



Possible schemes and barriers for joint activities

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Table of Contents

Executive summary	5
Overview of WP4: Development of joint activities	6
1. Introduction	7
2. Existing Schemes for Joint activities	9
3. Possible Barriers for Joint Activities	11
3.1 National funding rules/laws	11
3.2 National funding ways	11
3.3 Distribution/Handling of funding	12
3.4 Lack of existing cooperation	12
3.5 National status on the way to 2020/2050 goals	12
3.6 Politics	13
3.7 Funding budget	13
3.8 Private Investment	13
4. POSSIBLE SCHEMES FOR JOINT ACTIVITIES	15
4.1 NWW– New Ways of Working	16
4.2 Knowledge exchange	17
4.3 Implementation of a „European Geothermal Information Platform“	18
4.4 Industrial Initiatives	19
4.5 Test sites/laboratory	19
5. Conclusion	21
6. References	22
7. APPENDIX A	24

List of Tables

Table 1 Overview of specific calls in the Horizon 2020 programme with geothermal related subtopics in 2015.	10
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List of Figures

Figure 1 Examples for existing cooperation instruments on different levels	9
Figure 2 Main barriers for the development of joint activities.	11
Figure 3 Possible schemes for the development of joint activities.	16
Figure 4 Proposed schemes for joint activities on different levels regarding to the classification given in D2.5 (see appendix).	20

Abstract

This report gives an overview of possible ways for the realization of transnational cooperation in the geothermal energy sector. Respecting the existing cooperation programmes, five thematic clusters were identified in the consortium, which are capable to host joint activities between the participating countries. Regarding to the existing barriers for transnational cooperation, a bottom-up approach is proposed, starting with actions which require a straightforward budget and a manageable effort on human-resources. Based on the results of work package 2 the presented schemes will be closer defined in the following report.

Executive summary

In 2012, the Geothermal ERA-NET started with the aim to foster the further development of geothermal Energy in Europe. Representatives from the Azores, Iceland, Italy, France, Germany, Hungary, the Netherlands, the Republic of Slovenia, the Slovak Republic, Switzerland and Turkey are working together in seven work packages to reach this goal.

One instrument to support the European-wide development of geothermal energy is transnational cooperation.

Within the Work Package 4, one task is the identification of schemes for the implementation of joint activities to support this cooperation. To identify realizable joint activities, several barriers for transnational cooperation have to be taken into account. Besides the different administrative handling of research funding in the participating countries, the lack of existing cooperation's and the political support are existing barriers for the implementation of joint activities. The main barrier, directly related to the political support, is the acquisition of an adequate funding budget for cooperation instruments. The existing barriers were analysed and therefore a bottom-up approach for the implementation of joint activities is proposed. Starting with first actions in the framework of the Geothermal-ERA Net, several multinational working groups will be established which can be the base for further activities. These working groups will cover the following topical fields/clusters:

- NWW – New Ways of Working for national funding institutions/agencies
- Knowledge exchange groups on technical and non-technical barriers and RD&D topics
- Working Group on a European Geothermal Information Platform - „EGIP“
- Industrial Initiatives
- Test sites/laboratories

The successful implementation of these first actions with a small financial budget and a small effort on human resources can help to communicate the benefit of multinational cooperation. The next step is to define the structure of the proposed actions and determine the topics for each individual action. This will be done based on the results of work package 2-WP2- and will be part of the next report.

Overview of WP4: Development of joint activities

The Geothermal ERA-NET is an instrument to deepen the cooperation of national funding institutions with a focus on the utilization of geothermal energy. Within the Geothermal ERA-NET, the Work Package 4 will propose joint activities which can foster the transnational cooperation of different groups of stakeholders in the participating countries to support the development of geothermal energy in Europe. Therefore the objectives of Work Package 4 “Development of joint activities” are:

- The identification of joint activities
- The definition of possible schemes and barriers for the joint activities
- The preparation of an action plan for the implementation of joint activities in Work Package 7, ‘Implementation of joint activities’.

Based on the work package description, the work to achieve these goals will include:

Task 4.1. Identification of joint activities

Based on the results from WP2, WP3 and WP5, topics of common interest will be identified for the execution of joint activities. The relevant topics will be identified within existing national research programmes, by statements of policy makers, researchers and stakeholders in the geothermal energy area.

Task 4.2. Definition of possible schemes and barriers for joint activities

Due to the different structures and topics of the national research programmes, common objectives and interests will be defined between the ERA-NET partners. Workshops will be held to collect additional information about priorities, interests and gaps in research by workshop participants. Barriers for transnational co-operation will be identified and solutions will be developed and implemented. A common funding procedure will be developed and agreed between the participants in case of a joint call.

Task 4.3. Preparing an action plan for the implementation of joint activities

A working group will prepare an action plan to establish procedures for joint activities. National programme owners and their funding agencies will establish the necessary commitment at national levels. They will be supported by the High Level Policy and Implementation Committee.

