May 24. 2011

3RD GENERAL ASSEMBLY

Sigurður Magnús Garðarsson
Chairman of the board

Agenda

13:15-13:20 Welcome note by the Chairman of the Board

13:20-13:40 Annual Report Presented

13:40-13:50 Elections

13:50-14:00 Inauguration of new partners

14:00-14:10 Strategy workshop results

14:10-14:20 Other matters

Election of chair of the meeting

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

Sigurður Magnús Garðarsson, Chairman of the Board

ANNUAL REPORT PRESENTATION

REPORT OF THE BOARD

GEORG

GEOTHERMAL RESEARCH GROUP

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 21 partners, combining all major players on geothermal research and utilization in Iceland and their key international collaborators.*

GEORG *creates a platform for joint effort to strengthen research and development of innovations in the field of geothermal energy.*

GEORG *has supported 19 projects on various aspects of geothermal research and utilization.*

Industry axis

Scientific axis

UNIVERSITY OF ICELAND

MANNVIT ENGINEERING

brgm

Orkuveita Reykjavíkur

ÍSOR

GFZ Helmholtz Centre Potsdam

HÁSKÓLINN Í REYKJAVÍK REYKJAVIK UNIVERSITY

Keilir Atlantic Center of Excellence

United Nations University

REYST

Berkeley Lab

CNRS

HS ORKA HF

Landsvirkjun

MarkMar ehf

VERKÍS

Nýsköpunarmiðstöð Íslands

GNS SCIENCE TE PŪ AO

CARBON RECYCLING INTERNATIONAL

ORKUSTOFNUN

GEORG
GEOTHERMAL RESEARCH GRO

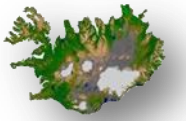
GEORG HAS THE VISION OF BEING A

INTERNATIONAL LEADER IN GEOTHERMAL ENERGY RESEARCH

MAIN OBJECTIVES:

WORLDWIDE REDUCTION OF GHG EMISSIONS

By contributing to significant increase in sustainable energy production and utilization from geothermal sources



