



IGA ACTIVITIES

Message from the President

Roland N. Horne

Happy New Year for 2011, and Gong Xi Fa Cai 恭喜发财 for the Year of the Rabbit. 2011 brings some new changes for IGA, and some continuing changes for geothermal energy. For IGA, one of the most important events will be the transfer of the IGA Secretariat from Reykjavik, Iceland to Bochum, Germany. This transfer is taking place in February. The full-time post of Executive Director, so ably filled by Arni Ragnarsson in Iceland, will transfer to Marietta Sander, who will take up the job in mid-February. Until recently, Ms. Sander has been the Project Manager of the Geothermal Energy Project in the Federal Institute for Geosciences and Natural Resources (BGR) in Germany, and also has had extensive international experience in collaborative projects in Vietnam, South Africa and Peru. She is fluent in German, English, Spanish and French, and some Vietnamese. Ms. Sander is a truly excellent fit as IGA's Executive Director, and I have a high degree of confidence that she will help lead IGA to new strength. Please join me in welcoming her to this new post.

The move to Bochum also brings IGA a new host. In Iceland, we have been supported generously by Samorka and by the Icelandic geothermal community. In Germany, our new host will be the Bochum University of Applied Sciences, with generous support from His Excellency Johannes Rimmel, Minister for Climate, Environment, Agriculture and Consumer Protection of the State of Northrhine-Westfalia, Prof. Dr. Martin Sternberg, President, Bochum University of Applied Sciences, Dr. Christina Reinhardt, Chancellor, Bochum University of Applied Sciences, Prof. Dr. Rolf Bracke, Director, International Geothermal Center – GZB, Prof. Dr. Horst Rueter, President, GtV - Bundesverband Geothermie, and members of the Steering Committee Dr. Frank-Michael Baumann and Leonhard Thien. We are grateful to our German colleagues for their sustaining support, and we look forward to a fruitful collaboration during the IGA Secretariat's residence in Germany.

Considering the current and forward path of the development of geothermal energy, we have much to be pleased about. To relate a personal story, we have just concluded the 36th Stanford Geothermal Workshop, held at Stanford University from January 31 to February 2, 2011. Typically, the Stanford Workshop has had 120-150

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participants, from about 12 countries, with about 50-60 papers presented. However, this year we had 280 participants, from 23 countries, with 141 papers (126 presented). This was a gigantic increase, and is a reflection of the huge expansion of interest in geothermal energy development. Significantly, of the 280 participants about 160 were from the USA and about 120 from other countries – so the expansion of interest is not restricted to the USA but is rather an international phenomenon. Clearly, with almost double the usual attendance, we had many new people at Stanford this year, but of particular encouragement to me was the number of them who were young. An industry that continues to engender enthusiasm among young people is one that has the capacity to grow. Young people bring new ideas, new energy and a new future.

The expansion of activity extends well beyond Stanford. The worldwide summaries reported at the

World Geothermal Congress 2010 for worldwide Direct Use by Lund, Freeston, and Boyd, and for worldwide Power Generation by Bertani revealed that around US\$10 billion have been invested in geothermal projects over the past five years, by 46 countries: 33% in Asia by 7 countries, 4% in Africa by 5 countries, 21% in Europe by 24 countries, 27% in the Americas by 8 countries, 15% in Oceania by 2 countries. Of those countries reporting on investment in geothermal, 28% was for direct-use projects in 29 countries, 22% was for electric power projects in 8 countries, and the remaining 50% was for research and development and for field development. The leaders in direct-use project investments were China, Switzerland, Korea, Ireland and Turkey. In electric power plant investment the leaders were New Zealand, Turkey, United States, Mexico and Kenya.

Personnel active in geothermal also expanded. Approximately 45,600 person-years of professional effort were allocated to geothermal development (the counting was restricted to personnel with university degrees) in 43 countries during the period 2005-2009 for both direct-use and electrical power (no distinction was made between the two). The average was 1,060 person-years/country, with countries allocating more than 1,000 person-years being Germany, Philippines, USA, Japan, Netherlands, New Zealand and China. The following were the regional allocations: 28% in Asia by 7 countries, 1% in Africa by 5 countries, 51% in Europe by 21 countries, 16% in the Americas by 8 countries, 4% in Oceania by 2 countries.

Approximately 2089 wells were drilled in 37 countries during the period 2005-2009 for both direct-use and electric power. Shallow heat pump wells were not included in these figures. The average was 56 wells/country, and the countries drilling more than 100 wells were: USA, China, Turkey, Iceland, Korea, India and New Zealand. The following are the regional allocations: 40% in Asia by 6 countries, 2% in Africa by 4 countries, 20% in Europe by 16 countries, 29% in the Americas by 9 countries, 9% in Oceania by 2 countries. Of the total number of wells drilled, 44% were for direct-use, 36% were for electric power, 20% were for combined use, and less than 1% were for "other".

(We should all be grateful to John Lund, Ruggero Bertani, Toni Boyd and the late Derek Freeston for their considerable effort in collating these data. The data themselves were collected and submitted by each of the country member associations of IGA. If you are interested in more details, you can download the full papers from the IGA website.)

Of course all of you, our IGA members, are the components of this expanding geothermal world. All of us have new excitements and new challenges in front of us!

UPCOMING EVENTS

EGU2011 Annual Meeting, Sessions "Deep geothermal resources – development, operation and management" and "Deep geothermal resources – reservoir assessment and exploration", Vienna, Austria, 3-8 April 2011. Website: <http://meetings.Copernicus.Org/egu2011>

International Workshop on Scaling and Mineral Deposition in Geothermal Fields, 25-27 April 2011, Manila, Philippines. Contact: ogena@energy.com.ph

World Renewable Energy Congress (WREC) 2011, 8-13 May 2011, Linköping, Sweden. Website: www.wrec2011.com

7th International Geothermal Conference, 11-12 May 2011, Freiburg, Germany. Contact: agentur@energychange.de

10th IEA Heat Pump Conference, 16-19 May 2011, Tokyo, Japan. Website: www.hpc2011.org

Geothermal Energy Utilization Associated with Oil and Gas Development, 13-15 June 2010, Dallas, TX, USA. Contact: blackwel@smu.edu

45th US Rock Mechanics/Geomechanics Symposium, 26-29 June 2011, San Francisco, California, USA.