1. Introduction

As stated in the proposal of the Geothermal ERA-NET, the objectives are according to the 7th Framework programme:

- Complete the preliminary work required to create a European Geothermal Database with the purpose of sharing information on legal and regulatory aspects, policies, measures, institutions, research projects and data.
- Exchange information on the status of geothermal energy, including national support schemes and RD&D activities and identification of gaps.
- Recommend measures to strengthen European geothermal development in order to meet short-term targets according to National Renewable Energy Action Plans and future contributions to renewable energy supply.
- Foster synergies at regional and pan-European level by mobilizing competitive and non-competitive funds for research in a more coordinated way through joint activities.
- Achieve a critical mass to address cross-thematic research targets, thus enhancing cooperation and avoiding fragmentation.
- Define possible schemes and barriers for the joint activities and recommend practical solutions.
- Prepare and execute transnational funding activities, required agreements on themes of the planned projects and on all implementation and administrative issues concerned.
- Increase transnational collaboration in research training and mobility in geothermal research, improving human capacity building, by sharing of best practices, gap analysis and improve science development and collaboration.
- Gain a clear understanding of the principal stakeholders for a successful, Europe-wide coordination of publicly funded, national research, development, deployment and innovation programmes.
- Communicate with principal stakeholders and enhance public awareness toward the values and benefits of geothermal scientific and policy issues.
- Prepare the ground for the future formulation of a common European action plan for geothermal energy technology research, development, deployment and innovation programme

On the way to fulfil these objectives, it is essential for the Geothermal ERA-NET to deepen European cooperation on geothermal research at national and administrative levels. Transnational collaboration in different fields is an efficient way to foster the further development of geothermal energy.

The previous work in the Geothermal ERA-NET reveals common research interests and also common RD&D needs in the participating countries (see Deliverable D2.3 & D2.4). The results from this work can be the thematic base for the development of future joint activities.

The topical assessment for future joint activities will be the second step on the realization of European cooperation. In a first step, adequate instruments have to be identified.

The results from work package 2 (D2.1) showed that geothermal energy is, at the moment, only a minor part of the energy portfolio in many ERA-NET countries. However, most countries have an ambitious agenda for the increase of the market for geothermal energy. Also instruments like Feed-in tariffs and insurance schemes are installed in many countries (D2.1). Despite of these support instruments and the national RD&D research funding programmes, geothermal energy has often a minor political priority compared to other renewable energy technologies.

With geothermal energy as a technology of minor impact within the renewable energies it is questionable to develop joint activities which require substantial changes in national funding rules or which need a large volume of financial support. However, the Geothermal ERA NET sees much scope for collaboration on joint activities, such as joint research activities and joint activities to remove barriers for further market growth. For the development of geothermal energy, a constructive way might be a bottom-up approach. Therefore it will be proposed to start with activities which require low to medium financial support and are not in conflict with national funding rules.

After the first period of the Geothermal ERA-NET one focal point emerged: Different countries have similar issues in the development of geothermal energy. Within Europe several clusters of technological levels exist, e.g. Iceland and Italy have to deal with problems that mainly exist in high enthalpy regions, whereas the Netherlands, Germany and Switzerland have to solve the problem that adequate temperatures are only reachable at large depth. These examples show that different countries can work together in solving such technical issues because they are dealing with the same topics. In a further step countries which already solved special technical issues can assist others which are just facing the problem (e.g. scaling problems in the Netherlands give an opportunity for a bilateral cooperation with German experts).

In addition to the common research fields, a survey between the participating countries reveals also common barriers for the development of geothermal energy. With future joint activities these transnational problems can be solved together. In addition these actions can also include guidance from countries which already solved similar issues.

This report presents possible schemes for the transnational cooperation and documents existing barriers for the development of joint activities.

2. Existing Schemes for Joint activities

The existing schemes for joint activities can be divided into different levels of cooperation. Figure 1 shows some examples for the cooperation at an international level, a European and transnational level and examples for binational partnerships with a focus on renewable energies.



Figure 1 Examples for existing cooperation instruments on different levels

At the moment there is cooperation activity through the IEA (International Energy Agency) Geothermal Implementing Agreement (GIA). The work within the IEA-GIA is focused on the cooperative research, analysis and information sharing concerning the sustainable development and utilization of geothermal energy. Several reports on the different subtopics can be found on the project website www.iea-gia.org. A second institution for international cooperation is the International Renewable Energy Agency (IRENA). This intergovernmental organisation serves as platform for international cooperation and supports countries in the development of renewable energy systems. An overview of the main activities can be found on the website www.irena.org.

On a European level the main instrument for transnational cooperation was in the past the EU 7th framework programme for research (which is also the base for the Geothermal ERA-NET project) and is now the Horizon 2020 programme. Table 1 shows an overview of the forthcoming calls within the Horizon 2020 programme which include subtopics that reveal possibilities for transnational projects on geothermal energy.

Within the Horizon2020 programme several other sub-programmes are focused on renewable energies and therefore also reveal possibilities for transnational geothermal projects. More information can be found on the websites of the European Commission www.ec.europa.eu. Information about funded projects within the international and continental programmes and the IEA-GIA activities can also be found in D2.5 “Actions to bridge gaps, overcome barriers and promote the use of geothermal energy in Europe”. In the framework of these programmes interest groups of the geothermal market such as EGEC (European Geothermal Energy Council) or IGA (International Geothermal Association) initiated multinational projects within the last years (etc. GEOELEC, GEODH).

