Minutes of the

39th Executive Committee Meeting

IEA Geothermal Implementing Agreement

Vienna, Austria.

2nd May 2018

**2nd May 2018 - Opening at 0910 hours**

**Notater fra Norges representant i «IEA-Geothermal» som er relevante til norske miljøer, Jiri Muller (jiri@ife.no)**

**Bakgrunn:**

Geothermal Technology Collaborating Program (TCP), tidligere kalt Geothermal Implementing Agreement (GIA) eller «IEA Geothermal», gir et fleksibelt og kraftig rammeverk for internasjonal geotermisk samarbeid mellom land, industri og industriorganisasjoner, og opererer i regi av Det internasjonale energibyrået (IEA), Paris, Frankrike.

Virksomheten er hovedsakelig rettet mot deling av informasjon; utvikle teknologier, teknikker og beste praksis for leting, utvikling , utnyttelse; produksjon og formidling av autoritativ informasjon og databaser.

IEA Geothermal konsentrerer sin innsats i fem brede områder ved å undersøke: miljøkonsekvenser av geotermisk energiutvikling, forbedrede geotermiske systemer (EGS), avansert geotermisk boring og logging teknologi, direkte utnyttelse av geotermisk energi og indusert seismisitet. I tillegg er utviklingen i geotermisk utnyttelse analysert på årlig basis.

Per 2017 har IEA Geothermal 16 medlemmer, bestående av 13 land: Australia, Frankrike, Tyskland, Island, Italia, Japan, Mexico, New Zealand, Norge, Republikken Korea, Sveits, Storbritannia og USA; Europakommisjonen; og to sponsorer: Spansk Geothermal Technology Platform (Geoplat) og Ormat Technologies, Inc.

* 1. Introduction and welcome

Lothar Wissing (Chairperson) welcomed participants. A special welcome to Lauren Boyd, Noramalina Mansor (Amal) and Hideki Kamitatara who were attending in official capacities for the first time. A round table of introductions followed with the Executive Committee participants introducing themselves.

ExCo Members and Alternates present

Filippo Gagliardi - member European Commission

Lothar Wissing - member Germany

Manuela Richter - alternate Germany

Kasumi Yasukawa - alternate Japan

Chris Bromley - member New Zealand

Jiri Muller - member Norway

Gunter Siddiqi – member Switzerland

Christian Minnig - alternate Switzerland

Noramalina Mansor - member United Kingdom

Yoonho Song – member Republic of Korea

Lauren Boyd – member USA

The sign in sheet is in Appendix 1.

**Observers**

Katharina Link (Leader WG 8), Josef Weber (Leader WG 10 and 13), Brian Carey (Executive Secretary), Hiroyuki Kamenosono (JOGMEC), Hideki Kamitatara (IEA Secretariat)

A photograph of the Executive Committee taken on the 2nd May is included in Appendix 2.

* 1. Apologies

Betina Bendall

Tae Jong Lee

Carsten Sorlie

Nobuyasu Nishikawa

Gudni Axelsson

Jonathan Busby

Jose Romo Jones

Thomas Kretzschmar

Jonas Ketilsson

**Proxy Voting**

No proxy voting requested

**Confirmation of quorum** 9 voting members attending in person.

* 1. Request for Extension Process

Formal notification approving the term extension request was received from the IEA Committee on Energy Research and Technology on 20th February 2018. This is now the 5th Term for IEA Geothermal.

An issue for the REWP and CERT were around connections with IRENA and the GGA. These were addressed. A comment was made that the strong connections IEA Geothermal has in Asia are often overlooked.

* 1. GNS Science - IEA Geothermal Secretariat Service contract

The secretariat service contract has been renewed until 28 February 2023 coinciding with the end of the 5th Term.

* 1. Membership Update

**Change of members and alternates.**

Lauren Boyd – The USA Member change has been notified to IEA Paris.

Andreas Uihlein – This change of EC Alternate has been notified to IEA Paris.

Noramalina Mansor – This UK Member change has been notified to IEA Paris.

Later in the meeting Filippo Gagliardi advised that he was changing his job and that in due course a replacement member for the European Commission would be formally advised.