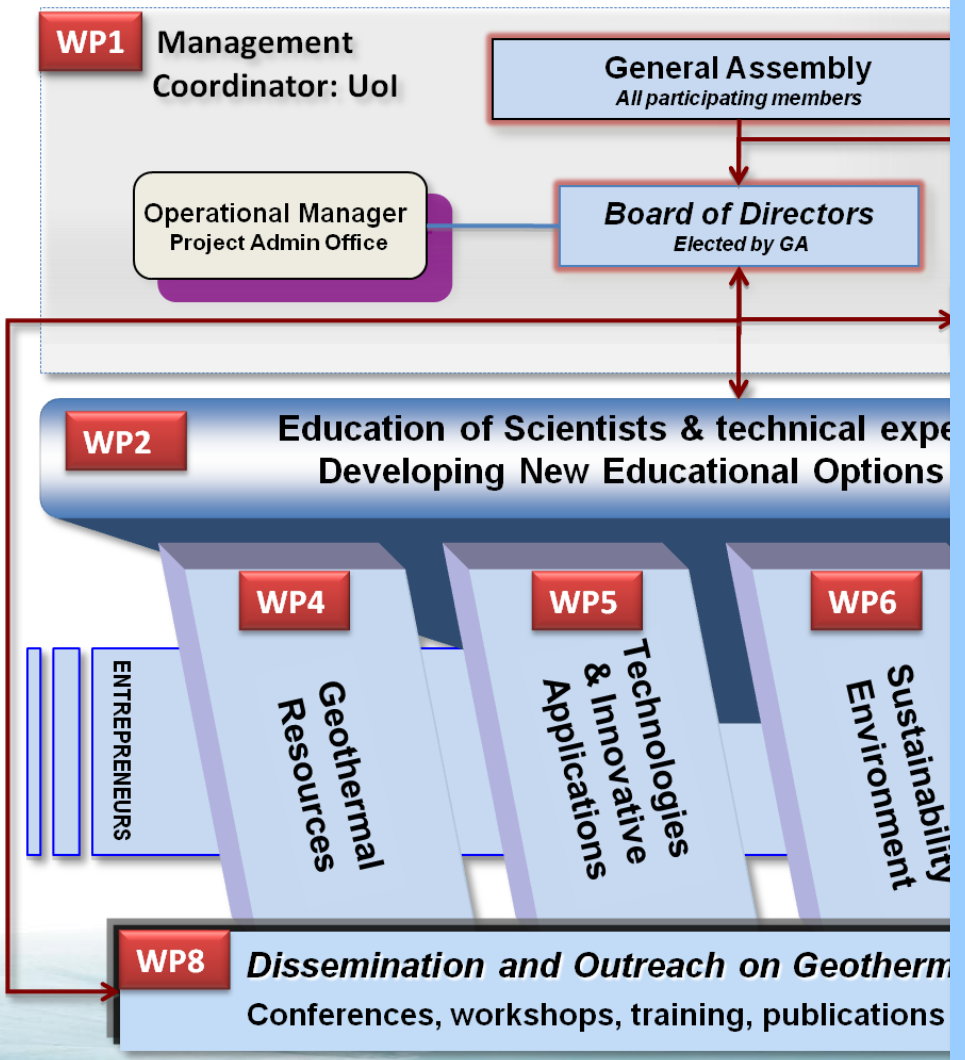
MAKE ICELAND A CASE STUDY

for near energy independent and a carbon neutral society

CREATE A PLATFORM FOR ENTREPRENEURSHIP

and export for geothermal energy resources and education, both for partners in the group and in the ensuing creative environment established through its national and international operations.

Organizational Chart



WP leaders

WP1: Sigurður Magnús Garðarsson
WP2: Edda Lilja Sveinsdóttir
WP3: Ágúst Valfells
WP4: Ólafur Flóvenz
WP5: Halldór Pálsson
WP6: Guðni Axelsson
WP7: Sveinn Agnarsson
(Brynhildur Davíðsdóttir)
WP8: Sigurður G. Bogason

Board of Directors

Auður Andrésdóttir
Edda Lilja Sveinsdóttir
Ernst Huenges
Guðrún Sævarsdóttir
Ólafur G Flóvenz
Rúnar Unnþórsson
Sigrún Hreinsdóttir
Sigurður Magnús Garðarsson

