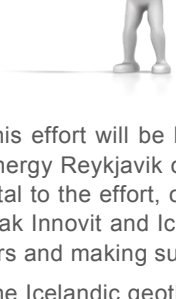


60 MISK for innovation on green energy

The combined Icelandic geothermal cluster cooperation's GEORG and Iceland Geothermal (IG) in cooperation with Arion banki, Landsvirkjun, Innovation Centre Iceland, and Klak Innovit is preparing an innovation effort focusing on green energy. The project will be based on the well-known methodology of business accelerators which have turned out to be quite successful in creating increased values and stimulate innovation and growth.

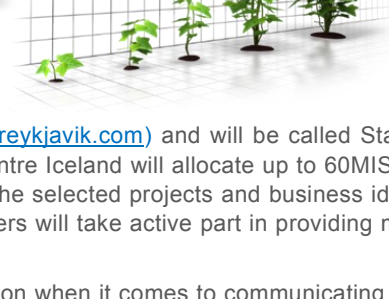
SELECTION OF IDEAS



BUSINESS DEVELOPMENT & TESTING



IMPLEMENTATION & GROWTH

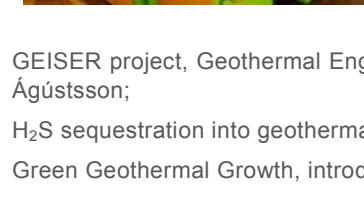


This effort will be based on the experience from Startup Reykjavik (www.startupreykjavik.com) and will be called Startup Energy Reykjavik or SER. Arion banki, Landsvirkjun, GEORG and Innovation Centre Iceland will allocate up to 60MISK in total to the effort, of which more than half will be devoted direct to investment in the selected projects and business ideas. Klak Innovit and Iceland Geothermal will facilitate the effort and the funding partners will take active part in providing mentors and making sure that the projects get the full support they need.

The Icelandic geothermal cluster (IG / GEORG partners) will be in a leading position when it comes to communicating with the partners of the cluster cooperation's and finding projects that could be appropriate for the accelerator. The cluster cooperation's will also provide access to the network of experts within the cluster.

The plan is to open for applications in the beginning of the next year so start digging out all the old and new ideas and be prepared to take part in innovation adventure in the new year!

GEORG open house 2013



GEORG open house was held for the third time at National Museum of Iceland on the 6th of November 2013 with great success. About 50 persons attended the event and enjoyed an introduction to GEORG operation and plans, presentation of five GEORG supported projects and an interesting poster session.

The following projects were introduced at the event:

The GSAP project, Geothermal Sustainability Assessment Protocol, introduced by Brynhildur Davíðsdóttir;

The HYDORIFT project, introduced by Sigríður Kristjánssdóttir;

GEISER project, Geothermal Engineering Integrating Mitigation of Induced Seismicity in Reservoirs, introduced by Kristján Ágústsson;

H₂S sequestration into geothermal systems, introduced by Andri Stefánsson and

Green Geothermal Growth, introduced by Atli Arnarsson

The slides and videos from the event can be found at the [GEORG website](#)

Deep roots of geothermal (DRG) project in good progress



The science community, energy companies and Orkustofnun agreed last summer to devote about ISK 100 million to research on the interaction of water and magma in volcanic roots. To learn how this interaction occurs and how heat is transferred from the magma into the geothermal systems is key to acquiring a deeper understanding of the rational utilization of geothermal energy.

The cooperative project, titled "DEEP ROOTS OF GEOTHERMAL SYSTEMS" (DRG), is managed within the cluster cooperation of GEORG and is financially supported by GEORG, Orkustofnun, Reykjavik Energy, HS Orka, Landsvirkjun and the Iceland Deep Drilling Project (IDDP).

The aim of the project is to understand the relationship of water and magma in the roots of volcanoes and how heat is transferred into geothermal systems to maintain their energy. Furthermore, the design of wells and well heads for high temperatures will be a focus of the project, as will methods for utilizing superheated steam from greater depths.

The research will be performed by three groups made up of representatives from universities, research institutes, engineering companies and energy companies. The latest technology will be applied in surveying, resistance measurements and seismic measurements, petrology and geochemistry. In addition, new simulation models will be developed. These models will be used to simulate heat transfer and operation of geothermal boreholes for high temperature steam. Training young scientists to work in this field will be an area of heavy focus for this project.

One of the key aspects of the DRG project is to foster and encourage cooperation with other international project in the same field such as the Swiss/IPGT-COTHERM project and EU-IMAGE project. As a starting point of that work GEORG organized a workshop on September 10th 2013, with the aim of introducing the DRG, COTHERM and IMAGE projects and stimulate discussions on synergy and cooperation between these projects. The first half of the workshop was devoted to introductions on the respective projects while two hours at the end of the workshop were devoted to a group discussion (see presentations and discussion points at the [GEORG DGR website](#)).

