

GEOHERMAL ERA-NET

Newsletter



May 2016

The role of geothermal energy to increase energy security and savings in Europe

Geothermal resources for power generation and direct use for heat supply have been used successfully and economically in some choice locations in Europe where geological conditions are highly favorable (e.g. Italy and Iceland, France), but they can play a much more important role at the European scale, if they can be economically exploited in other places. In recent years, the value chain of geothermal energy has expanded in some location to the provision of energy storage services and to some extent for revenues generated from credits for avoided greenhouse gas emissions.

In addition to minimizing the adverse impact of climate change, Europe is also embarking on a path towards increasing its competitiveness in clean energy technologies, decreasing its dependence on fossil fuels - not in the least owing to political instabilities in Europe's neighboring regions and an over-exposure to single foreign gas exporters.

This is well illustrated in the use of natural gas as a heating fuel; geothermal energy has the potential to significantly contribute to the substitution of natural gas (and oil, of course) in direct heating of homes and domestic hot water. Regions in Europe have a well-established geothermal resources (such as the Pannonian Basin of Central-Eastern Europe, the Paris Basin of Western-Central Europe and the Molasse Basin stretching along the northern rim of the Alps). The resource availability generates the possibility to tap geothermal sources for energy supply that are economically viable, and may replace fossil fuels (such as natural gas) thus improving energy security, cost savings and mitigating climate change.



Editorial

by Guðni A Jóhannesson
Coordinator

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The Geothermal ERA NET partners



Geothermal ERA NET News

In 2015 the Geothermal ERA NET partners proceeded with organising Joint Activities among European and worldwide energy players. Among the seven planned events, six workshops and conferences were organised and had a great outcome, which could lead to a greater cooperation between energy agencies and ministries in Europe, and make it possible for them to work towards common goals. Between these meetings, the Geothermal ERA NET partners took part in regular project meetings and worked on a strategic contribution to the European Action Plan “Energy Policy for Europe”, speeding up the deployment of geothermal projects, and represent scheme in the European geothermal scene. This newsletter presents some of the latest news within the project.

Iceland Geothermal Conference 2016

This event took place in April 2016 in Reykjavik, Iceland and focused on the advantages of using geothermal energy and the benefits of this energy resource. The conference included many interesting presentations as well as networking among inspiring players in the geothermal industry. It covered various case studies from an array of speakers, including topics such as the industrial use of geothermal energy; food processing using geothermal energy; chemical recovery from brine and resource parks; and the concept of turning waste to value. Parallel, the GeoExpo also took place. The expo offered a great networking platform for decision makers and professionals to generate extensive brand awareness, build up a prospect database, and generate new leads.



Reykjavik · Harpa · 26-29 April 2016

Knowledge exchange on geothermal energy the Netherlands & Slovenia

In the scope of EU project Geothermal ERA-NET a workshop "Geothermal Energy - Knowledge exchange on geothermal energy between the Netherlands and Slovenia" was organized at Ministry for Infrastructure of Republic of Slovenia on 19.2. 2016 in Ljubljana. At the conference Mojca Vendramin from the Ministry of Infrastructure, Energy Directorate presented the Slovenian policy on renewable energy sources - vision, objectives, action plan and instruments. Andrej Lapanje from the Geological Survey of Slovenia showed the current geothermal situation in Slovenia and Paul Ramsak from the Netherlands Enterprise Agency – RVO prepared a comprehensive presentation of the Dutch geothermal program - vision, objectives, budget, instruments and support mechanisms.

In the presence of Slovenian State Secretary for Energy Klemen Potisek overall 16 participants from the geothermal professional community discussed the opportunity to further develop geothermal energy and the cooperation between the Netherlands and Slovenia in this field. The Dutch approach showed that there are ways to promote and boost the use of geothermal energy if there is a will and commitment.

In the afternoon a Geothermal ERA NET working meeting was held at the Ministry of Infrastructure where the decision was made that Slovenia will join the GEOTHERMICA consortium for application in the ERA-NET CFA tender.



