

NEWSLETTER

- April 2008 – Issue n° 7

“Reaching the Kyoto targets by means of a wide introduction of ground coupled heat pumps (GCHP) in the built environment”

Project Progress

The GROUND-REACH project “*Reaching the Kyoto targets by means of a wide introduction of ground coupled heat pumps (GCHP) in the built environment*”, is now working on the technical-environmental-economical feasibility of Ground Source Heat Pumps, and on proposals for measures for barriers removal.

The Brochure on GSHP is now available in 14 languages !

We wish you an interesting reading, and invite you to regularly have a look at the Ground Reach website for the latest news and publications of our deliverables.

NEWS from Ground Reach

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Upcoming EVENTS



Project Coordinator :
CRES
Centre For Renewable
Energy Sources
19th km, Marathonos
Ave, 19009 Pikermi
Attikis – GREECE
☎ +30 210 6603375
cres@cres.gr
www.cres.gr



Editor : EGECE
European Geothermal
Energy Council
63-65 rue d’Arlon,
1040 Brussels –
BELGIUM
☎ + 322 400 10 24
info@egece.org
www.egece.org

For subscription of the Ground Reach Newsletter please
send your request to: info@egece.org

NEWS from Ground Reach



Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources

The European Commission has the 23/01/2008 agreed on a far-reaching package of proposals that will deliver the European Council's commitments to fight climate change and promote renewable energy. The package seeks notably to increase to 20% the share of renewable energies in the energy consumption by 2020.

“Comprehensive deliberations” between Council and Parliament on the Commission’s proposals should produce a deal “before the end of 2008 and consequently allow for their adoption within the current legislative term, at the latest early in 2009”, according to conclusions agreed during the Spring European Council in Brussels on 14 March.

With a major international meeting on climate change scheduled for Copenhagen in December 2009, the EU is under pressure to agree internally on how to deal with the threat of climate change before pushing other states to agree a post-2012 global climate deal to replace the Kyoto Protocol.

Now, the European Parliament is discussing the proposal within the ENVI and ITRE Committees. A vote is expected before the summer break.

Ground-Reach Workshop in conjunction with the 9th IEA Heat Pump Conference, Zürich, 23 May 2008

The Ground Reach international GSHP Congress & Exhibition will be organized the Friday 23 May 2008 during the 9th Heat Pump Conference in Zürich (Switzerland).

This workshop will promote the use of geothermal heat pumps through several case studies.

This conference is the ninth in a series of triennial conferences under the auspices of the International Energy Agency (IEA) Heat Pump Program. The conference will summarize the current technology and market status, progress, and trends. Previous conferences were held in Graz, Austria (1984), Orlando, Florida, USA (1987), Tokyo, Japan (1990), Maastricht, the Netherlands (1993), Toronto, Canada (1996), Berlin, Germany (1999), Beijing, China (2002), and Las Vegas, USA (2005) Heat Pump technologies include heat pump, air conditioning and refrigeration equipment and systems for residential, commercial, industrial, and district heating/cooling applications.

Who Should Attend ?

- Manufacturers and installer
- Planners and consultants
- Researchers, developers and equipment designers
- R&D managers and technology supporters
- Policy makers and environmental analysts
- Executives and representatives from industry, utilities, and from the public sector
- Energy managers and contractors

More info: <http://www.hpc2008.org/>

Promote “Geothermal Heating & Cooling in Italy & Mediterranean countries: a growing market” - Monday, May 19, 2008. Milano- Italy

The meeting, which is a part of the RESTMAC project sponsored by the EC – FP6, will promote geothermal Heating & Cooling implementation in Italy and the Mediterranean countries.

Deep geothermal potential in Italy, shallow geothermal potential in Italy, planning and design for GSHP, GSHP H&C development in Spain, special case-studies from the Mediterranean region and so on will be some of the main subjects in question.

