

# THE GEOTHERMAL ASSOCIATION OF IRELAND

## Newsletter

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MAY 2006

We have had two very interesting foreign guest speakers this year: Burkhard Sanner and Paul Younger. The GSHP grant system has been put in place at last. Important grants have been awarded for training and legislative research. Interesting times! GLIJ

Yes we are nearly there. The new website address is  
[www.geothermalireland.org](http://www.geothermalireland.org)

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### GEOTHERMAL DIARY

<b>Field trip</b>	Galway	June, 2006
<b>GeoDrilling 2006</b>	Donington Park, UK	21-22 June
Geothermal Renewable Energy Session (see inside)		
<b>World Renewable Energy Congress</b>	Florence, Italy	19-25 <sup>th</sup> August 2006
<b>GAI AGM</b>	Cork, Life Time Lab	Wed 7 <sup>th</sup> Feb 2007, 7pm

We look forward to seeing you at GAI events and hearing about your progress with geothermal energy.  
Do send us your articles - email the editor at [conodate@mac.com](mailto:conodate@mac.com).

The Geothermal Association of Ireland was formed in January 1998.  
To Promote the Development of Geothermal Resources in Ireland.  
The GAI is a member of the European Geothermal Energy Council  
and of the International Geothermal Association



## It's high time we were on the list

Paul Sikora  
Chairman GAI

In case you've missed the point, let's say it again...its high time we were on the list.

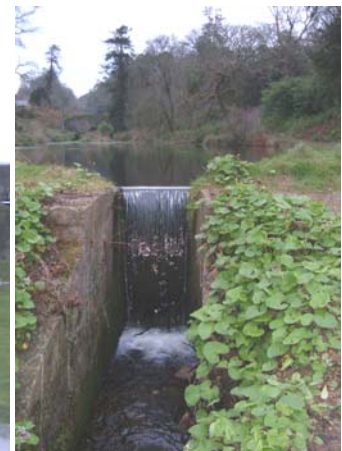
Who?...What list?... It's the list of renewable energies just about everyone recites off their fingers "Solar, wind, PV, biomass, hydropower, wood pellets, bio diesel, ethanol, hydrogen...and others". Every now and then someone will mention heat pumps or geo-something, but for the most part you could say that geothermal energy is an afterthought if it features at all.

As anyone in the GAI will know well, this Cinderella status is not because of any objective ranking of geothermal in the hierarchy of renewables. Like direct sunlight, geothermal can be used to produce power and heat. In its more widely available forms, pumped geothermal energy or ground source heat pump (GSHP) technology has been shown to have the greatest potential of any renewable energy technology for reducing greenhouse emissions worldwide. In terms of cost effectiveness pumped geothermal (GSHP) installations are among the top performers of any active renewable technologies. And unlike many other renewable energy systems, geothermal installations are visually discreet, make little or no sound, and require an absolute minimum of care and feeding.

So why does geothermal not fare better in public perception? Maybe geothermal hardware is too discreet for its own good. Solar collectors just have to be as visible as possible to catch the sun. Wind generators make their own statement against the horizon. Bio fuels are represented by photos of forests or fields of sunflowers or similarly photogenic scenes. Reduced to essentials a geothermal system consists of a metal box and a hole in the ground. Not exactly the kind of material that gets fashion photographers excited.

Does geothermal energy suffer from a lack of a visual image? Has it a charisma deficit? Does it need, in terms recently made famous in world politics, to be "sexed up"? Whatever the reason, geothermal energy is in dire need of something to put it on the list of renewable energy solutions for today.

The floor is open to anyone with a contribution to make.



Glenstall Abbey. Glenstall is the site of a new geothermal system Installation in 2005 by Dunstar Ltd.  
Left: the front facade of the building. Right: the outflow from the Chapel lake used as the Geothermal source for the system.



## Ground Source Heat Pumps Northern Ireland May 2005

Action Renewables

In their recent publication on renewable energy installations in Northern Ireland, with emphasis on small scale installations, Action Renewables report that by May 2005, Ground Source Heat Pumps have a total installed capacity of 669kWth. These consist of 56 small scale and 1 large scale (>30kWth). These are distributed fairly evenly across the region as shown by the county breakdown

Large Scale	Antrim	100%
Small Scale	Antrim	13%
	Armagh	24%
	Londonderry	16%
	Down	24%
	Fermanagh	9%
	Tyrone	21%

### GeoDrilling 2006

Donington Park, UK. 21-22 June

Geothermal Renewable Energy Session speakers will include:

- Paul Younger, HSBC Professor at University of Newcastle, reporting on testwork on the 1,000m Weardale borehole
- Ivor Catco, MD design and engineering solutions at Atkins, will identify geothermal energy as a major emerging opportunity
- Fr. Martin Preene, UK groundwater manager, Golders Associates will deal with the long-term sustainability of geothermal systems.
- Duncan Nicholson, Director at Ove Arups & Partners will talk about energy pile system opportunities in the UK and their use in Europe.
- Chris Davidson, technical director, Geothermal Heating (International) will review the development of geothermal energy in the UK and examine some international drilling case studies.
- Kathy Butcher, US National Ground Water Association will present the NGWA guidelines for vertical geothermal borehole construction.