From waste to value



Last spring GEORG organized a seminar series of five seminars under the headline: "From Waste to Value, Treatment and utilization of discharge from Geothermal Power Plant. How can GEORG help?"

The objective of the seminar was to discuss the status of treatment and utilization of discharge from geothermal Power Plants and explore possible opportunities of cooperation on research projects within GEORG with the aim to reducing environmental impact and convert waste to value. Slides can be found at [GEORG website](#)

The idea of this seminar series is to start the communication within the partnership of GEORG to form a research project on this topic, somewhat in the same spirit as the DRG project.

Out of the 22 supported projects of GEORG several of them are linked with environmental impact and therefore there is a good potential in increasing the value of the research by combining forces as has been done in the DRG project.

A follow-up to this will be announcements early next year.

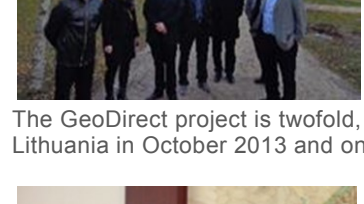
Student travel grants



GEORG offered a support to up to 10 graduate students, working on the topics of geothermal energy, to participate in International Conferences on Geothermal. The support would amount to 100,000 ISK for each student as a contribution to travel cost. The application deadline was on August 19th and seven applications were received, all of which were eligible. The students are therefore granted the support and they can claim it upon return of travelling documents (airline ticket/boarding pass or similar).

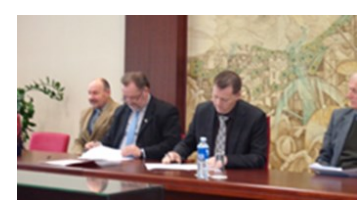
Cluster networking/study-trips autumn 2013

GeoDirect – Connection to Lithuania



Iceland Geothermal took part in the call BSR Innovation Express last spring, which is a part of a call named "BSR Stars" a cooperation carried out in collaboration with the Nordic Council of Ministers. Iceland Geothermal applied in cooperation with Klaipėda Science in Lithuania on a project called GeoDirect and was granted a support through Iceland Innovation Center. The goal of this project is to stimulate and encourage new business opportunities in new markets and build new business relationships.

The GeoDirect project is twofold, on the one hand, to support a study trip of Icelandic Geothermal delegation to Klaipėda in Lithuania in October 2013 and on the other hand to receive a Lithuanian delegation in Iceland in April 2014.



GEORG among other partners of the Iceland Geothermal cluster cooperation went to Klaipėda last October to examine, first hand, the geothermal utilization potential and research capabilities in Lithuanian. Among companies visited was **Geotema** heat plant, the oil drilling company **JSC Lotos Geonafta**, the **University of Klaipėda** and **Klaipėda Free Economic Zone**.

Hjalte Páll Ingólfsson, on behalf of GEORG, signed a memorandum of understanding on research collaboration with the University of Klaipėda on possible cooperation in research on health science and balneology. [The MOU can be found under this link.](#)

Cluster-trip to Norway



Hjalte Páll Ingólfsson, on behalf of GEORG, was invited to take part in a very helpful and interesting cluster study trip to Norway 18th-20th of November 2013. The trip was organized by Rannis as a part of the CDCM (Capacity Development for Cluster Managers Project), supported by the EU Competitiveness and Innovation Framework Programme (CIF). In addition to GEORG cluster managers of 7 other clusters in Iceland were invited and experts from the Innovation Centre Iceland and the University of Iceland.

