



May 16. 2013

5TH GENERAL ASSEMBLY

GEORG PROJECT

GEORG ASSOCIATION

Election of chair of the meeting



- Guðrún Sævarsdóttir - chair the meeting
- Hjalti Páll Ingólfsson, Operational Manager – take minutes

Agenda



- ***The annual report of GEORG for the past operating year***
- ***The annual accounts of GEORG Project***
- ***The annual accounts of GEORG Association***
- ***Determination of membership fees***
- ***Election of members of the Board of Directors***
- ***Inauguration of new partners***
- ***Any other business***



Sigurður Magnús Garðarsson, Chairman of the Board

ANNUAL REPORT PRESENTATION

REPORT OF THE BOARD



GEORG

GEOTHERMAL RESEARCH GROUP



GEORG is a research-driven Geothermal Cluster creating a platform for joint effort to strengthen research and development of innovations in the field of geothermal energy.



GEORG was founded early 2009 with the support of the Science and Technology Policy Council in Iceland through their Centers of Excellence and Research Clusters – program The support amount to 70MISK per year for seven years



GEORG is a partnership of 22 partners, combining all major players on geothermal research and utilization in Iceland and their key international collaborators.



UNIVERSITY OF ICELAND



Industry



Science



Keilir
Atlantic Center
of Excellence



United Nations University



Achievements to date

- During the first four years of operation GEORG has:
 - Supported 22 research projects through open calls
 - Responding to the goals set out in the original Description of Work.
 - Actively supported students
 - By expecting the research projects to include funding for students and supporting students conferences
 - Organized several seminar series
 - Subjects regarding the geothermal field been discussed
 - Put considerable effort into EU activities
 - By participating actively in the FP7 Committee for Energy
 - By leading and/or participating in grant applications under the FP7 framework
 - Leading the successful Geothermal ERA NET proposal
 - Matured as a research-driven clusters cooperation
 - Acquired a legal identity, as an association
 - Actively cooperated with Iceland Geothermal cluster cooperation
 - Received a Bronze Label Certificate on Cluster Management Excellence



Positive outcome of Mid-Term evaluation



- GEORG achievements and operation were evaluated by a team of qualified experts
- **Evaluation Outcome**
 - *“We congratulate the instigators, participants and supporters of GEORG on how much the cluster has achieved in a short time. In our opinion its focus is appropriate and augers well for its future activities and consequently we recommend that the funding from Rannís be continued”*