Experts from France , Germany , Italy , Spain and Turkey will present the experience gained in that field, and will be available for discussion.

This is your chance to learn about the current development, and how it might be used in your sector and area of responsibility.

For any queries, please contact EGEC

by email: com@egec.org,

by phone: +32 2 400 10 24 or

by fax: +32 2 400 10 39.

Within the Restmac project, EGEC will organize another conference the wednesday June, 18 - 2008 :

- Geothermal Electricity and CHP : a technology for our future, in Strasbourg (France)
 - Palais des Congrès

More information at com@egec.org and on www.egec.org

GROUNDHIT final workshop takes place in Berlin

On 5 May 2008 the GROUNDHIT final workshop takes place in Berlin.

The GROUNDHIT project, started in 2004, aimed at developing and demonstrating the next generation of ground source heat pumps. During the last four years, a coaxial borehole heat exchanger prototype and three heat pump prototypes were developed and tested at three demonstration sites.

During the final workshop the results of the project are presented and the market prospects of the technology developed are analysed.

More info: <http://www.geothermie.de/groundhit/index.htm>

Italian promotion meeting announced

GfE, as Italian partner involved in the Ground-Reach project, is organizing a national meeting in Florence to promote this technology in the central-south part of Italy, to promote the project and the results, as well as the economical/environmental benefits and all the other related technical aspects about this excellent system.

The meeting is scheduled to take place on September,22 2008.

Venue: Grand Hotel Baglioni - Piazza Unità italiana, 6 Firenze (IT)

Participation is free of charge and restricted to national project target groups.

Limited seats available.

Contact: Marco Spiccia, GfE energy management S.r.l.
Via Guglielmo Marconi, 55 - 50131 Firenze
Tel. 055 577 297 – Fax 055 572 896 - e-mail: marco.spiccia@gfe.biz
For further information: www.groundreach.eu

Heat Pumps in Industry and Large Buildings - Save Energy and Protect the Environment

Large Heat Pump Symposium, 12. June 2008, VDI-House, Stuttgart-Vaihingen

OCHSNER
Kompetenz bei Wärmepumpen

On Thursday, 12 June 2008 a symposium to the topic: “Heat Pumps in Industry and Large Buildings – Save Energy and Protect the Environment” takes place in the VDI-House in Stuttgart-Vaihingen. Organisers are the “Institut für Energiewirtschaft & Rationelle Energieanwendung” (IER) from the University of Stuttgart, OCHSNER Wärmepumpen GmbH and the “VDI-Arbeitskreis Energietechnik des WIV Württembergischer Ingenieurverein e. V.” in Stuttgart.

Heat pumps with higher output can be used for heating and cooling of commercial and office buildings, housing estates, administrative buildings as well as hotels and leisure time facilities. Through the achieved savings of energy and operating costs large heat pumps could be defined as especially profitable. They are also suitable for utilisation of (process) waste heat and exhaust air of any kind, wherefore their utilisation contributes to efficiency increase in manufacturing plants.

The symposium’s target is to demonstrate and communicate technical conditions, fields of application and potential of heat pumps as well as experiences with their planning and employment in industry and trade. A line exhibition serves as demonstrative supplementation of the content. The conference addresses participants e.g. from the industry branches food, textile, wood, paper, chemistry and synthetic, decision-makers and operations managers from industry and trade, facility managers as well as environmental officers.

Questions can be directed at:

Functional content: Dipl.-Ing. Jochen Lambauer, IER, Tel. 0711/68 58 78 75,
Mail jochen.lambauer@ier.uni-stuttgart.de

Organisation and exhibition: Dipl.-Ing. (TU) Undine Stricker-Berghoff, ProEconomy
Tel. 04502/77 05 –68, Mail info@proeconomy.de

Further information: www.industrielle-waermepumpen.de

GSHP for Masdar City

On 9 February 2008 Abu Dhabi broke ground on Masdar City, the world's first zero-carbon, zero-waste, car-free city for 50.000 inhabitants. Masdar City shall become the world's hub for future energy. By taking sustainable development and living to a new level, it shall lead the world in understanding how all future cities should be built.