Slovenian and the Netherlands representatives during the knowledge exchange meeting organized by the Geothermal ERA NET partners Source: [MZI RS](#)



The geothermal power plant in Lardarello in Valle del Diavolo

European Technology and Innovation Platform ETIP

In April 2016 more than fifty experts met in Brussels at the ETIPs kick off meeting to begin work on creating the Deep Geothermal Platform. The Geothermal ERA NET is participating in ETIP represented by Paul Ramsak from RVO-NL. Technology and innovation platforms have been recently recognized by the European Commission as a tool to strengthen cooperation with stakeholders under the Strategic Energy Technology Plan (SET-Plan), as part of the H2020 programme.

These ETIPs are expected to:

- Provide strategic recommendations to and input for the SET Plan Steering Group on its 10 priorities;
- Mobilise factors towards implementation activities;
- Contribute to future updates of the SET Plan Integrated Roadmap.

Existing European industrial initiatives do not include geothermal energy, although the European Commission has

recognised the pressing need for measures, such as an ETIP, to support the deployment of the next generation of geothermal power and heat plants.

The geothermal sector should therefore create an ETIP on deep geothermal, and ask for its official recognition and support from the European authorities.

Enel Green Power (EGP), as one of the main geothermal operators in Europe and the world, with the active support of the European Geothermal Energy Council (EGEC), has been asked by the European Commission to be the promoter of such an initiative. EGEC Geothermal 2016

European Technology
Deep Geothermal
& Innovation Platform

Geothermal ERA NET Joint Activities

There are various ways for international collaboration of national research and innovation programme owners and managers to foster utilization of geothermal energy and innovation in Europe, which may in principle range from information exchange to multinational financing of demonstration projects.

The Geothermal ERA NET is one of a large number of ERA NETs that all aim to make advances in their specific field. The ERALEARN initiative of the European Commission helps ERA NETs to benefit from their mutual experiences. The mapping and monitoring effort, supported by ERALEARN, has resulted in the following three groups of joint activities:

- Structuring common RD&D efforts:
- RD&D quality assurance:
- Human resources:

It is important to note that the majority of the ERA NETs focus on joint R&D, while the Geothermal ERA NET and other energy ERA NETs foster the cooperation between organisations that are both involved in R&D and in implementation activities. This results in a wider scope for possible joint activities.

To minimize the administrative burden, joint activities are fit-for-purpose and cost-effective. Within the Geothermal ERA NET, the approach was to consider various levels of potential joint activities. The following options were developed:

JA1 Information Exchange/ Knowledge Exchange groups) - low budget

Working groups address issues through dedicated meetings, /workshops, and visits. This proves to be a very effective and easy to organise way to ensure that progress in a number of countries is shared on a European scale.

JA2 Joint work/review – limited budget

These are joint assignments, e.g. to have an expert company produce a status report on a specific issue, a detailed study to solve a specific issue etc. All interested countries contribute funding for such an assignment, which results in a benefit to all.

JA3 Joint Call – significant budget

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

In order to create a scheme for the implementation of trans-European cooperation on geothermal energy, work package (WP) 4, “Development of joint activities”, builds on a bottom-up approach for the realization of joint activities. This approach is based on the previous results of the Geothermal ERA-NET and delivers benefits of a European cooperation scheme. The approach combines the following requirements (see also Geothermal ERA NET deliverable, D 4.1):

Minor effort of financial and human resources

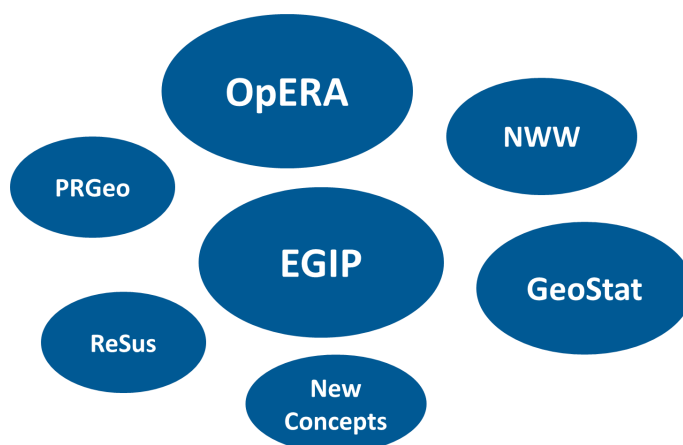
Based on input from the geothermal community to ensure the necessity of the results

Integration of stakeholders from the different fields of geothermal energy

Capable of producing high-quality results and solutions for non-technical and technical issues

Capable of identifying several topics for joint calls

In a second phase, this scheme was further developed and combined with the thematic needs on RD&D knowledge and information exchange and solutions to overcome non-technical and regulatory barriers



Selected joint activities of the Geothermal ERA-NET

In a second phase this scheme was further developed and combined with the thematic needs on RD&D knowledge and information exchange and solutions to overcome non-technical and regulatory barriers.

