

EHPA NEWS

This newsletter describes the activities of the Ground Reach project of which the EHPA has been a member for almost 3 years. It is concerned with the promotion of ground coupled heat pumps in Europe and is part funded by the European Agency for Competitiveness and Innovation. The 2007 sales figures for heat pumps systems are also analysed and the successful outcome of the vote on the RES directive in the ITRE committee of the European parliament is described.

Ground-Reach project

Background

The sales of heat pumps have varied very widely amongst Member States since statistics started being collected. A few countries have had and continue to have a high penetration of sales into the heating market most notably Sweden, Switzerland and Austria, some have had medium volume like France and Germany and some have never had large sales like the United Kingdom.

This trend has been apparent for many years and was considered in some depth in a study for the European Commission entitled 'Electrical heating and cooling of dwellings' which recommended and led to the formation of this Association in February 2000. In a subsequent report entitled 'Transforming the market for electrical heating of residential dwellings, the fundamental requirements for achieving a high level of sales were considered. These factors included:

- availability of suitable technology
- marketing of economically viable systems
- presence of trained actors
- consumer awareness
- existence of demonstrated systems
- availability of suitable financing systems

to which can now be added:

- high energy prices for heating
- requirements for low carbon buildings

The more of these factors that are present, the higher is the level of sales. The two countries that have met these criteria and therefore had very high growth rates are Finland and Czech Republic both starting from a very low base 10 years ago. Sweden with a population of 8 million has had annual sales up to 120,000 per year whilst the UK with a population of 60 million succeeded in selling 3,000 in 2007 partly as a result of Ground Reach activities to address these factors.

The 21 partners in Ground Reach have considered in depth all these factors and undertaken a series of activities including reports which can be accessed at www.groundreach.eu

Achievements

The main Ground-Reach achievements include the following items concerning ground source heat pumps:

A report on the present market status in Europe gives statistics from the main markets within the EU, as well as analysis of the economics. The market for ground source heat pumps is, so far, only well established in a small number of the European countries (Sweden, Germany, France, Switzerland and Austria). Other countries like the UK, Ireland, Poland and the Netherlands show a great potential, but have not yet been able to gain a self-sustaining market. There are a number of countries within the European Union that face a real challenge in meeting their Kyoto targets and these countries will benefit from lessons learned from the more developed markets for renewable energy sources. Given the overall focus on energy efficiency and promotion of the use of renewable energy sources, such markets are expected to grow rapidly in the years to come.

A *study* has calculated the improvements in energy efficiency and reduction of greenhouse gas emissions that will result from a wide introduction of ground source heat pumps in Europe. A widespread implementation of these types of heat pumps will lead to considerable savings in the demand for non-renewable primary energy. Even in a scenario with rather moderate expectations, which might be achieved from a continuous development of the current market, heat pumps could account for the 8% of the EU goal for reduction of greenhouse gas emissions, while with ambitious market penetration of GSHPs they could contribute to 42% of the EU goal for 20% reduction of greenhouse gas emissions by 2020.

A *report* on benchmarks, regulations and guidelines for renewable energy sources including heat pumps in the EU.

A *report* on the current legislation prevailing in EU member States.

40 best practice case studies of GSHP applications available on-line, with 17 more expected to be on-line by the end of this year.

A *report* on barriers to GSHPs market penetration which forms a rough overview on chances and barriers within Europe.

A large scale publicity *campaign* communicating the merits and benefits of GSHPs to key professionals such as:

- reduced primary energy demand
- lower greenhouse gases emissions
- improving the local environment
- adding value to the building
- higher quality of comfort

For this purpose Ground-Reach *posters and brochures* have been prepared in 14 languages, printed and distributed. A quarterly e-newsletter has been issued and e-mailed out on regular basis.

A series of *workshops* were held in Watford (UK), Vienna (Austria), Orleans (France), Milan (Italy), Sofia (Bulgaria), Brussels (Belgium), Warsaw (Poland), Setubal (Portugal), Gleisdorf (Austria), the 10 workshops of Netherlands, in Athens (Greece), Oradea (Romania), Madrid (Spain), Tallinn (Estonia), Florence (Italy), Aarhus and Copenhagen (Denmark), as well as the international project workshop of Zurich in conjunction with the 9th IEA heat pumps conference. Next workshops will be in Karlsruhe (Germany) and Stockholm (Sweden).