Website: <http://www.armasymposium.org>

IUGG General Assembly 2011, 28 June – 7 July 2011, Symposia "Heat Flow, Tectonics and Geothermal Energy" and "Physics of the seismic process: from laboratory studies to field observations", Melbourne, Australia. Website: <http://www.iugg2011.Com/program-iaspei.asp>

Geothermal Investment Forum and Networking Event, 14 September 2011, Toronto, Canada. Website: www.cangea.ca

GRC 35th Annual Meeting, 23-26 October 2011, San Diego, CA, USA. Website: www.geothermal.org

Geothermal Power Forum and Networking Event, 9 November 2011, Calgary, Canada. Website: www.cangea.ca

Sustainable Earth Science Conference, 8-11 November 2011, Valencia, Spain. Website: <http://www.eage.org/events/index.php?eventid=551&Opendiv=s3>

Kenya Geothermal Conference, 21-23 November 2011, Nairobi, Kenya. Website: www.gdc.co.ke

DIREC 2010 and the REN Alliance Workshop

Marcel Rosca, University of Oradea

Formed in 2004 at the time of the Bonn International Renewable Energy Conference, the REN Alliance is a partnership of five international organizations representing the spectrum of renewable energy. The partners of the Alliance comprise the International Geothermal Association (IGA), International Hydropower Association (IHA), International Solar Energy (ISES), World Bioenergy Association (WBA) and World Wind Energy Association (WWEA).

The strategic plan for 2010-2012 aims at strengthening the organizational structure of the REN Alliance and scaling up the range of activities in order to support a rapid deployment of renewable energy worldwide. Five work activities have been identified as key to the development of renewables and these form the core of the strategic plan. One strategic activity (number 5) is "Optimizing renewable energy systems", which explores ways for renewable energy technologies to be more efficient by interacting with each other.

The first REN Alliance Workshop on the Optimization Project was organized in Delhi, India, on October 26th, 2010, just before the official opening of the Delhi International Renewable Energy Conference 2010 (DIREC 2010). All REN Alliance partner organizations selected one or more experts to attend the Workshop and contribute to the Optimization project. The IGA BoD delegated Marcel Rosca for this task. The Workshop participants presented the state-of-the-art of the technology used for each of the renewable energy sources and different technical and economic possibilities for renewables working together. The Workshop ended with a discussion on the outline of the Scoping Paper on Renewable Energy Optimization, which was finalized later by e-mail communications.

The President of India, Pratibha Devisingh Patil, inaugurated DIREC 2010 at the Ministry of New and Renewable Energy in New Delhi. The Conference was held from 27th to 29th October, 2010, at the India Expo Centre & Mart Greater Noida. Energy Ministers of more than 50 countries and official delegates of almost 70 countries participated in the conference and deliberated on the vital issues of renewables and energy security, climate change and economic development. More than 13,000 delegates from about 70 countries participated in the main conference, which had 250 speakers, and more than 20,000 persons visited the exhibition, which had about 600 exhibitors. A full report can be downloaded at <http://www.direc2010.gov.in>.

Geothermal was mentioned a few times in the conference as one of the renewable energy sources, but mainly related to heating and cooling. At the exhibition,

though, it was rather absent, most stands being on solar, followed by wind, some bioenergy, and almost no hydro. It appears that geothermal has never been considered a potential energy source in India, but the Indian Government is now starting to show interest in developing the available resources.

None of the 11 Parallel Workshops and 29 Official Side Events organized during the conference was directly related to geothermal energy. The REN Alliance also organized an Official Side Event on the 27th October, with the title "Renewables Working Together Worldwide: Optimisation and Establishing a Global Renewable Energy Investment Fund", where the representatives of the partner organisations discussed options for the implementation of such a fund, including why optimising the synergies between renewables is key to up-scaling and mainstreaming renewables for solving global energy, climate and development challenges.

GEOTHERMAL ENERGY AT THE RECENT COP-16 MEETING

Luis C.A. Gutiérrez-Negrín, Mexican Geothermal Association

The United Nations Climate Change Conference COP-16/CMP-6 was held in the Mexican beach resort of Cancun, Mexico, through November 28-December 10,

Official Side Event
 Renewable Energy News
**Deutsche Bank UN DESA
 Greenpeace REN Alliance**

**Towards Global
 Feed-in
 Tariff
 Funds**

complimentary
 after-event drinks

20:15-21:45 - Tuesday 7 December
 Mamey Room - Cancunmessa - COP16 / CMP6

Front page of flyer announcing the side event



Mexico's pavilion at the Cancunmesse

2010. The Conference of the Parties (COP) is the supreme body of the United Nations Framework Convention on Climate Change (UNFCCC), adopted on 9 May 1992 in New York and signed at the 1992 Earth Summit in Rio de Janeiro by more than 150 countries and the European Economic Community. The first session of the COP (COP-1) was held in Berlin (1995), followed by Geneva (1996), Kyoto (1997), Buenos Aires (1998), Bonn (1999), The Hague/Bonn (2000, 2001), Marrakech (2001), Delhi (2002), Milan (2003), Buenos Aires (2004), Montreal (2005), Nairobi (2006), Bali (2007), Poznan (2008), Copenhagen (2009), and Cancun (2010). The ultimate objective of the UNFCCC is the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". Article 1 of the UNFCCC defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods".

The sixth meeting of the Parties to the Kyoto Protocol (CMP-6) was held at the same time.

Delegates from 194 nations, and representatives of various non-governmental groups, gathered in Cancun for two weeks of discussion aimed at making progress on a handful of issues rather than an overall agreement that would legally bind nations to reduce emissions. However,

the conference started with calls for decisive action to reduce greenhouse gas emissions worldwide as part of an effort to curb global warming.

In his opening remarks, Mexican President Felipe Calderón said the world may not be able to wait much longer for decisive action. He said climate change is already a reality for Mexico and the whole planet. He cited recent deadly floods in Mexico, Guatemala and Pakistan, as well as disasters in Russia and Africa, as evidence that climate change is already disrupting life for many of the world's people.