Table 1 Overview of specific calls in the Horizon 2020 programme with geothermal related subtopics in 2015.

Call for competitive low-carbon energy	H2020-LCE-2015-2
Subtopic: Demonstration of renewable electricity and heating/cooling technologies	Innovation Actions
Subtopic: Market uptake of existing and emerging renewable electricity, heating and cooling technologies	Coordination and Support Actions
Subtopic: Supporting coordination of national R&D activities	Coordination and Support Actions
Energy Efficiency Research & Innovation	H2020-EE-2015-2-RIA
Subtopic: Technology for district heating and cooling	Research & Innovation Actions
Energy Efficiency - Market Uptake	H2020-EE-2015-3 MarketUptake
Subtopic: Removing market barriers to the uptake of efficient heating and cooling solutions	Coordination and Support Actions
Horizon 2020 dedicated SME Instrument - Phase 1 & 2 2015	H2020-SMEINST-1(2)-2015
Subtopic: Stimulating the innovation potential of SMEs for a low carbon energy system	SME Instrument (70%)

The transition between the international or continental research programmes and the national programmes are bi- or transnational partnerships between countries within the Geothermal ERA-NET consortium. Some of these partnerships can generate projects which are finally realized within the high level programmes but furthermore these partnerships are often focused on particular issues. Within the work package 4 these bi-/transnational programmes will be analysed for energy related topics with a focus on geothermal energy. The programmes might offer opportunities for the proposed actions from the Geothermal ERA-NET. Often the bilateral partnerships are considered in the national funding programmes, offering possibilities for the funding of transnational projects.

The existing schemes for joint activities are offering various opportunities for cooperation on a multinational level. In case of the Geothermal ERA-NET with the focus on the deployment of geothermal energy, the lower levels of the existing schemes can be the adequate starting point for the development of joint activities due to the early stage of the geothermal market in most participating countries.

3. Possible Barriers for Joint Activities

Prior to the selection of instruments for joint activities, the barriers for the development of transnational cooperation have to be identified. As described in chapter 3, the status of geothermal energy within the field of the renewable energy technologies in the participating countries entails several barriers for the development of joint activities. Some of these barriers can be overcome within the scope of the Geothermal ERA-NET, others are out of influence of the consortium. Figure 2 shows the main barriers for the development of joint activities.

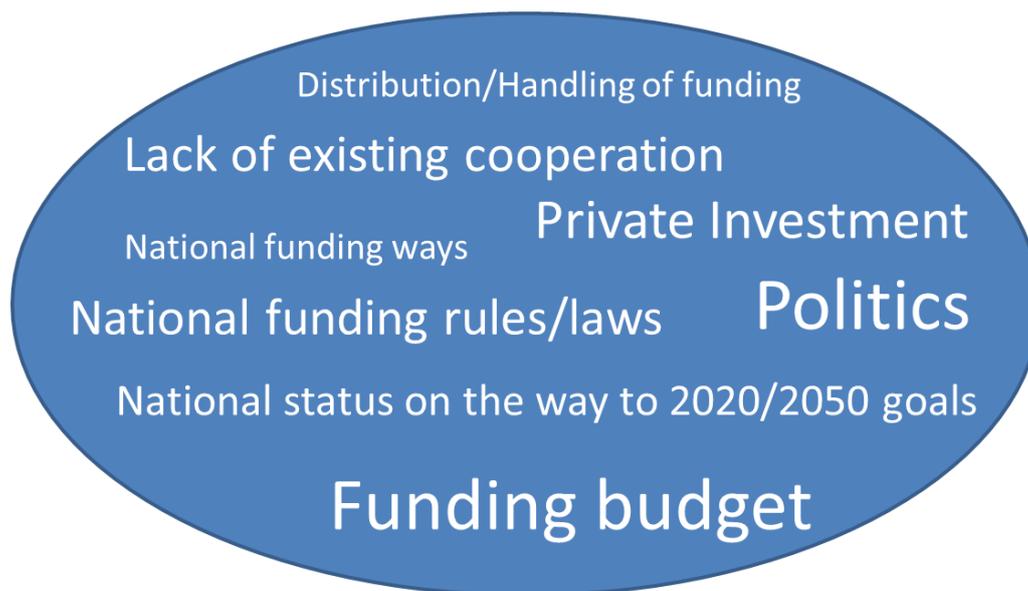


Figure 2 Main barriers for the development of joint activities.

In addition to the administrative barriers for the development of joint activities, different technical and legal barriers can be relevant for different topics which can be the content of joint activities. These barriers are mentioned in the process of the final thematic design of the proposed actions.

3.1 National funding rules/laws

The national research funding laws and rules are a heterogeneous field within the framework of the European guidelines (e.g. Treaty on the Functioning of the European Union, COMMISSION REGULATION (EU) No. 651/2014). Apart from various key aspects for the national support of renewable energies, the different countries have different approaches for the handling of funding for e.g. research institutes, universities, industry and SMEs. This heterogeneity can be a barrier for the development of joint activities, but a barrier which can be overcome. The European guidelines and laws can be the base also for transnational funding outside the programmes of the European Commission.

3.2 National funding ways

In addition to the differences in national funding laws and rules, the categories of research funding are treated slightly different in the participating countries. Research funding in e.g.

