Heat Pump News
HEAT PUMP ASSOCIATION NEWSLETTER
HPA
Helping you save energy
to create a better environment
Volume: 1 No. 6

Tipping point for great technology

There has been much recent talk of an energy awareness 'tipping point' — the moment in which there is a wide ranging public acceptance of the problem being real enough to require personal action by the individual and not only the government. Once such a point is reached it is easier for politicians — never ones to force an unpopular measure however justified — to put in place real fiscal and structural measures which will affect peoples' lives. The HPA perception is that we are indeed close to this tipping point. Interest is growing rapidly in heat pumps — ground source domestic installations are rising rapidly, air to water domestic and commercial units will soon start to make an impact, and air to air heat pumps are advancing from their commercial stronghold to enter the domestic market as well. The massive potential for energy savings is widely recognised, at last!

In domestic markets we are entering the next phase of development. Surging demand can lead to incompetence of supply and often attracts products of indifferent quality, so standards for both products and installer competence must be put in place. At present HPA is working closely with the Low Carbon Building Programme to produce a robust framework for Microgeneration products to flourish in domestic and small commercial uses. There is as yet a lot of work to do, but we should start seeing some emerging information by April/May 2007. In the meantime the ranges of proven heat pumps on the market, with or without the support of grants, are being installed in ever greater numbers and saving more and more energy!

Spreading knowledge about heat pumps is one of the key objectives of HPA, and this issue of 'News' is proud to announce our updated HPA website. It is very informative in a 'generic' way, and easy to navigate, so take advantage of it and tell people about it. It details types of heat pumps, explains how they work, quotes lots of real applications for the better guidance of those unsure of the right way of approaching the technology, and even provides a layman's guide to the jargon! Keep an eye on it in future to keep up with developments, and let us know if there is something you'd like to see added.

Tony Bowen, President, HPA

Calorex for indoor dive centre

A climate control system, from heat pump specialists Calorex, has played a major role in the construction of a £1m indoor dive training centre at Stoney Cove, Leicestershire — one of the UK's premier inland dive sites.

Calorex environmental control machines can reduce energy consumption by as much as 60% and associated CO_2 emissions by up to 55% when compared to a full fresh air ventilation system. Typically, the unit is capable of removing 240 litres of water in a 24 hour cycle and plays a vital role in maintaining temperatures and conditions for indoor pool environments.

The Calorex unit at Stoney Cove provides dehumidification, heat recovery and ventilation in one versatile package. It was chosen by City Electrical Factors for an 8m by 4m training pool with a 1.4m shallow instruction area with a 4m deep section for novice diver training.

The three-storey Stoney Cove complex that took three and a half years to complete, includes a basement which houses compressors, five lecture suites, diving and adventure lifestyle shops and a medical centre.

Mike Snow, Hinckley sales manager for City Electrical Factors (CEF), who was project manager said, "We actually supplied £300,000 of electrical materials, including the CCTV system, fire alarm and VDU installations. At the outset we called in one of the Calorex engineers to advise on project design."

Stoney Cove, a flooded stone quarry, attracts 1,000 divers each week to its 13 acres of clear sheltered spring water, complete with submerged shipwreck and submarine.

Martin Woodward, Stoney Cove director said, "It has always been our intention to provide all scuba diving requirements in one place. Before this state-of-the-art centre was built we would have to rent municipal or private pools off-site to conduct pre-open water training".

The Calorex unit controls the operation of the boiler and combines it with a highly efficient heat pump dehumidifier to provide air and water heating, humidity control, ventilation and energy recovery.

In contrast to most buildings, wet leisure areas constantly evaporate large volumes of moisture into the space around them. Unless this moisture is removed, humidity will rise creating an uncomfortable environment and structural/fabric damage. The unit typically offers 230% heat recovery to pool water and/or pool hall air compared to just 50-60% from recuperator type air-handling units.

Totally self-controlling, the Calorex unit will remove this moisture and recover energy from it that is then re-used to assist water and air heating. By utilising this method, a heat cycle is created and energy costs are kept to a minimum. A majority of the heating needs are provided by heat recovery from the dehumidification process. Heat losses that cannot be recovered are replaced.

www.calorex.com

New HPA Website Launched
P2

New HPA website

The HPA has launched its new, dedicated, website at

www.heatpumps.org.uk

With sections explaining how heat pumps work and which types are available, the website is designed to educate the lay person and the professional in the uses and dynamics of this important technology.