7 Joint Activities (JA) on various topics were proposed:

- NWW – New Ways of Working: Financial instruments and funding of RD&D and geothermal projects
- OpERA – RD&D knowledge exchange on operational issues of geothermal installations in Europe
- PRGeo - RD&D knowledge exchange on public relations for geothermal energy
- New Concepts for geothermal energy production and usage

- ReSus - RD&D knowledge exchange on reservoir sustainability
- Tuning EGIP (European Geothermal Information Platform) for target users
- GeoStat - Towards consistency of geothermal data

The specific activities and working groups follow partly iterative and partly continuous approaches. In addition, the different working groups are coordinated by a steering committee of two countries for each activity, and have developed an action plan until the end of the Geothermal ERA-NET.

JA achievements are described on the following pages

NWW Joint Activity

New Ways of Working: Financial instruments and funding of RD&D and geothermal projects

The joint meeting took place in Brussels on October 5, 2015 and was led by Iceland and Switzerland partners. Meeting objective was based on financial instruments and funding of RD&D and geothermal projects, and shows the barriers and opportunities, and policy recommendations.

A better understanding of the financial landscape is beneficial to all stakeholders in defining barriers and recommending practical solutions, e.g. to prioritize in future joint calls, increase investments and growth of geothermal projects in Europe.

The goal of the Joint Activity "New Ways of Working" is to improve the working practice of national funding institutions and the collaboration with their European counterparts.

The main focus of this activity is to :

- Analyse the financial instruments that are available and how they operate, and map the operational structure of the different national funding bodies, including policy and funding rules in R&D and industrial projects.
- Highlight the main barriers and opportunities, and how these instruments can more easily work together

In all participating countries, there are policy instruments in place to improve geothermal energy utilization. This includes R&D efforts, and in some countries there are also instruments to address the geological risk, in the form of soft loans or guarantee funds. Various participating countries have a feed-in-tariff in place for renewable energy production. In most cases this tariff is only applicable to electricity generation, but in France and the Netherlands there is also support for renewable (district) heating. The review also discusses other relevant issues, such as the availability of geological data, legislation and statistics.



Participants of New Ways of Working Joint Activities during workshop

PRGeo Joint Activity

RD&D Knowledge Exchange on public relations for geothermal energy

The advantages of using geothermal energy are little known, and media reports often focus on information on its disadvantages (e.g. high upfront costs, drilling risks, environmental threats etc.). The origin of the sceptical view on geothermal energy varies from the lack of information about the technology, to wrong conflict management from project owners. As a result, political decision makers and potential investors have concerns about possible risks in implementing geothermal projects, and social resistance often results in significant slowdowns of the projects.

The joint activity PR-Geo aims to exchange knowledge on the diverse approaches of public relations (PR)

experienced in different European countries, in order to make sure that geothermal energy can play its optimal role in Europe's future energy supply. A side event at the German Geothermal Conference at Haus der Technik in Essen was organized on November 4th 2015 with five invited speakers who presented the PR aspect of various types of projects from France, Germany, Italy and Switzerland.

The workshop concluded that although the PR work has been reinforced among project developers and operators in recent years, it can still be optimized, especially by streamlining focused messages to

the different target groups since each geothermal energy project is unique. Therefore, the same measures cannot be applied to all projects. Although different types of project examples were presented and discussed at the workshop, it was generally concluded that the acceptance of geothermal projects is a question of trust. PR work can therefore only be successful if it manages to create a basis of trust in which early, honest and strategically oriented communication has a crucial role.