Germany can be separated into institutional funding (e.g. research institutions), project based funding, indirect funding (e.g. special loans for energy related projects) etc. A combination of the different types is often possible, but has to be reviewed for each individual case. Therefore the expansion to a transnational level can be a barrier in individual cases, but again this is not an issue which cannot be solved.

3.3 Distribution/Handling of funding

In some countries the national funding is operated by the responsible federal ministries, in others by assigned funding agencies and in some countries the funding is operated by research institutions. In the third case the combination of national interests and the individual interests of the research institution may lead to a different focus for the funding programmes than in countries with an independent funding operator. This may lead to a different targeting for joint activities, but a clear structuring of the selected joint activities can help to avoid this issue.

3.4 Lack of existing cooperation

In case of already established partnerships the implementation of joint activities is more realistic than in cases where the assigned instrument will be the first step in cooperation between two or more countries. Therefore the ERA-NET should take the existing partnerships into account when proposing the possible partners for a joint activity. When a cooperation instrument is established between countries that already cooperate, it can be the keystone for further cooperation with new countries (also beyond the individual joint activity) by including them at a later stage of the joint activity. In summary, the lack of established cooperation between individual countries can be at first a barrier for the joint activities but may be, at a later stage more an opportunity.

3.5 National status on the way to 2020/2050 goals

The status on the way to the national goals for climate protection and development of renewable energies may influence the political support for joint activities which aim on geothermal energy. The status of geothermal energy in the national action plans may vary due to the need on fast results on the way to the goals for 2020. In this point, the technical barriers can influence the political barriers. The development of a deep geothermal installation in many countries requires between 2-8 years until the start of operation. Therefore geothermal energy is not capable to provide fast changes in the national energy portfolio. Geothermal energy is more a mid-to-long term solution for the energy supply and energy efficiency for most countries. However some countries have a faster project realization time-span and projects which are already under development may be realized in the near future. Moreover, countries having geothermal resources at relatively shallow depth may develop projects in a shorter time-span. Therefore dependent on the specific countries, geothermal energy, especially geothermal heat, is also a short-term solution.

3.6 Politics

Besides the influence of the goals for 2020/2050 on the political support in every country, geothermal energy in general has to be kept on the political agenda. For a further development of geothermal energy the technology has to be a constant part of the national action plans for the development of renewable energies in the participating countries. Therefore the necessity of support for geothermal energy has to be communicated to the political decision makers continuously. Without the political support in the participating countries, the implementation of valuable joint activities is unrealistic.

3.7 Funding budget

The political preference on geothermal energy directly influences the main barrier for the realization of joint activities, the funding budget. At the moment, in many countries geothermal energy is not capable to provide a significant amount of renewable energy to the national energy supply. Regardless the ubiquitous potential of geothermal energy the way to the status of an established, emancipated renewable energy is long and requires significant financial support. To gain the attention of politics and economy, a successful pilot project with a smooth development process without significant problems is needed. The character of this pilot project may vary in the participating countries. While an EGS-demonstration project (“Enhanced Geothermal System”) may be on the agenda of many countries, an unconventional-geothermal system pilot project or a multi-MW high-enthalpy plant is of main importance for a few countries. Besides a large-scale pilot project, the smooth realization of a significant number of conventional (hydrothermal) projects can help to get geothermal energy on the agenda. This can show that geothermal heat can play a significant role in heating Europe’s cities, providing Europe’s food (greenhouse heating) and can provide industrial heat supply for various processes. A European-wide expert knowledge exchange within the ERA-NET can support the realization of flagship-projects and the increased development of heat projects by using the synergy effects in solving issues within and for all participating countries. This is also the main idea behind the bottom-up approach for the development of joint activities. If a successful cooperation can be shown with low-to-medium financial funds and a manageable amount of human-resources, the argumentation base for more complex future joint activities will be enhanced.

3.8 Private Investment

The above mentioned barriers and the high upfront investment needed for the development of geothermal energy installations lead to a lack of private investments in the geothermal energy sector. As stated before by the RHC-Platform (2014) for renewable heating and cooling installations in general, geothermal energy has to turn into a profitable investment opportunity to acquire money from private investors. Once established geothermal energy has low running costs but needs a high upfront investment in a phase with significant risks for the final realization of a project. Besides RD&D approaches to reduce the exploration risk for geothermal installations and actions to reduce regulatory barriers, financial instruments are necessary to provide a stable investment environment for private financiers. These instruments for risk mitigation have to be developed country-specific in close coordination of

political and financial stakeholders and representatives from the geothermal industry. The current reluctance of private investors on some European markets decelerates the development of geothermal energy by the deceleration of individual projects. This leads directly to a reduced impact of geothermal energy in the field of the renewables and is therefore a barrier which has to be addressed. The Geothermal ERA-NET can help to overcome this barrier by providing a discussion platform for these stakeholders

4. POSSIBLE SCHEMES FOR JOINT ACTIVITIES

As already mentioned, geothermal energy is not the most supported technology in the field of renewable energies within the participating countries. In addition many of the national geothermal markets and the research communities are in an early stage of development. Therefore we propose a bottom-up approach for the development of joint activities within the Geothermal ERA-NET.