News updates, available publications and case studies are also included on the site and further key information will be forthcoming.

The HPA Secretary, Terry Seward, said that they are delighted to have completed this project, which is one of several that the HPA are undertaking to provide information to a wide audience.

There is a link to the new website from the FETA website at www.feta.co.uk.

York answers abbey's prayers

A York heat pump is fed with geothermal water taken from the lake at Glenstal Abbey.

York, a Johnson Controls company, has provided a heat pump for Glenstal Abbey, Co. Limerick, a Benedictine monastery whose community required a low sound heating system that would not compromise its peace and tranquillity.

Glenstal Abbey, comprising a 500 acre estate with streams, lakes and woodland paths surrounding a castle, is home to a community of monks who manage a boarding school for boys, a dairy farm and a guest house. Recent refurbishment added buildings to the public areas and demanded an overhaul of the existing heating equipment.

York's YCSE 60 heat pump was specified for the centre of a water source system, designed by thermal energy specialist Dunstar. It is located in a plant room close to the church, library and other public buildings. Water taken from the lake provides the heat source for the heat pump; this then raises the heating circuit temperature to 50ºC and feeds the radiators in the church and the underfloor heating system elsewhere on the site.

"The church and library, which is right next door to the plant room, are in constant use for prayer and study; it was therefore essential that the operation of York's heat pump would not disrupt these activities," said Father Finton Lyons. "We are delighted with the new system as it is extremely energy efficient and quiet."

Geothermal systems use the Earth's thermal energy and, therefore, have minimum impact on the environment. They can be successfully used in a wide range of installations, including IT centres, office and leisure complexes, health care facilities and for process applications. The York Cork office has supplied heat pumps for eight Dunstar installations to date and is currently in discussions regarding several new projects.

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Sweden moves from district to ground source heating

Due to the rise of prices of district heating in Stockholm over the last few years, one association of home owners has changed its heating source from district heating to ground source heat pumps, reports International Energy Agency's Heat Pump Centre Newsletter.

The association consists of five buildings containing 24 apartments. A total of 4 km were drilled, each borehole 200 metres deep, and each building was equipped with a 40 kW heat pump. The annual savings on this investment account to about EUR 48,000, with an estimated energy price of EUR 90/MWh.

Ground-source systems are used for residential and commercial applications, and have similar advantages as water-source systems, i.e. they have relatively high annual temperatures. Heat is extracted from pipes laid horizontally or vertically in the soil (horizontal/vertical ground coils), and both direct expansion and brine systems can be used. The thermal capacity of the soil varies with the moisture content and the climatic conditions. Due to the extraction of heat from the soil, the soil temperature will fall during the heating season. In cold regions most of the energy is extracted as latent heat when the soil freezes. However, in summer the sun will raise the ground temperature, and complete temperature recovery may be possible.

HPA domestic heat pump group launched

With the explosion of interest in heat pumps for dwellings, the HPA held its inaugural meeting of the Domestic Heat Pump Group in December 2006. The chairman of the Group is John Lightfoot of TEV Ltd. The aims of the group include:

- The Domestic Heating Group of the HPA will provide co-ordination of domestic heat pump application technologies, their introduction and accreditation.
- Scope will include all types of heat pump.
- The Group will feed into HPA requirements for representation of its views on domestic heat pumps in respect of government, regulation and setting of standards.
- To facilitate and promote the growth of the domestic HP industry in national and international markets.
- To provide domestic HP members with a source of information on market issues, legislation/regulation, training, technological advances and research.
- To raise awareness of domestic HPs by informing prospective specifiers of their long-term benefits and providing up to the minute technical advice on systems available.

UK leads a new IEA annex on heat pumps

A new Annex, Number 33, has been established under the auspices of the International Energy Agency, with the assistance of the IEA Heat Pump Centre. Annex 33 'Compact Heat Exchangers in Heat Pumping Equipment' will have as the Operating Agent the School of Engineering and Design at Brunel University represented by Professor David Reay (Hon. Life Member of the HPA) and Dr. Peter Kew of Heriot-Watt University, Edinburgh. Also active in the Annex is the Royal Institute of Technology (KTH), Department of Energy Technology, SE 100 44 Stockholm, Sweden, represented by Professor Bjorn Palm, and the USA and Japan are also participating. It is hoped that Norway and The Netherlands will join in the near future.

