

From promise to reality

The heat pump industry, the government and energy-aware folk all realise that heat pumps are poised to make a major contribution to domestic heating in the UK, this will add to their huge impact on commercial heating and cooling. Ground source, air source, heat recovery applications already exist in their thousands in UK despite the lack of significant government commitment compared to other European countries.

Remarkable energy efficiency leading to very significant CO₂ savings — even when compared to natural gas — is well documented, and the industry has demonstrated at home and abroad that it can successfully deploy products in sufficient quantity to rapidly make a difference.

All the hard work by HPA and its members in achieving acceptability for the technology is being dwarfed, however, by the work now required to properly introduce heat pumps into the fossil fuel dominated building regulations structure. The Standard Assessment Procedure (SAP) still insists on an outdated view of heat pump performance and ability to generate hot water, this despite being made aware of the problem by HPA for more than three years. SAP has, however, now moved from DEFRA to DECC (Dept. of Energy and Climate Change) to be under common guidance, and some revised thinking is sorely needed.

Another big issue is the short term CO₂ thinking espoused in the recent SAP consultation. The emission rate per kW/hr proposed, 0.591 kgCO₂/kWh, effectively ignores the multiple initiatives announced by the government this year to reduce the emissions rate in the medium to long term and tries to impose a 3-year time line on decisions effecting equipment, which will last between 15 and 40 years. How can this policy be so uncoordinated? How can we create a 'green' industry when this kind of attitude is still present?

A further potential show stopper is in testing. Heat pumps have good quality and robust testing standards, and the Microgeneration Certification Scheme introduces rigour to the selection and installation of heat pumps in the UK, this with the full support of industry. Newer schemes gratuitously try to impose other test regimes despite the quality of those already established. If this continues, the UK will become an expensive, complex and unpredictable place for heat pump manufacturers. The strong foundation for integrity in renewables, MCS, is in danger of being undermined in a wholly unsubtle way.

So the battle is on between those who

Ground source heat pumps reduce effect of fuel price volatility *by John Parker*

The last 12 months have seen a remarkable increase in the volatility of global fossil fuel prices apparently triggered by the near tripling of crude oil prices towards the end of 2007. Although the international recession lowered prices at the end of 2008, they now appear to be on the rise again in 2009.

The crude oil price tends to act as the marker for all other fossil fuels in international markets, so an increase in oil price produces corresponding rises in LPG, gas and coal prices.

Electricity however, being manufactured from a mix of all these fuels together with nuclear and renewables, can smooth out these increases to a certain extent, but is not immune to them.

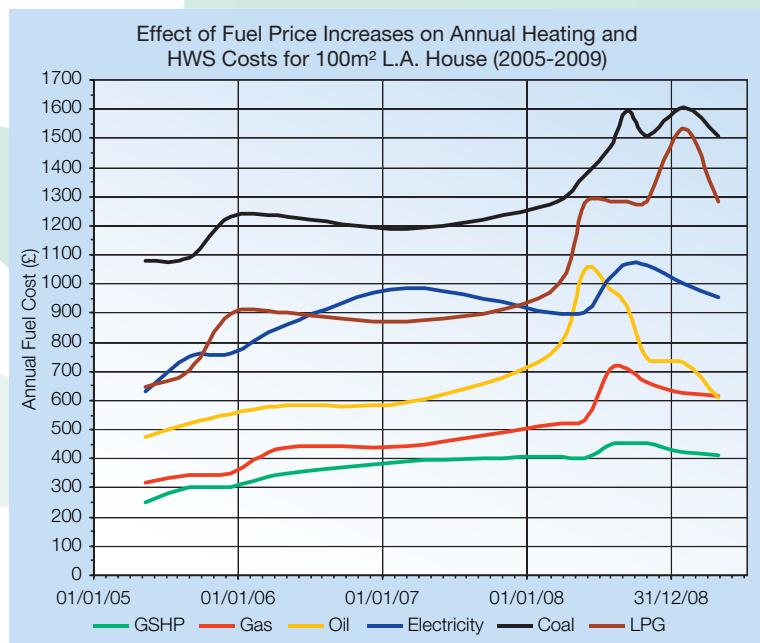
It is interesting to see the effect that these price variations have on the annual running cost of typical domestic heating systems and in particular the way that heat pump systems effectively reduce both the overall cost and volatility in practical situations.

