

21. May 2010

2ND GENERAL ASSEMBLY

Sigurður Magnús Garðarsson
Chairman of the board



Agenda



- 09:30-10:00** ***Coffee and refreshments***
- 10:00-10:05** ***Welcome note by the Chairman of the Board***
Sigurður Magnús Garðarsson
- 10:05-11:15** ***Annual Report Presentation***
- *Report of the Board*
Sigurður Magnús Garðarsson, Chairman of the board
- *Annual Accounts for 2009/2010*
- *Financial plan for 2010/2011*
Hjalti Páll Ingólfsson, Operational Manager
- *Discussion*
- 11:15-11:30** ***Elections***
- *Election of Board of Directors*
- *Election of Science Academy*
- 11:15-11:30** ***Regulations on New Member Admission***
- 11:30-12:00** ***Other matters***
- 12:00-13:10** ***Lunch break***
- 13:10-16:00** ***Open Conference***



Í tengslum við ársfund GEORG, alþjóðlegs rannsóknaklasa í jarðhita, er efnt til opins málþings um jarðhitarannsóknir og nýtingu jarðhita.

Markmið rannsóknaklasans er að leiða saman aðila á jarðhitasviðinu og mynda sterkt afl til skjótra framfara í jarðhitarannsóknnum, verkfræði og hönnun.

Framtíðarsýn klasans er að verða leiðandi afl í alþjóðlegum jarðhitarannsóknnum.

MÁLÞING UM RANNSÓKNIR Í JARÐHITA

í húsakynnum Orkuveitu Reykjavíkur

föstudaginn 21. maí, kl. 13:10 - 16:00

Málþingið mun fara fram á ensku og er öllum opið

- 13:10-13:20 **Welcome Address**
Sigurður Magnús Garðarsson, Chairman of the Board
- 13:20-13:40 **International Partnership of Geothermal Technology (IPGT)**
Ólafur G. Flóvenz, IPGT board member, ÍSOR
- 13:40-14:00 **The IEA Geothermal Implementing Agreement (GIA)**
*Jónas Ketilsson, GIA - Vice Chairman
The National Energy Authority*
- 14:00-14:20 **International Operation of Mannvit Engineering**
Tryggvi Jónsson, Mannvit
- 14:20-14:45 **Kaffihlé**
- 14:45-15:00 **Geothermal Models Using Inverse Analysis, Iceland / US Cooperation**
Magnús Þór Jónsson, University of Iceland
- 15:00-15:15 **Biological Utilization of Geothermal Gas**
Guðmundur Óli Hreggviðsson, University of Iceland
- 15:15-15:30 **High Pressure and High Temperature Geothermal Grouts**
Gísli Guðmundsson, Mannvit
- 15:30-15:45 **Resistivity Survey of Grímsvötn**
Arnar Már Vilhjálmsson, ÍSOR
- 15:45-16:00 **How should GEORG proceed?**
Almennar umræður

Suggested Meeting Management



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

Sigurður Magnús Garðarsson, Chairman of the Board

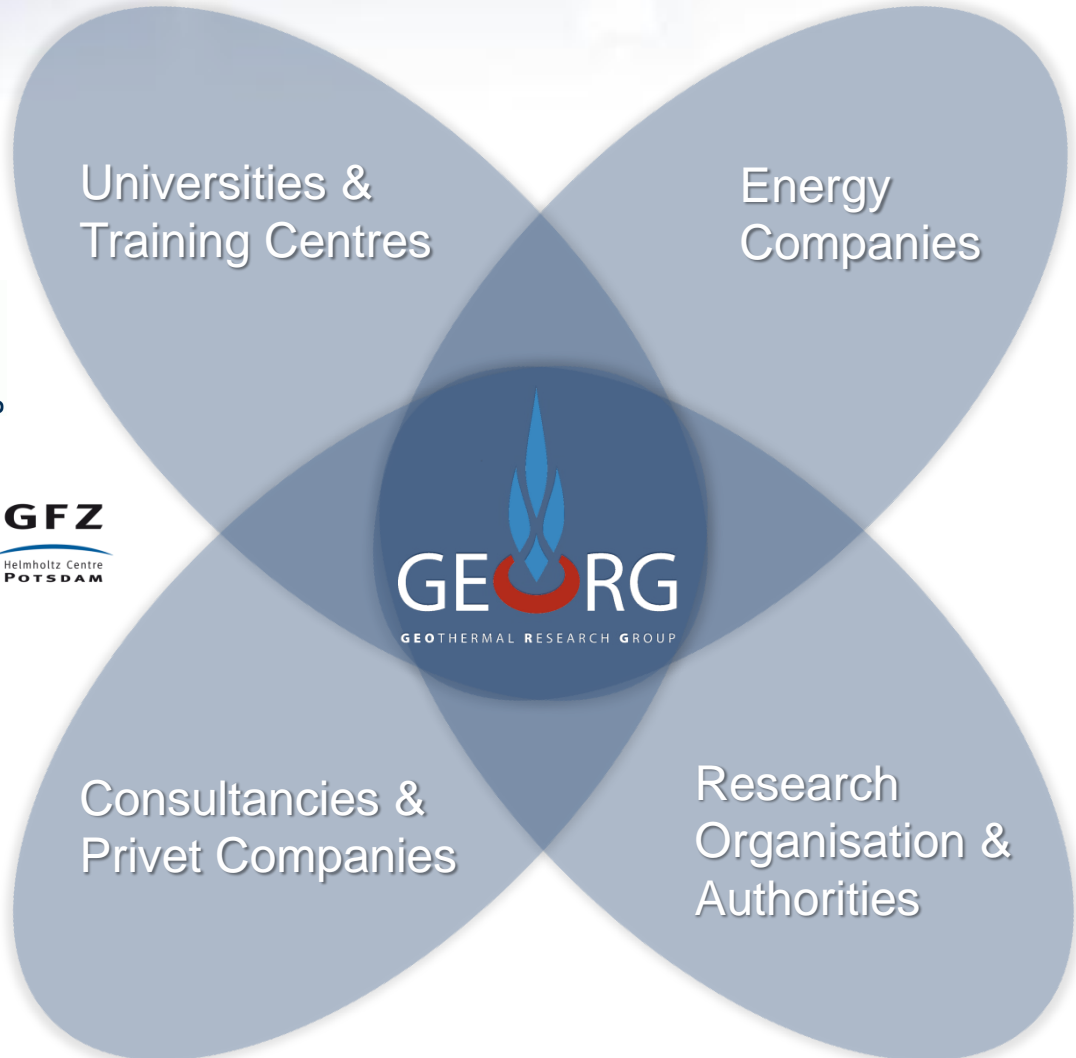
ANNUAL REPORT PRESENTATION
REPORT OF THE BOARD

Overview



- Structure of GEORG
- Execution and results of first call
- Execution and results of second call
- Summary of grants awarded
- Other activities

The partnership



21 international partners
Joint Research Venture

Industry axis

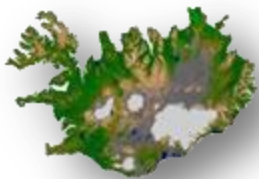
Scientific axis

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.