Operational Manager

Hjalti Páll Ingólfsson

Chair of Science Academy

Sveinbjörn Björnsson

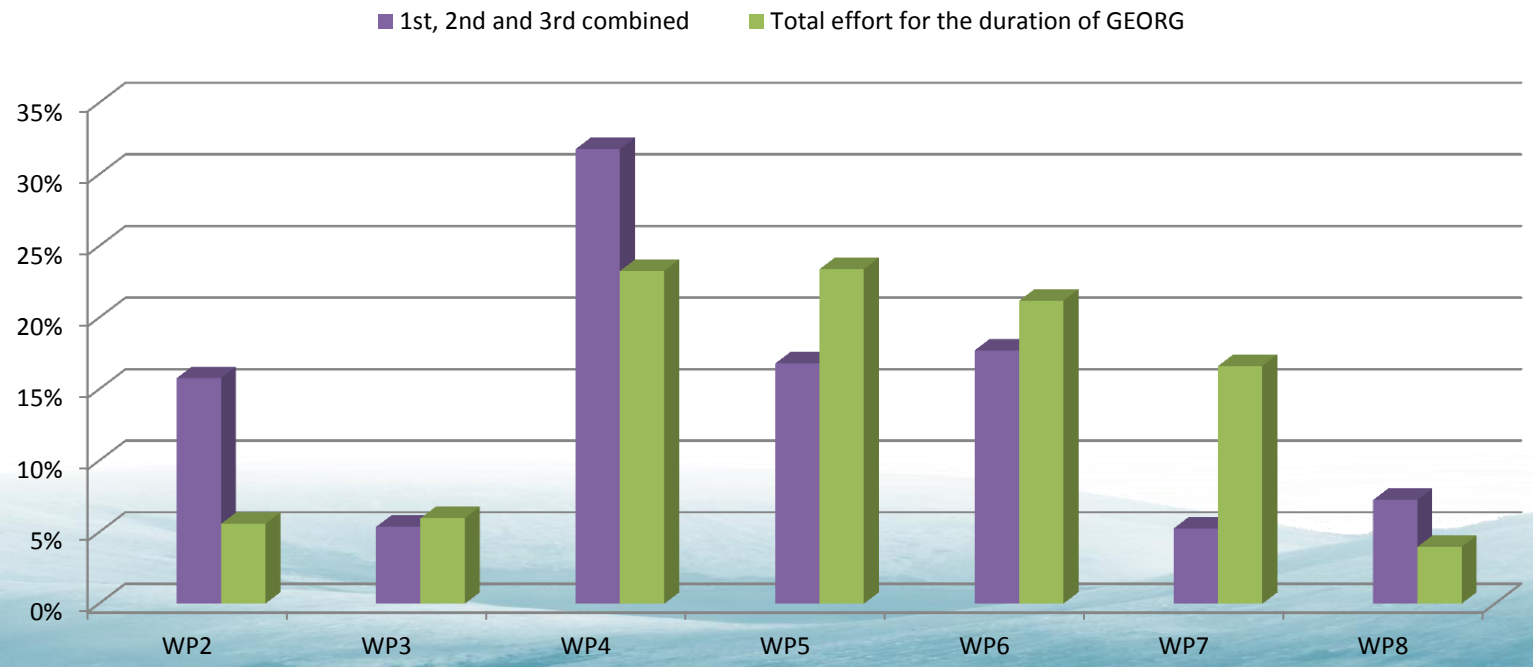
GEORG Operations

- Four main pillars
  - Project support through calls
  - Hosting and supporting events and conferences
  - Taking part in EU strategy work and seeking funds from abroad
  - Disseminating and promoting GEORG work and geothermal energy in general

Supported Projects

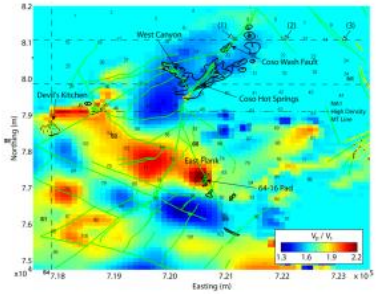
- GEORG has published 3 calls during 2 years of operation
- 19 projects supported
  - Total grants 231,5 MISK,
    - grant agreement with projects renewed yearly
  - Total project cost 941,2MISK

80% Cofinancing

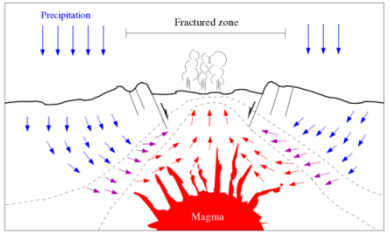


Supported projects

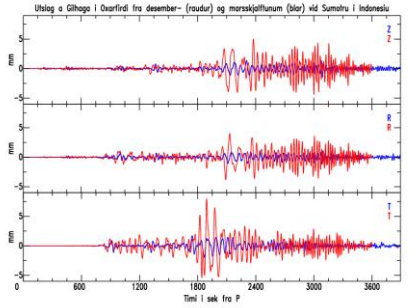
- **19 projects supported by GEORG,**
- **9 project in reservoir modelling and simulation**
  - Development of software and algorithm
  - Mapping and analysis of subsurface data (3D)
  - Methods to estimate sustainability of systems