Dr. Jean-Marie Hombert



Dr. Gerd Meier zu Köcker

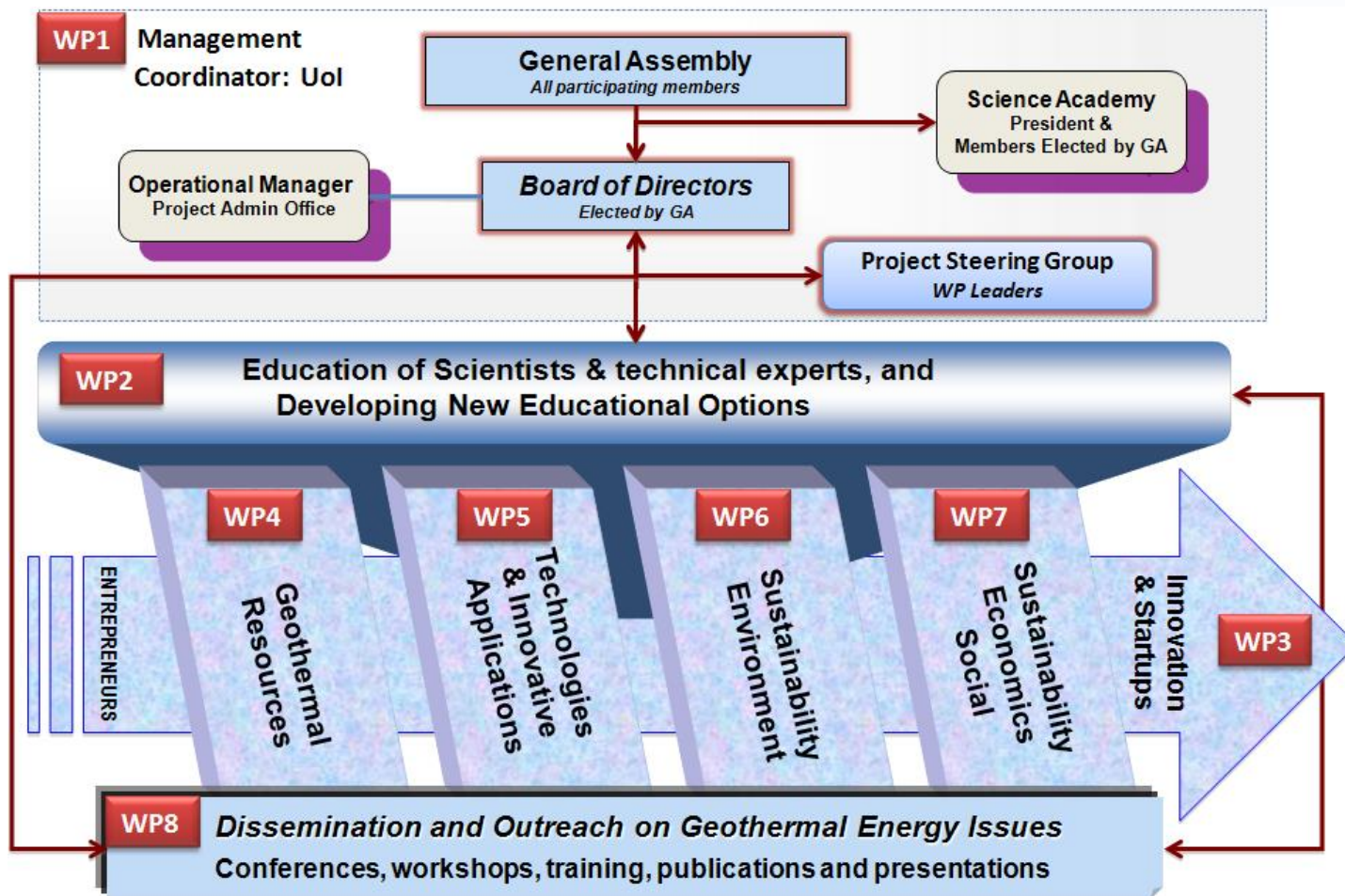


Dr. John Lund



Dr. Patrick Browne

Organisational Structure



Main activities – Four pillars



SUPPORT FOR GEOTHERMAL RESEARCH PROJECTS

- Works as lubrication to on-going activities of cluster participants and stimulates new and further cooperation

GRANT APPLICATION SUPPORT FOR PARTICIPANTS

- National level
- European level
- International level

SERVICE TO CLUSTER PARTICIPANTS

- Seminars and workshops
- Training and information sharing
- Matchmaking

PROMOTION AND DISSEMINATION

- Promoting geothermal
 - European level
 - International level

GEORG Association

THE LEGAL OPERATIONAL FORM OF **GEORG** IS AN ASSOCIATION

- Established April 2012
- Business ID: 430412-0350

OPERATIONAL MANAGER

- Hjalti Páll Ingólfsson
- Industrial Engineer

OFFICE

- Orkugarður, Grenásvegur 9
- 108 Reykjavík



Management

GEORG Project / GEORG Association

- Board of Directors

Elected by the GA every second year

*The Icelandic universities, research institutions, energy schools and governmental agencies jointly nominate/appoint **five representative seats** on the board, of which one seat is permanently reserved for a representative from the University of Iceland, arising from their role as coordinators of the first research contract with the Icelandic Research and Policy Council laying the foundations for GEORG,*

*The foreign members jointly nominate/appoint a representative for **one seat** on the board. Should an Associated representative be appointed for a seat on the board he/she shall have the same voting rights at the board level as the other nominated managers,*

*The Icelandic energy companies jointly nominate/appoint a representative for **one seat** on the board,*

*The Private company members jointly nominate/appoint a representative for **one seat** on the board*



Siguður Magnús Garðarsson
Chairman of the Board of Directors
University of Iceland



Ernst Huenges
GFZ Germany



Guðmundur Ómar Friðleifsson
Hs Orka



Guðrún A Sævarsdóttir
Reykjavik University



Ólafur Flóvenz
ISOR



Auður Andrésdóttir
Mannvit Engineering



Magnús Tumi Guðmundsson
University of Iceland



Rúnar Unnþórsson
University of Iceland



Management

■ Science Academy (SA)



Sveinbjörn Björnsson

SA president

Árný E Sveinbjörnsdóttir
Brynhildur Davíðsdóttir
Halldór Pálsson



David Brunh



David Mainprice

Einar Gunnlaugsson



Guðni Axelsson Iceland
Sæunn Halldórsdóttir



Guðni A Jóhannesson

Ingólfur Örn Þorbjörnsson



Kristinn Ingason



María S Guðjónsdóttir



Hrefna Kristmannsdóttir

Independent expert

■ Work Package Leaders

WP1, Sigurður M Garðarsson



WP2, Guðrún Sævarsdóttir



WP3, Rúnar Unnþórsson



WP4, Ólafur G Flóvenz



WP5, Halldór Pálsson



WP6, Guðni Axelsson



WP7, Sveinn Agnarsson



WP8, Sigurður G Bogason



Collaboration of GEORG projects

22 projects supported by GEORG



Projects in reservoir modelling and simulation

DRG

- Development of software and algorithm
- Mapping and analysis of subsurface data (3D)
- Methods to estimate sustainability of systems
- Seismicity research

High pressure / high temperature fluids

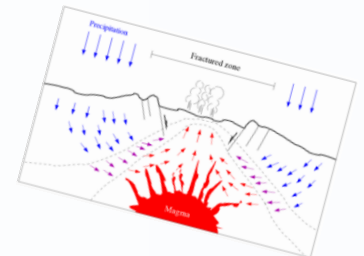
- Researches on two phase flow of fluids in porous media
- Utilisation of super critical fluids
- Development of high pressure and high temperature grouts for boreholes

