EUROPEAN HEAT PUMP NEWS

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EUROPEAN HEAT PUMP ASSOCIATION

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EHPA NEWS

In each newsletter, we discuss issues which have a European focus and in which the Association is actively involved. There is information about the activities of the three projects in which we are actively involved and the workshops being organised to disseminate the results to a wide audience together with an update of the status of ecolabelling heat pumps.

Ground source heat pump experiences across Europe

The first Workshop of the Ground Reach project of which the EHPA is a member was held on 21 June 2006 at the Building Research Establishment, Garston, England. About 40 persons participated in the event. Dimitrios Mendrinos (CRES) discussed the project objectives, which was part funded by the Energy Intelligent Europe programme. These included disseminating best practices, overcoming market barriers, promoting ground source heat pumps and disseminating information about them. The advantages of ground source heat pumps over air source heat pumps is that their performance in terms of heat production/energy consumed is independent of the outside air temperature because the heat source is stored in the ground, lake or river. Typical efficiencies of 4.0 to 5.0 could be obtained compared with 0.9 for a gas fired condensing boiler.

National experiences

Burkhardt Sanner (EGEC) described the procedures that had been involved to establish good working practices for the installation of ground source heat pumps in Germany. Andreas Presetschnik (Arsenal Research) described experiences in Austria, where renewable energy sources produces 11 % of the country's energy requirement; hydroelectric and heat pumps being the major sources. Johan Ronsquin (ADEME) described the rapid growth of the French market in the past five years which averaged 20 % per annum since 1997. Martin Forsen (SVEP) described their experience in Sweden, whose market was the largest in Europe even though their population was relatively small compared with the larger countries in Europe.

Success factors for high growth included rules for sizing heat pump systems, qualified installers, rules for drilling, low drilling costs, logging data about thermal transfer of every borehole that is drilled and the presence of the DACH quality label for heat pumps.

Long term growth continues in 2005

Sales continue to increase steadily for the three types of heat pump systems on which the EHPA is able to collect data namely air to water, ground to water and water to water. About 20 % of these systems provide space cooling as well as space heating. The market growth remains close to the long term average of 20 % compound growth since 1992 and this has been achieved in 2005 by growth in countries other than Sweden for the first time. The biggest increases were recorded in Finland and the Czech Republic which as the table shows had almost no market sales in 1992.

The long term growth in all the major markets appears sustainable with year upon year of steady growth. This is very different to the period during the previous (1978-83) oil peak when sales grew too rapidly and subsequently collapsed. Aspects contributing to this sustained growth include the ever rising price of oil (ca $75/barrel currently), the quality labels under which many of the heat pump systems are sold and the availability of trained installers. Some might also add the presence of the EHPA which is helping to diffuse knowledge and best practices.

For further analysis of the data and break down between different types of systems, consult the EHPA website.

The EHPA is unable to collect sales data for reversible heat pumps which are primarily used for space cooling in summer and which provide heating during the winter. Sales of these air to air heat pumps are believed to total in excess of one million per annum in three Southern European countries that is Italy, Greece and Spain. Neither does the EHPA currently collect statistics on sales of heat pumps used for providing hot water only.

Sales figures space heating — units

	1992	2003	2004	2005
Austria	800	3,780	5,129	6,700
Bulgaria		15	25	56
Czech Rep.	20	1,200	2,400	4,000
Estonia		510	750	1,095
Finland	100	8,540	12,648	22,300
France	4,000	13,700	17,300	25,200
Germany	2,000	15,838	20,636	26,037
Ireland		1,300	1,800	2,300
Netherlands		1,557	1,800	1,900
Norway	1,000	55,081	35,390	40,000
Slovenia		25	35	n/a
Sweden	15,000	68,100	100,215	101,360
Switzerland	2,700	8,695	9,796	12,000
Portugal				46,200
Italy				13,000
UK				500
Poland				1,465
Total	**25,620**	**178,341**	**207,924**	**304,113**

UK low carbon building programme

The government has announced that it would follow up its 'clear skies' programme with its low carbon building programme to encourage the uptake of micro generation of renewable energy sources to dwellings. Certain minimum energy efficiency measures are required in order to qualify for a grant and grants were also available for community buildings. Heat pumps with a certain minimum efficiency are eligible and this should stimulate the market for heat pumps which was still very small compared with almost all other European countries.