According to an article published in the German professional journal [cci](#) (04/2008), the needs for heating and cooling of buildings at extrem temperature differences between days and nights shall be met by the usage of reversible ground source heat pumps (GSHP) with vertical borehole heat exchangers and steam driven absorption chillers.

More information on the Masdar City project are available at the website of the Masdar Initiative. <http://www.masdaruae.com/index.aspx>

The 2008 Eco-innovation Call for Proposals is now online

Within the framework of the Competitiveness and Innovation Programme, Eco-innovation supports the first application and further market uptake of some of the best eco-inovative

products and services in Europe, and helps overcome those critical barriers that still hamper their commercial success.

The call text has now been published on the CIP website.

Read it to get more information about funding your next eco-innovative pilot and market replication project: http://ec.europa.eu/environment/etap/ecoinnovation/library_en.htm

2008 Call in Brief:

Deadline for submission of proposals (electronic only): **11 September 2008**

Total financial resources available for the 2008 Call: approx. **€ 28 million**

Expected number of funded projects: approx. **40**

Funding rate (as % of total eligible costs): **40 to 60%**

Best practice : University building of the Polytechnic Institute of Setúbal

Portugal is a country located in the South-West of Europe, with the following coordinates: 39°30 North, 8° West. Its territory is divided by the Tejo river. At North the view is mountainous and as we follow to the South the view became plain with a few mountain ranges.

Setúbal is located south of Tejo river and its soil temperature is between 14°C and 18°C over the year. ESTSetúbal is an engineering school which belongs to the Polytechnic Institute of Setúbal (*Photo 1*). ESTSetúbal was built in 1979.

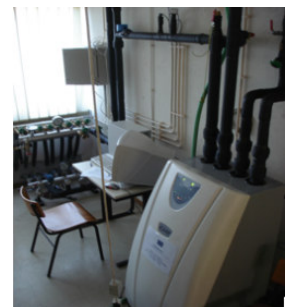
The floor that is being acclimatized with GSHP is a ground floor, which has 11 office rooms, 5 class rooms and one thermodynamic laboratory where the GSHP are installed. However, only 220 m² of that ground floor (103 m² of office rooms and 117 m² of classes rooms) are going to be cooled or heated by GSHP. The design outdoor/ indoor temperature are respectively 3,5°C/20°C in winter, and 32°C/25°C in summer. The ground floor of ESTSetúbal requires 10.560 kWh of heating and 7.040 kWh of cooling, per year, and for the design area the heating and cooling peak loads are 15,8 k. Initially the heating of ESTSetúbal was made through gas boilers, but along the years some of them were substituted with AVAC systems. However, mostly boilers and chillers are still used. The distribution system consists of fan-coils with two tubes with the supply/return temperatures 7°C/12°C for summer, and 45°C/40°C for winter, when working with heat pumps, and 80°C/70°C when working with boilers.



Heat Pump System

The GSHP system installed at ESTSetúbal comprises two ground source heat pumps (water-to-water) with 15 kW of nominal heating capacity, which acclimatize seven office rooms and two class rooms.

They are installed in the thermodynamics laboratory (*Photo 2*) and work as two independent circuits, but both of the heat pumps can provide, separately, the heat or cool for the offices and the class rooms. However, it is possible to use both of the heat pumps but in different circuits, this can be used for heating one part of the ground floor (like the office rooms) and for cooling the other part of the ground floor (like the class rooms) since they are in opposite facades, to each other.



The total heating/cooling area has 220 m², and all rooms are equipped with two tube fan coils (*Photo 3*). It is a new installation that has been working

since October 2007, and therefore it has been working in the heating mode only. However it can be operated in both heating and cooling mode, with the following capacities: 2x15 kW for heating and 2x12 kW for cooling. The refrigerant used in this case is R410a.