Environmental impact

- CO2 sequestration
- Reduction of emission by using biochemical
- The sustainability of geothermal utilization: sustainability indicator for geothermal utilization
- Evaluating the cost of environmental impact due to geothermal utilization
- H2S sequestration into geothermal systems
- Application of geothermal heat in aquaculture and building an ecological food park

Miscellaneous

- Geothermal economical database
- Efficient Maintenance Management of Geothermal Power Plants



Deep Roots of Geothermal systems (DRG)



- Example of successful synergy among the participants within the cluster
- Young engineers /scientists participated enthusiastically in the preparation seminars series
- Project research topics
 - Targets in the „Suprastate“
 - Heat transfer from magmatic intrusions into geothermal reservoirs
 - Utilization of superheated geothermal fluid – power conversion, chemistry and material challenges
- Planned support 98 MISK,
 - GEORG ~33 MISK (Confirmed)
 - Orkustofnun 15MISK (Confirmed with a signed agreement)
 - Landsvirkjun 15MISK (Confirmed with signed agreement)
 - Orkuveita Reykjavíkur 15MISK (TBC)
 - HS Orka 15MISK (Confirmed)
 - IDDP 5MISK (Confirmed)



Einar Gunnlaugsson



Ásgrímur Guðmundsson



Hjalti Páll Ingólfsson
Sveinbjörn Björnsson



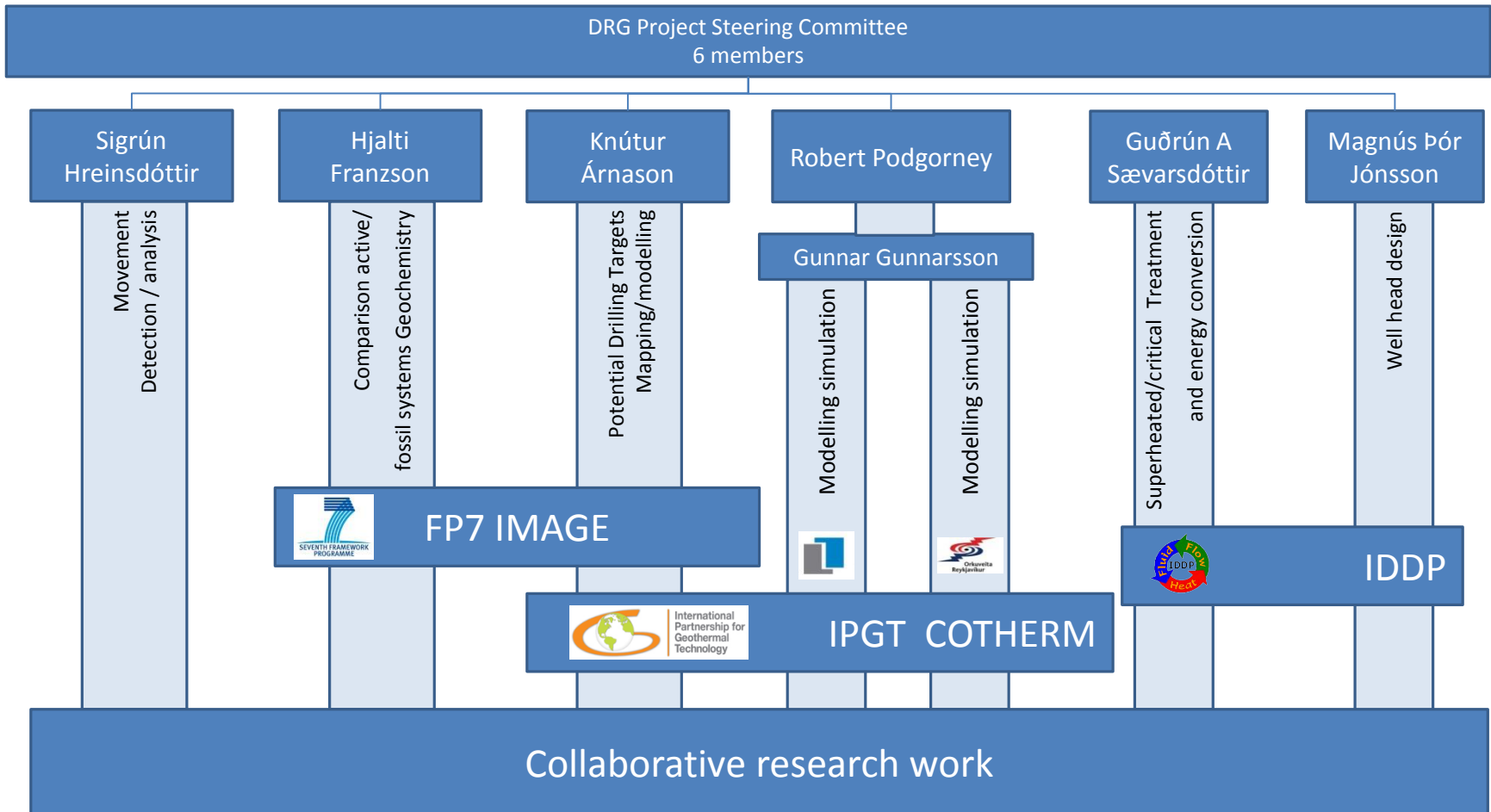
Jónas Ketilsson



Guðmundur Ómar Friðleifsson



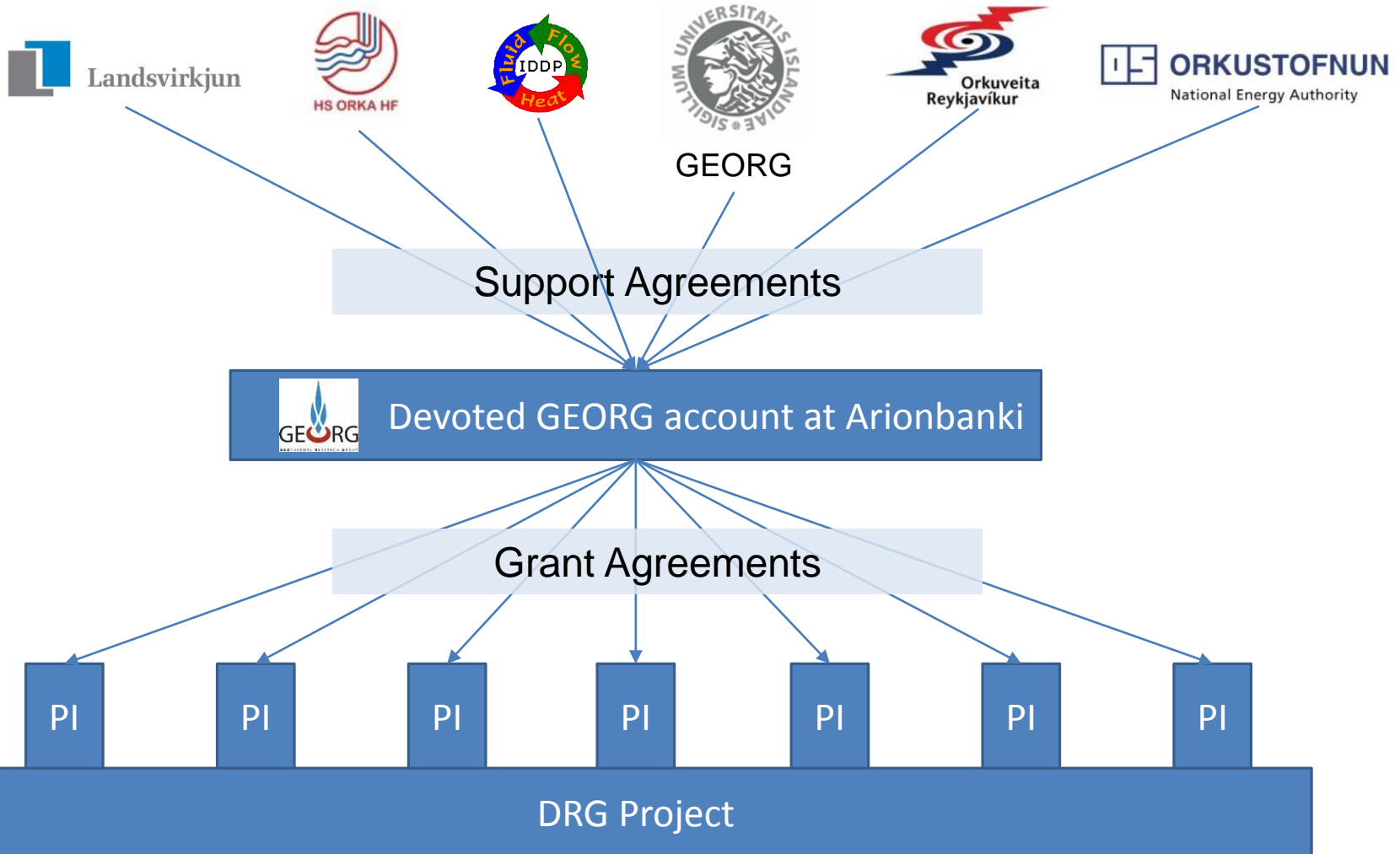
DRG setup





DRG

Practical setup of financing



Collaboration of GEORG projects

22 projects supported by GEORG



Projects in reservoir modelling and simulation

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High pressure / high temperature fluids

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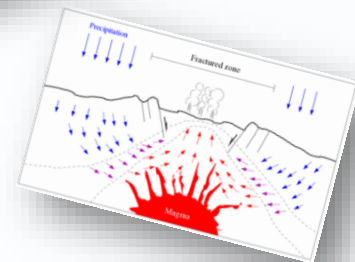
Environmental impact