This Annex, which commenced activities in the Autumn of 2006, is directed at widening the use of compact heat exchangers (CHEs) in heat pump systems. It is believed that these will improve efficiencies, minimise fluid inventories and reduce package size. The data collected during the Annex will, it is hoped, quantify the possible benefits from CHE use, and also highlight any concerns.

The objective of this Annex is to present a compilation of possible options for compact heat exchangers, used as evaporators, condensers and in other roles. The aim is to minimise the direct and indirect effect on the local and global environment due to operation of, and ultimate disposal of, the equipment. One activity involves identifying and documenting reasonably accurate methods of predicting heat transfer, pressure drop and void fractions in CHEs, thereby promoting and/or simplifying their commercial use by heat pump manufacturers. Integral with these activities will be an examination of manifolding/flow distribution in compact/micro-heat exchangers, in particular in evaporators.

The activities will include market research, the evaluation of the performance of compact heat exchangers relevant to heat pumps, the evaluation of properties and operating limits of such equipment, and information sharing. There will be opportunities for open meetings at which industry and academia can put forward their views and contribute to the project, the first of these being in Stockholm in May 2007.

The HPA will be kept informed of progress, and representatives will be invited to meetings. Feedback will be welcome as to the direction of the three-year project at any time.

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Daikin's Altherma helps solve residential problems

With fossil fuel and electricity costs soaring, homeowners are demanding more efficient ways in which to heat and cool their premises. A clear trend in the market towards meeting this need is low temperature heating. Technological advances and improved home insulation mean that lower water temperatures can be used to heat homes, resulting in increased comfort and improved energy efficiency.

One particular low temperature solution that has already proven its worth in the cold winters of Northern Europe is heat pump technology. Daikin Europe, has introduced Altherma, a heat pump based high efficiency home heating, domestic hot water and cooling system.

Instead of burning fuel as conventional fossil-fuel boilers, heat pumps extract the latent heat energy present in the ground, air or water. The Altherma air-to-water system is capable of extracting sufficient heat from the outside air to comfortably heat a home, even on the coldest days of winter. While traditional boilers achieve energy efficiencies of less than 1, Altherma delivers energy efficiencies of 3 or more, resulting in less primary fuel consumption and reduced CO_2 emissions. Altherma can be connected to all standard low temperature radiators and underfloor heating elements and is suited to both new constructions and refits.

Installation of Altherma is easy and flexible and no chimneys, fuel tanks or gas connections are required. Its main components are an outdoor unit and an indoor hydro-box. The outdoor unit can be placed outside new and existing houses and apartments, even when space is limited. The heat pump extracts heat from the air, upgrades it and transmits it to the indoor hydro-box where it is transferred to warm water and pumped to radiators under floor heating elements. The compact hydro-box does not require a plant room and contains all the system controls and the user interface.

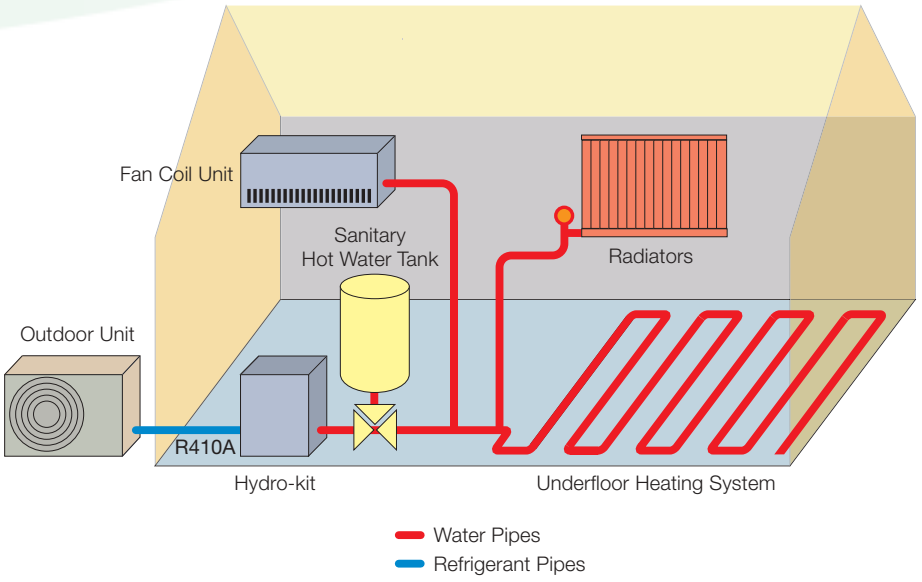
A domestic hot water option takes full advantage of heat pump efficiency providing hot water at 65ºC or more. This is accomplished via a purpose built stainless steel tank, the lower part of which is heated by water pre-heated to 55ºC from the heat pump. An electric booster heater located in the upper part of the tank boosts the temperature to the required levels.