The financial foundation of GEORG



The group 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 Grant was administrated by Rannis



The support is to the amount of 70MISK (~\$500.000) per year for seven years

Large review at end of year 3



ORGANIZATIONAL

WP leaders:

WP1: Sigurður M. Garðarsson

WP2: Edda Lilja Sveinsdóttir

WP3: Ágúst Valfells

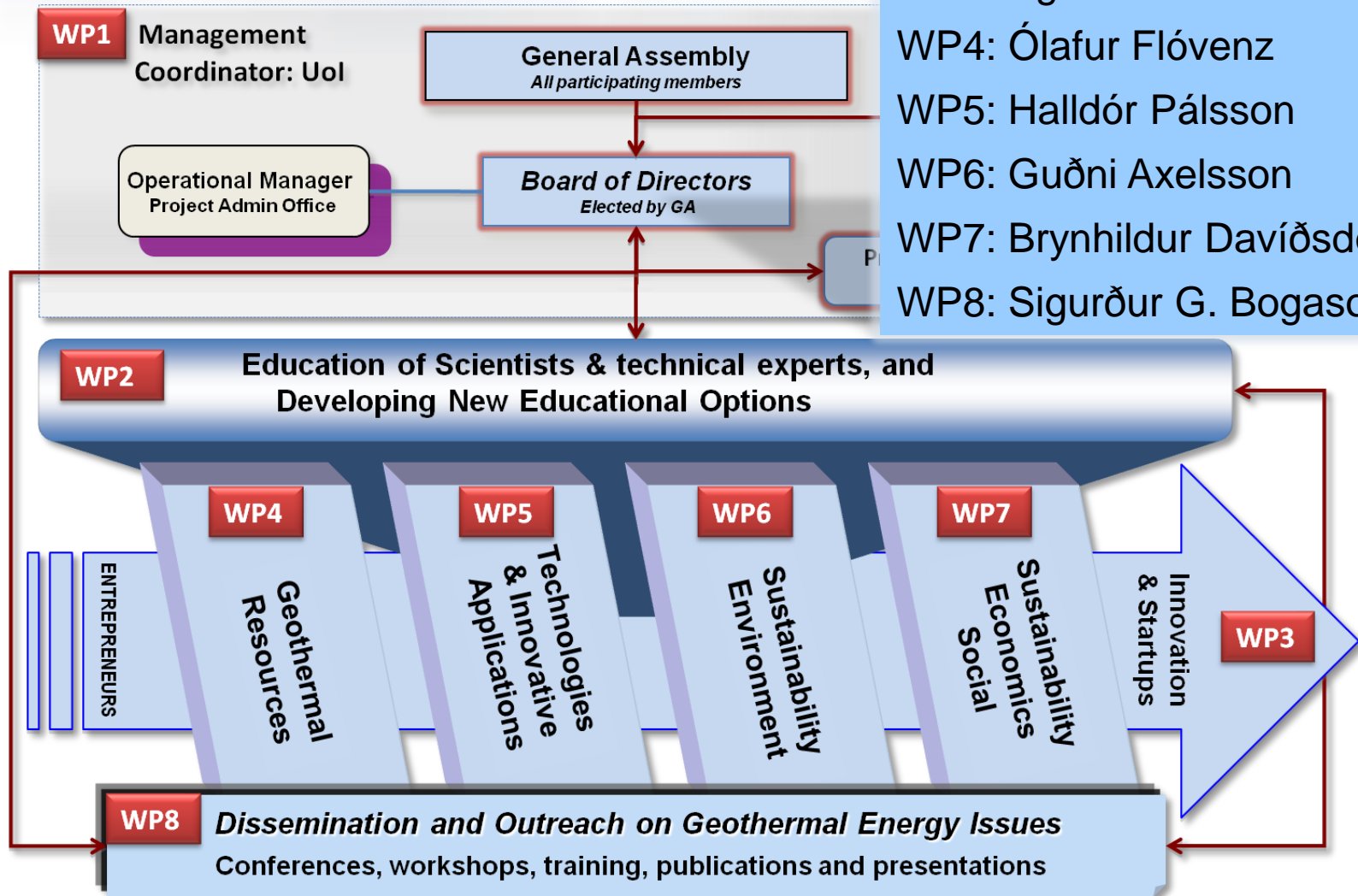
WP4: Ólafur Flóvenz

WP5: Halldór Pálsson

WP6: Guðni Axelsson

WP7: Brynhildur Davíðsdóttir

WP8: Sigurður G. Bogason



Board of Directors and Science Academy



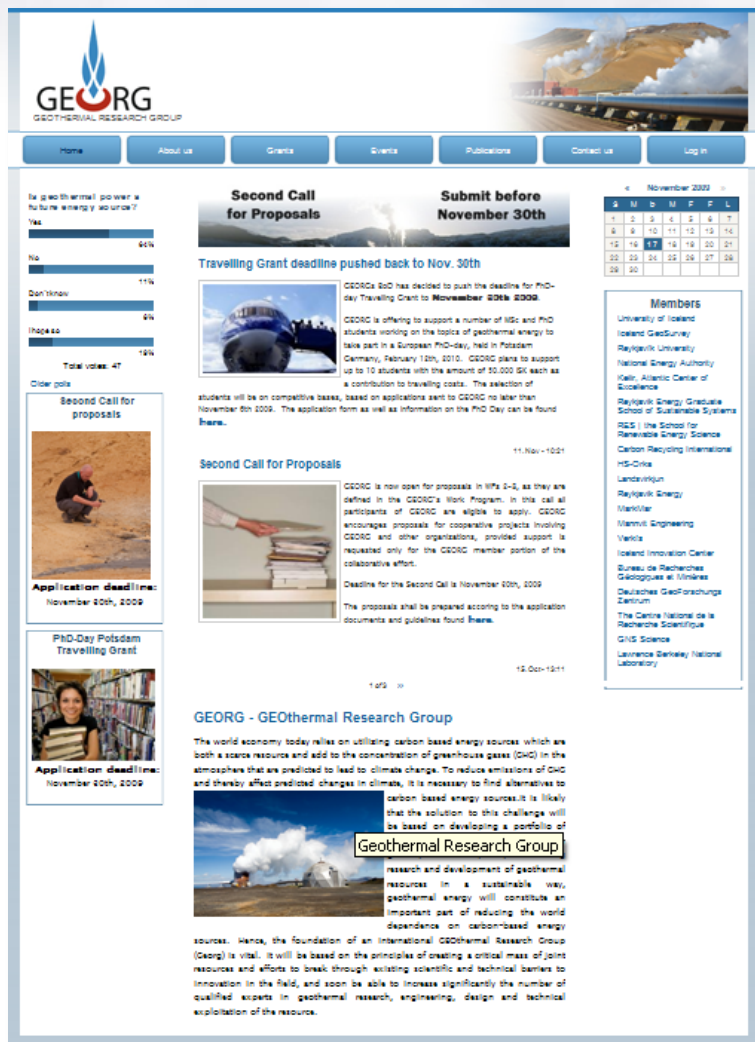
Board of Directors

<i>Icelandic Universities, research institutions and governmental agencies – 5 BoD seats</i>	<i>Energy companies – 1 BoD seat</i>	<i>Private companies– 1 BoD seat</i>	<i>Other EEA based participating collaborators and Associate members – 1 BoD seat</i>
Sigurður Magnús Garðarsson Chair (2) Andri Stefánsson (1) Guðrún Sævarsdóttir (2) Edda Lilja Sveinsdóttir (1) Ólafur G Flóvenz (2)	Bjarni Pálsson (1)	Oddur B Björnsson (1)	Ernst Huenges (2)

Science Academy

<i>Name</i>	<i>Position</i>	<i>Name</i>	<i>Position</i>
Sveinbjörn Björnsson	Chair	Ingólfur Örn Þorbjörnsson	Innovation Center Iceland
Brynhildur Davíðsdóttir	University of Iceland	William Harvey	Reykjavik University
Freysteinn Sigmundsson	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

Daily Operation



The screenshot shows the GEORG website homepage. At the top left is the GEORG logo and a navigation menu with links for Home, About us, Grants, Events, Publications, Contact us, and Log in. The main content area features several news items:

- Second Call for Proposals**: A large banner with the text "Submit before November 30th" and "Travelling Grant deadline pushed back to Nov. 30th". Below this is a photo of a blue geothermal power plant and text stating that GEORG has decided to push the deadline for PhD-day Travelling Grant to November 30th, 2009. It offers support for 10 PhD students working on geothermal energy topics in a European PhD-day held in Potsdam, Germany, February 12th, 2010. The grant covers up to 10 students with an amount of 50,000 SEK each as a contribution to travelling costs. The selection of students will be on a competitive basis, based on applications sent to GEORG no later than November 30th, 2009. The application form and information on the PhD Day can be found [here](#).
- Second Call for Proposals**: A smaller article dated 11. Nov - 10:21, stating that GEORG is now open for proposals in life 2-4, as they are defined in the GEORG's Work Program. It encourages proposals for cooperative projects involving GEORG and other organisations, provided support is requested only for the GEORG member portion of the collaborative effort. The deadline for the Second Call is November 30th, 2009. The proposals shall be prepared according to the application documents and guidelines found [here](#).
- PHD-Day Potsdam Travelling Grant**: An article dated 15 Oct - 13:11, stating that the world economy today relies on utilizing carbon based energy sources which are both a scarce resource and add to the concentration of greenhouse gases (GHG) in the atmosphere that are predicted to lead to climate change. To reduce emissions of GHG and thereby affect predicted changes in climate, it is necessary to find alternatives to carbon based energy sources. It is likely that the solution to this challenge will be based on developing a portfolio of research and development of geothermal resources in a sustainable way. Geothermal energy will constitute an important part of reducing the world dependence on carbon-based energy sources. Hence, the foundation of an international Geothermal Research Group (GEORG) is vital. It will be based on the principles of creating a critical mass of joint resources and efforts to break through existing scientific and technical barriers to innovation in the field, and soon be able to increase significantly the number of qualified experts in geothermal research, engineering, design and technical exploitation of the resource.