The threat is especially keen for small island nations – rising sea levels caused by global warming threaten their very existence. These nations wanted the world to commit to keeping global temperature no higher than 1.5 °C above pre-industrial levels – an ambitious goal given that world leaders struggled to commit to a two-degree limit at the COP-15.

Besides the official meetings, around 240 side-events were held by intergovernmental and non-governmental organizations (IGOs and NGOs, respectively) in an alternate venue – the so called Cancunmesse. These side-events were also convened and programmed by the UNFCCC Secretariat, and one of them was organized by the International Renewable Energy Alliance (REN Alliance), which currently brings together the International Geothermal Association (IGA), the International



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Hydropower Association (IHA), the International Solar Energy Society (ISOS), the World Bioenergy Association (WBA) and the World Wind Energy Association (WWEA).

The side-event hosted by the REN Alliance was titled “Towards Global Feed-in Tariff Funds”, and was officially registered and scheduled to be held on Tuesday, December 7, from 20:15 to 21:45 hours in one of the rooms of the Cancunmesse. The event was announced through flyers and the REN Alliance networks, with the following features:

TOWARDS GLOBAL FEED-IN TARIFF FUNDS

LEADING PROPOSALS AND RECOMMENDATIONS FOR IMPLEMENTATION

REN Alliance – the partnership of the world’s bioenergy, geothermal, hydro, solar and wind sector organizations – is pleased to host Deutsche Bank, Greenpeace, and the UN Department of Economic and Social Affairs who will present and discuss their leading proposals for global feed-in tariff funds. These will be tested against the realities of each renewable energy technology with recommendations made for implementation

Program

Welcome & Introductions

Duration: 5 min

Moderator: REN Alliance representative (Lau Saili)

Introduction to Deutsche Bank’s “GET FiT” (Global Energy Transfer Feed-in Tariffs programme)

Duration: 10 min

Guest Speaker: Mark Fulton, Global Head of Climate Change Investment Research, Deutsche Bank.

Introduction to Greenpeace’s “FTSM” (Feed-In Tariff Support Mechanism)

Duration: 5 min

Guest Speaker: Wendell Trio, Climate Policy Director, Greenpeace.

Introduction to UN DESA’s “G-FIT-F” (Global Feed-In Tariff Fund)

Duration: 5 min

Guest Speaker: Andrew Yager, Chief Officer: Water, Energy and Strategies, UN DESA.

Role of Each Renewable Energy Technology in Global Renewable Feed-In Tariff Funds

Duration: 25 min (5 min per technology)

Speakers:

Luis C.A. Gutiérrez-Negrín, Member: Board of Directors, International Geothermal Association

Cameron Ironside, Programme Director, International Hydropower Association

David Renné, President, International Solar Energy Society

Kent Nyström, President, World Bioenergy Association
Tanay Sidki Uyar, Vice President, World Wind Energy Association

Panel-Panel & Audience-Panel Discussion

Duration: 30 min

Moderator: REN Alliance representative (Lau Saili)

Summary & Conclusions

Duration: 5 min

Moderator: REN Alliance representative (Lau Saili)

The event ran as planned. Attendance fluctuated, with a peak of 40-50 persons. The presentation of the IGA representative can be found in the proper section of the IGA website, and basically was focused on why FiT schemes are important (and desirable) for geothermal development, in spite of having almost 11 GW of geothermal-electric installed capacity operating without FiT in hydrothermal reservoirs around the world. To achieve higher levels of geothermal deployment, financial support, economic incentives and risk mitigation mechanisms are necessary because of: (a) the high upfront investment cost of new projects due to the need to drill wells, in addition to the construction and installation of power plants; (b) the high risk in the initial stage in new projects in hydrothermal systems (the success rate of the first exploration wells ranges 20-60%); and (c) the high risk in the current technical performance of EGS projects. Feed-in tariffs with defined geothermal pricing have been very successful in attracting commercial investment in some European countries such as Germany, Switzerland, Belgium and Austria, among others, as past IGA President Ladi Rybach has pointed out.

In particular, the GET FiT program of the Deutsche Bank, quickly presented in the side event by Mark Fulton, is a concept specifically to support both renewable energy scale-up and energy access in the developing world through the creation of new international public-private partnerships, with the public partner implementing a strong and transparent regulatory environment and funding for the renewable premium while the private sector deploys capital to fund the projects.

The FTSM mechanism, presented by the Climate Policy Director of Greenpeace, has as its ultimate objective the provision of bankable and long term stable support for the development of a local renewable energy market. The tariffs would bridge the gap between conventional power generation costs and those of renewable generation. It proposes, for countries with higher levels of potential renewable capacity, the creation of a new sectoral no-lose mechanism generating emission reduction credits for sale to Annex I countries, with the proceeds being used to offset part of the additional cost of the feed-in tariff system. For other countries, there would need to be a more directly funded approach to paying for the additional costs to consumers of the tariff.

The importance of the REN Alliance side event lay in

it being the only one devoted to feed-in tariffs among all the 240 side events, as one of the attendees pointed out. It was also a relevant forum to spread the word about geothermal energy, since it was also the only side event where geothermal was mentioned.

Prior to the side event, the IGA representative participated in a brief TV interview taped and later broadcast by Climate-Change TV, the world's web channel dedicated entirely to discussions of global climate change effects and run under the auspices of RTCC (Responding to Climate Change). The interview was scheduled in advance, under the title: "Geothermal energy and its possible contribution to mitigation of climate change", and the theme: "Present status of geothermal energy in the world and its potential to replace non-renewable sources to generate heat and electricity, so contributing to mitigation of climate change". The TV interview lasted around 10 minutes (12:00-12:10 hours, December 7), with a couple of questions and answers around the mentioned theme. It is worth mentioning that this was the only TV interview in the COP-16 devoted to geothermal energy, among more than 100 interviews.

The COP 16 finished by adopting the Cancun Accord, signed by all the delegations except Bolivia. It provides for the creation of a Green Fund of \$100 billion USD to be delivered to the more vulnerable developing countries up to 2020 in order to mitigate climate change. Although it was not agreed where the funds will come from, and which must be the goals for GHG emission reductions, the agreement allows that crucial issues, such as continuation of the Kyoto Protocol, the mandatory actions, the rules

for channeling economic resources and the world warming range below 2°C by 2015, can be discussed and negotiated in the next COP 17 to be held in South Africa in 2011.