### RTE 31 May 2006

Gareth Ll. Jones

RTE's flagship morning radio programme **Morning Ireland** ran a week long Renewable Energy series at the end of May. On this Wednesday it was Geothermal Energy. Paul Cunningham presented Ground Source Heat Pumps which cut costs by 40% and work like a fridge in reverse. He interviewed two house owners from Dromahair, Co. Leitrim, Brid O'Donohue and John Hanly, who were very happy with the systems installed in their houses. These appeared to be coils in 1.2m deep trenches. They were pleased with constant hot water, better cost savings than expected and that it was environmentally friendly. Paul Cunningham delineated horizontal and vertical ground source, water source and the less efficient air source. Kevin O'Rourke of SEI delineated that there were higher savings with ground or water source rather than air source. A COP of 3 was expected and the ten year payback was cut to 7 years with the new grants. A sour note was brought in with the reporting of a problem in Clare where the expenditure of €20,000 produced no

hot water and a row with the installer. Overall there was a positive impression of geothermal energy.

The evening **Six One News** programme picked up the morning Renewable Energy series, so that on Wednesday evening there was also a geothermal slot. This time the action had moved to Co. Roscommon. The focus was first on a borehole and a drillrig was seen in position. Then a water source installation showed collector pipes being prepared for a half drained small lake. It looked a bit of a mess, but hopefully viewers would understand that it would all disappear beneath the surface as the lake filled up. A Mr. Jim Morrissey from Wicklow was pleased with his installation, but there was an awkward discussion of the abstruse point concerning the fact that electricity generation is inefficient (no mention of CHP), which was supposed to take away from the advantages of a COP of 3 (SEI) or 4 (RTE). Again overall, I thought that it was good exposure.



## GAI AGM Feb 7<sup>th</sup> 2006

Roisin Goodman  
Gareth Ll. Jones

A very successful and well attended meeting was held in the Life-Time Laboratory in the refurbished old Cork City Waterworks. 14 members and committee attended. It has to be said to much interest was generated by guest speaker Burkhard Sanner which followed the AGM and generated an audience of 37 for a 2.5 hour long talk in two parts. A cheese and wine reception was sponsored by Cork City Council during the break and all told a very successful night was had.



Outgoing Chairman Alistair Allen (right) chairs the AGM

**Chairman Alistair Allen (AA)** reported that the GAI had had a year of ups and downs with two planned lectures cancelled. These were a) joint meeting with the IAI about the Glucksman Art Museum and b) a geothermal specialist from Mexico who was to pass through Ireland on his way to the WGC in Turkey but his funding was cancelled. Róisín Goodman (RG) and Gareth Ll. Jones (GLIJ) gave a joint GAI/IAH talk in GSI, Dublin in June. Two newsletters were produced in 2005. Action Renewables in Northern Ireland held a half-day seminar in September to launch the results of reports of the CSA Group on geothermal resources in NI. Talks were given by Paul Sikora (PS), AA, RG and John Kelly together with NI Government energy representatives and Geothermal installers. Three representatives of the GAI were at the WGC conference in Turkey in April, RG, AA and Niall Burke (NB). AA gave a talk on geothermal potential in Ireland at the IGI Breaking Ground conference in November.

Plans for the coming year include the talk after the AGM by our guest speaker Burkhard Sanner, a joint IAH/GAI talk on the Weardale geothermal project in

UK by Paul Younger in April and a field trip to the Galway, GMT heat-pump project in June. A lecture has been suggested for Sept 2006 perhaps on Sultz (no name available). A pre-IGI conference or a joint talk with Cork IEI by someone from SERN (Sustainable Energy Resource Network) is also planned. It was noted that the IGA (Irish Geological Association) is going to Iceland in August and it may be an idea that GAI members could team up with them.

A number of European funding applications have been made in the past year by members of the GAI, results not known but there is a need to make plans for additional funding applications well in advance of deadlines. The GAI has renewed its membership of EGECE following GLIJ visit to EGECE office in Brussels in December, and is continuing its membership of the IGA.

**The Secretary's Report** was given by given by RG who reported that the association was less active than other years partly due to the pressures of work on all members. It should be noted however that the interest in geothermal is increasing rapidly and there is more of a need for the association now than ever before. GLIJ was thanked for his involvement as compiler and editor of the continually successful newsletter.

**The Treasurers Report** was given by given by Sarah O'Connell (SOC). The total in the bank at the end of 2005 is €6,678.36. GLIJ complimented SOC on the clarity of the accounts. Discussion was had on encouraging renewed membership by previous lapsed members. RG has contacted many of them and will send an updated list of members addresses to SOC. Michael O'Brien (MOB) made a formal proposal for the GAI to charge €300 for corporate membership. GLJ and AA argued that some of the member companies are quite small and suggested an increase from €100 to €150 which was agreed. Individual membership cost of €40 will remain the same.