Both of the heat pumps are connected to two manifolds (one which collects the water from the borehole heat exchangers, and the other which returns the water to the borehole heat exchangers) (*Photo 4*).



The borehole heat exchangers were installed in a vertical and zig-zag layout, with 80 meters depth each one and as a close circuit (*Photo 5*). In total there are five boreholes, three of them with double U heat exchanger type, and the other two with coaxial heat exchanger type.



Operation experiences

The first operational test for implementation in ESTSetúbal was the thermal response test, which had the objective to test the performance of the boreholes, including the connection of the manifolds. In this case the temperature data collected were the inlet and outlet temperature in the manifolds and the respective water flow rate.

The thermal response test was carried out over 7 days, from 10 to 13 September 2007 and from 17 to 19 September 2007. The following temperatures have been measured: Ambient temperature as well as inlet and outlet temperatures of the borehole heat exchangers (*Figures 1 and 2*). Additionally, although the flow rate was fixed at the constant value of 510 l/h, it was periodically measured and controlled. The inlet and outlet pressure were also measured and maintained constant at about 3 bars.

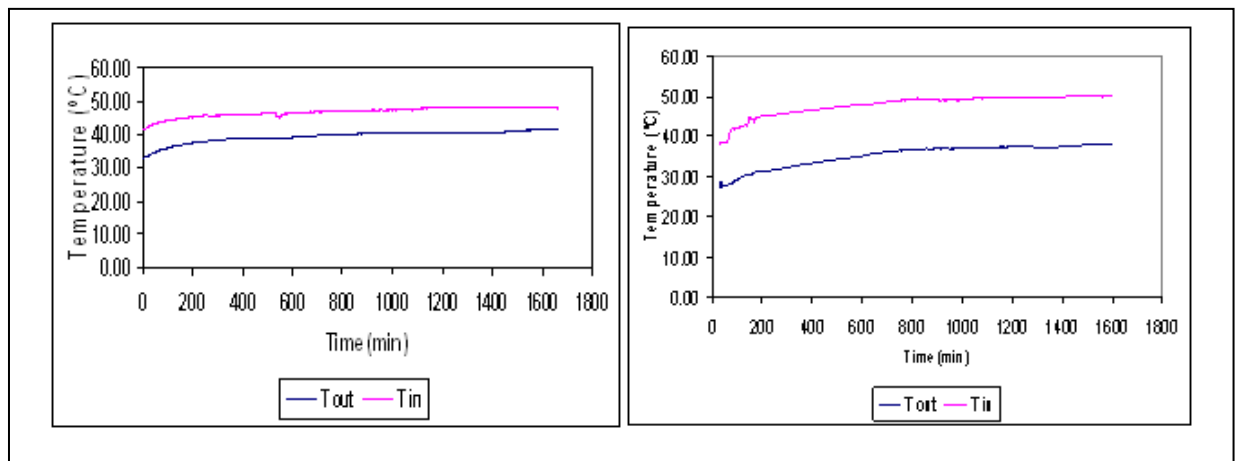


Figure 1: Coaxial Type

Figure 2: Double U Type

When admitting the same temperature variation for each type of borehole and considering the respective calculated thermal resistance, the heat exchange is higher for the coaxial and double U type. So double U and coaxial heat exchangers are the ones to have better results (*Table*).

Table: Calculated Heat Exchange

BHE	Temperature-Variation (°C)	BHE-Thermal-Resistance (K/W)	Heat-Exchange (W/m)
Coaxial	10	0.13509	74.0208
Double-U	10	0.13509	74.0208

As it was written before, it is a new installation that has been working since October 2007. It is a part of a European Project called GROUNDHIT which is going to be monitoring over 6 months (till the end of the project) and then till the end of the year 2008. The monitoring is being made by technical personal from ESTSetúbal which initially recorded the data every hour, over 7 to 8 hours a day. Then the data were collected with a computer program and a data acquisition system (*Photo 6*), allowing having a data base more representative of the GSHP efficiency.