AMERICAS

El Salvador

The first geothermal diploma course in El Salvador

Francisco E. Montalvo, LaGeo

The first geothermal diploma course at the University of El Salvador was carried out with the support of the Italian Cooperation involving the participation of lecturers from the Institute for Geosciences and Earth Resources of the National Research Council of Italy (IGG-CNR), University of El Salvador (UES) - San Salvador, LaGeo – Santa Tecla, CONACYT (Scientific and Technical Research Centre) of El Salvador and the University of Palermo (UNIPA) Italy. Central America is rich in geothermal resources; therefore it is necessary to give importance to the training of new specialists in geothermal resources in the region. The current energy crisis and the availability of resources in the area focuses the need to initiate and strengthen participation by young professionals and technicians in academic-scientific and technical skills, making the diploma course sustainable in the immediate future.



Figure 1. Participants of the Geothermal Diploma Course at the University of El Salvador.

The objective was to create a knowledge base through regional processes of training of future researchers and technicians from the Central American countries. In this sense, the establishment of a training programme in geothermal activities could technically support the Government in the execution and implementation of national energy policies and strategies, starting a screening of the Central American region to discover more geothermal potential. An expected consequence of this objective is that the diploma course will be helpful in promoting and improving academic and research institutions as far as the energy field of investigation is concerned. Finally these efforts will contribute to knowledge of the geothermal energy potential from a socio-cultural point of view. The establishment of a Faculty of Geosciences and Earth Resources, as provided by the University of El Salvador (UES) would ensure a future of high-level training of researchers and practitioners in the field, with the UES becoming a regional point of reference. The diploma course lasted 8 months, with one month of field practice. It began in April and ended in December 2010 with a Geothermal Congress, where all the students presented the results of their practical work, related to different disciplines like Geochemistry, Geophysics, Geology, Power Plants and Environmental aspects of geothermal projects.

Thirty nine students and professionals (Figure 1) with different academic college backgrounds, among them Chemical, Electrical, Mechanical and Civil Engineers, Chemists and Mathematicians, were trained in the Geothermal Diploma Course at the Faculty of Engineering and Architecture of the University of El Salvador. All the students, among them 3 from Nicaragua, were granted a fellowship under the auspicious of the Italian Cooperation. The diploma course also included a brief training course in the IGG-CNR of Pisa, for the 3 selected students with the best academic record.

EUROPE

NEWS from EUROPE

Philippe Dumas, EGEC

10.02.2011

Sometimes Europe has to look at other continents for best practice example about RES

The Indonesian government will soon issue a ministerial decree ordering state electricity company PT PLN to buy power produced by geothermal power plants across the nation to reduce the company's energy procurement costs amid surging global oil prices. The decree will pave the way for the resumption of several geothermal projects that have been delayed for a long time by disagreement over their proposed electricity prices.

07.02.2011

2nd European Geothermal PhD Day, Reykjavik, Iceland

The second European Geothermal PhD day took place 1-2 March, 2011, in Reykjavik, Iceland. Organized by Icelandic students, the aim of the event was to provide a platform for students to broaden their geothermal horizon and establish a firm network of future geothermal specialists.

04.01.2011

Geothermal: an innovative solutions for snow-melting

During this winter, several airports closed, trains were delayed and roads were blocked due to the snow. Geothermal is an innovative solutions for snow-melting and de-icing of transport infrastructures.

Find more information in our [EGEC brochure](#).

16.12.2010

EGEC 2010 statistics on deep geothermal

EGEC publishes today its first [statistical report on deep geothermal installations in Europe](#): both geothermal power plants and district heating systems. Report on [electricity - geothermal DH](#)

8.12.2010

Geothermal will be key for an optimal energy mix

More than 200 company representatives from 20 countries attended the Geopower Europe 2010 Conference today in Paris. As one of the sources with very high potential and zero emissions, geothermal energy nevertheless received poor attention in the National Renewable Energy Action Plans of the EU-27 Member States and in the last two EC Communications on 'Energy Strategy 2020' and 'Energy infrastructure priorities'. During this EGECE conference, a main finding was that geothermal energy can and will be a major contributor to a 2050 energy scenario with the less costly energy mix.

[EGEC Press Release 8 December 2010](#)

A bright future shines on the deep geothermal market in Europe:

Austria

Drilling of the largest geothermal project in Austria.

A geothermal DH project is currently being developed for the municipality of Ried. The total investment for the development and the distribution of the district heating, in the first expansion phase, will amount to about € 30 million. The goal is to firstly produce around 55 GWh per year and later in full expansion around 90 GWh of heat.

Denmark

A new company to develop geothermal DH in Denmark

The Danish District Heating Association (DDHA) has now set up a company specifically to develop geothermal energy as a source of heat supply for district heating. District heating in Denmark supplies 62 % of all

households in the country and covers a little more than half the national demand for space heat and hot tap water in all buildings. Already a number of geothermal installations feed energy into district heating and a number of projects are under development, while some 32 other potential locations have been identified. The state-owned energy company DONGenergy earlier this year returned all its concessions for geothermal energy to the Danish state, as the company will focus on other business areas. The company has been a partner in most of the current projects. DDHA sees a need to ensure that existing knowledge is retained and kept available to the Danish district heating sector. The association therefore set up the new company in January 2011. The manager for international affairs in DDHA says: "It's exciting for us to be able to promote what is clearly seen as one important future source of energy for building comfort. We already have an extensive horizontal distribution system, and now we acquire the competence to assist district heating companies in extracting this renewable and dependable energy." DDHA is a non-profit association organizing the more than 400 district heating utilities, mostly municipal or cooperative, that deliver around 99 % of all district heating in Denmark.

France

French aid for geothermal EGS project - Roquette authorised

On 12 January, the European Commission authorised France to grant aid of € 25.3 million for the construction of a heat boiler using geothermal energy in Alsace. The aid will be granted to a joint venture between Roquette Frères, Electricité de Strasbourg and Caisse des Dépôts et Consignations. The project also involves the construction of a 24 MWt geothermal boiler and the construction of a 15-kilometer pipeline to bring the heat from the underground geothermal source to the Beinheim site. The use of geothermal energy, a renewable energy source, will result in a reduction of CO₂ emissions by 39,000 tonnes a year compared to the same volume of heat produced from natural gas.