On the right side of the page, there is a calendar for November 2009 and a list of members from various institutions including the University of Iceland, Iceland GeoSurvey, Reykjavik University, National Energy Authority, and others.

The BoD has held 33 board meetings

The SA has held 3 formal meetings

GEORG has an office at Orkugarður Grenásvegi 9, Reykjavík

Daily operations:

Hjalti Páll Ingólfsson

Hired as Operational Manager, late April '09.

Contact information

Hjalti Páll Ingólfsson,

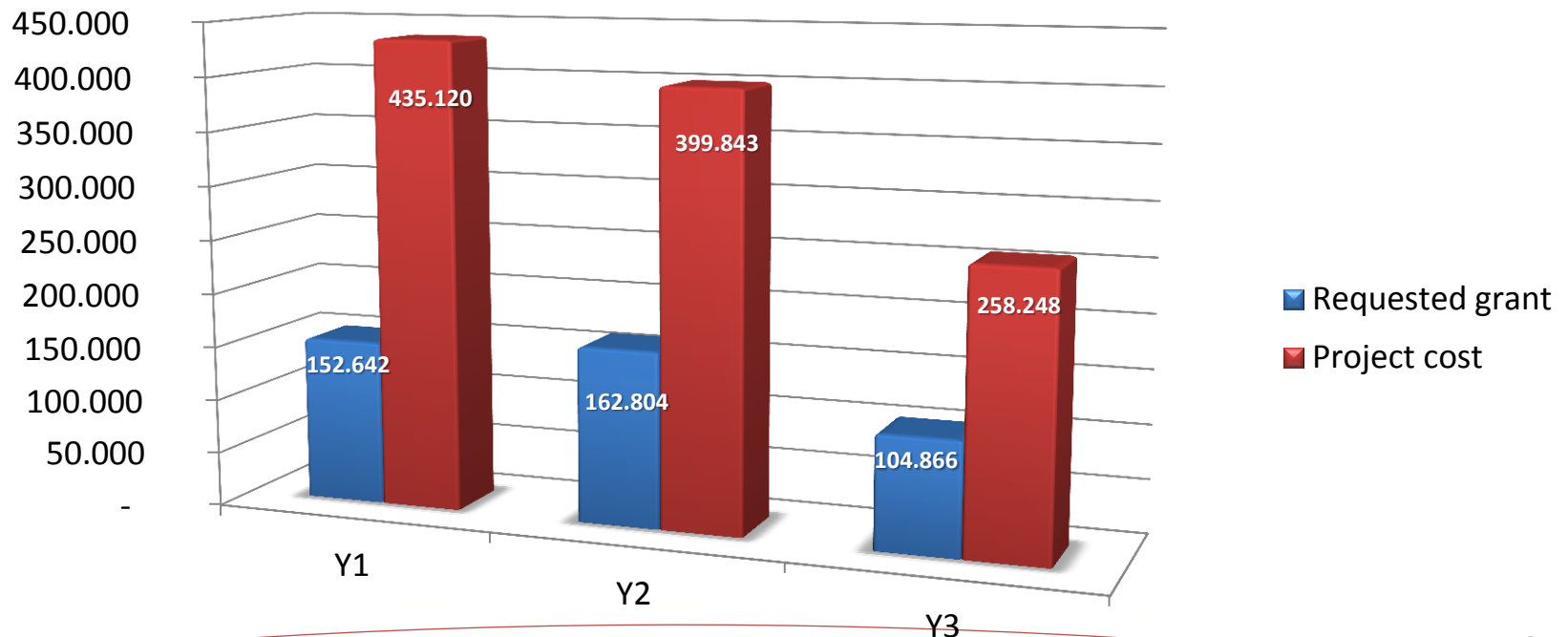
Orkugarður, Grenásvegur 9, 108 Reykjavík

e-mail: hjalti.p.ingolfsson@orkugardur.is,

GSM: +354 618 3541

1st Call

- Published: April 29th, 2009; Deadline: June 2nd, 2009
- Results announced July 3rd, 2009
- 33 proposals received
 - Total requested grant: 420 million ISK
 - Total project costs: 1.093 million ISK



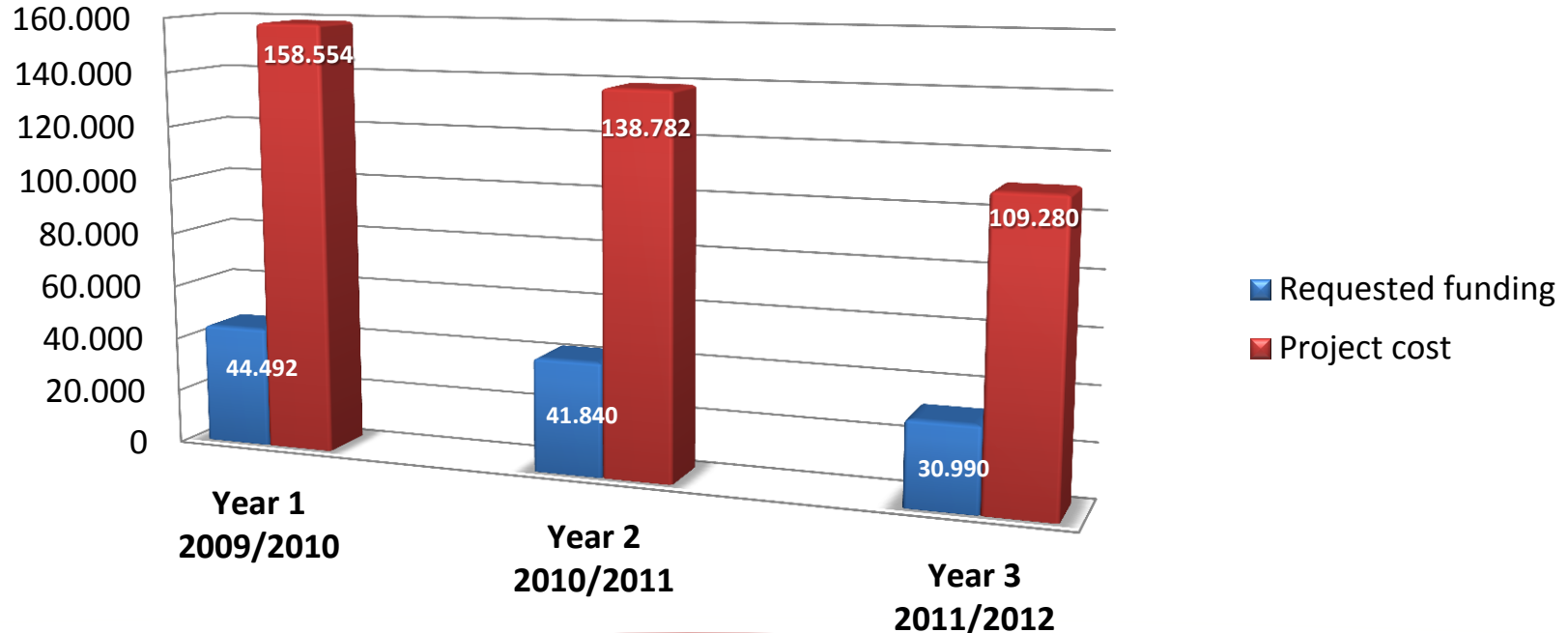
1st Call- grants awarded

- 10 proposals selected for negotiation

- Total awarded grant: 117 million ISK
- Total project costs: 407 million ISK



71% Co-financing



Supported projects from 1st call-reservoir modelling and simulation

MATHEMATICAL MODELING OF ENERGY FLOW IN A GEOTHERMAL RESERVOIR

- Define a framework for models and software that can be used for solving partial differential equations that are associated with flow in geothermal reservoirs.

