ISSUE 17
DECEMBER/JANUARY 2024

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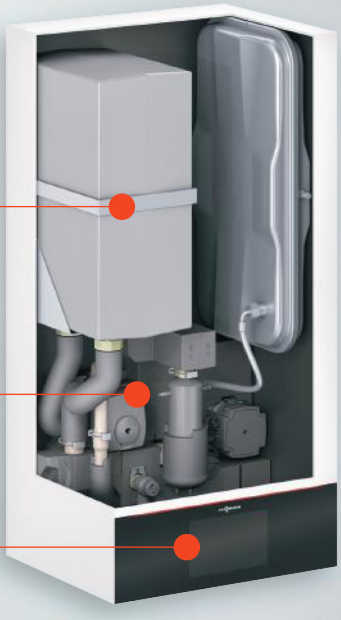

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Welcome to the December/January issue of Heat Pumps Today.

As we round off 2023 and look forward to 2024, on reflection, it's been quite a year for getting out & about again. This industry works hard on building relationships and meeting up face to face is a key factor in this. I'd like to say thank you for all the invitations to product launches, projects, industry dinners and conferences.

As for the ACR & Heat Pumps team, we've had quite a busy year with the ACR Expo's, the Installer Show, ACR Trainee of the Year Awards and of course the flagship National ACR & Heat Pump Awards held in Manchester back in June. Be sure to book your places shortly, this event always sells-out!

We're looking forward to seeing you all again over the next 12 months. If you have anything you'd like to contribute to forthcoming issues, feel free to get in touch – **Julietl@warnersgroup.co.uk**

CONTENTS

Editor
Juliet Loiselle CompCIPHE/MInstR
Julietl@warnersgroup.co.uk

Multimedia Sales Executive
Victoria Brown
01778 395029
victoria.brown@warnersgroup.co.uk

Design
Ady Braddock

Production
Sue Ward
01778 392405
production@warnersgroup.co.uk

Publisher
Juliet Loiselle CompCIPHE/MInstR
01778 391067
julietl@warnersgroup.co.uk

Published by:
Warners Group Publications Plc
The Maltings, West Street,
Bourne, Lincs, PE10 9PH
01778 391000
01778 394748
www.warnersgroup.co.uk

Renewable energy company expands with new northern base

One of the UK's largest supplier of heat pumps has responded to the ever-growing demand for renewable energy solutions by opening a new head office and warehouse in the North-East of England.

Go Geothermal Ltd has been able to further increase its extensive product range following the opening in September 2023 of new premises in Newton Aycliffe, County Durham.

This has enabled the company, which was established in 2006, to double the size of its previous premises in Newton Aycliffe, and the new warehouse in particular provides it with the ability to increase its stock holding by three and half times – equating to £1.6 million worth of renewable energy products, with space to grow to £5 million.

The premises at Maple Way, Newton Aycliffe, will help Go Geothermal maximize distribution into Scotland as well as the rest of England and Wales, and is complemented by its existing commercial office in the Midlands.

The expansion of the head office forms part of Go Geothermal's growth strategy and enables it to provide customers with even more availability and choice on products, which include air and ground source heat pumps from the world's leading manufacturers, such as CTC, Vaillant, Viessmann, Bosch, Waterkotte, Clausius & Stiebel Eltron, as well as biomass, underfloor heating, solar, and many other renewable energy technologies.

Go Geothermal Director Sean Sowden (right) with Technical Manager Alan Brooke outside the new office/warehouse with a CTC heat pump

Homeowner demand driving increase in renewable heating sources

Last month, it was reported that there has been a record number of renewable energy installations in the first six months of 2023 and heat pumps reached a peak number of 3,000 household installations a month for the first time, according to industry standards body MCS.

The data found that while the industry itself is pushing to meet ambitious government targets, consumers are also gaining the confidence to invest in renewable systems, such as heat pumps and solar. In fact, according to recent research, the rise in renewable heating systems across the UK is being largely driven by homeowner demand, with a third (33%) of residential heating engineers saying that homeowners are 'very passionate' about reducing carbon emissions, and 29% saying that consumers only ask for renewable heat sources.

With the cost of energy continuing to remain unstable, demand is also being created by consumers who are looking to renewable technology to decrease the hefty energy bills we have seen over the past year by generating their own energy and heat.

In fact, the survey, which was commissioned by Polypipe Building Products, revealed that almost one in five (18%) of homeowners are interested in renewables mainly because they want to reduce gas bills, and a further 17% put their customers' interest primarily down to reducing long-term costs overall.

Commenting on the findings, Dan Love, Head of Commercial at Polypipe Building Products said, "With an obvious and increasing demand from homeowners, the argument for developers to invest in renewable heating sources has never been clearer. Whether it is due to a desire to decrease carbon emissions, or to save money on energy bills, British households are increasingly embracing the option of renewable energy, meaning that in time – if not already – low carbon heating systems will have a large impact on home buyers' purchasing decisions."

www.polypipeufh.com/futurehomeshub/

Beijer Ref announce the launch of Fenagy UK based in Leeds, Northern England

Fenagy has for some time been working on UK projects alongside their key partners. Fenagy is a manufacturer of heat pump products for large industrial applications typically used in district heating. This latest development is a natural progression and will enable Fenagy to locally support current and new opportunities in this important and fast-growing market.

Paul Bevington has been appointed Business Director and will head this latest venture supported by the Danish and UK management teams. Paul, a familiar face within the retail refrigeration sector has a wealth of knowledge in CO_2 cooling & heating applications and technologies. Please reach out to Paul for further information.

www.fenagy.dk/en/home

Retrofit training win offers boost to Britain's 26-million home energy efficiency need

Elmhurst Energy has won a share of £8.85m Government funding to train retrofit recruits.

Announced recently under Phase 2 of the Home Decarbonisation Skills Training (HDST) competition, Elmhurst's training will provide upskilling in retrofit for energy efficiency professionals, as well as people new to the career.

The organisation is now inviting registrations of interest in three courses for domestic energy assessor (DEA) and retrofit assessor training for new entrants, retrofit assessor upskilling for current DEAs, and energy efficiency for older and traditional buildings.

HDST Phase 2 will provide an estimated 8,000 training courses, as part of a government goal to boost both the number of retrofit professionals and skills required to deliver energy efficiency installations at scale through programs such as the Energy Company Obligation (ECO), Great British Insulation Scheme (GBIS), and Social Housing Decarbonisation Fund (SHDF).

www.elmhurstenergy.co.uk

Heat pump specialist Ventive secures c.£900,000 investment

NetScientific Plc (AIM: NSCI), the deep tech and life sciences VC investment group, announces that its portfolio company Ventive has successfully closed a c.£900,000 investment ("Investment").

The Investment included £316,000 from existing shareholders and the conversion of two existing convertible loans (and interest thereon) valued at c.£600,000. This is the first closing as part of Ventive's proposed £1 million to £1.5 million investment programme, with further new investment anticipated prior to 30 April 2024 in one or more additional closings.

This additional funding is complemented by ongoing non-dilutive funding from, amongst other grants awarded, a £1.5 million BEIS grant secured in 2022, as well as a recently awarded £100,000 UK Government grant focused on 'net zero HVAC' systems.

The Investment was led and syndicated by EMV Capital, the Company's wholly owned venture capital and corporate finance firm. It follows the initial investment led and syndicated by EMV Capital that was announced (via RNS Reach) on 20 October 2022, where EMV Capital secured an initial c.16% stake in partial settlement of its fees. Since that initial investment, the value creation team of EMV Capital has worked closely with Ventive to stabilise and develop its business plan and product range.

The proceeds of the Investment will support the completion of the design and test phase and factory build for Ventive's modular heat pumps, further enhancements to its passive air ventilation product range, and build-up of its marketing and sales capacity to drive sales of its existing product range.

Over £3 million awarded to upgrade heat networks across Britain

HEAT NETWORK EFFICIENCY SCHEME

Millions of pounds of investment is being provided to social housing, local authorities, and private housing organisations to improve and optimise heat networks across the country, helping residents to keep warm at lower prices.