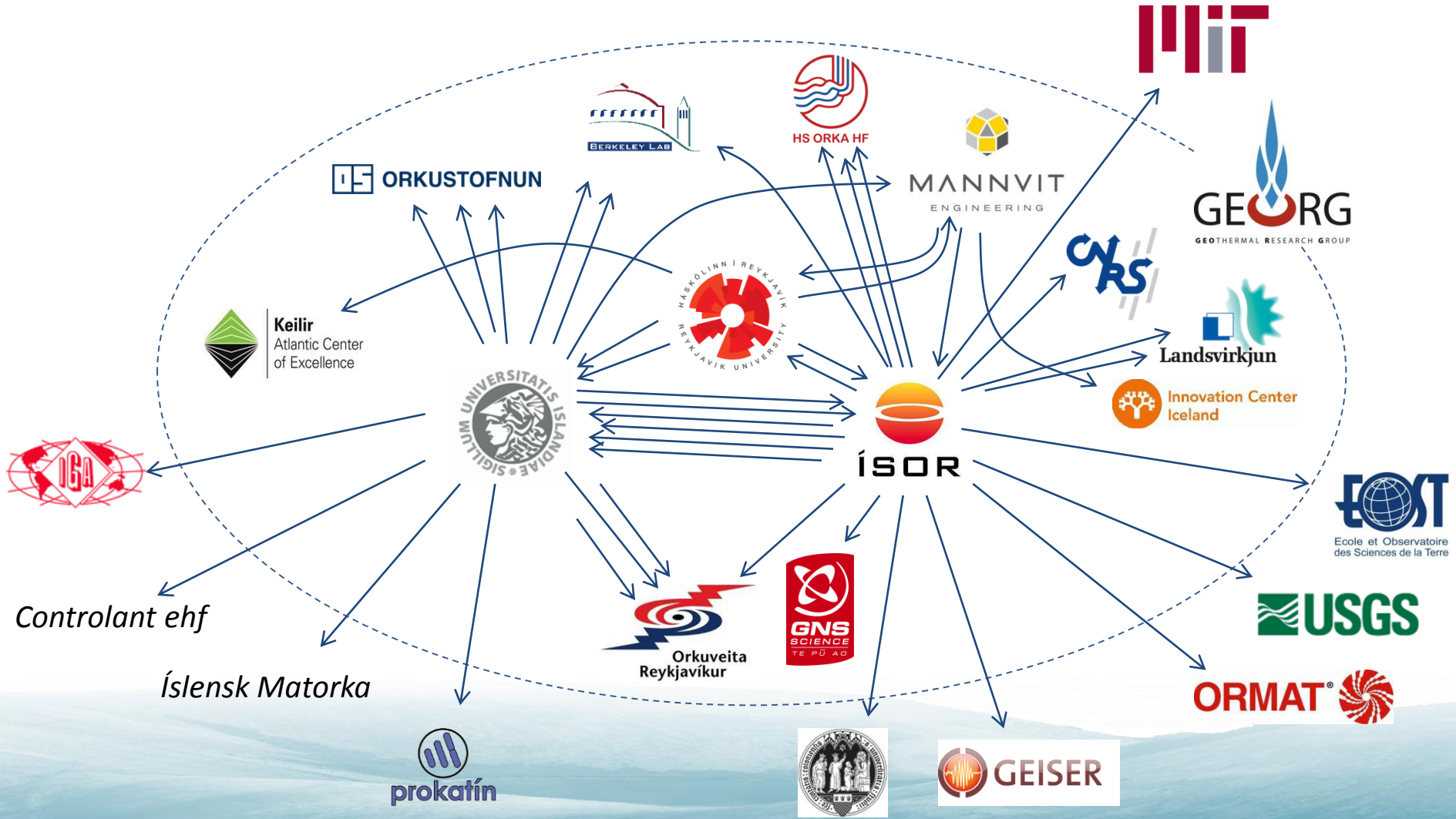
- **2 Project researching the super critical fluids**
  - Researches on two phase flow of super critical fluids and the utilisation of such fluids



- **8 Projects on other issues**
  - Seismicity research
  - Development of high pressure and high temperature groutsfor boreholes
  - CO_2 sequestration
  - Reduction of emission by using biochemical
  - Application of geothermal heat in aquaculture and building an ecological food park
  - Geothermal economical database
  - The sustainability of geothermal utilization: sustainability indicator for geothermal utilization



Collaboration pattern of supported projects



3rd call focus points

Task 4.3: Effects of tectonic movements and volcanic activity on geothermal systems