PROPERTIES OF TWO PHASE FLOW OF WATER AND STEAM IN GEOTHERMAL RESERVOIRS

- Study on a two phase flow in geothermal reservoirs, both theoretically using mathematical models and by conducting experiments on such flow situations.

RESISTIVITY SURVEY OF GRÍMSVÖTN

- To map the spatial extent and depth span of resistivity anomalies in the upper crust under Grímsvötn and magma bodies in the uppermost 3-5 km, allowing comparison with other high-temperature geothermal areas.

EVALUATION AND IMPROVEMENTS OF GEOTHERMAL MODELS USING INVERSE ANALYSIS

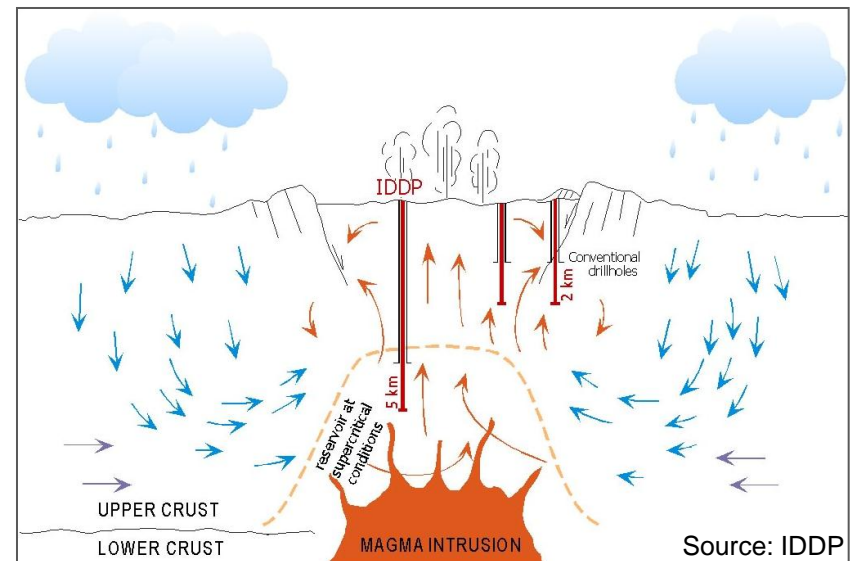
- Develop a technology to improve usage of geothermal reservoirs and to optimize the placement of wells, steam gathering system and separators.

DEVELOPMENT OF COUPLED REACTIVE FLUID FLOW MODELS

- Apply TOUGHREACT to model fluid flows and chemical processes in geothermal areas

RENEWABILITY OF GEOTHERMAL RESOURCES

- Development of a methods to study the recharge and mass balance and apply them to the Reykjanes-Svartsengi geothermal region in Iceland



Other supported projects in 1st call

Biological Utilization to Seismicity

Biological Utilization of Geothermal Gas

- The aim is to develop a system for large-scale production of microbial biomass using the geothermal gas effluent from geothermal power plants.

High pressure and high temperature geothermal grouts

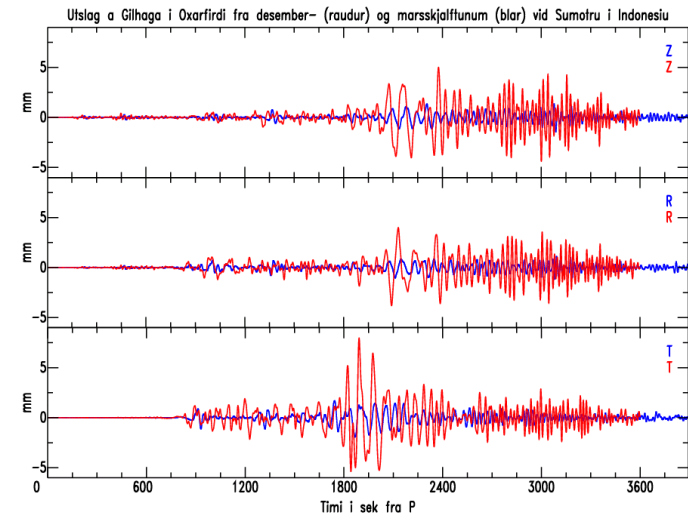
- This project deals with grouts for cementing steel casings in geothermal wells where high temperature and high pressure are prevailing (geothermal grout).

Geothermal Engineering Integrating Mitigation of Induced Seismicity in Reservoir (GEISER)

- Contribute to the improvement of the concept of Enhanced Geothermal Systems by addressing the need to investigate the role of induced seismicity.

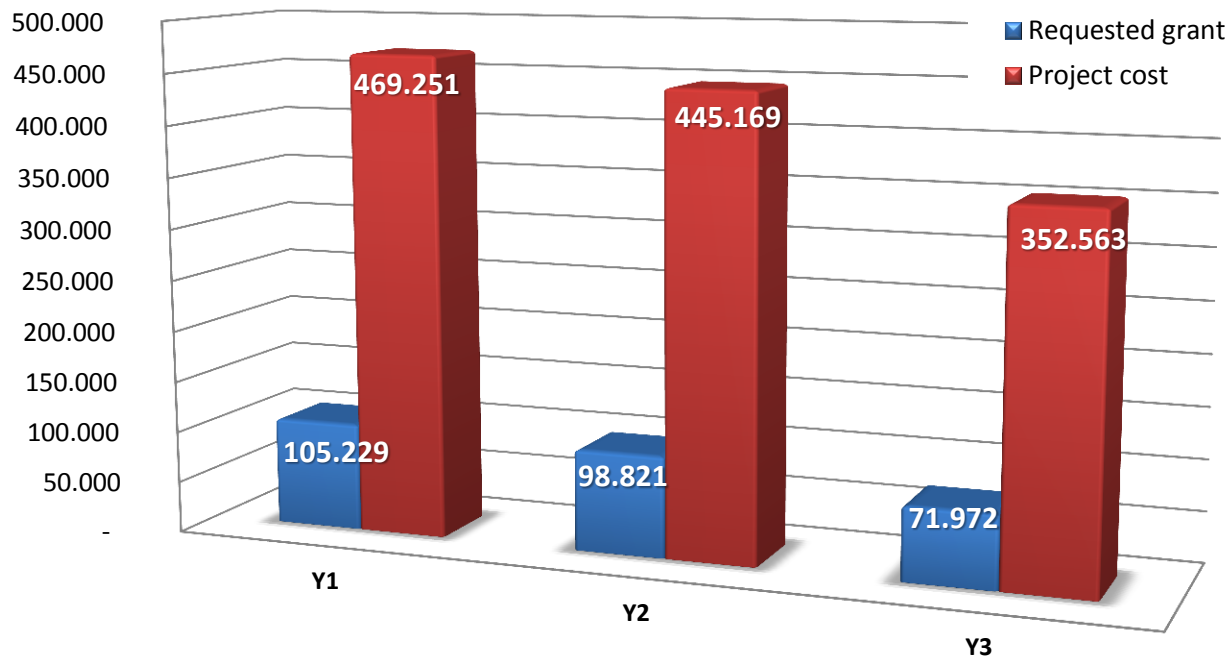
HYDRORIFT

- To improve the understanding and knowledge of hydrothermal processes in the crust, especially the processes of heat extraction from hot or even partially molten intrusions at crustal levels.