- CO2 sequestration
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- Application of geothermal heat in aquaculture and building an ecological food park

W2V

Miscellaneous

- Geothermal economical database
- Efficient Maintenance Management of Geothermal Power Plants



Waste to Value seminars

General Introduction

3. April, 2013 @ 14.00-16.00 University of Iceland, VR-II, room 157;

- Sigurður Magnús Garðarsson, Professor at University of Iceland Chairman of GEORG Board of directors
- Bjarni Már Júlíusson, Project Manager at Reykjavik Energy
- Auður Andrésdóttir, Resource manager, environment and safety, Mannvit Engineering

H2S emission from Geothermal Power Plants

10. April, 2013 @ 14.00-16.00 University of Iceland, VR-II, room 157

- Hjalti Sigurjónsson Project manager at Vatnskil Engineering
- Snjólaug Ólafsdóttir PhD student at University of Iceland
- Ragnhildur Finnbjörnsóttir, PhD student at University of Iceland-

Value creation from chemicals/gases

17. April 2013 @ 14.00-16.00 Reykjavík University, room M20R

- María Hildur Maack, Environmental Manager, Icelandic New Energy
- Guðmundur Gunnarsson, Group leader, Innovation Centre Iceland
- Ómar Sigurbjörnsson, Head of Research, Carbon Recycling International

Value creation from chemicals/gases

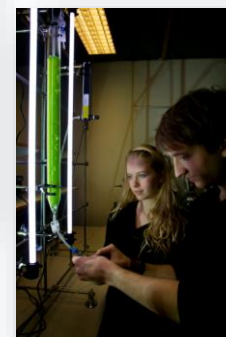
24. April 2013 @ 14.00-16.00 Reykjavík University, room M20

- Sveinn Aðalsteinsson, GeoGreenhouse
- Sigurður Brynjólfsson, Prófessor við Háskóla Íslands
- Arnþór Evarsson, Prokatin

Disposal and Sequestration

8. May 2013 @ 14.00-16.00 Reykjavík University, room M208

- Edda Sif Aradóttir, Reykjavik Energy
- Gunnar Gunnarsson, Reykjavik Energy



From Waste to Value

W2V

Slides from the seminars at
<http://georg.hi.is/node/227>

Aim: To form a research project on this topic, in the same spirit as the DRG project.

Next steps: To sum up the content of the seminars identify research gaps and cooperation opportunities

Workshop planned next fall

GEORG Open House

GEORG organized an Open House, November 22nd 2012,
8 projects presented
6 projects presented with posters

Held at the conference room of the National Museum of Iceland

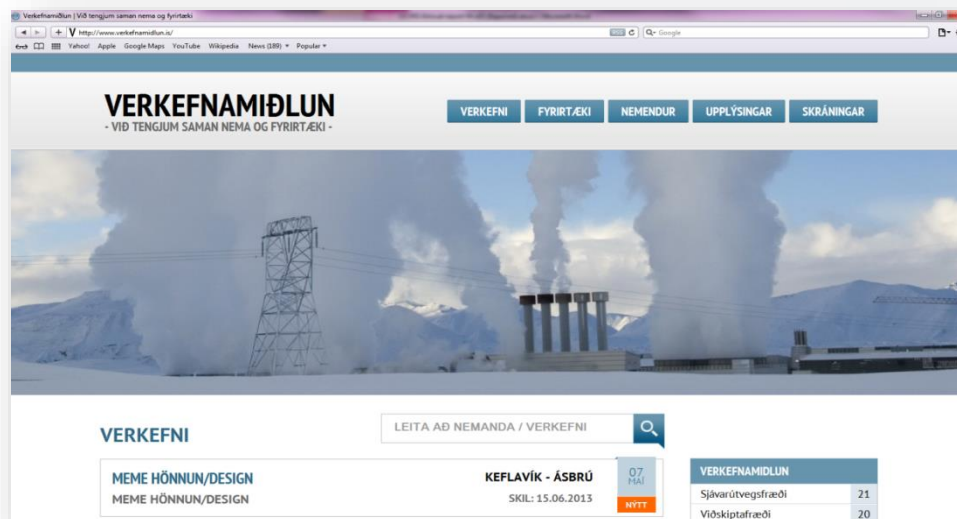
Over fifty people attended.