Through the Heat Network Efficiency Scheme (HNES), £3.12 million will be provided to 54 heat networks. The funding will help keep over 7,000 residents warm and comfortable throughout the year whilst also saving them money on their energy bills.

HNES, funded by the Department for Energy Security and Net Zero, provides funding to heat network owners and operators in all sectors looking to improve the efficiency of their underperforming heat networks.

Over £17 million has now been announced from the scheme and this funding will help to facilitate improvements and vital optimisation studies for a range of different public, private and third sector providers.

Capital grant funding is provided to aid performance improvement works whilst revenue grant funding is available for studies to determine opportunities for efficiency enhancements.

These improvements include various initiatives, such as pipework replacement, installation of new metering equipment, and other essential infrastructure upgrades.

The heat network improvements and optimisations made possible by this funding will result in a reduction of over 5,000 t/CO_2 reductions over the next 40 years.
General enquiries and expressions of interest can be sent to **HNES@gemserv.com**

Heatly appoints new Technical Manager

Heat pump expert, Paul Spence, has been appointed as Technical Manager for heatly, the new app and supporting software currently in development, set to revolutionise the heat pump sector in 2024.

Paul has always worked in the heating industry, following his father's footsteps in the early 1970s, helping him out after school, in the holidays and on weekends. After leaving school at 15, Paul went straight into an apprenticeship with the largest industrial and commercial M&E company in the country at the time, Haden Young Ltd.

He joined the armed forces, serving on board HMS Ark Royal and HMS Newcastle and at a variety of shore bases, where he spent most of time dealing with chilled water plant ACP's and flash evaporators generating drinking water from sea water - both of which use the same principles as today's heat pumps.

After leaving the armed forces, Paul set up his own heating business, primarily installing gas and oil-fired heating systems. He has been running that successfully for over 30 years.

www.heatly.com

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If you have any queries regarding entering please contact hayleyc@warnersgroup.co.uk

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The ACR & HEAT PUMP Trainee Of The Year Awards

Saluting the next generation

The ACR & Heat Pump Trainee of the Year Awards returned with a fresh format and a new venue at Emirates Old Trafford in Manchester.

New categories for 2023 included trainees in sales and support roles, while the event also covered the booming heat pump sector for the first time.

Hosted by ACR Journal and Heat Pumps Today publisher Juliet Loiselle and with Mitsubishi Heavy Industries (MHI) as main sponsor, the awards recognise the young people who represent the future of our sector.

Allcool NW enjoyed a double success, with Gold awards for Lewis Cook in the ACR Service Engineer and Harvey Talarczyk in the ACR Installation Engineer categories. Jordan Guy of GEA HRT struck gold in the Heat Pump Engineer competition, while Claryhs Radford of Beijer Ref UK & Ireland was named Sales & Support Services winner and Megan Bradley of Vital Energi triumphed in the Project Engineer section.

In addition to a trophy and certificate, Gold winners received an Apple Watch, £500 cheque from the sponsors and a £100 cheque kindly donated by the Institute of Refrigeration (IOR). Silver and Bronze winners also received an Apple watch, plus a year's membership to the IOR.

Former Rangers and Scotland striker Derek Parlane was guest speaker.

ACR Service Engineer

Gold: Lewis Cook, Allcool NW

Lewis Cook has been with Allcool NW since 2019 and has built up his experience by tackling challenging jobs and, in his own words, constantly asking questions.

Managing Director Paul Talarczyk said: "Lewis has become a well-respected service engineer for both refrigeration and air conditioning within the company. Lewis also works alone carrying out service, repair, and maintenance of refrigeration and air conditioning systems with his technical ability and confidence continuing to grow. He is regularly put into the position where he has to think on his feet and he possesses a positive attitude whilst remaining calm under pressure to complete the work in a timely and professional manner. Lewis has shown the kind of initiative and confidence which is necessary to become a fully-fledged refrigeration and air conditioning engineer."

Senior Engineer Alan Hoy described Lewis as "a great asset to Allcool and the air conditioning and refrigeration industry in general", while Jayne Stefani, General Manager (Service) added: "Lewis is a pleasure to have on the service team and is keen and eager to learn and grow in his role."

Ian Cross, of Practical Refrigeration Training Centre, said: "Lewis is a very driven and extremely capable engineer. Whilst undertaking his diploma, he consistently worked to a high level and was exceptionally self-motivated, staying behind after class to further his understanding and get the most out of his learning. Throughout his time with us, Lewis was always a very pleasant and affable member of the class. He could be relied on to complete work to a high standard individually and as part of a team. He actively encouraged other learners throughout their training, taking the initiative to help his peers and foster a supportive working environment."

Silver: Corey Surtees-Smith, J&E Hall

Bronze: Harry Gallagher, ACME Facilities Group

Heat Pump Engineer

Gold: Jordan Guy, GEA HRT

Since beginning his apprenticeship in 2020, Jordan Guy has never looked back. His learning journey has covered many areas of the industry and it is partly that variety that has developed his passion for his career.

Jordan, who studied at Grimsby Institute of Further & Higher Education, said: "One project that really stands out was the opportunity to work on the Gateshead Mine Water Heat Pump. It is a pioneering project, with sustainability at its very heart, something that I am keen to learn more about. While I wasn't involved in the design process for the project, I did form part of the team responsible for installation, testing and commissioning. My eyes have been opened by this project to the endless possibilities available to us as an industry if we consider more wholly the complete process, allowing heating and cooling demands to be balanced, reducing waste, and drastically reducing the energy spent to cool a process or area."

Colleague Lisa-Jayne Cook, who made the nomination, said: "Jordan is an absolute credit to GEA HRT. He always takes pride in his work, ensuring that procedures are followed correctly and that any actions are recorded and reported to the relevant parties. He is always well turned out, punctual, polite, arrives with a positive attitude and a drive to ensure the task at hand is completed with a satisfactory outcome for both GEA and our clients. Jordan is, to put it simply, an ambassador for GEA HRT, constantly ensuring our reputation as the best in industry is maintained. I am proud to work with him and cannot wait to see where the industry will take him next (although I hope he will stay with us at GEA for a long time to come)."

ACR Installation Engineer

Gold: Harvey Talarczyk, Allcool NW

Harvey Talarczyk decided to follow both his father and grandfather into the refrigeration and air conditioning industry. Colleagues and customers who supported his nomination for this award are in no doubt he made the right choice.

Allcool NW Technical Director Robert Acton said: "Harvey has always shown a willingness to learn and better himself and has grasped the industry and his chosen career with both hands, which in my opinion is a fundamental requirement for the young men and women entering our industry. Harvey is quickly becoming one of the "go-to" engineers at Allcool. He has the patience to deal with new apprentices coming through the system and has also been known to give up his own personal time to help colleagues when they have asked for help."

Senior Engineer Alan Hoy added: "He has excelled in training and has carried out offshore maintenance and service on various platforms, achieving accreditations for this job type. His refrigerant handling and Health & Safety understanding is excellent and offers assurance when I am assigning him his jobs, alongside the ability to put across his knowledge to the younger apprentices in a pleasant and encouraging manner."

Among the customer testimonials supplied was the following from Daniel Jones, of Alan Jones Chartered Surveyors in Blackpool: "I wanted to give you some feedback on Harvey Talarczyk who has recently completed two projects for me. The sites in question, Royal Lytham & St Annes Golf Club and Easthams Solicitors, both required extremely punctual and professional contractors, on site at all times and Harvey displayed these key skills. I was also absolutely delighted with the level of knowledge, service and professionalism that Harvey displayed during meetings with myself, clients and the feedback from site was also extremely positive and this reflects well on my own practice."

Silver: Adam Tweedle, Demeva Refrigeration
Bronze: Mckenzie Firth, LAC AC

Sales & Support Services

Gold: Claryhs Radford, Beijer Ref UK & Ireland

As a Trainee Sales Engineer with MHI Projects, Clarhys Radford has recently been involved in a number of significant projects.