ReSus Joint Activity

RD&D knowledge exchange on reservoir sustainability

To foster sustainable and safe use of geothermal reservoirs, as well as increase the lifetime of the resource, boreholes and system components, it is very important to understand the physical properties of the reservoir rocks and fluids and their interaction during the exploitation process.

The Joint Activity (JA) "ReSus" will set up a platform to study geothermal reservoir sustainability taking into account, as starting point, the tasks which have been addressed in Annex I by IEA-GIA and the results of an international workshop on sustainability modelling held in late 2008 in Taupo (NZ). Comparing the current practice used by operators, highlighting the best solutions and studying the unsuccessful cases, we will animate a fruitful debate to capture the current state-of-the-art and explore possible scenarios for future economic and sustainable exploitations. Beyond the scientific community, the topic of such a JA clearly interests regulatory authorities and operators who seek to implement sustainable development strategies.

Consequently, it will be very important to involve, along with the Geothermal ERA NET community, regulatory authorities, the EERA-JPGE as well as the European geothermal operators

GeoStat Joint Activity

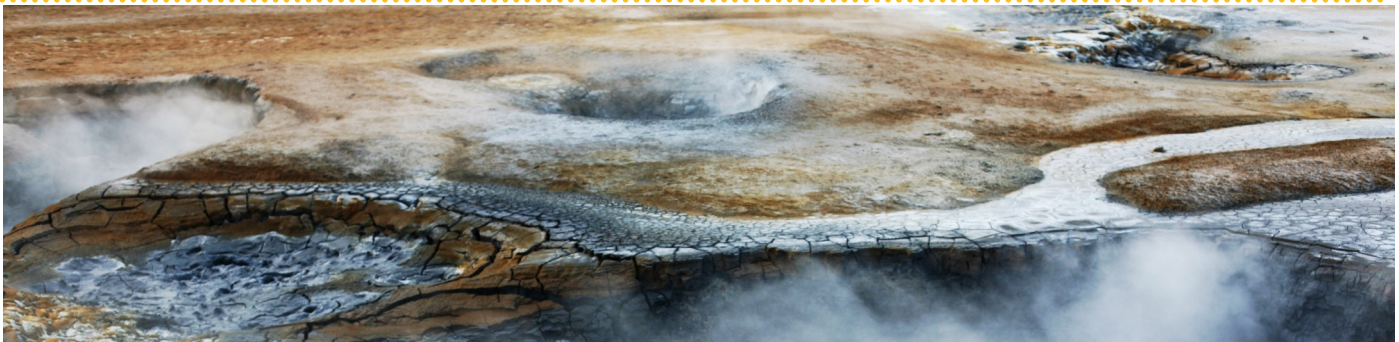
Geothermal Statistics- towards consistency

Data on geothermal energy is collected by various international organizations. These collections are based on questionnaires which are all different, although the objective is to collect the same data. Due to these differences the same data can be misunderstood, misinterpreted and give wrong signals. Therefore, a common ground is needed to enable the use and comparison of energy statistics, increase reliability, security and decrease fragmentation in line with the aim of these organizations, motions and regulations.

Following are the proposed objectives with measurable indicators and how GeoStat can achieve these:

1. Participating countries to aim at reducing the difference between industry and official statistics below a defined benchmark for year 2020.
2. GeoStat could facilitate by aiming at identifying the source of error in each case with dissemination and discussions on terminology and definitions and direct comparison of statistics for each nation.
3. Participating countries to aim at reducing duplication of efforts domestically.
4. Collaboration between entities on a domestic level having the following indicator:
5. Simplified process across organizations and reducing duplication of efforts with the following indicators

The intention of GeoStat is to make the connections and starting the review process in cooperation with the partners, and to make the terminology clearer. GeoStat will write a short manual with terminology and definition already identified in this report, in particular for thermal capacity.



EGIP Joint Activity

Tuning the platform

The work dedicated to the European Geothermal Information Platform (EGIP) is the first Joint Activity performed by some of Geo ERA-NET partners. Started in 2012, it produced a State of the art report and a Feasibility study (2013) that led to the development of a Pilot (2014). The results have been published by Trumpy et al. (2015).

