



**International Energy Agency
Implementing Agreement
for a
Co-operative Programme
on
Geothermal Energy
Research and Technology**

GEOHERMAL ENERGY

**Goals, Activities, Benefits,
Obligations and Costs**

19 February 2008

THE IEA GEOTHERMAL IMPLEMENTING AGREEMENT (GIA)

The GIA officially went into effect on 7 March 1997, being designed to operate for an initial period of five years. In late 2001, the GIA's mandate was continued for a second 5-year term, to 31 March 2007. In February of 2007, the IEA Committee on Energy, Research and Technology (CERT), acting on the recommendation of the IEA Renewable Energy Working Party (REWP), unanimously agreed to extend the GIA's operation for a third 5-year term, taking its activities to 31 March 2012.

The GIA provides an important framework for wide-ranging international cooperation on geothermal issues. It brings together important national and industry programmes for exploration, development and utilization of geothermal resources, emphasizing the assemblage of specific expertise and increasing effectiveness by establishing direct cooperative links among the geothermal experts in the participating countries and industries. The GIA's present activities are directed primarily toward the coordination of the ongoing national programmes, with contributions from the Sponsors.

Membership in the GIA is arranged through the joining of (1) Contracting Parties, which include the European Commission and either governments or parties designated by their governments; and (2) Sponsors, who are typically companies not designated by governments of their countries. The GIA and IEA Secretariat provide assistance for new membership.

As of February 2008, the European Commission (EC), 11 countries: Australia, France, Germany, Iceland, Italy, Japan, Mexico, New Zealand, Republic of Korea, Switzerland and the United States and three industry Sponsors: ORMAT Technologies, Inc., Geodynamics Limited and Green Rock Energy Limited, are members. The present involvement of these 15 Members in the Annexes is shown in Table 1. Participants take part in those Annexes to which they can contribute, hence are not necessarily active in every one.

MISSION AND OBJECTIVES OF THE GIA

According to the IEA World Energy Outlook 2006 Alternative Policy Scenario, renewable energy sources (including biofuels) could contribute 12% of the avoided 6.3 Gtonne CO₂ emissions by 2030 (IEA World Energy Outlook 2006, www.worldenergyoutlook.org/). The IEA GIA can play a significant role in helping to contribute to achieving this ambitious target.

In fact, the mission of the GIA for its third term, as stated in the GIA 2007-2012 Strategic Plan, is: *to promote the sustainable utilization of geothermal energy throughout the world by: improving existing technologies, developing new technologies to render exploitable the vast and widespread global geothermal resources, facilitating the transfer of know-how, providing high quality information and widely communicating geothermal energy's strategic, economic and environmental benefits.*

To achieve this mission, six strategic objectives were set:

Objectives

- Actively promote effective cooperation on geothermal RD&D through collaborative work programmes, workshops and seminars
- Collect, improve/develop and disseminate geothermal energy RD&D policy information for IEA Member and non-Member countries
- Identify geothermal RD&D issues and opportunities and improve conventional and develop new geothermal energy technologies and methods to deal with them
- Increase membership in the GIA
- Encourage collaboration with other international organizations and appropriate implementing agreements
- Broaden and increase the dissemination of information on geothermal energy and the GIA's activities and outputs to decision makers, financiers, researchers and the general public

ACTIVITIES OF THE GIA

The general scope of GIA's activities consists of international collaborative efforts to:

Major Efforts

- Compile and exchange information on geothermal energy research and development worldwide concerning existing and potential technologies and practices
- Develop improved technologies for geothermal energy utilization and
- Improve the understanding of the environmental benefits of geothermal energy and ways to avoid or minimize environmental impacts

Work is presently being conducted on four diverse research topics that are specified in four Annexes to the implementing agreement, with the activities of each divided into tasks. Each Annex has several participants (requires a minimum of two) and is coordinated by an Operating Agent (appointed by the Annex participants) through a chosen Annex Leader, with tasks supervised by Task Leaders.

The four current active Annexes are:

Active Research Areas

(1) Annex I: Environmental Impacts of Geothermal Energy Development: The main activities of this Annex are directed at clearly identifying possible environmental effects and devising and adopting methods to avoid or minimize their impact; investigating induced seismic events associated with EGS reservoir development and regular geothermal operations; and examining sustainable utilization strategies.

(2) Annex III: Enhanced Geothermal Systems: This Annex investigates new and improved technologies that can be used to artificially stimulate a geothermal resource to allow commercial heat extraction.