**Malaysia** : Detailed membership information has been emailed to Malaysia (Fredolin Javino)

**Thailand** : Detailed membership information has been emailed to Thailand (Kriangsak Pirarai

**Taiwan** – Lothar Wissing had enquired from the IEA Secretariat concerning formal membership of Taiwan in IEA Geothermal. A response was received indicating that membership was not open to Taiwan. There was discussion on this point and Hideki Kamitatara reiterated the formal position. However, Jiri Muller recalled discussing Taiwan informally with Paolo Frankl in Oslo, January 2018 (from IEA Paris), and being told that there is a possible mechanism for their participation in TCPs. This led to the discussion on the Privileged Partnership concept.

* 1. 2017 Annual (Carey)

Chapters from Japan, France, USA and Iceland are required to complete the report. The Executive Secretary and Sophie Pearson will be following up.

Executive Secretary expressed appreciation to contributors for getting contributions in so that a substantive draft was able to be completed and available for GeoTHERM 2018.

It was excellent to have this report out early in 2018 (Beginning of March).

* 1. 2018 Annual reports

Executive Secretary will be calling for contributions for the 2018 report at the beginning of December 2018. This is to fit in with the timing of GeoTHERM 2019 which is scheduled for the middle of February 2019.

* 1. future International Organisation Collaboration

**IGA** – Excellent relationship which will continue to be fostered. Continue to work together including the work on Statistics and joint workshops.

**IRENA** –It is a political platform that does reach politicians. Gunter Siddiqi is the nominated IEA Geothermal representative and Lothar Wissing has recently been appointed to represent Germany. In organizing a Baltic States Geothermal Symposium for GeoTHERM 2019 it is suggested that IRENA and the German Geothermal Association be invited to give Key Note addresses. EC is considering joining the GGA due to the political nature of the Association but procedurally requires a letter from a commissioner which has not yet been completed. Lothar Wissing has informally asked if the GGA will join IEA Geothermal at which point the discussion stops.

**EGEC** – Keep an overview of what is occurring but with little / no suggestion that benefit would be gained by IEA Geothermal becoming more involved currently.

**ETIP** – This is an area where IEA Geothermal can be more involved. Jiri Muller is on the steering committee and there are links and collaboration that IEA Geothermal should continue to strengthen. Filippo Gagliardi reinforced this as a place to be more involved.

**Asian Geothermal Connections** – IEA Geothermal is strongly connected here through our members and alternates. Outreach is occurring.

**Central and South Americas** – IEA Geothermal has connections here and outreach opportunities that can be pursued.

**IEA** – Statistics is one of the main drivers for our connections to the IEA broader family of organisations.

Connections will be strengthened where collaboration will be of benefit to the work of IEA Geothermal. Workshops, seminars and symposiums are important.

* 1. Working Group Reports

WG 1 Environmental Impacts

The preface to the virtual Special Issue in Geothermics on Environmental Aspects and Social Acceptability of Geothermal Developments is being prepared.

Paper 61 could still be published but the authors need to respond to the revision process.

There was discussion on Green House Gas emissions associated with Geothermal Energy in Europe. ENEL have to work out how to deal with this issue in Tuscany where there is opposition to the atmospheric discharges. Filippo Gagliardi indicated that there is a study to be launched by the European Commission to map geothermal emissions throughout Europe which may lead to discussion on how to regulate Geothermal differently to other Renewable Energies.

Filippo Gagliardi indicated if there was material on GHG emissions available from participants he would be pleased to receive it. He offered to keep IEA Geothermal informed on the EC work.

Jiri Muller mentioned that there was a Horizon 2020 proposal submitted to EU on zero emission plants (from a strong consortium) which includes monitoring reinjected gases (NCG) using tracer technology. He suggested that this could be linked to the work in WG1.

**WG 8 DIRECT USE OF GEOTHERMAL ENERGY**

The presentation identified the current participants in WG 8. It identified the most recent workshop activity of WG 8 was the Geothermal Energy Development for a Green Economy Workshop held in Hanoi Vietnam in November 2017.

Future activity will focus on a workshop in November 2018 in association with the 12th Asian Geothermal Symposium in Daejeon, Korea.

**WG 10 DATA FOR GEOTHERMAL ENERGY APPLICATIONS**

The 2016 Power Report has been finalized and was published in February 2018 as part of GeoTHERM 2018.

Work moves to completing the 2016 Trend Report and then the focus will become the statistics for 2017. The GSHP questionnaire is to be revised.