For the development of possible large-scale transnational projects in the framework of the international or continental funding schemes, mentioned in chapter 4, the knowledge exchange between the European countries has to be enhanced. Therefore a bottom-up approach for the development of joint activities is most constructive. A first level of joint activities with a minor effort on human resources and financial support could present the effectiveness of transnational cooperation and smooth the way for more complex future joint activities.

In the past, many national research communities were focused on solving issues within the own country borders, not knowing that in some cases other countries in Europe had to deal with the same problems or already solved these problems before. The results from work package 2 revealed lots of topics which are relevant for different countries in the consortium and maybe are also in focus in other European countries. This knowledge and experience transfer now has to be brought from the Geothermal ERA-NET to the local geothermal communities. The aim of this report is to propose instruments to enable this process.

During the 6th ERA-NET meeting in Gstaad, Switzerland ideas for joint activities were collected for different target groups within the countries. The collected activities can be divided into actions aiming on national funding authorities, the research communities and the national geothermal industries. Figure 3 shows the results from the Gstaad brainstorming session.

Besides the instruments for joint activities, also topics were identified which can be investigated within the framework of the initiated cooperation. In combination with the results of work package 2, detailed joint actions on specific topics will be formulated in the next report of Work Package 4.

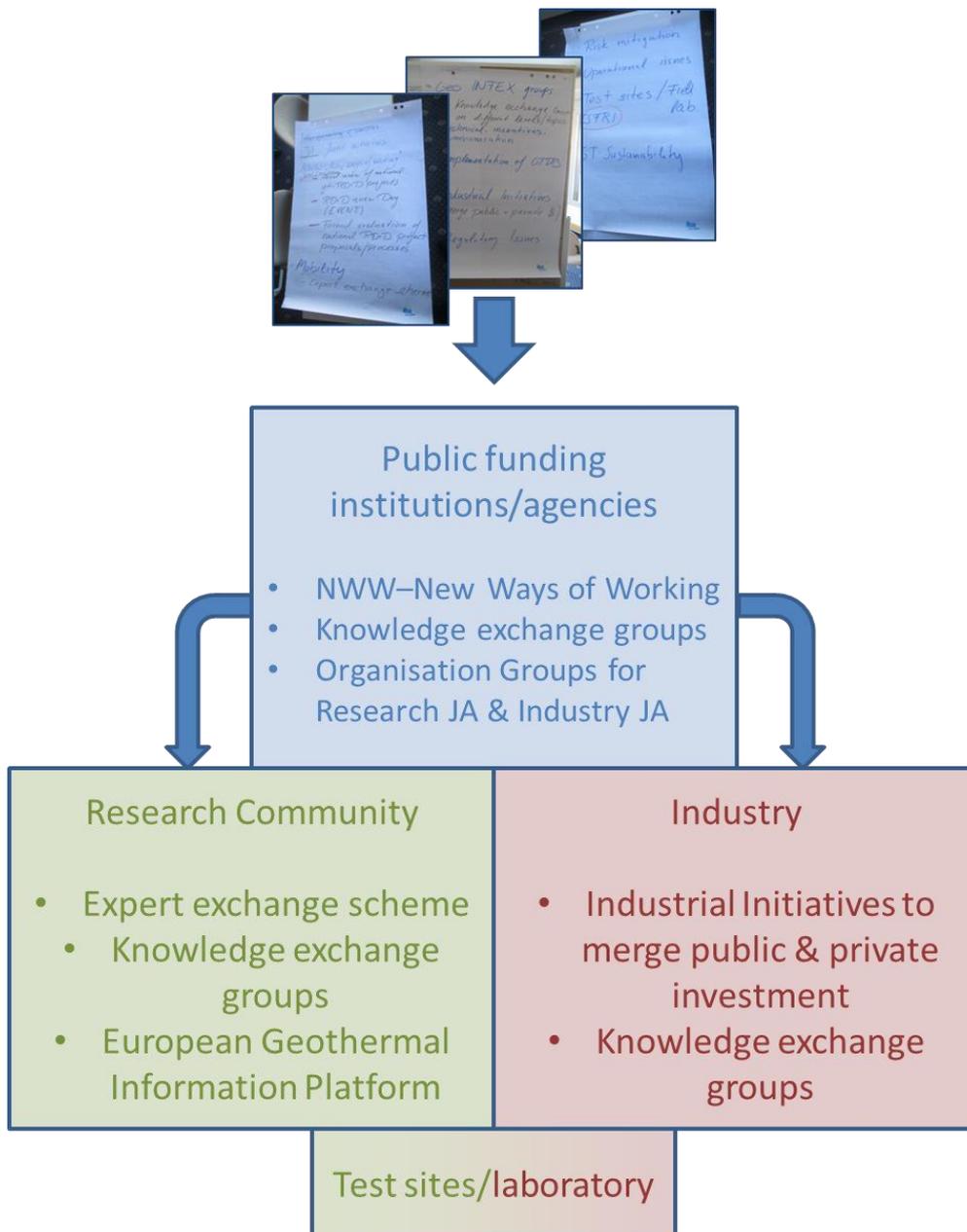


Figure 3 Possible schemes for the development of joint activities.