(3) Annex VII: Advanced Geothermal Drilling Techniques: This Annex pursues advanced geothermal drilling research and investigates all aspects of well construction with the aim of reducing the costs associated with this essential and expensive part of geothermal exploration, development and utilization.

(4) Annex VIII: Direct Use of Geothermal Energy: This Annex addresses the direct use of geothermal energy and the identification and removal of barriers to such use.

A list of the GIA Operating Agents, Annex Leaders and participating countries and sponsors is provided in Table 1 below.

The results from the Annex work include: numerous technical papers, databases (on CD-ROM), contributions to conference proceedings, meeting minutes, handbooks and annual reports. In addition, an interactive GIA website provides basic GIA information to the public, including access to GIA reports and papers, links to the IEA and participant sites and public service geothermal announcements. A password-protected Member's section currently provides GIA participants access to ExCo Meeting minutes and presentations, and will be further developed to provide an information archive; specially collected data, reports and other documents. The GIA, through the Secretariat, and with the assistance of the ExCo, also promotes itself, its activities and the worldwide use of geothermal energy through the publication of "popular" articles and brochures, participation in international geothermal conferences and workshops, and participation in IEA organized meetings and seminars.

Funding for all four existing Annexes is of the *task-sharing* mode, whereby the participants allocate specified resources and personnel to conduct a portion of the Annex work at their own expense. However, *cost-sharing* tasks, in which participants contribute to a specific Annex common fund used for research, equipment purchase, information processing and exchange, *etc.* may be considered in the future.

BENEFITS OF BEING A GIA MEMBER

The research, government, industry and academic sectors are the main beneficiaries of membership in the GIA, at both technical and policy levels.

Collaboration within the GIA provides researchers with the opportunities for joint R&D cooperation and information exchange on recent R&D developments via meetings, symposia, workshops and networking. Members from industry are able to participate together on R&D projects and to develop databases, models and handbooks. Policy and decision makers are able to gain an international perspective on geothermal issues, opportunities and development. In addition, there are benefits to society that arise from the acceptable development of geothermal resources in an environmentally acceptable manner.

More specifically, membership within the GIA provides the following benefits:

Benefits

- Increases R&D capabilities beyond that of single a country/group by combining the efforts of several nations
- Provides appropriate focus for R&D, hence avoids duplication and unproductive research
- Provides opportunities for research networking
- Develops skills and knowledge required to meet future technical challenges
- Improves R&D cost effectiveness by sharing research costs and technical resources
- Provides wider and easier access to key information, research results and technological capabilities
- Makes accessible a strong technical base provided by R&D activities in the participating countries
- Provides impartial information and analysis to help guide national policies and programmes
- Provides the opportunity to review current issues, ongoing research and the need for future research
- Provides opportunity to draw upon expertise and efforts of our sponsoring organization, the OECD/IEA
- Helps build a common understanding of the technical basis for various geothermal issues
- Investigates barriers to development
- Helps develop technical standards and methodologies
- Contributes to the development of energy policies

STRUCTURE OF GIA AND OBLIGATIONS OF MEMBERS

Members of the GIA participate in one or more tasks described by the Annexes to the implementing agreement. They coordinate their activities with other task participants in order to avoid duplication and enjoy mutual benefits from existing resources and expertise. They also cooperate in coordinating the Annex work and endeavour, on the basis of an appropriate sharing of burdens and benefits, to encourage cooperation among other participants with the objective of advancing the state of understanding of all participants.

Members designate an Operating Agent for each task in the relevant Annex. Each Annex is binding only upon its Operating Agent and the participants therein, and does not affect the rights or obligations of other members.

Management control of the GIA is vested in the Executive Committee (ExCo). Decisions made by the ExCo are binding on the members. The ExCo consists of one voting member from each member country and sponsor. An alternate may serve on the ExCo if the designated member is unable to do so. The ExCo meets twice a year and members and/or their alternates are strongly encouraged to attend. The ExCo manages all administrative activities resulting from or affecting the GIA. During ExCo meetings the members report on national programmes, exchange information and results of work under Annexes, and consider ongoing and arising issues.

Members cover the travel expenses for their representatives to attend meetings and workshops. Travel costs are minimized by doing business by mail and e-mail whenever possible. To the extent practicable, meetings will be scheduled to coincide with other events to minimize travel costs. Each participant bears all the costs they incur in carrying out its task activities, including reporting and travel expenses. Unless otherwise specified, the cost of publishing Annex reports and summary assessments shall be borne by the Operating Agent.