UK GSHP Club to become a legal entity

At a meeting on 20 June the UK Ground Source Heat Pump Club was formally re-launched as a self-governing body under the name of 'The Ground Source Heat Pump Association' and an initial Management Board was elected by the members present.

The Club was formed in October 2004 as part of a two-year project undertaken by the National Energy Foundation, with sponsorship from the Department of Trade & Industry and Powergen, to promote ground source heat pumps and to develop their market.

The Ground Source Heat Pump Association, which aims to be self financing, will work with other stake holders to overcome the formidable barriers to market growth in the UK. It also aims to guard standards (thereby protecting the end-user) and, of course, to generally further its members' interests.

Overcoming market and technical barriers to ground source heat pumps

During May national experts attended this IEA workshop held in Linz, upper Austria. The picture shows delegates on the study tour to Neura Electronics, a manufacturer of heat pumps. The managing director, Peter Huemer, showed the production line, the company's latest innovation and gave an overview of the Upper Austrian heat pump market. (Source: Neura: http://www.neura.at)

As an example of a national programme on climate protection, Andreas Bangheri, introduced the initiative of Austria's Federal Ministry of Agriculture, Forestry, Environment and Water Management – klima: aktiv. Klima: aktiv offers tailor-made programmes for all those who want to benefit from the advantages offered by modern, climate-friendly technologies. A major target within this programme is to promote an environmental friendly and effective heating system. This has benefits in two ways – it strengthens the domestic heat pump market and boosts the competitiveness of that part of industry and additionally Austrian consumers profit from high quality products.
For more information: http://www.waermepumpe.klimaaktiv.at

Delegates on the study tour to Neura Electronics

Ecolabelling of heat pumps

The discussion about the possible criteria for affixing the EU ecolabel to various types of heat pump systems has reached an important stage with the EHPA circulating a set of proposals to members of the ad hoc working group set up by DG Environment. The various proposals are being reviewed by DG Environment and a proposal will be circulated ahead of the next meeting of the working group currently set for September 22 in Brussels.

If a consensus can be reached then heat pumps will become the first renewable energy system eligible for the EU ecolabel. This is an important stage in the evolution of the market because it would be sensible, for grants where these are available, to be given to systems which are awarded the ecolabel.

Control Algorithm Suite for natural refrigerant heat pumps

Report by Donal Finn and co-authors,
University College, Dublin

In addition to the workshops which the SHERPHA project will organise, information is also available on the SHERPHA website. The various state of the art reports such as the one below are initially available to members of the EHPA and GRETH and subsequently after a period of 6 months to the public.

Keywords: Heat pump, primary control, secondary control, capacity, coefficient of performance, propane, ammonia, carbon dioxide

This report summarises the various concepts used in contemporary control of heat pumps. A product survey of control techniques in commercially available heat pumps is given and a summary of potential control algorithm concepts are outlined. Research in heat pump control can be considered according to primary and secondary side control. Considering primary-side or refrigerant-side control, the capacity control techniques that are most likely to be employed in heat pumps is traditional on/off compressor control, possibly with twin compressor utilisation. Although stepless capacity control by means of inverters is technically viable, it has still not made major inroads with heat pump manufacturers.

Considering control of refrigerant expansion, thermostatic expansion valves continues to be heavily exploited. Although EEV devices are technically feasible, their use is only justified where significant variation in capacity is expected and where the additional financial cost is not an issue. Secondary side control is also discussed in the report.

Controlling the motor speed of the secondary fans and pumps can produce a reduction in the condensing pressure at lower ambient conditions, thereby minimising compressor power consumption. The decreased condensing pressure is achieved by increasing the flow of the secondary fluid. Therefore, the reduced compressor power consumption is achieved at the expense of increased fan or pump power consumption. As a result, an optimised control scheme must be developed, which minimises the total power consumption of the compressor and the fan or pump.

Control of brine circulation rate or evaporator fan speed may also offer potential and is considered. Control algorithms are considered and are proposed for output and performance optimisation using secondary side control.