These include multiple sites for Lidl alongside contractor HAS Electrical, where she worked with the technical team as well as the local branch of wholesaler HRP to make sure all deliveries meet schedule.

She has also worked on a large AC project with contractor Summit Mechanical Services for a office refurbishment with a 3-pipe VRF system feeding individual office spaces for different tenants. The design consisted of 26 outdoor units feeding 108 indoor units which are made up of a mixture of compact and standard cassettes, and wall-mounted units. James Harding and Kris Bourne, Directors at Summit Mechanical Services, said: "We have been dealing directly with Claryhs for the last three years or so. She manages our chaotic jobs and schedules professionally and promptly and with a smile. Any issues that arise, Claryhs is quick to respond with answers, and on the occasions she isn't sure Claryhs will be honest with you and come back with the correct answer quickly. We have total confidence and trust in Claryhs."

Claryhs recently completed a case study with contractor DBS Group on another office refurbishment in Guilford. She assisted with the design for a 3-pipe system feeding two floors for a travel company, to allow them to have simultaneous comfort cooling and heating. Josh White, Project Manager at DBS Group, said: "I have found working with MHI very good. Claryhs and the internal team are incredibly helpful and they always come back with the best solution for any technical query. We would definitely use them again and recommend."

Silver: Sam Jones, SURE Solutions
Bronze: Jessica Long, SURE Solutions

Project Engineer

Gold: Megan Bradley, Vital Energi

Since joining Vital Energi, Megan Bradley has established herself as an instrumental member of the electrical design team and the lead on the production of essential documentation for installations.

Her employers say her work writing software for programmable logic controllers for refrigeration plant, with some heat recovery, has been far beyond the level they would expect from an apprentice. Her role has extended to pick up any errors being generated, work on improved programming and ensure KPIs are met. Additionally, She is involved in testing the products before they are sent to site, making necessary corrections and working with multiple departments.

Head of Construction Gary McKiernan said : "It is with great satisfaction that I reflect upon our decision to bring Meg on board at Vital. Since joining the team, Meg's contributions have been invaluable and she has swiftly established herself as an integral part of our organisation. I am excited to witness Meg's continued growth and development within our company. With her talent, motivation, and commitment, there is no doubt that she will make significant strides in her career and contribute significantly to the success of Vital Energi."

In a glowing customer testimonial, Tom Marshall, Technical Director at JD Cooling, said: "Meg has brought great value to this project; she has been incredibly helpful and proactive in making sure everything is correct and operating as required. Meg is always available to support us with the project and help with any issues with the electrical design and the controller software. She approaches problems with a positive attitude and goes above and beyond to help solve and correct the issue, viewing it as an opportunity to learn and improve. She has been an absolute delight to work with and I expect her to have a bright future in the industry."

Silver: Caitlan (Cat) Earle, WAVE Refrigeration

The ACR & Heat Pump Trainee of the Year Awards are made possible due to the generous support of headline sponsor MHI.

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Heat Pumps alone are not a magic bullet for school net zero

The race is on to decarbonise heating in schools across the country. Rob Smelt, of low carbon consultancy BREng, highlights the challenge and opportunities this presents, and the role heat pumps will play in combination with other renewable technologies.

There are 32,226 schools in the UK, including around 4,000 secondary schools. Add the UK's 142 universities – in themselves effectively small towns, and circa 400 Further Education colleges, and the national education estate amounts to a very substantial and diverse network of multi-use buildings, with complex HVAC requirements.

In terms of energy use, the scale of consumption across the education sector is very significant. Total annual energy consumption by education buildings is estimated to be a staggering 11,378 million kWh of energy, equivalent to 25% of total public sector energy use.

The requirement to decarbonise school buildings poses a major challenge for the sector. It will require every establishment to come up with a plan to achieve net zero carbon emissions within a defined timetable.

The national UK target of 2050 mandated in law is somewhat misleading, as some local authorities have adopted much faster net zero deadlines for public buildings in their areas.

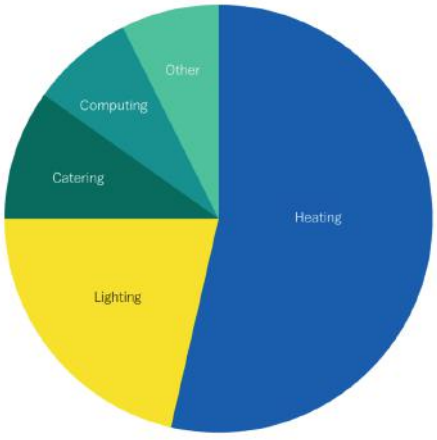
For example; major cities such as London, Birmingham and Bristol have set a target to be net zero by 2030. Manchester has a target of 2038.

Rob Smelt, BREng

Plans need to be put in place now

In practice, therefore, education estate managers should be putting plans in place now to map out their route to net zero.

Unfortunately, due to the diversity of school building types, usage patterns and existing energy systems, it is not possible to apply a single template to deliver net zero. No one model could possibly cover the complex reality on the ground.



Breakdown of Energy use in the average school

BREng carried out a phased decarbonisation project at Kepier School

It requires a school-by-school approach. This starts with a detailed survey of existing HVAC infrastructure, taking into account the specifics of building fabric, insulation, glazing, orientation, design and lay-out – down to heating provision and occupancy levels of individual spaces at the classroom level.

Impossible to ignore

Heat pumps have been held up as a major technology solution in the effort to decarbonise heating, and rightly so. From a thermodynamic perspective, the fundamental efficiency of heat pumps is impossible to ignore.

Their ability to harvest low grade heat energy from the environment and upgrade it into a useful form to heat and cool buildings gives them a big advantage over alternatives.

While the most efficient forms of gas heating approach Coefficients of Performance (COPs) of less than one, modern heat pumps can achieve COPs many times this. As a result, heat pumps can generate several times more energy than they consume, far outstripping rival approaches.

This, coupled with the fact they are proven technology, sets heat pumps apart among competing low carbon solutions, and means they will have a huge role to play in helping schools on the journey to net zero.

As well as helping to reduce carbon emissions for individual buildings, heat pumps have an important part to play in

reducing emissions through their use in distributed heat networks.

This is particularly relevant for larger education estates, such as universities and colleges, where the combined heating requirements are greater and economies of scale deliver the highest savings.

Challenges with occupation

In terms of public buildings, schools are unusual in being occupied for only part of the year. In term time, usage is very intense, with high occupancy density. During holidays, occupancy falls dramatically, in many cases to zero. This presents schools with both challenges and opportunities for achieving net zero carbon.

High occupancy and intense usage during term time requires suitably powered HVAC systems to cater for heating, cooling and ventilation requirements.

Adequate heating capacity is particularly important to ensure comfortable conditions at the start of the day. However, due to the high-density occupancy, particularly in classrooms and high-use corridors, heating demand can fall rapidly due to the thermal contribution of pupils to the space.

This requires careful control of individual rooms to ensure the natural heat gain that occurs throughout the day in classrooms is taken account of, and heating inputs managed accordingly.

Combined with other technologies

As efficient as heat pumps are, the reality is that they are not sufficient on their own to deliver net zero for most schools. They must be used in combination with other technologies.

Having carried out detailed HVAC and energy surveys of scores of schools, for the reasons outlined above it is clear that the precise solution will be different in almost every case. It is likely to involve a mix of heat pumps, solar PV, LED lighting, upgraded heat emitters, insulation and high efficiency ventilation.

Use of photovoltaic panels is particularly attractive in combination with heat pumps. Firstly, they provide an additional source of renewable energy to supplement that generated by heat pumps, helping to further reduce use of primary high-carbon electricity.

Secondly, as schools are not occupied for significant periods of time, particularly during the summer when solar energy is greatest, the surplus power produced can be returned to the grid to offset primary electricity used when the school is occupied.

Heat emitters were upgraded to be future-ready for installation of heat pumps

Additional power

Thirdly, PV systems contribute helpful additional electrical power, which can be valuable for schools with limited power headroom, stretched by the higher power demand from installing heat pumps. This may help overcome the need to invest in upgrading power supplies, which can be a significant additional capital cost.