There was some discussion on various aspects of the statistics, with comments made about differences between organizations and with official country statistics. Lothar Wissing commented that IEA Geothermal are working to have the most reliable statistical data of any of the organizations.

**WG 12 DEEP ROOTS OF VOLCANIC GEOTHERMAL SYSTEMS**

Chris Bromley presented an overview of WG12 since inception in 2015 and activity during 2017. There was some discussion on activity occurring in Iceland and Italy on supercritical work but there was no one present from these two nations to provide the most up to date information. DESCRAMBLE is complete (funds have been used), and final workshop presentations can be found at:

<http://www.descramble-h2020.eu/index.php/events/talks>

The follow on DESCRAMBLE2 has not yet been funded. Filippo Gagliardi indicated some of the work from DESCRAMBLE will be applied in GeoWELL which is scheduled to finish in January 2019. Jiri Muller indicated IDDP3 was moving forward from a larger resource base that Reykjavík Energy has now brought. Lauren Boyd indicated the Newberry EGS site was working on supercritical. Also, that there is work going on in cement formulations with Japan and that these might also be useful to connect into the GeoWELL work. Kasumi Yasukawa mentioned Japanese work on “Subduction Origin Super-critical” replacing the former “Beyond Brittle” project, and involving mainly lab work and improved drilling technology, at present.

Lothar Wissing suggested that the material be assembled for presentation at one of the IEA Geothermal workshops as an expert overview of the work going on at the leading edge of geothermal technology.

**WG 13 EMERGING GEOTHERMAL TECHNOLOGIES**

**TASK D**

The publications and presentations delivered in 2017 and 2018 were outlined. Future activities were discussed. Lauren Boyd indicated that she could provide USA contact names for geothermal induced seismicity collaboration (in addition to Ernie Majer, who has retired).Gunter Siddiqi indicated that there was much more that could occur internationally in scientific collaboration. There is a workshop in Switzerland (Schatzalp, Davos, 5 – 8 March 2019) and it would be good if Task D could be involved messaging the benefits of collaborative work

**TASK E** – (Presented by Jiri Muller)

The report focused on the European Technology and Innovation Platform (ETIP – DG). There are five working groups; drilling, exploration, production technologies, surface/generation and non-technical. Two workshops were held in Italy on the 27th and 29th March. Jiri Muller represents IEA Geothermal and he will act as a link in terms of activity occurring and material being produced. Some of this work might be useful to assist in developing suggestions for the EU FP8 programme.

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Lunch taken 1300 to 1400

* 1. Opportunities with the Gas and Oil Technologies TCP

Presentation was made by Christian Minnig that discussed crossover aspects and how IEA Geothermal might connect into the Gas and Oil Technologies TCP (GOT) and also American Association of Petroleum Geologists (AAPG).

AAPG and the International Geothermal Association held a technology cross over workshop on 17-18 April 2018.

IEA GOT have a workshop planned in Brussels for the 11-12 October 2018.

IEA GOT are tying in with Mission Innovation (web pages <http://mission-innovation.net/> ) where 22 countries and the European Union are working to double their public clean energy R&D investment over five years.

* 1. European Commission Reports

Filippo Gagliardi presented a European Commission U report:

The SET Deep Geothermal Implementation Plan has 8 elements:

* Geothermal heat in urban areas
* Materials, methods and equipment to improve operational availability
* Enhancement of conventional reservoirs and deployment of unconventional reservoirs
* Improvement of performance
* Exploration techniques
* Advanced drilling/well completion techniques
* Integration of geothermal heat and power in the energy system and grid
* Zero emissions power plants

2 non-technical barriers that should be addressed are:

* Public acceptance and development / dissemination of best practice health, safety and environmental aspects of geothermal projects
* Coordination of national geological risk mitigation methods and financial schemes

Refer the web page for more detail: <https://setis.ec.europa.eu/actions-towards-implementing-integrated-set-plan/implementation-plans>

An Implementation Working Group is being established to guide the work.

There was discussion on the EC 2020 and 2030 renewable energy targets. The 2020 target is expected to be achieved. The European Parliament is looking to reset the 2030 target to 35% binding at the European level. Making this 2030 target nationally workable will be the issue.