**European Liaison report.** Possible funded projects for GAI. Bill Griffin (BG) reported on 2004 with regard to European developments. The objective is getting funding. BG put in an Altener proposal for the retrofit of existing social housing but was not funded on the basis that it was not innovative enough. BG currently has another proposal ready



but is waiting for sanction by Cork Co. Co. Funding is being sought for a geothermal academy linked to UCC.

**BM was welcomed back as development officer** after being out of action for a long time after an accident.

**New Board Members elected for 2006 are:**

Chairman	Paul Sikora
Vice Chair	Bill Griffin
Secretariat	Roisin Goodman, CSA
Treasurer	Sarah O'Connell
European Liaison Officer	Alistair Allen
Development Officer	Breacan Mooney WYG Darragh Musgrave
Editor	Gareth Ll. Jones
Events Officer	Niall Burke (in absence)

Discussion on the **GAI Website** was initiated by BG. MOB offered €600 to support the cost of developing the website (this is the projected cost of its development). We need to provide higher quality data for the website than has been provided so far. There is a need for a working group (suggested by

BG) whose responsibility it is to deliver the website. The same guy as previously is available for design of the website. Committee members volunteered, AA, BG, RG, PS, JW.

**ACCEL:** GLIJ reported on the acquisition of the preliminary ACCEL grant to apply for the full training grant. GLIJ looking for additional company names for circulation of questionnaire. **EFG:** GLIJ highlighted his work with the EFG over the last number of years and said the new geothermal expert panel will hopefully be going to the ENGINE conference in Orleans, France. A talk will be presented on the EFGs panel of experts. **GTRG:** The Geothermal Research Group has been proposed by AA and BG in which it is proposed that the GAI be involved. Cork City Co. will support (MOB) if possible.

**Finally** PS proposed a vote of thanks for AA and his work as Chairman of the association over the years much of which had gone unnoticed. AA said it was a privilege to chair the association and pointed out that it was the MOB and PW who had the vision to establish the group 10 – 12 years ago.



Michael O'Brien, Alistair Allen and Burkhard Sanner at the Lifetime Lab



**Dr. Burkhard Sanner**  
Cork lecture  
Life time Lab



A very well attended talk was given to the GAI following the AGM by Dr. Burkhard Sanner of Geeste, Germany entitled "Geothermal Energy Use in Europe: Status and Future Prospects" he followed it up with a detailed look at ground source heat pumps. So two fascinating talks for the price of one!

Dr. Sanner is:

- President European Geothermal Energy Council (EGEC)
- Member Board of Directors International Geothermal Association (IGA)
- Vice Chairman European Branch Forum IGA (IGA-EBF)
- Acting President, Geothermal Association, Germany and Austria (GtV)



Left: Part of the audience for Dr. Sanner's talk, with incoming Chairman Paul Sikora, front left. Right: Michael O'Brien, Róisín Goodman, Dr. Sanner

**Sweden Plans for oil-free economy**

Irish Times 8<sup>th</sup> February 2006

STOCKHOLM – Sweden (population 9 million) is to take the biggest energy step of any advanced western economy by trying to wean itself off oil completely within 15 years without building nuclear power station.

The attempt is being planned by a committee of industrialists, academics, farmers, car-makers, civil

servants and others, who will report to parliament in several months.

The Swedish government said that the intention is to replace fossil fuels with renewables before climate change destroys economies and growing oil scarcity leads to huge new price rises. - (Guardian services)



## THE LIFETIME LAB

Michael O'Brien

Senior Engineer, Environment, Cork City Council

The €8.5m Project involves the refurbishment and restoration of the old disused Public Waterworks buildings located immediately north of the River Lee 2 km. west of Cork City. It has been grant assisted by European Economic Area Financial Mechanism, Cork City Council and U.C.C.

The aims of the project are:

- To establish Cork as Ireland's leading 'Eco-city' with sustainable development integrated into city life and its infrastructure
- To preserve the architectural and industrial heritage of the Old Lee Road Waterworks site including its listed building
- To develop the site into a valuable educational, heritage and tourist attraction.
- To create a centre of excellence where expertise will be available in the areas of global warming, air quality, sustainable urban transport, waste management, waste water and sludge management, water supply and conservation, renewable energy development, eco-construction and 'green' building.
- To pool the expertise between Cork City Corporation and University College Cork with the latest technological developments and state of the art sustainable solutions to local environmental problems



The completed project consists of a **Visitors Centre** in the old stores and machine shop with interactive display units providing information on water, waste, energy, nature etc. A theatre / conference centre for 40 adults with audio visual and teleconferencing facilities. A reception area has a Pledge Board and Information Totem Pole and there is a small canteen. There is a **Steam and Industrial Heritage Centre** in the old disused boiler house and steam plant listed

under Cork City Development Plan, which displays scale models and modern steam units



The **Education Resource Centre** is based in the waterworks store, with a classroom / laboratory for 40 pupils. The Dept of Education and Science will provide a national teacher full time for a year to host workshops and demonstrate elements of the Primary Schools Science Curriculum to pupils from Cork City and County and further afield. It has been accredited as a Discover Science Centre under the Auspices of Forfas.