4.1 NWW– New Ways of Working

The thematic cluster “New ways of working” is focused on the cooperation between the European funding institutions. Ideas in this thematic field are:

1. Joint European annual review of national geothermal RD&D projects.
2. RD&D review day (Event).
3. Formal evaluation of national RD&D project proposals and/or national review processes.

From the barriers mentioned in chapter 5 mostly the barriers “National funding rules/laws”, “National funding ways” and “Distribution/Handling of funding” will affect possible actions in this cluster. The above mentioned proposed actions 1 and 2 are, most probably the second step in a cooperation between the national funding agencies. Before a joint review of national projects can be realized,

knowledge about the national funding processes has to be exchanged. We propose a working group for the organization of a first workshop on the exchange about the national funding processes from the research proposal over the review process to the final funding decision. This can be the initial base for further knowledge exchange about issues in funding operation which can be discussed on additional workshops. At a later stage a joint review can be realized but with a focus on quality management for the participating countries. The national funding agencies are also the target group to work on the results for nontechnical barriers from work package 2. The first actions would correspond to category JA1 “Information Exchange/Knowledge exchange groups” from D2.5 but can be expanded to actions in the JA2 category “Joint work/review” (see appendix A for the explanation of categories from D2.5 “Actions to bridge gaps, overcome barriers and promote the use of geothermal energy in Europe”).

Proposed actions:

- Working Group: “Operation and Steering of research funding”
 - Task: Organization of knowledge exchange between the European national funding agencies, Propose instruments for a European Joint review of national RD&D projects. Data collection of already funded research projects in the participating countries.
 - Possible Instruments: Working Group meetings, Workshops, Events

4.2 Knowledge exchange

The results from work package 2 revealed that the knowledge about RD&D needs and possible barriers and opportunities for the development of geothermal energy outside the own country borders is insufficient. Therefore it is necessary to spread this knowledge between the different public funding institutions/agencies as a starting action and also between the research communities and the national geothermal industries. In many European countries, the geothermal market is not on a stage where a competition between the countries exists. A transnational knowledge exchange can provide additional benefit for the development by bundling search attempts on issues which are important in several countries. Based on the clustering of work package 2 several working groups can be established to identify experts in all countries, organize a platform for the knowledge exchange and connect the target groups cross-border. Due to the fact, that these joint actions will need only a minor financial effort, there should be no barriers for the realization of the transnational knowledge exchange. This action will also connect researchers and members of the geothermal industry. This can be the base for the realization of possible large scale research projects within the European programmes. Besides a knowledge exchange on RD&D topics, regulatory aspects and financial support schemes have to be addressed. Therefore the instrument of an organized knowledge exchange reveals the largest potential for joint activities of the described schemes. The selection of appropriate topics for a transnational knowledge exchange based on the results of work package 2 will be part of the next report on the defined actions. Corresponding to D2.5 the proposed actions are part of category JA1 “Information Exchange/Knowledge exchange groups”. Together with the above stated knowledge exchange on funding issues and common barriers, these working groups can cover a large part of the existing issues for geothermal energy.

Proposed actions:

- Working Groups: “RD&D Knowledge exchange” (est. 6, one for each thematic cluster from WP2)
 - Task: Proposal of instruments for a knowledge exchange in each thematic cluster and organization of a sustainable knowledge transfer.
 - Possible Instruments: Networking Meetings, Workshops, New Media Platforms.
- Working Groups: “Regulatory framework and Economics” (est. 1-3, addressing the non-technical clusters of WP2)
 - Task: Proposal of instruments for a knowledge exchange for the evaluation of the national regulatory frameworks, financial support schemes and instruments for investment risk mitigation.
 - Possible Instruments: Roundtables, Working Groups to propose county-specific instruments.

4.3 Implementation of a „European Geothermal Information Platform“

One topic of the Geothermal ERA-NET was the preliminary work for the implementation of an EU Geothermal Platform. This work was done in the work package 3 “Towards an EU Geothermal Platform”. Within the work package, the state-of-the-art and the needs in regarding geothermal information and existing tools to manage it, were analysed (D3.1). In addition, a feasibility study for the realization of a “European Geothermal Information Platform - EGIP” was carried out (D3.2). Part of this study was the partial implementation of an EGIP-Pilot application. In a further step, a final analysis of the boundary conditions for the complete implementation of an information platform will be made, including the evaluation of possible joint calls for the realization of the project. The main barriers for the realization of the project as a joint activity will be the “Politics” and the “Funding Budget”. Regarding underground data, most countries in Europe have implemented national databases and are not seeing any necessity for the realization of a European wide database, although most countries realize that the different data formats used does not allow combining the available underground information at the moment. Therefore it will be difficult to argument for the financial support for a joint call on a European database uniquely based on national funds. At the moment the component of knowledge exchange as additional benefit is not clearly visible as part of EGIP, although it has been partially described in D3.2. However, the pilot study on EGIP was the first joint activity realized within the Geothermal ERA-NET with the participation of France, Italy, Hungary and Slovenia. Although the implementation of the EGIP via a joint call within the Geothermal ERA-NET is probably not the most realizable joint action, due to the described issues, it should be taken into consideration. The final realization corresponds to the category JA3 from D2.5, but to estimate the chances for realization for such large-scale action it is straightforward to implement a category JA1 working group in advance. Therefore the proposed actions are:

Proposed actions:

- Finalization of the work of WP 3 with the definition of the boundary conditions for the technical realization of the EGIP.
- Define the key factors for the realization with a joint call.