Lighting is another area where worthwhile gains can be made. Lighting represents around 8% of schools' energy use, and 20% of their energy costs. Upgrading to modern LED lighting reduces electricity use by around 80%, compared with traditional technology, contributing a useful saving in the overall energy budget.

Heat pumps in combination with PV systems and LED lighting can deliver very significant reductions in school carbon emissions. To fully optimise buildings, however, it often requires fine tuning HVAC systems with upgraded heat emitters, improved insulation and the use of modern monitoring and control systems.

BREng school decarbonisation case studies

No single magic bullets

While this is the main palette of technology options, it is important to stress that there isn't a single magic bullet to deliver net zero. Schools are complex estates, with diverse designs, legacy technologies and usage patterns.

This requires each site to be approached afresh, and the challenges and opportunities for achieving net zero assessed with an open mind in the light of the specifics, in each case.

Once a solution has been designed, installed and commissioned, the process doesn't stop there. In our experience, there are often significant additional gains that can be made by optimising the system in the light of how it operates in practice.

Following the completion of a number of school decarbonisation projects over the past couple of years, we are now working with schools on fine-tuning systems – to further reduce energy bills, cut carbon, and ensure pupils and staff benefit from the most comfortable and productive environment possible.

With 30,000 plus schools requiring decarbonisation, this is going to require a huge national effort. When considered alongside the wider challenge of decarbonising all public and private sector buildings, it is truly an epic undertaking.

The key is starting now, and making use of the valuable lessons learned by the early adopters pioneering on the net zero frontier.

Building the future of cardiac care with the help of Heat Pumps

By Zac Thomson, Greenway Building Services Consultants

In the heart of Warwickshire, nestled within the busy confines of Warwick Hospital, a cutting-edge project emerged. This ambitious venture, which has brought together innovation and engineering excellence, aims to redefine the way cardiac facilities are imagined. Meet the £3,000,000 Catheterisation Laboratory, a testament to the invaluable contribution of Greenway and Partners Ltd, a small mechanical and electrical consultancy based in Leamington Spa.

A Vision of Excellence: The Warwick Catheterisation Laboratory

The project was conceived with a clear mission - to create a state-of-the-art facility that would allow medical professionals to perform complex cardiac procedures while ensuring minimal environmental impact. The client aspired to upgrade their cardiac care facilities, space constraints and the uninterrupted operation of the hospital posed significant challenges.

The consultants were entrusted with the task of designing and implementing the mechanical and electrical systems for this pioneering project, and they rose to the occasion with exceptional engineering expertise.

Sustainable Solutions: Heating and Cooling with Renewable Energy

One of the standout features of this laboratory is its commitment to sustainability. To ensure that the facility is powered solely by renewable sources and free from fossil fuels, it was agreed that the solution for heating was heat pumps. Four heat pump units were installed to deliver heating to the ward area, ancillary rooms, and the catheterisation laboratory. These systems employed radiant panels for efficient heat distribution and heating coils

Zac Thomson, Director

on the air handling unit to meet the HVAC requirements of an operating theatre.

The team didn't stop there in their quest for sustainable energy solutions. Domestic hot water needs were addressed by a separate heat pump/calorifer installation, meticulously designed by the team, which further reduced the environmental footprint of the facility.

Cooling for the laboratory was achieved via DX cooling coils on the air handling unit, as the site lacked the space and infrastructure for traditional chilled water plants. This creative cooling solution not only met the stringent requirements of the laboratory but also demonstrated the ability to overcome site-specific challenges.

Ensuring Continuous Operation: Redundancy and Power Supply

Recognising the critical nature of the facility, the team took it a step further by implementing a separate project to guarantee uninterrupted operation. A new transformer, generator, and LV switch panel were installed nearby, allowing the entire project to have a secondary power supply. This redundancy extended to the heating and hot water systems, ensuring the facility could continue to serve patients even during power outages.

Precision Engineering: UPS and Isolating Transformer Installation

This particular project demanded the highest level of redundancy for the medical and imaging equipment, making it essential to have a robust power backup system. The team of engineers designed a UPS (Uninterruptible Power Supply) and isolating transformer installation. This provided a fail-safe mechanism to maintain power to the laboratory even during unforeseen electrical interruptions, safeguarding the integrity of critical medical procedures.

Throughout the project's development the M&E engineers collaborated closely with imaging specialists, the client, architects, and contractors, ensuring a seamless integration of all systems for optimal outcomes. This meticulous coordination resulted in a cardiac care facility that's not only technologically advanced but also a testament to the power of teamwork.

A New Era in Cardiac Care at Warwick

The high-tech project is now operational, providing a much needed facility in the area. Thanks to the dedication, expertise, and innovative solutions provided by the team, this state-of-the-art facility has paved the way for a new era in cardiac procedures at this hospital. It's a testament to what can be achieved when engineering and medicine join hands to transform lives and raise the bar for healthcare.

Info
www.greenwaysbsc.com

Product focus: Thermox DTX Thermal Fluid

Hydratech have been formulating and manufacturing heat transfer fluids, glycol formulations, antifreeze solutions, corrosion inhibitors, water treatment and conditioning chemicals to protect cooling and heating systems for over 25 years.

In 2010 Hydratech launched Thermox DTX, a pioneering non-toxic heat pump thermal fluid formulated to improve system efficiency, save energy, and provide comprehensive system and component protection.

Commissioned in thousands of commercial and domestic heat pump systems, the high efficiency heat transfer fluid – via a patented the DeTox™ additive - utilises the advantages ethylene glycol has over propylene glycol, whilst delivering a non-toxic solution.

Key benefits of Thermox DTX over traditional propylene glycol based fluids include:

- More efficient heat transfer
- Easier to pump, especially at low temperatures
- Less volume for the same freeze protection
- Cheaper per litre

Specified by the UK's largest heat pump contractors, installers and designers, including Kensa, Nu-Heat and Ideal, Thermox DTX is formulated with multi-metal and multi-function inhibitors, to protect heat pump pipework and system components from internal corrosion, scaling and biological fouling. Classified as non-toxic and food-safe, the Hydratech product is readily biodegradable (90% over ten days) and will not remain in the environment or bio-accumulate.

Thermox DTX: at the heart of the UK's leading heat pump projects

Hydratech are committed to helping the UK achieve zero emissions by 2050. A recent collaboration saw Hydratech work as technical partners on a turn-key heat pump project, capable of producing 12% of the UK's tomatoes. Low Carbon Farming's mega-greenhouse projects in Norfolk and Suffolk, a world-first for renewable heating has 70 acres of greenhouse growing space - five times more glass than the Shard, and over 10km of underground pipeline. Utilising Thermox DTX fluid technology, the carbon footprint of the food produced at the sites is expected to be 75% lower than equivalent European greenhouses, and 10 times more productive than field farming. Other projects benefitting from DTX technology include Scotland's new national energy and sport centre, Rolls Royce's on-site CHP at their primary manufacturing plant, and numerous council *renewable housing schemes.*

Thermox DTX Properties

Non-Toxic: Tested and classified as Non-Toxic by an EPA certified laboratory.

Optimum Flow: Thermox DTX has improved heat transfer characteristics. Including lower dynamic viscosity and higher thermal conductivity.

System protection: Thermox DTX contains synergistic corrosion inhibitors to protect metals commonly found in such systems. It has been independently tested and found to meet BS6580 and ASTM D1384 corrosion standards. Thermox DTX also contains scale and biological inhibitors to help prevent fouling – thus promoting long operational life and high thermal efficiency.

Frost protection: -50°C depending on concentration.

Biodegradability: Thermox DTX mixtures are readily biodegradable (90% over ten days) and will not remain in the environment or bioaccumulate.

Working with you

For over 25 years, Hydratech have been assisting the renewables industry with fluid selection - utilising over 150 years combined experience in all aspects of heating applications. Whether your priority is cost, thermal efficiency, environmental impact, toxicity, corrosion resistance or a combination of all these, Hydratech has a fluid to suit.