Other activities include *co-ordination* of EHPA activities with those of the EGEN (European Geothermal Energy Council) as well as press releases and presentations in various promotional events.

The Ground-Reach project also enjoyed *international recognition*, as it was awarded with the National Energy Globe Award for Greece, and the GSHPs technology was disseminated to an international Audience during the corresponding award ceremony at the European Parliament in Brussels.

Dimitris Mendrinou, CRES
Ground-Reach co-ordinator

EU regulations and legislation

GfE Italy, within the planned activities in the framework of GROUND-REACH project, prepared the report '*Inventory of EU legislation on Ground Source Heat Pumps (GSHPs)*'. This report examines the current situation of the legislation and guidelines available concerning ground source heat pumps (GSHPs) in the European Union Member States, not only focusing the attention on the 15 Member States that were EU members prior to 2004, but also on the new 10 Member States who joined EU on May 2004 and on Romania and Bulgaria as well, who joined the EU 1st January 2007.

This report is currently being revised in order to try to provide the same amount of information for each Country as detailed as possible. A first draft is already available on the project website www.groundreach.eu following the links 'Deliverables' and 'Projects reports'. In the first part of the report the European Commission's set of regulations is described. In the second part, a detailed description per Member State is analysed (where information was available).

Generally speaking, what the document tries to disseminate is as follows:

- need of more supportive governmental policies
- efforts to promote and get the development of geothermal resources for direct use faster.

The set of legislation for geothermal energy is not available in all the European countries and where it is provided, it reveals great differences in existing legislation. A harmonisation process is clearly needed!

EU issued Directive 2001/CE for the promotion of energy from renewable energy sources also lists geothermal energy as a renewable source. Thus agencies like the International Energy Agency (IEA)

could and should become the necessary leader in encouraging governments to supportive legislation to encourage geothermal user. Both commitment and effort is required!

Marco Spiccia

GfE energy management S.r.l.

Ground reach best practice portal

This activity is aimed at demonstrating the essential benefits of GSHP concerning primary energy saving and CO₂ emission reduction in practice and thereby encouraging the market penetration in Europe.

Main purpose of the database is:

- to provide reliable information on the high energy efficiency and low CO₂ emissions achieved with GSHP in practice
- to show the broad range of possible application areas for this sustainable heating/cooling technology all over Europe
- to reveal the national and regional differences regarding climate, geology, electricity mix, energy prices etc. and their influence on energy efficiency, economic competitiveness and environmental behaviour
- to form the basis for setting up recommendations for a successful design, installation and operation of GSHP systems

An example of a case study is provided by the VIKA building in Aachen.

VIKA office building in Aachen



The new office building lies on the edge of a 'solar housing estate' in the German town of Aachen and follows the energy specifications for the residential buildings of the estate.

The compact, four-storey office building without a cellar has a north-south orientation. The large surfaced floor plan without load-bearing interior walls allows

a flexible subdivision. Five parties currently use the building with approx. 100 workplaces in total. In theory, up to eight units would be possible per floor.

The reinforced concrete skeleton construction with load-bearing precast concrete facades was, for the most part, prefabricated. The building shell was therefore finished within 8 weeks and the whole building within 9 months. The high standard of insulation is in line with the construction method of a passive house but only reaches an average U-value of 0,48 W/m²K. This is, among other things, a result of the glazing in the slightly-heated staircase which, however, is located inside the insulated envelope, with a U-value of 1,6 W/m²K.

The outer walls are insulated with 20 cm mineral wool and faced with square tiles ventilated at rear. The windows in the office zones consist of triple glazing in thermally separated aluminium frames (UW = 0,80 W/m²K). The windows account for 41 % of the facade surface area. Because of the glazing's comparatively low g-value of approx. 50 % and cooling using thermally activated concrete surfaces, exterior shading was not installed. The annual heating requirement was calculated at 39 kWh/m² p.a. The air-tightness test of the building envelope produced an n50-value of 0,3 per hour.

Heat pump system

An electrically driven ground source heat pump is responsible for heat generation. Each of the 28 borehole heat exchangers is 42 meters deep. The heat pump supplies a buffer storage tank (900 litres) which feeds the concrete core temperature control (CCTC) with a maximum supply temperature of 28°C. The CCTC is divided into two control circuits (north and south) on each floor. In summer, the heat is extracted from the rooms via CCTC and released into the earth by means of the borehole heat exchangers. The minimum supply temperature in summer is 18°C. In summertime the heat pump is not in operation (free cooling).