Greece

Tender for geothermal potential of unexplored mining areas

The Ministry of Environment, Energy and Climate Change has announced an International Open Tender for the leasing of the right to explore the geothermal potential of four unexplored mining areas in Greece: central and southern Chios Island, Evros River Delta, Nestos River Delta and Samothraki Island. The candidates' bids must be submitted before 16 February 2011. [more](#)

Hungary

Italian companies invest in geothermal in Hungary

According to the Italian Chamber of Commerce in Hungary, ENI and Edison are contemplating geothermal energy projects in Hungary. The Italian government is supporting these companies that would invest in green

energy production and have the necessary expertise that could be deployed in Hungarian projects.

PannErgy has just completed the acquisition of a geothermal energy company: Berekfőrdő Energia. The company, which has 320 kWe of generating plant and 450 kWt of installed heat supply, has the ability to generate HUF 55 – 65 million a year. A second piece of good news for Pannergy is the positive decision of the European Investment Bank to approve a credit facility (€ 110 million) for the company to carry out geothermal projects.

Ireland

SLR Consulting will analyse deep geothermal resources in the Republic of Ireland with support from the Sustainable Energy Authority Ireland (SEAI). The project is designed to advance the exploitation of geothermal energy to generate renewable electricity. SLR will carry out a Play Fairway Analysis which will assess the geothermal exploration risk by analysing the various attributes of the subsurface of Ireland to a depth of 5000 m. The contract has been funded by SEAI under its Renewable Energy Research, Development & Demonstration Programme, the National Development Plan (of Ireland) and the European Union.

Italy

The Italian Ministry for Economic Development is funding a project coordinated by NCR-IGG in Pisa. This 2-year project (€ 8 million) aims at evaluating the geothermal potential of southern Italy, and to propose 8 plants (possibly 3 for power generation and 5 for direct uses).

Portugal

SOGEO - Open public tender - contract for the provision of workover and drilling services for geothermal wells

In the scope of the new investment projects on the use of geothermal resources, SOGEO intends to contract out all of the drilling services necessary for the workover of the geothermal wells CL2 and CL4 and for the drilling of the directional geothermal well CL8 in the Ribeira Grande Geothermal Field; there is the possibility of drilling additional geothermal wells, up to a maximum of three with an expected maximum depth of 1,500 m, at the option of the awarding entity. The closing date was 7 March 2011.

[more](#)

Serbia

Mannvit Awarded Contract for Renewable Energy Consulting in Serbia

Mannvit, as a member of a consortium led by the Spanish consulting firm Eptisa, has recently been awarded a new contract in the Republic of Serbia. The European Union has allocated € 1.5 million for a project entitled "Promotion of Renewable Energy Sources and Energy Efficiency" that aims to contribute to sustainable

development in Serbia. This consulting project is being conducted for the Serbian Ministry of Mining and Energy, to explore renewable energy sources, specifically geothermal energy and combined heat and power (CHP) potential. Mannvit will, for the next 18 months, act as project coordinator in the mapping of geothermal energy resources in Serbia with the consortium partners, select the three most favorable areas in cooperation with the ministry and conduct pre-feasibility studies for geothermal utilization at the three sites. Mannvit will also contribute to the study of the CHP market in Serbia.

Slovakia

Changes in the Promotion of Renewable Energy

In December 2010, the Slovak Parliament adopted an Amendment to the Renewable Energy Sources (RES) Promotion Act. The RES Promotion Act revises the rules that support electricity produced from renewable energy sources, and introduces new rules that support the high-efficiency cogeneration of electricity. A RES electricity producer is entitled to an additional payment on a feed-in tariff for 15 years after the initial operation, reconstruction, or modernisation of a facility. The feed-in tariff used for the calculation of the additional payment will be the same for the entire period during which the electricity producer is entitled to the additional payment. The producers may enjoy the 2011 feed-in tariffs for geothermal energy: € 195.84/MWh.

Switzerland

AXPO enters the geothermal market

The Swiss energy company Axpo, a new member of EGEC, has established a competence center for geothermal energy in Glattbrugg. The first project in which the company will be involved is participation in a promising and drill ready project in Taufkirchen in Bavaria/ Germany. Axpo plans to operate its own long-term geothermal power plants at suitable locations in Switzerland. "Geothermal Energy has a strong technical potential in Switzerland with a long term energy generation of up to 17 TWh per year", declared CEO Heinz Karrer of Axpo Holding AG.

Turkey

New financing for geothermal projects in Turkey

Turkish legislation guaranteeing prices and incentives for energy from renewable resources may pave the way for new geothermal power investments as the country seeks to meet rising electricity demand. Lawmakers ratified the law on 2 January 2011. The law sets guaranteed prices of 7.3 U.S. cents per kilowatt-hour for wind and hydroelectric energy from licensed plants, 13.3 cents for solar and biomass and 10.5 cents for geothermal. Additional incentives for using local equipment may add 0.4 cents to 2.4 cents to the price for five years.

Moreover, the European Bank for Reconstruction and Development (EBRD) has launched a new financing facility to support Turkey's investments in renewable energy and energy efficiency projects to increase energy

savings and decrease carbon emissions. In the new Mid-size Sustainable Energy Financing Facility (MidSEFF), the EBRD will offer a total of € 400 million in loans to Turkish banks for lending to private sector companies to undertake mid-size renewable energy, waste-to-energy and industrial energy efficiency investments.

Enel Green Power (EGP), Italy's biggest renewable energy company, has agreed a deal to develop geothermal energy in Turkey as the group moves to expand. EGP has reached an agreement with the Uzun group (Turkish Meteor consortium) to set up a company that will hold 142 exploration licences covering areas in the Aegean and Marmara regions to explore for geothermal resources in the west of Turkey. Enel could build a 100 MWe geothermal power plant with a € 350 million investment. Installed geothermal capacity in Turkey stands at 86 MWe and Ankara intends to develop an additional 600 MWe through 2015. Turkey's regulatory framework provides for 10-year incentives that vary according to the energy resource used, with a further five-year incentive if the equipment used is made in Turkey.

