
DISCUSSIONS

KEEPING THE MARKET INFORMED

ISSUE 2 MAY 2008



WELCOME...

REHAU's reputation in the renewable energy sector continues to grow as its products are increasingly specified in both the commercial and domestic sectors and in mainstream and cutting edge projects across the UK.

In this issue of Discussions, we showcase some of these recent projects and explain briefly some of the technologies behind our range.

Our new office in the London Building Centre has become the focus point of our renewable energy division. A large display area and facilities for presentations as well as meetings with our renewables team and clients.

REHAU are always delighted to welcome visitors to the Building Centre or to our Head Office in Ross on Wye. Here they can see and touch the products for themselves and discuss forthcoming projects with our team. Please get in touch via email, phone or our website and we will be delighted to talk to you about REHAU's sustainable solutions.



ECOBUILD

The success of this year's EcoBuild show was just the latest small indication of the huge growth and potential in the sustainable energy sector.

REHAU was one of 500 exhibitors at the Earls Court event which attracted a record 24,000 visitors. Our stand focused primarily on the AWADUKT Thermo ground-air heat exchanger, ground source heating and cooling systems and rainwater management systems. The level of interest was exceptionally high.

With so much new technology on show, visitors were particularly reassured by REHAU's case studies of large scale installations of its products across Europe. Demonstrating not only that our systems are well proven but also that they come with fully analysed, quotable performance and payback figures.

AWADUKT THERMO – HOW IT WORKS

AWADUKT Thermo operates by drawing filtered air from outside a building through an underground network of pipes buried 1.5m deep where the ground is a constant 8-12°C all year round. The air temperature moves towards the ground temperature. So in the summer the air is pre-cooled before it enters the building by up to 14K and in winter the reverse happens and it is pre-warmed by as much as 14K.

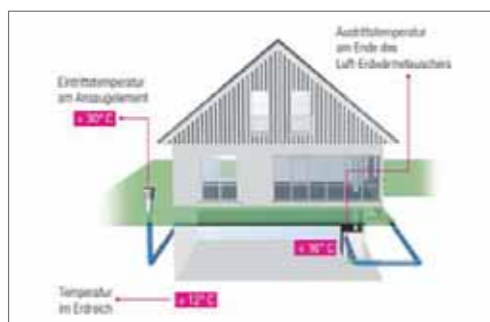
Typically, this pre-heating and pre-cooling of the air contracts the temperature profile eliminating the peaks and thus

REHAU's AWADUKT Thermo ground air heat exchanger is a unique product in the UK – a controlled ventilation system with a Co-efficient of Performance of around 50 to 200.

reducing the heating and cooling costs. In most applications AWADUKT Thermo is used with a heat recovery unit. The heat recovery unit extracts heat from warm stale air as it is drawn out

of the building and transferring it to the incoming fresh air. The running costs of the system are minimal as all that is needed is a fan to draw in the air. AWADUKT Thermo systems

can be designed for any size of project, from large commercial buildings to small domestic properties – all that is required is for the length of the pipe network to be calculated appropriately.



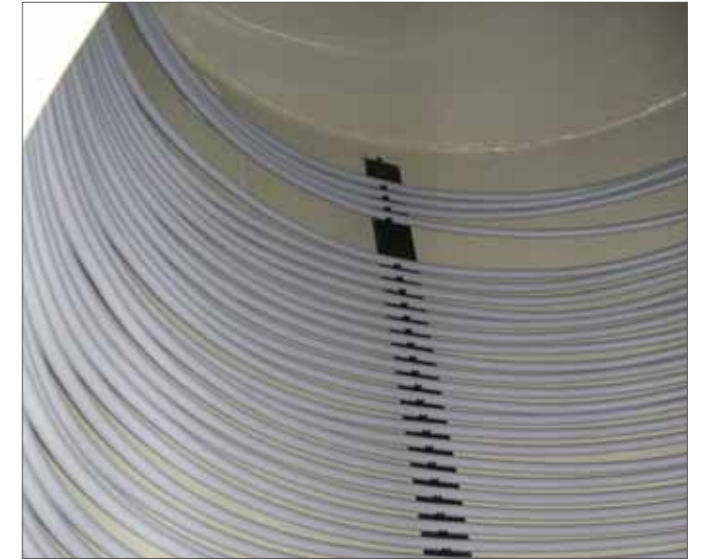
REHAU PIPEWORK USED IN BIOGAS PLANT

REHAU's polymer expertise means it has a pipework range available for virtually any renewable application.