The Geo ERA-NET project consortium and the Supervisory Board decided that a further step of EGIP. Consequently, this “Tuning EGIP for target users” JA aims to perform an analysis of the boundary conditions for such Geothermal Information Platform at European level. The JA is based on the experience learned from the EGIP Pilot in order to propose its complete implementation. A Web survey has been conducted to give the EGIP Pilot accessible to European stakeholders and to collect their feedback on effective needs, impacts and benefits that EGIP must have. The results and conclusions of this survey are described in the Tuning EGIP JA report (2016). In parallel, the Feasibility study has been updated and enhanced using the outcomes of the survey.

Early 2016, the EGIP Expert Group was created to formulate INSPIRE oriented guidelines for the harmonization of geothermal data, and to envisage a call for tender for the implementation of EGIP. The Expert Group is supported by an Extended Expert Group gathering technical skills especially regarding the INSPIRE European Directive and geothermal databases. During the final course of Geo ERA-NET, the Expert Group will produce an overview of EGIP to prepare its implementation. Such a document will be dedicated to whom will take care of the development of the Information Platform. Considering the close end of the GEO ERA-NET project, the Expert Group also seeks for opportunities to find a framework where EGIP could come true.



OpERA Joint Activity

RD&D knowledge exchange on operational issues of geothermal installations in Europe



Participants of OpERA workshop in Vaals, the Netherlands 2015

The major advantage of geothermal energy over other renewable energy sources is the time and site independent availability of the geothermal resource. To use this advantage, the operational availability of geothermal energy installations has to be stable on a high level. Scaling and material corrosion for instance, are issues in many geothermal areas in Europe (for example: boiling point scaling in production wells, scaling in surface equipment (mostly amorphous silica; calcium carbonate and sulphides to a lesser degree), scaling in reinjection wells (amorphous silica). Both lead to breakdown times due to necessary repair or service works. Also other issues like high gas content of the thermal brine or pressure related issues have to be discussed.

To create a platform for this discussion the OpERA working group was founded. The OpERA working group aimed on bringing together the national experts (Plant owners, project developers, researchers) to provide an overview of potential solutions, like adapted materials in the geothermal installation, the use of inhibitors or optimized pipe geometries or well design. Therefore, OpERA provided a platform for technical knowledge exchange to solve Operational issues on a European base.

As a first step towards this European knowledge exchange, OpERA organized a workshop on operational issues on the 1st & 2nd of October 2015 in Vaals (NL). 37 experts from 11 countries participated in the workshop. On the first day country overviews from Hungary, Italy, the Netherlands, Slovenia, Germany, Iceland, Switzerland, France, Denmark and Austria were presented to create an overview of the most urgent operational issues in Europe. These issues were summarized in the "OpERA-Magna Carta" (respecting the 800th anniversary of the real Magna Carta in 2015) which shows solved and unsolved issues on scaling, gas content, corrosion and reinjection by country. The second day was structured with four topical sessions on scaling, scaling & gas content, corrosion and re-injection issues. In these sessions 13 presentations on specific issues, possible solutions and examples from different locations were held. Both days were enveloped by discussion & summary sessions moderated by a specialist for operational issues from the oil & gas industry. The experts participated very actively in the fruitful discussions and solutions for several issues were addressed on a European base

In the last session of the workshop, the "OpERA-Expert Group" was founded, to create a joint publication on operational issues in Europe. 22 experts accepted to provide input for this publication. Besides the country overviews and the "OpERA-Magna Carta" the publication will entail summaries of the general, solved and unsolved issues in the different topical fields and several excurses on specific topics as e.g. carbonate scaling, corrosion in low enthalpy fields or induced seismicity. The OpERA Joint Activity revealed the necessity of a trans-European knowledge exchange on specific topics and showed, that the community appreciates a neutral platform to discuss urgent issues on an open level without any country or company based restrictions. During the whole workshop the focus was on topics and solutions and not on competition. Therefore "OpERA" was a showcase, how a European geothermal community can work together in the future to support the further development of geothermal energy. Following the workshop and the publication further activities like a transnational online information system on operational issues are planned.

