustainable Energy Units (SEU) for this example.

A member state could invest into a geothermal project in its own state or in another state and sell the realised sustainable energy output to another member state which can use it to realise its SEU goals. In this way the expertise, and funding, of one-member state could be used to realise more sustainable energy in or for another member state.

Of course, to make this feasible a system and market of SEU's would have to be created at European level.

¹⁰ https://ec.europa.eu/clima/policies/ets_en

Pay it forward scheme

Type of capital:	all forms possible
Amount of capital:	Suited for all amounts, most suited to whole projects
Involvement of community	none, but governments high, Risk government

2.3 ADDITIONAL FINANCIAL SUPPORT INSTRUMENTS

Guarantee schemes

Important additional financial instruments that are very effective in realizing funding and reducing risks are guarantee schemes. In a loan guarantee scheme a guarantor gives a guarantee to investors that in case of default, the loan the investors have given to a third party (in this case the geothermal project or company) will be (partly) repaid by the guarantor. The guarantor can be for example the European Union, the national government, an insurance company or an NGO.

Usually a guarantee covers a certain percentage of the principal amount that has been lent but will not be paid back (called the default). It does not cover any interest payments that have been missed.

Guarantee schemes significantly reduce the risk for investors as their potential loss is limited to only part of the amount they have lent out. It makes it possible to attract more funding from investors. In case of investment by community investors a guarantee is especially attractive as community investors usually do not have the means to diversify their investments to reduce the overall risk like large investors can. The risks of losing the money are significantly reduced.

Governments usually work with a general guarantee scheme for certain types of loans. Per loan the party handling the loan (a financial intermediary or platform, or sometimes the project or company itself) has to apply for the guarantee. The guarantor then screens the loan and its conditions to see if the loan can be accepted under the guarantee.

Usually a premium is charged, calculated as a percentage of the whole amount of the loan covered by the guarantee. Usually the cost of this admittance fee is passed on to the borrowing party, so they pay the additional cost for the guarantee. In some cases, the interest asked by investors will be lowered in case of a guarantee, as the risk of the investment is reduced by the guarantee. This means the overall cost for the borrower does not necessarily have to end up higher because a guarantee is used.

Some guarantees at European level are created to stimulate a certain kind of projects or the financing of vulnerable groups (like small companies). In these cases, the guarantee comes without an admittance fee, which makes them even more attractive to use.

Decentralized Finance and Smart contracts

Decentralized Finance (deFi) is an ecosystem of financial applications that are built on blockchain networks. For example, the bitcoin market. It is an open sourced, transparent financial system that is accessible to everyone without central regulators. Users keep complete control over their assets and communicate through decentralized peer-to-peer applications (so called dApps). Peer to peer here means that the transactions are just concluded between the (usually two) parties involved and no one else is part of it. In the DeFi ecosystem smart contracts can be made between parties.

A smart contract has the terms of the agreement between buyer and seller directly written into lines of code. The self-executing means that, if certain conditions are met the contract will start the necessary transactions independently. Transactions are trackable and irreversible.

Smart contracts permit trusted transactions and agreements to be carried out among disparate, anonymous parties without the need for a central authority, legal system, or external enforcement mechanism¹¹.

Because of this decentralized and irreversible system, smart contracts could enable sustainable energy projects to raise money from a large group of investors without using a bank or another platform.

Smart contracts also give the possibility to raise money provisionally. This means that the money can be safely invested but will only be made available to the project if certain conditions are met, for example, if all the necessary permits have been given. If the necessary conditions are not met, the money will automatically be returned to the investors.

In Deliverable 2.1 an example was described of Thuga and Badenova in Germany (page 16) in which 30 million euros had been invested but the buy of shares in the company turned out not to be possible. The money had to be returned to the investors but with a 10% loss. If smart contracts had been used in this example the money could have been returned automatically through the smart contract. This would probably have reduced the loss as incurred costs would have been less.

Fiscal instruments

A last support instrument that should be mentioned is the introduction of tax measures. If a government wants to promote the development of geothermal projects, certain tax measures could be introduced, for example, a tax relief for investments into geothermal projects.

A good example of tax relief for risk-sharing investments are the Enterprise Investment Scheme (EIS) and Seed Enterprise Investment Scheme (SEIS) tax regimes in the UK¹². EIS and SEIS are investment schemes designed to encourage investment in small or medium sized companies. They do this by offering tax reliefs to individual investors who buy new shares in a company. Both regimes give companies the possibility to offer equity investors a tax reduction of 30-50 % for investments made. On top of that future earnings are tax free and incurred losses are tax deductible.

¹¹ <https://www.investopedia.com/terms/s/smart-contracts.asp>

¹² <https://www.whatinvestments.co.uk/eis-and-seis-tax-breaks-explained-2381293/>

CHAPTER 3 WHICH NEW FINANCE SCHEMES MATCH WHICH CASE STUDY COUNTRY

The new finance schemes described in Chapter 2 give an overview of a whole range of new possibilities to use in the financing of geothermal projects. They give possibilities to increase the involvement of community investors and reduce the risk for these investors who are usually more vulnerable than larger investors.