2nd Call

- Published: October 15th, 2009; Deadline: November 30th, 2009
- Results announced February 3rd, 2010
- 22 proposals received
 - Total requested grant: 276 million ISK
 - Total project costs: 1.267 million ISK (one project with over 400 MISK)



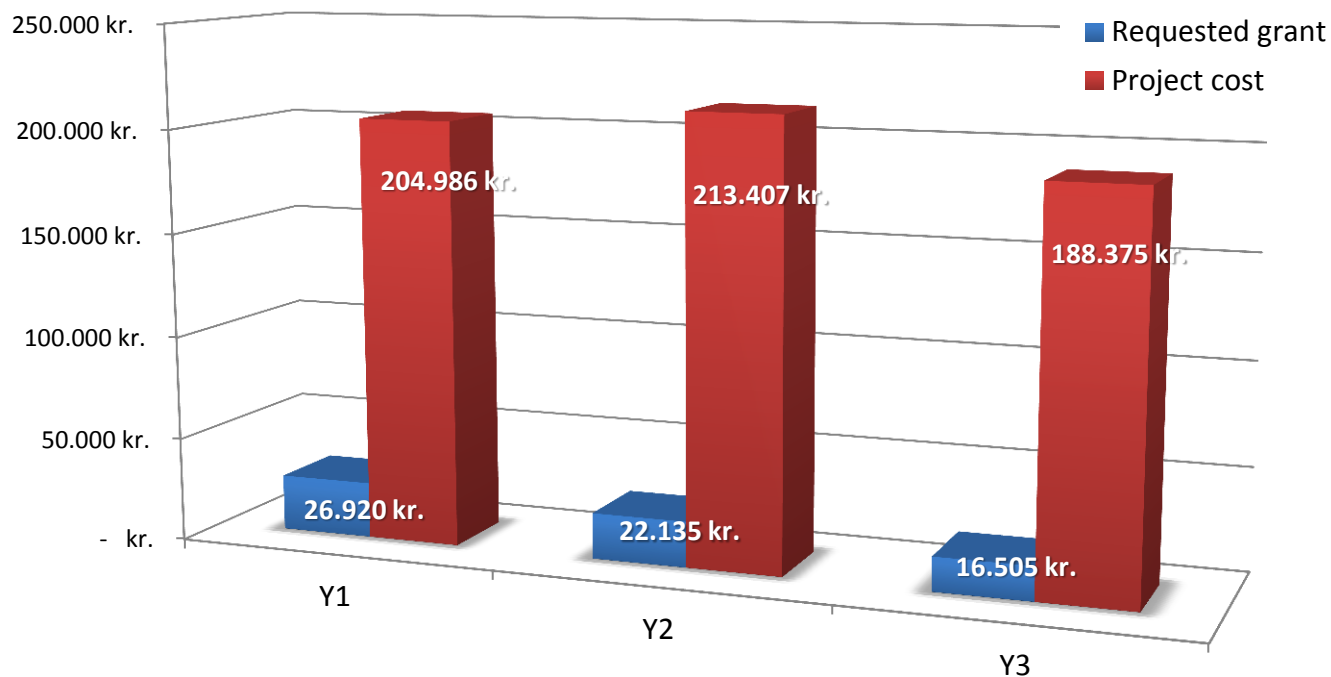
2nd Call-grants awarded

- 5 proposals selected for negotiation

- Total awarded grant: 66 million ISK
- Total project costs: 607 million ISK



89% Co-financing



Supported projects from 2nd call

CARBFIX PROJECT

Develop an industrial solution for mineral sequestration of CO₂ in basalt, and to train young scientist to carry this knowledge into the future.

THE HENGILL GEOTHERMAL RESERVOIR. EVALUATION OF SUBSURFACE GEOLOGICAL DATA

Defining the character of the Hengill geothermal system with special emphasis on integrating the various geological and geophysical borehole data.

ADVANCED 3D GEOPHYSICAL IMAGING TECHNOLOGIES FOR GEOTHERMAL RESOURCE CHARACTERIZATION

Development of joint geophysical imaging methodologies using complimentary data for geothermal site characterization and demonstrate their potential in three areas: Krafla, the Reykjanes-Hengill areas and Coso in the USA.

GEOTHERMAL ECONOMIC IMPACT DATA BASE

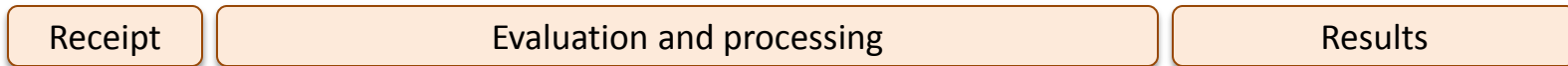
Proposes to assemble a data-base of how geothermal energy is utilised throughout the country and the development of this usage through time.

UTILIZATION OF SUPERCRITICAL GEOTHERMAL FLUID

Evaluate appropriate cycle and equipment selections for the utilization of supercritical or high superheat geothermal resources.