For more information on Thermox DTX, specialist technical advice and factory direct pricing call Hydratech's Sales Engineers:
Call **01792 586800** or email **info@hydratech.co.uk**

Thermox DTX
www.hydratech.co.uk

Air Source Heat Pumps – A reality check?

By Glen Greenbank F.Inst.R. Practical Refrigeration Training Centre Ltd

Air Source Heat Pumps have become increasingly widely used and adopted by governments as the solution to achieving all things 'green' but is all as it seems? To examine in more detail some of the issues which tend to be conveniently forgotten a rather different picture may emerge:

1. Are they to be used for heating/cooling or purely for heating? To achieve optimum performance the installation of the outdoor unit is different depending on the intended use.

2. As a small island surrounded by water and with the prevailing weather coming off the Atlantic, we suffer from a constant humidity. When operating between ambient temperatures of +10°C to -10°C the outdoor unit will build ice which will reduce its efficiency. There are very few days when we experience low humidity in this country.

3. The lower the ambient air temperature the less efficient the system as the refrigerant must boil off at a lower temperature to get the heat into it. This in turn increases the operating envelope of the system, using more power at the compressor and increasing the running costs – at a time when electricity is the most expensive power source.

4. There is also a potential issue with the 'Noise Abatement' law which means that at night the unit should not exceed 34 dBA when the unit will be working at maximum to maintain house temperatures. To reduce the noise level the unit will either have to be switched off altogether or run at a minimum to keep it below the 34 dBA and avoid possible problems.

Glen Greenbank F.Inst.R.

5. Conversion costs for most homes will greatly exceed the government grant and on top of this, a separate hot water system will be required. This is also in view of the government's accepted scenario that most of the existing housing is not suitable for heat pump conversion anyway.

6. Many systems are being installed by people who have not received sufficient training in how a heat pump works so the system is not fitted to achieve maximum efficiency leading to even higher running costs since the average run time will be about 18 hours a day.

7. A standard (ie no special coating and copper fins) air source heat pump fitted in a coastal area will have a much shortened life due to the corrosive effects of the salt.

8. The real issue that has been ignored and will prove an expensive cost to the homeowner within a relatively short time, is that all the systems fitted now but containing R32 refrigerant will need replacing in under ten years because the 'F Gas' refrigerants are being phased out by 2030 and this equipment is not suitable electrically to be retrofitted due to the flammability of the replacement natural refrigerant alternatives.

9. The other consideration which is yet to be tackled is that of the electrical supply system. The grid simply will not be able to cope with the increased load which would be placed on it with neither the infrastructure under the streets nor the substations designed to take the greatly increased load.

It has to be questioned as to how many MPs have actually looked at all the issues and spoken to industry before implementing this massive change, or is it to become another HS2 white elephant at the public expense?

It could also be speculated as to how many of the MPs themselves, or government buildings, have adopted heat pumps or whether this is just a programme to be forced on the long-suffering general public at a time when resources are already stretched to breaking point. No-one would deny that we have to find sustainable long-term solutions to the energy crisis, but it is crucial that the options are researched thoroughly before being actioned and all the options are explored not just the obvious favourite of the day.

Joining forces with Social Enterprise to support Innovative Traineeship

Samsung Climate Solutions join forces with Your Energy Your Way to address shortage of labour in low carbon heating by recruiting diverse workforce of technicians

Samsung Climate Solutions has joined forces with social enterprise Your Energy Your Way (YEYW), to back the launch of their innovative Trainee Scheme which is designed to help boost the number of trained low carbon heating installers in the UK.

Given the timely increase of the Boiler Upgrade Scheme Grant to £7,500 and the urgency within the industry to move forward with decarbonisation of heating, as heating our homes accounts for roughly 14% of UK emissions, it's more important now than ever to create the necessary skills infrastructure to cater to growing consumer take up of heat pumps.

The scheme is designed to help close the skills gap by attracting a more diverse pool of technicians into the profession, especially women. By providing more supportive learning environments and access to a range of role models the hope is this new traineeship will forge an alternative path for those wanting to re-train or enter the industry.

The trainees were welcomed to Samsung House and Training Centre in Chertsey for an induction day to kick off their traineeship, learning about the industry as a whole and Samsung's experience within it.

At the event, Leah Robson, Managing Director of Your Energy Your Way, said of the traineeship: "My personal experience is one of becoming an accidental expert in the low carbon heating installation business. Over the past 10 years, assisting with and then running my own firm has taught me more than any MBA or College course ever could. We wanted to create a course that trained you to install high-quality integrated low carbon heating solutions, drawing on electrical, plumbing, technical, design, software, sales and customer service skills."

Support

The recruitment of the trainees was supported by Greenworkx, a recruitment company that focuses on jobs in sustainable and low carbon energy. Through a staged process of applications, interviews and a final assessment day with a range of tasks at the City Plumbing Training Centre, three successful applicants have been selected.

Leah added: "We think we have found a solution, by designing a training programme that is rooted in real world experience, combined with payment of the Living Wage to bring new entrants of all ages and backgrounds into the industry. And we are very, very excited to be launching the traineeship today with our first trainees."

Samsung will provide training, support, and product awareness to all of the trainees as well as fulfil an important mentorship role. With a two year commitment of learning on the job, and formal training via BetaTeach's Learning Experience Platform, trainees will develop their skills in the installation of heat pumps and solar panels, and learn from the Your Energy Your Way team across installation, customer service and maintenance.

Aimee Holloran, Heating Business Development, Samsung Climate Solutions commented: "This is such an exciting time to be in the low carbon heating business and we need to do all we can to attract more diverse new talent for the future of the industry. I am personally very proud to be a part of this scheme as a mentor to one of the trainees, and fully support Leah in her important mission to help close the skills gap. Samsung Climate Solutions has worked with Leah for nearly ten years, and we hope that by supporting these trainees through their journey on this pilot scheme, we can encourage more people to upskill in low carbon heating as the UK works towards hitting its decarbonisation targets."

Assessment

At the end of the course, the trainees will be peer assessed by Your Energy Your Way staff and other recognised industry professionals to confirm that they are industry ready.

"For me, on-the-job learning programmes give people a skill for life, like did they did for me, and it's always something you can fall back on. We can't wait for the trainees to hit the ground running and support them on their career journey," added Aimee.

Info
www.samsung-climatesolutions.com/en-gb/b2b/professionals/Training.html

The case for the Hydrosplit Heat Pump

Viessmann's Product Manager Hugh Jones takes a look at why hydrosplit heat pumps are less common in the UK than parts of Europe, and if that's about to change.

Installers have a crucial role to play in guiding clients to the best solution to suit their brief and budget. A heat pump is a long-term investment and it's essential to get it right. This is particularly important given how new heat pump technology is to most UK consumers. As a nation, we have yet to make the mental shift away from gas-fired combi boilers to renewable heating systems. Understanding how heat pumps work is like learning a new language; until you're proficient, you need an interpreter.

To split or not to split?

One of the important decisions to make early on is whether to go for a monobloc, with an enclosed refrigerant circuit in the outdoor unit (ODU) and only water pipes connecting the ODU to an indoor water cylinder and the rest of the heating system, or a split heat pump, with two refrigerant pipes connecting the ODU to an indoor unit (IDU).

As monobloc heat pumps don't require refrigerant piping, they are quicker and easier to install, while also removing the risk of refrigerant leaking into the house. On the other hand, with a separate indoor unit, split heat pumps need less room outside, which can be handy for properties with small gardens. Furthermore, as only refrigerant is piped between the outdoor and indoor units, there is no risk of freezing water pipes in winter.

Hugh Jones, Viessmann's Product Manger

Best of both worlds

Hydrosplit is a third option which, although popular in Germany and Belgium, is still less common in the UK, despite offering some compelling additional advantages.

Hydrosplit heat pumps are a form of monobloc, as the refrigerant circuit is contained within the ODU. However, like a split heat pump, they also incorporate an IDU which manages the building's hydraulic heating system.

