

## EHPA NEWS

### Climate change and renewable energy

*The Chairman describes the current state of climate change legislation in Brussels and the role of heat pumps systems in mitigating climate change.*

The weather this summer has been one of extremes, which for some countries has meant blistering heat and for others torrential rain, often leading to severe flooding. The Vltava River in Prague rose to its highest level for 200 years and caused severe damage in the Czech Republic as well as other countries bordering the Danube and the Elbe. We extend our sympathy to those who have been affected by the flooding.

Unfortunately such extreme weather conditions are much more likely to become the norm in future as predicted by climate change models based on warming due the accumulation of greenhouse gases in the atmosphere. Apart from taking precautions to prevent rivers flooding in this way again, it is also clear that society must try to prevent climate change even more rigorously - the Kyoto targets were always envisaged as the starting point, not the end point.

Legislators in Brussels are actively discussing three initiatives that are designed to promote the use of energy in a more efficient and sustainable manner. These form part of the first phase of the EU's climate change programme. Two of these initiatives require



*Figure: EHPA members relaxing after the Stockholm meeting*

primary legislation that is quite far advanced and concern energy performance in buildings and the provision of energy services. The third is a parallel measure to generate awareness about climate change and what individuals can do to mitigate the changes.

Heat pump systems are a renewable energy source that can be used either to concentrate low grade heat for heating or discard high grade heat for cooling and do this in a more efficient manner than any other system.

The EHPA therefore seeks to work with all stakeholders in generating awareness of the potential of the technology and developing initiatives to educate and train persons working with buildings and the associated heating and ventilation.

These matters were again discussed at the June meeting of our Executive in Stockholm and it was decided to pursue both an extension of the DACH quality labelling system and to develop the necessary educational resources.

*Rayner Mayer  
Chairman EHPA*

### The certified heat pump installer in Austria

*Austria - A crucial factor in developing heat pump markets has been the efficient planning and installation of heat pump systems, which has helped raise consumer confidence. Training courses have therefore been introduced in many countries. The Austrian Certified Heat Pump Installer is one very effective example.*

Heat pump space heating systems are more complicated than other heating systems. Any installer who wants to work with heat pump technology needs a mixture of skills that are normally covered by different professions (electrical engineer, installer for space heating, refrigeration engineer, etc.). Additionally in some European regions we face the

problem that markets are currently growing faster than the number of qualified installers available. This could again result in badly installed systems, with a similar dramatic effect on the development of the heat pump market as witnessed in the early 80s.

To cope with these problems the Austrian Heat Pump Association - LGW organised a pilot training course in Linz in 1999. More than 20 trainees attended the course, which consisted of mainly theoretical work on refrigeration and heat pump systems. The feedback was highly encouraging, but the next step had to be the standardisation of courses and examinations. At this stage the LGW asked Arsenal Research for help.

To ensure that the training schedule achieved a consistently high level of quality, a marketing asset was created and installers were part of a continuing quality process, it was evident that a certification scheme was needed and so the *Austrian Certified Heat Pump Installer* was created.

The certification process is based on European Standard EN 45013. This standard is derived from international documentation, particularly ISO/IEC Guideline 40 and describes the necessary administrative structure, the requirements for certification personnel, the requirements of the certification and surveillance procedure, the quality manual, the withdrawal and cancellation of certificates, questions of confidentiality, etc. Training targets for the course are based on the European Standard EN 13313, which describes the competence required for refrigerating system and heat pump personnel. The design of training targets for heating installers and refrigeration technicians was also used as a basis.

Besides the training course and the examination there are other requirements for certification:

- The person is a competent water and gas installer, space heating installer, electrician, refrigeration technician or similar or he/

she has had a similar technical school or high school education.

- Documentation for one system design must be submitted.
- Every second year the certified person has to provide proof of further training or attendance at specialised events.
- The certified person is obliged to document complaints about installed systems and submit this information to the certifying body.
- The installer has to be active in the field of heat pump installation, must document the installed systems and submit this information to the certifying body.
- A certification agreement has to be signed.