The **Environment Information Office** will be staffed by Cork City Council staff and will incorporate the existing Cork City Energy Office. It will provide information on environmental topics such as recycling, water conservation, energy etc. A science based **playground** will facilitate families and pupils visiting the site.

### Site Energy Utilisation

The four buildings have been designed to the highest energy conservation standards without compromising aesthetics. The electricity consumed on site is green hydro-electricity generated at the old turbine house nearby (see below). Space heating is provided



geothermally from groundwater resources underlying the buildings. Solar panels provide heat for domestic hot water. Photovoltaic panels provide some of the external lighting. It is estimated that at least 80% of the buildings energy requirements are provided from renewable resources.

### **Generation of Hydroelectricity at Lee Road.**

In this project the old disused turbines which were used to pump water in winter time until the 1960s, have been converted into generators of electricity in a public private partnership between Cork City Council and Dan Twomey Water Power Ltd.

These generators supply green electricity into the national grid which is retrieved by Cork City Council in 60% of its electricity account locations (offices, depots, etc).

Thus, under agreements with its private partner, CCC receives green electricity to 60% of its accounts all year, makes a modest financial saving

and at the same time ensures the preservation of the Victorian pumphouse and plant.

This facility supplies the Lifetime Lab with its electricity needs.

### **Conclusions**

It is hoped that the Lifetime Lab will be a vibrant, active and attractive, unique site which will demonstrate a holistic approach to the promotion and demonstration of sustainable development and environmental excellence. It is hoped that it will fit into the Council of Europe's concept of an European network of ECO sites.

It also sets up a template of co-operation at a regional level, between local authorities and education and health interests, in promoting the common goal of a sustainable lifestyle.

Further information from our web-site [www.lifetimelab.ie](http://www.lifetimelab.ie)

## **The Renewable Energy House, Brussels**

EREC & Gareth Ll. Jones



The European Geothermal Energy Council (EGEC) has its offices in the Renewable Energy House (REH). The REH is the base of the European Association of Renewable Energy Centres Agency (EUREC Agency), and also houses the offices of ESHA (European Small Hydropower Association), ESTIF (European Solar Thermal Industry

Federation), EWEA (European Wind Energy Association) and EUFORES (European Forum for Renewable Energy Sources). The Renewable Energy House is located close to the European Parliament and the European Commission. The sharing of the same working location enables EREC and its members to speak with one voice and to co-operate as closely as possible among themselves and with the EU institutions, in particular the European Parliament.



Drilling in the courtyard of the REH

The Renewable Energy House address from January 2006 is Rue d'Arlon 63-65, 1000 Brussels. The REH will be featuring solar thermal heating and cooling



system, a wood pellets heating system, a photovoltaic installation producing electricity, a wind and small hydropower technology display, and a geothermal heating and cooling facility, among others. In order to find out more about the energy concept of the new Renewable Energy House please consult the **Renewable Energy House leaflet**.

With great difficulty a small drilling rig was inserted through the access passage to gain the courtyard at the rear of the building where four boreholes, 115m deep were drilled. The closed loop collectors yield 25kWth.



Gareth Jones inspects the borehole collector system.



Philippe Dumas crossing the collector pipe trenches

The trenches with the heat collector pipes from the four boreholes. These are brought together before they enter the building to connect to the heat pump.



Frantic activity at EREC House in December 2005

[www.egec.org](http://www.egec.org)  
[www.erec-renewables.org](http://www.erec-renewables.org)

### Draft European Standard for Micro-generation

Róisín Goodman  
CSA Group

Submission to the draft European Standard

"The GAI is anxious that any new regulations covering the connection of microgeneration into public power networks is framed so as to facilitate microgeneration connection in so far as possible, while maintaining the safe and efficient operation of the grid."



## €27 million in grant aid to be made available for renewable home heating

### The Department of Energy Marine Natural Resources

Press Release: Dublin 26th March 2006

The Minister for Communications, Marine and Natural Resources, Noel Dempsey T.D., today launched a grant aid scheme of up to €27m for domestic renewable heat technologies. The scheme was agreed in last year's Budget and is part of a multi-annual finance package of €65m for renewable energy that will also include grants for a range of renewable heat, electricity and transport initiatives.

The "Greener Homes" scheme will allow individual householders, for the first time ever, to obtain grants for the installation of renewable technologies including wood pellet stoves and boilers, solar panels and geothermal heat pumps. Grant aid of €1,100 to €6,500 will be provided depending on the individual technology used.