As all the components such as pump, three-way valve, expansion vessel, control unit and electric flow and back-up heaters are contained within the indoor unit, there is no need to install these separately with a hydrosplit. Even a defrost buffer and/or water cylinder can sometimes be integrated.

This makes for a much quicker and simpler installation, saving around 90 minutes compared to heat pumps with separate components. Furthermore, it's more reliable as the components are perfectly matched, assembled and tested on a production line and the entire

system is covered by the manufacturer's warranty. If an engineer does need to visit, everything is easy to find and accessible in one place, so it's quicker and more convenient for both the installer and the customer.

Having everything inside a sleek and well-designed box is also more aesthetically pleasing than the alternative, which is usually a water cylinder with all the necessary equipment and peripheries attached to it, looking unsightly.

For these reasons and as a German heating systems manufacturer, the majority of Viessmann's domestic heat pump range is hydrosplit.

Question of space

Given all these benefits, plus the fact that hydrosplit heat pumps cost around the same as other types – or even slightly less when the installation savings are factored in – one could be forgiven for asking why they aren't more popular in the UK?

It usually comes down to internal space. Unlike many continental properties, UK homes don't normally have the luxury of a basement. In smaller houses, where every inch of space is at a premium, it can be simply impossible to find a suitable location for a floor-standing appliance or wall-mounted unit and separate water cylinder. Adding components individually in different locations, as with a split heat pump, provides more flexibility for installers to fit them into irregular spaces, albeit at the cost of a neat appearance.

This situation may change over time, especially after 2025 when new build properties are designed with heat pumps in mind and if the benefits of the hydrosplit approach are more widely understood. If space allows, a hydrosplit heat pump is almost always the better solution, which is why manufacturers are increasingly introducing them into their UK product ranges.

Whenever HVACR professionals have influence over building design, we believe they should steer architects down the hydrosplit route. This is particularly true in the case of larger housing developments, where ease of installation becomes a highly significant advantage when multiplied hundreds of times. But even in the case of single retrofits, a hydrosplit will offer significant advantages for homeowners.

Don't skip the (defrost) buffer

Whether you're opting for a monobloc, split or hydrosplit, you should include a defrost buffer vessel in most cases. Some manufacturers are not explicit in specifying this, however, meaning people don't always put them in. This can lead to major headaches.

Buffer vessels serve two purposes which is why they are important. Firstly, in cold conditions water from the (defrost) buffer, which is at the same temperature as the water in the heating system, is used to keep the ODU from freezing. To avoid the need for a defrost buffer vessel, there is a minimum water volume requirement within the system itself, which depends on factors like the heat pump's capacity, the outdoor temperature, and the system design. While a system with a high water volume, such as in the case of underfloor heating, may not need a separate buffer vessel, it will almost certainly be needed with a radiator system.

The second function of the buffer is to prevent the heat pump turning itself on/off too quickly when the weather is slightly warmer around the beginning and end of the heating season. In the spring and autumn, there is a risk that the heat pump will be continuously stopping and starting in response to changes in temperature. The buffer vessel stops this from happening because the water in it absorbs heat from the system, thereby extending the system's run time by around 15-40 minutes, depending on the size of the vessel. This is important not only because cycling through frequent stops and starts is less efficient, but also because the life span of a compressor is determined by the number of times it starts, not by the length of time it runs. This means that a buffer vessel can significantly extend the life of your heat pump.

Lack of indoor space can be a factor in deciding to omit a buffer vessel from a heat pump system. But if you opt for a hydrosplit system with an integrated buffer such as Viessmann's Vitocal 150-A or 151-A, the problem of finding that extra installation space is avoided.

Baxi unveils commercial Heat Pump facility and technology

By David Crowson, Digital Editor, Heat Pumps Today

In August, Heat Pumps Today was invited to take a closer look at Baxi's new range of high temperature air source heat pumps at their €13 million commercial heat pump R&D and laboratory site in Vilafranca del Penedès, Spain.

The 7,000m² Baxi facility, located near Barcelona and opened just last year, is focused on developing and producing commercial heat pump technology. The site boasts complete in-house capabilities spanning R&D, logistics, manufacturing and assembly, and including climatic testing chambers and a controls desk.

During the visit, we were provided with an exclusive preview of the new Remeha Effenca commercial heat pump series that was designed and produced at Vilafranca and is currently undergoing final testing. The new range, which includes high temperature R290 refrigerant air source heat pumps (ASHPs), will launch imminently in the UK with a full Environmental Product Declaration (EPD).

Harriet Evans, Renewables Director at Baxi said: "The focus on low carbon design is now critical in line with ambitious government decarbonisation targets. Heat pumps, which decarbonise heating at the point of use, are a big part of how we as a company are supporting our commercial and residential customers through the energy transition.

"We are proud to demonstrate our full in-house capabilities and competencies at Vilafranca, and of the wide expertise and support we have within the Group in this technology. We are excited to be expanding our Remeha ASHP range in the very near future with both medium and high temperature ASHPs – watch this space!"

In the UK, Baxi launched its first Remeha commercial heat pump in 2022. The company recently announced its latest commercial ASHP project, a collaboration with Oakes Energy Services to decarbonise a series of school swimming pool buildings for the Priory Federation of Academies Trust.

Heat pump production capacity at Vilafranca has scaled up by 50% in the last twelve months, with plans to triple in the next five years via new commercial heat pump solutions in development.

It was indeed a journey worth investing time in, and I look forward to seeing the Remeha Effenca commercial heat pump series being launched in the UK.

Info
www.baxi.co.uk

REHAU event puts retrofitting residential heat networks in the spotlight

Heat Pumps Today attended a recent REHAU Retrofit 23[1] event, where a panel of industry experts discussed retrofitting low-carbon technologies in residential projects, including district heating and heat.

The event took place at The Building Centre, it featured sessions by speakers including **Bean Beanland**, Director of Growth & External Affairs for the Heat Pump Federation; **Simon Eddleston**, Director of Construction at Switch2 Energy and **Steve Richmond**, Head of Marketing & Technical at REHAU.

Topics covered in the event, included how the new Government targets and current installation skills gaps would affect the adoption of district heating technologies. In all three presentations, the speakers looked to dispel myths surrounding heat networks and what buildings they can be deployed in.

Steve said: "I think the biggest step we as an industry have to take is demonstrating that district heating isn't an unproven concept, and this event is a key part of this. It's actually the opposite as there are low-carbon schemes going on in the UK all the time, whether that's fourth-generation or fifth-generation heat networks.

"There is a lot of interest in these schemes and as I said on the night, we just need to increase the supply chain and get more contractors involved in the sector. By doing so, we can help bring costs down further and get more district heating networks installed across the UK.

"There can be misconceptions on which buildings they can be used in, and that naturally impacts a second major topic that came up on the night – namely, how we turn fossil fuel district heating networks into low-carbon heat networks.

"What the event made clear is that the industry is seeing growing interest in the technology, with professionals often asking how to join existing community-led heat networks, and who they need to speak to. The reason we hold these sessions is to provide additional clarity in this important area, and I believe we achieved our goal."

To register your interest for future events, visit: **https://tinyurl.com/45y9jf36**

Bean Beanland, Director of Growth and External Affairs for the Heat Pump Federation

HPF HEAT PUMP FEDERATION

Panel expert Bean highlights and discusses key points from his session with us.

Heat Pumps in District Heating and Retrofit

Gay-Lussac's Law[2] states that the pressure of a given mass of gas varies directly with the absolute temperature of the gas. The principle is related to both Boyle's Law[3] and Charles's Law[4]. These three beautifully simple laws of physics underpin the gas refrigeration that makes possible the lives of convenience that we all enjoy. Imagine how different the daily routine would be if we all had to go to the farm for fresh milk each morning and if we couldn't enjoy the comfort of our air-conditioned offices and cars. Heat pump technologies are ubiquitous. In the modern vernacular, the fridge, the freezer, A/C, and even heat pump tumble dryers.