Project presented		Coordinator
ID number	Name	Name
09-01-003	Development of coupled reactive fluid flow models	Hannes Jónsson
09-01-011	Properties of two phase flow of water and steam in geothermal reservoirs	Guðrún Sævarsdóttir
09-01-012	RENEWABILITY OF GEOTHERMAL RESOURCES	Guðni Axelsson
09-01-028	Evaluation and Improvements of Geothermal Models using Inverse Analysis	Magnus Þor Jonsson
09-02-001	CarbFix project	Sigurður R. Gíslason
09-02-005	The Hengill geothermal reservoir. Evaluation of subsurface geological data	Hjalti Franzson
09-02-017	Geothermal economic impact data base	Sveinn Agnarsson
10-03-005	GeoChem	Sigurður Brynjólfsson
10-03-012	Sustainability Assessment Protocol for Geothermal Utilization	Brynhildur Davíðsdóttir
10-03-013	Mapping interaction between magmatic and hydrothermal system with fluid inclusion analysis	Anette K. Mortensen
11-04-003	H ₂ S sequestration into geothermal systems	Andri Stefánsson
11-04-005	Efficient Maintenance Management of Geothermal Power Plants	Rúnar Unnþórsson

PROJECT SHARING WEBSITE

- Strengthening the connections between students and businesses and encouraging their cooperation
- GEORG and Iceland Geothermal recently signed a cooperation agreement with the Icelandic Ocean cluster on joining the operation of the project sharing website: www.verkefnamidlun.is
- Ensures an access for the geothermal sector to the website as well as the influence on future development of the site

VERKEFNAMIDLUN
- VÍÐ TENGJUM SAMAN NEMA OG FYRIRTÆKI -

VERKEFNI FYRIRTÆKI NEMENDUR UPPLÝSINGAR SKRÁNINGAR

LEITA AÐ NEMANDA / VERKEFNI

VERKEFNAMIDLUN	
Sjávarútvegsfræði	21
Viðskiptafræði	20

MEME HÖNNUN/DESIGN
MEME HÖNNUN/DESIGN

KEFLAVÍK - ÁSBRÚ
SKIL: 15.06.2013

07
15.06
NYTT

Student support



■ ***THE FOURTH EUROPEAN GEOTHERMAL PHD DAY - EGPD 2013***

- 2 students were supported to participate in the 4th European Geothermal PhD day, held in Hungary in early May

■ ***BEST***

- GEORG also supported the BEST Reykjavík, as they did hold a spring course on geothermal in Iceland in March.
- BEST, Board of European Students of Technology is a non-profit and non-political organisation, consisting of 95 Local BEST Groups (LBGs) in 33 countries of which BEST Reykjavik is one of them.

■ ***GENERAL TRAVEL SUPPORT FOR STUDENTS FOR CONFERENCE PARTICIPATION***

- This year the GEORG BoD decided to allocate additional funds to general travel support for students
- Up to 2MISK per year, including the support for EGPD.
- Target group:
 - Students working on project on geothermal/ within the scope of GEORG
 - Students that are linked with GEORG partners
 - Student presenting his/her work at the conference



Focus on the utilization of geothermal energy ranging from direct use to high enthalpy resources for power generation

Budget: € 2.2 mln (2012-2016)

Lead partner is Orkustofnun
(National Energy Authority of Iceland)

■ **Aims:**

- **Deepen European cooperation** at national and administrative levels
- Enable the **integration of national research programs**
- Develop agenda for a coherent European geothermal R&D program

Hjalti Páll Ingólfsson,
working part time on the ERA NET at Orkustofnun

Activities on the road

- Define potential **new partners**: UK, Norway, Romania, Slovenia, Austria, Spain, Greece and Portugal ...
- The ERA NET **website** : www.geothermaleranet.eu
- Information Exchange started; information collection through questionnaires:
 - Status, programmes and public incentives
 - RD&D highlights (selected projects)
 - Mapping of national stakeholders
 - Available data and databases
- Prepare the ground for **EGIP**, 1st Roundtable in Reykjavik, 5th of March 2013, 2nd Roundtable in Pisa, 3rd of June 2013

... and ahead

- Identify and analyse technical and non-technical barriers (and opportunities) for geothermal development and map the need for future RD&D
- Propose (joint) actions to bridge gaps, overcome barriers and promote the use of geothermal energy in Europe



GEORG and Iceland Geothermal (IG)



- The cooperation between GEORG and Iceland Geothermal is continually growing
 - Sigurður Magnús Garðarsson and Hjalti Páll Ingólfsson observes the IG BoD meeting
 - Þóra Margrét Þorgeirsdóttir / Hákon Gunnarsson observes the GEORG BoD

The cooperation is now focused on three main topics:

1) *Innovation efforts*

Working together on setting up innovation accelerators to speed up product development and encourage entrepreneurship



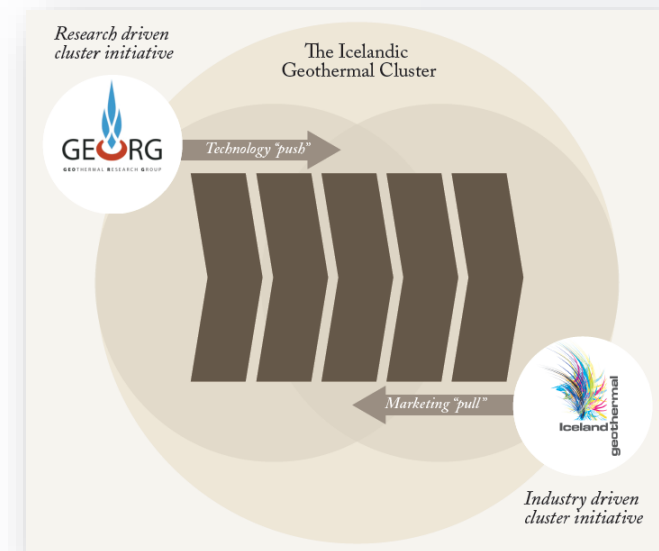
2) *Recruitment in the geothermal sector*