2nd Call Proposal evaluation process

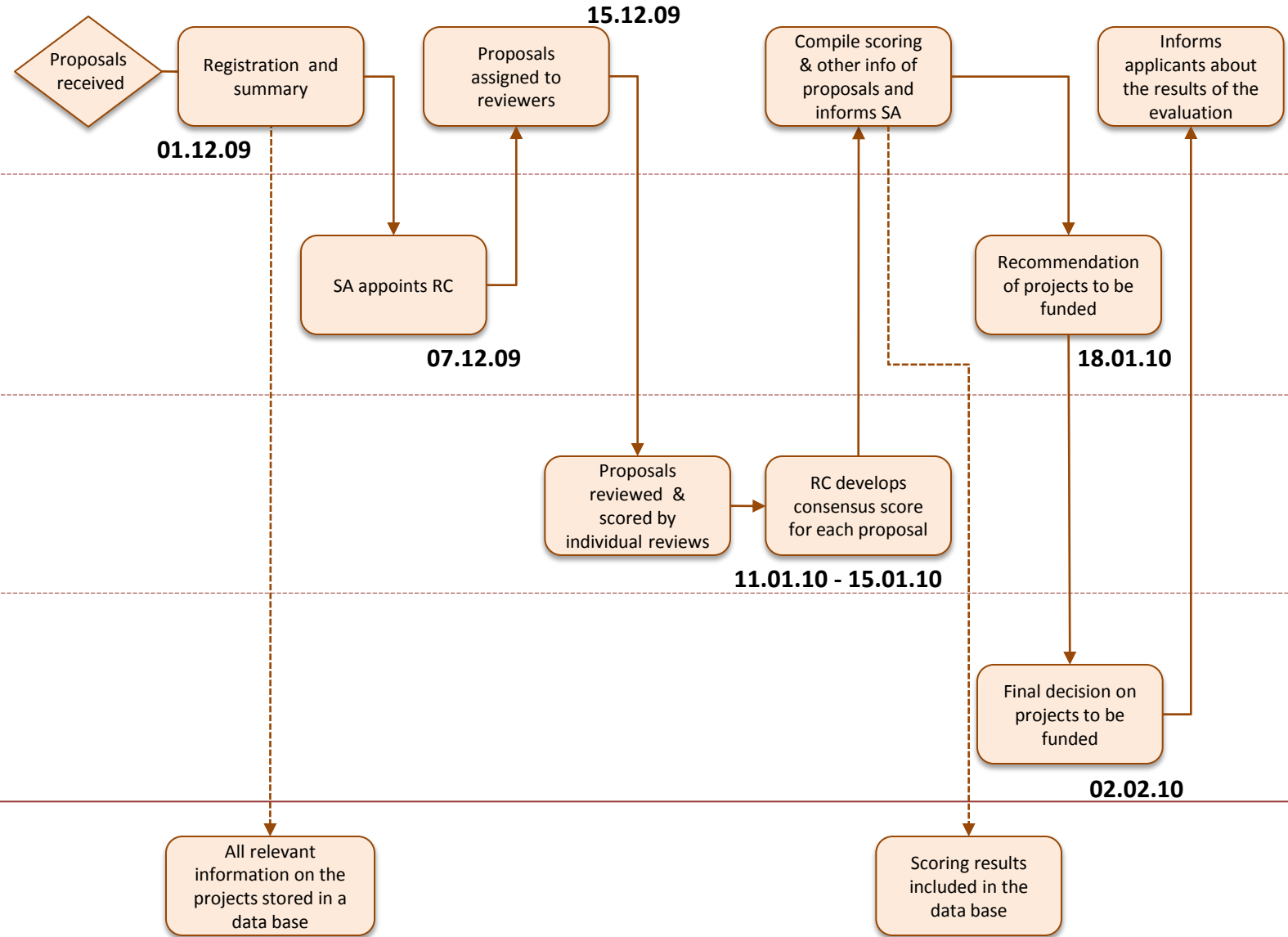


Operation Manager

Science Academy

Reviewers

Board of directors



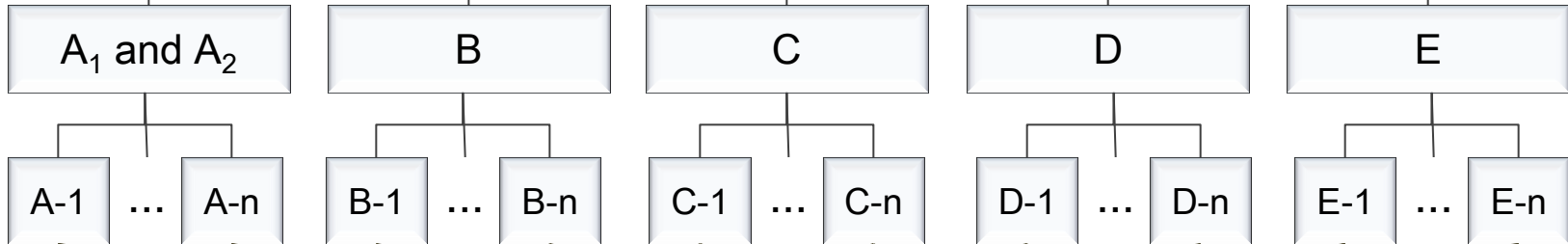
Analytic Hierarchy Process

PROBLEMS ARE DECOMPOSED INTO A
HIERARCHY OF CRITERIA AND ALTERNATIVES

Main criteria

Objective

Select the best projects



Sub criteria

09-02-001 09-02-n

Alternatives
Projects

A_{1/2} - Scientific and Technical Merit

A_{1/2}-1advance important knowledge and understanding ...?

A_{1/2}-2 ...suggest and explore creative and original concepts?

A_{1/2}-3scientific advancement or methodologies that can increase the sustainable utilisation of geothermal resources?

B - Innovation / Entrepreneurship

- B-1promote the concept of added value through innovative approaches?
- B-2potential to bring Iceland into international collaboration?
- B-3promote the position of Iceland as a productive source of geothermal expertise and technologies worldwide?

C - Education / Dissemination

C-1 ...create an research environment ... for students?

C-2 ...ensuring that education in the geothermal field is first class...?

C-3encourage entrepreneurship among researchers

C-4 ...bringing research results to the attention of industry and government ...?

D – Managerial

D-1 ..qualifications of team and good reputation with regards to its former ... obligations toward GEORG?

D-2 How sound is the managerial structure ...?

D-3 ..likely to deliver results according to its goals, ...?

D-4 ..encourage cooperation involving GEORG and other organizations?

E – Financial

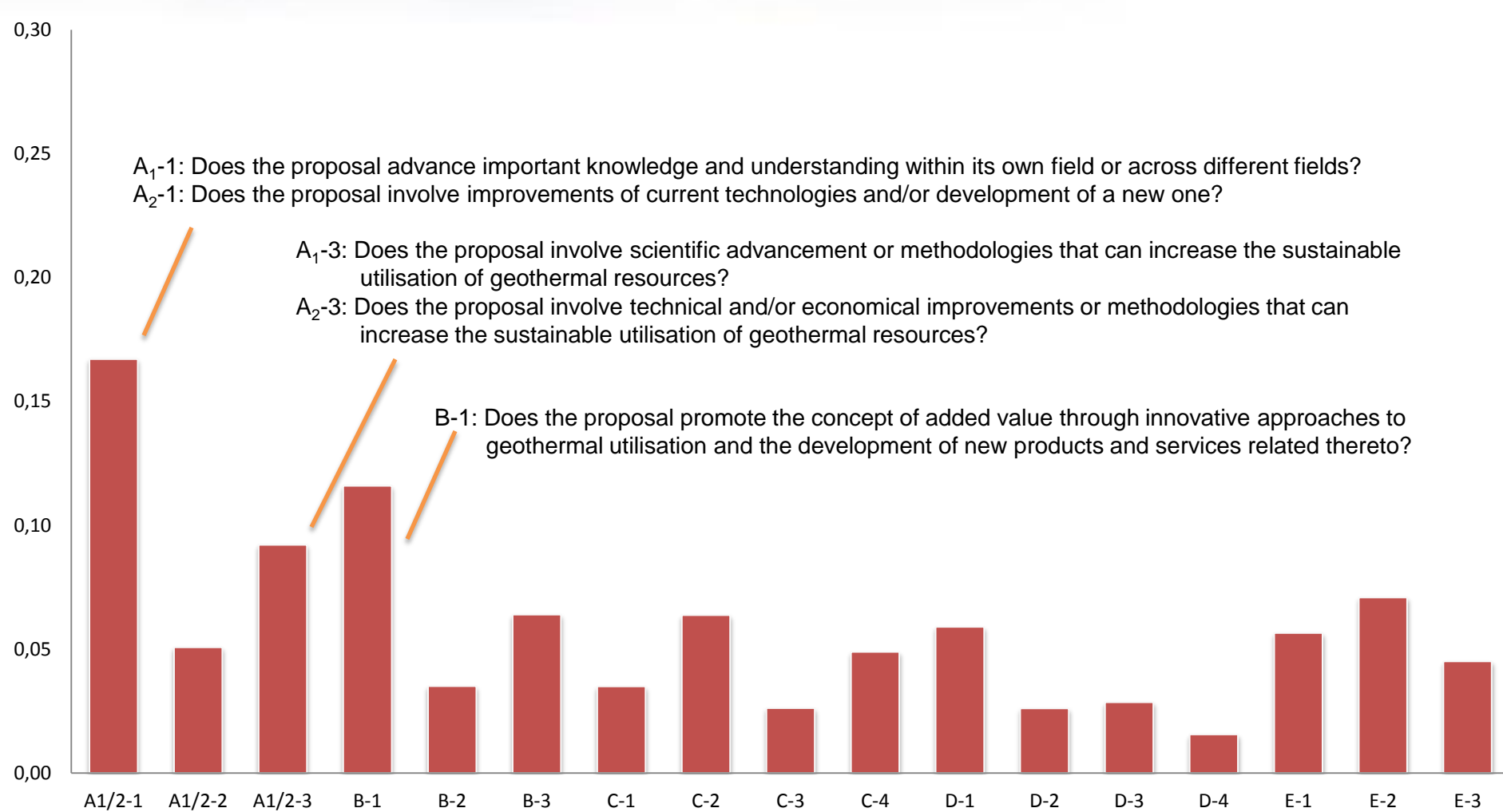
E-1 How credible is the budget?

E-2 ... help in achieving the overall goal of 75% co-financing?