The schedule consists of four modules over three days (Thursday, Friday, Saturday); three modules are theoretical modules, and the fourth module includes practical work and theoretical and practical examinations at Arsenal Research. The Austrian vocational training institutes WIFI and BFI collaborated in the creation of the course. At the end of this year a reassessment, reorganisation and upgrade will be organised.

Five new courses are planned for 2002. So far 100 installers have attended the course and the feedback from courses has been extremely positive.

### **The European Vision**

A coordinated European effort would currently help the heat pump industry much more than diverse actions at a national level. A common European certification scheme would be a major step and should include the following topics:

- Jointly agreed training targets for heat pump installers
- European curricula for training courses
- Development of a European certification scheme
- European-wide training courses
- Certified Heat Pump Installers on a European basis
- Standardisation of the monitoring data gathered on-site for the certification process
- Extension of the training & certification scheme to candidate countries, etc.

At the EHPA meeting in Stockholm, Sweden in June 2002 a working group on education & training was formed. Its first task will be to assess the needs and framework conditions in member countries, with the focus then shifting to the development of common educational schemes.

Besides the positive effects of having a growing pool of well-trained heat pump installers, the **European Certified Heat Pump Installer** would be a perfect marketing instrument. A trademark could be created and promoted at national and international level for improving customer perception of this technology.

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### **Heat pump EoI submitted to European Commission**

*Germany - FIZ Karlsruhe has submitted an Expression of Interest (EoI) document entitled "Network of Excellence for Heat Pump RTD" to the European Commission. The network of excellence aims at integration of European forces to build up a leading RTD capacity for heat pumps. This EoI is supported by the EHPA as well as over 30 European universities, other research centres, professional organisations and the industry.*

### **The EoI "process"**

The Sixth Framework Programme (2002-2006) for European-funded research was adopted by the Council of Ministers on 3 June 2002. In advance of this approval the European Commission had already invited the European RTD community to submit Expression of Interest (EoI) documents for "Integrated Projects (IP)" or "Networks of Excellence (NoE)". Both IPs and NoEs are new instruments for the Sixth Framework Programme. The EoI documents will be used for defining the call for project proposals, expected in November/December 2002.

Universities, companies and research centres have sent more than 11,500 ideas for European research projects to the European Commission. More than 100,000 groups and institutions were involved in drafting the ideas.

In an effort to promote partnering and collaboration, the Commission will publish all EoI documents on the web site <http://www.cordis.lu/fp6/eoi-instruments/home.html> (Expected publication date 15 September). An analysis of the ideas received will be published in September 2002 and will feed into the drafting of the detailed work programmes, which form the basis for the calls for proposals to be published at the end of this year.

### **Aim of the Network of Excellence**

In contrast to conventional boilers the efficiency of heat pumps can still be improved, despite the high quality of products currently available on the market. To make this potential accessible, European-wide integrated efforts in the fields of research, technical development and demonstration (RTD) are required.

In the first working period of the planned NoE the consortium will concentrate its efforts on two main tasks offering the biggest potential for saving primary energy and reducing CO<sub>2</sub> emissions:

- Development and testing of heat pump concepts for the extended use of renewable energy sources (RES) and rational use of energy (RUE) in the building retrofitting sector, including advanced cycles, alternative refrigerants, micro-technology etc.
- Analysis and development of strategies for integrating RES (and also industrial waste heat) via heat pumps in distributed energy supply systems, in combination with combined heat and power generation and district heating/cooling.

The complete text of the EoI is available on the EHPA web site (<http://www.ehpa.org>) under the item "Projects"

### **What happens next?**

If this EoI is recognised by the Commission and is the subject of a call for proposals at the end of the year, there will be an opportunity for further interested partners to join the consortium.

### **Collaboration**

EHPA is aware of four other EoI concerning heat pumps. At the last meeting on 28 June in Stockholm the participants proposed to make efforts to integrate the known heat pump related EoIs as far as possible, aiming at improving the position of heat pump technology within the FP6 in general. For this reason EHPA is planning to invite all submitters as well as a limited number of representatives of all heat pump related EoIs to a meeting in Brussels on 7 November 2002.