The clusters jointly signed a cooperation agreement with the Ocean Cluster regarding accessibility of the geothermal industry to the project sharing website www.verkefnamidlun.is



3) *Data collection and analysis*

The cluster management teams are seeking ways to start a cooperation project on data gathering and analysis for the geothermal sector. This could also include cooperation with Orkustofnun and the Geothermal ERA NET to streamline data collection and avoiding duplicating efforts in data collection and analysis.



Dissemination



- GEORG has been presented in several conferences and meetings, in Iceland and abroad
- GEORG has an website: www.georg.hi.is
 - Information on calls and conferences etc.
 - ...and on Facebook as well



DISCUSSION ON ANNUAL REPORT



Hjalti Páll Ingólfsson, Operational Manager

ANNUAL ACCOUNTS

GEORG Project



GEORG Project - Cost and financing account

Cost	Note	Year 3			Year 4		
		GEORG	Partners	Total	GEORG	Partners	Total
Grants	1	32.889	62.453	95.342	34.520	70.099	104.619
Contracted services.....	2	278	150	428	292		292
Travel expenses.....	3	206		206	0		0
Conferences, dissem. & outreach.....	4	435	4.020	4.455	105	3.600	3.705
Overhead total.....	5	8.982	3.900	12.882	10.405	5.276	15.681
Total operation cost		42.790	70.523	113.313	45.322	78.975	124.297
Financing							
Admission fee.....		460		460	0		0
Partner Co-financing.....		100	70.523	70.623	0	78.975	78.975
Funding from Rannis.....	6	70.000		70.000	14.000		14.000
Total financing		70.560	70.523	141.083	14.000	78.975	92.975
Results of operational activities		27.770	0	27.770	-31.322	0	-31.322

GEORG Project



GEORG - Balance sheet

	Note	Year 3	Year 4
		31. March 2012	31. March 2013
Assets			
Cash and cash equivalents.....	7	71.267	39.944
Unpaid funding fom Rannís.....	6	14.000	70.000
Other receivables.....	1	2.400	32
Total assets		87.667	109.977
Debts and liabilities			
Unpaid grants for projects.....	8	71.950	45.605
Other short term liabilities.....	1	73	0
Total debts and liabilities		72.023	45.605
Balance at beginning of period		16.466	15.644
Final results of the year		-822	48.728
Total assets		15.644	64.372

Annual Account Review

Reykjavík 15. maí 2013



Skoðun á verkefninu „GEORG - Centre of Excellence and Research Cluster“ fjórða ár.

Við yfirferð okkar á reikningshaldi vegna verkefnisins könnuðum við hvort kostnaðurinn mætti teljast eðlilegur miðað við tilgang verkefnisins og samninga sem gerðir hafa verið þar um. Við könnuðum einnig hvort og hvaða ferlar væru til staðar er lúta að samþykktum reikninga, bókunum þeirra o.fl.



Skoðun okkar leiddi ekki annað í ljós en kostnaður væri eðlilegur miðað við verkefnið og greiðslur ársins í samræmi við samantekt starfsmanns verkefnisins með smávægilegum undantekningum þar sem kostnaður kr. 32.420 tilheyrði GEORG-Rannsóknarklasa í jarðhita.



Sveinbjörn Sveinbjörnsson

Löggiltur endurskoðandi

GEORG Association

Statement of Activities 1.4.2012-31.3.2013

	Note	1.4.2012- 31.3.2013
Revenues		
Operational grants		461.033
Other grants		1.520.410
		<u>1.981.443</u>
Expenses		
Grants awarded		670.000
Other expenses		1.293.573
		<u>1.963.573</u>
Financial income and (expenses)		
Interest revenues and exchange differences		1.243
Financial income taxes		(248)
Bank related service fees		(18.865)
		<u>(17.870)</u>
Increase in Net Assets		0
Excess of revenues over expenditures		<u><u>0</u></u>





Statement of Financial Position

Assets

	Note	31.3.2013
Current assets		
Receivables:		
Cash and cash equivalents		1.886.417
		<hr/>
	Current assets	1.886.417
		<hr/> <hr/>
	Total assets	1.886.417
		<hr/> <hr/>

GEORG Association

31 March 2013

Equity and Liabilities

	Note	31.3.2013
Net assets		
Permanently restricted		0
Temporarily restricted		0
Unrestricted		0
Total net assets	3	<u>0</u>
Current liabilities		
Deferred income		1.538.967
Accounts payable		347.450
Total liabilities		<u>1.886.417</u>
Total net assets and liabilities		<u><u>1.886.417</u></u>