As part of the long term investment that EoN have made in ground source heat pump technology, and in particular their Calorex HeatPlant series (which is specifically designed to meet the needs of the Social Housing market), the electricity consumption of a number of early installations were monitored for the first five years of their use.

The summary mid-point energy data of this monitoring exercise was used by EoN as the core of a regular heating and hot water running cost comparison, which has been published at regular intervals for the last six years.

This article collects and collates the results given in those publications and displays them in the graph below.

Note that although the energy profile is fixed and relates to exactly the same house and occupancy, no adjustment has been made for monetary inflation (or deflation) over the period and the costs displayed are those pertaining at the time.



understand the new technologies and those that feel threatened by them. This was no doubt to be expected, and HPA and its members will continue the hard graft, but we have a lot to do to ensure that heat pumps achieve their rightful place in the energy hierarchy.

Tony Bowen, President, HPA

It is notable that the GSHP heating system is not only always the lowest cost solution, there is nothing like the variation in costs that are concomitant with the use of more conventional systems. This is another clear-cut case in favour of heat pumps!

Calorex protects buried treasure

A Calorex dehumidifier is maintaining climatic conditions at a new state of the art storage facility set within a chalk hillside on the Hampshire/Wiltshire border.

Dean Hill started life as the Naval Armaments Depot and the bunkers have been bought as high security storage for a number of national arts organisations.

Totally devoid of sunlight and only accessible via internal entrance tunnels, the bunkers were perfect for conversion to 'vaults'.

A Calorex DH150AX dehumidifier provides a 'reliable and efficient method' of solving problems of excess moisture and condensation that cause damage and deterioration to ensure the safe storage of irreplaceable works of art.

Drying by traditional heating involves continuously warming a stream of outside air on a constant 'in and out' cycle equivalent to eight times the volume of the room every hour.

Dehumidification, recirculates the same air and physically removes moisture from it. Typically, for every unit of energy that a Calorex dehumidifier consumes, it will

convert 2.5 times this amount to useable heat. Compared to traditional heat and ventilation energy, cost savings of 500% are said to be not unusual.

"It's unlikely that nuclear weapons were ever stored long term at Dean Hill," says Michael Festenstein, managing director of Oxford Exhibition Services. "However, what better legacy could the peace process have given the arts than this superb safe storage for invaluable artefacts.

"For us, this involved installing bespoke-designed systems to create controlled stable environments and other measures to make the placing and removal of priceless objects as risk-free as possible," says Mr. Festenstein.

"Calorex has more than played its part in helping us to achieve ideal environmental conditions."

Dehumidification recirculates the same air and physically removes moisture from it. This alleviates the need to continuously reheat incoming air. A dehumidifier converts energy taken out of the room as latent energy, to create sensible energy

that can be used to heat the room, accelerating the drying process.

The DH150, 300 and 600 dehumidifiers from Calorex are suitable for a number of applications including: Industrial, agricultural, warehousing/equipment stores, metals storage, pumping stations, spare part stores, museums and art galleries.

www.calorex.com



Heat Pumps as renewables now recognised in law

The EU Directive on the Promotion of Renewable Energy Sources was published in June in the Official Journal, this means that the text of the Directive, first published in December, is now EU legislation. This long awaited Directive recognises for the first time under EU law the potential of aerothermal and hydrothermal energy as sources of renewable energy.

Under the new legislation, part of the so-called Climate Change Package, adopted in December 2008, all EU Member States should increase their share of renewable energy in final energy demand in an effort to boost the EU's total share to 20% by 2020.

This new legislation recognises the potential of heat pumps using aerothermal energy (stored in the air), geothermal energy (stored in the ground), or hydrothermal energy (stored in standing water) in reducing the energy consumption in the EU, especially in the building sector.