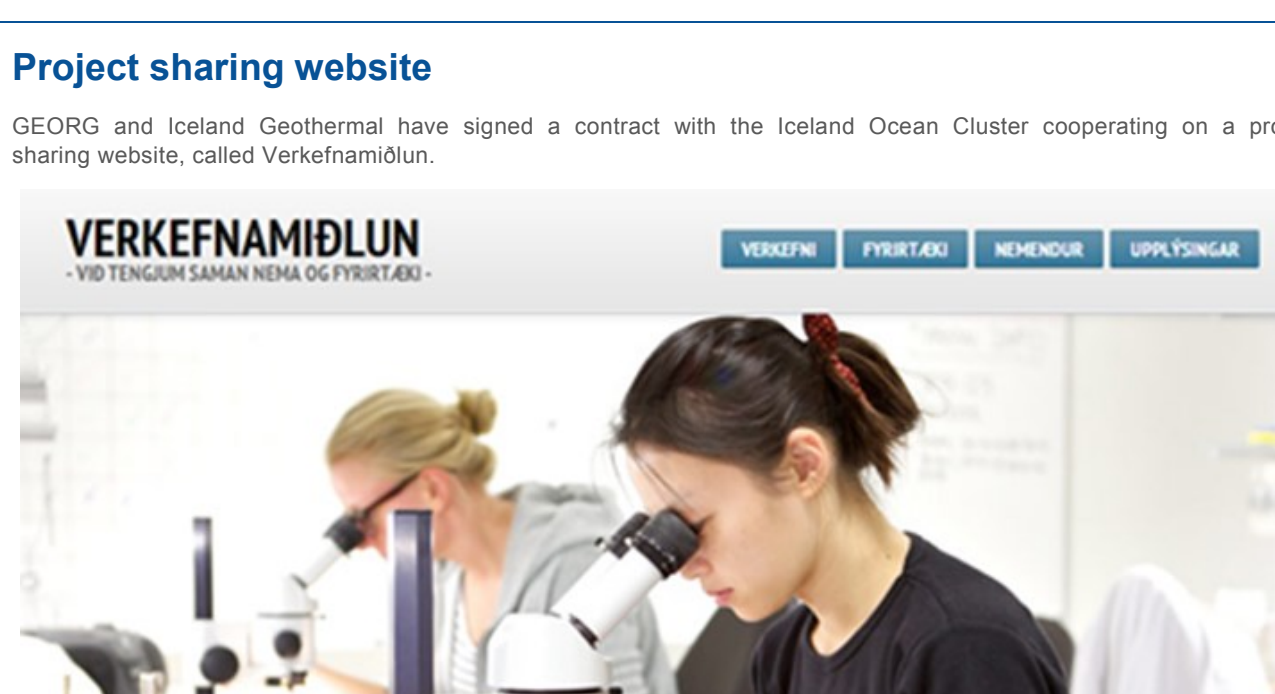
The objective of the Norway tour was to learn from the experience of Norway in terms of cluster support and policy as well as hearing from few cluster managers which have shown excellent success in cluster management. It's obvious that Norway has developed very comprehensive public cluster support schemas which fits a broad range of clusters cooperation platforms both in regards to size and maturity. The Norwegian support is both in terms of capital lubrication and consulting which is essential in the early steps of cluster cooperation development.

It was also very interesting to hear from cluster managers themselves and it will be very interesting to continue such cluster to cluster cooperation and knowledge sharing.

For further information on Norwegian cluster programs please visit the [arena website](#).

Project sharing website

GEORG and Iceland Geothermal have signed a contract with the Iceland Ocean Cluster cooperating on a project sharing website, called Verkefnamiðlun.



Verkefnamiðlun is a platform for project sharing which was initiated by the Iceland Ocean Cluster and members of the Ocean Cluster education group. The aim of Verkefnamiðlun is to enhance the connection between students and companies. Initially, the focus was on connections between students and companies in ocean related fields but due to high demand there are now projects from all sectors of the economy. Over 60 projects have been registered on the site, dozen of which are already active with students working together with companies.

If you as a company have any projects that you need working on, do not hesitate to contact us. We encourage students as well, to be in touch and register for possible projects. Visit www.verkefnamidlun.is for more information.

GEORG general assembly

GEORG 5th General Assembly (GA) took place at Orkugarður on May 16th, 2013. The GA agenda was traditional with a presentation of the 4th year annual report and discussions, as well as the presentation and acceptance of the annual accounts for year 4. The management and committees of the cluster cooperation was elected and other issues discussed, such as the entry of new partners

One new GEORG member was inauguration at the 2013 GA. This was the Uppsala University in Sweden. The geophysics section at the dept. of Earth Sciences, Uppsala University (UU), has been involved in many projects in Iceland in the last 20 years. The projects have ranged from structural studies based on local seismicity, seismicity studies, earthquake induced stress fields, reflection seismic to electromagnetic studies. Some of these have been of direct relevance for geothermal research, though some have had other objectives. UU is involved in several projects of direct relevance for geothermal research in cooperation with other research institutes on Iceland and the US.

The following **Board of Directors (BoD)** was elected at the GA:

Sigurður Magnús Garðarsson	University of Iceland	Chairman
Magnús Tumi Guðmundsson	University of Iceland	
Auður Andrésdóttir	Mannvit	
Guðmundur Ómar Friðleifsson	HS Orka	
Ernst Huenger	GFZ, Potsdam, Germany	
Einar Jón Ásbjörnsson	Reykjavík University	
Rúnar Unnþórsson	University of Iceland	
Steinunn Hauksdóttir	ISOR	

Further information on the management of GEORG can be found at the [GEORG website](#).