Because one of the aims of promoting community funding in geothermal projects is to increase the acceptance of and commitment towards the project by the community, it is important to look at the risks for community investors to prevent too many negative experiences. Deliverables 3.2 and 3.3 have provided a comprehensive review and inventory of potential alternative finance risks and mitigation measures.

Too much loss of community investments could decrease community acceptance and commitment instead of increasing it. This is one of the main reasons to look carefully at all the circumstances of a specific project, like the project phase, the phase-related risk, the regulatory framework, the other financiers involved, the financial position of the project overall, and government support, before choosing a certain finance method to involve community investors.

One of the first factors to consider when choosing, is the regulatory framework in the country in which the project is situated. The regulatory framework determines if a certain finance scheme is allowed and applicable in a certain country. Regulation concerning ownership structures, energy and financial laws are the most important parts of the regulatory framework. More information on these frameworks for the three case study countries can be found in Deliverable 2.2.

As the regulatory framework is a core issue, this chapter will combine the information on the regulatory framework of Deliverable 2.2 with the described finance schemes from this report in Chapter 2, to give an overview which of these new schemes would actually work in which case study country.

Table 3.1 starts with a short overview of the main relevant factors in the three case study countries. Table 3.2 then combines the case study countries with the possible new finance schemes.

3.1 Main characteristics regulatory framework per case study country¹³

Case study country/ main characteristic	Hungary	Iceland	Spain
Structure of the Energy market	Municipalities are responsible for energy distribution. Most energy companies are state owned.	Production and distribution both state-owned and private, rurally there is a large role for the municipality.	Distribuidoras (private companies) are responsible for the distribution of electricity, and Comercializadoras (private companies), who are responsible for selling electricity to customers.
Pricing	Fixed by the state at a level not necessarily reflecting costs.	Price paid depends on size of user.	Partly regulated (consumers) partly free prices.
Other	No incentive for energy companies to invest in geothermal energy. No individual investment strategy for investment companies.	Icelandic energy fund to fund renewable energy projects.	Promoting self-generation by groups of consumers and self-consumption of sustainable energy.
Financial market	To operate, a crowdfunding platform has to register as full financial institution.	No specific crowdfunding regulation. Happens informally.	Crowdfunding possible/ lending not exclusively allowed to credit institutions.

3.2 Which finance scheme works for community funding purposes in which case study country?

Finance scheme	Hungary	Iceland	Spain
Crowdfunding loan	No crowdfunding possible without full Mifid 2 license (changes per nov 2021)	Yes	Yes
Equity crowdfunding	Not crowdfunding possible without full Mifid-2 license	Yes	Yes
Reward-based crowdfunding	No crowdfunding possible without full	Yes , but difficult as price	Yes

¹³ Based on content described in deliverable 2.2. the regulatory framework

	Mifid 2 license, and energy price is fixed	is fixed for smaller users	
Direct lending	Yes but also license needed	Yes	Yes
Crowdfunding social impact bonds	No crowdfunding possible without full banking license	Yes	Yes
Leasing	Yes but no incentive for energy companies to be involved	Yes	Yes
Match funding	Yes but no government funds	Yes but at the moment no money for new geothermal grants.	Yes
Reward based funding	Yes	Yes	Yes
Donations	Yes	Yes	Yes
Steward ownership	Yes, but new legal model may be needed	Yes, but new legal model may be needed	Yes, but new legal model may be needed
Revenue based financing	Yes but not with the crowd	Yes	Yes
Guarantee schemes	Yes	Yes	Yes
DeFi and smart contracts	Yes but probably not with the crowd	Yes	Yes
Pay it forward between member states	Yes but system would have to be developed	Yes but system would have to be developed	Yes but system would have to be developed

As can be seen in table 3.2 the regulatory framework has a large influence on the number of new finance schemes that can be used in a certain country. Spain has all the possibilities, while the possibilities in Hungary are rather limited.

After the possibilities within the regulatory framework have been determined, the next step is to look at the other characteristics around a certain project. For example, the amount of finance needed, the wishes and characteristics of the community and the supporting government instruments available.

In this way the best matching form of finance can be determined to involve the community.

CHAPTER 4 HOW DO OTHER MEMBER STATES RELATE TO THE CASE STUDY MODELS?

As part of the Crowothermal project geothermal experts and organizations (Linked Third Parties or LTP's) from different member states have filled in a questionnaire about the basics of the regulatory framework in their country. In this chapter we compare the given information to the regulatory framework in the three case study countries so interested parties in these countries can see which case study country is closest to their own situation. Using table 3.2 they can see which new finance schemes could be interesting for geothermal projects their country.

In 4.1 we classify the information given by the LTP's in the questionnaire. Based on this we can determine which case study country they are closest to. The case study countries will be referred to in the table as H for Hungary, I for Iceland and S for Spain. By looking at table 3.2 member states can compare themselves to the case study countries and then determine which new finance schemes could be considered. In the next phase of the project when we test finance schemes, table 4.1 can be used to determine what we can learn from case studies for other countries. Or what we can learn from projects that may be included from other countries.