The scheme will be rolled-out over a five-year period starting today, and will potentially support the conversion to renewable energy in up to 10,000 homes. By its final year, it is expected to save energy equivalent to 54,000 barrels of oil per annum and 23,000 tonnes of CO2 per annum. This is equivalent to meeting 100% of the heating needs of 7,000 homes from renewable energy, or removing 6,700 cars off the road.

"Since coming into office, I have been impressed by the number of householders who want to play their part in contributing to the environment, by installing renewable energy systems in the home. Despite the fact that renewable energy systems have low running costs, high equipment and installation costs have excluded many people from making the switch. This scheme recognises the contribution that individual householders want to make in reducing energy demand, and will provide concrete support for them to make the switch to low cost, low emission heating systems," said Minister Dempsey. "This scheme is also particularly relevant in the context of rising fossil fuel costs," he added.

The package will also provide funding for a wood chip / pellet boiler programme for small to medium scale enterprises, Combined Heat and Power (a process in

which electricity is generated on-site and the heat from that process captured and also used), and a biofuels capital grants programme to underpin a €205m excise relief programme.

There has been intense interest in the domestic grants scheme since it was first announced that a scheme was to be developed. "Almost 1,200 enquiries have already been received by members of the public and renewable energy suppliers, and I am delighted that the scheme is now open for business," Minister Dempsey said.

Details of the scheme and application forms are available on the Sustainable Energy Ireland (SEI) website from tomorrow Monday, 27th March ([www.sei.ie](http://www.sei.ie)), and a dedicated low-call phone line will also be open from Monday (ph: 1850 SEI SEI / 1850 734 734), to deal with queries and applications in relation to the scheme. Those that have previously enquired about the launch of the scheme will be sent details directly by post or email.

Greener Homes Scheme Grant aid available for Renewable Heat Technologies.

Technology	Grant amount
Wood Chip or Pellet Boilers	€4200
Wood Chip or Pellet Stoves	€1100
Wood Chip or Pellet Stoves with Back boiler	€1800
<b>Heat Pump - Horizontal Ground Collector</b>	<b>€4300</b>
<b>Heat Pump - Vertical Collector</b>	<b>€6500</b>
<b>Heat Pump - Water (well) to water</b>	<b>€4300</b>
Heat Pump - Air source	€4000
Solar (per m2 to a max of 12m2)	€300

#### Department of Communications, Marine and Natural Resources,

29-31 Adelaide Road, Dublin 2, Ireland  
Tel +353-1-6782000 Fax +353-1-6782449





## Advice to homeowners regarding “Greener Homes Scheme”

Bill Griffin

Geothermal Association of Ireland  
Cork County Council

### Introduction

Homeowners can now avail of government grants of between €4,000 and €6,500 depending on the type of geothermal system you decide to install.

### Grants Available

Heat Pump - Horizontal Ground Collector	€4,300
Heat Pump - Vertical Ground Collector	€6,500
Heat Pump - Water (well) to Water	€4,300
Heat Pump - Air Source	€4,000

<b>Who are the Geothermal Association of Ireland and what are they selling ?</b>
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The Geothermal Association of Ireland is a not-for-profit voluntary organisation of individual experts who are interested in promoting the benefits of heat-pump and geothermal technology. We therefore are committed to helping individuals choose the best type of geothermal system regardless of who supplies or installs the system. We are not selling anything and have no profit motive – our goal is to promote this important green renewable technology.

### Warning

Our goal is to be impartial. Make sure your house is very well insulated before considering renewable energy. Otherwise you are wasting your time and money.

### Which type of geothermal system will work best for me ?

This advice should be read in conjunction with the material already available on-line on the SEI website. We are not attempting to produce a definitive guide on heat-pumps but rather to provide some general tried and tested rules of thumb to assist homeowners get the best value from this grant. Homeowners can find huge amounts of information on-line but this is usually from other countries, therefore we felt the need to produce this fact sheet for Irish homeowners.

There are four types of geothermal systems eligible for a grant. On the following page is a very simplified description of how each might be used by a typical Irish homeowner.

#### Horizontal Ground Collector

You would choose this system if you have a large garden on your site. The minimum size of garden

needed will depend but usually you will need at least a half-acre for this option. This is the most typical type of installation used in Ireland.

#### Vertical Ground Collector

If you don't have the garden don't worry. This option does not require the same space, it is more expensive but the grant is bigger. This is essentially the same as the first option but involves drilling down on the site. Hence one is called horizontal and the other vertical.

#### Water (well) to Water

You would choose this option if you have a lake or stream available on site. Sometimes groundwater can be used as well if the water table is very high. This option has been successfully used many times in Ireland and is ideal where a large body of water is conveniently available near the house. This type of system uses water from a pumped well, lake or stream. A secondary heat exchanger is required to protect your house and your heat pump. The water is pumped through the heat exchanger and either re-injected in another well or run off to a stream or river

#### Air Source

This type of system is newer to Ireland than the others. It uses the air as a source of heat – obviously if warm air was available e.g. exhaust air from some process then this is a good option. It can be used with normal air also but will not perform as well as the first three options unless you have some exhaust air to harness all year around.