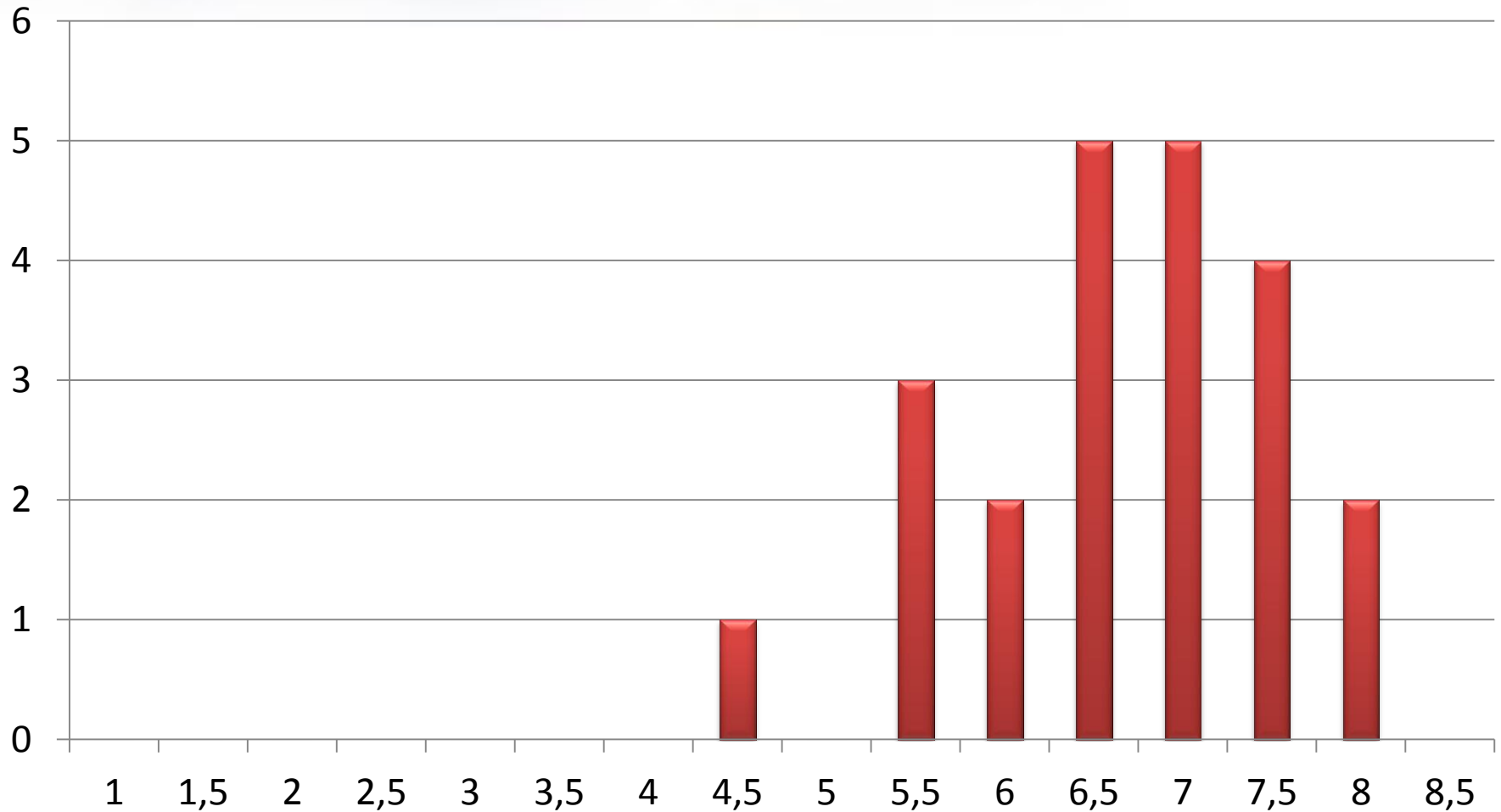
E-3 ...attracting larger funding sources such as FP7 or U.S. DOE?

Weights of BoD members

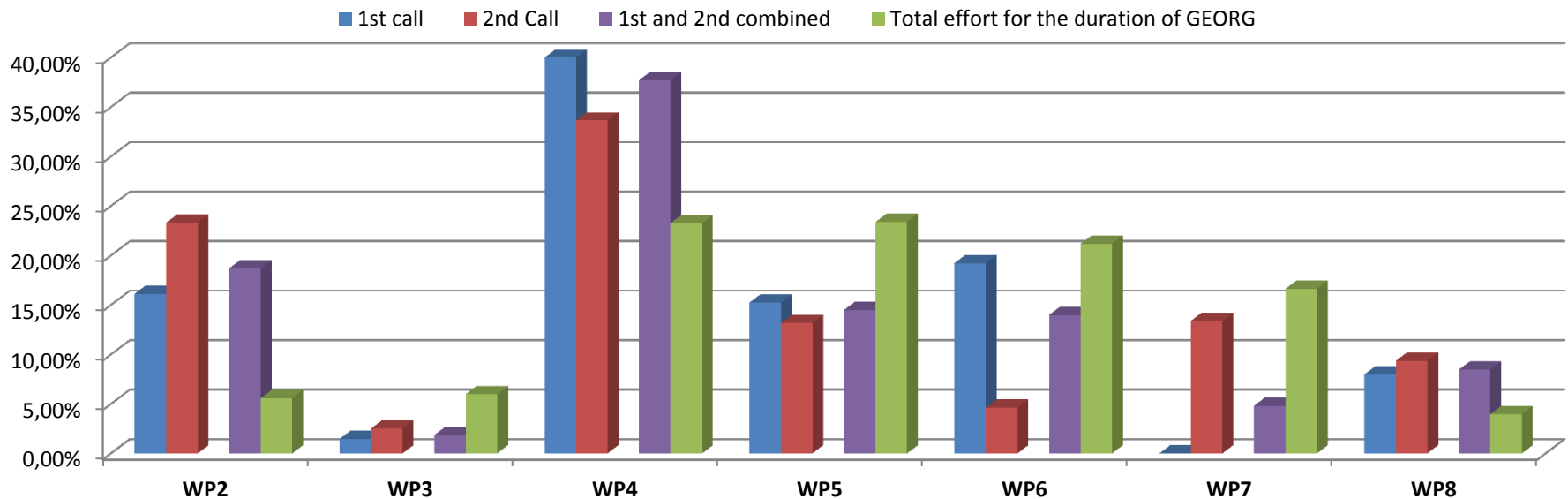
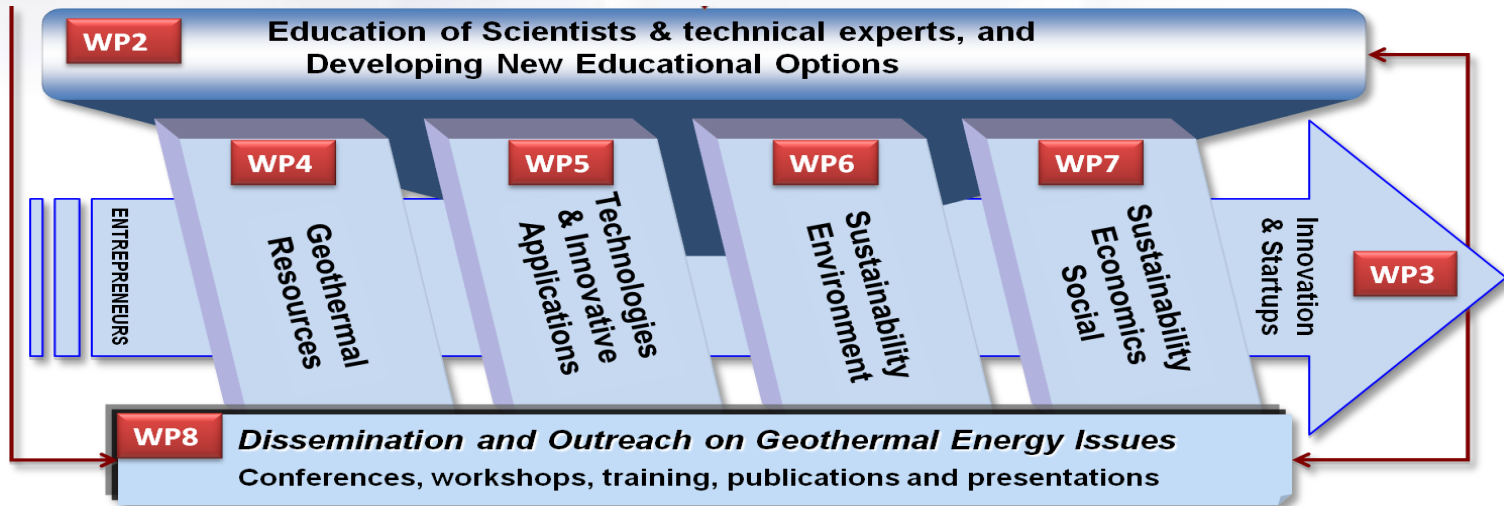
AHP weight factors - BoD results (from BoD meeting 9.12)



Final outcome - variance



WP relevance of supported projects in Call 1 and 2



Other activities of GEORG



- PhD day in Potsdam Germany,
 - February 2010 GEORG supported 8 graduate students from Iceland to go and take part in a PhD day in Potsdam Germany.
 - The support was a 50.000 ISK travelling grant per student
 - The first ever held
 - The next European Geothermal PhD day will be held in 2011 in Iceland



Other activities of GEORG cont...