4.4 Industrial Initiatives

As described before, a knowledge exchange between the research communities and the national geothermal industries can sensitize the different stakeholders for European-wide issues which are related to the development of geothermal energy. This can also offer opportunities for industry-driven initiatives, to merge public and private investments. Due to the status of the geothermal market development in Europe, cooperation between the national industry stakeholders can be more useful than adding additional barriers to the market by forming an artificial competitive situation. In e.g. Germany collaboration in the national geothermal community (Project developers, project owners, exploration companies etc.) is quite common to realize projects timely and economically (for mutual benefit). The main goal for the realization of industrial initiatives is to define joint efforts and joint needs. This can help to reduce costs, not only by working together on the joint issues, also by communicating joint demands during contracting processes with global industry companies (e.g. drilling companies). However the initiation and support of industrial initiatives (JA2) may be the second step after the establishment of a European-wide knowledge exchange (JA1).

Proposed actions:

- Working group: "Industrial Initiatives"
 - Task: Based on the results of the working groups on "Knowledge Exchange" possible topics for industrial initiatives can be identified. With the results from the stakeholder analysis of work package 5, the target groups for possible initiatives can be defined.
 - Possible Instruments: Invited meetings with relevant stakeholders on different topics.

4.5 Test sites/laboratory

Test sites or field laboratories (e.g. joint drilling test site, corrosion test site for materials used in geothermal plants etc.) can be a useful establishment for both the geothermal industry and the research community. Both kinds of facilities need a significant amount of funding and an administrative background for the operation. Because of the impact of such a facility, organisational issues have to be addressed in advance and a detailed concept has to be set up. For the realization of large-scale European-wide test sites (JA3) the political support is mandatory. Therefore a joint activity (JA1) on this topic can only have a preliminary character.

Proposed actions:

- Working Group: "Test sites/Field laboratory"
 - Task: Identify possible concepts for European-wide test-facilities. Identify the possible target groups for the different concepts. Propose realization ways for the concepts.

Figure 4 summarizes the proposed schemes for the development of joint activities and sorts them into different levels. The levels can be seen as a time-scale for the realization but also as levels of financial and organisational effort.

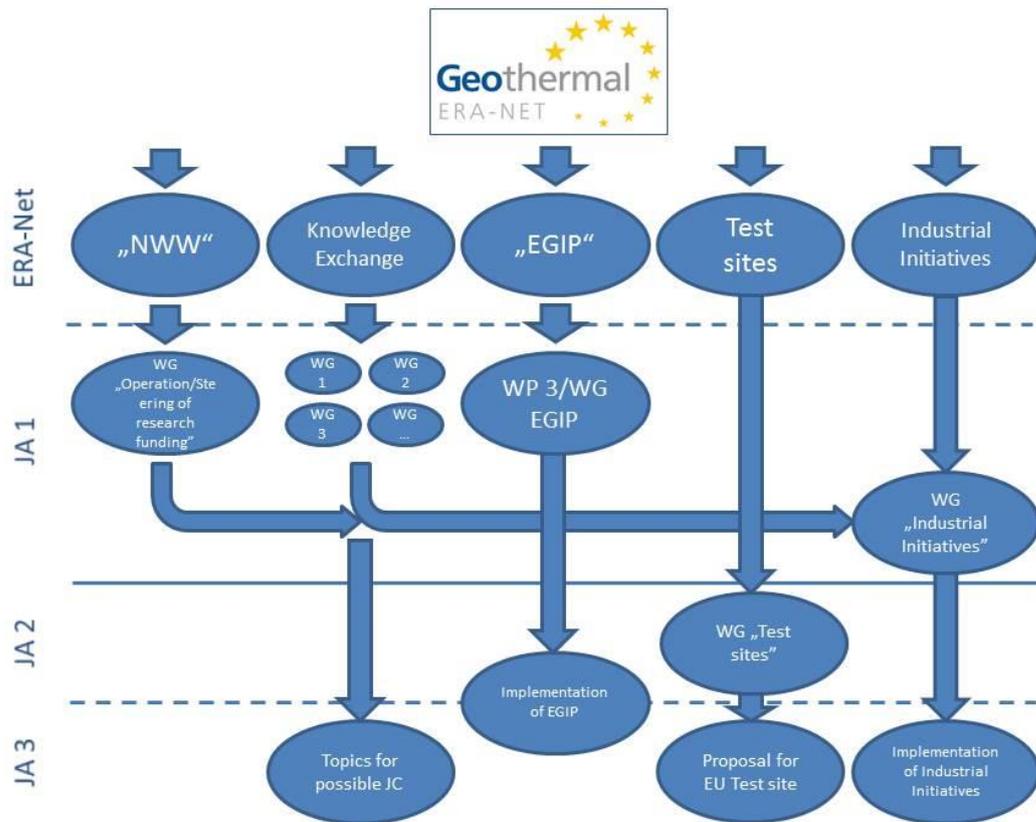


Figure 4 Proposed schemes for joint activities on different levels regarding to the classification given in D2.5 (see appendix).