The range of heat pumps available on the market today is enormous, from those designed for highly insulated micro-apartments, at 1.5kW, through to the largest commercial units at up to 10MW. All these devices can be cascaded to deliver heating and cooling for massive industrial and community-wide systems.

A look at district heating systems

District heating systems are commonplace in many parts of Scandinavia and Europe. Many started out based on energy from waste, biomass or fossil fuel sources, but these are now being retrospectively converted to run on heat pump technologies as the high temperature output range increases through refrigerant and compressor innovation. Conventional chemical HFC refrigerants are destined to be phased out as the implications of high Global Warming (GWP) and Ozone Depleting (ODP) Potential are recognised. CO_2, Propane (R290) and ammonia (R717) all have an ODP of zero and ultra-low GWP of 3 or less. By comparison, R32, the current dominant HFC has a GWP of 675. The UK has a number of innovative, industry leading commercial heat pump manufacturers working with natural refrigerants which are increasingly demanded by climate conscious clients. These refrigerant developments are delivering viable economic solutions with flow temperatures up to 150°C, using any source, and combined with an increased ability to scavenge waste heat, this is bringing heat pump technologies to the fore in retrofit scenarios.

Carrier

DECARBONISING HEATING WITH HIGH TEMPERATURE HEAT PUMPS

61XWH

AQUAFORCE Heating

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AQUASNAP

61CWD

AQUAFORCE Heating

Renewable energy

Environmentally sustainable

Up to 120 °C

Financial incentives & low total cost of ownership

The other factor that has previously held back heat pump technologies has been the myth of incompatibility with conventional heat emitter systems. Low environmental impact, high flow temperatures and economic efficiencies, mean that retrofitting and decarbonising period and Listed buildings are now routinely possible. Many such historic structures are found at the heart of medical and educational campus sites where smaller and micro-district schemes are now finding a ready market, supported by government funding, previously under the Non-Domestic Renewable Heat Incentive[5] and latterly under the Public Sector Decarbonisation Scheme[6]. The National Trust and the Church of England are notable entities increasingly turning to heat pump technologies to decarbonise their estates and these high-profile exemplars are providing real encouragement to the communities that they serve. The concept of Bath Abbey as a low, and ultimately zero, carbon Grade I Listed building was unthinkable, but is now a reality, thanks to a water source heat pump system.

Whilst carbon dioxide is the problem for the climate, it is other emissions derived from burning fossil fuels for heat, NOx, SOx and particulates, which are so damaging to health. Urban air-quality will be the beneficiary as existing heat networks are progressively retrofitted with heat pump technologies, many of which are specifically designed to include the harvesting of waste heat. The Bunhill scheme in Islington captures waste heat from the London Tube system and heats homes, a school and two leisure centres. There is sufficient waste heat in London to heat nearly 800,000 homes, levels of profligacy with fossil fuels that we can no longer afford. Waste heat is all around us, from industry, power generation and water treatment. As emissions start to dominate the retrofitting of mechanical services at all scales, scavenging waste will be a huge part of the economics.

A significant element

In the retrofitting of existing district heating schemes and the development of completely new networks, a significant element will be the messaging to consumers. Essentially, most homes and commercial buildings are already on a network – we call it the gas grid, where premises each have their own “converter”, a boiler. A heat network isn’t that different, there is a communal energy carrier and each building has a different type of “converter”, be this an individual heat pump on an ambient loop system, or a heat interface unit (HIU) on a 4th generation network. The optimised heat pump network scheme for any given community will be down to a number of factors, including access to beneficial assets, such as a source of waste heat or a major river, and the analysis of the loads. The rate at which this transition is adopted will largely be driven by our ability to demonstrate benefit and security of comfort to consumers. If we get this right, the current government assumption, that 20% of UK homes will be on some sort of heat network by 2050, could be an underestimate.

This all sounds too good to be true, so why do fossil fuels continue to dominate in the UK?

Essentially, this is down to the tax regime and the existing market relationship between the wholesale price of gas and the wholesale price of electricity. The combined impact is historically high electricity costs, whilst the gas price does not attract anything like the scale of social and environmental levies. For a typical domestic dual fuel bill, less than 2% of the gas price derives from levies, whilst the levies on electricity still sit at around 22%. Under the current domestic price cap, electricity is nearly four times the price of gas, per kWh. Even with increasingly

efficient heat pump technologies, this presents a major obstacle leaving the UK at the bottom of the league in Europe for heat pump deployment per 1,000 households. For commercial customers, outside the protection of the OFGEM price caps the "spark gap", the price differential between gas and electricity, can be even more challenging.

But change is coming

In Powering Up Britain, the major policy release in March this year, government committed to the Review of Electricity Market Arrangements (REMA)[7] and to the rebalancing of the social and environmental levies. Both seem to have survived the Prime Minister's latest pronouncements, and both should result in lower electricity prices, commercially and domestically. As set out above, the harvesting of waste heat should also improve the economics of electrification using heat pumps. Local generation capacity, again at both commercial and domestic scale, effectively reduces the average cost of electricity. Finally, recognition of the value to be derived from matching demand to increasingly intermittent zero carbon generation from wind and solar PV is also coming to the markets in multiple ways. This "flexibility" again has enormous economic potential. The challenge is to optimise the balancing mechanisms and to fairly distribute the economic value to encourage participation at all levels. A report published by the Carbon Trust and Imperial College in May 2021 put a value of £16.7bn per annum on net savings from flexibility across all scenarios. This is serious money.

In conclusion

It was once said that the Stone Age did not end because we ran out of stone, and that the fossil fuel age will not end because we run out of oil and gas. All heat pump technologies draw primary energy from the sun, whether stored in air, the ground or water. As the stars of decarbonisation policy, technical innovation and consumer engagement with the energy systems of the future, start to align, so combustion for heat will eventually be consigned to the history books.

www.hpf.org.uk

In the next issue, we will hear from Simon Eddleston, who discussed retrofitting homes, in particular looking at district and communal heating technologies and the benefits to end-users as a result of their retrofit work.

Source

1. *www.buildingcentre.co.uk/whats_on/exhibitions/retrofit2023*
2. *https://en.wikipedia.org/wiki/Gay-Lussac%27s_law*
3. *https://en.wikipedia.org/wiki/Boyle%27s_law*
4. *https://en.wikipedia.org/wiki/Charles%27s_law*
5. *www.gov.uk/non-domestic-renewable-heat-incentive*
6. *www.gov.uk/government/collections/public-sector-decarbonisation-scheme*
7. *www.gov.uk/government/consultations/review-of-electricity-market-arrangements*

WOMEN IN THE HEAT PUMP INDUSTRY

Caring for the environment and looking for a practical hands-on job is what attracted Georgia to the sector. Interestingly, the traineeship Georgia is on is entirely made up of females. Read on to find out more about her wonderful journey.

GEORGIA'S JOURNEY AS A TRAINEE

How did you get into the heat pump industry?

I care a lot about the environment and have tried to do my bit to lower my carbon impact, just little things like recycling, using reusable products where I can and trying to reduce my energy consumption. I knew that heat pumps had a lower carbon impact than traditional gas boilers so I was interested in being part of this transition to lower carbon energy. I was also looking for a practical, hands-on job where I could do something different every day.

I got into the heat pump industry when I applied for the traineeship with Your Energy Your Way (YEYW). Seeing how YEYW supported women and diversity as a whole within the industry, encouraged me to apply. The trainee scheme that I am doing is made up entirely of females which has made YEYW workforce split 50/50 with men and women being equally represented.

On the first day of the traineeship, we had an induction day at Samsung's head offices and training centre where we met the team and my mentor on the scheme, Aimee who works on business development at Samsung and started out as a plumbing apprentice. This outside perspective is really helpful in developing my knowledge and confidence in the low carbon heating sector. It was really interesting to understand how the business works from meeting the product manager, training and marketing team. I'm looking forward to working together both on my development and raising awareness for the industry, particularly for women.

Charlotte Lee, first Chief Executive of the Heat Pump Association (HPA)

What was your first job?