The GIA ExCo has a Secretariat, currently based in New Zealand, and managed by a Secretary who provides secretarial, administrative and other duties as required for the organization (basic duties are defined in Article 5 of the Implementing Agreement).

GIA FINANCIAL STRUCTURE AND COSTS

The expenses for the operation of the GIA Secretariat, including the Secretary’s salary, and other common costs of the ExCo are met from a Secretariat Common Fund, administered by a Custodian, presently the National Renewable Energy Laboratory (NREL) based in the USA.

To support the Common Fund, a monetary contribution is made based upon the number of shares assigned to each member through unanimous decision by the GIA ExCo. Sponsors from member countries are assessed half the number of shares of their member country, with a minimum of 1 share allocated. For the current membership, the apportionment for GIA members is:

Australia	2	New Zealand	1
European Commission	4	Republic of Korea	2
France	4	Switzerland	2
Germany	4	United States	4
Iceland	1	Geodynamics	1
Italy	2	Green Rock Energy	1
Japan	4	ORMAT	2
Mexico	1	~	~
Total = 35 shares			

The ExCo has set the cost per Common Fund share at US\$ 3,500/year for 2008.

With the addition of new members, or the withdrawal of current members, the total number of shares will increase or decrease, and may affect each member’s contribution. Contributions will be made annually on a calendar year basis. The number of shares assigned to new members will be determined by the ExCo acting in unanimity. The Custodian, who administers the Common Fund, will provide periodic accounting reports to the ExCo.

Other common funds may be established as required to meet the needs of new Annexes or Tasks. The costs will be shared among the participants of the relevant Annex in accordance with the shares set out in the Table above. The designated Operating Agent will serve as the Custodian of the Annex common fund. Arising issues of finance and budgeting will be decided based upon the conditions and requirements of Article 7 of the GIA.

Table 1. List of GIA Annex titles, operating agents, annex leaders, affiliations & contact e-mail addresses, participating countries and operating status.

Annex Number	Annex Title Operating Agent (OA) Annex Leader (AL); Affiliation; Contact E-mail Participants	Status
I	Environmental Impacts of Geothermal Development OA: GNS Science (GNS), New Zealand AL: Chris Bromley; GNS, New Zealand; c.bromley@gns.cri.nz Participants: EC, France, Iceland, Italy, Japan, Mexico, New Zealand, USA	Active since 1997, Continuing through 2009
II	Shallow Geothermal Resources	Closed
III	Enhanced Geothermal Systems OA: Geodynamics Limited, Australia AL: Roy Baria; MIL-TECH UK Ltd, England; roybaria@onetel.com Participants: Australia, EC, France, Geodynamics, Germany, GreenRock Energy, Italy, Japan, ORMAT, Switzerland, USA	Active since 1997, Continuing through 2009
IV	Deep Geothermal Resources	Closed 2006
V	Sustainability of Geothermal Energy Utilization	Draft
VI	Geothermal Power Generation Cycles	Draft
VII	Advanced Geothermal Drilling Techniques OA: Sandia National Laboratories, United States AL: Stephen Bauer; Sandia National Laboratories, USA; sjbauer@sandia.gov Participants: EC, Geodynamics, Green Rock Energy, Iceland, Mexico, New Zealand, ORMAT, USA	Active since 2001, Continuing through 2009
VIII	Direct Use of Geothermal Energy OA: Federation of Icelandic Energy and Waterworks, Iceland AL: Einar Gunnlaugsson, Reykjavik Energy, Iceland; einar.gunnlaugsson@or.is Participants: France, Iceland, Japan, New Zealand, Republic of Korea, Switzerland, USA	Active since 2003, Continuing through 2011
IX	Geothermal Market Acceleration	Closed

To Find Out More

**If you are interested in finding out more about the IEA Geothermal Programme,
or you wish to join the GIA:**

Contact the IEA GIA Secretary

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IEA Geothermal Energy

***Supporting and Advancing Worldwide
Geothermal Energy Use Through
International Cooperation***

www.iea-gia.org

The IEA Geothermal Implementing Agreement (GIA), also known as the Implementing Agreement for a Cooperative Programme on Geothermal Energy Research and Technology, functions within a framework created by the International Energy Agency (IEA). Views, findings and publications of IEA GIA do not necessarily represent the views or policies of the IEA Secretariat or of all its individual member countries.