- Workshop on Geothermal Reservoir Science
 - March 4th 2010.
 - Held in cooperation with IPGT (*International Partnership for Geothermal Technology*).
 - The workshop was very successful with over 50 participants and fruitful discussions.
 - Web streams of the lectures are available at GEORG website.



Other activities of GEORG cont...



- Support to BEST Reykjavik (Board of European Students of Technology)
 - Support of 120.000 ISK to host European seminar on geothermal utilization for international students.
 - The seminar was held in Reykjavík March 9th-17th 2010.
 - With over 20 participants from universities all around Europe.



Other activities of GEORG cont...



- Presentations at conferences and meetings
 - GEORG was presented at four conferences and meetings on the first operational year
 - Annual meeting of the Icelandic Geothermal Association (Jarðhitafélag Íslands) in April 2009.
 - ASI Symposium “Atvinnumál á krepputímum” in January 2010.
 - Second CSM Geothermal Symposium held in Colorado School of Mines, USA on January 18th, 2010.
 - European Union, Sustainable Energy Week, 22 – 26. March 2010. The conference was held at Grand Hotel Reykjavík on March 25th.

Other activities of GEORG cont...



- Hjalti Páll appointed as an expert in the European commission FP7 – Energy Committee on behalf of Iceland
- FP7 WP 2011 will open for proposals for ERA NET in Geothermal
 - Participation of GEORG and /or Rannís will be explored
- Ongoing discussion with DoE in USA regarding possible evaluation exchange.
 - DoE experts would participate in the evaluation of GEORG proposals and in return GEORG partners would participate in the evaluation of DoE proposals



Hjalti Páll Ingólfsson, Operational Manager

ANNUAL REPORT PRESENTATION
ANNUAL ACCOUNTS



GEORG - Cost and financing account

Year 1, 2009-2010

Cost	Note	Budget plan			Actual Accounts		
		GEORG	Partners	Total	GEORG	Partner	Total
Grants	1	33.120	88.067	121.187	10.958	31.731	42.689
Contracted services.....	2	1.155		1.155	957	0	957
Travel expenses.....	3	1.000		1.000	0	0	0
Other costs.....	4	869	165	1.034	724	845	1.569
Overhead.....	5	7.620	9.000	16.620	6.505	8.700	15.205
Total operation cost		43.764	97.232	140.996	19.144	41.276	60.420
Financing							Co-financing of 68%
Partner Co-financing.....			97.232	88.232		41.276	40.931
Funding from Rannis.....	6	70.000		70.000	50.000		50.000
Total financing		70.000	97.232	167.232	50.000	41.276	90.931
Results of operational activities		26.236	0	26.236	30.856	0	30.856



GEORG - Balance sheet

Year 1, 2009-2010

Assets	Note	31. March 2010
Cash and cash equivalents.....	7	30.856
Unpaid funding from Rannís.....	6	20.000
Unaccounted co-financing.....	1	82.081
Total assets		132.937
Debts and liabilities		
Unpaid grants from first call.....	1	33.014
Unaccounted co-financing.....	1	82.081
Short term dept and business liabilities.....	8	711
Total debts and liabilities		115.806
Total assets		17.131

GEORG - Budget Plan Year 2, 2010-2011

Cost	Note	Budget plan		
		GEORG	Partners	Total
Grants	1	61.517	248.626	310.143
Contracted services.....	2	1.980		1.980
Travel expenses.....	3	1.000		1.000
Others total.....	4	579	540	1.119
Overhead total.....	5	8.620	8.280	16.900
Total operation cost		73.696	257.446	331.142
Financing				Co-financing of 78%
Partner Co-financing.....			257.446	257.446
Funding from Rannis.....	6	82.000		82.000
Total financing		82.000	257.446	339.446
Results of operational activities		8.304	0	8.304

ELECTIONS

Election of Board of Directors



Board of Directors

<i>Icelandic Universities, research institutions and governmental agencies – 5 BoD seats</i>	<i>Energy companies – 1 BoD seat</i>	<i>Private companies– 1 BoD seat</i>	<i>Other EEA based participating collaborators and Associate members – 1 BoD seat</i>
Sigurður Magnús Garðarsson Chair (2) Andri Stefánsson (1) Guðrún Sævarsdóttir (2) Edda Lilja Sveinsdóttir (1) Ólafur G Flóvenz (2)	Bjarni Pálsson (1)	Oddur B Björnsson (1)	Ernst Huenges (2)

The Board of Directors proposes the following individuals as new Board members, serving for two years

BoD nominees

Andri Stefánsson	->	Sigrún Hreinsdóttir	<i>Icelandic Universities, research institutions and governmental agencies</i>
Edda Lilja Sveinsdóttir	->	Rúnar Unnþórsson	<i>Energy companies</i>
Bjarni Pálsson	->	Edda Lilja Sveinsdóttir	<i>Private companies</i>
Oddur B Björnsson	->	Auður Andrésdóttir	<i>Icelandic Universities, research institutions and governmental agencies</i>

Election of Board of Directors



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

SA nominees

<i>Name</i>	<i>Position</i>	<i>Name</i>	<i>Position</i>
Sveinbjörn Björnsson	Chair	Ingólfur Örn Þorbjörnsson	Innovation Center Iceland
Brynhildur Davíðsdóttir	University of Iceland	María S Guðjónsdóttir	Reykjavik University
Árný Erla Sveinbjörnsdóttir	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	RES		

REGULATIONS ON NEW MEMBER ADMISSION

Admission in Consortium Agreement



In the Consortium Agreement it is stated:

“A new Party enters the Consortium upon signature of the accession document Attachment 1 by the new Party and the Coordinator. Such accession shall have effect from the date identified in the accession document.”

And in the Attachment 1 the following sentence confirms the approval of the new member:

“hereby certifies that the Consortium has accepted in the meeting held on [date] the accession of [the name of the new Party] to the Consortium starting [date]”

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.

OTHER MATTERS



***THE GENERAL ASSEMBLY IS
CONCLUDED***



Í tengslum við ársfund GEORG, alþjóðlegs rannsóknaklasa í jarðhita, er efnt til opins málþings um jarðhitarannsóknir og nýtingu jarðhita.

Markmið rannsóknaklasans er að leiða saman aðila á jarðhitasviðinu og mynda sterkt afl til skjótra framfara í jarðhitarannsóknnum, verkfræði og hönnun.

Framtíðarsýn klasans er að verða leiðandi afl í alþjóðlegum jarðhitarannsóknnum.

MÁLÞING UM RANNSÓKNIR Í JARÐHITA

í húsakynnum Orkuveitu Reykjavíkur

föstudaginn 21. maí, kl. 13:10 - 16:00

Málþingið mun fara fram á ensku og er öllum opið

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Sigurður Magnús Garðarsson, Chairman of the Board
- 13:20-13:40 **International Partnership of Geothermal Technology (IPGT)**
Ólafur G. Flóvenz, IPGT board member, ÍSOR
- 13:40-14:00 **The IEA Geothermal Implementing Agreement (GIA)**
*Jónas Ketilsson, GIA - Vice Chairman
The National Energy Authority*
- 14:00-14:20 **International Operation of Mannvit Engineering**
Tryggvi Jónsson, Mannvit
- 14:20-14:45 **Kaffihlé**
- 14:45-15:00 **Geothermal Models Using Inverse Analysis, Iceland / US Cooperation**
Magnús Þór Jónsson, University of Iceland
- 15:00-15:15 **Biological Utilization of Geothermal Gas**
Guðmundur Óli Hreggviðsson, University of Iceland
- 15:15-15:30 **High Pressure and High Temperature Geothermal Grouts**
Gísli Guðmundsson, Mannvit
- 15:30-15:45 **Resistivity Survey of Grímsvötn**
Arnar Már Vilhjálmsson, ÍSOR
- 15:45-16:00 **How should GEORG proceed?**
Almennar umræður