* 1. Country Reports

**New Zealand** - Chris Bromley presented a [New Zealand Country Report](file:///\\waishared\shared\IEA-GIA\Minutes%20of%20ExCo%20Meetings\39th%20Meeting\Supporting%20Documents\2018%2005%2002%20NZ%20Country%20Report.pdf)

Information on the 2017 performance of New Zealand geothermal electricity sector was presented. Later in 2018 the 25 MW Te-Ahi-o-Maui power plant at Kawerau is scheduled for completion. Direct geothermal energy use is being promoted by the New Zealand Geothermal Association and regionally in the Bay of Plenty through strategies and action that connects potential users with geothermal energy suppliers.

An early-phase study looking at the potential of the South Island alpine heat anomaly to supply low temperature geothermal energy to Westland has commenced.

There was discussion on the computer code Waiwera that is being developed in New Zealand as the next generation open-source modelling code expected to surpass TOUGH2 in its capabilities.

There was also discussion on a joint venture between Tuaropaki (Mokai project owners) and a Japanese company that have advertised that they are looking to produce hydrogen from geothermal electricity for use in the transport sector.

**USA – Lauren Boyd presented a** [**USA Country Report**](file:///\\waishared\shared\IEA-GIA\Minutes%20of%20ExCo%20Meetings\39th%20Meeting\Supporting%20Documents\2018%2005%2002%20USA%20Country%20Report.pdf)

The work going on the USA was described. Funding to the Geothermal Technologies Office for geothermal studies has been increased by the Federal government. For 2018 that amounted to some USD 80 Million. Focus of the work is on reducing cost and risk through four geothermal programmes: Enhanced Geothermal Systems, Hydrothermal, Low Temperature and Co-produced Resources, and Systems Analysis.

Geothermal electricity capacity is growing quite slowly with 80 MWe installed since 2015. Projects are slowed by permitting, financing and negotiation of power purchase agreements.

Nationally important critical minerals work is the subject of an executive order that, once approved, might boost the implementation of lithium extraction processes from geothermal fluids.

Two funding opportunity announcements are open during 2018:

* $14.5 million in funding available to advance efficient drilling for geothermal energy
* $4.3 million lab call for Waterless Stimulation

For clarification FORGE is working to create a subsurface reservoir (only one site will eventually be funded (approximately $30M /yr) of the two currently being studied) Power plant development is not a part of the work.

There was discussion on collaboration and Lauren Boyd indicated the USA is looking to be more purposeful in increasing international collaborative activity, importantly getting expertise together. Collaboration might involve the sharing of test sites.

* 1. Event Planning

**40th ExCo** - 2018 Autumn in Korea at KIGAM in Daejeon

ExCo and WG meeting - 7th (Wed) to 9th (Fri) November

Field excursion to Sejong - Saturday 10th November

Asian Geothermal Symposium - 11th and 12th (Sunday and Monday)

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**GeoTHERM 2019** – 14th and 15th February 2019

Baltic Geothermal Symposium on 13th February 2019 – Lothar Wissing to continue with organization of this event which will focus on district heating. Key note presentations will be invited from IEA / IGA / GGA.

**41st ExCo** - 2019 Spring: Spain

Canary Islands. Lothar Wissing indicated he would continue working with Margarita de Gregorio to firm up this meeting which has subsequently been confirmed for week 19 in 2019.

**European Geothermal Congress** – 11th to 14th June 2019

Hague, Netherlands

There was discussion which identified that this EGC meeting is not seen as a platform for IEA Geothermal and there will be no official presence by way of a booth, as was the case at the 2016 EGC.

**42nd ExCo** - 2019 Autumn

Costa Rica. Lothar Wissing to continue discussions with GIZ who are expected to become the host for this meeting. The meetings could include capacity building and training such as a workshop (similar to the Cuernavaca workshop) and also a 3 day training course run by Universities. Direct heat use is to feature.

ORMAT have been asked whether they were interested in helping to host the 42nd – no reply had yet been received.

**43rd ExCo** - 2020 Spring: Scotland - Move to Iceland for WGC 2020.

(Jonas Ketilsson has recently indicated he is happy to consider ExCo meetings in Iceland if the ExCo wished).

**WGC 2020** – Harpa Concert Hall and Convention Centre, Reykjavík, Iceland 27 April to 1 May 2020. <http://www.wgc2020.com/> Abstracts close 31 January 2019. Theme of the congress is *Connect to the Source*. IEA Geothermal participants need to put together a list of potential papers.