EBRD will hire consultants to assess the geothermal market in Turkey:

The European Bank for Reconstruction and Development is considering a wide range of renewable energy proposals in Turkey, some of which are in the geothermal sector, and as such requires a consultant to provide an assessment of the geothermal market in Turkey. The current EBRD objective is to enable the Bank to effectively assess geothermal project risks and make informed decisions on the financing of these projects.

Turkey orders Pratt's power units:

Pratt & Whitney Power Systems has received orders from Turkey for three more of its special low-heat electricity conversion systems. Pratt said the orders launch it into the Turkish renewable energy market. Turkey's Jeoden Electricity production plant in Denizli, near Izmir, Turkey, is scheduled to be operational in April using three PureCycle modules to generate up to 780 kWe of net energy from a naturally occurring geothermal formation. The project will be installed, owned and operated by Jeoden Geothermal, a joint venture between NRG Enerji and MDO Group.

United Kingdom

Three winners get hot £1.1m prize in Geothermal UK competition

Three geothermal projects run by Keele University, Newcastle and Durham University and Cofely District Energy in Southampton have won a total of £1.1 million in funding from the Government's Deep Geothermal Challenge Fund's second round.

This second round has concentrated on heat-only projects. The Government continues to see a strong future for all types of deep geothermal energy. The Deep Geothermal Challenge fund was set up to help companies carry out exploratory work needed to find viable sites for

this technology. The funding has been allocated as follows:

- * £500,000 to Keele University, to drill a 1200m borehole to provide geothermal heat for their proposed sustainable campus;
- * £400,000 to a Newcastle/Durham University project to fund the drilling, hydraulic testing and geophysical logging of a 2km deep borehole at 'Science Central', a large development in central Newcastle. The team plans to drill through old mining tunnels to search for geothermal energy under the city centre. Researchers from Newcastle University who are leading the project hope it could initially provide up to 5MWt of thermal energy, with potentially more heat and electricity from future boreholes. Drilling is expected to begin next week, pending a number of official permissions.
- * £200,000 to Cofely District Energy Limited, to part-fund the refit of the Southampton deep geothermal well.

The first round concentrated on deep geothermal power, and the two successful Cornwall-based projects continue to move ahead. Cornwall Council granted EGS Energy planning permission for its geothermal plant. Work on drilling is expected to start in the second half of next year, with electricity to be produced towards the end of 2013. The plant, which will be situated on the north side of the Eden Project site, is due to produce up to 4MWe for use by the attraction. The surplus, which will supply approximately 5,000 homes, will go to the National Grid. In addition, heat produced by the plant will be used to

provide warmth for the Eden Project Biomes.

Ryan Law, managing director of Geothermal Engineering, said the firm has been holding extensive meetings with an unnamed potential investor from the oil and gas sector for its proposed £40m geothermal plant in Redruth, Cornwall. The company is planning to make a formal funding announcement in the coming months and then expects to start drilling the first well by October this year. The 4.5km-deep well is expected to access rocks that reach temperatures of up to 200°C and is intended to be followed by two further wells. Geothermal Engineering has already raised the £10.5 million needed to complete the first well and test the viability of the site through a mix of private sector backers and a £1.5 million grant awarded by the Department of Energy and Climate Change in 2009. The company will still need to raise a further £30 million to complete the project if it is to achieve its goal of bringing the plant online in 2013.

Europe's largest geothermal heat pump is up and running in London

The London shopping centre 'One New Change' officially began use of the largest geothermal heat pump in Europe at the end of January 2011. Sustainability has been central in the design of One New Change, which has reduced its carbon footprint by at least 10% through the use of geothermal energy on site. This equates to a saving of around 900 tonnes of CO₂ emissions annually. The

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development has maximised its energy efficiency through the use of large-scale geothermal heating technology. This system means One New Change can be heated and cooled with extreme ease simply by using geothermal energy. Land Securities has installed a ground source energy system which is the largest commercial application of the technology in Europe: drilling to a depth of 150 metres and installation of pipework which spans 60km in length. According to the owner of the shopping centre the system will save around £300,000 on heating bills each year.

ASIA

China

Industrial Synergies Between Geothermal Energy and Waste Heat Recovery

Cully Cavness, Thomas J. Watson Fellow

The geothermal industry's future faces numerous challenges and obstacles, many of which have grown familiar to seasoned geothermal professionals. Financing, resource assessment, drilling, reservoir management, supply chain management, and plant operations have become the standard list of hurdles for institutions throughout the geothermal value chain. This article offers a broadly applicable strategy for addressing these and other problems: leverage overlaps and synergies in technically related but otherwise disconnected industries.

Geothermal professionals understand the industry's multidisciplinary demands. Financing, drilling, and power cycle engineering all present totally unique challenges, yet successful geothermal developers must coordinate these disparate disciplines along with many others. Luckily, the geothermal industry is not alone, and other industries share overlapping challenges. As a result, the geothermal industry can tap into many related, but currently underutilized sources of technology, best practices, skills, and expertise. Research outside the geothermal industry may reveal new tricks and tips for the geothermal projects of tomorrow.

This article will explore one specific example of such overlap: Industrial Waste Heat Recovery. Subsequent articles and essays will investigate the manifold other examples of potential collaboration for the geothermal energy industry.

Industrial Waste Heat Recovery (WHR) is the process of recycling hot gas or liquid waste streams from industrial point sources like cement mills, steel mills, or refineries. Arrangements of heat exchangers, steam turbines, and generators can harness industrial waste heat streams in much the same way as geothermal brine, thus creating

continuous electricity production without consuming additional fossil fuel.

Predictably, both geothermal and WHR face many of the same engineering challenges like boosting power cycle efficiency, avoiding scaling, preventing corrosion, accommodating heat input variability, condenser/cooling system optimization, and more. One very important obstacle for both industries is the challenge of effectively harnessing low-temperature heat resources. The problem arises from condensation-exacerbated corrosion and Carnot efficiency limitations in low-temperature power cycle systems.