(a) System stress analysis by using break-out information from borehole televiewer data;

(b) Analysis of reservoir pressure changes observed during major earthquakes;

(d) Studies of the effects of magma intrusion into the roots of a geothermal systems and its degassing on the chemical and isotopic properties of the geothermal fluid;

Task 4.6: Development of methods for exploitation of deep geothermal systems

(c) Evaluation of scaling potential upon depressurization of the fluid;

Task 5.2: Direct use of geothermal heat for industrial processes

Task 5.6: Maintenance procedures in geothermal utilization

Task 5.7: Offshore drilling and utilization

Task 6.2: Environment and health impacts of geothermal energy utilization:

Task 6.4: Geothermal sustainability assessment protocol:

Task 7.3: Regional development and local capacity building

Task 7.4: Macroeconomic effects:

Task 7.6: Cost-benefit analysis and environmental impact:

Third Call Projects

- Published on September 22nd 2010
- Deadline on November 30th 2010
- 13 project proposals submitted and 4 projects awarded
  - Total support to these project amounts to just over 52 MISK
  - Total project cost is 215MISK

Project Name	Coordinator	Other Participants
Mapping interaction between magmatic and hydrothermal system with fluid inclusion analysis	Anette K. Mortensen	Landsvirkjun, USGS, ORMAT
Sustainability Assessment Protocol for Geothermal Utilization	Brynhildur Davíðsdóttir	Orkuveita Reykjavíkur, ÍSOR, ORKUSTOFNUN
GeoChem	Bernhard Örn Pálsson	Controlant ehf
Green Geothermal Growth	Sjöfn Sigurgísladóttir	Íslensk Matorka; ORKUSTOFNUN

Events and Conferences Y2

- Open Conferences at General Assembly
- 2nd European PhD day supported
  - EGPD in Iceland 2011
- Roots of Geothermal Systems
  - 7 seminars held weekly, winter and spring 2011
  - Follow up conference planned in August 2011
- Frá gufu til gjaldeyris
  - 6 mini conferences on Geothermal Energy innovation
- Strategy workshops
  - WP leader workshop in August 2010 - 3rd call preparation
  - Strategy meeting in January 2011

Events and conferences Y2

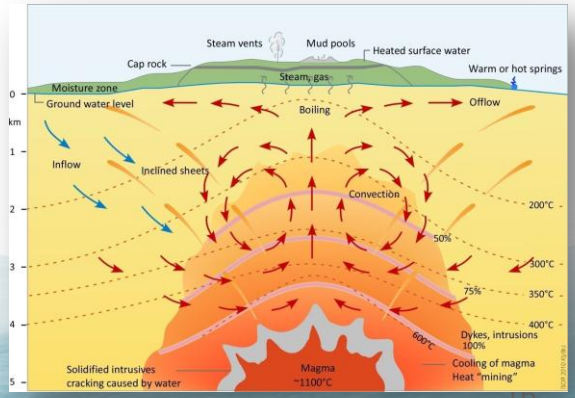
- Frá Gufu til gjaldeyris
  - 6 mini conferences on Geothermal Energy innovation

10. mars 2011 Jarðhiti og matvælaframleiðsla, Háskólanum í Reykjavík
16. mars 2011 Jarðhiti og ferðaþjónusta, Háskólanum í Reykjavík
23. mars 2011 Jarðhiti og iðnaður, Háskólanum í Reykjavík
6. apríl 2011 Jarðhiti og ráðgjafastarfsemi, Orkuveitu Reykjavíkur
13. apríl 2011 Jarðhiti, menntun, mannauður, Orkuveitu Reykjavíkur
5. maí 2011 Jarðhiti og vöruþróun, Orkuveitu Reykjavíkur

Events and conferences Y2

- Roots of Geothermal Systems
  - 7 seminars held weekly, winter and spring 2011
  - Follow up conference planned in August 2011

15.02.11 Volcanic Roots of Krafla and Hengill,
24.02.11 Properties of intrusives,
03.03.11 Use of Magneto-Telluric prospecting,
09.03.11 Pressure and temperature of volcanic geothermal systems and their roots
17.03.11 Energy transfer to the deep roots The conceptual model for central volcano fields
24.03.11 Heat Sources - Fluid Interactions
07.04.11 Heat extraction in the roots