Karl Ochsner, chair of the European Heat Pump Association (EHPA) said, "Most stakeholders will benefit from the new Directive: the individual is encouraged to use state-of-the-art renewable technologies for heating and cooling at lowest possible costs, the national

economies by increased local demand for such technologies and the national governments by the opportunity to reach their individual targets in the burden sharing agreement in a cost-efficient way."

Contrary to most other renewable energy technologies, heat pumps can be used virtually everywhere: in example by the industry, in district heating and cooling, for farms, for individual and remotely located houses, and for building blocks in cities.

A great day

Friedrich Busch, director general of the European Partnership for Energy and the Environment (EPEE), added, "Today is a great day for the environment. EU law finally recognises heat pumps as a renewable energy technology, alongside windmills and solar panels. But today is also a great day for consumers, as the use of heat pumps in houses will drastically reduce heating and cooling costs. Whereas before consumers would opt for technologies with lower investment costs at the start, but with high annual running costs, financial incentives from national governments will now result in an uptake of heat pumps, which have extremely low usage costs."

Heat pump sales increase in Germany and France

The benefits of heat pumps are beginning to be widely seen in Europe as sales increase, particularly in Germany and France.

In Germany 185,000 new residential buildings were erected in 2007, of which 123,000 were single- and two-family houses. Of all the new buildings approved in 2008, 59% still planned to use gas heating, as many as 19% heat pumps, 12% district heating and only 2% oil heating.

The German market for heat pumps has shown huge growth since 2005 and another new record followed the boom year of 2006 in 2008.

With almost 62,500 space heating heat pumps sold (+40% over 2007) and an additional 13,861 hot water heat pumps, almost twice as many as the previous year (7,354), the German market continued to grow strongly in 2008.

The 62,500 space heating heat pumps sold in 2008 therefore exceed 10% of the total market for heat producers for the first time.

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According to the latest statistics, ground-source heat pumps occupy the largest market share with 48%; air-water heat pumps with 44.9% (a rise of 58% over the previous year) achieve a similar level in the ranking list. Ground water is used as heat source by 7.1% of buyers.

Commenting on the current heat pump market The German Heat Pump Association says, "The heat pump industry profits from the strong market growth in Europe with a 45% export share: Germany is the second largest heat pump manufacturer in the EU after Sweden. Some 900 employees here produce about 80,000 space heating HPs a year, of which around 35,000 are exported. Another 1,400 employees work for the German heat pump manufacturers in sales, product management, development, after sales service and administration. 1,500 tradesmen installed the 45,000 heat pumps sold in Germany

in 2007 and achieved 1.2 billion Euros turnover. Boring contractors make-up another market segment, which profits from the heat pump boom: to use the near-surface geothermal energy, i.e. the heat stored in the ground and ground water, 2.5 million metres of ground are penetrated in Germany every year. The number of boring contractors has trebled since 2005 — and these have created around 350 new jobs."

French heat pump sales leap too

According to statistics recently announced by AFPAC (Association Francaise pour les Pompes a Chaleur), 2008 sales of aerothermie (air-to-water heat pumps) in France numbered 133,080 units, which translates into a sizeable 161% jump over 2007 and record-breaking growth of more than 10-fold over 2005!

Luxury clubhouse powered by NIBE ground source system

The KP Club, outside Pocklington in Yorkshire, consists of a 400-acre estate in a park and woodland setting. At the heart of a new development of discreetly hidden chalets lies an 18-hole, par 70, golf-course. This is served by a distinctive clubhouse and restaurant overlooking the 18th green. Designed by LKR Architects it is known appropriately as the Glasshouse. Glass frontages are notoriously expensive to heat but the architects and the KP Management team took good care of this aspect at the planning stage. A network of 4,000 metres of 40mm diameter pipe was laid under the grassed area while the Glasshouse was being built, forming the basis of a ground source heating system and installed by specialist sub-contractor SASIE Ltd.