Low temperature resources represent enormous opportunities for both geothermal and WHR industries. The western United States, for example, abounds with low-temperature geothermal resources that are just outside the window of viable economics. Similarly, the amount of wasted industrial heat in America and internationally is stunning, and a significant portion is contained in untapped low-temperature waste with marginal recovery economics. Thus, improvements in low-temperature resource exploitation by either the geothermal or WHR industry can expand the economic possibilities of both industries.

Take, for example, recent improvements to the Rankine Cycle – a standard technology in both geothermal and WHR. Alexander Kalina, a Russian émigré to the United States, invented, patented, and commercialized Kalina Cycle technology in the 1980's. The technology deploys an ammonia-based working fluid blend that increases heat acquisition efficiency and extends the viable temperature range of Rankine power cycles. Kalina technology enhances the efficiency of Rankine cycles by allowing a non-isothermal heat exchange process during working fluid expansion and condensation. Essentially, Kalina's invention improves a Rankine cycle's efficiency at lower temperatures, and can be used to economically harness resources as cool as 100°C.

The technology found early deployment in the Waste Heat Recovery industry. However, an Australian funded, London-based firm called Global Geothermal (GGL) and its Chinese licensee, Shanghai Shenghe New Energy Resources Science and Technology (SSNERST), seek to deploy the technology for low-temperature geothermal applications.

SSNERST, which historically specialized in waste heat recovery, now collaborates with GGL to research, develop, and perfect the Kalina Cycle. The firms also jointly build plants for demonstration and operation – a successful low-temperature geothermal demonstration in Taiwan being the most recent example of that effort. This sharing of resources, best practices, expertise, personnel, and technology represents a promising opportunity for both waste heat and geothermal industries, and could unlock enormous resources of low-temperature waste and geothermal energy.



Low temperature power cycle engineering is only one of many potential synergies that the geothermal energy industry may find with other industries and technologies. The industry may find additional opportunities in the technical overlaps between Unconventional Natural Gas “fracking” and EGS reservoir creation and stimulation. Semiconductor-based technologies used to prevent scaling and corrosion in naval applications may find receptive markets in geothermal power plants battling corrosive hydrothermal brines. Further, Coal Bed Methane (CBM) wells in Raton Basin, Colorado, offer a new perspective on potential collaborations between the oil and gas industry and the geothermal industry.

Cully Cavness’ subsequent essays and articles in the International Geothermal Association Quarterly will address the above topics and others. Cully Cavness is a Thomas J. Watson Fellow researching industrial synergies for the geothermal energy industry in Iceland, China, Spain, Trinidad and Tobago, Chile, and the United States. He is a geologist and native of Denver, Colorado, USA. He currently resides in Shanghai, China.

Philippines

Renewable Energy and Expo 2010 held in the Philippines

by **Sylvia Ramos, NGAP**

The Renewable Energy Conference and Expo 2010 was held for the first time in the Philippines on December 2-3, 2010 at the Dusit Thani Manila Hotel, Makati City. With the theme “From Policy to Action: Generating Impacts in 2010 & Beyond,” the conference assessed the impact of the RE sector since the passage of the Renewable Energy Law last December 2008 in terms of advancing growth of this sector, in promoting energy security and in mitigating the impacts of climate change. It also looked into ways of sustaining the momentum in the implementation of the RE Law and harnessing meaningful inter-sectoral partnerships. This event has evolved from the Annual Geothermal Conference, hosted by Energy Development Corporation for the past 30 years, in due



recognition of the critical role of geothermal and other forms of renewable energy in paving a successful path for the country's sustainable energy development.

The conference was honored by the presence of Philippine President Benigno Aquino III and Energy Secretary Jose Rene Almendras. President Aquino, in his keynote address, highlighted the balance between energy development and responsible stewardship of the environment for the benefit of future generations. On the other hand, Secretary Almendras, in his opening statement, emphasized the key role of RE development in achieving energy security. He also mentioned that the government has already generated investment commitments of over 80 billion Philippine pesos (USD 1.8 billion).

The conference was attended by more than 400 participants representing various RE sectors, government, NGO's, and other key stakeholders. It was convened by the RE Coalition in coordination with the Philippine Department of Energy and the National Geothermal Association of the Philippines. Various RE companies including FirstGen, Energy Development Corporation, Chevron Geothermal Phil. Holdings, Inc., Aboitiz Power, and First Metro Investment Corp provided full corporate support.

AFRICA

Kenya

Exploration drilling starts in Menengai prospect, Kenya

Peter Omenda and Ruth Musembi, GDC, Kenya

Kenya has two geothermal fields which have been explored by drilling, namely Olkaria with 209 MWe installed and Eburru which has not been developed yet. Menengai is the newest geothermal area in Kenya to be committed for exploratory drilling. Results from detailed surface studies conducted between 2005 and 2009 which included geological investigations together with sampling and analyses of fumaroles, shallow ground temperature distribution and geophysical measurements mapped a large geothermal field with high potential. Geophysical measurements that included MT and TEM defined a suitable area of more than 110 km² with estimated power potential of over 1,650 MWe. Gas geothermometry indicates reservoir temperatures of more than 270°C.

In that regard, the Geothermal Development Company (GDC), which is a Government of Kenya owned corporation formed in 2008 to fast track development of geothermal resources in the country, has embarked on a massive exploration drilling program at Menengai. GDC recently acquired two new high capacity drilling rigs which



have been commissioned and started drilling at Menengai in February 2011. Both rigs will drill simultaneously and the first two wells will be completed to about 3,000 m by April 2011.

In anticipation of a resource discovery after drilling of the four exploration wells, GDC advertised in December 2010 for expression of interest (EOI) for interested investors to develop up to 400 MWe during phase one of the development of the project. In that arrangement, GDC will undertake appraisal and production drilling; and also develop the steam gathering system. GDC will then enter into steam sales agreement with successful developers. Appraisal and production drilling will be fast tracked by the deployment of an additional four rigs at Menengai to ensure that the 400MW power plants are commissioned by 2014. In order to provide power to the national grid at the earliest opportunity, GDC will encourage interested investors to install wellhead generating units using steam from the discovery and appraisal wells prior to the development of the large plants.