EU ACTIVITIES

- **7th Framework Program Committee for Energy**
  - great advantage to explore and facilitated the opportunities in FP7
  - change to promote geothermal as an important energy source within the renewable energy portfolio
- **EERA - JPGE**
  - Aims at providing an outstanding contribution bringing together the 14 leading European geothermal research institutions in a single strategically oriented Joint R&D Programme
  - Out of the 14 EERA –JPGE partners 4 are participating in GEORG
  - EERA –JPGE and GEOTHERMAL ERA NET will work formally together forming future European Research strategy through the ERA NET cooperation.
- **EU CIP call: Strand 1 – Promoting international cluster activities in the CIP participating countries**
  - GEORG submitted, together with Iceland Innovation Centre, Gekon, INNOVA ÉSZAK-AFÖLD (Hungary) and BUNDESVERBAND GEOTEHERMIE (Germany) a Concept Note on Geothermal Cluster in the EU CIP call - 3/G/ENT/CIP/11/C/N04C011.
  - Aims at fostering European cluster cooperation in view of internationalization strategies outside Europe, by building upon and further developing successful support schemes already implemented in some Member States

E R A - N E T

SEVENTH FRAMEWORK PROGRAMME

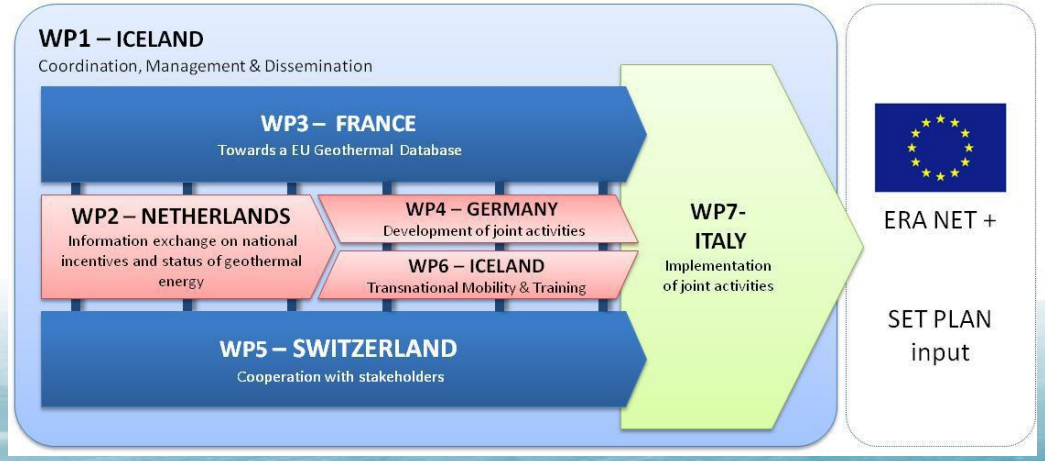
GEORG
GEOTHERMAL RESEARCH GROUP

- **GEORG** coordinated a proposal submission in the EU call "FP7-ERANET-2011-RTD".
  - The duration of the ERA NET is 4 years and the support for the EU amounts to 2M€. ERA NET is a coordination action and is 100% financed by the EU Commission
- Participating in this ERA NET gives a golden opportunity to deepen the cooperation of national program owners and administrators and thus be an enabler for the integration of national research and development agendas into a coherent European geothermal R&D program.
- Partners

National Energy Authority (coordinator)
Agentschap NL
Swiss Federal Office of Energy
The National Research Council of Italy
Project Management Jülich
ADEME (French Agency for Environment and Energy Management)
Icelandic Centre for Research (RANNIS)
The Energy Efficiency, Environment and Energy Information Agency
Scientific and Technological Research Council of Turkey (TUBITAK)
Ministry of Education, Science, Research and Sport of the Slovak Republic