The most recent example of this is the use of REHAU's RAUBIO PE-Xa fermenter heating pipe in a Biogas district heating installation at a large tomato farm in Alderley Edge, Cheshire supplying one of the UK's leading supermarkets.

REHAU worked closely with Biotech Services Ltd which was designing the overall biogas scheme to recommend and install the pipework for

both the fermenter where the chemically resistant cross-linked polyethylene RAUBIO pipework has been used and for the transport of waste material between the fermenter tanks where REHAU's high performance AWADUKT PP polypropylene sewer pipe was judged the most suitable. The leaves and unwanted tomatoes from the crop are fed into a fermenter which is heated to around 40-50°C so



that methane producing bacteria can break down the organic waste and generate combustible methane. The gas is then fed into a CHP unit which converts the methane into both electricity and heat energy. The heat energy is channelled back into the fermenter heating pipework so that the system is completely self sustainable but is also being used to heat the greenhouses which have to be kept at a constant 23°C for optimum

tomato plant growing conditions. The electricity is being used on site also, saving the cost of connecting the CHP onto the national grid.

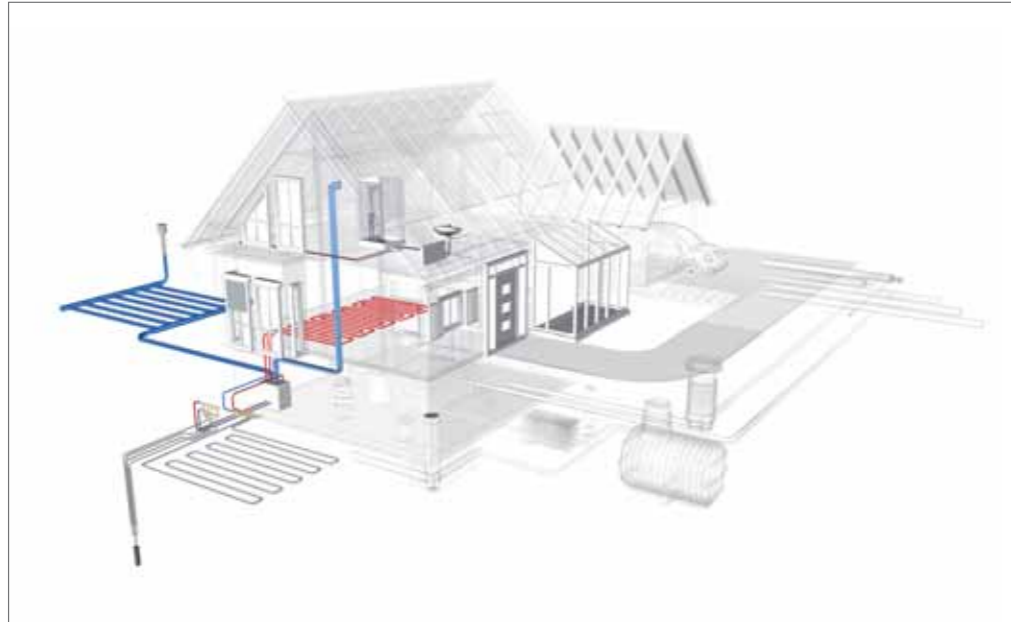
The payback period for the project is estimated at just five years and it is being closely monitored not only by the farmer but also by three universities to establish the optimum methane producing conditions for future installations.

COMPOSITE CURTAIN WALLING TAKES ON ALUMINIUM

The REHAU Polytec 50 composite curtain walling system is REHAU's alternative to the industry standard aluminium. In performance, aesthetic and energy efficiency terms, it represents a step forward.

The standard REHAU Polytec 50 system has particularly outstanding thermal characteristics with an U_f -Value of 1.0.W/m²K and a weather performance rating to 1950Pa.

It can be coloured in any one of 150 RAL colours using a permanent system which is scratch and fade resistant. It is increasingly being used in new build commercial projects from schools, to offices and luxury housing developments.