5th European PhD Day



The European Geothermal PhD Day (EGPD) is a student organized conference for PhD students working in all fields of science related to geothermal research (geosciences, engineering, chemistry, business, law, etc.). Attendees will have the opportunity to present their research projects both with an oral and a poster presentation, to receive feedback and to engage an open debate with peer doctoral students. The conference offers a great platform for international networking to aspiring academic researchers.

The 5th EGPD conference will be hosted by the Chair of Geothermal Science and Technology of the Technical University of Darmstadt in cooperation with the Young Geothermal Chapter (Junge Geothermie) of the German Geothermal Association.

When :	31 st March 1 st April 2 nd April	Icebreaker Party EGPD Conference Field Trip	Where:	Institute of Applied Geosciences Schmittspahnstraße 9 64287 Darmstadt, Germany
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Visit <http://www.egpd.tu-darmstadt.de/> for registration and more information. Deadline for application and abstract submission is the 1st March 2014.

EU Horizon 2020 work programmes



Draft work programmes for Horizon 2020 are now available for most of the pillars and challenges and [are accessible in this link](#).

Hjalte Páll Ingólfsson, GEORG operational manager, participates in the energy committee of Horizon 2020 where the **Secure, clean and efficient energy** WP is prepared. This program is planned for two year 2014 and 2015 and there are quite a few topics there that are directly or indirectly related to geothermal energy

Few topics out of the energy work program

LCE 2 – 2014/2015: Developing the next generation technologies of renewable electricity and heating/cooling page 43-46

2014 – f) Deep geothermal energy: Development of new drilling technologies and concepts for geothermal energy – New drilling technologies and concepts are necessary to increase the number of economically viable geothermal resources, including in hard rock and high temperature/pressure conditions, and have a demonstrably smaller environmental footprint by comparison to existing drilling methodologies. Cross-fertilization with hydrothermal oil and gas technologies and operations shall be explored.

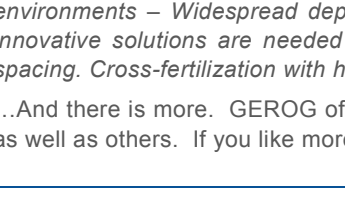
2015- f) Deep geothermal energy: Development of new technologies and concepts for geothermal energy - New technologies and concepts for geothermal energy are necessary to increase the number of economically viable geothermal resources, including in hard rock and high temperature/pressure conditions, and to have a demonstrably smaller environmental footprint to existing technologies. Cross fertilization with hydrothermal oil and gas technologies and operations shall be explored.

LCE 3 – 2014/2015: Demonstration of renewable electricity and heating/cooling technologies page46-49

2015 – d) Deep geothermal energy: Testing of enhanced geothermal systems in different geological environments – Widespread deployment of enhanced geothermal systems (EGS) needs new and improved models and innovative solutions are needed to routinely create EGS reservoirs with sufficient permeability, fracture orientation and spacing. Cross-fertilization with hydrothermal fields and cross-fertilization with tight oil and gas fields can be explored.

...And there is more. GEORG offers to help in preparing, participating and even leading a project proposal in this program as well as others. If you like more information or do not hesitate to contact us directly or be e-mail georg@orkugardur.is

Geothermal ERA NET news



GEORG initiated the Geothermal ERA NET, together with Orkustofnun, in May 2012. The project is supported by the EU Seventh Framework and the participants of the project, together with Orkustofnun, are Rannis and administrative bodies of eight other European countries, namely from the Netherlands, France, Switzerland, Germany, Italy, Hungary, Turkey and Slovakia.

The selection of countries for the alliance was based on their objectives regarding the utilization of geothermal energy and how those features match EU goals to reduce emissions of carbon dioxide (CO₂) to the years 2020 and 2050.

The duration of the ERA NET is four years and the support from the EU amounts to about 2 M€. The ERA NET is different from traditional research project to the extent that this provides for support for the integration and coordination of research programs of the participating countries but not for basic research. Therefore, the ERA NET can be the first step towards a coordinated research plans within the European Union through the so-called SET PLAN (European Strategic Energy Technology Plan).

The collaboration has been very successful and already analyses on the research programs of the participating countries have been done and a considerable work has been put into preparation work for synchronisation of geothermal information in Europe, through geothermal information platform. Already four meetings have been held and two special workshops on the preparation work for European Geothermal Information Platform. The next steps are to analyse the research need of the countries and search for cooperation opportunities for joint activities in favour of geothermal energy in Europe. The next ERA NET meeting will be held in Switzerland, 11th – 12th of March 2014