4.1 REGULATORY BASICS PER COUNTRY

LTP state	Structure of energy market	Pricing/other	Financial market structure	Closest to
Slovenia	Little financial support for investment into geothermal energy.	Prices not regulated, except for heat.	European legislation,	I
Bulgaria	No incentives for self-generating of energy but it is possible, private companies can be suppliers	Prices are regulated	European legislation no hindrance to raising funds	H/I
Greece	Incomplete regulatory framework licencing and tender procedures Public and private ownership possible of infrastructure and supply combined. Not of the grid. For geothermal energy no development at all during the past decades, due to technical problems and defective licensing	Prices regulated but discount possible for larger users.	Limitations for crowdfunding maximum amount 500.000 per investment and 5000 per investor. Crowdfunding not wel developed.	H

	procedures, but mainly because of the negative reactions of the local communities.			
Italy	Privatized market for energy supply.	Prices not regulated.	Tax incentives for investments into energy.	S
Romania	Private ownership possible, incentives for own producing and cooperatives.	Prices regulated.	European regulation no obstacles.	S
Portugal	Suppliers of energy can be private companies or cooperatives. But grid and supply can be owned by one company. Own use and feed in is possible. Tax incentives for own use exist.	Prices are set by traders.	Specific crowdfunding legislation, limiting amount invested per transaction and in total per year.	S
Belgium	Private ownership possible for production not for a geothermal site. Incentives for private generation of energy.	Prices regulated but variance possible.	Crowdfunding possible.	S but no ownership of community of geothermal site possible.
Luxembourg	Private ownership of supply is possible. Feed-in tariffs exist.	Prices are market based.	No hindering regulation.	S
Croatia	Feed in structure and tariff was unclear. Ownership possible by all legal entities.	Prices regulated.	Instable regulatory framework, large legal costs.	H
Estonia	Ownership possible by all legal entities. Private and public. No feed in tariffs or incentives, or legislation for cooperatives owning energy production or distribution.	Prices not regulated.	No specific crowdfunding regulation.	S, but without feed - in possibilities. and funding schemes
Germany	Grid and distribution ownership split, geothermal owned mainly by municipalities. Feed in tariffs exist.	Partially regulated but different prices possible.	No legal hindrances to crowdfunding but has to be done by a financial service provider.	S
Poland	Both private and public companies possible. Both grid and distribution can be owned by one company. Fed in tariffs exist.	Prices are regulated.	capital market regulations and administrative barriers, primarily with respect to	S but with regulated prices.

			public money gathering, are limiting the development of Crowdfunding in Poland,	
Serbia	Market driven process. Both public and private companies for distribution. Ownership of grid and distribution by one party not possible. There is a feed-in tariff for energy production from RES. Besides feed-in tariffs, there are other Financing schemes for developing res projects Geothermal energy exploration/exploitation can be performed by a company and/or another legal entity and entrepreneurs.	Prices are regulated.	No hindrances to crowdfunding.	S but with regulated prices.
Turkey	Private Electricity companies and self-supply are possibilities for electricity supply in Turkey. The distribution of the electricity is being distributed in 21 different districts. Turkey has "Distributors" who are responsible for the distribution of electricity, and "Suppliers" who are responsible for selling electricity to customer. Ownership of grid and supply by one company is not possible. Self supply is also possible. Private landowners and companies can develop and exploit geothermal energy projects.	Prices are regulated	No obstacles for crowdfunding	I
Ukraine	Ownership possible by all legal entities. Use of alternative energy sources defined by special law.	Prices regulated but special green tariffs apply	No hindrance for crowdfunding in energy market	S but with special green tariffs

	Ownership of grid and distribution split.	including special possibilities for consumer cooperatives		
Czechoslovakia	The government owned company, privately owned companies or cooperatives, etc. are allowed to offer energy to the public in the Czech Republic, either as supplier or owner of the infrastructure. Feed in tariffs exist.	Prices regulated for consumers and retail but not for big users	No hindrance for crowdfunding in energy market	I

4.2 PRACTICAL TESTING OF POSSIBLE MODELS

As part of the research in 2.2 and 2.3 the Altfinator hubs and EFG third parties have been contacted to identify the regulatory framework and possible opportunities in geothermal projects where the new finance models that would be described in this report could be tested and implemented.

Now the possible models have been determined in this report we will try to find suitable geothermal initiatives to test a selection of the described models. Other possibilities in sustainable energy will be identified in case not enough geothermal projects are available.

The first three are of course the Crowdthermal case studies. The aim is to adjust possible mechanisms so that they will also be compatible with a the blockchain model for energy payment based on tradeable Smart Energy Contracts.

The new models will be tested and implemented in close collaboration with existing crowdfunding platforms in the countries covered by the EFG Third Party Network and the Altfinator Hubs. The guarantee schemes, match-funding from governments or other additional financial instruments will be co-created with the existing financial infrastructure of these countries working closely with national stakeholders, geothermal experts and financiers.