New Concepts Joint Activity

RD&D knowledge exchange on operational issues of geothermal installations in Europe

The New Concepts (JA) mission is to stimulate creative concepts for European innovators in geothermal utilization and technology. It highlights opportunities in direct utilization of low enthalpy geothermal energy such as geothermal heat and cooling for smart cities, food production, and cosmetics. The activities create cooperation between the CleanTech sector and the European business network and display successful innovative projects. Crucial in this JA is expanding and stimulating new opportunities. Trend in renewable energy is changing constantly and current EU statistics indicate a significant growth and importance of geothermal energy each year. New European Union Research and Innovation funding programmes, increased geothermal energy supports up to 15% or to almost 70M€ financial support and additional 30M€ in renewable heating and cooling.

New Concepts (JA) workshop was held in Geneva on October 30, 2015. It was organised by Geothermal ERA NET leaders, Iceland and the Netherlands, together with IEA Geothermal, and supported by Swiss Federal Office of Energy. The workshop displayed the opportunities in the geothermal sector and stimulated growth of its industry in Europe. The focus was put on new and innovative applications of geothermal energy utilisation at a European level with interest from worldwide examples.

The workshop included an overview of GEO Innovative opportunities and pilot projects enhancing possibilities from small innovative ideas to large industry in Geothermal. The event had three sessions presented by specialists from Europe and one session based on worldwide example:

- Session I: EGS projects + direct use applications
- Session II: Direct use applications (new concepts – built environment)
- Session III: Direct use applications (new concepts – other sectors)
- Session IV: Innovative Applications of Geothermal Direct Use worldwide

Visionary Panel Discussion, Conclusions and Next Steps Each session had significant importance on different geothermal application issues. The closing session of the workshop included a visionary panel with ideas of future in geothermal energy development. The visionary panel had a challenging task for participants, which was to draw the future of geothermal with famous wax crayons from the 100-year-old Geneva- based company "Caran d'Arche". The outcome of delivered cartoons will be a part of the proceeding released in spring 2016.

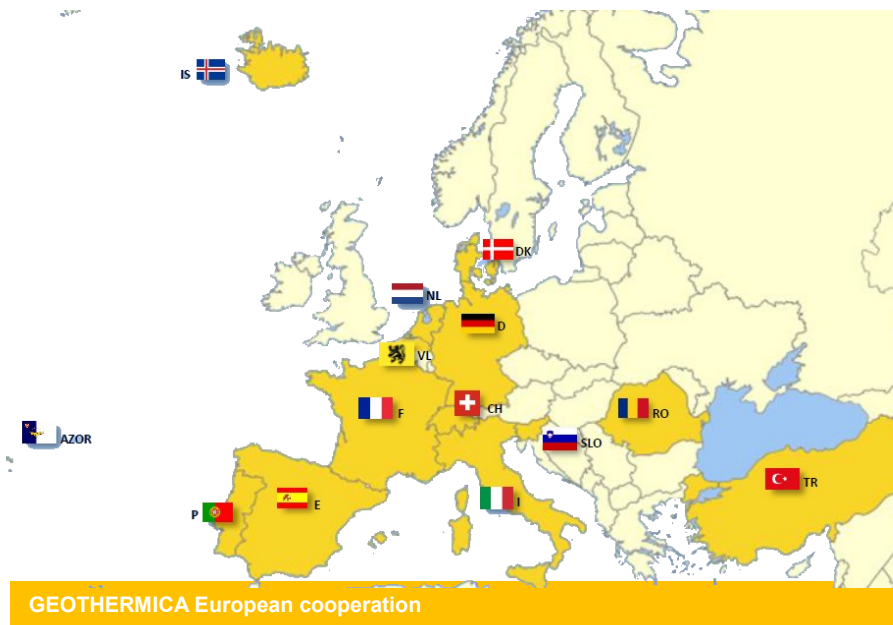
The Geothermal ERA NET New Concepts may convey its aspirations to its stakeholders by communicating effectively and efficiently the benefits of such a framework and, eventually receive their long-lasting support in the development of this framework

Ruggero Bertani (Enel Green Power, Italy) presenting his drawing about future of geothermal energy during New Concepts Workshop in Geneva