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## Sleeping on water



Figure: Hotel Palafitte with heat pump

**Switzerland** - Under the auspices of the Swiss National Exhibition (EXPO.02) a visionary hotel concept at Lake Neuchâtel provides high tech comfort for guests, with the application of advanced security and building control systems for heating and cooling, as well as for communication and information systems. The project represents high-class comfort using the latest technology. The installation is equipped with a modern, digitally controlled water/water heat pump of 90 kW. The five-star Palafitte hotel has forty 120-bed pavilions, twenty four of which are built directly over the lake water, effectively creating a modern-day high-tech pile-dwelling complex.

*Dr. Hansueli Bruderer*  
Swiss EHPA Delegate of FWS

## Exaggerated fear of brine

**Sweden** - This article, which was published in a Swedish newsletter, was received from the Swedish VET group.

### Brine is not a threat to the environment

The installation of ground source heat pumps in environmentally sensitive areas means that high demands are made on leakage prevention from the brine system.

Today we have so much experience in installing ground collectors in energy-wells and underground that leakage is rare, if not completely eliminated. The fears of Environment & Health Departments in some communities are therefore exaggerated.

### Always a tested collector

The collector pipe for ground heat is buried approximately 0.9 – 1.2 metres deep, de-

pending on geographic location, with a length appropriate for the required heat (normally 300-500 metres). A single hose with no fittings is used to prevent leakage from joints. The hose is tested at a pressure of 3 – 4 kilos before it is buried to make sure no transportation or site damage has occurred.

When drilling an energy-well the same pressure testing procedure is carried out prior to setting the hose in the well, usually at a depth of 90 – 140 metres.

### Bioethanol brine decomposes rapidly

The hose is filled with water-bioethanol brine. It holds approximately 28 % ethanol by weight. Pure bioethanol is practically odourless and has no taste. If, despite all the precautions, a small amount of bioethanol brine leaks out, it will break down in the upper soil levels in just a couple of weeks, leaving no trace and without harming the environment.

### Only a small amount can leak out

In a standard heat pump the leakage is limited by a low-pressure valve that stops the heat pump to prevent the compressor breaking down if the brine level drops. No more than 4 – 6 litres should leak out before it stops, and when circulation does stop no further fluid will leak out as it is a closed circulation system. To reduce the risk still further in extremely environmentally sensitive areas an expansion vessel with an integrated low-level valve is installed. In these cases the circulatory system and compressor can be shut down when only 2 litres of brine are left.

Two litres of bioethanol brine contains 0.7 litres pure bioethanol. This is an exceedingly small amount in comparison with the amounts of ethanol, of far more doubtful quality, that are used to clean the wind-screens of our cars every day.

### Negligible risk

All in all the opinion of the VET-group is that from an environmental point of view a ground heat pump installation with brine or water-bioethanol, if correctly installed, is harmless both for inner and outer water protection areas, as the risk of leakage from hose and fittings is negligible.

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## Swiss Retrofit Heat Pump

**Switzerland** - Martin Zogg reports that the KWT prototype has now been officially awarded the name "Swiss Retrofit Heat Pump".

The decision to develop a *Swiss retrofit heat pump* specifically for the renovation market based on results from research projects has now been taken. The KWT Company in Belp (near Bern) has been awarded the name **Swiss Retrofit Heat Pump** for its prototype by the Swiss Federal Office of Energy (SFOE).

The SFOE thereby recognises this firm's innovative and forward-looking endeavours in producing a heat pump system for room heating at supply temperatures up to 60° C, with a thermodynamically integrated domestic hot water system, using air as the heat source. The system also features excellent defrosting characteristics. The SFOE's decision is based on the results of previous research projects, the encouraging results obtained from a comprehensive field test in the heating season 2001-2002, and the unanimous recommendation of an independent panel. The SFOE is confident that this development will result in a successful commercial product in the near future.

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Figure: The Swiss Retrofit Heat Pump

## Raising acoustic requirements for air/water heat pumps

**Switzerland** - Out of consideration for neighbours the requirements for acoustic emissions from air/water heat pumps for the heating of dwellings are becoming more stringent in Switzerland. This has led to a thoroughgoing discussion between manufacturers, heat pump association and authorities. The de-

mands for lower acoustic emissions outside houses, the smallest possible size for the equipment itself with the same high efficiency (COP) will create new challenges for designers. In Switzerland, air/water heat pumps are most common and very popular.