#### Contact the Geothermal Association of Ireland

If you have a query regarding the “Greener Homes Scheme” then you can email the Geothermal Association of Ireland via:

[geothermalireland@yahoo.ie](mailto:geothermalireland@yahoo.ie)

Or soon check our new website:

[www.geothermalireland.org](http://www.geothermalireland.org)

Be sure to put “Greener Homes” as the subject of your message. Don't forget to look at [www.sei.ie](http://www.sei.ie) as well.

We hope that you will enjoy the many benefits of renewable energy and geothermal energy in particular.





## A renaissance for geothermal energy in Britain?

Paul L Younger  
Newcastle University, England

*Is suarach uisge teth a shireadhfo chloich fhuair*  
(It's daft to look for hot water beneath a cold stone)  
(Scottish Gaelic Proverb)

*An unexpected convergence of circumstances recently led to the drilling of the first deep geothermal exploration borehole in the UK in two decades. This uncovered a number of surprises in its 995m journey into the heart of the North Pennines, Prof. Younger, University of Newcastle explained at a joint meeting of the Geothermal Association of Ireland and the Irish Chapter of the International Association of Hydrogeologists, Dublin March 2006.*



FORACO rig at Eastgate

Back in autumn 2003, the University of Newcastle received a visit from a Director of Parsons Brinckerhoff (PB), who had come to find out more about our water resources engineering research. At the end of the meeting, in the usual period of idle chat, we enquired what else PB were currently active with in northern England. “We’ve been asked to do a scoping study for the redevelopment of the cement works site in Weardale, with an emphasis on

renewable energy”, came the reply. “Get away?” we said: “We’ve always reckoned there’s a serious geothermal prospect under that site”. “Get away?” said the PB Director. And that, we presumed, would be that, until early Spring 2004 when we received a call from one of the Director’s colleagues asking us how serious we thought the prospect was. By that stage, PB Power had come up with the idea of developing the UK’s first renewable energy model village on the former cement works site. The usual array of renewables (wind, micro-hydro, solar, biomass) are all feasible to some degree in the wet and windswept Pennines – but what about something a little more exotic, and something that speaks to the rich mining-oriented geological heritage of County Durham?

The former LaFarge Blue Circle cement works at Eastgate was, until 2002, the biggest employer in Upper Weardale, and its closure (with the loss of 147 jobs and around £7 million from an already fragile local economy) dealt another blow to an area still reeling from the final closure of the local fluorspar mines in 2000, and the subsequent effects of the foot and mouth crisis. Was it just wishful thinking to imagine an usable geothermal resource beneath the site? Wouldn’t that be just too handy?

Back in the late 1980s, when Cambokeels Mine was in production, a strong saline water feeder was encountered in the eastern forehead of the mine, as little as 50m below ground level. The Slitt Vein, which was the structure worked by the mine, continued unworked eastwards from Cambokeels beneath LaFarge property: i.e. the brine was coming from the direction of cement works. Earlier geothermometric calculations which we’d made (see *Min. Mag.* (1990) **54**: 629 - 636) suggested the saline water might have equilibrated at a temperature as high as 160°C. More recently, repeated mine water analyses which we’d made (during the last years of mining) in the Frazer’s Grove Fluorspar Mine, which lies on a very similar vein a few kilometres north of Eastgate had revealed that these structures are associated with very high geothermal gradients (see *Applied Geochemistry* (2000) **15**:1383 – 1397). Normally, the sort of speculation amongst



geologists to which such observations give rise never make it from the pub to the proposal form: would you really fancy your chances with NERC on that one?



Paul Younger addressing the joint GAI / IAH meeting at the GSI

However, with plans to create a 'renewable energy village and activities centre' on the site beginning to cause quite a buzz locally, the Wear Valley Task Force (a consortium led by the local District Council (Wear Valley) and including the Regional Development Agency, One North East (ONE)) were sufficiently enthusiastic to take a punt at the probability to which we pointed. So the question came back: "What would it cost to prove your theory one way or the other?". The obvious answer ("How much have you got?") having been dispensed with, negotiations started and it emerged that there might be as much as £500K available from One North East. One stipulation was that the borehole must be constructed in such a manner that it might be itself directly used for some pumping / injection purpose in future, and for this reason we were constrained to drilling at a fairly large diameter. We reckoned that would get us to about 1000m depth, which should certainly be enough to prove whether or not the theory was credible. We couldn't believe our luck when the funding came through, and we rushed to re-arrange our diaries for the summer of 2004. First we did some trial-pitting (inconclusive) and five inclined (45° to 60°) boreholes (each up to 50m in length), with which we were able to pin down the location of the Slitt Vein, beneath thick drift cover, in unmined ground on the LaFarge property. Meanwhile, tenders solicited through the official journal of the EU were being evaluated. The successful bidder (FORACO S.A. from southern France) arrived on site, and began drilling on 26<sup>th</sup> August 2004. It was to be an eventful deep drilling exercise. Under the watchful eye of Dr Sorcha