2nd SHERPHA workshop: Applications of natural refrigerant heat pump systems

October 3, 14.00 to 18.00, Arsenal Research, Vienna

The SHERPHA partners are developing the next generation of heat pumps which use natural rather man made refrigerants such as ammonia, carbon dioxide and propane. The first workshop in Valencia on 31 March considered the use of such refrigerants in designing and developing components like heat exchangers (see EHPA newsletter number 7/1).

The second workshop will present the exploratory work undertaken by the project partners to characterize the use of such refrigerants in heat pump systems – this includes characteristics of such refrigerants, laboratory testing using flow rigs of heat transfer properties and possible control strategies. This will be followed by papers which will describe the selection of components and design of one of each the refrigerant system that are now under test.

This workshop is to be held immediately before the TRACE symposium, also at Arsenal Research. There is no charge but it is necessary to register as early as possible. Futher information will be sent to those who register including specific arrangements for the day. To reserve your place please contact Andreas Presetschnik at Arsenal Research as soon as possible (andreas.presetschnik@arsenal.ac.at)

EUCERT and competent heat pump installers

As part of the TRACE symposium, the members of the EU CERT project will present their conclusions on a European training and certification programme for installers in the field of heat pump technology.

There is an increasing need for competent installers of renewable energy systems so that the full benefits of these technologies can be achieved. There is a common set of skills required for all such systems and a set of specific skills for particular types of systems. EUCERT has been a three year project, which has been part funded by the EU's SAVE programme. The 10 project partners, including the EHPA, have considered the heat pump specific skills and developed a

specification for Institutes to run training courses. For those who will run the training courses, a comprehensive training manual has been compiled based on best practice from countries like Sweden, Austria and France. Manufacturers will supplement such training by organising courses to train installers to install and maintain their equipment.

There is a specific requirement for an Accreditation Board to be set up which can accredit courses which comply with the proposed syllabus and course contents. The EHPA has agreed to host this Board and its formation and role will be discussed in Vienna. Regarding the training and certification boards in EUCERT, the project is in the process of elaborating the commitment contracts for the training and certification boards and institutes now. The certification agreement is based on the ideas of the EN 17024. As each country is currently operating different systems accreditation as a notified body will become a longer term aim. However the project has developed a good quality system and a sound certification procedure whose quality aspects will be covered by the certification guidelines.

If you would like further information please contact Susanne Gosztonyi (Arsenal Research) or Robert Garwood (BRE).

Training and Certification Symposium for Renewable Energy Systems (TRACE)

While technologies for renewable energies develop and markets boom, the missing link between high quality products and the implementation workforce should not be neglected. Instead the supply of both – high tech energy systems and well-trained installers must be guaranteed. Therefore several EU training programmes have initiated TRACE in order to provide an EU wide platform for training activities in renewable energy systems (RES). The aim is to enable the exchange of experiences and knowledge between partners and to invite new countries to join the training programme.

Benefits of attending include

- Getting to know already established training courses in RES
- Learning about experiences in implementing education & certification systems
- Starting partnerships and cooperations for trainings

Target group includes

- Project partners of EARTH, EUCERT, CER2 and SHERHPA
- Training institutions specialised in RES and trainers
- Representatives of energy agencies and certification institutions
- Representatives of the branches and guilds
- Stakeholders on national and European level interested in RES training

The Symposium will be held as a two day event, October 4/5 2006, at Arsenal Research, Vienna. The structure is based on practically orientated plenary and parallel sessions including cooperation talks on training programmes in renewable energy technology. There is no attendance charge but registration is required. More details, programme, information fact sheet and registration form are provided at: http://www.cer2.net – TRACE Symposium.

Diary

September 29	meeting of EHPA executive, KOWI, Bruxelles 09.30 to 15.00
October 2/3	meeting of SHERPHA project, Arsenal Research, Vienna
October 3	SHERPHA workshop: Applications of natural refrigerant heat pump systems Arsenal Research, Vienna 14.00 to 18.00
October 4/5	Training and Certification Symposium for Renewable Energy Systems, Arsenal Research, Vienna

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Closing date for contributions to next issue:
7 September 2006 Theme: **installer training**