*Dr. Hansueli Bruderer  
Swiss EHPA Delegate of FWS*

## COUNTRY IN FOCUS: DENMARK

### The Danish Market

In Denmark there are approximately 40,000 heat pumps used in several types of systems. Both heat pump water heaters and air/air systems (A/C units) are highly popular.

During the past few years the market has been relatively stable and the state subsidy for heat pumps has had a beneficial effect on the market.

The figures below show the market developed during the past five years. Please note that the figure cannot be used as a survey of the number of heat pumps installed in the years in question.

Approval of the Danish Budget for 2002 ended a long era in Danish energy policy as subsidies for the installation of renewable energy systems finally came to an end. For almost 20 years private consumers had received subsidies for the installation heat pump systems and even in late 2001 it was possible to receive a subsidy of up to 15% for the installation of heat pump systems in areas without natural gas or district heating.

This new political initiative affected not only heat pumps, as subsidies for other renewable energy sources such as solar heat and bio fuels were also removed.

### Implications of the new policy

Initially there may be a decline in the sale of heat pumps in Denmark, but in the long term (i.e. 1-3 years) sales are expected to reach the level of former times. This is because it is mainly small air/air heat pumps that are sold in large quantities. Previously these systems could only be sold if they were equipped with a device that limited their use to heating (i.e. no cooling operation). Suppliers then had to change the system before

it was installed, which increased the price for the customer. Removal of the subsidy means the systems are sold with optional cooling operation, i.e. the supplier does not have to change the system.

With regard to the other types of systems, the new policy will definitely have implications. It is to be expected that geothermal systems will no longer be attractive financially in Denmark after the removal of the subsidy.

### Continuation of approval scheme

Financial support for the Danish Test Laboratory for Heat Pumps has also been removed. At the end of the year 2002 this service will be closed down in its existing form. In order to ensure that Danish customers can continue to buy systems meeting a number of minimum requirements, the Danish Test Laboratory for Heat Pumps will be replaced by a voluntary approval scheme. As before this scheme will be administered by the Danish Technological Institute. More information (in Danish) can be found on: [www.teknologisk.dk/varmepumpeinfo](http://www.teknologisk.dk/varmepumpeinfo).

The terms and basis for the new approval scheme are in principle unchanged compared to the former one. A number of innovations are however expected to be introduced. In the future, it will be possible to get approval for systems designed primarily for cooling operation.

For further information about heat pumps in Denmark or the voluntary approval scheme please contact:

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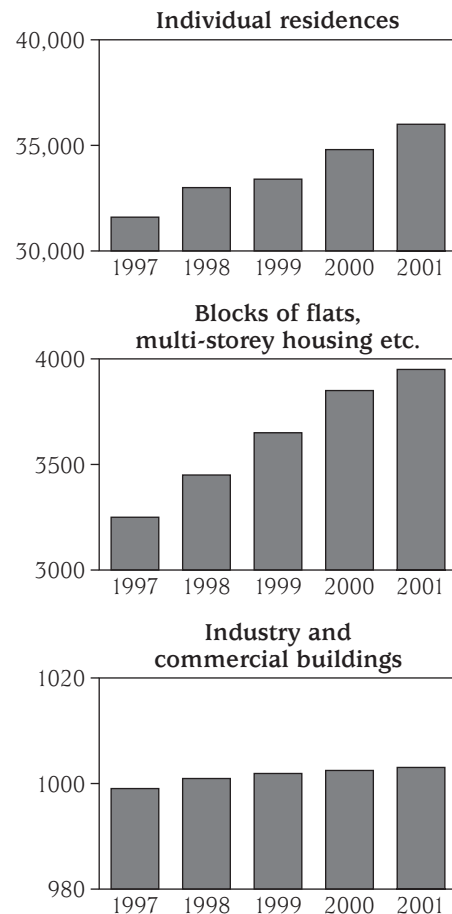


Figure: Total heat pump stock in various market sectors (including heat pump water heaters).

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