The energy requirements for cooling and heating balance each other out – the temperatures in the soil therefore do not build up during the course of the year. The borehole heat exchangers' water circuit can also be used for cooling and heating the supply air by means of an additional heat exchanger.

The control concept was optimised continuously over a five years monitoring period and in the 2007, a seasonal performance factor (SPF) of 4,3 was reached.

Heat pump sales in 2007

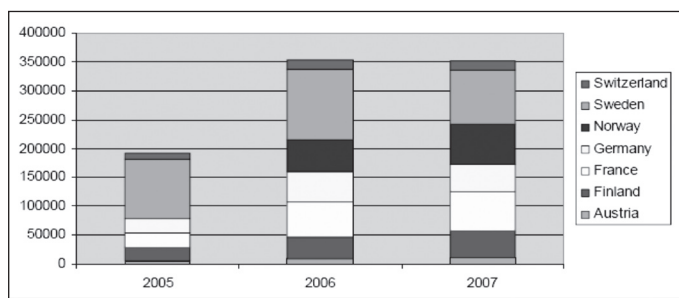


Figure 1: Market sales 2007

The total number of systems installed in 2007 for the 7 leading countries was the same as in 2006, but this reflects consolidation within these markets after an increase of 50% sales in 2006 and a 20% annual cumulative increase since 1992. What is significant is the steady growth in 5 of these countries and only a decrease in Germany and Sweden (Figure 1).

Sweden remains as always the largest market with sales of 93,000 systems in 2007 though its share of the market is decreasing from a high of 60% in 1992. Sweden, Finland, Norway, Austria and Switzerland all have similar populations so by examining the data in Figure 1 it can be seen that the penetration rate is much higher in Scandinavia than in middle Europe. This is partly due to the absence of a gas grid and partly to the extreme weather conditions which require high efficiency heating systems operating continuously throughout the winter.

Heat pump type and size

Data have also been collected showing the split between various types in each country (Figure 2). This shows that air to water is favoured in some countries like France and ground source heat pumps in countries like Germany. Direct expansion is most common in Austria and Germany.

Other countries with small but growing markets include Czech Republic, Denmark, Ireland, Poland and the UK. About 2% of sales are systems greater than 20 kW but some systems are very large including the 5.5 MW system for Mansfield General Hospital, UK.

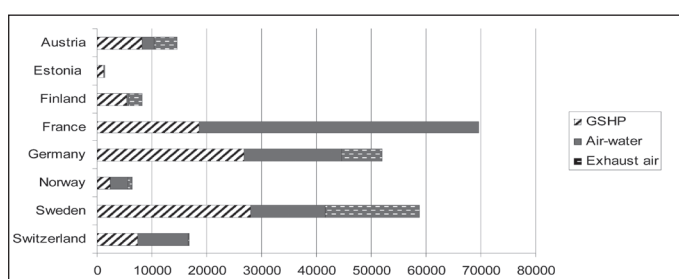


Figure 2: Heat pump sales in Europe (heating only units)

Update on RES directive

After a lot of preparation, several meetings for information dissemination and preparatory workshops, the members of the ITRE committee of the European Parliament voted on their report on 11 September. It is important to note that the activities of the heat pump industry on the different levels have greatly influenced the contents of this report.

Contrary to initial approaches and positions, today's vote included the suggestions to enhance the definition for RES by aero thermal, hydrothermal and geothermal energy (Amendments 342, 343, 344 and 345 were accepted). Most importantly, the ITRE report will integrate all types of heat pumps as renewable, once they fulfil certain requirements (CA 7 accepted).

We will later present a more detailed report on our assessment of this document and our suggestions for the next steps to be taken to safeguard the achieved position and to possibly even improve the perception of the heat pumps contribution potential in the final Directive.

Thanks to all of you who contributed to this work over the past years - and congratulations on our success.

Thomas Nowak

EHPA communications officer

Update prior to Energy Council meeting

The current compromise agreement presented by the French presidency foresees the inclusion of energy from aerothermal, hydrothermal and geothermal sources (article 2) and the final energy method as proposed by EHPA, EPEE and in line with the text of the Directive (article 5.5.1, 5.5.2). While ground- and hydrothermal heat pumps have no requirements, air source heat pumps shall comply with the efficiency requirements for the eco-label, where applicable. The same requirements shall be used for additional support for heat pumps (article 12).

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Closing date for contributions to next issue is January 5, 2009. Theme installer training.