The pipes are buried roughly 20cm below the first line and contain a non-freezing emulsion of glycol and water. The latent heat in the surrounding earth — typically at a temperature between 11°C and 12°C regardless of season — is absorbed into the liquid and passed to a NIBE Fighter 1330 unit situated in the Glasshouse. There it is passed through a heat exchange process compressing the liquid to bring it up to a suitable temperature (around 35°C degrees) to run the Nu-Heat under-floor heating system and the entire hot water requirement including the showers that form a sizeable proportion of a golf club's usage.

www.nibe.co.uk



Financial boost for air source heat pumps

The Department of Energy and Climate Change's (DECC) Warm Front Scheme has been changed 'to improve the quality of service for its customers'.

Households connected to the gas grid are now eligible for grants of up to £3500, up from £2700, while those in areas off the gas grid can apply for funding up to £6000, an increase of £2000.

The Scheme is also being expanded to include the installation of low-carbon heat and power technologies such as air source heat pumps and solar thermal heating, which DECC says will help householders generate their own low-cost, renewable energy. These technologies will initially be trialled in small-scale pilot programmes.

Air to water heat pumps have been added to the heat pump categories covered by the Enhanced Capital Allowances Scheme. Investments in single split and packaged air to water heat pumps qualify if the specific product is named on the Energy Technology List. Listed products must meet eligibility criteria including performance thresholds; products with a heating capacity of 20 kW or less must have a COP >4.00 and EER >3.10 and products above this size must have a COP >3.80 and EER >3.00 (when supplying water at 35°C). For eligible products the cost of buying the equipment including other direct costs like transport and installation can be claimed against corporation tax in the year of purchase providing a cash flow boost to the purchaser. For more details see www.eca.gov.uk.

New air conditioning and heat pump institute is formed

The Institute of Refrigeration (IOR) has set up an affiliated institute, the Air Conditioning and Heat Pump Institute (ACHPI) to offer independent technical information for individuals who install service or maintain air conditioning and heat pump equipment.

"The heat pump and air conditioning sector is one of the ongoing major advancements of the refrigeration cycle. This burgeoning sector of our industry has its own different technical needs and the ACHPI can help develop this growing area where engineers are thirsty for reliable and independent information", said John Ellis, chairman of the IOR ACHPI technical panel.

Membership is free until March 2010 for those who join now as Founder Members. There will be a £30 renewal fee from April.

www.ior.org.uk/achpi

1200 Ecodan heat pumps for energy assistance package – Mitsi makes them in Scotland



Mitsubishi Electric will be supplying up to 1200 Ecodan residential heat pump heating systems to Scottish Gas as part of the Scottish Government's Energy Assistance Package.

At the same time, the company announced that it is manufacturing its award-winning, residential heating system — Ecodan — at its Livingston factory in Scotland, where it has invested £2m on production and calorimeter and acoustic testing facilities. These can show the heating and hot water system working to outdoor temperatures of minus 30°C.

Production switch

The company switched a production line from air conditioning units to the low carbon heating system in September and anticipates that it will be able to produce 10,000 units a year for the UK and European market, which are climates that Ecodan is designed for.

The Scottish Gas contract, which runs until the end of March 2010, will see the company supplying a variety of Ecodan models to help Scottish Gas alleviate fuel poverty north of the border.

"We are delighted to be working with Mitsubishi to supply the Ecodan system in Scotland," explained Stuart Margerrison, director of Scottish Gas Contract Partnerships. "The energy saving potential will make a real difference to the lives of those who need it most."

Ecodan is an air source heat pump, which 'can help lower a home's CO₂ emissions by up to 50% and reduce running costs by at least 30% over modern gas boilers.' Funded by the Scottish Government, the Energy Assistance Package gives advice and support to help households maximise income, cut fuel bills and make homes warmer and more comfortable.

Speaking of the move to manufacture heat pumps at Livingston, Yoshinori Miyata, corporate officer and general manager, Air-Conditioning & Refrigeration Systems Division of Mitsubishi Electric, said, "Although Ecodan is not an air conditioning unit, it shares much of the technology with our current Mr Slim models which are made in Livingston, so we are able to switch production with relative ease."

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How to Join:

The HPA is dedicated to the application of heat pump technology and will achieve this goal with the aid of new members joining the already committed companies.

If your company would like to receive information on joining the HPA. Please contact Terry Seward, HPA Secretary.

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 or by fax back form below.



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**Attention of
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