GEOTHERMAL ERA NET focus

- The Geothermal ERA-NET is aimed
  - to deepen the cooperation on national and administrative level
  - be an enabler for the integration of national research
  - development agendas into a coherent European geothermal R&D programme
- The Geothermal ERA-NET will focus on the utilization of geothermal energy, from direct heating use up to higher enthalpy resources and their corresponding use (e.g. power generation)



CLUSTERS COOPERATION

- The “Icelandic Geothermal Cluster – Porter style”
  - GEORG is participating in the preperation work of creating the “Icelandic Geothermal Cluster”
  - An expert panel was established and Edda Lilja Sveinsdóttir is appointed as GEORG representative
  - GEORG is willing to continue exploring the possibilities of further and broader cooperation in this field

Timeline provided by GEKON

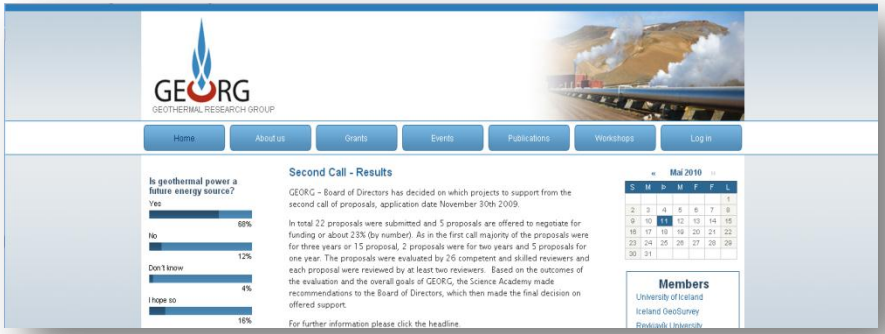
CLUSTERS COOPERATION

- Nordic-German-Polish Cluster Excellence Project
  - GEORG is taking part in a Nordic-German-Polish Cluster Excellence Project on Benchmarking of clusters in cooperation

    with Rannís.
  - GEORG participated in an interview conducted by Dr. Gerd Meier zu Köcker, Managing Director of the Agency Competence Networks Germany,
  - The project has organized an intensive cluster conference Copenhagen later this week
    Hjalti Páll will attend on behalf of GEORG

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 is active on Facebook as well



Hjalti Páll Ingólfsson, Operational Manager

ANNUAL REPORT PRESENTATION

ANNUAL ACCOUNTS

GEORG - Cost and financing account Year 2, 2010-2011

GEORG - Cost and financing account

		Year 1			Year 2		
Cost	**Note**	**GEORG**	**Partners**	**Total**	**GEORG**	**Partners**	**Total**
Grants	1	10.958	31.731	42.689	53.452	218.921	272.373
Contracted services.....	2	957	0	957	537		537
Travel expenses.....	3	0	0	0	433		433
Conferences, dissem. & outreach.....	4	724	845	1.569	308	3.500	3.808
Overhead total.....	5	6.505	8.700	15.205	8.829	6.200	15.029
Total operation cost		**19.144**	**41.276**	**60.420**	**63.559**	**228.621**	**292.180**
Financing							
Partner Co-financing.....			41.276	40.931	400	228.621	229.021
Funding from Rannis.....	6	50.000		50.000	76.000		76.000
Total financing		**50.000**	**41.276**	**90.931**	**76.400**	**228.621**	**305.021**
Results of operational acivities		**30.856**	**0**	**30.856**	**12.841**	**0**	**12.841**

co financing 78%

GEORG - Balance sheet
Year 2, 2010-2011

Assets	**Note**	**31. March 2011**
Cash and cash equivalents.....	7	43.697
Unpayed funding fom Rannís.....	6	14.000
Unaccounted co-financing of R&D projects.....	1	61.289
Total assets		**118.985**
Debts and liabilities		
Unpayed grants for projects.....	1	26.844
Unaccounted co-financing of R&D projects.....	1	61.289
Total debts and liabilities		**88.133**
Total assets		**30.853**