A cooling version of the hydro-box is also available. Moderate cooling is achieved by circulating cooled water through radiators and underfloor heating elements. The hydro-box can also be set to provide maximum cooling via fan coil units.

In its most popular configuration the Altherma heat pump is sized to handle the full heating load for 90-95% of the year and makes use of a back-up electric heater to handle 5-10% of the load on the coldest days. This arrangement, which generally results in well balanced installation costs and ongoing energy consumption, has proven particularly popular in Sweden and Norway.

The heat pump can also be dimensioned to provide full heating capacity on its own and can be connected to (existing) fossil-fuel boilers to optimise energy efficiency of the total system.

www.daikineurope.com



New system uses excess heat to provide free hot water

The owners of a 4-bedroomed house in Kent have been using a unique new boiler to provide free hot water for their swimming pool, while enjoying fully controllable air conditioning to provide year-round comfort cooling and heating.

When the house, which stands in the grounds of an equestrian centre near Dartford, Kent, was being refurbished the owners decided to install air conditioning in the bedrooms and an annexe containing a small gymnasium.

With rising summer temperatures, especially in the South East of England, the owners wanted a system that would provide comfort cooling particularly at night, but which would also be versatile enough to cope with Britain's variable temperatures by being able to switch to heating.

Added to this was the need to replace the heating source for the property's outdoor swimming pool, which had previously been heated by a wood-burning boiler. This had proven expensive to run, troublesome to maintain and made it very difficult to control and regulate the temperature of the pool.

While summer cooling was the primary driver for the installation, the owners also wanted to control energy costs and find an alternative to the high maintenance pool heating system.

With the installation of a City Multi 2-pipe VRF heat recovery system coupled to the unique PQFY heat pump boiler, the owners now have the best of both worlds — fully controllable air conditioning, and free hot water for the swimming pool.

The PQFY heat pump boiler, which was recently introduced by Mitsubishi Electric, uses the vapour compression cycle of the air conditioning system to raise the water temperature of the outside pool to a comfortable level. Instead of simply discharging the heat from the refrigerant to the air as in a conventional split type air conditioner, the hot gas refrigerant pipe in the PQFY runs through the water piping in a unique tube-in-tube coaxial system that extracts the heat from the refrigerant cycle and transfers it directly to the water.

This effectively provides free hot water for the swimming pool and is far more fuel efficient than the wood-burning stove, helping to reduce the running costs of the swimming pool by more than half. It is also around four times better than the most efficient type of conventional gas boiler on a kW / kW basis, leading to a substantial reduction in CO_2 emissions. Exact control of the swimming pool temperature is also achieved by the inverter-driven compressor which only consumes as much energy as needed to continually match the pool heating demand.

In the winter, the air conditioning that supplied the much necessary summer cooling, is switched to provide heating to the house and gym. The swimming pool is covered for the winter months and thus has a very small heating requirement. The heat produced by the City Multi system to supply the house has reduced the heating power consumption by 50% compared to the previous existing radiators and boiler combination.

www.mitsubishielectric.co.uk/aircon

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How to Join:

The Heat Pump Association is dedicated to the implementation of applying the available technology of heat pumps and will achieve this goal with the aid of new members joining the already committed companies.

Therefore any company that would like to receive information on how to join the HPA and share in the continuing benefits of all our members, please contact the HPA secretary Terry Seward:

E-mail: terrys@feta.co.uk.
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or by fax back form below.

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The Heat Pump Association is a founder member of the U.K. Heat Pump Network.

Origination and printing by The Advertising Designers, Edenbridge, Kent.

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Attention of
Terry Seward HPA Secretary

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