The preliminary monitoring of the integrated systems shows that the GSHP running under real conditions can reach values of COP above 6 in heating mode, more than proposed in the project and coincident with the pre-prototype measurements in laboratory.

Regarding to the operational problems, at the beginning flow problems have been detected in the water distribution circuit for the fan-coils. However, that problem was solved, by regulating the water-flow in each fan-coil. With this problem solved, the ground floor necessities were satisfied.



Costs, economic efficiency, incentives

It is still too early to get some kind of information about the economic efficiency of the system. Regarding to the investment cost, the most expensive part of the GSHP system installation was the borehole drilling. The rest of the installation was the same cost as a traditional acclimatization system. However, it is important to mention that this installation was a prototype installation where the monitoring equipment was more comprehensive than for a commercial installation.

Regulations, guidelines, benchmarking

Unfortunately Portugal has not yet assumed that GSHP are a technology using renewable energy, and this market is only in the beginning. That is why there is not any kind of incentives available to promote the use of geothermal energy for heating and cooling of buildings.

However, in 2006, Portugal had three main laws describing the best way how to improve energetic efficiency of buildings, being the most important the following one:

"Regulamento dos Sistemas Energéticos de Climatização em Edifícios - RSECE, Decreto Lei n.º 79/2006 de 4 de Abril (4th April 2006)" (Building Acclimatization Energy systems Regulation) - has the purpose to improve the building energy efficiency and to reduce the energy consumption, as well as CO₂ emissions from the building sector.

More information about this best practice could be found on the website of GROUND REACH.

Upcoming EVENTS



Under the Auspices of H.E. the President of the Hellenic Republic,
Dr. Karolos Papoulias

The Athens Summit - Global Climate and Energy Security "The Challenge of Change", Athens Hilton, Greece, 5-7 May 2008

The Athens Summit

Amidst increasing concerns over climate change, environmental safety and the security of energy supply/demand, the Mediterranean region is in a privileged position to act as a host to a wide variety of viewpoints regarding the resolution of our global sustainable development issue.

The **Athens Summit 2008** aims at bringing together senior government officials, international civil servants, corporate leaders, financiers, academic and market analysts from all swaths of the energy and environmental communities, in order to forge a common understanding of the challenges facing the area's sustainable development, as well as to provide a unique networking opportunity for all interested parties.

Session Titles:

- Implications of Climate Change for Energy Policy
- Strategic Developments in Energy and Climate Security
- Towards a Sustainable World Society
- Hydrocarbon Dependence and Evolution
- The Environment and Energy Communities Meet: Finding Common Ground for Energy and Climate Security
- Conventional Power for the Future
- Renewables to the Rescue
- The Financiers Forum: The New Era of Energy/Environmental Investment
- The Role of Cities in Combating Climate Change



9th International Energy Agency - Heat Pump CONFERENCE

Zürich, Switzerland, 20 - 22 May 2008

Conference Secretariat hpc2008

Hochschule für Technik HSR

CH-8640 Rapperswil

Switzerland

Email: info@hpc2008.org

www.hpc2008.org

Next GROUND REACH Workshops:

- Promotion meeting 13: GROUND REACH Workshop, Risikov, Denmark, May 2008
- Ground-Reach Workshop in conjunction with the 9th IEA Heat Pump Conference, Zürich, 23 May 2008
- Promotion meeting 7: "Heat driven heat pumps" - COWI, Kongens Lyngby, Denmark, 13 June 2007 (**postponed**)
- Promotion meeting 14: GCHPs in Poland as part of "Clean Energy Conference", Warsaw, June 2008

Please send your request to be unsubscribed to: info@egec.org

This Ground Reach Newsletter was elaborated by EGEC – European Geothermal Energy Council.