UNDERFLOOR HEATING AND GROUND SOURCE ENERGY – PERFECT PARTNERS

Now, those same low flow temperatures are also making underfloor heating the perfect partner for ground source energy systems and REHAU is offering complete solutions from pipework to ground source probes.

The compatibility of underfloor heating with condensing boilers has done much to underpin the dramatic growth of the sector over recent years. The low return flow temperatures of underfloor heating systems allow condensing boilers to operate in the efficient condensing mode all the time.

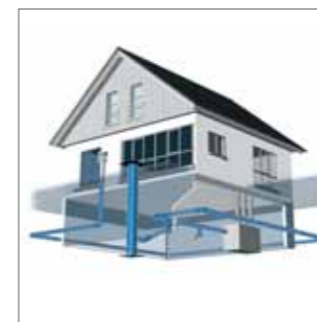
Energy is extracted from the ground via a low temperature water/glycol mix from pipes

within the ground. A heat pump then converts this energy into higher temperature water for the heating circuit. The lower the temperature of the water in the heating circuit the more efficiently the heat pump will operate.

Indeed, a ground source system will not work with a conventional radiator system with a flow temperature requirement of up to 70-75°C. A conventional underfloor heating system with a flow temperature of 45°C will be perfectly compatible but a lower flow temperature of 35°C will make the system even more efficient, with a COP of 4-5.

Our calculations of the Coefficient of Performance of a Heat Pump show that it varies dramatically depending on the heating circuit flow temperature. Typically, water comes out of the ground at 5°C giving a COP of around 4 for a standard underfloor heating system yet if radiators were used with a flow temperature of 50-70°C, the COP would be as low as 2.

REHAU's teams of engineers based at Ross on Wye and at our regional sales offices can provide more information and design advice.



LOW CARBON COOLING WITH AWADUKT THERMO

The first private sector commercial installation of the AWADUKT Thermo ground to air heat exchanger was in Northern Ireland where it was used to provide a controlled ventilation system for a new development of serviced business units at Ards Business Centre in Newtownards, near Belfast.

The REHAU AWADUKT solution was proposed by M&E consultants Bennett Robertson. REHAU AWADUKT Thermo met the client's objective of an environmentally friendly, comfortable building with low energy and maintenance costs.

The AWADUKT Thermo system is being used in conjunction with conventional tempered air handling units and night cooling, replacing conventional fresh air inlet ductwork and louvers. Treated fresh air is supplied to the office units via displacement floor grilles with the access floor system. Used both as the supply plenum and to provide access to the floor slabs for thermal storage.

In combination with a heat recovery unit, AWADUKT Thermo is expected to significantly reduce the heating and cooling costs for the business units. An additional benefit for the building's users is the reduced need for natural ventilation – such as opening windows – which will improve security and reduce noise levels and draughts.

DISTRICT HEATING SCHEME SUCCESS STORY

A biomass boiler powered district heating scheme in Surrey demonstrates the potential of REHAU's RAUTHERMEX pre-insulated PE-Xa pipework.



The Bellway Homes-led Park 25 development in Redhill features a sustainable heating scheme for 250 apartments designed by MCA Consulting Engineers Ltd.

of the apartment blocks on the site and feeds RAUTHERMEX pipework laid in a ring main with spurs off to each property.

on similar projects across Europe and because it utilises our high performance, fully warranted compression sleeve jointing system.

systems, pre-insulated with a closed cell polyurethane foam.

This foam provides optimum heat insulation and is longitudinally stable meaning that there is no change in length of the pipes laid underground due to temperature fluctuations while in operation.

The safe, low maintenance and easy to install REHAU pipework was specified because it had already been proven by REHAU

RAUTHERMEX is made from the same PE-Xa which is used for REHAU's underfloor heating

An 840kW wood chip powered boiler is sited in a large plant room in the basement of one

A VERY GRAND DESIGN



Regular viewers of Channel 4's Grand Designs programme may have spotted many thousands of metres of REHAU pipework being installed in a contemporary styled bungalow featured in a recent episode.

The property, near Maidstone, Kent was being built by ex-REHAU employee Paul Tarling on behalf of his parents in law so he used his knowledge of REHAU's renewable energy solutions to maximise the efficiency of the building.

underfloor heating system which has been installed throughout.

A REHAU Awadukt Thermo heat exchanger completes the picture, operating successfully alongside the other REHAU product innovations.