GEORG - Budget Plan Year 3, 2011-2012

	Plan for Year 3		
Cost	**GEORG**	**Partners**	**Total**
Grants	101.412	352.705	454.117
Contracted services	700		700
Travel expenses	200		200
Conferences, dissem. & outreach	200	3.500	3.700
Overhead total	9.298	6.200	15.498
Total operation cost	**111.810**	**362.405**	**474.215**
Financing			
			Co-financing of 76,4%
Partner Co-financing	200	362.405	362.605
Funding from Rannis	70.000		70.000
Total financing	**70.200**	**362.405**	**432.605**
Results of operational acivities	**-41.610**	**0**	**-41.610**

ELECTIONS

Election of Board of Directors

BoD			
Icelandic Universities, research institutions and governmental agencies – 5 BoD seats	*Energy companies – 1 BoD seat*	*Private companies– 1 BoD seat*	*Other EEA based participating collaborators and Associate members – 1 BoD seat*
Sigurður Magnús Garðarsson Chair (2) Sigrún Hreinsdóttir(1) Guðrún Sævarsdóttir (2) Rúnar Unnþórsson (1) Ólafur G Flóvenz (2)	Edda Lilja Sveinsdóttir (1)	Auður Andrésdóttir (1)	Ernst Huenges (2)

All board members are willing to continue working for GEORG

Election of *Science Academy*

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

SA nominees			
Name	***Position***	***Name***	***Position***
Sveinbjörn Björnsson	**Chair**	**Ingólfur Örn Þorbjörnsson**	**Innovation Center Iceland**
Brynhildur Davíðsdóttir	**University of Iceland**	**María S Guðjónsdóttir**	**Reykjavik University**
Sigurður Reynir Gíslason	**University of Iceland**	**Guðni A Jóhannesson**	**OS**
Guðni Axelsson	**Iceland GeoSurvey**	**Einar Gunnlaugsson**	**OR**
Halldór Pálsson	**University of Iceland**	**Kristinn Ingason**	**Mannvit**
David Mainprice	**CNRS**	**David Bruhn**	**GFZ**
Hrefna Kristmannsdóttir		**Árný Erla Sveinbjörnsdóttir**	**University of Iceland**
Ólafur Guðmundsson	**HR**	**Sæunn Halldórsdóttir**	**ISOR**

INAUGURATION OF NEW MEMBERS

Admission Rules Proposed by the BoD

- Additional members of GEORG should be companies or institutions that conduct research and/or development in the field of geothermal science, technology and utilization and can contribute to the overall objectives of GEORG.
- The admission of a new member is subject to the payment of an admission fee, decided by the BoD.
- Indicative admission fee for 2010 is $2.000
- Admission of a new member must be approved by 2/3 of votes at General Assembly.

New Members

- Vatnaskil
  - Vatnaskil Consulting Engineers specialize in geothermal reservoir, groundwater, surface runoff, air pollution and environmental modelling
- Islensk Matorka
  - Íslensk Matorka ehf. is a company that focuses on utilization of renewable energy sources in Iceland and energy-intensive food production.

The BoD recommends to the GA that these companies become members of the cluster

STRATEGY WORKSHOP RESULTS

STRATEGY WORKSHOP RESULTS

- Session 1 GEORG existence
  - Identity: Possible organisational forms discussed including, Consortium, SES, EHF, EPC
    - BoD assigned to review and analyse and make recommendation to partners.
    - Strong emphasis on some kind of business identity (kt.)
  - Image and branding
    - Image created by reputation (láta verkin tala)
    - Understand/analyse the added value of the Cluster
- Session 2
  - GEORG as a Project.
    - Strengthen the inner work of GEORG
    - GEORG is a project and has responsibility to fulfil the grant agreement
    - Modify tasks according to lessons learnt
    - Increase visibility of products
    - Identify the span of GEORG
    - Define a procedure how to mobilise direct funding within GEORG, combined modality approach.
- Session 3
  - Possible future scenarios discussed with a focus international connections
    - E.g. BONUS EEIG, JPI OCEANS, DoE, NSF.....
  - Realise new sources of income...

OTHER MATTERS?

THE GENERAL ASSEMBLY IS CONCLUDED