Itemizations

	1.4.2012- 31.3.2013
Grants awarded	
MarkMar	280.000
Gekon ehf	140.000
Viðfari Best á Íslandi	250.000
	<hr/>
	670.000
	<hr/>
Other expenses	
Rent	697.628
Other services purchased	148.592
Computerized IT systems	12.235
Paper, printing and other office supplies	56.964
Meetings and conferences	322.762
Advertising and marketing costs	50.392
Founding related expenses	5.000
	<hr/>
	1.293.573
	<hr/>



DISCUSSION ON ANNUAL ACCOUNTS

GEORG – Operational Plan



Rannis total grant	MISK	490
Already allocated		-245
Operational cost (first 4Y)		-40
Still to be allocated		205
Minimum operational cost for Y5 -Y7 + 1 additional year (12MISK x 4 years)		-48
Total budget left for research		<u>157</u>
	-> on yearly basis	<u>52</u>

	2013-2014	2014-2015	2015-2016	Total
	Y5	Y6	Y7	
DRG project (WP4)	11	11	11	33
Opportunities in Geothermal Gases / downstream utilization (WP6)	2	10	10	22
Data management, economic and social activities (WP7)	5	10	10	25
Innovation efforts (WP3 & WP5)	8	4	4	16
Increased visibilitiy (WP2 & WP8)	2	2	2	6
Improved services (all WP's)	4	4	4	12
Open calls - TBD	20	11	12	43
Total	52	52	53	157



DETERMINATION ON MEMBERSHIP FEES

Decision on Membership Fees



- The BoD proposes that the membership fee continues to be 0



ELECTIONS

Election of Board of Directors



Icelandic Universities, research institutions and governmental agencies – 5 BoD seats

Sigurður Magnús Garðarsson

Magnús Tumi Guðmundsson

Guðrún Sævarsdóttir

Rúnar Unnþórsson

Ólafur G Flóvenz

Energy companies –
1 BoD seat

Guðmundur Ómar
Friðleifsson

Private companies–
1 BoD seat

Auður Andrésdóttir

Other EEA based participating collaborators and Associate members –
1 BoD seat

Ernst Huenges

BoD propose the following:

- Einar Jón Ásbjörnsson HR to replace Guðrún A Sævarsdóttir
- Steinunn Hauksdóttir ISOR to replace Ólafur G Flóvenz
- Sigurður Magnús Garðarsson and Ernst Huenges continue

The Board proposes that following individuals be re-elected to the Science Academy:

Name	Position	Name	Position
Sveinbjörn Björnsson	Chair		
Brynhildur Davíðsdóttir	UNI	María S Guðjónsdóttir	RU
Árný Erla Sveinbjörnsdóttir	UNI	Guðni A Jóhannesson	OS
Guðni Axelsson	ISOR	Einar Gunnlaugsson	OR
Halldór Pálsson	UNI	Kristinn Ingason	Mannvit
David Mainprice	CNRS	David Bruhn	GFZ
Hrefna Kristmannsdóttir	Independent	Ingólfur Örn Þorbjörnsson	ICI
Ólafur Guðmundsson	Uppsala University	Sæunn Halldórsdóttir	ISOR



INAUGURATION OF NEW PARTNERS

Uppsala University



Application to join GEORG send in January 2013

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

- **The BoD recommends to accept Uppsala University as a new member**



OTHER MATTERS



The General Assembly is concluded





GEORG office task list

- **Manage calls**
- **Follow up on supported projects**
 - Collect in systematic way results and products from projects and look for innovation aspects and product development possibilities
 - Look for further cooperation possibilities within projects and beyond
- **Special projects of GEORG**
 - Other projects with similar set-up as DRG
 - Data collection
 - Exhaust treatment from geothermal power plants
 - Innovation projects/programs

- **Match-making**
- **Organizing conferences, workshops and seminars**
- **Innovation and entrepreneurship**
 - Increase innovation activities
 - Search for innovation aspects and opportunities within supported projects
 - Search for innovation aspects and opportunities among cluster participants
 - Offer innovation training and matchmaking on geothermal
 - Help in seeking funding for innovation
 - Close cooperation with Iceland Geothermal on this.



- **Participation in EU energy committee on behalf of Iceland**
- **Grant applications on behalf of GEORG**
- **Grant application support for GEORG participants**
 - Collect, in systematic way, project ideas and opportunities for GEORG partners to write and submit applications in larger international funds.
 - Matching possible cooperation projects of GEORG partners to calls of various support programs (national and international)

- **Website**
 - Update more frequently on news and events and increase information sharing
 - Keep on streamlining the website so it is more user friendly
 - Set up a project sharing/cooperation request platform
- **Promotion at conferences and events**
- **Project result dissemination**
 - Follow up on regular bases the dissemination of supported project results and outcomes
- **Overall visibility increase**
 - Increase GEORG visibility (national/international)
 - Introduce GEORG more actively to different organisation and platforms (e.g. EGEC, EERA JPEG, IEA GIA, GRC and others)