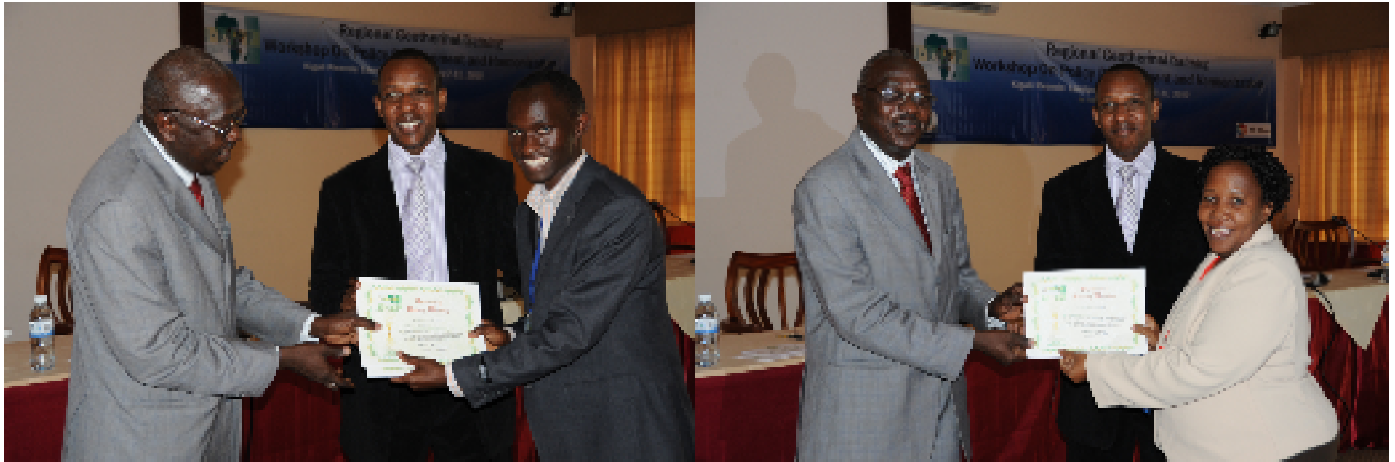
Rwanda

Regional Geothermal Training Workshop on Policy Development and Harmonization, Kigali, Rwanda, 7-11 December 2010

Philippe Niyongabo and Meseret Teklemariam, Department of Infrastructure and Energy, Africa Union Commission

The Department of Infrastructure and Energy of the African Union Commission (AUC) successfully conducted a "Five-day" Regional Geothermal Training Workshop (RGTW) on Policy Development and Harmonization in collaboration with the Government of Rwanda, in Kigali, from 7-11 December 2010. The workshop focused on the twelve Eastern Africa Countries: Burundi, Comoros, Djibouti, Democratic Republic of Congo, Eritrea, Ethiopia, Kenya, Malawi, Rwanda, Tanzania, Uganda and Zambia.

AUC organized this workshop in the context of implementation of the "Road Map" and "Action Plan" developed as an outcome of the Regional Geothermal



Distribution of Certificate Awards

Stakeholders' Workshop (RGSW) organized by the AUC in Nairobi in March 2010. The RGSW was organized in collaboration with the government of Kenya and the German Federal Institute for Geosciences and Natural Resources (BGR).

The overall objective of this Regional Geothermal training workshop (RGTW) was to address an important challenge and a barrier to development of geothermal resources in the East Africa Region (EAR), namely: an inadequate policy, institutional and regulatory framework to attract private investments in the region. The workshop also aimed at developing an appropriate, clear and coherent legal and institutional framework to attract private investors to the geothermal sector.

RGTW's specific objectives included: (i) to delineate the needs and expectations of the private sector; (ii) to create awareness about, and transfer knowledge of, the subject; (iii) to present a progress report on the Regional Geothermal program for the Eastern African Countries, and (iv) to acquire inputs and guidance from representatives of Eastern African countries to further implement the adopted road map/action plan (March 2010).

Among the 120 participants were experts from 10 Eastern Africa Countries (except Burundi and Eritrea); the African Union Commission (AUC), Ministry of Infrastructure (MININFRA) of Rwanda, institutions with geothermal support programmes (Federal Institute for Geosciences and Natural Resources (BGR), Icelandic International Development Agency (ICEIDA), United States Agency for International Development (USAID)), investment and development partners (German Development Bank (KfW) World Bank (WB), African Development Bank (AfDB), French Development Agency (Afd), European Union (EU), International Finance Corporation (IFC)) and the private sector (Reykjavik Geothermal).

The RGTW covered various activities, in particular a Certificate Award distribution and a One-day Field Excursion to the Gisenyi geothermal prospect in Rwanda.

As a RGTW major outcome, the participants affirmed the need for a Regional Geothermal Programme and developed a "Recommendation on the Way Forward" for accelerated geothermal energy resource development in the Eastern African countries. Specific outputs of the workshop were: (i) the needs and expectations of the



Participants of the field trip



Workshop participants

private sector were delineated; (ii) awareness was created and knowledge transferred on the subject; (iii) about 40 representatives from ten Eastern African countries were trained and awarded certificates for their active participation and successful completion of the training; (iv) a compendium of presentations and training materials was prepared; and (v) a “Recommendation on the Way Forward” was developed.

Further, some of the issues in the recommendation adopted by RGTW were (i) Governments of the Eastern African countries should take the lead in the implementation process; and (ii) the African Union Commission should assist in defining the framework and policy guidelines, as well as assuring coherence in the programmes

The Way Forward: (i) Propose a Policy Guideline to Governments to maintain coherence between the policies and legislations of the different countries; (ii) Identify focal points and establish a Regional Working Group to develop a detailed action plan; (iii) Encourage active participation and involvement of Regional Economic Communities and Regional Power Pools; and (iv) Ensure continuous implementation of the action plan developed during March 2010.

IGA News

IGA News is published quarterly by the International Geothermal Association. The function of IGA News is to disseminate timely information about geothermal activities throughout the world. To this end, a group of correspondents has agreed to supply news for each issue. The core of this group consists of the IGA Information Committee:

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The members of this group submit geothermal news from their parts of the world, or relevant to their areas of specialization. If you have some news, a report, or an article for IGA News, you can send it to any of the above individuals, or directly to the IGA Secretariat, whatever is most convenient. Please help us to become essential reading for anyone seeking the latest information on geothermal worldwide.

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