Diskin, and with cuttings being logged by the local mining geology expert, Dr Rick Smith of FWS Consultants, we first made our way through heavily mineralised Lower Carboniferous sediments to the Whin Sill. Even in this interval the water yielded by the borehole was already excitingly saline. Normally the Whin Sill isn't much of an aquifer, so we thought we'd lose some of the heavy water burden of the borehole by casing off in that horizon. To now avail. Within a few metres of renewed drilling, we struck more mineralised fractures which were capable of exceeding the 60m<sup>3</sup>/hr water pumping capacity of the drilling rig. Eventually we made it through the 66.5m of the Sill, through a further 115m of Carboniferous sediments, and into the Weardale Granite. This is only the second borehole ever to enter this granite. Some 133m into the granite we figured it would definitely be safe to case out all overlying water-bearing beds. We were a bit nervous that this might be the last we'd see of our beloved saline water, which was already warm to the touch. Sure enough after the casing grout had set, we drilled in a dry hole for 4m. Then suddenly, at 411m depth, the entire drill string dropped by half a metre! We had apparently hit a 0.5m wide open void in solid granite! A breeze could then be felt coming out of the top of the borehole, as the air column in the borehole was pushed out ahead of a rapidly rising water surface. This thankfully settled some 11m below ground, but pump as we might (> 60m<sup>3</sup>/hr) we could make no impression on it. Granites don't do this: it had to be open fractures associated with the Slitt Vein!



Collection of badly worn drilling bits

So we drilled on, with a great attrition rate for drill bits in the hard granite and hyper saline water (a Ca-Na-Cl brine, about 50% more salty than the sea). Eventually at 995m depth, on 4<sup>th</sup> December 2004, we called it a day, withdrew the drilling equipment and let the water column settle for a few days. We



then waited with bated breath while Reeves Geophysical logged the borehole. Those hours in the logging truck watching the printouts slowly emerge were some of the longest in our lives. But the outcome was worth the wait: a bottom hole temperature in excess of 46°C, which is more than 11°C higher than would be expected in areas of average subsurface heat flow. That the Weardale Granite is a high heat producer is not news; this has been known since the drilling of the 808m Rookhope Borehole by the late great Sir Kingsley Dunham back in 1960-61. What is news is the ability of the granite to sustain high fracture permeabilities at depth, where it is affected by structures such as the Slitt Vein. Packer testing of the most productive fractures (at around 411m depth) has shown transmissivities in excess of 3,000 darcy-metres (i.e. equivalent to more than 2,500 m<sup>2</sup>/d, were the rocks carrying cool fresh groundwaters).

In practical terms, if this borehole (or another nearby) were sunk to a typical “production” depth of about 1,800m, the bottom-hole temperature would be expected to be around 78°C, which is enough to heat conventional radiators and supply hot water tanks for a large number of buildings (as is currently done in Southampton, the only geothermal plant yet

developed in the UK). The volumes of water found in the Eastgate borehole far exceed those found at Southampton, and the rest water level in the borehole is only 14m below ground (compared with 150m at Southampton), implying inexpensive pumping lift costs. By any standards, therefore, the Eastgate prospecting programme has been a great success, revealing the presence of a geothermal resource at least as promising as the best ever previously identified in the UK. Even with this single borehole, the mix of waters already available is enough to supply large amounts of water at more than 27°C, raising the possibility of a natural thermal spa development in the chilly North Pennines. One possibility would be to improve our knowledge of long-term reservoir response by fitting the existing borehole as a ‘standing-column’ well (without packers), or with a permanent packer so that abstraction and reinjection can occur in the same borehole, and using the borehole over a number of years for spa purposes, before gradually gaining further insights into the reservoir which might justify the costs of drilling deeper exploration boreholes to seek water hot enough to run a binary plant, this time using slimline drilling techniques already available through Priority Drilling, based in Ballinasloe, Ireland.

**Welcome to our new Members**

**INDIVIDUAL**

David McLorinan, WYG Belfast  
John Fallon, J.B.Barry & Partners  
Brian Homan, Homan O'Brien Architects

**CORPORATE**

CDGA Ltd.  
LIT Ltd.  
Des Behan Ltd  
Meehan Drilling Ltd

**Treasurer's new contact details**

Sarah O'Connell  
CDGA Engineering Consultants Ltd.,  
Bridge House  
Patrick's Quay, Cork

Ph: 021 4552955  
Fax: 021 4552963  
e-mail: [so'connell@cdga.ie](mailto:so'connell@cdga.ie)

Please send you membership cheques to Sarah: €40 / £28 individual      €150 / £100 corporate

**GET INTO HOT WATER –  
JOIN THE GAI NOW!!!**

## The Geothermal Skills Accel Project

Gareth Ll. Jones



At the end of last year CSA on behalf of the GAI was awarded a small grant by Accel to apply for a larger grant for geothermal in-company training. Accel is an initiative of the Dept. of Enterprise Trade & Industry managed by Skillnets Services Ltd. This allowed an application for a two year grant to be made. GAI companies, and others, have been approached to enquire about their interest in participation in this scheme. Some 23 companies have expressed an interest in being involved. This application has also been successful and the GT Skills: Geothermal Skills Accel project is just about to start.