In addition to this, the curved roof of the property is acting as a giant solar panel managing both the solar gain and heat dissipation. Built off site in 23 sections, the roof features steel and reinforced concrete sandwiched around a layer of insulation. Fitted inside the top layer of concrete is the same REHAU universal pipework used elsewhere which is collecting, storing and radiating heat via the roof.

What would have been considered cutting edge technology just three or four years ago has been integrated cost effectively into this contemporary home and we expect the project to inspire not only other self-builders but also more mainstream developers.

For example, the entire bungalow is built on 46 x 10m deep concrete piles. Inside each is a steel cage containing a loop of REHAU's 20mm PE-Xa pipework. The loops feed ground energy into a ground source heat pump which provides heat for the REHAU



REHAU SCORES AN A

The BFRC (British Fenestration Ratings Council) energy ratings scheme is designed to give windows the same type of A-G energy rating so familiar to consumers from domestic appliances.

Under the criteria set by the scheme, windows which score an A, B or C rating can use the coveted Energy Saving Recommended logo, while a window which achieves an A rating can be used by specifiers as a net contributor to the energy demand of a building.

REHAU's Window Division has invested significantly in the configuration and assessment of a range of window options which score a C rating or above and has recently become the first profile manufacturer to achieve an A rating on both a white and coloured window with full reinforcement.

Further details of the scheme and REHAU's successful response are available via our website at www.rehau.co.uk

PASSIVE HOUSE PARTNERSHIP



REHAU is a partner in the BASF House Project at Nottingham University's School of the Built Environment. One of six experimental houses to be built on the site, it is designed to demonstrate how passive heating and ventilation can be successfully achieved in a UK property delivering a low carbon footprint at an affordable cost.

Based on a 20-house development, the BASF House could be built with a budget of £70,000. This is largely down to the fact that it utilises passive design and high performance insulation materials rather than the costly and experimental renewable technologies seen in previous low energy concept homes.

elevation and openings, polymer pipework for the plumbing and drainage, a ground air heat exchanger and rainwater management system.

ventilated air to the house. The RAURAIN rainwater management system collects and filters rainwater in an underground tank and then distributes it for all non-potable water requirements.

A full height glazed REHAU sun space on the south elevation contributes towards solar gain in winter and reduces the requirement for artificial lighting. The REHAU ground air heat exchanger works alongside this to provide a constant supply of pre-warmed or pre-cooled

REHAU has supplied a range of materials for the house including the PVC-U window and curtain walling system for the glazed

The house will be occupied by PhD students for a year and its performance will be monitored by the university. Further information on the house is available at www.basf.co.uk/en/uk/house.



WELCOME RAINFALL

REHAU's environmentally friendly rainwater and storm management systems have been installed at our newly expanded polymer processing plant in Amlwch on Anglesey.

In line with our status as a partner in the EU's Green Building Programme, we have installed a 10,000 litre RAURAIN rainwater recovery system to meet a significant percentage of the non potable water requirements and a RAUSIKKO storm water management scheme to reduce the disruptive effects of heavy rainfall on the site.

The RAURAIN system is based around a high-impact polyethylene tank installed below ground which collects rainwater from the roof of the facility via a series of downpipes. The rainwater is passed through an underground filter to remove leaves and debris before being stored within the tank until required.

When there is a water demand, the stored water is distributed via a pump to the plant's

process water tank where it is used as cooling water in the polymer manufacturing process. A float switch in the rainwater harvesting tank enables the pump to automatically turn on or off depending on the water demand and availability.

The above average rainfall on Anglesey, and the threat of further increased rainfall in the future prompted us to install the RAUSIKKO system alongside RAURAIN.

RAUSIKKO is a stormwater attenuation box which reduces the risk of flooding by allowing rainfall surges to soak away into the ground via a honeycomb structured flow control system.

At Amlwch, REHAU has installed 80 boxes at a depth of between 3m and 0.8m below ground during construction work on the factory expansion - sufficient to eliminate the twin problems of surface water on the site and flooding from a nearby stream.



After the widespread flooding last year, REHAU is encouraging clients to follow its lead and focus on ways to routinely manage rainfall rather than responding only when it becomes an emergency. Both RAURAIN and RAUSIKKO are simple and cost effective solutions which do just that.

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