5. Conclusion

With a look at the ubiquitous potential of geothermal energy in Europe the recent level of the technical development of this energy resource in many countries is manifold. While in some countries the use of geothermal energy is a standard technology, other countries are at the beginning of the development process. This leads to a multiple research effort in different countries at the same time or on topics which are already processed elsewhere. A reason for this might be the lack of transnational knowledge exchange between the different countries. The national funding institutions of the Azores, Iceland, Italy, France, Germany, Hungary, the Netherlands, the Republic of Slovenia, the Slovak Republic, Switzerland and Turkey found a way for cooperation within the Geothermal ERA-NET. Besides the international research activities funded by European or other international funds, the local research communities often are focused on working within the borders of their home countries, often due to the rules of the national funding programmes. Moreover, there is not yet an established way to share knowledge on other topics, such as reporting codes, risk mitigation, regulatory aspects or financial issues. Here the national stakeholders have to be sensitized for a more European way of researching. It has to be communicated, that different countries are dealing with the same technical and non-technical issues. This transnational knowledge will help to remove barriers in the development of geothermal energy more efficiently. In parallel the politic decision makers have to be sensitized for the potential of transnational cooperation. Geothermal energy use can support the way to the 2020/2050 goals for the reduction of CO₂ emissions on a much higher level than today. A European approach for the development of the technology will give a large benefit for all participating countries, on a financial level and on the status of the change to a renewable energy supply. The industrial stakeholders in Europe have to reflect the market situation within Europe. In the current market situation in many European countries cooperation also between possible competitors can lead to mutual benefit.

To communicate the necessity of a European-wide cooperation programme a bottom-up approach for joint activities is the most constructive way. By bringing the stakeholders together, the advantages can be presented independently from large-scale financial disbursements for the participating countries. This can be the initial point for the development of cooperation on a larger scale, also within the existing European programmes.

The proposed schemes for the development of joint activities follow this approach and take the possible barriers for these actions into account. In a next step, the Geothermal ERA-NET consortium will select adequate schemes for pilot activities. Based on the results of the work packages 2, 3 and 5 these schemes will be further developed and realized. The explicit actions on different topics and for different target groups will be communicated in the next report.

6. References

Existing Schemes for Joint activities:

- European Commission: <http://ec.europa.eu>
- EC Horizon 2020: <http://ec.europa.eu/programmes/horizon2020/>
- EC NER-300: <http://ner300.com/>
- EERA-Joint Programme on Geothermal Energy: <http://eera-set.eu/eera-joint-programmes-jps/geothermal/>
- EGEC – European Geothermal Energy Council: <http://egec.org>
- Geothermal ERA-NET: <http://geothermaleranet.is/>
- GeoDH – Geothermal District Heating: <http://geodh.eu/>
- GEOELEC: [http:// geoelec.eu](http://geoelec.eu)
- GeoMol: Assessing subsurface potentials of the Alpine Foreland Basins for sustainable planning and use of natural resources: <http://geomol.eu>
- International Energy Agency – Geothermal Implementation Agreement: <http://iea-gia.org>
- IGA – International Geothermal Association: <http://geothermal-energy.org>
- IRENA – International Renewable Energy Agency: <http://irena.org>
- South East Europe programme: <http://southeast-europe.net>

Possible Barriers for Joint activities

- RHC – Renewable Heating & Cooling Platform: <http://www.rhc-platform.org/>
- RHC (2014): Common Implementation Roadmap for Renewable

Heating and Cooling Technologies, via <http://www.rhc-platform.org/publications/>

Geothermal ERA-NET:

- D2.1: Geothermal Energy status and policy review
- D2.2: Inventory of RD&D project highlights
- D2.3: Technical and non-technical barriers & opportunities
- D2.4: RD&D needs

- D2.5: Actions to bridge gaps, overcome barriers and promote the use of geothermal energy in Europe
- D3.1 Report on the state of the art and needs in regarding geothermal data and existing tools to manage them
- D3.2: Feasibility study for a European Geothermal Information Platform
- D5.1: Report with the inventory of principal stakeholders & classification of stakeholders on national level

All listed deliverables and additional reports from other work packages can be found on:
www.geothermaleranet.is/publication/deliverables-

All deliverables are accessible via www.geothermaleranet.is

7. APPENDIX A

Description of proposed categories for joint activities from D2.5 “Actions to bridge gaps, overcome barriers and promote the use of geothermal energy in Europe”:

JA1 Information Exchange/ Knowledge Exchange groups) - low budget

InfEx/KnowlEx groups to tackle issues through several means (dedicated meetings/workshops/visits/...). This can be a very effective and easy to organise way to make ensure that progress in a number of European countries is shared on a European scale.

JA2 Joint work/review – limited budget

This could be a joint assignment, e.g. to have a expert company produce a status report on a specific issue, a detailed study to solve a specific issue etc. All interested countries could bring together budget for such an assignment, which is then of benefit to all.

JA3 Joint Call – significant budget

A joint call allows stakeholders in the participating countries to work jointly on developing new insights and new systems, in contrast to the first two types of joint activities, that essentially aim to improve availability of or analysis of existing information, where it is required.



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