GEOTHERMICA

The next phase of European collaboration



The GEOTHERMAL ERA-NET has provided a strong platform for continued collaboration among Europe's geothermal research and innovation program owners and managers. Four years of intensive exchange and collaboration on research policies, programming, funding instruments and frequent interpersonal exchange have enabled the formation of strong relationships among participants. So much so, that the GEOTHERMAL ERA NET member countries intend to move to a subsequent stage in coordination of national research and innovation programme. Building on joint activities and prioritization of trans-European common research and innovation topics and themes, and the continued support and facilitation of the European Commission to enhance and strengthen cooperation and coordination of national research and innovation programmes, a large number of GEOTHERMAL ERA NET countries and new European partners have teamed up to launch an ERA NET Cofund

Action. ERA NET Cofunds under Horizon 2020 support joint programming initiatives of European countries, in their preparation, establishment of networking structures, design, implementation and coordination of joint activities as well as Union topping-up of a trans-national call for proposals. To this effect, 16 geothermal energy research and innovation programme owners and managers from 13 countries have come together and have formulated a plan to develop GEOTHERMICA as an ERA NET Cofund. GEOTHERMICA has been submitted in April 2016 to the European Commission for consideration as an official and sanctioned ERA-NET Cofund. Participating research and innovation program owners and managers hail from Belgium, Denmark, France, Germany, Iceland, Italy, the Netherlands, Portugal, Romania, Slovenia, Spain, Switzerland and Turkey.

Specifically, GEOTHERMICA aims to launch joint actions that demonstrate and validate novel concepts of geothermal energy utilization within the energy system and that identify paths to commerciality. Joint actions comprise joint calls and coordina-



Geothermal ERA-NET partners during field trip to greenhouses, Hveragerdi, Iceland

tion activities, which will strengthen Europe's geothermal energy sector by building a tightly interconnected and well-coordinated network of European funding agents. For a first joint call, some EUR 30 million will be made available for a small number of major demonstration projects. Joint calls will have a strong industry participation with a targeted 50% contribution towards work programs and budgets of successful proposals. In addition to joint programming and joint calls, a number of additional activities will be undertaken to develop shared and deep knowledge, to promote operational excellence, to exchange good practices in the realm of support policies, and to define strategic recommendations related to long-lasting and durable joint pursuits of research and innovation.

Ultimately, a strong public sector will complement the research and innovation community as well as Europe's geothermal industry sector to build an overall strong European geothermal energy sector ready to contribute to the European Energy Union, the implementation of the SET Plan as specified by the SET Plan Roadmap.

Editorial

Alicja Wiktorja Stokłosa

Specialist

Geothermal – ERA NET

Orkustofnun

Hjalte Páll Ingólfsson

Project Manager

Geothermal – ERA NET

Orkustofnun

María Guðmundsdóttir

Specialist

Geothermal – ERA NET

Orkustofnun

Baldur Pétursson

Project Manager

Geothermal – ERA NET

Orkustofnun

Publisher

Coordination Office,
Geothermal ERA NET
Orkustofnun, Grensásvegi 9,
108 Reykjavík;

Tel: +354-569 6000,

Email: os@os.is

Website:

www.geothermaleranet.is

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ERA NET VISION

*Minimize the fragmentation of
geothermal research in Europe*

*Build on European know-how and
know-who to utilize geothermal
energy*

*Contribute to a framework to
realise large opportunities in the
utilization of geothermal energy
through joint activities*



Geothermal ERA NET group during field trip to Krýsuvík

Project Information

In 2012, the European Commission has provided a financial grant to launch a GEOTHERMAL ERA NET and support its development for four years until October 2016. Research and innovation programme owners and managers from 11 European countries have joined the ERA NET under the leadership of Iceland's National Energy Authority, Orkustofnun, to realize the first steps of an integrated European geothermal energy research and innovation programme. Initial activities focused on exchange of information on national research and innovation ecosystems, identify shared goals, objectives, gaps, areas of necessary and unnecessary duplication.

Subsequently, a number of Joint Activities of pan-European interest were established to learn how national funding agents collaborate and cooperate. Progress and added value in the joint activities – together with a shared vision that geothermal energy is crucial to Europe's sustainable development and competitiveness – has resulted in the preparation of a more extensive cooperation via an ERA NET cofund, GEOTHERMICA.

GEOTHERMICA will have at its core a joint call, an expansion of Joint Activities and is envisaged to run from 2016/2017 to 2020/2021.

Geothermal ERA NET final meeting will be held in October 2016 in Iceland



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