My first job was working for a well-known pub chain as a waitress after school, after leaving this job I started work as a supermarket assistant in Waitrose, this job entailed completing a number of differing roles including shelf stacking, replacing point of sale signs, working on the tills, answering questions from customers in the store and directing them where to find things. I enjoyed engaging with the customers and found it rewarding helping them where I was able. The traineeship scheme is my first job in the low carbon heating industry and I'm really excited to start my career in this sector.

What does your current role involve?

My role currently involves a lot of listening, watching and learning about the work that Your Energy Your Way are doing day by day – installing heat pumps and solar PV systems. I am starting to get involved hands on with soldering, fitting solar panels on roofs and commissioning heat pumps, all under the supervision of the YEYW team.

I've been into Nesta's offices in London with Nathan Gambling at BetaTeach for our first learning sessions, which will happen every fortnight. This is great to get all of the trainees together, and we also have a portal on the app where we can share our experiences and learn from each other as we each have slightly different on-the-job experiences at the moment. For example, I recently fitted a heat pump sensor outside to detect weather conditions, and the others haven't done this yet, so I wrote up my learning and can now help the others with this.

What do you see as the challenges facing the industry?

Consumer awareness is a big thing, as many people are not aware about the benefits and efficiency of heat pumps. For instance, when I'm speaking to my family and friends about what I'm doing, they knew very little about heat pumps before so it's really interesting explaining to them what I'm learning. We really need to raise awareness about the advantages to encourage widespread adoption, especially as there are higher upfront costs compared to traditional gas boilers which can be an obstacle to heat pump adoption.

What would you say to other women who are considering coming into the heat pump industry?

First and foremost, believing in yourself is extremely important, as is having confidence in your abilities. Don't be discouraged by stereotypes or gender biases. As a woman in a traditionally male dominated field, you can be an advocate for diversity and inclusion, to encourage more women to join the industry and inspire others.

What do you like to do outside of work?

The main things I enjoy outside of work are; going on long dog walks with family or friends, I also love to travel, whether that be exploring parts of the UK with my friends, spending long weekends around Europe or travelling to new countries further afield. In April 2022, I travelled to Thailand and spent three months backpacking around the country with three friends. I also enjoy keeping fit and attend the gym regularly and have set myself the goal of hiking up Snowdon in 2024.

The Innovation Zone

The guide to what's new for Heat Pumps Today readers, offering vital industry news.
To advertise your product in 'The Innovation Zone' section please contact **hayleyc@warnersgroup.co.uk**

Samsung Climate Solutions are delighted to announce the full EHS Mono HT Quiet range (8kW, 12kW, 14kW) has achieved 65 degrees Celsius high temperature rating on MCS.

The 8kW (AE080BXYDEG/EU) tested at SCOP 2.82 at 65 degrees Celsius, the 12kW (AE120BXYDEG/EU) tested at SCOP 3.01 at 65 degrees Celsius, and the 14kW (AE140BXYDEG/EU) tested at SCOP 3.03 at 65 degrees Celsius.

Joseph Raftery, Heating Product Manager at Samsung Climate Solutions, "Since MCS have changed the threshold for heat pump listing, from 2.4 SCOP to 2.8 SCOP, this has made listing at 65 degrees extremely difficult to achieve. With the support of our fantastic R&D facilities, Samsung Climate Solutions rose to this challenge. This has resulted in a heat pump, the EHS Mono HT Quiet, that can deliver total performance down to minus 25 degrees ambient conditions, as well as high temperature capabilities, and of course, it's Samsung's quietest heat pump yet and Quiet Mark certified. We are truly proud of this amazing evolution in heat pump technology and performance."

For more information visit:

www.samsung-climatesolutions.com

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Innovative Heat Pump Connection Solutions

Watts Industries UK is known for developing innovative products and technologies. Built on our HVAC knowledge and expertise, our new heat pump connection solutions range offers a wide range of components designed to seamlessly integrate air-to-water heat pump systems with heating and hot water networks.

Our solutions facilitate straightforward heat pump installation and are suitable for both new build and retrofit projects and aim to maximise both energy efficiency in the system and provide building occupants with desired comfort levels.

From the specifically designed Microflex HP which enables fast installation of the heat pump away from properties to smart home systems, hydronic heating and balancing valves, customers can select the exact components to deliver a highly efficient heat pump system.

For more information about any of our heat pump products or for support with your heat pump project, please call us on:

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Carrier Launches Multiple Lines of Commercial High Temperature Heat Pumps Helping Customers Meet Decarbonisation Goals

Carrier has introduced a comprehensive new line of high temperature and very high temperature heat pumps for use in industrial, commercial and public buildings and district heating. Carrier is a part of Carrier Global Corporation (NYSE: CARR), global leader in intelligent climate and energy solutions.

Designed to reduce both carbon emissions and energy costs, the new line consists of AquaForce® and AquaSnap® air and water source heat pumps with varying capacities from 30 to 735 kW and water temperatures from 82 to 120 deg C with low global warming potential (GWP) hydrofluoroolefin refrigerants. The high temperatures enable the heat pumps to replace fossil fuel boilers in heating applications such as apartment blocks and residential estates, commercial buildings, food manufacturing, industrial drying, biogas production and chemical plants. These innovative products support Carrier's 2030 Environmental, Social & Governance (ESG) goal of reducing its customers' carbon footprint by more than 1 gigaton.
In addition to harnessing heat from ambient air and the ground, the heat pumps capture wasted heat from a wide range of sources, including data centres, leisure facilities, hotels and restaurants, process water, flue gases and sewage systems. Heat collected can be used for comfort heating and domestic hot water production in large buildings and facilities. The heat pumps can also be applied in industrial applications, and in district and local heating networks where high temperatures or very high temperatures are required.

The units come ready to connect to Abound, Carrier's cloud-based digital platform that enables real-time, intelligent outcome-based results that make buildings more efficient and responsive. To minimise operating costs, users can opt for one of Carrier's BluEdge® service options to keep heat pumps operating at peak performance and efficiency throughout their lifecycle. This leads to predictive maintenance rather than preventive maintenance, saving time and money.

For more information visit

www.carrier.com/carrier/en/worldwide/

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Ask ME* about decarbonising heating

*Graham Jones, Customer Service Manager

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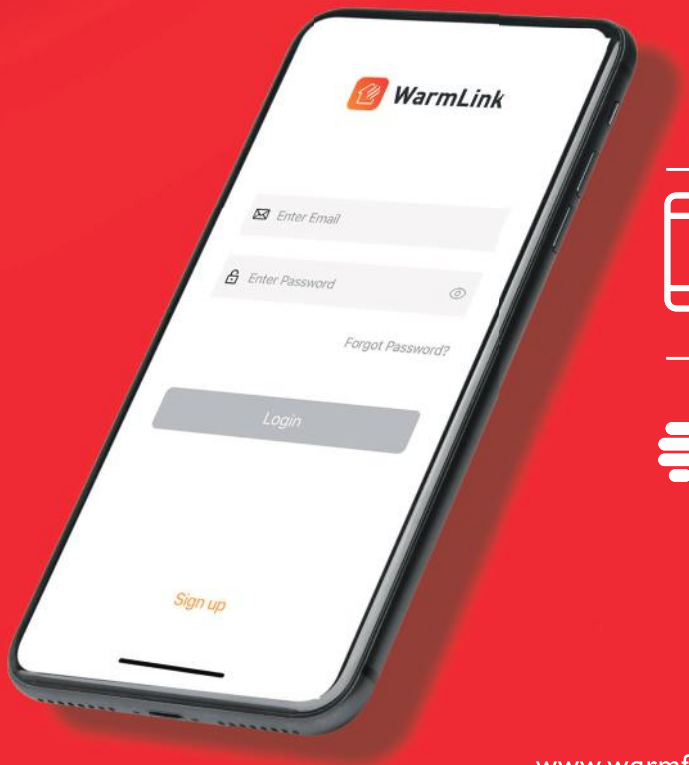

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