From The Executive Summary of the Application:  
The companies involved with this project include those from the renewable energy & natural resource, exploration and development sectors, also the heat pump manufacturers, suppliers and installers, drillers, consulting engineers, architects. The objective is to provide skill training to company employees, so that geothermal energy technology can be encouraged to develop in a sustainable and effective manner. This will increase the pool of qualified professionals able to undertake the exploration, definition and delineation of the geothermal resource and to operate the design, installation and maintenance of geothermal technologies with the right ability and skills. It will develop high quality standards among their employees to increase consumer confidence and to ensure customer satisfaction.

A range of courses will be delivered to target

installers, plumbers, technicians, electricians, designers, engineers, consultants, etc.

This programme is seen as part of the implementation of the strategy adopted by SEI for the development of geothermal renewable energy systems, derived from the proposal from Arsenal, the Austrian renewable energy consultancy.

As the GT Skills team proceeds with this new programme it will be developed and made available to other groups, in particular architects and other consultants who are involved in renewable energy.

The GT Skills team is drawn from experienced members of the geothermal sector, who have been involved with different aspects of the technology as it developed in recent years.

Companies interested in the programme should contact me at [glljones@csa.ie](mailto:glljones@csa.ie)



Drilling rig at the Welsh Assembly site

## New Welsh Assembly Building, Cardiff



A Green Building, including a Ground Source Heat Pump. Opened 1st March 2006





## **Altener GTR-H grant** Róisín Goodman

The Evaluation Committee of Intelligent Energy Europe, has decided that the Geothermal Regulation – Heat (GTR-H) application to Altener, by the the CSA Group and 7 EU partners, may be awarded a European Community grant, subject to negotiation which began on May 31<sup>st</sup>. Project. The partners are CSA Group (Co-ordinator) - Ireland, Geological Survey of Northern Ireland - N. Ireland, European Geothermal Energy Council – Belgium, Hungarian Geological Survey (Magyar Geologiai Szolgalat) - Hungary, Polish Academy of Sciences - Mineral and Energy Economy Research Institute - Poland, Bureau de Recherches Géologiques et Minières - France, Geothermischen Vereinigung e.V. - Germany, Stichting Platform Geothermie – Netherlands.

The Kistelek Declaration was announced in Hungary in April 2005 and identified key issues resulting from the absence or shortcomings of geothermal regulation in the EU. Altener project K4RES-H is undertaking a review of regulations for all heat producing sources across member states. The present lack of regulation for geothermal energy exploitation (GEE) over most of the EU, is inhibiting the effective exploitation of this underutilised resource. This proposal is for the delivery of a regulation framework for geothermal energy or 'GeoThermal Regulation - Heat', 'GTR-H'. The project will link K4RES-H with earlier studies of renewable energy regulations across Europe to

outline a regulatory framework for EU member states for the exploration and exploitation of geothermal energy. GTR-H will suggest solutions and implementation steps necessary to address key issues identified in the K4RES-H project in the form of a standardised transferable framework for geothermal regulation across the EU.

The primary aims of the GTR-H project are to: Produce regulations for GEE for Ireland, Hungary, Poland and N. Ireland, UK to be used as a template for geothermal regulation across Europe; Review best international practice and effectiveness of existing regulations in place in other countries; Follow up on barriers to GEE identified by K4RES-H and will develop a template for establishing solutions; Design and elaborate geothermal regulations in focusing on promotion of exploration and exploitation of geothermal energy; Draw up a template to remove regulatory – legislative barriers and provide solutions through a draft regulation framework; Produce best EU wide applicability of the drafted regulatory template by the experience and scope of the GTR-H team. This template will be adaptable to Ireland, Hungary, Poland and N. Ireland, UK and will facilitate the use of a common template for future EU standardisation. The process is planned to outline and encourage investment of GEE by private and public sector partnerships.

### **Recent GSHP Installations**



#### **GSHP in N. Ireland**

Roan Primary School in Dungannon, Co. Tyrone is Northern Ireland's first School to use Geothermal Heatin. The collector is under the adjacent playing fields.

#### **Two recent Dublin closed loop borehole installations in overburden**



Left:  
The Green Building, Temple Bar, where ten years of experience has been accumulated.



Right:  
2005.  
The Daintree building, 61 Camden St.  
“It will be the greenest building in Ireland”